

**Real Time Water Quality Deployment Report  
NF02ZK0023 - Rattling Brook below Bridge (Vale Inco)  
October - November 2008**

**General**

- The Water Resources Management Division staff monitors the real-time web page on a daily basis.
- Vale Inco will be informed of any significant water quality events in the form of a monthly report.
- This monthly report interprets the data from the Rattling Brook River RTWQ station for the period of October 17<sup>th</sup>, 2008 to December 1<sup>st</sup>, 2008.
- Throughout the deployment period, there were several instances where the data did not transmit successfully, resulting in data gaps. This issue will be addressed.

**Maintenance and Calibration of Instrumentation**

- The Rattling Brook instrument was deployed on October 17<sup>th</sup>, 2008. A second set of data readings were collected at the time of installation, using a similar, freshly calibrated instrument. Data readings from both instruments were compared and their variability was ranked, as part of QA/QC protocol.
- The QA/QC rankings upon comparing water quality data from both instruments for the removal before the start of the deployment period and the installation at the start of the deployment period are both indicated in **Table 1**. Rankings of “good” and “excellent” were achieved on removal for all parameters with the exception of conductivity, which received a “poor” ranking. In this particular instance, the problem was a result of the QA sonde used which did not calibrate for conductivity accurately. The conductivity readings being taken at the end of the deployment period by the sonde installed in the river were still very accurate (as compared to expected levels) even after a 30 day deployment. Upon installation, all parameters received rankings of “good” or “excellent”.

**Table 1: QA/QC Data Comparison Rankings upon removal on October 14<sup>th</sup>, 2008 and installation on October 17<sup>th</sup>, 2008**

Station	Date	Action	Instrument Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Rattling Brook (Long Harbour)	Oct. 14, 2008	Removal	Good	Good	Poor	Excellent
	Oct. 17, 2008	Installation	Good	Good	Good	Excellent

- The Rattling Brook instrument was deployed for the period of October 17<sup>th</sup> to December 1<sup>st</sup> (a period of 46 days). A second set of data readings were collected at the time of removal, using a similar, freshly calibrated instrument. Data readings from both instruments were compared and their variability was ranked, as part of QA/QC protocol.

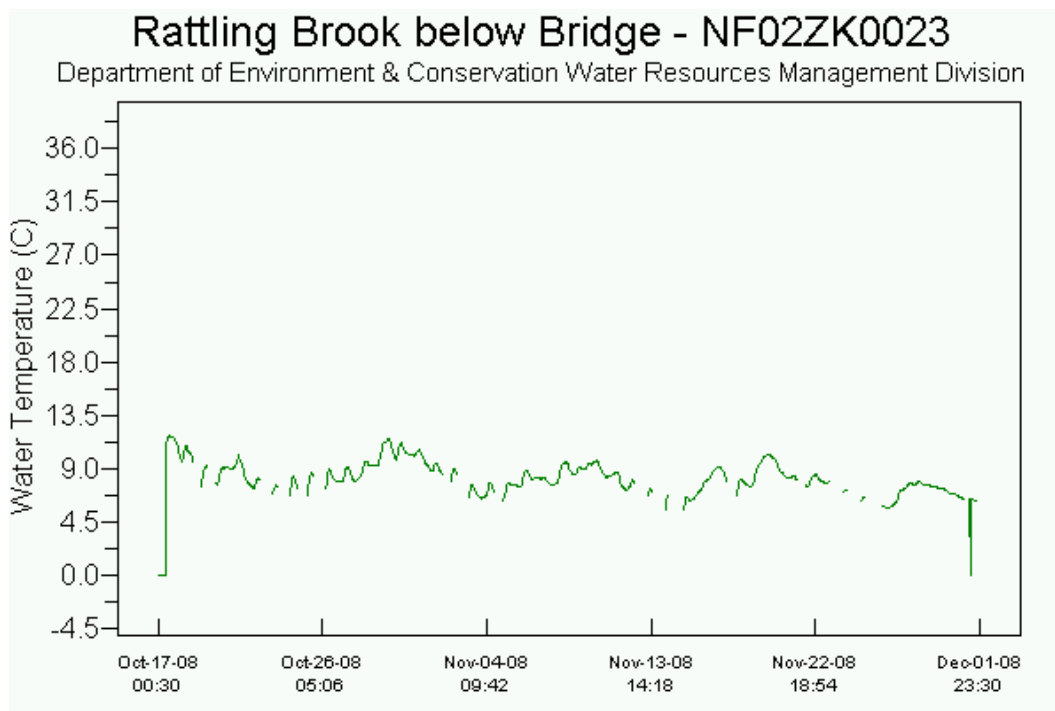
- The QA/QC rankings upon comparing water quality data from both instruments for the removal at the end of the deployment period and the installation after the deployment period are both indicated in **Table 2**. The “excellent” and “good” rankings on removal indicate a high degree of accuracy in the data obtained for all parameters with the exception of pH which received a “fair” ranking. In this particular instance, the problem was likely a result of the QA sonde used which did not calibrate for pH accurately. Upon installation, rankings of “good” and “excellent” were achieved for all parameters except pH, which again ranked as “fair”.

**Table 2: QA/QC Data Comparison Rankings upon removal on December 1<sup>st</sup>, 2008 and installation on December 1<sup>st</sup>, 2008**

Station	Date	Action	Instrument Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Rattling Brook (Long Harbour)	Dec. 1, 2008	Removal	Excellent	Fair	Good	Excellent
	Dec. 1, 2008	Installation	Excellent	Fair	Good	Excellent

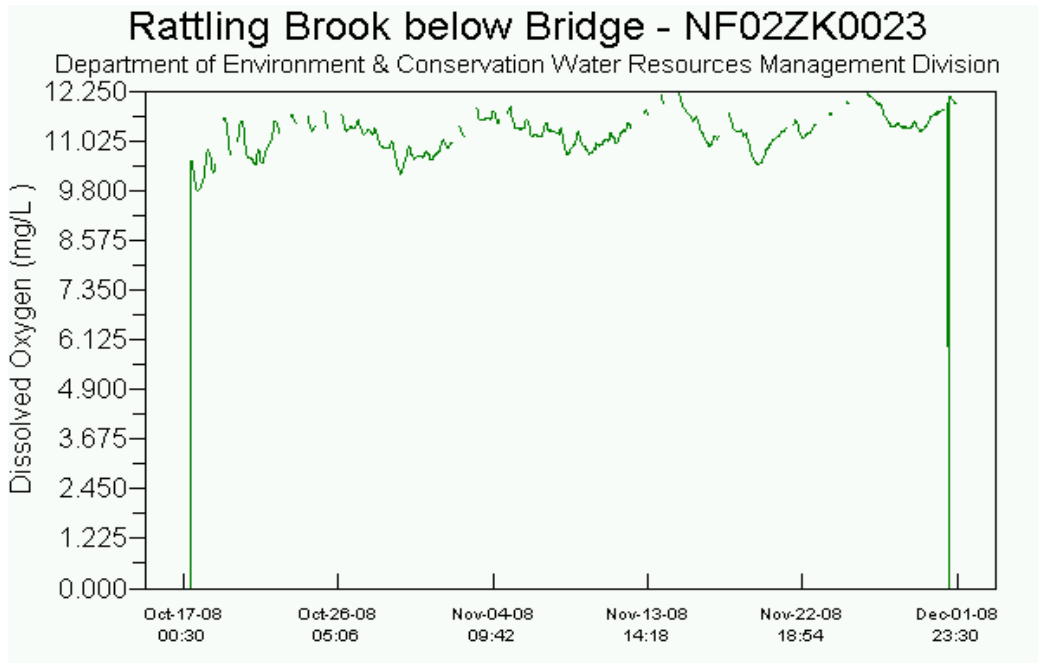
## Data Interpretation

- Water temperature values (**Figure 1**) for the deployment period displayed diurnal fluctuations and showed a slight decrease as expected for the fall season. Water temperature ranged between 5.51 and 11.8°C.



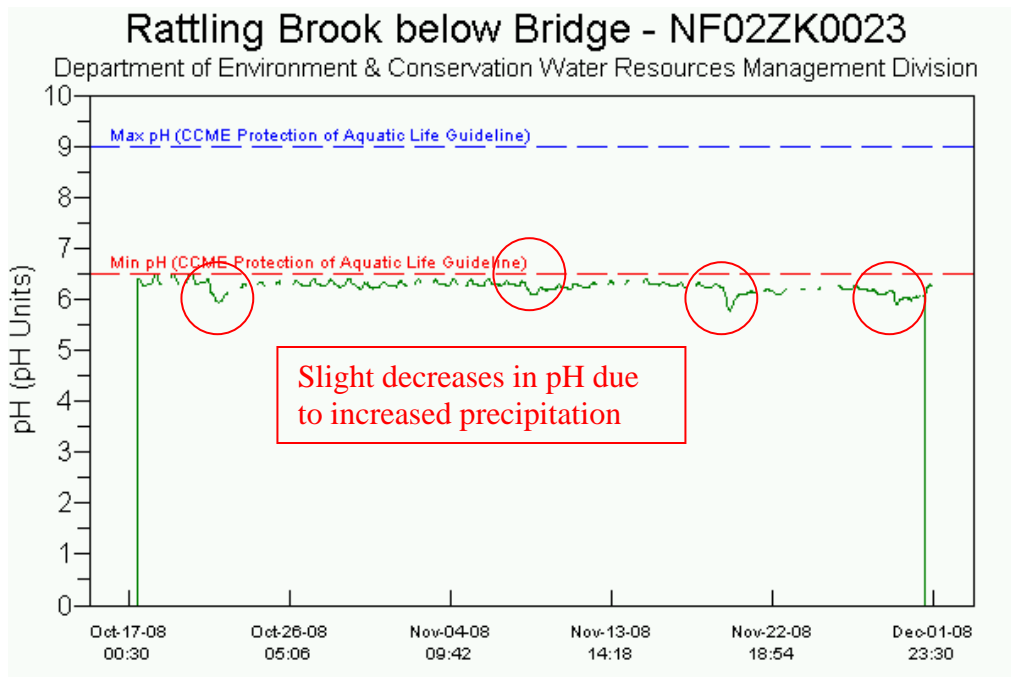
**Figure 1**

- Dissolved oxygen (DO) values (**Figure 2**) for the deployment period were somewhat variable. As the water temperature decreased the dissolved oxygen concentration increased. This inverse relationship is evident from the water temperature and dissolved oxygen graphs. DO values ranged from 9.77 to 12.25 mg/L, all above the minimum DO concentrations recommended by the Canadian Council of Ministers of the Environment (CCME) Protection of Freshwater Aquatic Life Guidelines (cold water/other life stages – above 6.5; warm water/other life stages – above 5.5; warm water/early life stages – above 6; cold water/early life stages – above 9.5 mg/L).



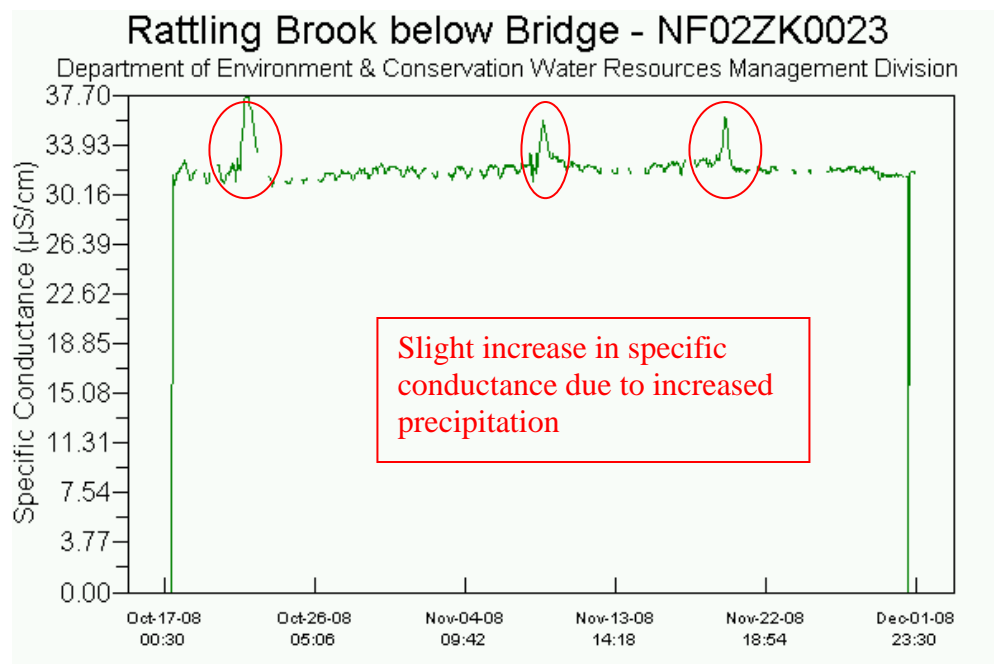
**Figure 2**

- pH values (**Figure 3**) were consistent over the deployment period, with several decreases associated with precipitation events as evident from the climate data tables in Appendix A. pH values ranged between 5.78 and 6.5. All values fell just below/at the minimum pH level of 6.5 recommended by the CCME Guidelines for the Protection of Freshwater Aquatic Life (due to the naturally acidic nature of NL waters).



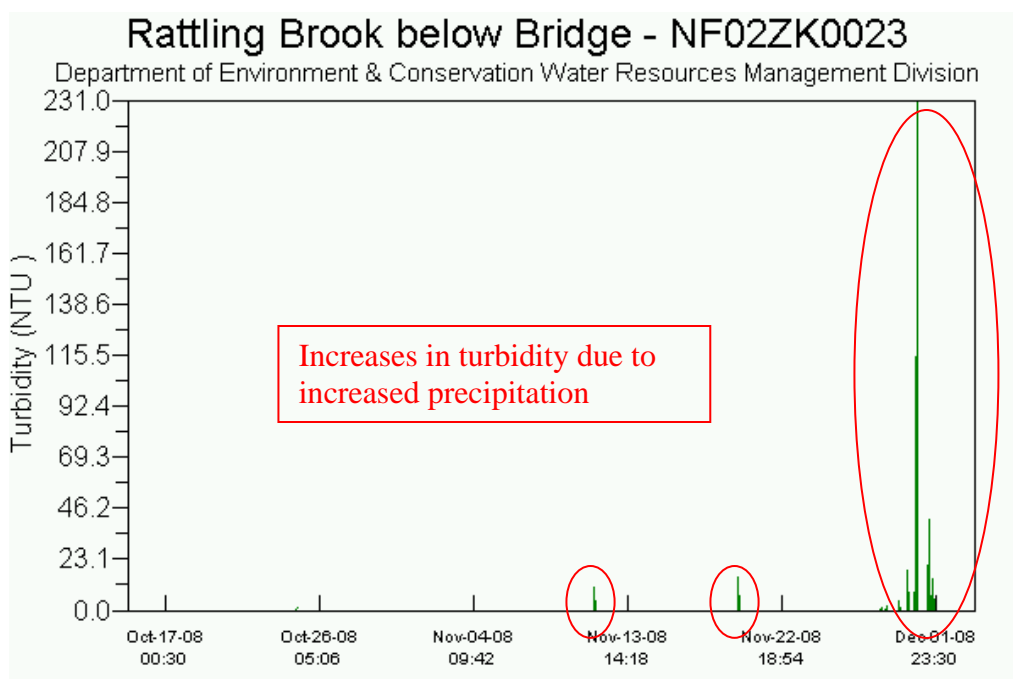
**Figure 3**

- Specific conductance values (**Figure 4**) were consistent over the deployment period with the exception of slight increases due to precipitation events as evident from the climate data (Appendix A). Values ranged from 30.8 to 37.7 $\mu$ S/cm.



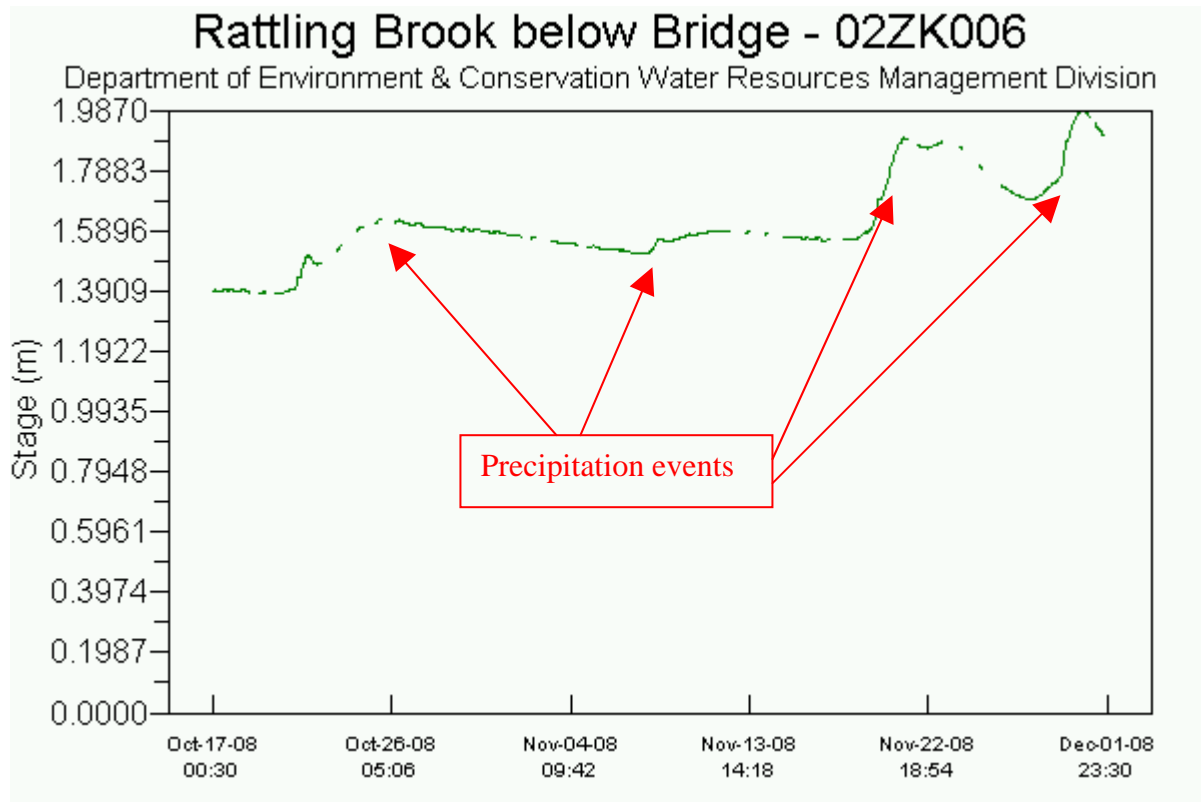
**Figure 4**

- Turbidity values (**Figure 5**) were at zero NTU for the majority of the deployment period. Increases in turbidity were observed during or immediately following precipitation events (Appendix A). In particular, the increases near the end of the deployment period coincided with a rise in stage. The maximum turbidity value recorded during the deployment period was 231 NTU.



**Figure 5**

- Stage readings (**Figure 6**) were consistent with precipitation events in this area (Appendix A) and showed a gradual increase over the deployment period. The height of the river ranged from 1.382 to 1.987m.



**Figure 6**

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## Appendix A – Climate Data for Argentina, NL (October & November 2008)

Daily Data Report for October 2008											
D a y	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†	16.4	11.9	14.2	3.8	0.0	M	M	0.0		26	41
02†	16.1	10.1	13.1	4.9	0.0	M	M	0.0		20	37
03†	16.0	12.5	14.3	3.7	0.0	M	M	0.0		19	48
04†	14.6	10.3	12.5	5.5	0.0	M	M	0.8		25	80
05†	13.2	9.5	11.4	6.6	0.0	M	M	0.0		27	57
06†	12.5	8.9	10.7	7.3	0.0	M	M	0.0		27	56
07†	11.1	5.9	8.5	9.5	0.0	M	M	0.6		31	41
08†	8.7	5.3	7.0	11.0	0.0	M	M	0.7		25	56
09†	12.4	5.8	9.1	8.9	0.0	M	M	4.8		26	56
10†	13.5	10.1	11.8	6.2	0.0	M	M	2.3		26	57
11†	10.3	4.0	7.2	10.8	0.0	M	M	0.7		2	33
12†	9.6	3.5	6.6	11.4	0.0	M	M	0.0			<31
13†	12.0	5.1	8.6	9.4	0.0	M	M	0.0	2	4	46
14†	9.4	3.7	6.6	11.4	0.0	M	M	0.0		22	41
15†	12.3	9.0	10.7	7.3	0.0	M	M	0.0		20	59
16†	12.7	9.0	10.9	7.1	0.0	M	M	0.6		13	33
17†	11.9	8.8	10.4	7.6	0.0	M	M	3.5		33	46
18†	10.0	4.4	7.2	10.8	0.0	M	M	0.0		27	48
19†	8.9	2.6	5.8	12.2	0.0	M	M	0.0			<31
20†	11.0	5.9	8.5	9.5	0.0	M	M	7.5		9	57
21†	13.9	5.7	9.8	8.2	0.0	M	M	43.0		3	91
22†	6.2	3.0	4.6	13.4	0.0	M	M	0.6		2	59
23†	5.2	1.1	3.2	14.8	0.0	M	M	0.0		5	57
24†	9.1	1.2	5.2	12.8	0.0	M	M	0.0		32	39
25†	10.6	0.9	5.8	12.2	0.0	M	M	0.0			<31
26†	11.4	4.4	7.9	10.1	0.0	M	M	0.0			<31
27†	11.9	6.6	9.3	8.7	0.0	M	M	0.0			<31
28†	16.3	9.0	12.7	5.3	0.0	M	M	0.6			<31
29†	18.7	10.1	14.4	3.6	0.0	M	M	11.4		16	70
30†	15.0	9.4	12.2	5.8	0.0	M	M	0.0		20	39
31†	13.7	8.2	11.0	7.0	0.0	M	M	0.7		22	74
<b>Sum</b>				<b>266.8</b>	<b>0.0</b>	<b>M</b>	<b>M</b>	<b>77.8</b>			
<b>Avg</b>	<b>12.1</b>	<b>6.6</b>	<b>9.36</b>								
<b>Xtrm</b>	<b>18.7</b>	<b>0.9</b>							<b>3</b>	<b>91</b>	

Daily Data Report for November 2008											
D a y	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†	9.5	5.2	7.4	10.6	0.0	M	M	0.7		25	69
02†	6.6	-0.1	3.3	14.7	0.0	M	M	1.2		34	59
03†	6.9	-0.9	3.0	15.0	0.0	M	M	0.0		25	69
04†	8.1	5.8	7.0	11.0	0.0	M	M	0.0		26	65
05†	9.4	6.1	7.8	10.2	0.0	M	M	0.0		22	54
06†	11.1	8.6	9.9	8.1	0.0	M	M	0.0		22	44
07†	10.1	5.9	8.0	10.0	0.0	M	M	3.0		12	33
08†	14.3	6.9	10.6	7.4	0.0	M	M	20.1		20	54
09†	15.4	7.6	11.5	6.5	0.0	M	M	1.2		14	54
10†	13.6	6.7	10.2	7.8	0.0	M	M	0.6		22	44
11†	10.9	6.5	8.7	9.3	0.0	M	M	0.7		25	72
12†	7.8	3.3	5.6	12.4	0.0	M	M	0.8		25	57
13†	6.4	-0.3	3.1	14.9	0.0	M	M	0.0		31	43
14†	4.6	-1.7	1.5	16.5	0.0	M	M	0.0			<31
15†	9.4	1.9	5.7	12.3	0.0	M	M	0.7		15	70
16†	15.9	9.3	12.6	5.4	0.0	M	M	2.9		19	74
17†	14.8	6.2	10.5	7.5	0.0	M	M	7.2		16	87
18†	9.3	3.1	6.2	11.8	0.0	M	M	0.0		6	48
19†	15.2	7.2	11.2	6.8	0.0	M	M	48.2		14	80
20†	14.9	4.8	9.9	8.1	0.0	M	M	7.9		16	83
21†	8.1	3.3	5.7	12.3	0.0	M	M	5.4		25	59
22†	14.2	3.2	8.7	9.3	0.0	0.0	M	17.3		11	83
23†	6.4	1.8	4.1	13.9	0.0	M	M	2.4		25	57
24†	5.2	2.0	3.6	14.4	0.0	M	M	0.0		27	46
25†	2.9	-2.0	0.5	17.5	0.0	M	M	0.0			<31
26†	8.1	-2.2	3.0	15.0	0.0	M	M	0.0		10	69
27†	14.4	8.1	11.3	6.7	0.0	M	M	3.6		12	67
28†	12.9	7.3	10.1	7.9	0.0	M	M	11.6		16	63
29†	8.1	6.1	7.1	10.9	0.0	M	M	6.7		26	61
30†	6.6	5.1	5.9	12.1	0.0	M	M	0.0		26	63
<b>Sum</b>				<b>326.3</b>	<b>0.0</b>	<b>0.0*</b>	<b>M</b>	<b>142.2</b>			
<b>Avg</b>	<b>10</b>	<b>4.2</b>	<b>7.1</b>								
<b>Xtrm</b>	<b>15.9</b>	<b>-2.2</b>							<b>16</b>	<b>87</b>	