

Water Quality in the LaPlatte River

Summary Report for 2013

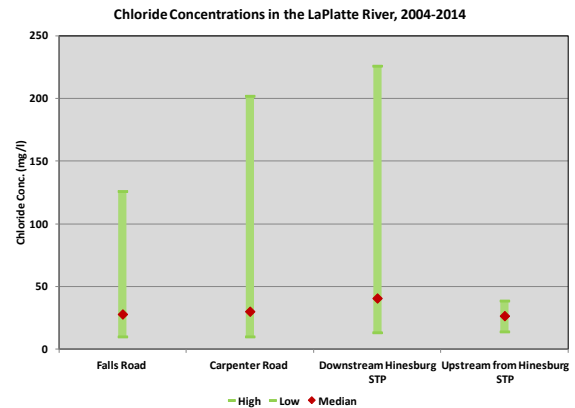
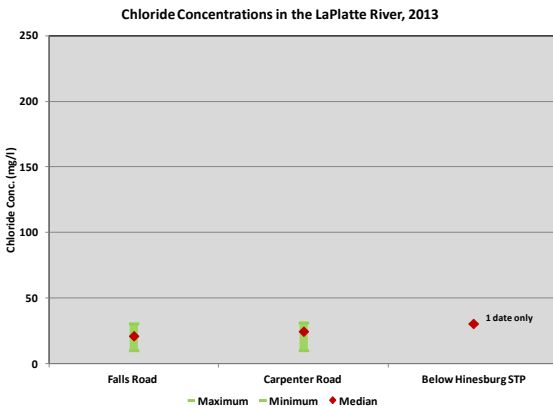
**Prepared for
VT DEC Watershed Management Division
Volunteer Water Quality Monitoring
LaRosa Analytical Services Partnerships**

**Prepared by
South Chittenden River Watch
March 31, 2016**

Water quality monitoring in the LaPlatte River during 2013 was carried out at “sentinel” stations, and was a first effort to target high discharge rates. Although rates were generally higher than historical levels monitored, they fell short of the targeted flows of exceeding 100 cfs at Falls Road (see ANNEX IIA). The range of flows sampled did, however, provide important insights into the dynamics of suspended sediment and particulate phosphorus in the LaPlatte River. They also, provided experience in anticipating high flows, and the targeting of high flows should be continued in future.

Chloride

Median chloride concentrations in the LaPlatte River downstream from the Hinesburg waste treatment facility to Falls Road in Shelburne were close to historical results. The range of values, however, was very narrow in 2013, exhibiting little variation. Unfortunately, only one

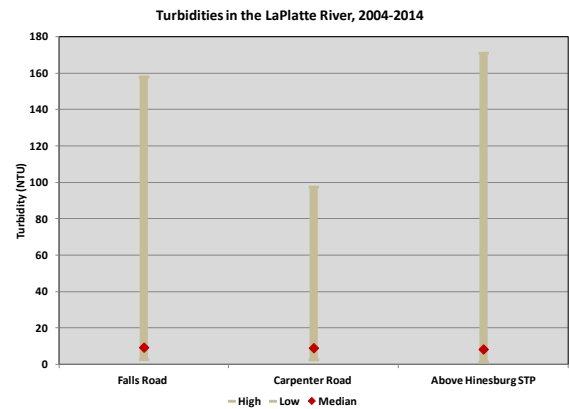
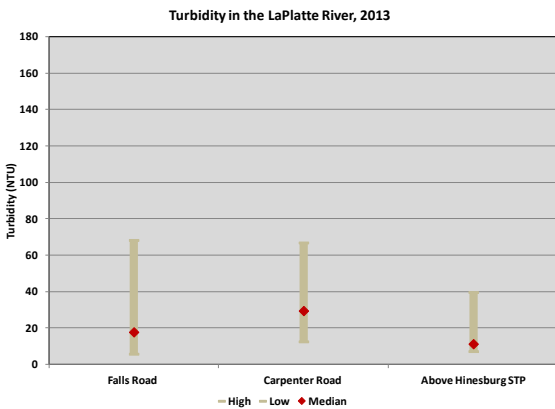
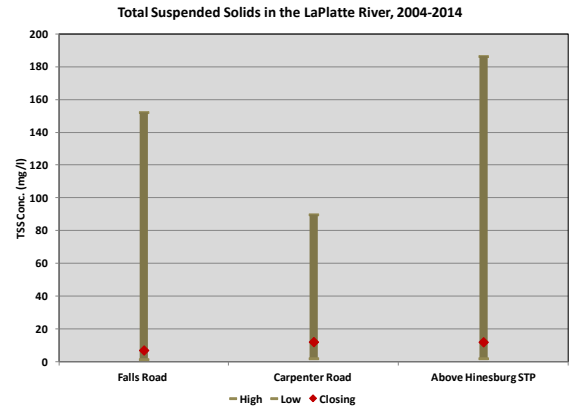
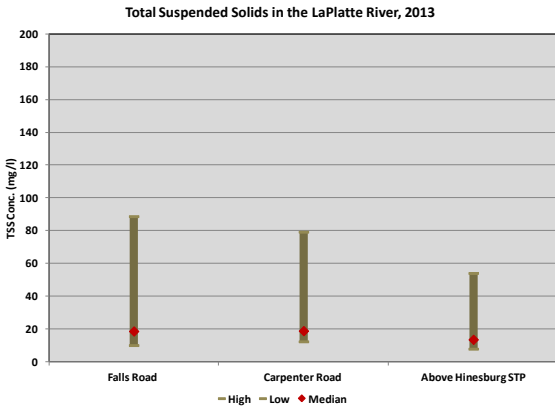


sample was collected below the Hinesburg waste treatment facility, compromising the value of the data as an indicator of dilution downstream. On the other hand, the results observed at Carpenter and Falls Roads would suggest that in general, the flow increased by a factor of about 1.167. Discharge was determined on three dates when rates varied from low on September 3 and medium on October 8, to high on September 13. Reduction in chloride and total nitrogen correlated well with dilution observed between the two locations only on September 13 when the discharge rate was high as shown in the following table:

Date	Discharge Rate	Flow Ratio (LP 05/LP 03)	Chloride Ratio (LP 03/LP 05)	Total N Ratio (LP 03/LP 05)
Sept. 3	Low	0.724	0.865	0.571
Sept. 13	High	0.895	0.857	0.893
Oct. 8	Medium	0.629	1.013	0.551

Suspended Solids

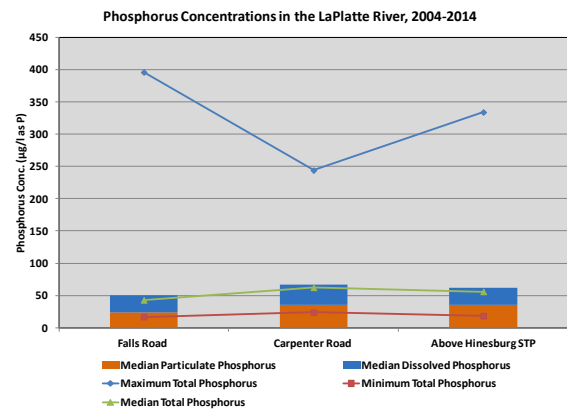
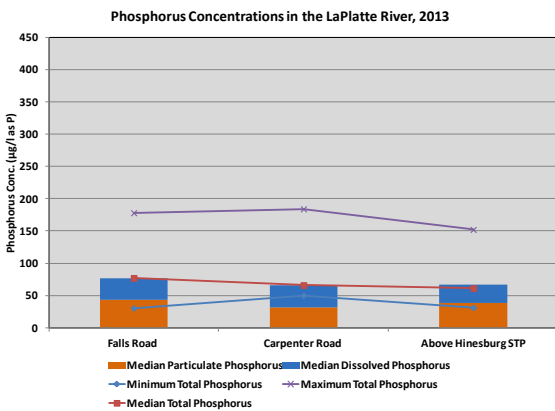
Suspended solids concentrations and turbidity levels observed in 2013 were in general higher than historical levels, increasing between the Hinesburg waste treatment facility and Carpenter Road consistent with high bottom scour and streambank erosion, particularly between the plant and Leavenworth Road. Solids levels then decreased from Carpenter Road downstream to Falls Road in Shelburne. The decrease downstream can be understood in the



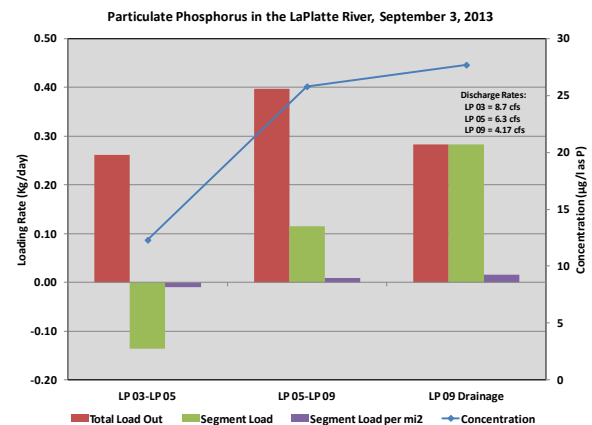
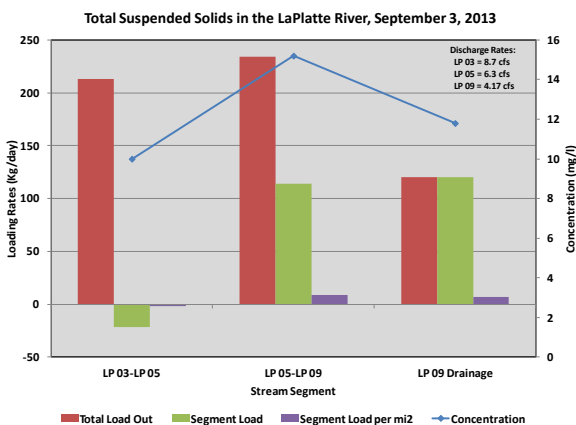
context of the discussion of discharge and loading rates suggesting that solids settle out at low and moderate flows (see discussion below). Maximum solids levels did not attain the very high levels reported in the past at very high discharge rates.

Phosphorus

Phosphorus levels observed in 2013, like those of chlorides, solids, and nitrogen, fell well within the historical range. In general, levels above the Hinesburg waste treatment facility and at Carpenter Road resembled those observed historically. In contrast to historical observations, median levels continued to increase downstream to Falls Road, driven primarily by a general rise in the level of particulate phosphorus. This increase is surprising in view of the general decrease in the level of solids over this section of the stream. The dynamics of suspended solids and particulate phosphorus in the LaPlatte River can be understood better through an examination of loading rates and mass balances.

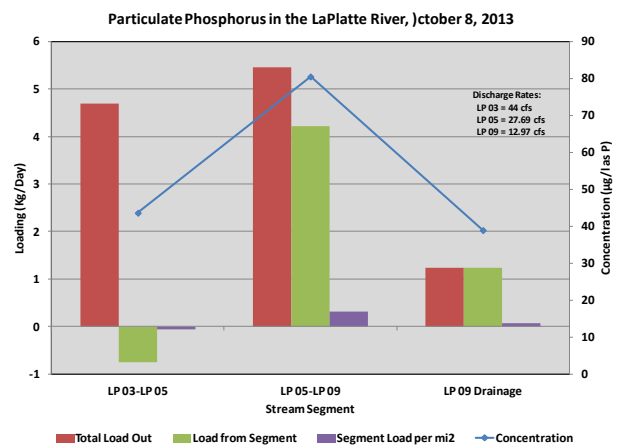
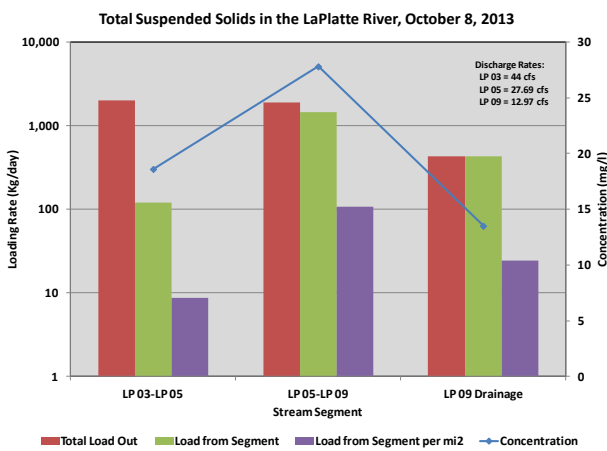


These dynamics can be visualized through comparisons of mass balances at low, moderate, and high discharge rates. At low flow observed on September 3, 2013, the segmental solids loadings can be seen to decrease steadily from the LP 09 drainage downstream, becoming negative between Carpenter and Falls Roads, indicating that solids were removed as a result of settling over this reach. This pattern was reflected in the mass balance of particulate phosphorus. The segment acted as a trap for sediment and particulate phosphorus.

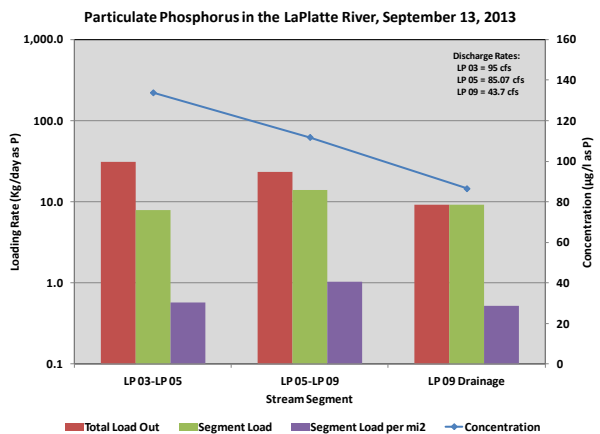
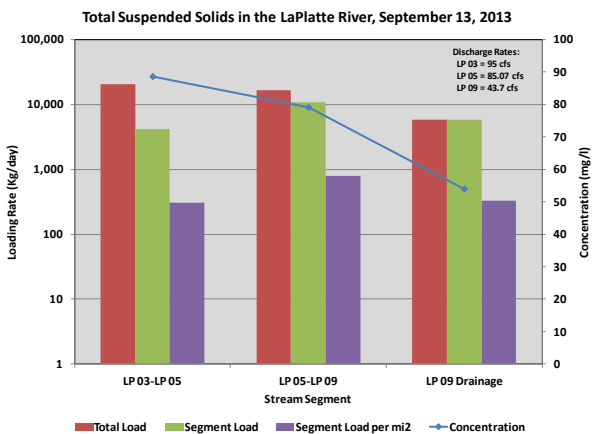


In the moderate flow range represented by conditions observed on October 8, 2013, solids loadings increased between the Hinesburg treatment facility and Carpenter Road, reflecting the high sensitivity of the stream, especially upstream from Leavenworth Road. Downstream from Carpenter Road, the segmental suspended solids loading rate was positive, but lower than the upstream segmental loading rate. Segmental loadings of particulate phosphorus increased more dramatically between the treatment facility and Carpenter Road than did solids loadings, suggesting that there was a phosphorus rich component of the sediment mobilized. This was reflected in higher phosphorus burdens associated with solids observed above the treatment facility and at Carpenter Road (2.88 and 2.90 gms/Kg, respectively) compared to 2.34 gms/Kg at Falls Road.

In sharp contrast to segmental solids loadings, was a loss of particulate phosphorus between Carpenter and Falls Roads.



At high flows, represented by that sampled on September 13, 2013, segmental sediment and particulate phosphorus loadings presented essentially identical pictures, increasing slightly between the Hinesburg treatment facility and Carpenter Road, and then declining slightly downstream to Falls Road.

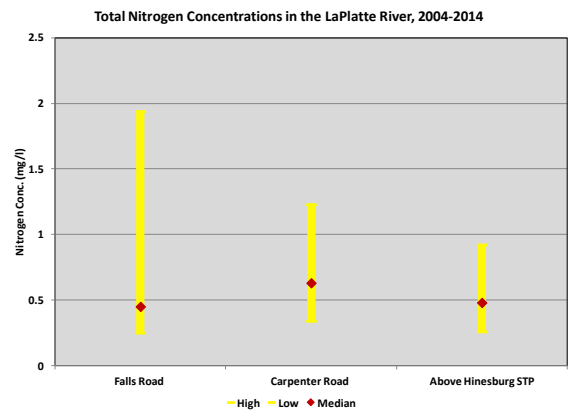
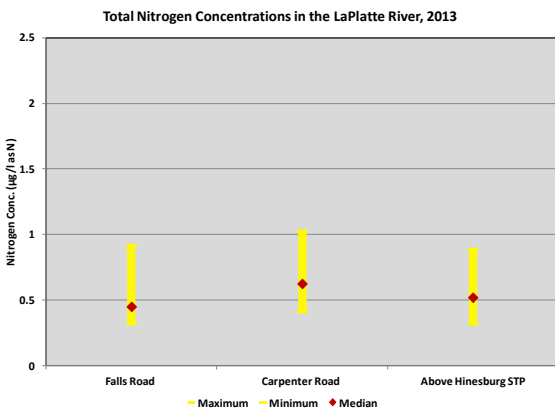


Between Carpenter and Falls Roads, both suspended sediment and particulate phosphorus were re-suspended, reaching high concentrations and loading rates. This picture is consistent with, and supportive

of, the concept of a “critical”, or “threshold” discharge rate in the LaPlatte River, as well as other tributaries to Lake Champlain. It also provides greater understanding of factors affecting phosphorus discharged to Lake Champlain and its bays.

Nitrogen

Total nitrogen concentrations detected in the LaPlatte River in 2013 were low and, in general, very close to historical levels, increasing between the Hinesburg waste treatment facility and Carpenter Road in response to the discharge of treated waste. They then decreased between Carpenter and Falls Roads as a result of dilution. High concentrations in 2013 did not reach maximum levels observed historically.



CONCLUSIONS

General

- The range of flows sampled provided important insights into the dynamics of suspended sediment and particulate phosphorus in the LaPlatte River
- Levels of all parameters fell well within historical ranges
- Levels of suspended solids and phosphorus were in general slightly higher than historical medians

Chlorides

- Chloride concentrations were consistent with historical levels, and fell within a very narrow range
- Chloride levels appeared to reflect well dilution only at high flows

Suspended Solids

- Levels of suspended solids tended to be higher than historical median concentrations
- Concentrations increased from the Hinesburg waste treatment facility to Carpenter Road, reflecting sensitivity to scour and stream bank erosion, especially between the treatment plant and Leavenworth Road
- Concentrations tended to decrease between Carpenter and Falls Roads, reflecting the generally low to moderate flows sampled in 2013

Phosphorus

- Phosphorus levels upstream from the Hinesburg waste treatment facility to Carpenter Road were consistent with those observed historically
- Levels tended to increase from Carpenter Road to Falls Road, in contrast to historical medians

Nitrogen

- Low total nitrogen levels and patterns were similar to those observed historically

CONCLUSIONS (Cont'd)

Sediment and Phosphorus Loadings

- Results of flow monitoring at “sentinel” monitoring stations on the LaPlatte River and segmental loadings and mass balances helped to elucidate i) the dynamics of sediment and particulate phosphorus transport in the stream, and ii) the uncertainties of data interpretation when random flows are sampled
- At low discharge rates, the Carpenter-Falls Road segment acted as a trap, or “sink”, removing both suspended solids and particulate phosphorus
- At moderate flow rates, the Carpenter-Falls Road segment functioned as a trap for particulate phosphorus, but not for suspended sediment
- At high discharge rates, sediment and particulate phosphates were re-suspended over the Carpenter-Falls Road segment
- The in-stream dynamics of suspended sediment and particulate phosphorus is highly dependent on discharge rates. As a result, random flow monitoring of both suspended solids and phosphorus is highly variable
- High flow monitoring can be expected to reduce variability introduced by the trap effect which occurs at low and moderate flows.

RECOMMENDATIONS

High Flow Monitoring

- It is recommended that high flow monitoring be strengthened and continued to enhance:
 - Consistency and compatibility of results over time
 - Representativeness of data
 - Interpretation of results.

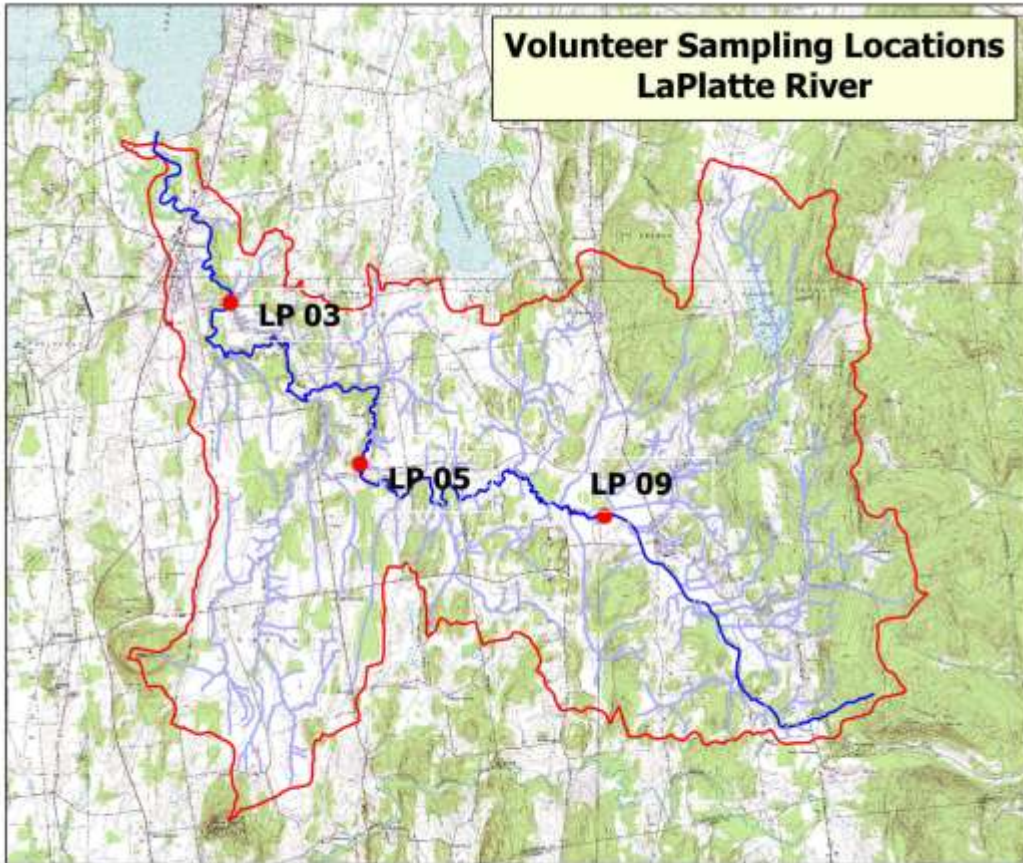
ANNEX I

Sampling Stations

ANNEX IA

Station Locations

Site ID	Site Location	Site Latitude	Site Longitude	Upstream Area (mi2)	Staff Guage
LP 03	LP 03 - LaPlatte River at Falls Road	44.37022	-73.21577	44.8	
LP 05	LP 05 - LaPlatte River at Carpenter Road	44.34176	-73.18383	31.2	Y
LP 08	LP 08 - LaPlatte River below Hinesburg STP Outfall				
LP 09	LP 09 - LaPlatte River above Hinesburg STP Outfall	44.33395	-73.12598	17.7	Y



ANNEX II-A

Raw Data: Final – 2013

Solids Concentrations in the LaPlatte River - 2013

	Station No.	5/27/2013	7/9/2013	9/3/2013	9/13/2013	10/8/2013	Median	Minimum	Maximum
TSS	LP 03	34.5	11.3	10	88.7	18.6	18.6	10	88.7
	LP 05	12.3	18.8	15.2	79.2	27.8	18.8	12.3	79.2
	LP 09	7.8	18.4	11.8	54	13.5	13.5	7.8	54
Turbidity	LP 03	27.8	13.4	5.7	68.2	17.7	17.7	5.7	68.2
	LP 05	12.5	29.4	12.7	66.8	39.1	29.4	12.5	66.8
	LP 09	7.15	13.2	8.29	39.6	11.2	11.2	7.15	39.6
Specific Turbidity	LP 03	0.81	1.19	0.57	0.77	0.95	0.81	0.57	1.19
	LP 05	1.02	1.56	0.84	0.84	1.41	1.02	0.84	1.56
	LP 09	0.92	0.72	0.70	0.73	0.83	0.73	0.70	0.92

Chloride Concentrations in the LaPlatte River - 2013

Sampling Location	5/27/2013	7/9/2013	9/3/2013	9/13/2013	10/8/2013	Median	Minimum	Maximum
LP 03	9.99	14.2	27	21	30.5	21	9.99	30.5
LP 05	10	13.6	31.2	24.5	30.1	24.5	10	31.2
LP 08	13.3	16.3			30.4	16.3	13.3	30.4

Nitrogen Concentrations in the LaPlatte River - 2013

	Station No.	5/27/2013	7/9/2013	9/3/2013	9/13/2013	10/8/2013	Median	Minimum	Maximum
TN	LP 03	0.45	0.5	0.32	0.92	0.38	0.45	0.32	0.92
	LP 05	0.41		0.56	1.03	0.69	0.625	0.41	1.03
	LP 09	0.32	0.52	0.55	0.89	0.48	0.52	0.32	0.89
Nox	LP 03	0.07	0.12	<0.05	0.1	0.05	0.7	<.05	0.12
	LP 05	0.06		0.2	0.13	0.05	0.095	0.05	0.2
	LP 09	0.09	0.1	0.19	0.12	0.06	0.1	0.06	0.19

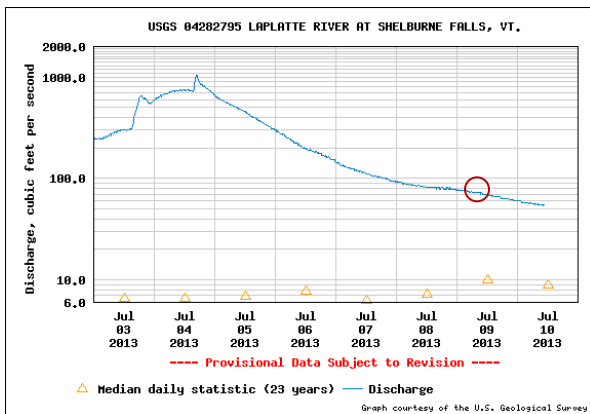
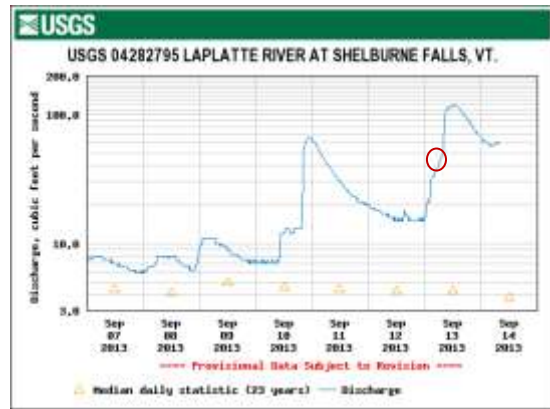
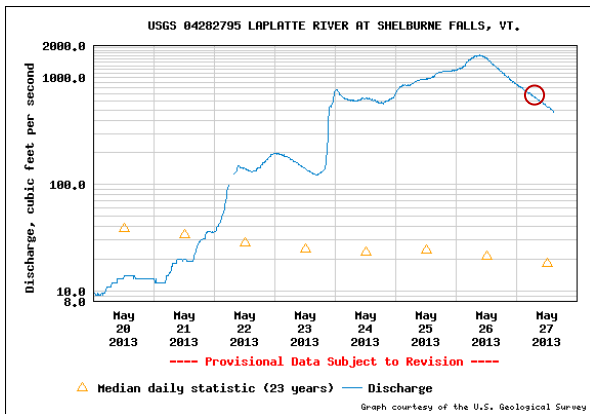
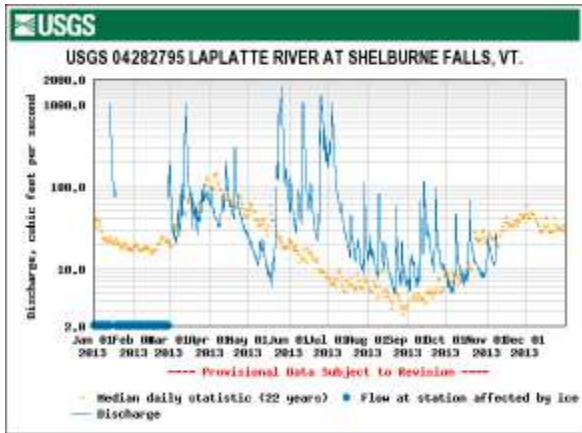
Phosphorus Concentrations in the LaPlatte River - 2013

	Station No.	5/27/2013	7/9/2013	9/3/2013	9/13/2013	10/8/2013	Median	Minimum	Maximum
TP	LP 03	84.4	66.7	30.3	178	76.8	76.8	30.3	178
	LP 05	49.9	65.9	57.7	184	148	65.9	49.9	184
	LP 09	31.2	61.2	56	152	76.9	61.2	31.2	152
PP	LP 03	52.1	30.9	12.3	133.9	43.6	43.6	12.3	133.9
	LP 05	24.1	31.9	25.8	111.9	80.5	31.9	24.1	111.9
	LP 09	16.5	39.3	27.7	86.6	38.9	38.9	16.5	86.6
DP	LP 03	32.3	35.8	18	44.1	33.2	33.2	18	44.1
	LP 05	25.8	34	31.9	72.1	67.5	34	25.8	72.1
	LP 09	14.7	21.9	28.3	65.4	38	28.3	14.7	65.4
% DP	LP 03	38.27	53.67	59.41	24.78	43.23	43.23	24.78	59.41
	LP 05	51.70	51.59	55.29	39.18	45.61	51.59	39.18	55.29
	LP 09	47.12	35.78	50.54	43.03	49.41	47.12	35.78	50.54
TSS	LP 03	34.5	11.3	10	88.7	18.6	18.6	10	88.7
	LP 05	12.3	18.8	15.2	79.2	27.8	18.8	12.3	79.2
	LP 09	7.8	18.4	11.8	54	13.5	13.5	7.8	54
PP/TSS	LP 03	1.51	2.73	1.23	1.51	2.34	1.51	1.23	2.73
	LP 05	1.96	1.70	1.70	1.41	2.90	1.70	1.41	2.90
	LP 09	2.12	2.14	2.35	1.60	2.88	2.14	1.60	2.88

ANNEX II-B

Discharge – 2013

Date	Discharge Rate (cfs)		
	LP 03	LP 05	LP 09
27-May	585	-	-
9-Jul	56	-	-
3-Sep	8.7	6.3	4.2
13-Sep	97	85.1	43.7
8-Oct	44	27.7	13.0



ANNEX III-A

Quality Control Analysis - 2013

Parameter	Station	Date	Results		(S-D)	Absolute Value (S-D)	(S + D)/2	RPD
			Value	Units				
Chlorides	MB 05 - McCabes Brook at Lime Kiln Road	5/27/2013	9.25	mg/L	0.0200	0.0200	9.2400	0.2165
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/27/2013	9.23	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	5/27/2013	10	mg/L	0.0400	0.0400	9.9800	0.4008
	LP 05 DUP - LaPlatte River at Carpenter Road	5/27/2013	9.96	mg/L				
	MB05 - McCabes Brook at Lime Kiln Road	7/9/2013	11.4	mg/L	0.2000	0.2000	11.3000	1.7699
	MB05 DUP - McCabes Brook at Lime Kiln Road	7/9/2013	11.2	mg/L				
	LP03 - LaPlatte River at Falls Road	7/9/2013	14.2	mg/L	0.0000	0.0000	14.2000	0.0000
	LP03 DUP - LaPlatte River at Falls Road	7/9/2013	14.2	mg/L				
	LP05 - LaPlatte River at Carpenter Road	7/9/2013	13.6	mg/L	-0.1000	0.1000	13.6500	0.7326
	LP05 DUP - LaPlatte River at Carpenter Rd	7/9/2013	13.7	mg/L				
	MB 05 - McCabes Brook at Lime Kiln Road	9/13/2013	14.5	mg/L	0.2000	0.2000	14.4000	1.3889
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/13/2013	14.3	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	9/13/2013	24.5	mg/L	0.2000	0.2000	24.4000	0.8197
	LP 05 DUP - LaPlatte River at Carpenter Road	9/13/2013	24.3	mg/L				
	H 01 - Holmes Creek behind Tennis Court below pond	9/13/2013	19.7	mg/L	0.3000	0.3000	19.5500	1.5345
	H 01 DUP - Holmes Creek behind Tennis Court below	9/13/2013	19.4	mg/L				
	MB 05 - McCabes Brook at Lime Kiln Road	9/3/2013	14.7	mg/L	-0.3000	0.3000	14.8500	2.0202
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/3/2013	15	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	9/3/2013	31.2	mg/L	-0.4000	0.4000	31.4000	1.2739
	LP 05 DUP - LaPlatte River at Carpenter Road	9/3/2013	31.6	mg/L				
MB 04a - McCabes Brook at Teddy Bear Access Road	10/8/2013	25	mg/L	0.7000	0.7000	24.6500	2.8398	
MB 04a - DUP McCabes Brook at Teddy Bear Access Rd	10/8/2013	24.3	mg/L					
LP 05 - LaPlatte River at Carpenter Road	10/8/2013	30.1	mg/L	0.7000	0.7000	29.7500	2.3529	
LP 05 DUP - LaPlatte River at Carpenter Road	10/8/2013	29.4	mg/L					
							Mean	1.28
							Target	10%

Parameter	Station	Date	Results		(S-D)	Absolute Value (S-D)	(S + D)/2	RPD
			Value	Units				
Turbidity	MB 05 - McCabes Brook at Lime Kiln Road	5/27/2013	9.25	NTU	-1.3500	1.3500	9.9250	13.6020
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/27/2013	10.6	NTU				
	LP 05 - LaPlatte River at Carpenter Road	5/27/2013	12.5	NTU	-1.1000	1.1000	13.0500	8.4291
	LP 05 DUP - LaPlatte River at Carpenter Road	5/27/2013	13.6	NTU				
	H 01 - Holmes Creek Behind Tennis Court Below Pond	5/27/2013	14.7	NTU	-0.9000	0.9000	15.1500	5.9406
	H 01 DUP - Holmes Crk bnd Tennis Crt Blw Pond	5/27/2013	15.6	NTU				
	MB05 - McCabes Brook at Lime Kiln Road	7/9/2013	7.99	NTU	0.5200	0.5200	7.7300	6.7270
	MB05 DUP - McCabes Brook at Lime Kiln Road	7/9/2013	7.47	NTU				
	LP03 - LaPlatte River at Falls Road	7/9/2013	13.4	NTU	-2.0000	2.0000	14.4000	13.8889
	LP03 DUP - LaPlatte River at Falls Road	7/9/2013	15.4	NTU				
	MB 05 - McCabes Brook at Lime Kiln Road	9/3/2013	41.8	NTU	3.4000	3.4000	40.1000	8.4788
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/3/2013	38.4	NTU				
	LP 05 - LaPlatte River at Carpenter Road	9/3/2013	12.7	NTU	0.7000	0.7000	12.3500	5.6680
	LP 05 DUP - LaPlatte River at Carpenter Road	9/3/2013	12	NTU				
	MB 05 - McCabes Brook at Lime Kiln Road	9/13/2013	28.2	NTU	-0.3000	0.3000	28.3500	1.0582
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/13/2013	28.5	NTU				
	LP 05 - LaPlatte River at Carpenter Road	9/13/2013	66.8	NTU	-8.5000	8.5000	71.0500	11.9634
	LP 05 DUP - LaPlatte River at Carpenter Road	9/13/2013	75.3	NTU				
	H 01 - Holmes Creek behind Tennis Court below pond	9/13/2013	38.4	NTU	2.4000	2.4000	37.2000	6.4516
	H 01 DUP - Holmes Creek behind Tennis Court below	9/13/2013	36	NTU				
	MB 04a - McCabes Brook at Teddy Bear Access Road	10/8/2013	24.5	NTU	-1.4000	1.4000	25.2000	5.5556
	MB 04a - DUP McCabes Brook at Teddy Bear Access Rd	10/8/2013	25.9	NTU				
	LP 05 - LaPlatte River at Carpenter Road	10/8/2013	39.1	NTU	-0.2000	0.2000	39.2000	0.5102
	LP 05 DUP - LaPlatte River at Carpenter Road	10/8/2013	39.3	NTU				
	H 02 - Holmes Creek behind Tennis Court below pond	10/8/2013	68	NTU	-1.5000	1.5000	68.7500	2.1818
	H 02 DUP - Holmes Creek behind Tennis Court below	10/8/2013	69.5	NTU				
						Mean	10.20	
						Target	15%	

Parameter	Station	Date	Results		(S-D)	Absolute Value (S-D)	(S + D)/2	RPD		
			Value	Units						
TSS	MB 05 - McCabes Brook at Lime Kiln Road	5/27/2013	10.7	mg/l	-0.1000	0.1000	10.7500	0.9302		
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/27/2013	10.8	mg/l						
	LP 05 - LaPlatte River at Carpenter Road	5/27/2013	12.3	mg/l	-2.9000	2.9000	13.7500	21.0909		
	LP 05 DUP - LaPlatte River at Carpenter Road	5/27/2013	15.2	mg/l						
	H 01 - Holmes Creek Behind Tennis Court Below Pond	5/27/2013	8.78	mg/L	-0.4400	0.4400	9.0000	4.8889		
	H 01 DUP - Holmes Crk bnd Tennis Crk Blw Pond	5/27/2013	9.22	mg/L						
	MB05 - McCabes Brook at Lime Kiln Road	7/9/2013	5.57	mg/L	-0.9000	0.9000	6.0200	14.9502		
	MB05 DUP - McCabes Brook at Lime Kiln Road	7/9/2013	6.47	mg/L						
	LP05 - LaPlatte River at Carpenter Road	7/9/2013	18.8	mg/L	0.8000	0.8000	18.4000	4.3478		
	LP05 DUP - LaPlatte River at Carpenter Rd	7/9/2013	18	mg/L						
	H01-Holmes Creek	7/9/2013	35	mg/L	4.2000	4.2000	32.9000	12.7660		
	H01 DUP - Holmes Crk behind Tennis Court below Pond	7/9/2013	30.8	mg/L						
	MB 05 - McCabes Brook at Lime Kiln Road	9/3/2013	32.2	mg/L	0.0000	0.0000	32.2000	0.0000		
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/3/2013	32.2	mg/L						
	LP 05 - LaPlatte River at Carpenter Road	9/3/2013	15.2	mg/l	0.6000	0.6000	14.9000	4.0268		
	LP 05 DUP - LaPlatte River at Carpenter Road	9/3/2013	14.6	mg/l						
	MB 05 - McCabes Brook at Lime Kiln Road	9/13/2013	18.2	mg/L	-1.2000	1.2000	18.8000	6.3830		
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/13/2013	19.4	mg/L						
	LP 05 - LaPlatte River at Carpenter Road	9/13/2013	79.2	mg/L	7.6000	7.6000	75.4000	10.0796		
	LP 05 DUP - LaPlatte River at Carpenter Road	9/13/2013	71.6	mg/L						
	H 01 - Holmes Creek behind Tennis Court below pond	9/13/2013	37.2	mg/L	1.6000	1.6000	36.4000	4.3956		
	H 01 DUP - Holmes Creek behind Tennis Court below	9/13/2013	35.6	mg/L						
	MB 04a - McCabes Brook at Teddy Bear Access Road	10/8/2013	22.6	mg/L	0.6000	0.6000	22.3000	2.6906		
	MB 04a - DUP McCabes Brook at Teddy Bear Access Rd	10/8/2013	22	mg/L						
	LP 05 - LaPlatte River at Carpenter Road	10/8/2013	27.8	mg/L	-2.2000	2.2000	28.9000	7.6125		
	LP 05 DUP - LaPlatte River at Carpenter Road	10/8/2013	30	mg/L						
	H 02 - Holmes Creek behind Tennis Court below pond	10/8/2013	64.3	mg/L	3.3000	3.3000	62.6500	5.2674		
	H 02 DUP - Holmes Creek behind Tennis Court below	10/8/2013	61	mg/L						
									Mean	9.95
									Target	15%

Parameter	Station	Date	Results		(S-D)	Absolute Value (S-D)	(S + D)/2	RPD
			Value	Units				
Total P	LP 05 - LaPlatte River at Carpenter Road	5/27/2013	49.9	µg P/L	-0.9000	0.9000	50.3500	1.7875
	LP 05 DUP - LaPlatte River at Carpenter Road	5/27/2013	50.8	µg P/L				
	H 01 - Holmes Creek Behind Tennis Court Below Pond	5/27/2013	44.2	µg P/L	-2.8000	2.8000	45.6000	6.1404
	H 01 DUP - Holmes Crk bnd Tennis Crt Blw Pond	5/27/2013	47	µg P/L				
	MB05 - McCabes Brook at Lime Kiln Road	7/9/2013	66.8	µg P/L	-0.7000	0.7000	67.1500	1.0424
	MB05 DUP - McCabes Brook at Lime Kiln Road	7/9/2013	67.5	µg P/L				
	LP03 - LaPlatte River at Falls Road	7/9/2013	66.7	µg P/L	-0.2000	0.2000	66.8000	0.2994
	LP03 DUP - LaPlatte River at Falls Road	7/9/2013	66.9	µg P/L				
	LP05 - LaPlatte River at Carpenter Road	7/9/2013	65.9	µg P/L	-3.9000	3.9000	67.8500	5.7480
	LP05 DUP - LaPlatte River at Carpenter Rd	7/9/2013	69.8	µg P/L				
	H01-Holmes Creek	7/9/2013	104	µg P/L	2.0000	2.0000	103.0000	1.9417
	H01 DUP - Holmes Crk behind Tennis Court below Pond	7/9/2013	102	µg P/L				
	MB 05 - McCabes Brook at Lime Kiln Road	9/3/2013	108	µg P/L	4.0000	4.0000	106.0000	3.7736
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/3/2013	104	µg P/L				
	LP 05 - LaPlatte River at Carpenter Road	9/3/2013	57.7	µg P/L	-0.4000	0.4000	57.9000	0.6908
	LP 05 DUP - LaPlatte River at Carpenter Road	9/3/2013	58.1	µg P/L				
	MB 05 - McCabes Brook at Lime Kiln Road	9/13/2013	135	µg P/L	-2.0000	2.0000	136.0000	1.4706
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/13/2013	137	µg P/L				
	LP 05 - LaPlatte River at Carpenter Road	9/13/2013	184	µg P/L	2.0000	2.0000	183.0000	1.0929
	LP 05 DUP - LaPlatte River at Carpenter Road	9/13/2013	182	µg P/L				
	H 01 - Holmes Creek behind Tennis Court below pond	9/13/2013	91.5	µg P/L	-2.6000	2.6000	92.8000	2.8017
	H 01 DUP - Holmes Creek behind Tennis Court below	9/13/2013	94.1	µg P/L				
	MB 04a - McCabes Brook at Teddy Bear Access Road	10/8/2013	158	µg P/L	1.0000	1.0000	157.5000	0.6349
	MB 04a - DUP McCabes Brook at Teddy Bear Access Rd	10/8/2013	157	µg P/L				
	LP 05 - LaPlatte River at Carpenter Road	10/8/2013	148	µg P/L	4.0000	4.0000	146.0000	2.7397
	LP 05 DUP - LaPlatte River at Carpenter Road	10/8/2013	144	µg P/L				
	H 02 - Holmes Creek behind Tennis Court below pond	10/8/2013	154	µg P/L	-2.0000	2.0000	155.0000	1.2903
	H 02 DUP - Holmes Creek behind Tennis Court below	10/8/2013	156	µg P/L				
							Mean	2.25
							Target	15%

Parameter	Station	Date	Results		(S-D)	Absolute Value (S-D)	(S + D)/2	RPD
			Value	Units				
Dissolved P	LP 05 - LaPlatte River at Carpenter Road	5/27/2013	25.8	µg P/L	0.8000	0.8000	25.4000	3.1496
	LP 05 DUP - LaPlatte River at Carpenter Road	5/27/2013	25	µg P/L				
	MB 05 - McCabes Brook at Lime Kiln Road	5/27/2013	23.9	µg P/L	-0.2000	0.2000	24.0000	0.8333
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/27/2013	24.1	µg P/L				
	H 01 - Holmes Creek Behind Tennis Court Below Pond	5/27/2013	26.9	µg P/L	0.4000	0.4000	26.7000	1.4981
	H 01 DUP - Holmes Crk bnd Tennis Crk Blw Pond	5/27/2013	26.5	µg P/L				
	MB05 - McCabes Brook at Lime Kiln Road	7/9/2013	48.9	µg P/L	0.1000	0.1000	48.8500	0.2047
	MB05 DUP - McCabes Brook at Lime Kiln Road	7/9/2013	48.8	µg P/L				
	LP03 - LaPlatte River at Falls Road	7/9/2013	35.8	µg P/L	0.3000	0.3000	35.6500	0.8415
	LP03 DUP - LaPlatte River at Falls Road	7/9/2013	35.5	µg P/L				
	LP05 - LaPlatte River at Carpenter Road	7/9/2013	34	µg P/L	0.7000	0.7000	33.6500	2.0802
	LP05 DUP - LaPlatte River at Carpenter Rd	7/9/2013	33.3	µg P/L				
	H01-Holmes Creek	7/9/2013	38.8	µg P/L	1.0000	1.0000	38.3000	2.6110
	H01 DUP - Holmes Crk behind Tennis Court below Pond	7/9/2013	37.8	µg P/L				
	LP 05 - LaPlatte River at Carpenter Road	9/3/2013	31.9	µg P/L	-1.4000	1.4000	32.6000	4.2945
	LP 05 DUP - LaPlatte River at Carpenter Road	9/3/2013	33.3	µg P/L				
	MB 05 - McCabes Brook at Lime Kiln Road	9/13/2013	82.9	µg P/L	0.4000	0.4000	82.7000	0.4837
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/13/2013	82.5	µg P/L				
	LP 05 - LaPlatte River at Carpenter Road	9/13/2013	72.1	µg P/L	-0.6000	0.6000	72.4000	0.8287
	LP 05 DUP - LaPlatte River at Carpenter Road	9/13/2013	72.7	µg P/L				
	H 01 - Holmes Creek behind Tennis Court below pond	9/13/2013	22.8	µg P/L	0.3000	0.3000	22.6500	1.3245
	H 01 DUP - Holmes Creek behind Tennis Court below	9/13/2013	22.5	µg P/L				
	MB 04a - McCabes Brook at Teddy Bear Access Road	10/8/2013	64.5	µg P/L	-0.4000	0.4000	64.7000	0.6182
MB 04a - DUP McCabes Brook at Teddy Bear Access Rd	10/8/2013	64.9	µg P/L					
LP 05 - LaPlatte River at Carpenter Road	10/8/2013	67.5	µg P/L	-1.5000	1.5000	68.2500	2.1978	
LP 05 DUP - LaPlatte River at Carpenter Road	10/8/2013	69	µg P/L					
H 02 - Holmes Creek behind Tennis Court below pond	10/8/2013	22.8	µg P/L	-1.4000	1.4000	23.5000	5.9574	
H 02 DUP - Holmes Creek behind Tennis Court below	10/8/2013	24.2	µg P/L					
							Mean	1.92
							Target	15%

Parameter	Station	Date	Results		(S-D)	Absolute Value (S-D)	(S + D)/2	RPD	
			Value	Units					
Total N	MB 05 - McCabes Brook at Lime Kiln Road	5/27/2013	0.36	mg/L	-0.0100	0.0100	0.3650	2.7397	
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/27/2013	0.37	mg/L					
	LP 05 - LaPlatte River at Carpenter Road	5/27/2013	0.41	mg/L	0.0400	0.0400	0.3900	10.2564	
	LP 05 DUP - LaPlatte River at Carpenter Road	5/27/2013	0.37	mg/L					
	H 01 - Holmes Creek Behind Tennis Court Below Pond	5/27/2013	0.41	mg/L	0.0000	0.0000	0.4100	0.0000	
	H 01 DUP - Holmes Crk bnd Tennis Crt Blw Pond	5/27/2013	0.41	mg/L					
	MB05 - McCabes Brook at Lime Kiln Road	7/9/2013	0.57	mg/L	0.0100	0.0100	0.5650	1.7699	
	MB05 DUP - McCabes Brook at Lime Kiln Road	7/9/2013	0.56	mg/L					
	LP03 - LaPlatte River at Falls Road	7/9/2013	0.5	mg/L	0.0100	0.0100	0.4950	2.0202	
	LP03 DUP - LaPlatte River at Falls Road	7/9/2013	0.49	mg/L					
	MB 05 - McCabes Brook at Lime Kiln Road	9/3/2013	0.65	mg/L	0.0100	0.0100	0.6450	1.5504	
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/3/2013	0.64	mg/L					
	LP 05 - LaPlatte River at Carpenter Road	9/3/2013	0.56	mg/L	0.0000	0.0000	0.5600	0.0000	
	LP 05 DUP - LaPlatte River at Carpenter Road	9/3/2013	0.56	mg/L					
	MB 05 - McCabes Brook at Lime Kiln Road	9/13/2013	1.03	mg/L	0.0000	0.0000	1.0300	0.0000	
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/13/2013	1.03	mg/L					
	LP 05 - LaPlatte River at Carpenter Road	9/13/2013	1.03	mg/L	-0.0500	0.0500	1.0550	4.7393	
	LP 05 DUP - LaPlatte River at Carpenter Road	9/13/2013	1.08	mg/L					
	H 01 - Holmes Creek behind Tennis Court below pond	9/13/2013	0.86	mg/L	-0.2700	0.2700	0.9950	27.1357	
	H 01 DUP - Holmes Creek behind Tennis Court below	9/13/2013	1.13	mg/L					
	MB 04a - McCabes Brook at Teddy Bear Access Road	10/8/2013	0.85	mg/L	0.0100	0.0100	0.8450	1.1834	
	MB 04a - DUP McCabes Brook at Teddy Bear Access Rd	10/8/2013	0.84	mg/L					
	LP 05 - LaPlatte River at Carpenter Road	10/8/2013	0.69	mg/L	0.0100	0.0100	0.6850	1.4599	
	LP 05 DUP - LaPlatte River at Carpenter Road	10/8/2013	0.68	mg/L					
	H 02 - Holmes Creek behind Tennis Court below pond	10/8/2013	0.81	mg/L	0.0100	0.0100	0.8050	1.2422	
	H 02 DUP - Holmes Creek behind Tennis Court below	10/8/2013	0.8	mg/L					
								Mean	4.16
								Target	15%

Parameter	Station	Date	Results		(S-D)	Absolute Value (S-D)	(S + D)/2	RPD
			Value	Units				
NOx	MB 05 - McCabes Brook at Lime Kiln Road	5/27/2013	0.05	mg/L	0.0000	0.0000	0.0500	0.0000
	MB 05 DUP - McCabes Brook at Lime Kiln Road	5/27/2013	0.05	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	5/27/2013	0.06	mg/L	0.0000	0.0000	0.0600	0.0000
	LP 05 DUP - LaPlatte River at Carpenter Road	5/27/2013	0.06	mg/L				
	H 01 - Holmes Creek Behind Tennis Court Below Pond	5/27/2013	0.07	mg/L	0.0000	0.0000	0.0700	0.0000
	H 01 DUP - Holmes Crk bnd Tennis Crt Blw Pond	5/27/2013	0.07	mg/L				
	MB05 - McCabes Brook at Lime Kiln Road	7/9/2013	0.05	mg/L	0.0000	0.0000	0.0500	0.0000
	MB05 DUP - McCabes Brook at Lime Kiln Road	7/9/2013	0.05	mg/L				
	LP03 - LaPlatte River at Falls Road	7/9/2013	0.12	mg/L	0.0000	0.0000	0.1200	0.0000
	LP03 DUP - LaPlatte River at Falls Road	7/9/2013	0.12	mg/L				
	MB 05 - McCabes Brook at Lime Kiln Road	9/3/2013	0.06	mg/L	0.0000	0.0000	0.0600	0.0000
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/3/2013	0.06	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	9/3/2013	0.2	mg/L	-0.0100	0.0100	0.2050	4.8780
	LP 05 DUP - LaPlatte River at Carpenter Road	9/3/2013	0.21	mg/L				
	MB 05 - McCabes Brook at Lime Kiln Road	9/13/2013	0.21	mg/L	0.0200	0.0200	0.2000	10.0000
	MB 05 DUP - McCabes Brook at Lime Kiln Road	9/13/2013	0.19	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	9/13/2013	0.13	mg/L	0.0100	0.0100	0.1250	8.0000
	LP 05 DUP - LaPlatte River at Carpenter Road	9/13/2013	0.12	mg/L				
	H 01 - Holmes Creek behind Tennis Court below pond	9/13/2013	0.05	mg/L	0.0000	0.0000	0.0500	0.0000
	H 01 DUP - Holmes Creek behind Tennis Court below	9/13/2013	0.05	mg/L				
	MB 04a - McCabes Brook at Teddy Bear Access Road	10/8/2013	0.06	mg/L	0.0000	0.0000	0.0600	0.0000
	MB 04a - DUP McCabes Brook at Teddy Bear Access Rd	10/8/2013	0.06	mg/L				
	LP 05 - LaPlatte River at Carpenter Road	10/8/2013	0.05	mg/L	0.0000	0.0000	0.0500	0.0000
	LP 05 DUP - LaPlatte River at Carpenter Road	10/8/2013	0.05	mg/L				
	H 02 - Holmes Creek behind Tennis Court below pond	10/8/2013	0.05	mg/L	0.0000	0.0000	0.0500	0.0000
	H 02 DUP - Holmes Creek behind Tennis Court below	10/8/2013	0.05	mg/L				
Mean								1.76
Target								10%

Summary of Percent Differences

Parameter	Target Precision	Mean RPD
Chloride	10%	1.28
Turbidity	15%	10.20
TSS	15%	9.95
Total P	15%	2.25
Diss. P	15%	1.92
Total N	15%	4.07
NOx	10%	1.76

