

General

- Data from Leary’s Brook monitoring station is monitored by the Water Resources Management Division staff.
- This monthly deployment report interprets the data from the Leary Brook real-time water quality station for the period of July 17 to September 16, a period of 59 days.
- Leary Brook station operational status was nominal over the deployment period; no communications dropouts or malfunctions were detected. Hydrolab Datasonde 5X s/n 44975 was in place for this time period.

Maintenance and Calibration of Instrument

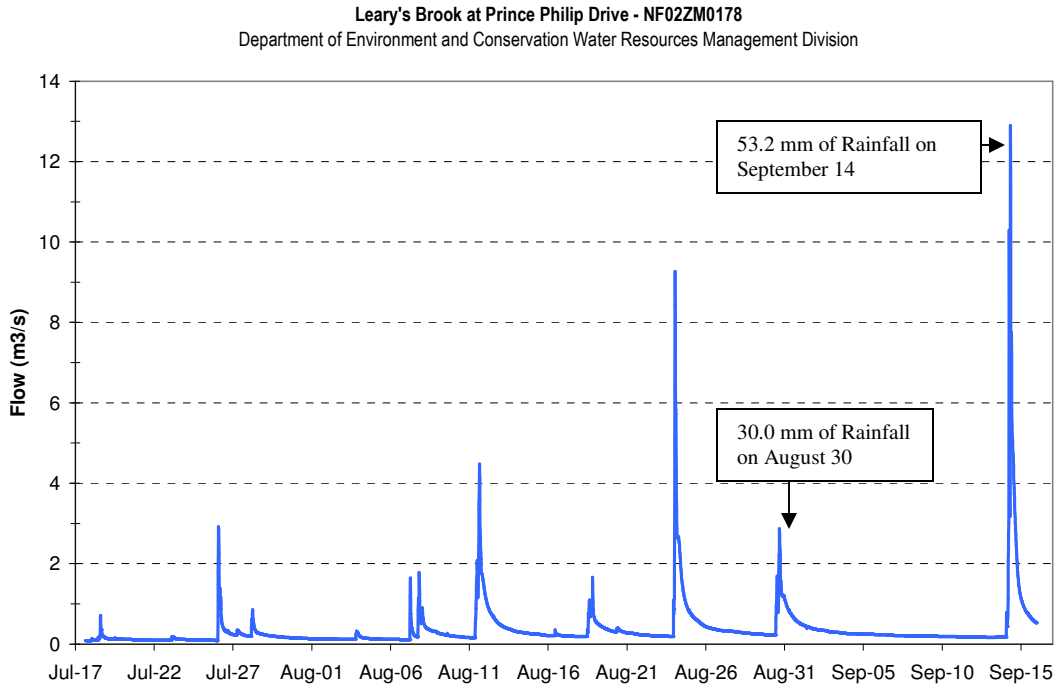
- As part of the removal and reinstallation process, parameters are recorded from both the field sonde (in situ) and a similar, newly-calibrated QA sonde (placed side by side). The parameters from both instruments are compared and their variability is ranked as part of the QA/QC protocol (see Table 1).
- Upon installation all parameters were ranked as “Excellent” except conductivity which ranked as “Good”. Upon removal, once again, all parameters were ranked “Excellent” except conductivity which ranked as “Good”.

Station	Date	Action	Instrument Comparison Ranking				
			Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
Leary Brook at Prince Philip Drive	July 17, 2009	Installation	Excellent	Excellent	Good	Excellent	Excellent
	September 16, 2009	Removal	Excellent	Excellent	Good	Excellent	Excellent

Data Interpretation

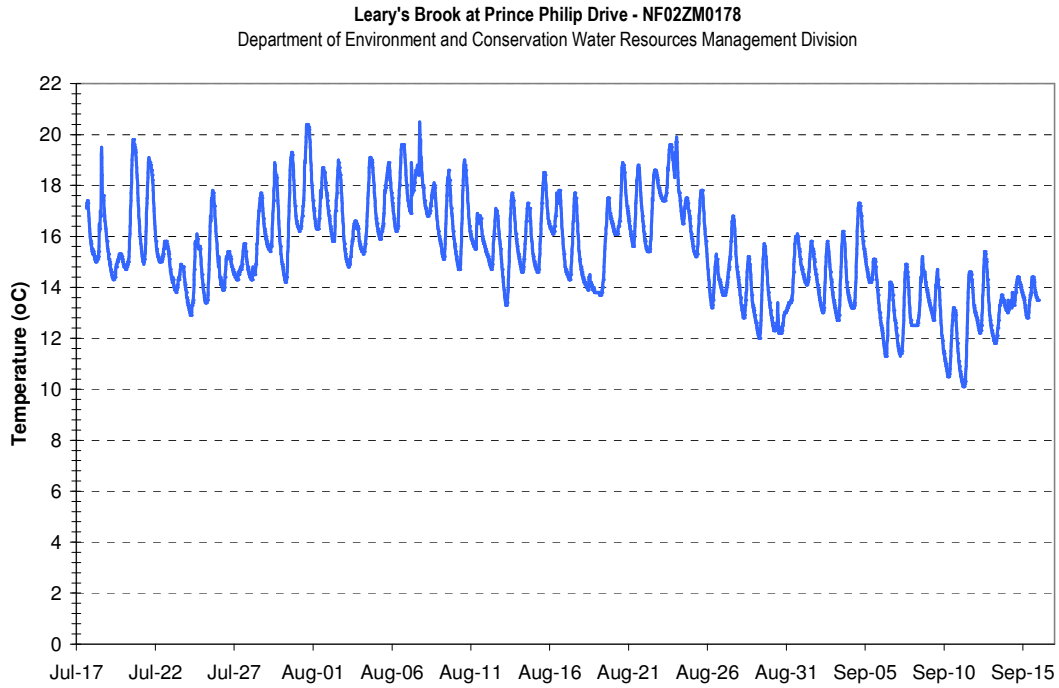
- Figure 1 illustrates the flowrate of Leary’s Brook derived from measurements of stage level. Peaks within this chart illustrate rainfall events followed by a descending leg and a return to baseflow. A flowrate of 0.089 m³/s, or 89 l/s, was measured on July 17 during a period of minimal precipitation. A maximum of 12.9 m³/s, or 12 900 l/s was measured on September 14 during a rainfall of 53.2 mm.

Figure 1: Flow at Leary's Brook from July 17 to September 16, 2009



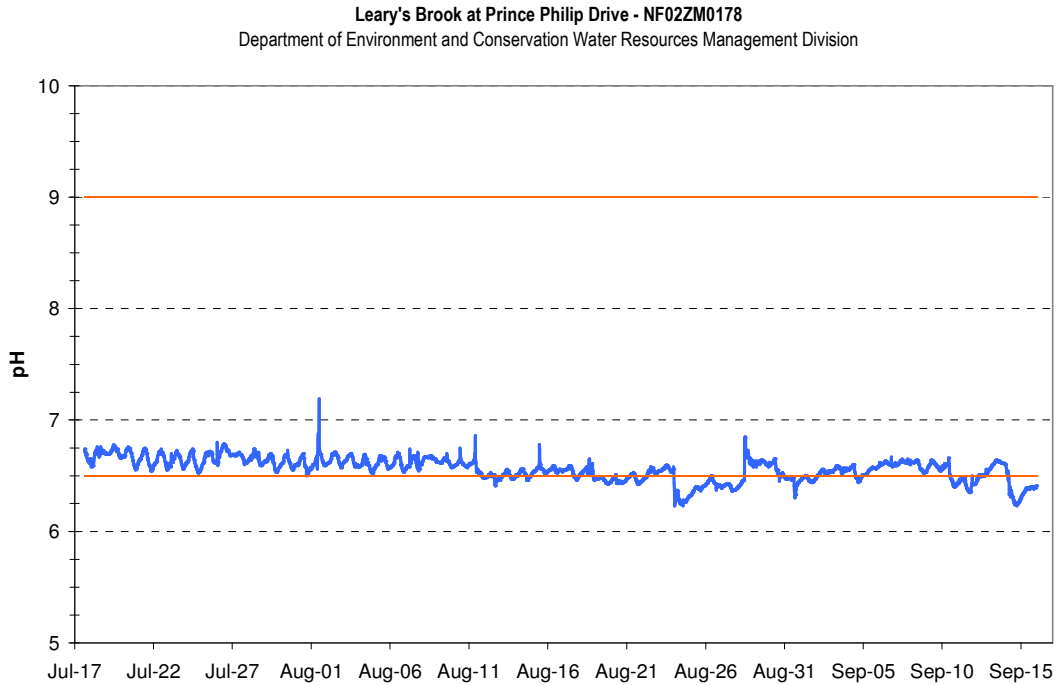
- The first half of Figure 2 shows the summer water temperature plateau followed by the seasonal decline around August 21. The water temperature at Leary's Brook ranged from 20.5°C on August 7 to 10.1°C on September 11.

Figure 2: Water Temperature at Leary's Brook from July 17 to September 16, 2009



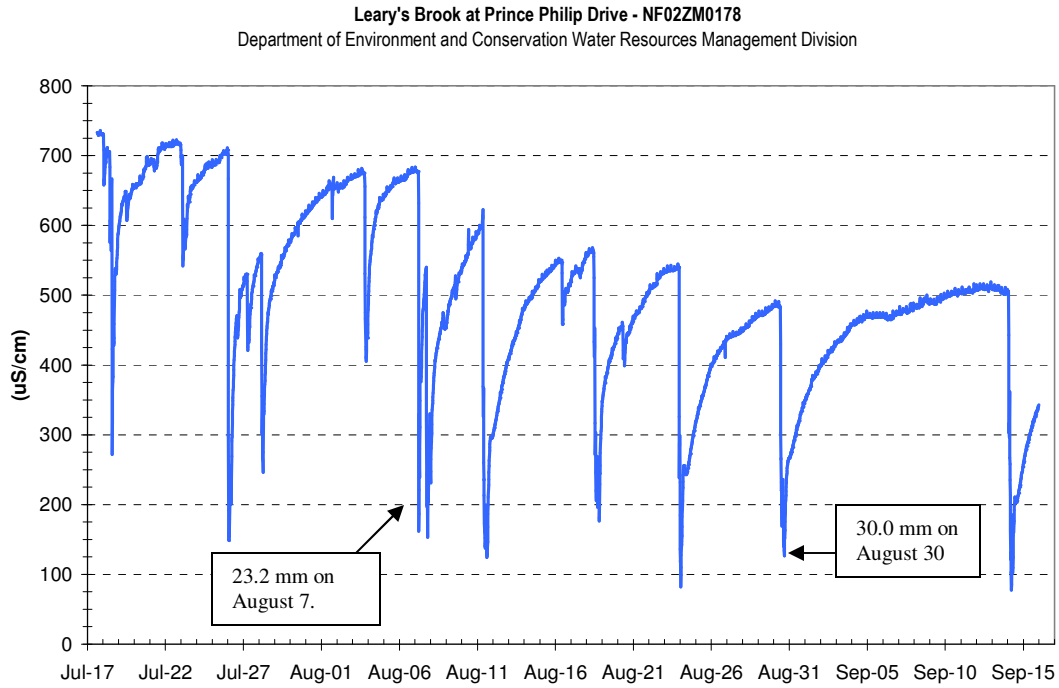
- pH at Leary's Brook ranged from 6.23 to 7.19 over the course of the deployment period. CCME Guidelines for the Protection of Aquatic Life suggest an appropriate range for pH in natural waters. This pH range is from 6.5 to 9. Figure 3 depicts that pH is usually in the lower part of this range with frequent below-range values.

Figure 3: pH at Leary's Brook from July 17 to September 16, 2009



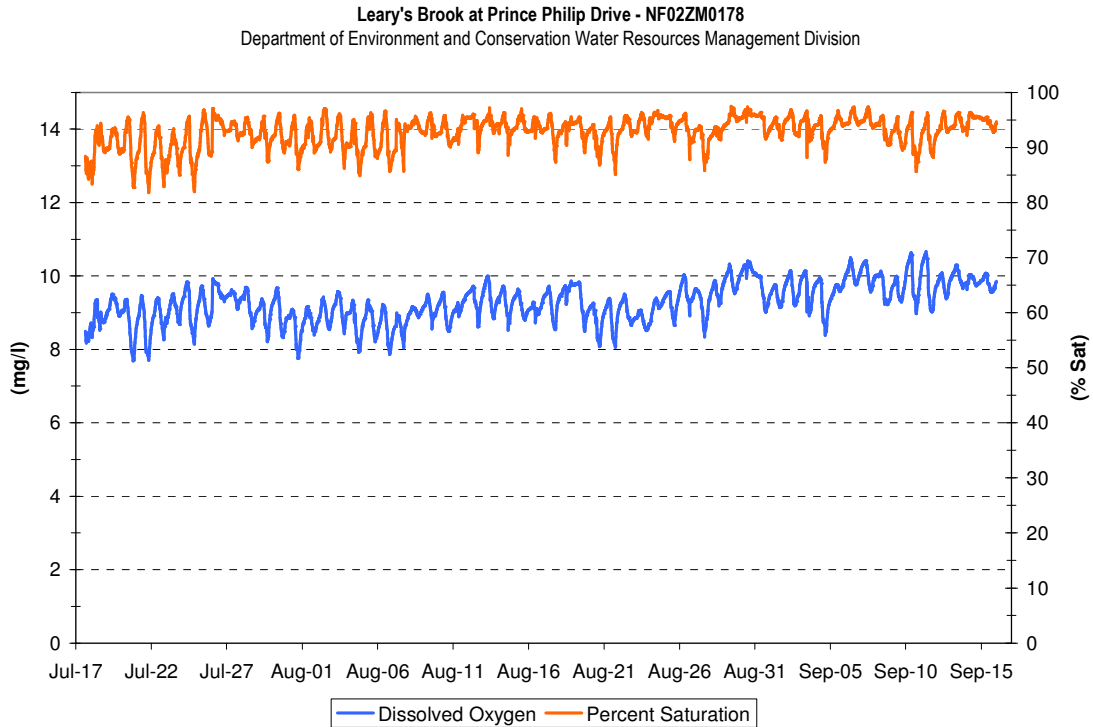
- Specific conductivity shows a downward trend with punctuated, precipitous drops related to stormwater runoff from precipitation events. Given the characteristics of Leary's Brook and the amount of impervious ground cover in the drainage basin, even small amounts of precipitation lead to a large, short-duration surge of water through the river system. A sampling of precipitation events is included on Figure 4. See Appendix for complete record of precipitation.

Figure 4: Specific Conductivity at Leary's Brook from July 17 to September 16, 2009



- Figure 5 depicts the saturation and concentration of dissolved oxygen at Leary's Brook over the deployment period. Oxygen concentration shows a positive slope related to the decrease in water temperature (temperature and oxygen saturation are inversely proportional).

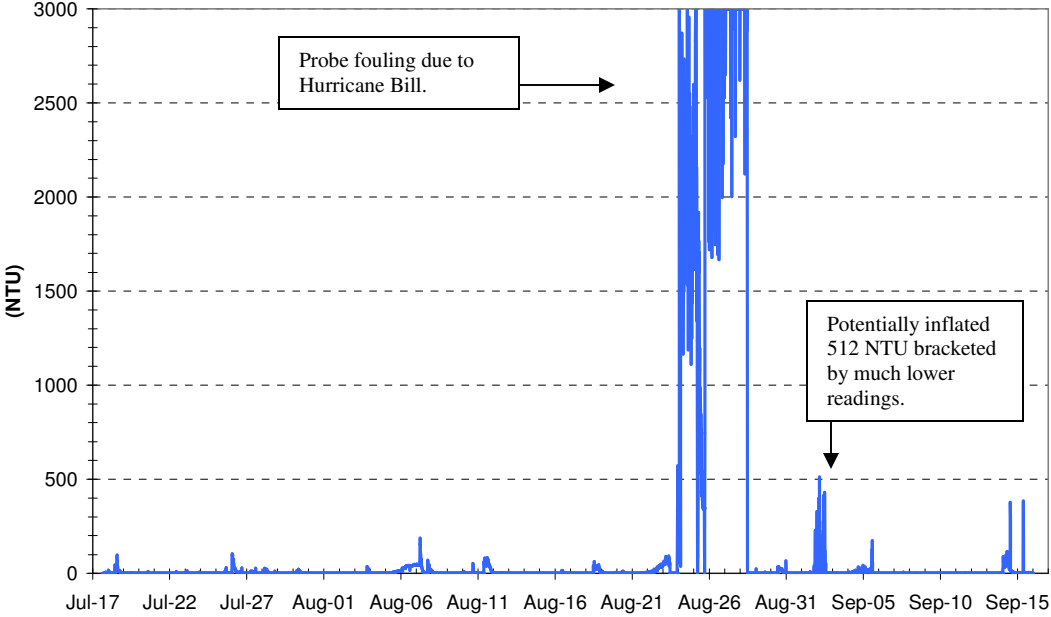
Figure 5: Dissolved Oxygen at Leary's Brook from July 17 to September 16, 2009



- Turbidity at Leary's Brook is generally low with periods >0 NTU occurring during high-flow events. On August 23, 38.2 mm of rain fell, leading to a plume of sediment that fouled the sensor. This problem was not resolved until a site visit was made on August 28th. Since it can be reasonable assumed that the readings between August 23rd and August 28th are unreliable, the resulting maximum turbidity event of 512 NTU occurred on September 2nd, however, this reading was bracketed by readings of 18.5 and 11.2 NTU, suggesting 512 NTU may be an inflated measurement caused by substantial amounts of coarse, suspended debris.

Figure 6: Turbidity at Leary's Brook from July 17 to September 16, 2009

Leary's Brook at Prince Philip Drive - NF02ZM0178
Department of Environment and Conservation Water Resources Management Division



Appendix

Daily Data Report for July 2009											
<u>D</u> <u>a</u> <u>y</u>	<u>Max</u> <u>Temp</u> °C	<u>Min</u> <u>Temp</u> °C	<u>Mean</u> <u>Temp</u> °C	<u>Heat</u> <u>Deg</u> <u>Days</u> °C	<u>Cool</u> <u>Deg</u> <u>Days</u> °C	<u>Total</u> <u>Rain</u> mm	<u>Total</u> <u>Snow</u> cm	<u>Total</u> <u>Precip</u> mm	<u>Snow</u> <u>on</u> <u>Grnd</u> cm	<u>Dir of</u> <u>Max</u> <u>Gust</u> 10's Deg	<u>Spd of</u> <u>Max</u> <u>Gust</u> km/h
<u>01</u>	12.8	7.4	10.1	7.9	0.0	0.8	0.0	0.8	0		<31
<u>02</u>	16.7	7.8	12.3	5.7	0.0	T	0.0	T	0		<31
<u>03</u>	16.0	10.5	13.3	4.7	0.0	T	0.0	T	0		<31
<u>04</u>	20.4	10.7	15.6	2.4	0.0	T	0.0	T	0		<31
<u>05</u>	23.1	12.5	17.8	0.2	0.0	6.2	0.0	6.2	0	25E	44E
<u>06</u>	16.3	6.7	11.5	6.5	0.0	0.4	0.0	0.4	0	26E	39E
<u>07</u>	9.1	3.5	6.3	11.7	0.0	3.0	0.0	3.0	0		<31
<u>08</u>	18.6	2.6	10.6	7.4	0.0	0.0	0.0	0.0	0	28E	35E
<u>09</u>	20.6	7.8	14.2	3.8	0.0	0.0	0.0	0.0	0		<31
<u>10</u>	23.8	7.3	15.6	2.4	0.0	0.0	0.0	0.0	0	25E	52E
<u>11</u>	26.3	13.3	19.8	0.0	1.8	0.0	0.0	0.0	0		<31
<u>12</u>	23.6	12.5	18.1	0.0	0.1	0.0	0.0	0.0	0	27E	33E
<u>13</u>	22.5	10.9	16.7	1.3	0.0	3.4	0.0	3.4	0	16E	56E
<u>14</u>	22.9	12.3	17.6	0.4	0.0	T	0.0	T	0	15E	44E
<u>15</u>	23.6	12.4	18.0	0.0	0.0	0.0	0.0	0.0	0	28E	33E
<u>16</u>	22.9	11.6	17.3	0.7	0.0	0.0	0.0	0.0	0	25E	39E
<u>17</u>	24.0	12.5	18.3	0.0	0.3	0.4	0.0	0.4	0	25E	41E
<u>18</u>	20.1	12.5	16.3	1.7	0.0	3.2	0.0	3.2	0	19E	32E
<u>19</u>	17.6	12.2	14.9	3.1	0.0	2.2	0.0	2.2	0	27E	44E
<u>20</u>	26.1	15.9	21.0	0.0	3.0	T	0.0	T	0	27E	39E
<u>21</u>	21.8	14.2	18.0	0.0	0.0	0.0	0.0	0.0	0		<31
<u>22</u>	15.9	11.5	13.7	4.3	0.0	3.2	0.0	3.2	0		<31
<u>23</u>	13.5	9.9	11.7	6.3	0.0	2.2	0.0	2.2	0		<31
<u>24</u>	16.3	9.8	13.1	4.9	0.0	0.0	0.0	0.0	0		<31
<u>25</u>	21.1	12.2	16.7	1.3	0.0	14.6	0.0	14.6	0	16E	41E
<u>26</u>	15.7	12.2	14.0	4.0	0.0	6.8	0.0	6.8	0		<31
<u>27</u>	15.0	13.3	14.2	3.8	0.0	2.4	0.0	2.4	0		<31
<u>28</u>	22.8	13.7	18.3	0.0	0.3	6.2	0.0	6.2	0	25E	48E
<u>29</u>	21.3	10.4	15.9	2.1	0.0	T	0.0	T	0		<31
<u>30</u>	23.7	10.4	17.1	0.9	0.0	0.4	0.0	0.4	0	20E	37E
<u>31</u>	25.5	16.8	21.2	0.0	3.2	T	0.0	T	0	27E	59E
<u>Sum</u>				87.5	8.7	55.4	0.0	55.4			
<u>Avq</u>	20.0	10.9	15.5								
<u>Xtrm</u>	26.3	2.6								27E	59E

Daily Data Report for August 2009

<u>D</u> <u>a</u> <u>y</u>	<u>Max</u> <u>Temp</u> °C 	<u>Min</u> <u>Temp</u> °C 	<u>Mean</u> <u>Temp</u> °C 	<u>Heat</u> <u>Deq</u> <u>Days</u> °C 	<u>Cool</u> <u>Deq</u> <u>Days</u> °C 	<u>Total</u> <u>Rain</u> mm 	<u>Total</u> <u>Snow</u> cm 	<u>Total</u> <u>Precip</u> mm 	<u>Snow</u> <u>on</u> <u>Grnd</u> cm	<u>Dir of</u> <u>Max</u> <u>Gust</u> 10's Deg	<u>Spd of</u> <u>Max</u> <u>Gust</u> km/h
01†	24.0	16.4	20.2	0.0	2.2	1.0	0.0	1.0		24	48
02†	21.0	10.9	16.0	2.0	0.0	0.0	0.0	0.0			<31
03†	17.9	11.6	14.8	3.2	0.0	6.0	0.0	6.0		15	41
04†	25.9	15.3	20.6	0.0	2.6	0.2	0.0	0.2		28	35
05†	25.8	14.9	20.4	0.0	2.4	T	0.0	T		26	37
06†	23.3	16.1	19.7	0.0	1.7	0.0	0.0	0.0		26	50
07†	22.5	15.9	19.2	0.0	1.2	23.2	0.0	23.2		23	32
08†	20.4	13.5	17.0	1.0	0.0	0.4	0.0	0.4		25	33
09†	20.9	12.1	16.5	1.5	0.0	T	0.0	T		28	37
10†	23.6	12.1	17.9	0.1	0.0	T	0.0	T		25	33
11†	17.5	14.5	16.0	2.0	0.0	36.4	0.0	36.4		18	56
12†	17.5	8.4	13.0	5.0	0.0	T	0.0	T		1	33
13†	23.2	9.1	16.2	1.8	0.0	0.0	0.0	0.0		25	39
14†	21.6	13.7	17.7	0.3	0.0	0.0	0.0	0.0		26	44
15†	25.3	14.3	19.8	0.0	1.8	0.0	0.0	0.0		25	37
16†	21.2	11.4	16.3	1.7	0.0	1.6	0.0	1.6		25	48
17†	20.9	10.8	15.9	2.1	0.0	0.0	0.0	0.0		2	37
18†	13.5	10.5	12.0	6.0	0.0	26.4	0.0	26.4		11	44
19†	23.0	13.1	18.1	0.0	0.1	0.2	0.0	0.2		26	44
20†	24.0	16.2	20.1	0.0	2.1	2.8	0.0	2.8		26	37
21†	22.7	13.9	18.3	0.0	0.3	0.0	0.0	0.0			<31
22†	25.7	14.4	20.1	0.0	2.1	T	0.0	T		25	56
23†	25.8	18.4	22.1	0.0	4.1	38.2	0.0	38.2		16	80
24†	19.1	13.3	16.2	1.8	0.0	1.6	0.0	1.6		31	78
25†	21.5	7.5	14.5	3.5	0.0	0.0	0.0	0.0		30	32
26†	16.6	7.3	12.0	6.0	0.0	T	0.0	T		20	48
27†	20.2	11.8	16.0	2.0	0.0	0.4	0.0	0.4		27	61
28†	15.9	9.5	12.7	5.3	0.0	0.0	0.0	0.0		26	63
29†	18.1	8.3	13.2	4.8	0.0	0.0	0.0	0.0		28	63
30†	18.8	8.0	13.4	4.6	0.0	30.0	0.0	30.0		14	74
31†	19.1	13.8	16.5	1.5	0.0	T	0.0	T		27	46
Sum				56.2	20.6	168.4	0.0	168.4			
Avg	21.2	12.5	16.83								
Xtrm	25.9	7.3								16	80

Daily Data Report for September 2009											
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†	19.5	9.6	14.6	3.4	0.0	T	0.0	T		25	44
02†	15.3	9.1	12.2	5.8	0.0	0.0	0.0	0.0		25	37
03†	21.6	11.3	16.5	1.5	0.0	0.0	0.0	0.0		26	67
04†	23.3	12.3	17.8	0.2	0.0	0.0	0.0	0.0		25	46
05†	13.9	5.3	9.6	8.4	0.0	0.0	0.0	0.0			<31
06†	14.1	4.8	9.5	8.5	0.0	0.0	0.0	0.0			<31
07†	19.7	7.4	13.6	4.4	0.0	0.0	0.0	0.0		26	70
08†	17.9	12.5	15.2	2.8	0.0	0.8	0.0	0.8			<31
09†	13.2	5.3	9.3	8.7	0.0	T	0.0	T		1E	48E
10†	11.4	4.5	8.0	10.0	0.0	0.2	0.0	0.2		33	44
11†	20.5	7.2	13.9	4.1	0.0	0.0	0.0	0.0		28	50
12†	16.3	6.1	11.2	6.8	0.0	0.0	0.0	0.0		35	33
13†	13.8	6.6	10.2	7.8	0.0	4.0	0.0	4.0		18	33
14†	17.9	12.2	15.1	2.9	0.0	53.2	0.0	53.2		16	69
15†	18.2	9.7	14.0	4.0	0.0	T	0.0	T		26	61
16†	9.7	5.7	7.7	10.3	0.0	1.2	0.0	1.2		3	33
17†	17.4	5.4	11.4	6.6	0.0	0.0	0.0	0.0		27	37
Sum				96.2*	0.0*	59.4*	0.0*	59.4*			
Avg	16.7*	7.9*	12.3*								
Xtrm	23.3*	4.5*								26*	70*

Prepared by:
 Ryan Pugh
 Regional Water Quality Officer
 Department of Environment and Conservation
 Water Resources Management Division
 Phone: 709.729.1681
 Fax: 709.729.3020