

Summary Report 2010 Water Quality Monitoring Ottauquechee River Group – La Rosa Laboratory Results

April 29, 2011

Overview

The Ottauquechee River Group's (ORG's) water quality monitoring program was made possible in 2010 by the LaRosa Partnership Program and a dedicated team of local volunteers. There were 9 regular volunteer river monitors and the program was organized and run by a volunteer coordinator (Todd Menees) assisted by an unpaid VT DEC intern (Soren Paris) who divided his hours of services between the ORG, West River Watershed Alliance and Marie Caduto, VT DEC Watershed Coordinator for Basins 10, 11 & 13. The internship helped Soren to meet practicum requirements of his graduate program at Antioch New England College in Summer 2010.

There were 10 sites chosen for monitoring in ORG's 2010 program to be sampled every 2 weeks over a total of 7 weeks for Chloride, Total Phosphorous, E. coli and Turbidity. These site locations were previously sampled in 1992 and 1993 and were chosen for comparison with that data (data comparison is pending).

E. coli

About 37% of E. coli results exceeded State or Federal limits for E. coli. Results indicate that E. coli bacteria levels varied the most in Kedron Brook (site KeB045) in South Woodstock and the least in Kent Pond Brook (site KtB015) in Killington. The Kedron Brook E. coli results exceeded State or Federal limits in 67% of the sampling events. The Kent Pond samples were the only sampling site without any results exceeding State or Federal limits.

The next highest levels of trend variation occurred in the Ottauquechee River (site OtR254) in Bridgewater and in the Ottauquechee River (site OtR133) in Woodstock (less than half of sampling results at both sites exceeded State or Federal limits). Only one site in Killington (site OtR006) showed a declining trend for the sampling period with a 57% exceedance of State and Federal limits for the first 4 sampling events.

Chloride

Chloride results indicated the consistently highest levels at site RoB013 on the Roaring Brook in Killington and the consistently lowest levels at site NBO002 on the North Branch of the Ottauquechee River in Bridgewater. The next highest levels of trend variation occurred in the Ottauquechee River (site FaO004) below the confluence with Falls Brook in Killington and in the Ottauquechee River (site OtR384) in Killington. All sampling sites showed an increasing trend in Chloride levels as the Summer progressed.

Total Phosphorous

Phosphorous results indicated generally low variability over the watershed in the Summer with high spikes in mid- to late-Summer in Bridgewater (site NBO002) and Woodstock (site KeB045). The higher trend values were observed in Woodstock (site OtR133), the lowest trend values were generally in

Killington (site RoB013) and the most consistent results over the Summer were observed in Killington below Kent Pond (site KtB015).

Turbidity

The highest spike in Turbidity was observed in Bridgewater (site OtR254) and the generally lowest results were in Killington below Kent Pond (site KeB045). The highest trending values were observed in Woodstock (site OtR133) and six of ten sites showed a spike in Turbidity at the end of June sampling event.

Quality Control

Independent Quality Control (QC) review was provided by Todd Menees and Soren Paris. The QC results are generally acceptable and these reviews are summarized below:

- The **E. coli** average Relative Percent Difference (RPD) of field duplicates was 30.7% for the 7 sampling dates and is within the RPD goal of estimated range of precision specified in the QAPP.
- The **Chloride** average RPD of field duplicates was 1.2% for the 7 sampling dates and is within the RPD goal of estimated range of precision specified in the QAPP.
- The **Total Phosphorous** average RPD of field duplicates was 17% for the 7 sampling dates and is within the RPD goal of estimated range of precision specified in the QAPP.
- The **Turbidity** average RPD of field duplicates was 46.4% for the 7 sampling dates and exceeds the RPD goal of estimated range of precision specified in the QAPP. Only 2 Turbidity duplicates were within the RPD goal in the QAPP.
- Twenty lab blank samples were analyzed and one lab blank sample for Total Phosphorous at site OTR185 was reported above the analytical method limit (blank sample #100733-12) and this unexpected value is presumed to be due to using old de-ionized water in field sampling (i.e. phosphorous in the container leached into the de-ionized water that had been held from a previous sampling event).

Comprehensive Report

Soren Paris will be developing a more Comprehensive Report to meet practicum requirements of his graduate program at Antioch New England College in Spring 2011. This report will include a comparison of 2010 results to the 1992 and 1993 results to be distributed to the Ottauquechee River community.

Appendices

Table 1 Site ID Numbers & Coordinates

Table 2 – Number of sampling events & Data completeness

Table 3 – Dates on which duplicates were taken

Table 4 – Values for duplicate samples

Table 5 – Actual sample values corresponding to duplicate sample dates

Table 6 – Relative Percent Difference comparing duplicate and actual values

Table 1 Site ID Numbers & Coordinates

Site Number	Site Description	Lat.	Long.
OtR006	Ottauquechee River Hartland Covered Bridge D/S	43.59316 N	072.34883 W
OtR133	Ottauquechee River Taftsville Dam U/S	43.63203 N	072.46867 W
OtR185	Ottauquechee River WUHS	43.61223 N	072.54421 W
OtR254	Ottauquechee River Rte 100A bridge	43.58648 N	072.65647 W
OtR384	Ottauquechee River Rabeck Rd.	43.65093 N	072.76862 W
FaB004	Falls Brook Confluence	43.6046 N	072.7546 W
KeB045	Kedron Brook WWTF D/S	43.5652 N	072.5281 W
KtB015	Kent Brook Pond Outlet	43.67552 N	072.79902 W
NBO002	North Branch Confluence	43.59335 N	072.66113 W
RoB013	Roaring Brook WWTF D/S	43.64901 N	072.78779 W

Table 2 – Number of sampling events & Data completeness

I = Intended, A = Actual

	Chloride		Phosphorus		E. coli.		Turbidity	
	I	A	I	A	I	A	I	A
FaO004	7	7	7	7	7	7	7	7
KeB045	7	6	7	6	7	6	7	6
KtB015	7	7	7	7	7	7	7	7
NBO002	7	6	7	6	7	6	7	6
OtR006	7	7	7	7	7	7	7	7
OtR133	7	7	7	7	7	7	7	7
OtR185	7	7	7	7	7	7	7	7
OtR254	7	6	7	6	7	6	7	6
OtR384	7	7	7	7	7	7	7	7
RoB013	7	7	7	7	7	7	7	7
Total	70	67	70	67	70	67	70	67
% complete		96%		96%		96%		96%
Field Duplicates	7	7	7	7	7	7	7	7
Blanks	7	5	7	5	7	5	7	5

Table 3 – Dates on which duplicates were taken

Site	Chloride	Phosphorus - Digested	Preliminary E. coli.	Turbidity
FaO004	07/15/10	07/15/10	07/15/10	07/15/10
KeB045	07/01/10	07/01/10	07/01/10	07/01/10
KtB015	09/23/10	09/23/10	09/23/10	09/23/10
OtR006	08/26/10	08/26/10	08/26/10	08/26/10
OtR133	09/09/10	09/09/10	09/09/10	09/09/10
OtR185	07/29/10	07/29/10	07/29/10	07/29/10
RoB013	08/12/10	08/12/10	08/12/10	08/12/10

Table 4 – Values for duplicate samples

Site	Chloride	Phosphorus - Digested	Preliminary E. coli.	Turbidity
FaO004	22.40	17.00	276	1.26
KeB045	8.58	31.80	214	0.82
KtB015	13.80	12.70	3	1.06
OtR006	18.40	18.30	58	1.42
OtR133	22.30	23.20	18	2.45
OtR185	12.80	14.60	126	3.53
RoB013	50.80	6.55	37	2.01

Table 5 – Actual sample values corresponding to duplicate sample dates

Site	Chloride	Phosphorus - Digested	Preliminary E. coli.	Turbidity
FaO004	22.70	16.40	291	1.63
KeB045	8.81	14.70	218	0.20
KtB015	13.80	12.50	1	1.11
OtR006	18.10	18.50	49	1.17
OtR133	22.10	22.10	18	2.54
OtR185	12.80	19.00	326	2.16
RoB013	51.80	6.06	36	0.65

Table 6 – Relative Percent Difference comparing duplicate and actual values

Site	Chloride	Phosphorus - Digested	Preliminary E. coli.	Turbidity
FaO004	1.3%	3.6%	5.3%	25.6%
KeB045	2.6%	*73.5%	1.9%	*121.6%
KtB015	0.0%	1.6%	100.0%	4.6%
OtR006	1.6%	1.1%	16.8%	*19.3%
OtR133	0.9%	4.9%	0.0%	3.6%
OtR185	0.0%	26.2%	*88.5%	*48.2%
RoB013	1.9%	7.8%	2.7%	*102.3%
Average RPD	1.21%	16.95%	30.74%	46.44%
RPD Goal	≤ 5%	≤ 30%	≤ 50% (> 25) ≤ 125% (< 25)	≤ 15%

* Bold Numbers with asterisks indicate values that exceeded goals of the QAPP