

Real Time Water Quality Deployment Report Main River July – September 2009

General

- The Water Resources Management Division staff monitors the real-time web page on a daily basis.
- The 2009 field season was a very difficult one for the Main River RTWQ program with a combination of technical issues including; damage from beaver activity, a malfunctioning oxygen sensor, and issues with a data logger. These technical issues severely limited the amount of usable data available for this field season. The data presented in this report is the only data available for the 2009 field season.
- Main River at Paradise Pool is only accessible by helicopter and because of heavy icing it is only operated after spring break-up until late fall before significant ice forms. Initial installation for the 2009 field season was on June 11th, however there was a technical issue which lead to only the temperature value being transmitted. On June 27 data transmission stopped completely when a curious beaver cut through the underwater deployment cable(see photo 1).
- For the period after this deployment report from September 25th onward there was a technical issue with the data logger which resulted in no data be stored or transmitted. As a result of this issue, the instrument was removed from the field for the year in mid-October.



Photo 1

Maintenance and Calibration of Instrumentation

- The instrument at Main River at Paradise Pool was deployed from July 14th to September 25th, 2009. This 73 day deployment period is typical for the Main River at Paradise Pool which is only accessible by helicopter.
- The results from comparing the Minisonde values to the Datasonde values during the reinstallation can be seen in **Table 1**. This involves a second set of data readings being collected at the time of installation, using a similar, freshly calibrated instrument. The readings from both instruments were compared and their variability was ranked, as part of QA/QC protocol. It should be noted that temperature, pH and conductivity all maintained calibration during the deployment as indicated in the results in Table 1. As there was a problem with the oxygen sensor there are no results available for this parameter.

Table 1: QA/QC Data Comparison Rankings - Installation – July 14th, - Removal – Sep. 25th, 2009

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Main River	July 14 th 2009	Installation	Excellent	Good	Excellent	NA
	Sep.25 th 2009	Removal	Excellent	Good	Excellent	NA

Data Interpretation

- The water temperature (**Figure 1**) showed normal day-to-day fluctuations during the entire deployment period with an overall gentle decreasing trend as temperatures dropped in the late summer/early fall. There is a diurnal pattern with warmer temperatures during the day and cooling at night. Temperatures ranged from a high of 23.1 to a low of 9.1

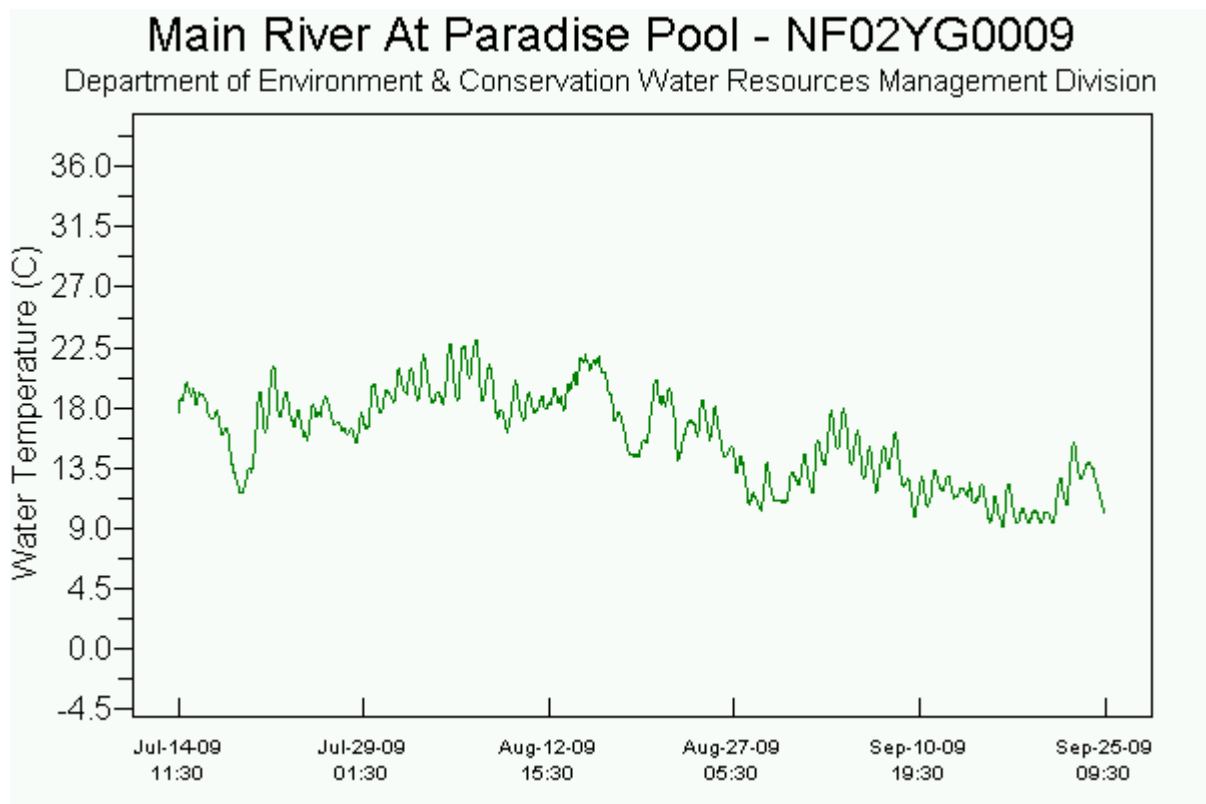


Figure 1

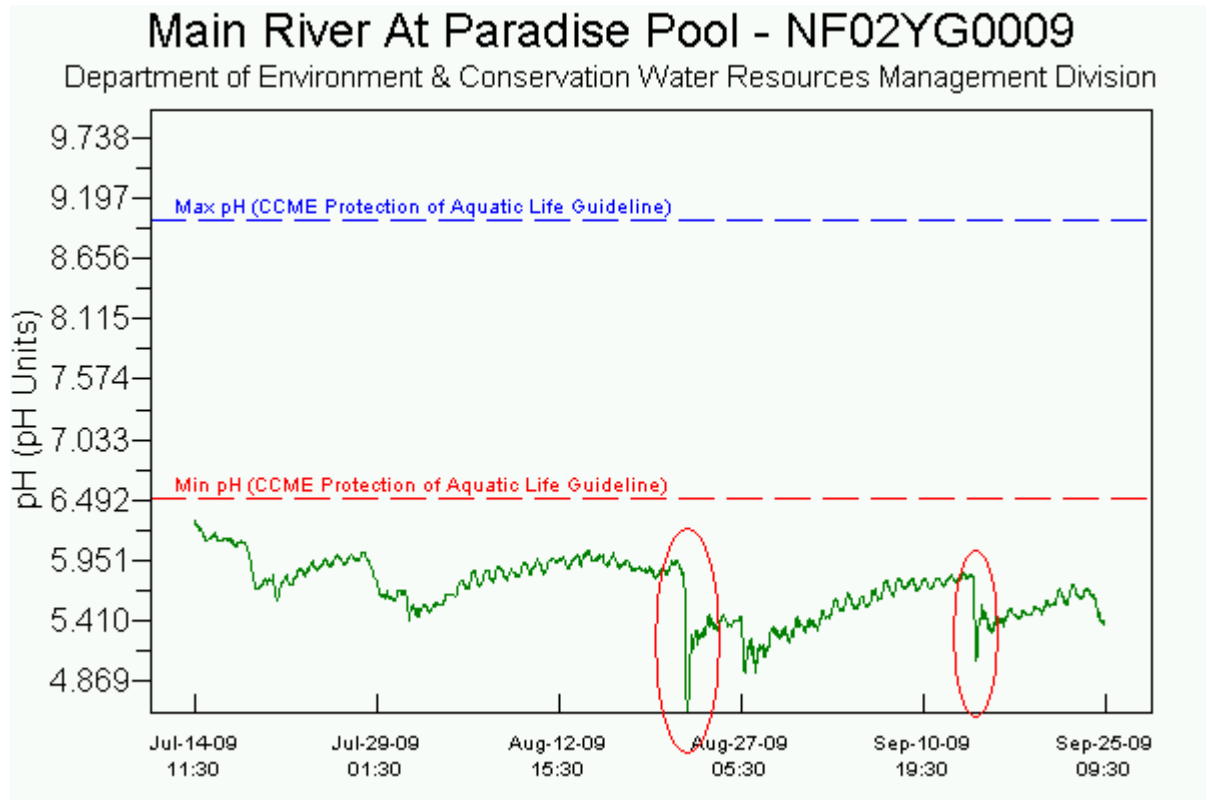


Figure 2

- The pH values (**Figure 2**) for Main River station showed some variability during the deployment period ranging from a low of 4.59 to a high of 6.31. Two significant drops in pH which are highlighted with red ovals appear to be related to significant increases in flow as highlighted by red ovals in Figure 5.
- All pH values were lower than the recommended range (6.5 – 9.0) for the CCME Protection of Aquatic Life Guidelines. Due to the pristine condition of the area upstream of this station it is likely that the low pH values are due to natural causes and they are typical of much of Newfoundland waters.

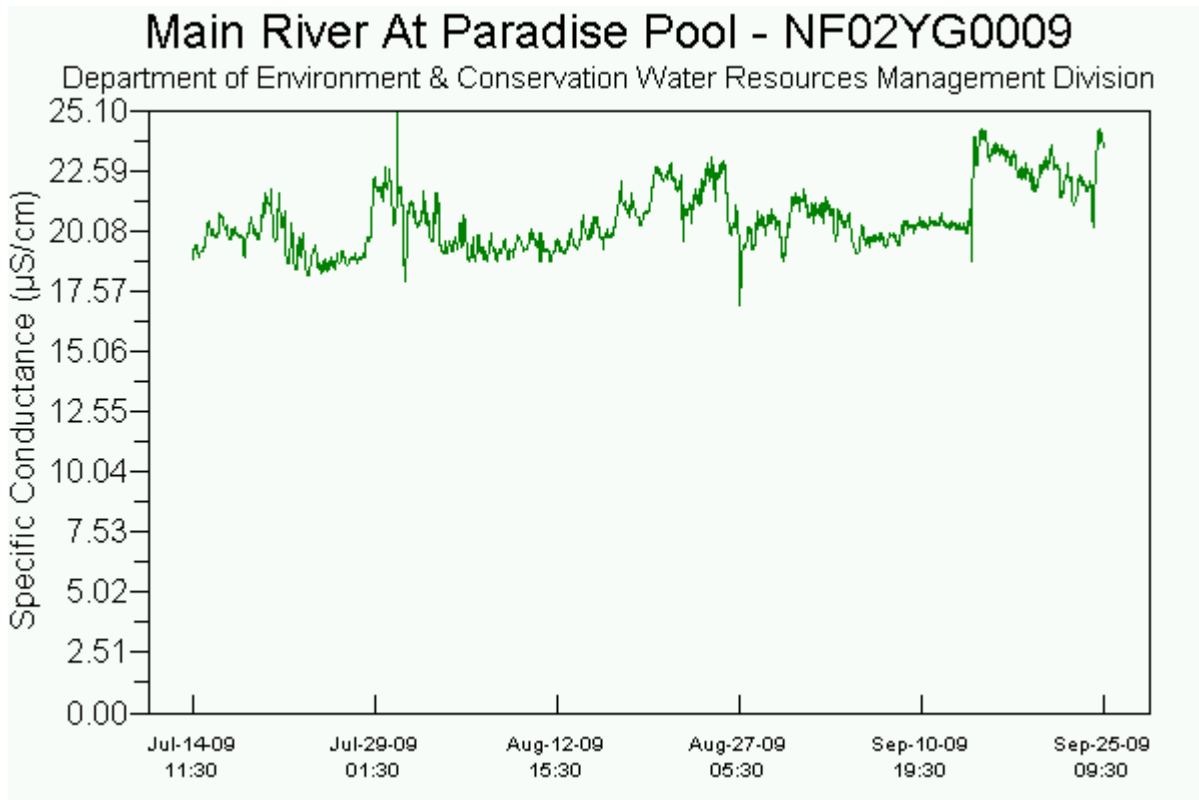


Figure 3

- Specific conductivity values (**Figure 3**) ranged from a low of 17 uS/cm to a high of 25.1 uS/cm which is typical of this site .
- The majority of turbidity values (**Figure 4**) were 0 with occasional low level values in the order of 2 to 5 NTU. Several significant spikes, including one up to 753 NTU are most likely due to organic or vegetative matter temporarily blocking the sensor and do not reflect actual turbidity levels in the river.
- Stage readings (**Figure 5**) showed a series of significant spikes which correspond to quick increases in flow after significant rainfall events. Stage readings ranged from 0.525 m to 2.572 m over the deployment period and this equated to a range in flow from 3.68 m³/sec to 164 m³/sec. The stage height and corresponding flow values are typical for this station at this time of the year.

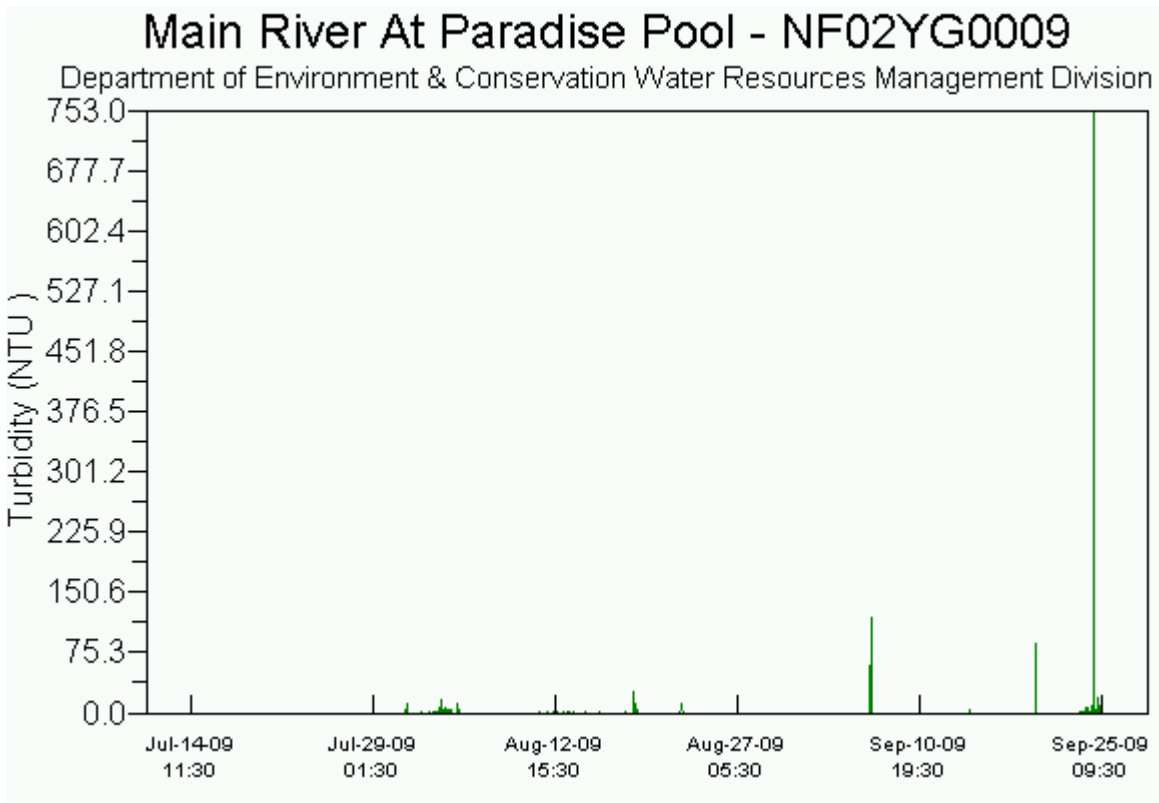


Figure 4

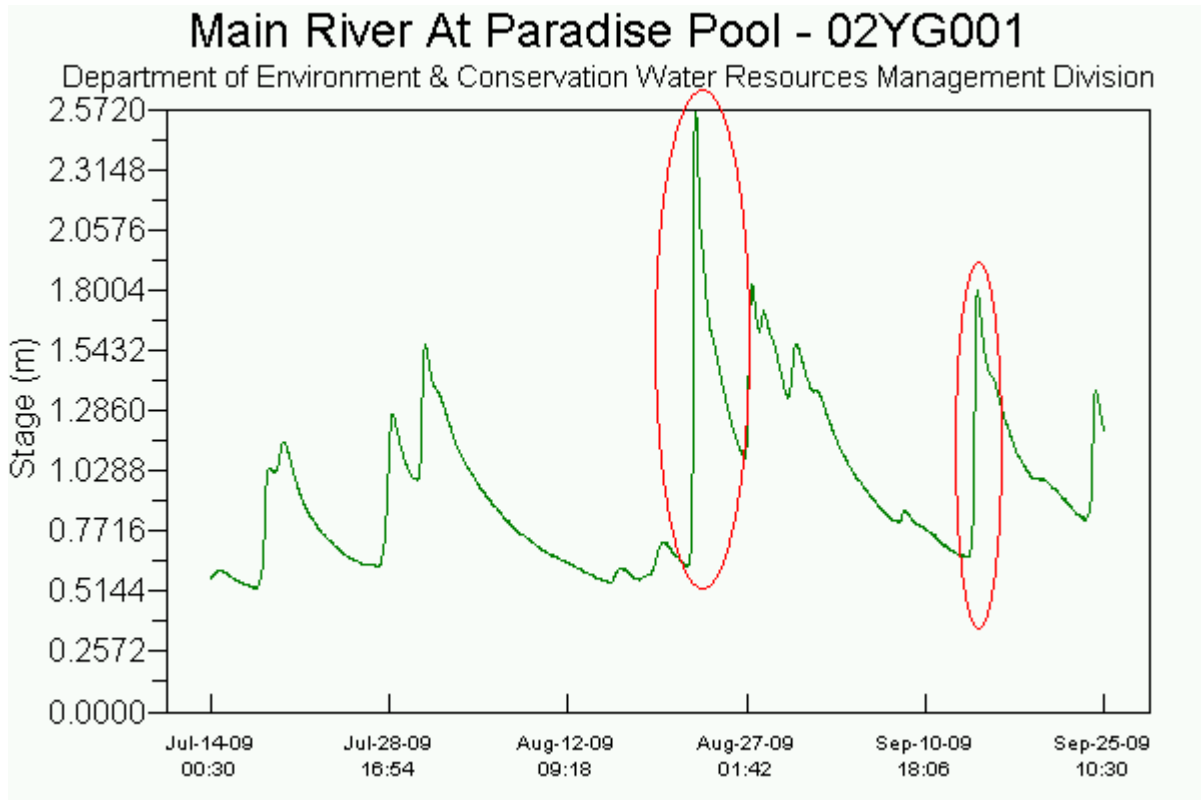


Figure 5

Climate data for the deployment period are included at the end of this report. This data is from Deer Lake which is the closest Environment Canada weather station to this site.

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Climate Data

Daily Data Report for August 2009

D a y	<u>Max Temp</u> °C 	<u>Min Temp</u> °C 	<u>Mean Temp</u> °C 	<u>Heat Deg Days</u> °C 	<u>Cool Deg Days</u> °C 	<u>Total Rain</u> mm 	<u>Total Snow</u> cm 	<u>Total Precip</u> mm 	<u>Snow on Grnd</u> cm	<u>Dir of Max Gust</u> 10's Deg	<u>Spd of Max Gust</u> km/h 
01 †	23.1	16.7	19.9	0.0	1.9	8.8	0.0	8.8		25	37
02 †	26.7	12.1	19.4	0.0	1.4	0.0	0.0	0.0			<31
03 †	23.4	12.2	17.8	0.2	0.0	4.8	0.0	4.8			<31
04 †	26.1	13.8	20.0	0.0	2.0	0.4	0.0	0.4			<31
05 †	29.2	12.4	20.8	0.0	2.8	4.0	0.0	4.0	24E		37E
06 †	25.7	12.5	19.1	0.0	1.1	T	0.0	T	2		46
07 †	24.6	10.7	17.7	0.3	0.0	0.0	0.0	0.0			<31
08 †	16.7	10.1	13.4	4.6	0.0	28.6	0.0	28.6			<31
09 †	22.5	9.3	15.9	2.1	0.0	0.0	0.0	0.0			<31
10 †	24.4	12.4	18.4	0.0	0.4	0.0	0.0	0.0	22		37
11 †	22.5	12.4	17.5	0.5	0.0	T	0.0	T			<31
12 †	23.6	8.5	16.1	1.9	0.0	0.0	0.0	0.0			<31
13 †	26.1	6.2	16.2	1.8	0.0	0.0	0.0	0.0			<31
14 †	28.2	10.3	19.3	0.0	1.3	0.0	0.0	0.0	27		46
15 †	29.4	17.7	23.6	0.0	5.6	2.8	0.0	2.8	24		37
16 †	21.6	8.4	15.0	3.0	0.0	1.8	0.0	1.8			<31
17 †	20.9	8.6	14.8	3.2	0.0	4.2	0.0	4.2			<31
18 †	13.3	10.7	12.0	6.0	0.0	12.2	0.0	12.2			<31
19 †	19.5	12.2	15.9	2.1	0.0	9.6	0.0	9.6			<31
20 †	23.2	13.6	18.4	0.0	0.4	0.0	0.0	0.0	26		41
21 †	23.2	13.0	18.1	0.0	0.1	1.0	0.0	1.0			<31
22 †	22.3	12.8	17.6	0.4	0.0	14.0	0.0	14.0	23		41
23 †	23.2	15.9	19.6	0.0	1.6	16.2	0.0	16.2	4		44
24 †	22.8	8.7	15.8	2.2	0.0	0.0	0.0	0.0			<31
25 †	20.5	4.2	12.4	5.6	0.0	0.0	0.0	0.0	28		37
26 †	21.1	5.4	13.3	4.7	0.0	2.0	0.0	2.0	20		46
27 †	16.0	8.8	12.4	5.6	0.0	0.8	0.0	0.8	24		69
28 †	12.8	6.9	9.9	8.1	0.0	0.4	0.0	0.4	25		46
29 †	16.8	5.7	11.3	6.7	0.0	0.0	0.0	0.0			<31
30 †	12.0	6.1	9.1	8.9	0.0	32.4	0.0	32.4	5		37
31 †	19.1	9.7	14.4	3.6	0.0	1.0	0.0	1.0			<31
Sum				71.5	18.6	145.0	0.0	145.0			
Avg	22	10.6	16.27								
Xtrm	29.4	4.2							24		69

Daily Data Report for September 2009

<u>Day</u>	<u>Max Temp</u> °C 	<u>Min Temp</u> °C 	<u>Mean Temp</u> °C 	<u>Heat Deg Days</u> °C 	<u>Cool Deg Days</u> °C 	<u>Total Rain</u> mm 	<u>Total Snow</u> cm 	<u>Total Precip</u> mm 	<u>Snow on Grnd</u> cm	<u>Dir of Max Gust</u> 10's Deg	<u>Spd of Max Gust</u> km/h
01 †	17.8	5.8	11.8	6.2	0.0	0.4	0.0	0.4		27	33
02 †	21.1	3.7	12.4	5.6	0.0	0.0	0.0	0.0		23	46
03 †	21.1	13.4	17.3	0.7	0.0	0.6	0.0	0.6		23	56
04 †	21.7	10.0	15.9	2.1	0.0	0.2	0.0	0.2		25	46
05 †	15.9	3.3	9.6	8.4	0.0	T	0.0	T			<31
06 †	15.9	1.4	8.7	9.3	0.0	0.0	0.0	0.0			<31
07 †	21.1	10.1	15.6	2.4	0.0	1.0	0.0	1.0		22	65
08 †	19.4	7.6	13.5	4.5	0.0	0.8	0.0	0.8		18	37
09 †	12.5	1.0	6.8	11.2	0.0	T	0.0	T		1	37
10 †	16.7	0.4	8.6	9.4	0.0	0.0	0.0	0.0		25	37
11 †	21.0	9.3	15.2	2.8	0.0	0.0	0.0	0.0		25	48
12 †	20.6	7.3	14.0	4.0	0.0	0.0	0.0	0.0			<31
13 †	20.6	8.5	14.6	3.4	0.0	4.8	0.0	4.8		18	33
14 †	16.6	10.3	13.5	4.5	0.0	22.2	0.0	22.2		24	50
15 †	12.2	4.4	8.3	9.7	0.0	0.2	0.0	0.2		25	59
16 †	11.8	2.3	7.1	10.9	0.0	0.0	0.0	0.0			<31
17 †	17.9	4.6	11.3	6.7	0.0	0.0	0.0	0.0		26	37
18 †	12.5	5.1	8.8	9.2	0.0	4.4	0.0	4.4			<31
19 †	12.5	7.2	9.9	8.1	0.0	8.6	0.0	8.6			<31
20 †	11.5	5.5	8.5	9.5	0.0	0.8	0.0	0.8			<31
21 †	18.1	3.7	10.9	7.1	0.0	0.0	0.0	0.0		24	46
22 †	24.1	12.1	18.1	0.0	0.1	0.0	0.0	0.0		21	46
23 †	19.7	15.1	17.4	0.6	0.0	2.6	0.0	2.6		23	52
24 †	16.5	4.2	10.4	7.6	0.0	3.0	0.0	3.0		23	37
25 †	9.4	-1.8	3.8	14.2	0.0	0.0	0.0	0.0		6	37
26 †	9.6	-2.2	3.7	14.3	0.0	0.0	0.0	0.0			<31
27 †	16.1	5.0	10.6	7.4	0.0	0.0	0.0	0.0		23	37
28 †	17.2	2.5	9.9	8.1	0.0	5.2	0.0	5.2			<31
29 †	18.7	7.3	13.0	5.0	0.0	0.0	0.0	0.0			<31
30 †	22.0	6.6	14.3	3.7	0.0	1.2	0.0	1.2			<31
Sum				196.6	0.1	56.0	0.0	56.0			
Avg	17.1	5.8	11.43								
Xtrm	24.1	-2.2								22	65