

Real Time Water Quality Monthly Report For Peter's River December 2004

General

- The Water Resources Management Division staff monitor the real-time web page on a daily basis.

Maintenance and Calibration of Instrumentation

- The Datasonde was removed from Peter's River January 6/05 for routine cleaning, maintenance and calibration.
- Water quality readings were taken with a Minisonde at the time of removal for comparison purposes. The Minisonde was calibrated prior to use.
- Water samples were taken January 24/05 for laboratory analysis as part of QA/QC procedures.
- Due to heavy ice conditions the Datasonde will not be reinstalled until the Spring 2005.

Data Interpretation

- In general, water quality parameters were stable during the period of measure between December 2/04 and January 6/05, with expected daily/nightly (diurnal) and seasonal changes occurring.
- Environment Canada reported the following daily air temperatures, precipitation and maximum wind gusts for the Central NL region during the month of December 2004, as seen in **Table 1**, below:

Table 1

Daily Data Report for December 2004						
D a y	Max Temp °C	Min Temp °C	Total Rain mm	Total Snow cm	Total Precip mm	Spd of Max Gust km/h
01†	4.5	-3.8	0.0	0.0	0.0	<31
02†	5.8	-2.3	3.4	T	3.4	63
03†	-2.1	-6.6	0.0	T	T	76
04†	-2.7	-9.3	0.0	0.0	0.0	52
05†	1.8	-9.0	0.0	1.6	1.6	69
06†	-6.8	-12.4	0.0	0.6	0.4	100
07†	-5.4	-10.8	0.0	T	T	69
08†	-1.3	-10.5	0.0	6.2	6.2	50
09†	0.3	-2.5	0.0	8.8	8.0	52
10†	-0.8	-3.5	0.0	T	T	<31
11†	-0.2	-4.2	0.4	6.2	6.6	41
12†	2.5	-0.3	7.2	T	7.2	37
13†	3.3	0.5	0.8	T	0.8	<31
14†	6.6	-1.5	2.8	1.0	4.2	69
15†	-0.4	-4.7	0.0	0.0	0.0	41
16†	-4.1	-5.8	0.2	T	0.2	<31
17†	2.3	-9.7	2.2	1.0	3.2	54

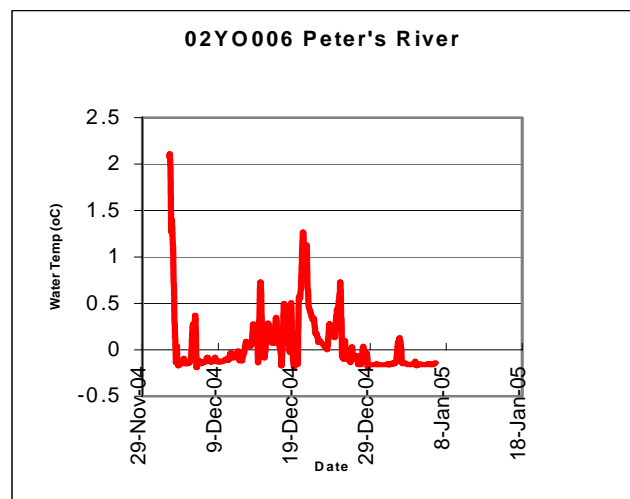
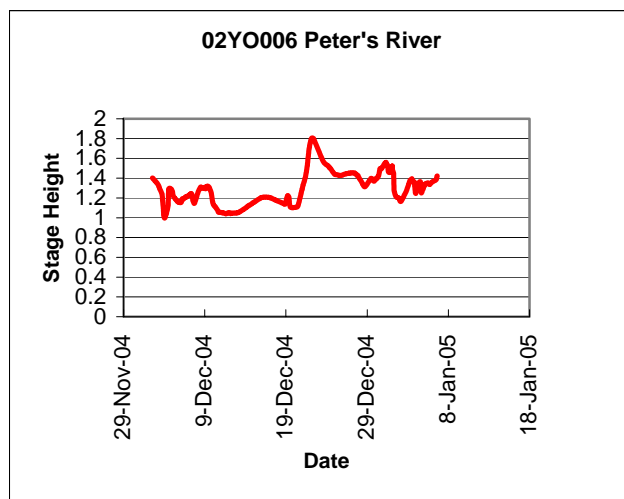
<u>18</u> †	0.8	-7.9	0.0	0.0	0.0	41
<u>19</u> †	7.7	-7.3	6.4	T	6.4	56
<u>20</u> †	11.9	3.0	31.6	0.0	31.6	46
<u>21</u> †	9.8	0.1	6.4	1.0	8.2	70
<u>22</u> †	1.1	-4.3	0.0	T	T	46
<u>23</u> †	6.2	-4.3	0.0	0.0	0.0	44
<u>24</u> †	11.4	2.8	3.2	0.0	3.2	67
<u>25</u> †	11.1	-10.1	19.4	14.4	34.4	39
<u>26</u> †	-10.0	-13.4	0.0	T	T	33
<u>27</u> †	2.7	-13.0	1.0	23.6	30.2	82
<u>28</u> †	1.1	-13.0	0.0	1.8	1.6	67
<u>29</u> †	-1.8	-12.7	0.0	2.6	2.4	48
<u>30</u> †	-7.6	-12.7	0.0	0.2	0.2	48
<u>31</u> †	0.5	-9.8	0.0	T	T	52

*T=trace amount; † = daily data has undergone only preliminary checking

- **Stage height** (water level) rose and fell in response to daily precipitation as well as melting and freezing temperatures, as seen in **Figure 1**. A sharp rise in water level is seen on the graph on Dec 20th, corresponding to a reported 31.6mm of rain that fell in the area that day. Heavy precipitation also occurred on December 25th (34.4 mm) and December 27th (30.2mm), however, there was no corresponding sharp increase in water level, probably because much of the precipitation was in the form of snow.
- **Water temperature** fluctuated in response to daily maximum and minimum air temperature as can be seen when the graph in **Figure 2** is compared to the air temperature data in **Table 1**. A sharp decrease is seen in water temperature at the beginning of December in response to the steep decrease in daily maximum air temperature that occurred between December 3rd and 4th. A notable increase in water temperature is indicated in the graph on December 20th, when the maximum daily air temperature rose from 0.8°C on December 18th to 11.9°C on December 20th. Ice conditions developed in Peter's River as water temperature fell consistently below 0°C.

Figure 1

Figure 2



- **Conductivity** levels spiked on December 4th (**Figure 3**), however, there doesn't appear to have been a significant rainfall or wind event (**Table 1**), which caused this sudden change. There may have been some material or debris, which passed close to the sensor and moved on, thus causing a spike in conductivity. Conductivity readings were stable for most of this time period, with an expected decrease on December 20th, in response to significant rainfall that day.
- **Total dissolved solids** levels reflected the changes in conductivity, as seen in **Figure 4**. Conductivity measurements are a good indication of total dissolved solids and total dissolved ion concentrations, although this is not an exact linear relationship.

Figure 3

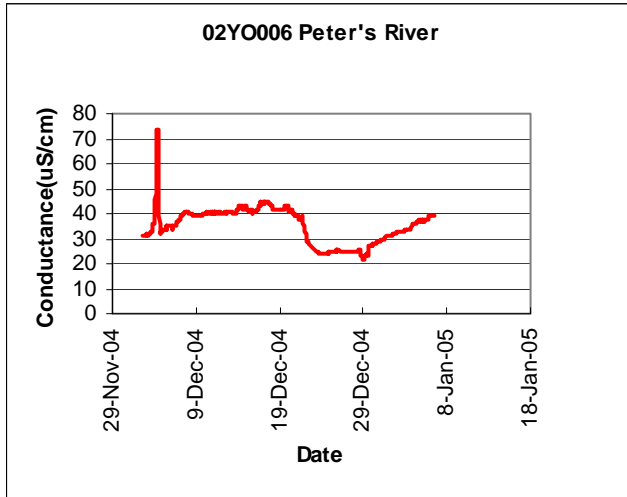
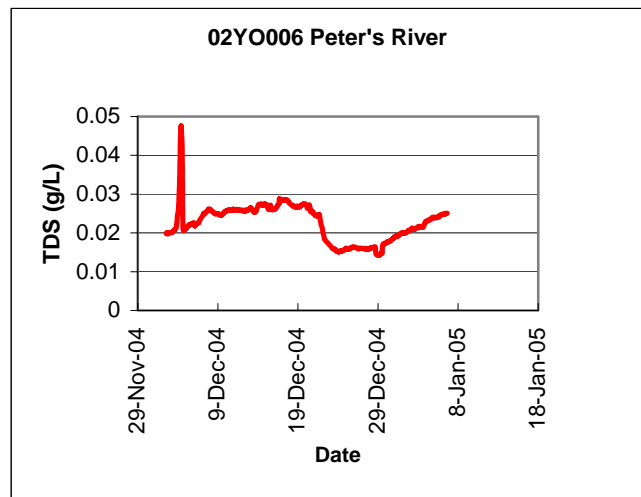


Figure 4



- **pH** levels were consistently below the CCME minimum recommended Guideline for Freshwater Aquatic Life of 6.5 (see **Figure 5**). The average pH level for this period was 6.3 (see **Table 2**). According to our data, the average pH level during November 2004 was 7.09. Seasonal decreases in pH are expected this time of year as daylight hours, and thus photosynthetic activity, decrease.
- **Dissolved oxygen (DO)** levels were constant during this period of measure (see **Figure 6**). All dissolved oxygen measurements were above the CCME recommended maximum guideline of 9.5. The average DO level for this period was 12.72mg/L. The average DO level during November 2004 was 13.26, also exceeding the recommended maximum. This could be an indication that background DO levels generally exceed the recommended maximum at this time of year, however, more data needs to be collected over a longer period of time.

Figure 5

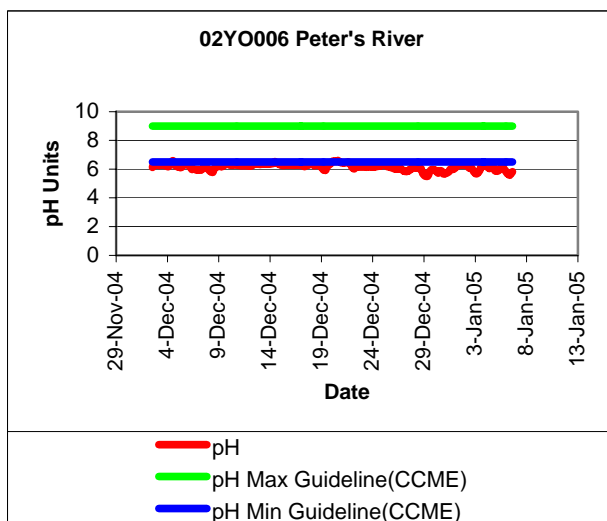
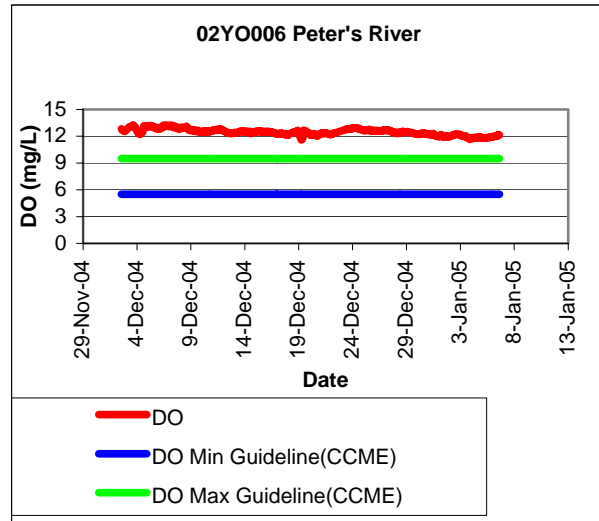
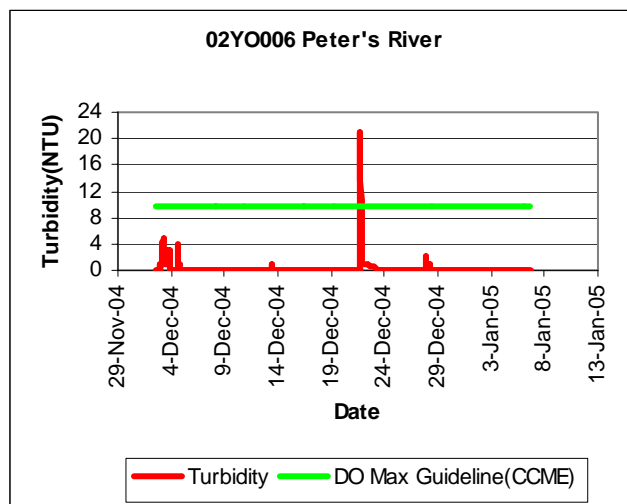


Figure 6



- **Turbidity** levels fluctuated near the average to date, of 1.64 NTU's. One turbidity spike occurred on December 21st, (see **Figure 7**), probably in response to high winds on that day and heavy rainfall on the preceding day. This peak exceeded the CCME recommended maximum of 8 NTU above background levels.

Figure 7



Additional Information

- Table 2 provides summary statistics on water quality parameters for Peter's River from December 2nd to January 6th.

Summary Stats	Temp-Water	pH	Conductance	TDS	Percent-Satur	Diss-Oxy	Turbidity
Max	2.11	6.75	73.09	0.0470	93.70	13.32	21.00
Min	-0.24	5.71	9.79	0.0062	81.32	11.85	0.00
Average	0.01	6.30	27.46	0.0174	87.81	12.72	0.13
Standard dev	0.33	0.19	10.23	0.0066	1.96	0.27	0.88

*Turbidity stats are taken from raw data, stats for all other parameters are taken from corrected data.

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