

**Real Time Water Quality Monthly Report  
Rattling Brook below Bridge (VBNC)  
September 2007 – October 2007**

**General**

- The Water Resources Management Division staff monitors the real-time web page on a daily basis
- Voisey’s Bay Nickel Company (VBNC) will be informed of any significant water quality events in the future in the form of a monthly report
- The initial installation of the RTWQ instrumentation at Rattling Brook below Bridge occurred on December 12<sup>th</sup>, 2006
- Envirodat number given to site: NF02ZK0023
- Instrument has been sent to supplier for repairs

**Maintenance and Calibration of Instrumentation**

- The instrument at Rattling Brook was removed on September 4<sup>th</sup>, 2007 for cleaning and calibration and then reinstalled on September 5<sup>th</sup>, 2007. The results of comparing the Minisonde values to Datasonde values during removal and installation on September 4<sup>th</sup>/5<sup>th</sup>, 2007 can be seen in **Table 1**.

**Table 1: QA/QC Data Comparison Rankings upon reinstallation on September 5<sup>th</sup>, 2007**

| Station                          | Date                                | Action       | Minisonde vs. Datasonde Comparison Ranking |           |              |                  |
|----------------------------------|-------------------------------------|--------------|--|-----------|--------------|------------------|
|                                  |                                     |              | Temperature                                | pH        | Conductivity | Dissolved Oxygen |
| Rattling Brook<br>(Long Harbour) | September 4 <sup>th</sup> ,<br>2007 | Removal      | Excellent                                  | Fair      | Good         | Excellent        |
|                                  | September 5 <sup>th</sup> ,<br>2007 | Installation | Good                                       | Excellent | Excellent    | Excellent        |

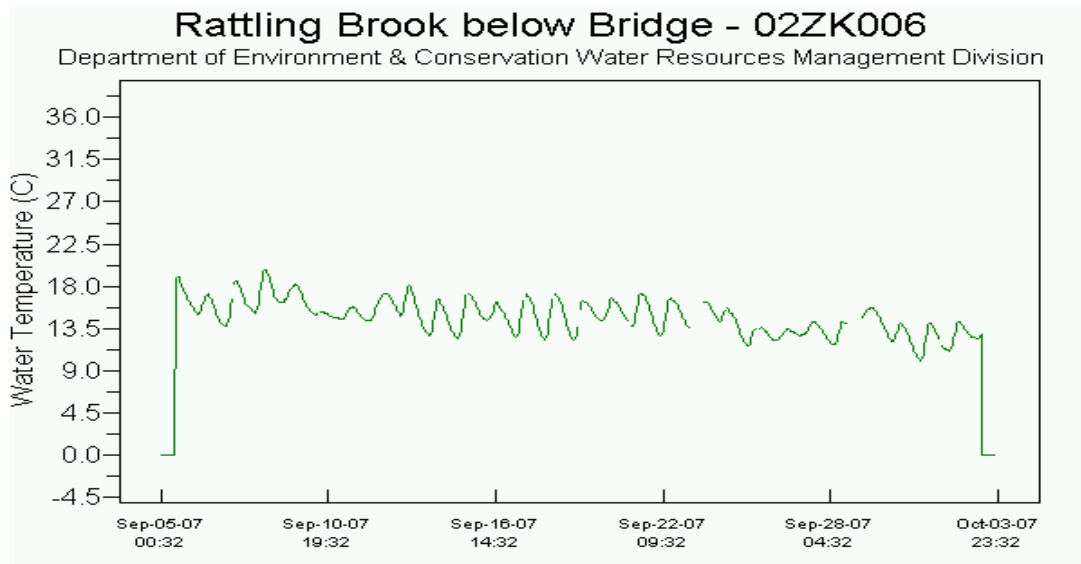
- The instrument was deployed until October 3<sup>rd</sup>, 2007 (28-day deployment period) at which point it was removed for repairs. The results of comparing the Minisonde values to the Datasonde values during removal on October 3<sup>rd</sup>, 2007 can be seen in **Table 2**.

**Table 2: QA/QC Data Comparison Rankings upon removal on October 3<sup>rd</sup>, 2007**

| Station                          | Date                              | Action  | Minisonde vs. Datasonde Comparison Ranking |      |              |                  |
|----------------------------------|-----------------------------------|---------|--|------|--------------|------------------|
|                                  |                                   |         | Temperature                                | pH   | Conductivity | Dissolved Oxygen |
| Rattling Brook<br>(Long Harbour) | October 3 <sup>rd</sup> ,<br>2007 | Removal | Good                                       | Fair | Good         | Poor             |

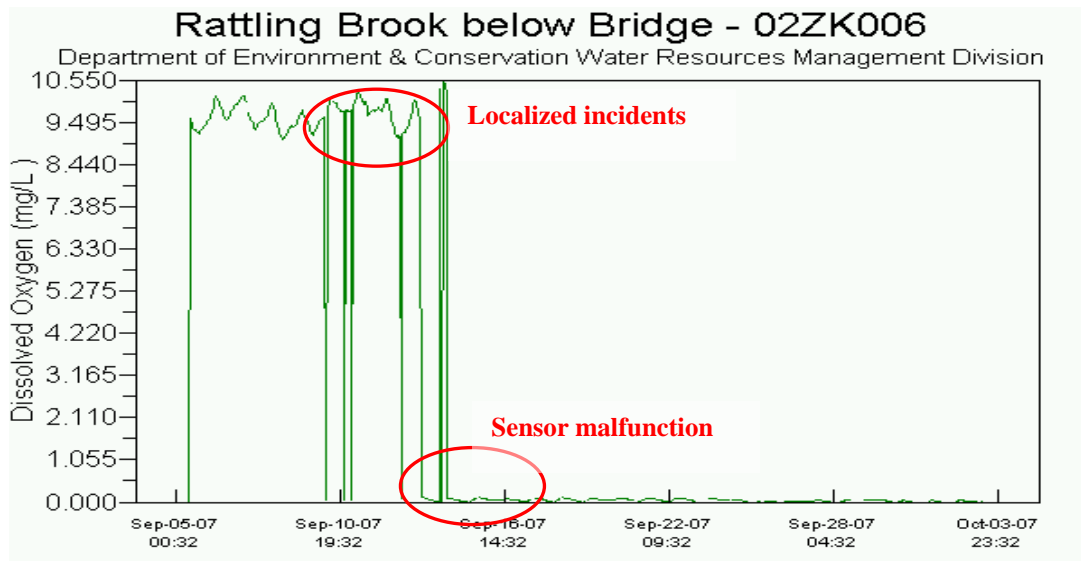
## Data Interpretation

- The water temperature (**Figure 1**) began to decrease over the deployment period. This is typical for this time of year with a temperature range of 10.09-19.81°C.



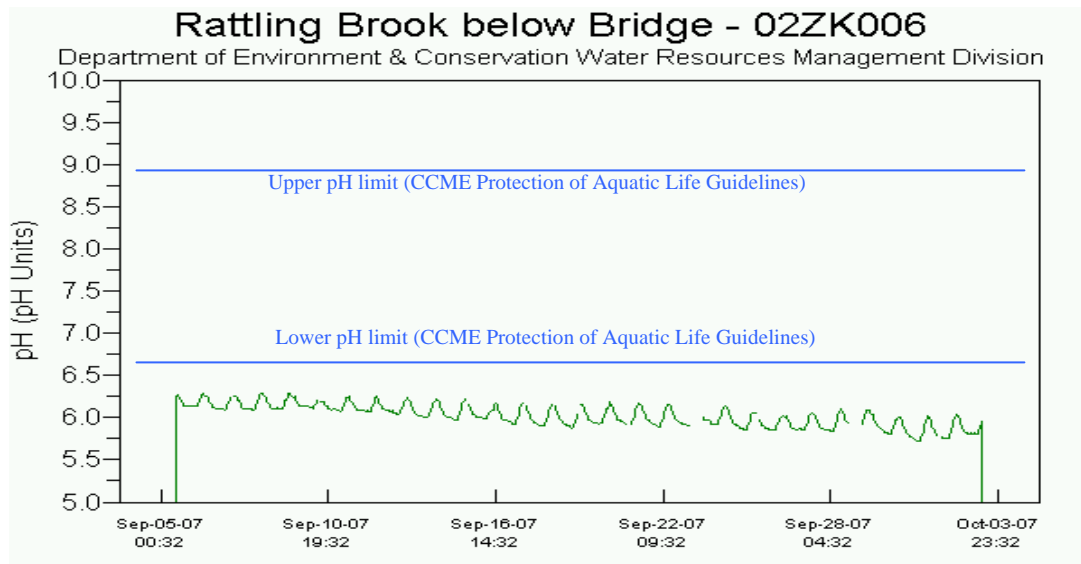
**Figure 1**

- The dissolved oxygen (DO) values (**Figure 2**) spiked several times for brief 1 hour incidents near the beginning of the deployment period. Aside from these incidents, reasonable values were maintained until September 13, 2007 when the DO sensor appears to have malfunctioned as illustrated in Figure 2. DO values obtained before apparent sensor malfunction had a maximum of 10.55mg/L and most were above the most conservative values in the CCME Protection of Aquatic Life guidelines for dissolved oxygen (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 – 9.5 mg/L).



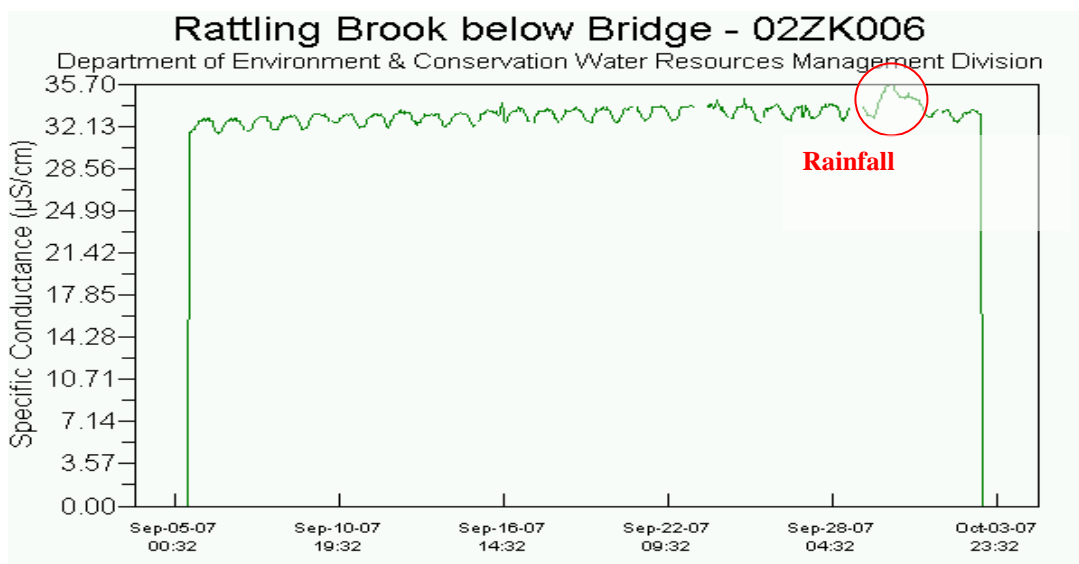
**Figure 2**

- The pH values (**Figure 3**) for Rattling Brook station remained relatively consistent with a slight downward drift during the deployment period possibly due to loss of calibration of the sensors. The pH values ranged from 5.72 to 6.29, all values falling under the recommended range (6.5 – 9.0) for the CCME Protection of Aquatic Life guidelines due to the naturally acidic nature of NL waters.



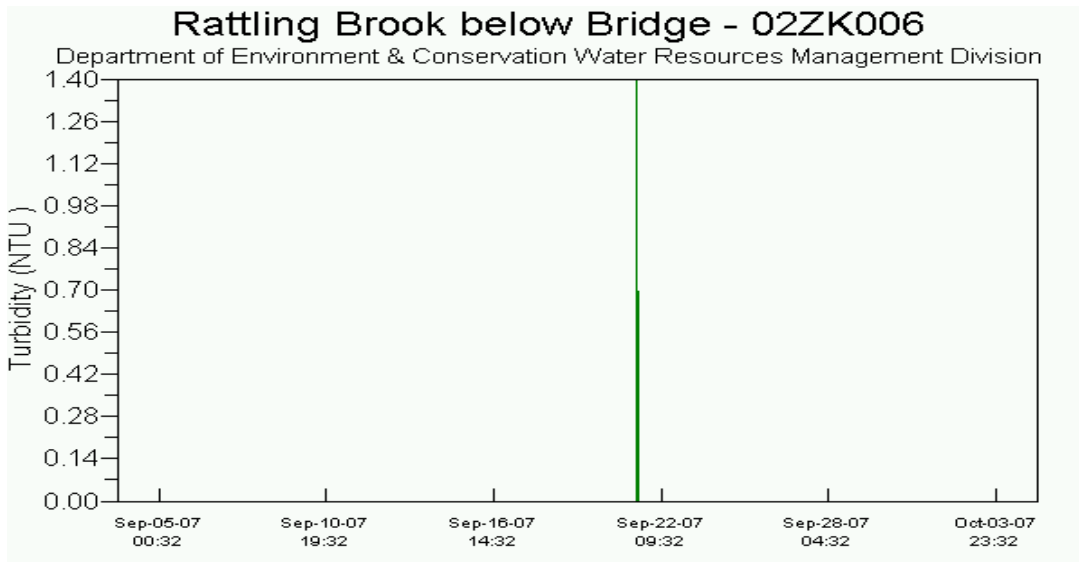
**Figure 3**

- The specific conductivity values (**Figure 4**) remained relatively consistent throughout the deployment period with values ranging from 31.5– 35.7  $\mu\text{S}/\text{cm}$ . There was an upward drift in values during the deployment period possibly due to loss of calibration of the sensor. Also seen was a small jump in values near the end of the deployment period possibly due to rainfall on the 28<sup>th</sup> and 29<sup>th</sup> of September (see **Appendix A** for climatological data).



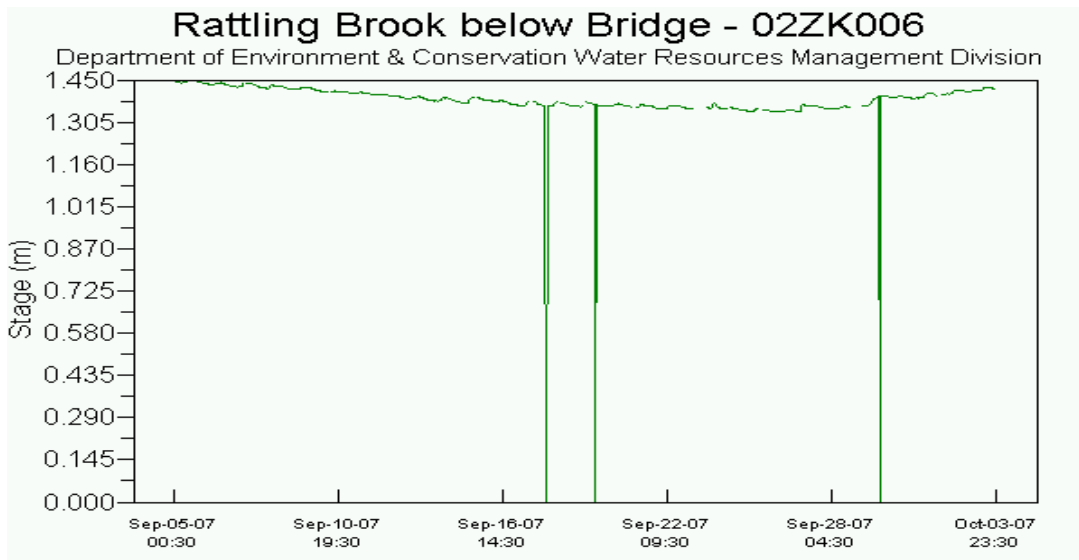
**Figure 4**

- Turbidity values (**Figure 5**) were not recorded during the deployment period, indicating that this sensor may have malfunctioned.



**Figure 5**

- The stage values (**Figure 6**) indicate that water level slightly decreased during the deployment period but experienced an increase after several rainfall events towards the end of the deployment period (see **Appendix A** for climatological data).










**Figure 6**

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## Appendix A – Climate Data for Argentina, NL (September & October 2007)

| Daily Data Report for September 2007 |                |                |                 |                     |                     |                  |                  |                    |                    |                             |                         |
|--------------------------------------|----------------|----------------|-----------------|---------------------|---------------------|------------------|------------------|--------------------|--------------------|-----------------------------|-------------------------|
| Day                                  | Max Temp<br>°C | Min Temp<br>°C | Mean Temp<br>°C | Heat Deg Days<br>°C | Cool Deg Days<br>°C | Total Rain<br>mm | Total Snow<br>cm | Total Precip<br>mm | Snow on Grnd<br>cm | Dir of Max Gust<br>10's Deg | Spd of Max Gust<br>km/h |
| 01†                                  | 20.8           | 13.5           | 17.2            | 0.8                 | 0.0                 | M                | M                | 9.9                |                    | 19                          | 78                      |
| 02†                                  | 17.8           | 10.7           | 14.3            | 3.7                 | 0.0                 | M                | M                | 0.0                |                    | 36                          | 56                      |
| 03†                                  | 16.6           | 9.8            | 13.2            | 4.8                 | 0.0                 | M                | M                | 0.0                |                    | 21                          | 46                      |
| 04†                                  | 16.1           | 13.4           | 14.8            | 3.2                 | 0.0                 | M                | M                | 3.5                |                    | 21                          | 48                      |
| 05†                                  | 16.6           | 10.0           | 13.3            | 4.7                 | 0.0                 | M                | M                | 0.0                |                    | 25                          | 46                      |
| 06†                                  | 14.4           | 6.9            | 10.7            | 7.3                 | 0.0                 | M                | M                | 0.0                |                    | 2                           | 41                      |
| 07†                                  | 16.4           | 7.2            | 11.8            | 6.2                 | 0.0                 | M                | M                | 0.0                |                    |                             | <31                     |
| 08†                                  | 17.5           | 11.3           | 14.4            | 3.6                 | 0.0                 | M                | M                | 0.0                |                    |                             | <31                     |
| 09†                                  | 16.5           | 10.8           | 13.7            | 4.3                 | 0.0                 | M                | M                | 0.0                |                    | 4                           | 46                      |
| 10†                                  | 12.3           | 10.6           | 11.5            | 6.5                 | 0.0                 | M                | M                | 0.6                |                    | 4                           | 41                      |
| 11†                                  | 15.2           | 10.9           | 13.1            | 4.9                 | 0.0                 | M                | M                | 0.0                |                    | 12                          | 46                      |
| 12†                                  | 19.4           | 11.6           | 15.5            | 2.5                 | 0.0                 | M                | M                | 0.6                |                    | 15                          | 80                      |
| 13†                                  | 15.9           | 10.4           | 13.2            | 4.8                 | 0.0                 | M                | M                | 0.0                |                    | 26                          | 57                      |
| 14†                                  | 14.4           | 9.2            | 11.8            | 6.2                 | 0.0                 | M                | M                | 0.0                |                    | 27                          | 46                      |
| 15†                                  | 15.6           | 8.3            | 12.0            | 6.0                 | 0.0                 | M                | M                | 0.0                |                    | 17                          | 56                      |
| 16†                                  | 18.1           | 10.7           | 14.4            | 3.6                 | 0.0                 | M                | M                | 4.2                |                    | 18                          | 85                      |
| 17†                                  | 14.7           | 8.1            | 11.4            | 6.6                 | 0.0                 | M                | M                | 0.0                |                    |                             | <31                     |
| 18†                                  | 15.7           | 6.9            | 11.3            | 6.7                 | 0.0                 | M                | M                | 0.0                |                    |                             | <31                     |
| 19†                                  | 15.4           | 8.2            | 11.8            | 6.2                 | 0.0                 | M                | M                | 0.0                |                    | 24                          | 33                      |
| 20†                                  | 15.6           | 13.2           | 14.4            | 3.6                 | 0.0                 | M                | M                | 0.0                |                    | 21                          | 48                      |
| 21†                                  | 18.0           | 8.7            | 13.4            | 4.6                 | 0.0                 | M                | M                | 0.0                |                    | 27                          | 37                      |
| 22†                                  | 16.3           | 9.3            | 12.8            | 5.2                 | 0.0                 | M                | M                | 0.0                |                    | 17                          | 39                      |
| 23†                                  | 18.4           | 12.2           | 15.3            | 2.7                 | 0.0                 | M                | M                | 8.1                |                    | 19                          | 57                      |
| 24†                                  | 12.9           | 9.1            | 11.0            | 7.0                 | 0.0                 | M                | M                | 0.0                |                    | 27                          | 59                      |
| 25†                                  | 12.2           | 9.1            | 10.7            | 7.3                 | 0.0                 | M                | M                | 0.0                |                    | 32                          | 41                      |
| 26†                                  | 13.3           | 9.6            | 11.5            | 6.5                 | 0.0                 | M                | M                | 8.1                |                    | 17                          | 41                      |
| 27†                                  | 15.8           | 8.1            | 12.0            | 6.0                 | 0.0                 | M                | M                | 0.0                |                    | 20                          | 46                      |
| 28†                                  | 18.5           | 7.9            | 13.2            | 4.8                 | 0.0                 | M                | M                | 6.8                |                    | 21                          | 74                      |
| 29†                                  | 15.6           | 9.7            | 12.7            | 5.3                 | 0.0                 | M                | M                | 15.4               |                    | 23                          | 52                      |
| 30†                                  | 12.2           | 6.5            | 9.4             | 8.6                 | 0.0                 | M                | M                | 0.0                |                    | 32                          | 41                      |
| Sum                                  |                |                |                 | 154.2               | 0.0                 | M                | M                | 57.2               |                    |                             |                         |
| Avg                                  | 15.9           | 9.7            | 12.83           |                     |                     |                  |                  |                    |                    |                             |                         |
| Xtrm                                 | 20.8           | 6.5            |                 |                     |                     |                  |                  |                    |                    | 18                          | 85                      |

Daily Data Report for October 2007

| D<br>a<br>y | Max<br>Temp<br>°C<br> | Min<br>Temp<br>°C<br> | Mean<br>Temp<br>°C<br> | Heat Deg<br>Days<br>°C<br> | Cool Deg<br>Days<br>°C<br> | Total<br>Rain<br>mm | Total<br>Snow<br>cm | Total<br>Precip<br>mm<br> | Snow on<br>Grnd<br>cm | Dir of Max<br>Gust<br>10's Deg | Spd of Max<br>Gust<br>km/h<br> |
|-------------|--|--|---|---|---|---------------------|---------------------|--|-----------------------|--------------------------------|---|
| <u>01</u> † | 12.9   | 6.6  | 9.8   | 8.2   | 0.0   | M                   | M                   | 0.0  |                       | 24                             | 48  |
| <u>02</u> † | 14.2   | 10.6   | 12.4  | 5.6   | 0.0   | M                   | M                   | 0.0  |                       | 25                             | 48  |
| <u>03</u> † | 15.1   | 10.3   | 12.7  | 5.3   | 0.0   | M                   | M                   | 0.0  |                       |                                | <31   |
| <u>04</u> † | 15.2   | 10.5   | 12.9  | 5.1   | 0.0   | M                   | M                   | 2.9  |                       | 20                             | 48  |
| <u>05</u> † | 14.3   | 11.1   | 12.7  | 5.3   | 0.0   | M                   | M                   | 0.0  |                       | 26                             | 59  |
| <u>06</u> † | 13.5   | 8.7  | 11.1  | 6.9   | 0.0   | M                   | M                   | 0.0  |                       | 33                             | 57  |
| <u>07</u> † | 10.2   | 6.8  | 8.5   | 9.5   | 0.0   | M                   | M                   | 0.7  |                       | 28                             | 52  |
| <u>08</u> † | 11.0   | 6.7  | 8.9   | 9.1   | 0.0   | M                   | M                   | 4.4  |                       | 33                             | 61  |
| <u>09</u> † | 9.0  | 5.2  | 7.1   | 10.9  | 0.0   | M                   | M                   | 0.0  |                       | 35                             | 56  |
| <u>10</u> † | 11.1   | 4.2  | 7.7   | 10.3  | 0.0   | M                   | M                   | 0.0  |                       | 33                             | 33  |
| <u>11</u> † | 11.2   | 4.2  | 7.7   | 10.3  | 0.0   | M                   | M                   | 0.0  |                       | 11                             | 37  |
| <u>12</u> † | 12.1   | 3.6  | 7.9   | 10.1  | 0.0   | M                   | M                   | 0.0  |                       | 7                              | 39  |
| <u>13</u> † | 11.9   | 6.1  | 9.0   | 9.0   | 0.0   | M                   | M                   | 9.0  |                       | 10                             | 63  |
| <u>14</u> † | 9.7  | 7.3  | 8.5   | 9.5   | 0.0   | M                   | M                   | 0.0  |                       |                                | <31   |
| <u>15</u> † | 12.0   | 6.6  | 9.3   | 8.7   | 0.0   | M                   | M                   | 7.8  |                       |                                | <31   |
| <u>16</u> † | 7.7  | 3.7  | 5.7   | 12.3  | 0.0   | M                   | M                   | 3.0  |                       | 34                             | 43  |
| <u>17</u> † | 8.0  | 4.4  | 6.2   | 11.8  | 0.0   | M                   | M                   | 0.0  |                       | 34                             | 57  |
| <u>18</u> † | 8.0  | 4.1  | 6.1   | 11.9  | 0.0   | M                   | M                   | 0.7  |                       | 27                             | 54  |
| <u>19</u> † | 8.7  | 2.6  | 5.7   | 12.3  | 0.0   | M                   | M                   | 0.0  |                       | 31                             | 35  |
| <u>20</u> † | 15.3   | 4.3  | 9.8   | 8.2   | 0.0   | M                   | M                   | 25.6   |                       | 20                             | 74  |
| <u>21</u> † | 14.0   | 8.7  | 11.4  | 6.6   | 0.0   | M                   | M                   | 23.0   |                       | 21                             | 65  |
| <u>22</u> † | 10.3   | 4.3  | 7.3   | 10.7  | 0.0   | M                   | M                   | 0.0  |                       | 26                             | 54  |
| <u>23</u> † | 14.6   | 5.3  | 10.0  | 8.0   | 0.0   | M                   | M                   | 0.0  |                       | 20                             | 69  |
| <u>24</u> † | 11.9   | 5.9  | 8.9   | 9.1   | 0.0   | M                   | M                   | 0.0  |                       | 21                             | 59  |
| <u>25</u> † | 7.2  | 4.5  | 5.9   | 12.1  | 0.0   | M                   | M                   | 0.0  |                       | 29                             | 32  |
| <u>26</u> † | 8.8  | 4.4  | 6.6   | 11.4  | 0.0   | M                   | M                   | 0.0  |                       | 26                             | 54  |
| <u>27</u> † | 10.7   | 7.7  | 9.2   | 8.8   | 0.0   | M                   | M                   | 0.0  |                       | 26                             | 44  |
| <u>28</u> † | 15.6   | 9.3  | 12.5  | 5.5   | 0.0   | M                   | M                   | 17.9   |                       | 19                             | 72  |
| <u>29</u> † | 10.6   | 2.5  | 6.6   | 11.4  | 0.0   | M                   | M                   | 9.7  |                       | 26                             | 54  |
| <u>30</u> † | 6.2  | 1.9  | 4.1   | 13.9  | 0.0   | M                   | M                   | 0.6  |                       |                                | <31   |
| <u>31</u> † | 4.9  | 2.1  | 3.5   | 14.5  | 0.0   | M                   | M                   | 0.6  |                       | 34                             | 43  |
| Sum         |  |  |   | 292.3   | 0.0   | M                   | M                   | 105.9  |                       |                                |   |
| Avg         | 11.2   | 5.9  | 8.55  |   |   |                     |                     |  |                       |                                |   |
| Xtrm        | 15.6   | 1.9  |   |   |   |                     |                     |  |                       | 20                             | 74  |