Real Time Water Quality Report
Aur Resources: Duck Pond Mine
Deployment Period 2007-08-07 to 2007-09-21

General

- The Water Resources Management Division's (WRMD) staff monitors the real-time web page on a daily basis. Any unusual observations are investigated, with site visits being carried our as warranted.
- Management at Aur Resources are informed of any significant water quality events or instrumentation problems by WRMD.
- The Tributary to Gills Pond Brook Station is located 1700 m downstream of the final discharge point for the mine's Polishing Pond. This station is located such that any impacts from the mine discharge on receiving waters can be measured. East Pond Brook Station is located several kilometres downstream of the Tailings Management Area. This station is located such that any surface water impacts from the Tailing Management Area via seepage through Dam A can be measured. A groundwater station with the designation "Monitoring Well after Tailings Dam A," has been established immediately downstream from tailings Dam A, in an attempt to capture any changes in groundwater quality due to seepage from the tailings pond into the groundwater table.
- Raw (uncorrected) data has been used in the preparation of the graphs and subsequent discussion below.

Maintenance and Calibration of Instrumentation

- Following regular cleaning and calibration of the Datasondes, the instruments were installed in both the Tributary to Gills Pond Brook and East Pond Brook, on August 7, 2007 and remained deployed until September 21, 2007 (45-day deployment).
- The Quanta G monitoring probe was installed at the groundwater station (Well after Tailings Dam A) on June 27, and remained deployed until September 27, 2008.
- *In-situ* measurements of ambient water quality were undertaken with a freshly calibrated Minisonde each time a Datasonde was installed or removed. In-situ measurements were also taken in the groundwater well with a Minisonde, when the Quanta A was installed on June 27 and removed on September 27, 2008.
- The comparative results between the Minisonde and Datasonde values at the beginning and end of the deployment period are shown in **Table 1** for Tributary to Gill's Pond Brook and **Table 2** for East Pond Brook.
- The comparative results between the Minisonde and Quanta A values at the beginning and end of the groundwater deployment period are shown in **Table 3.**

Table 1: QA/QC Data Comparison Ranking During Deployment Period (Gill's Pond Brook)

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Tributary to Gill's Pond Brook	2007-08-07	Installation	Excellent	Excellent	Excellent	Excellent
	2007-09-21	Removal	Good	Good	Good	Good

Table 2: QA/QC Data Comparison Ranking During Deployment Period (East Pond Brook)

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
East Pond Brook	2007-08-07	Installation	Excellent	Good	Good	Good
	2007-09-21	Removal	Excellent	Excellent	Excellent	Excellent

Table 3: QA/QC Data Comparison Ranking During Quanta Deployment Period (Well After Tailings Dam A)

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking		
			Temperature	pH	Conductivity
Well After Tailings Dam A	2007-06-27	Installation	Excellent	Excellent	Excellent
	2007-09-27	Removal	Excellent	Poor	Poor

Data Interpretation

TRIBUTARY TO GILLS POND BROOK

- Water temperature (**Figure 1**) displayed a slight decreasing trend for the deployment period, with obvious diurnal fluctuations. Decreasing water temperature corresponds with overall decreasing air temperatures for the same period, which are shown in the Daily Climate Data Tables for Badger, NL for the months of August and September 2007, found in **Appendix A**, at the end of this report. Water temperatures ranged between 9.53 and 23.51 ^{o}C during this period.

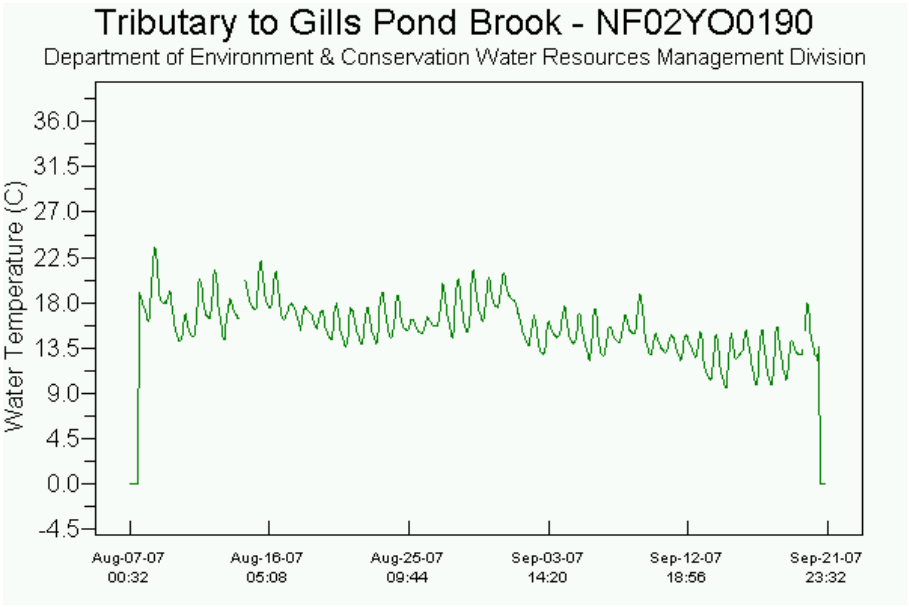


Figure 1

- pH values (**Figure 2**) demonstrate the impact significant rainfall events can have on water quality parameters. On August 9th, 36mm of rainfall was recorded in the Badger area; on September 1st, 51mm of rainfall was recorded for Badger; and from September 11th- 12th, 28.7mm of rainfall was recorded for this area. (Daily precipitation amounts are found in **Appendix A** at the end of this

report). The rainfall and its resulting land-based run-off had an acidic content, as significant decreases in pH occurred during the periods corresponding to the rainfall events. The pH values ranged from a minimum of 5.83 to a maximum of 7.46 during this deployment, with some of the values falling below the recommended range (6.5 – 9.0) for the CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life*. Newfoundland and Labrador surface waters are often naturally acidic, influenced by the abundance of acidic bogs and the natural geology of their basins.

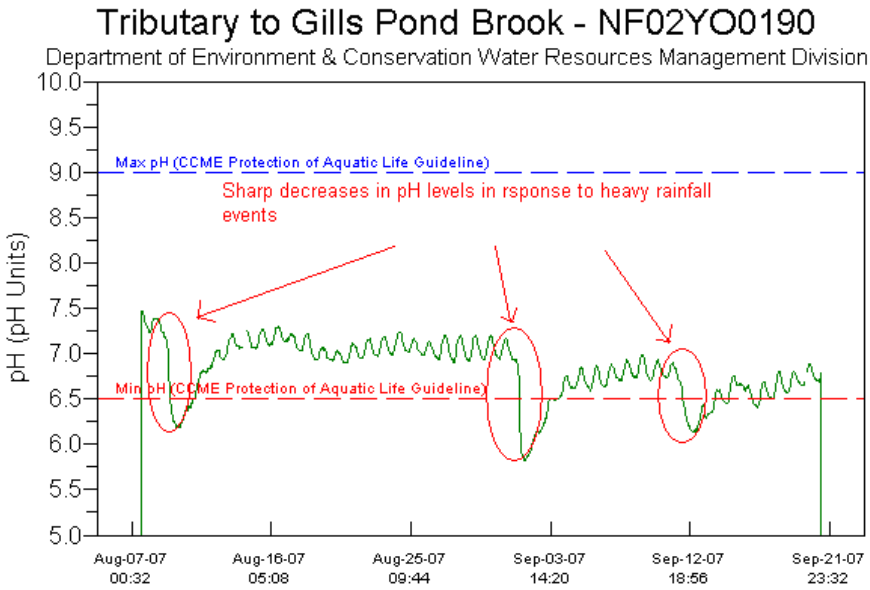


Figure 2

- Heavy rainfall appeared to have a dilution effect on specific conductance values **(Figure 3** during this deployment period. Sharp decreases in conductivity correspond to significant rainfall events on August 9th, September 1st and on September 11th -12th. Specific conductivity values ranged between 76.0 and 431.0µS/cm during the deployment period. Elevated conductivity levels in this brook are the result of continuous effluent discharge from the Polishing Pond.

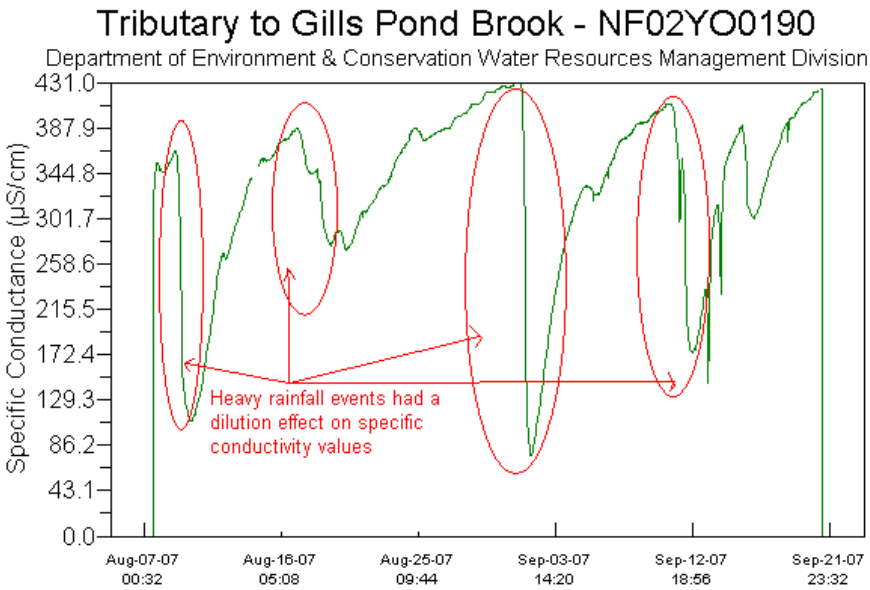


Figure 3

- Dissolved oxygen (DO) (**Figure 4**) values also reflected the impacts of heavy rainfall. DO levels decreased in response to significant precipitation and the resultant land run-off, probably due to an abundance of organic material being washed into the water body and consuming oxygen as part of decomposition. DO values ranged from 7.81 to 10.77 mg/L during this deployment. Some values dropped below the recommended minimum CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life* for dissolved oxygen (cold water/other life stages – above 6.5 mg/L; cold water/early life stages – above 9.5 mg/L; warm water/other life stages – above 5.5 mg/L; warm water/early life stages – above 6 mg/L). Seasonally lower DO levels can be expected in the summer months when water temperatures are higher.

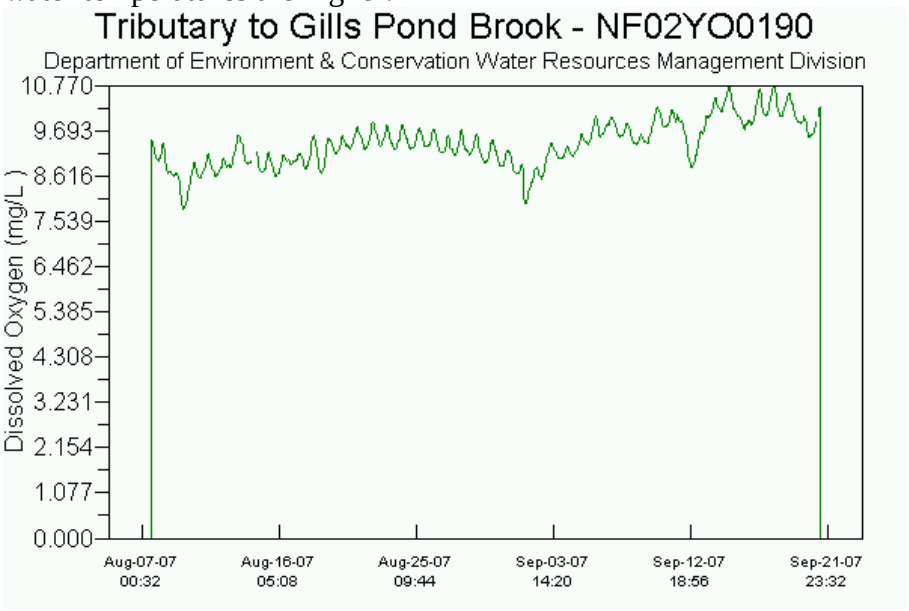


Figure 4

- Turbidity values **(Figure 5)** were influenced by heavy rain and effluent discharge from the Polishing Pond, throughout this deployment period. Effluent discharge from the Polishing Pond began on July 11, 2007 and continued until December 22, 2007. Turbidity values ranged from a minimum of 0 to 19.2 NTU during this deployment.

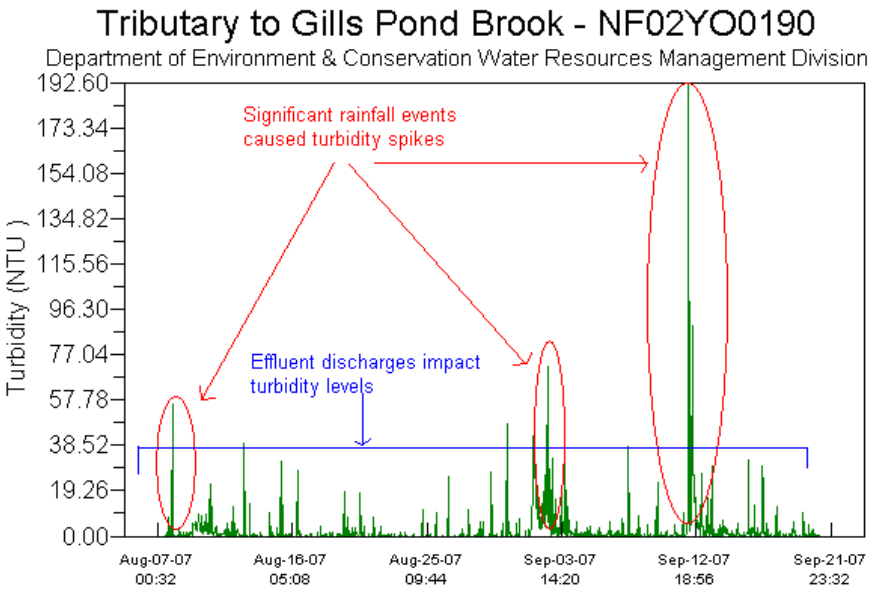


Figure 5

- The stage height **(Figure 6)** (or water level) increased during periods of heavy rainfall on August 9th , September 1st and September 11th -12th. Water level also increased at the beginning of the effluent discharge period on July 11, and remained fairly constant at this higher level for the duration of the deployment period. Stage height ranged between 1.21 and 1.60m during this deployment.

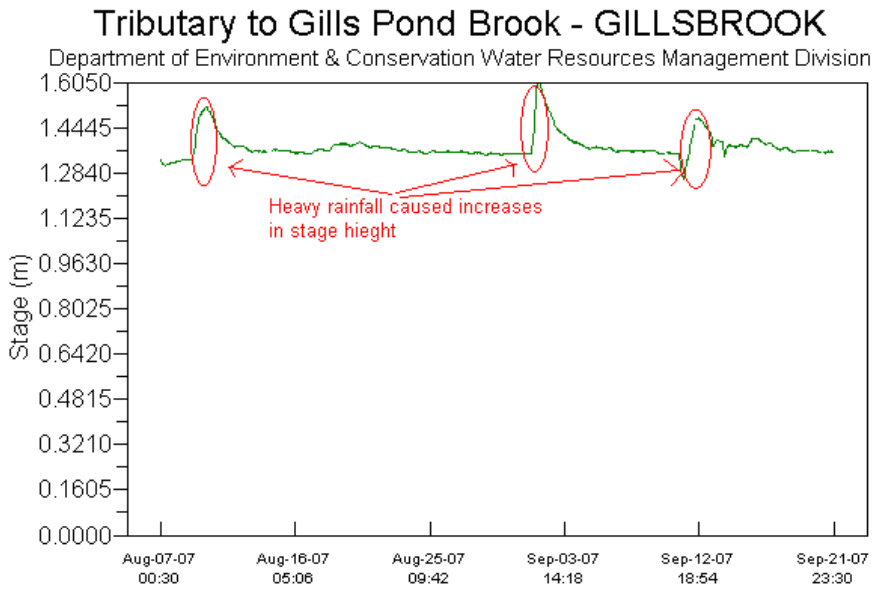


Figure 6

EAST POND BROOK

- Water temperature in East Pond Brook (**Figure 7**) remained fairly constant throughout the deployment period, with obvious daytime and night time fluctuations. Temperature values ranged from a minimum of 9.85˚ C to 24.69˚C during this period. Data gaps are visible in the East pond Brook graphs for this deployment period, indicating a problem with data transmission. This situation will be investigated by both the Department of Environment and Conservation and Environment Canada.

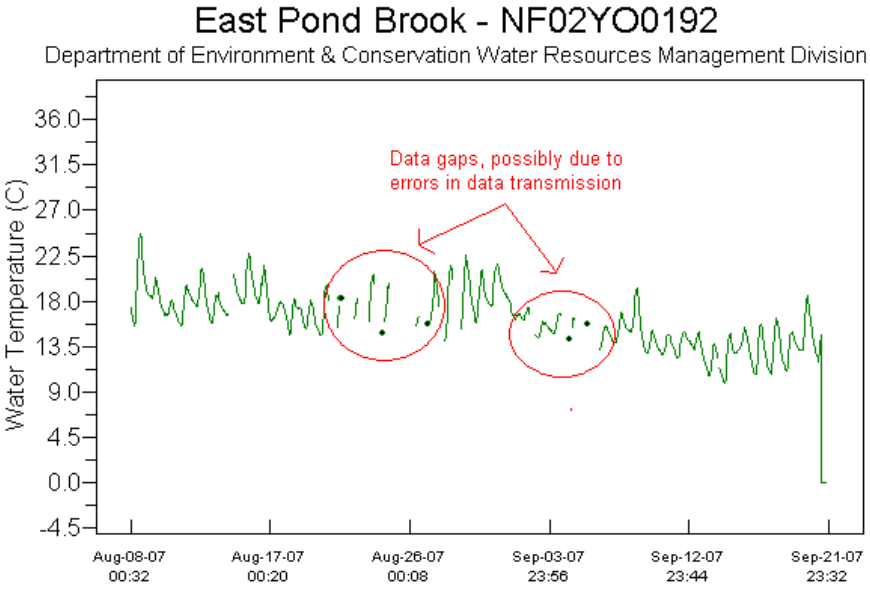


Figure 7

- pH values (**Figure 8**) at East Pond Brook demonstrate the impact significant rainfall events can have on water quality parameters, however, pH levels in East Pond Brook were less impacted by the rainfall than were pH levels in Gill's Pond Brook. East Pond Brook is wider and deeper than Gill's Pond Brook and has a greater volume of water, thus a greater capacity to buffer inputs that may potentially impact water quality. pH values ranged from a minimum of 6.17 to a maximum of 7.67pH units throughout the deployment period, with most of the values falling within the range recommended by the CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life*, (6.5 – 9.0). The background pH of this brook is sometimes naturally lower than the recommended pH range, which may be attributed to the acidic nature of the surrounding bog-type terrain, and to acid rainfall events.

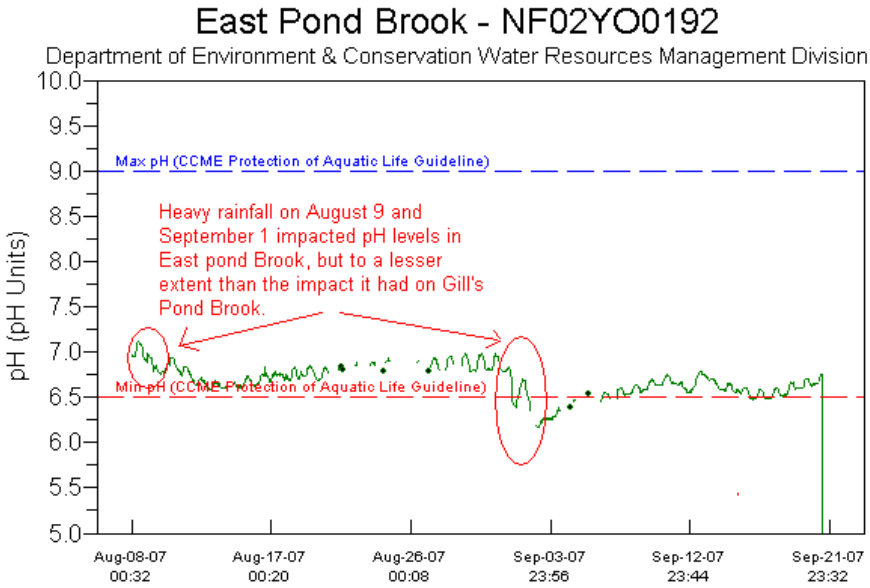


Figure 8

- Specific conductance **(Figure 9)** remained at background throughout the deployment period, ranging from 17.8 to 26.4µS/cm. Dilution effects from heavy rainfall are apparent as conductivity levels decreased on August 9th and September 1st.

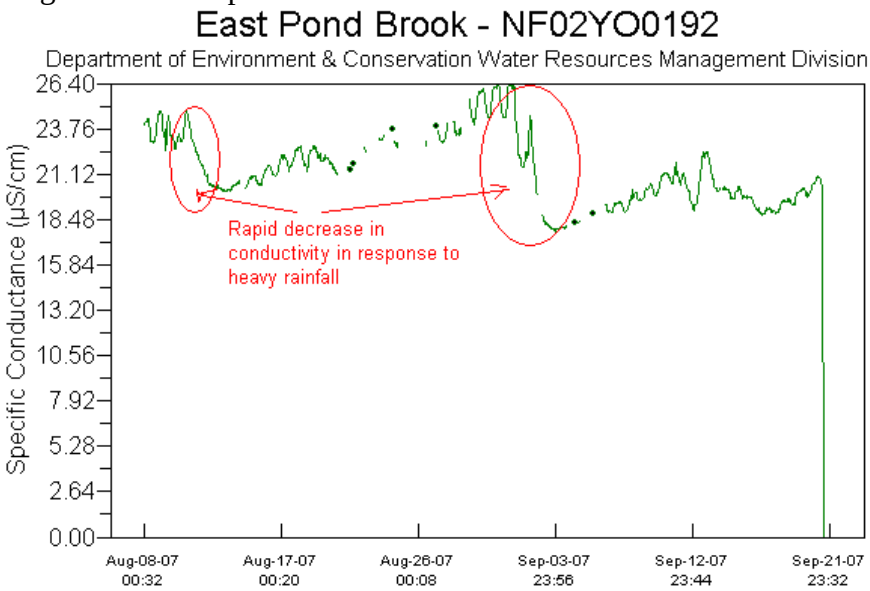


Figure 9

- The dissolved oxygen values (**Figure 10)** ranged from a minimum of 8.18mg/L to a maximum of 11.08mg/L over the deployment period. DO displayed an overall increasing trend throughout the deployment, which corresponds with an overall decreasing trend in water temperatures. Some dissolved oxygen values fell below the recommended CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life* for dissolved oxygen (cold water/other life stages – above 6.5 mg/L; cold water/early life stages – above 9.5 mg/L; warm water/other life stages – above 5.5 mg/L; warm water/early life stages – above 6 mg/L). The DO range in East Pond Brook closely resembles DO range in Gill's Pond Brook for this deployment, indicating that effluent discharge from the Polishing Pond continues to have little impact on DO levels in Gill's Pond Brook .

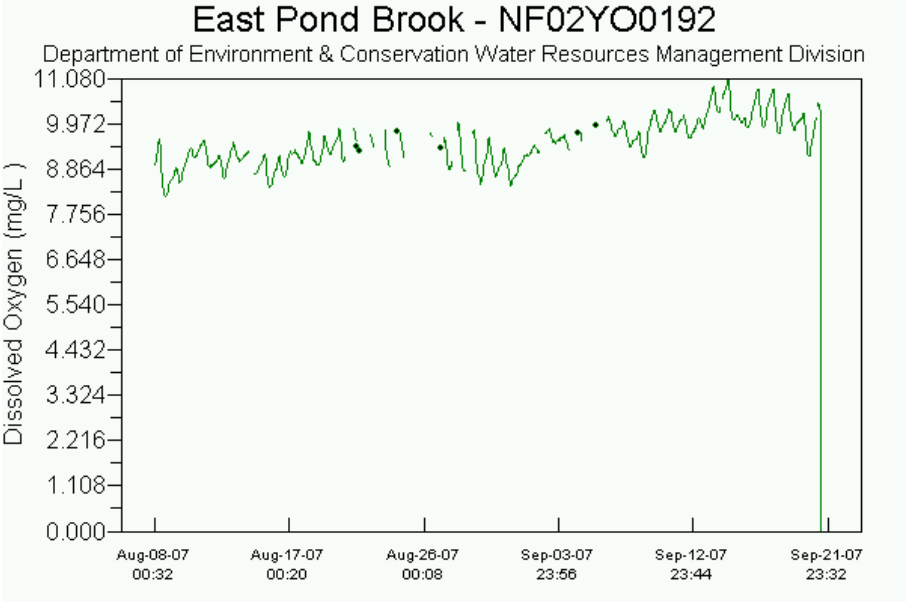


Figure 10

- The turbidity values **(Figure 11)** were consistent at 0 NTU throughout the deployment period with the exception of three spikes that corresponded with heavy rainfall (Appendix A). Turbidity values ranged between 0 and 7.3 NTUs during this deployment.

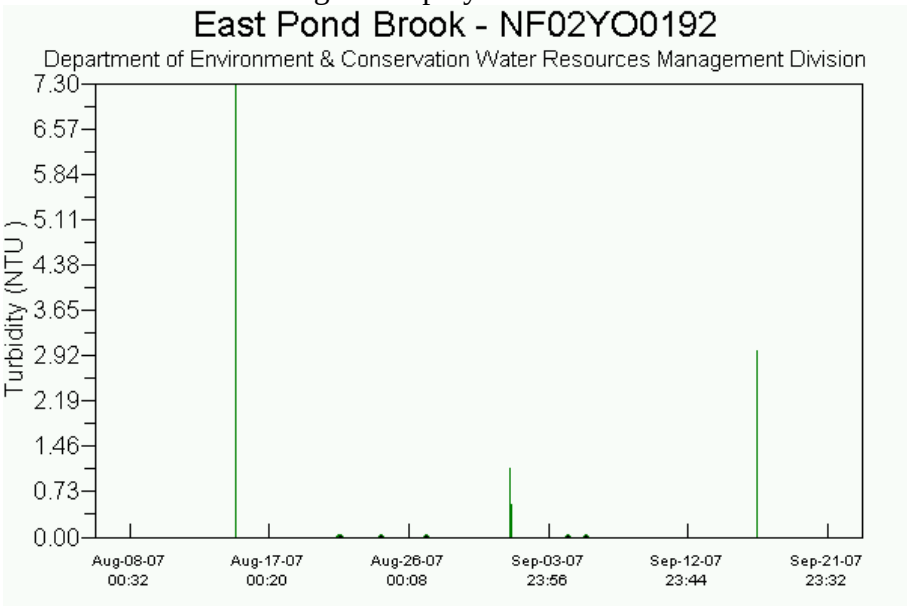


Figure 11

- The stage **(Figure 12)** or water level increased during periods of heavy rainfall on August 9th, September 1st and September 11th -12th. Stage height values ranged from a minimum of 0.097m to a maximum of 1.62m during this deployment. The downward spikes that appear in the graph on August 24th and 27th and on September 5th appear to be transmission errors.

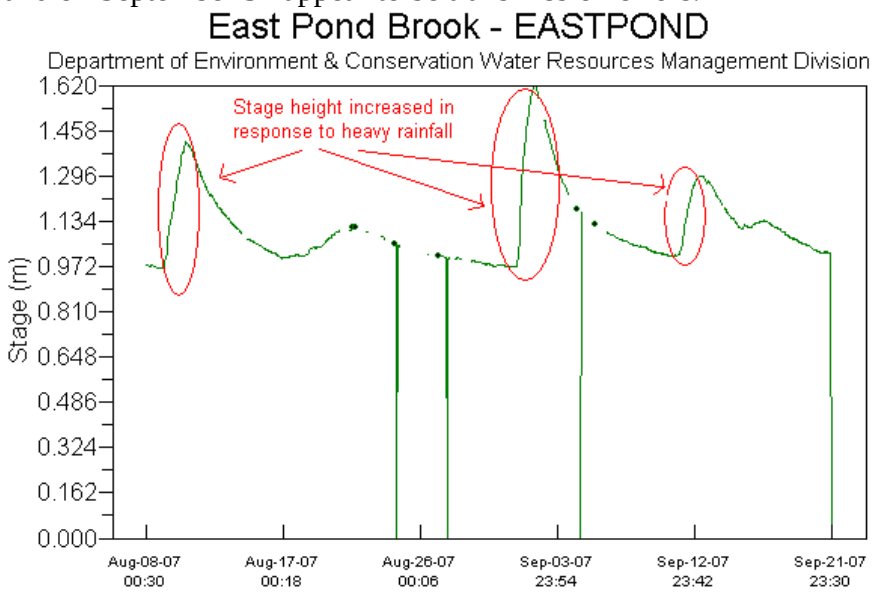


Figure 12

WELL AFTER TAILING DAM A

- The Quanta G was deployed in the groundwater well on June 27 and was not removed on September 27th (92-day deployment). The water in the well has still not clarified despite numerous attempts to purge the well. The water appears "milky" with fine grey/white particles in suspension. Water quality data collected from this well cannot be considered reliable, and consideration should be given to re-locate the well.

- Groundwater temperature (**Figure 13)** remained very steady, ranging between 4.51 and 4.90°C fro the period of deployment.

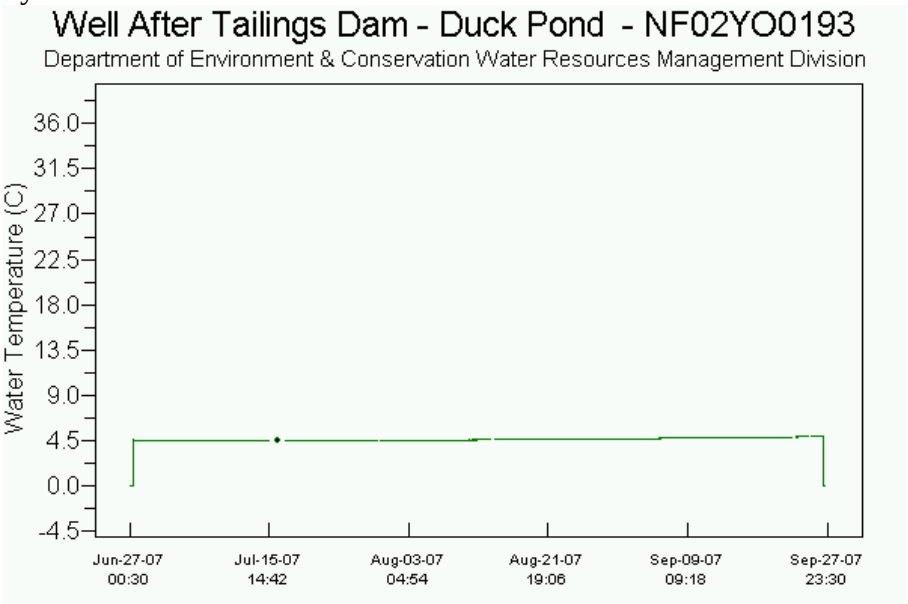


Figure 13

- pH levels (**Figure14**) fluctuated between 7.7 and 8.6 pH units for the first 10 days of the deployment , and then remained constant, just above 9.0 pH units for the remainder of the period.

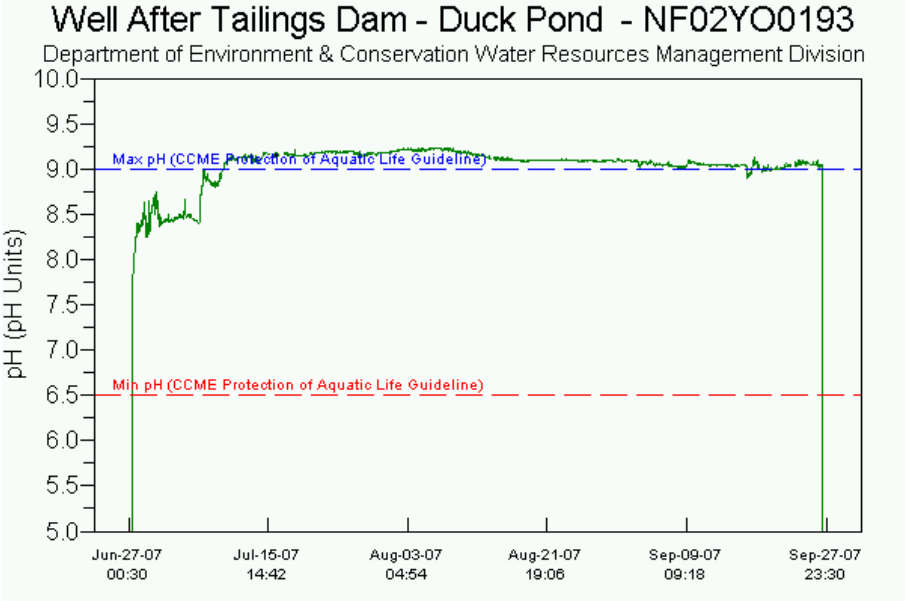
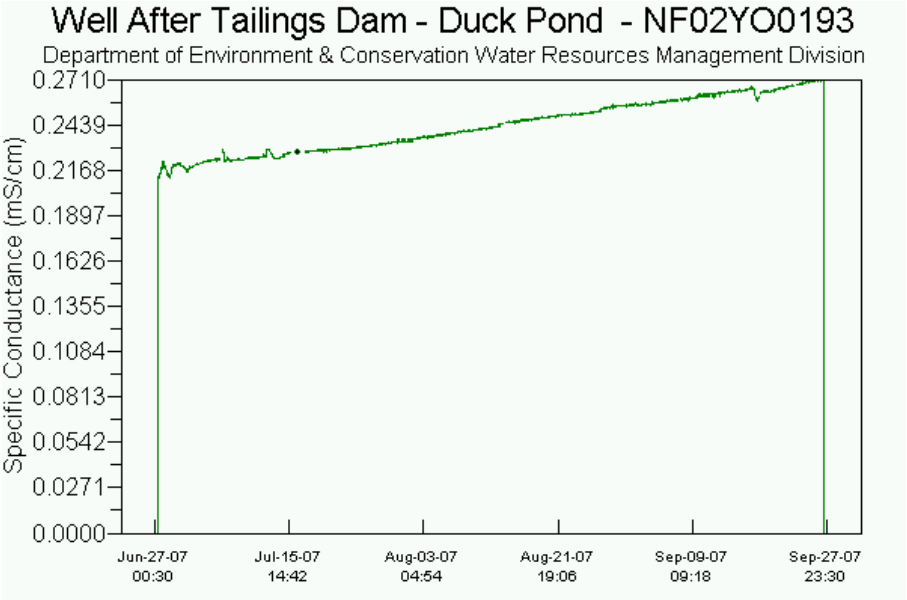


Figure 14

- Specific conductivity (**Figure 15**) values ranged from 210 to 272µS/cm and showed an increasing trend throughout this deployment period.



APPENDIX A

Daily Data Report for August 2007											
Day	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

01†	20.8	11.1	16.0	2.0	0.0	M	M	0.0		4	32
02†	22.9	11.0	17.0	1.0	0.0	M	M	0.0			<31
03†	17.9	13.1	15.5	2.5	0.0	M	M	0.0			<31
04†	21.9	14.4	18.2	0.0	0.2	M	M	0.0		21	44
05†	21.0	9.9	15.5	2.5	0.0	M	M	13.5		17	43
06†	23.0	4.8	13.9	4.1	0.0	M	M	0.0			<31
07†	22.4	3.9	13.2	4.8	0.0	M	M	0.7		19	33
08†	25.5	10.0	17.8	0.2	0.0	M	M	9.7			<31
09†	24.6	10.2	17.4	0.6	0.0	M	M	36.0		18	41
10†	19.0	9.4	14.2	3.8	0.0	M	M	0.0		32	44
11†	28.1	12.4	20.3	0.0	2.3	M	M	0.0		26	37
12†	21.3	3.5	12.4	5.6	0.0	M	M	8.7		25	32
13†	22.3	2.4	12.4	5.6	0.0	M	M	0.0		22	37
14†	25.1	15.0	20.1	0.0	2.1	M	M	0.0		18	35
15†	24.8	14.7	19.8	0.0	1.8	M	M	0.0			<31
16†	24.2	6.8	15.5	2.5	0.0	M	M	0.0		25	44
17†	20.3	8.1	14.2	3.8	0.0	M	M	3.0		21	32
18†	19.2	6.4	12.8	5.2	0.0	M	M	8.3		20	41
19†	18.5	7.2	12.9	5.1	0.0	M	M	8.8		27	52
20†	19.9	8.4	14.2	3.8	0.0	M	M	29.4			<31
21†	18.1	7.9	13.0	5.0	0.0	M	M	3.5		31	33
22†	16.9	8.4	12.7	5.3	0.0	M	M	0.6			<31
23†	22.8	6.5	14.7	3.3	0.0	M	M	0.6			<31
24†	20.0	4.5	12.3	5.7	0.0	M	M	0.0			<31
25†	16.7	12.4	14.6	3.4	0.0	M	M	0.7		18	39
26†	17.7	13.8	15.8	2.2	0.0	M	M	1.0			<31
27†	24.0	8.2	16.1	1.9	0.0	M	M	0.0		29	43
28†	24.9	7.0	16.0	2.0	0.0	M	M	0.0			<31
29†	27.2	8.2	17.7	0.3	0.0	M	M	0.0			<31
30†	25.7	7.7	16.7	1.3	0.0	M	M	0.0		23	32
31†	23.5	13.6	18.6	0.0	0.6	M	M	0.0			<31

Daily Data Report for September 2007

Day	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
01†	18.7	10.8	14.8	3.2	0.0	M	M	51.1		1	37
02†	18.5	3.7	11.1	6.9	0.0	M	M	0.0			<31
03†	18.7	5.6	12.2	5.8	0.0	M	M	0.0		19	44
04†	22.0	7.5	14.8	3.2	0.0	M	M	11.6		22	37
05†	15.5	6.8	11.2	6.8	0.0	M	M	2.1		33	32

06†	15.6	0.7	8.2	9.8	0.0	M	M	0.0			<31
07†	18.4	1.5	10.0	8.0	0.0	M	M	0.0			<31
08†	21.4	12.8	17.1	0.9	0.0	M	M	0.0			<31
09†	20.6	4.0	12.3	5.7	0.0	M	M	0.0			<31
10†	12.0	2.5	7.3	10.7	0.0	M	M	0.0			<31
11†	14.8	8.4	11.6	6.4	0.0	M	M	9.4			<31
12†	20.6	8.9	14.8	3.2	0.0	M	M	19.3		22	43
13†	17.3	4.6	11.0	7.0	0.0	M	M	0.0		30	59
14†	16.2	-0.8	7.7	10.3	0.0	M	M	0.0		27	44
15†	20.2	-1.5	9.4	8.6	0.0	M	M	0.0		19	56
16†	18.9	-0.9	9.0	9.0	0.0	M	M	3.7		18	54
17†	18.3	-1.8	8.3	9.7	0.0	M	M	0.0			<31
18†	21.5	-1.7	9.9	8.1	0.0	M	M	0.0			<31
19†	20.3	0.5	10.4	7.6	0.0	M	M	0.0		20	32
20†	25.0	9.2	17.1	0.9	0.0	M	M	0.0		19	39
21†	17.3	-1.0	8.2	9.8	0.0	M	M	0.0			<31
22†	20.0	-1.3	9.4	8.6	0.0	M	M	0.0			<31
23†	19.7	3.0	11.4	6.6	0.0	M	M	2.5		18	43
24†	13.3	2.1	7.7	10.3	0.0	M	M	0.0		28	43
25†	12.7	3.4	8.1	9.9	0.0	M	M	0.0		30	43
26†	12.4	5.3	8.9	9.1	0.0	M	M	9.6			<31
27†	11.1	6.0	8.6	9.4	0.0	M	M	0.6		1	39
28†	17.0	6.3	11.7	6.3	0.0	M	M	9.8			<31
29†	17.9	1.0	9.5	8.5	0.0	M	M	0.6		28	35
30†	11.4	-0.7	5.4	12.6	0.0	M	M	0.0		31	37

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