

## **Report for 2011 Volunteer Water Quality Monitoring Analytical Services Partnership for Water Quality Monitoring in the Four Rivers Partnership**

### **Background:**

The Four Rivers Partnership is an affiliation of nonprofit organizations, state and local government entities and schools that is focused on watershed projects including water quality monitoring. It includes the area of the Winooski River that is bounded on the upstream edge by the confluence of the Kingsbury River and on the downstream end by the confluence with the Dog River. The Stevens Branch and North Branch join the Winooski River in between the Kingsbury and Dog River.

### **Goals:**

As stated in the 2011 Four Rivers Partnership (4RP) water quality monitoring project application there were four goals:

1. Test common recreational sites for pollutants, primarily bacteria, that could present a health risk;
2. Collect water quality data for potentially contaminated storm water outfalls to determine whether poor water quality documented in prior illicit discharge assessments was rectified or still exist;
3. Gather data on turbidity and phosphorus concentration with the goal of identifying and reducing pollutant sources;
4. Engage and educate the public through the monitoring process and provide water quality information based on monitoring data.

### **Results:**

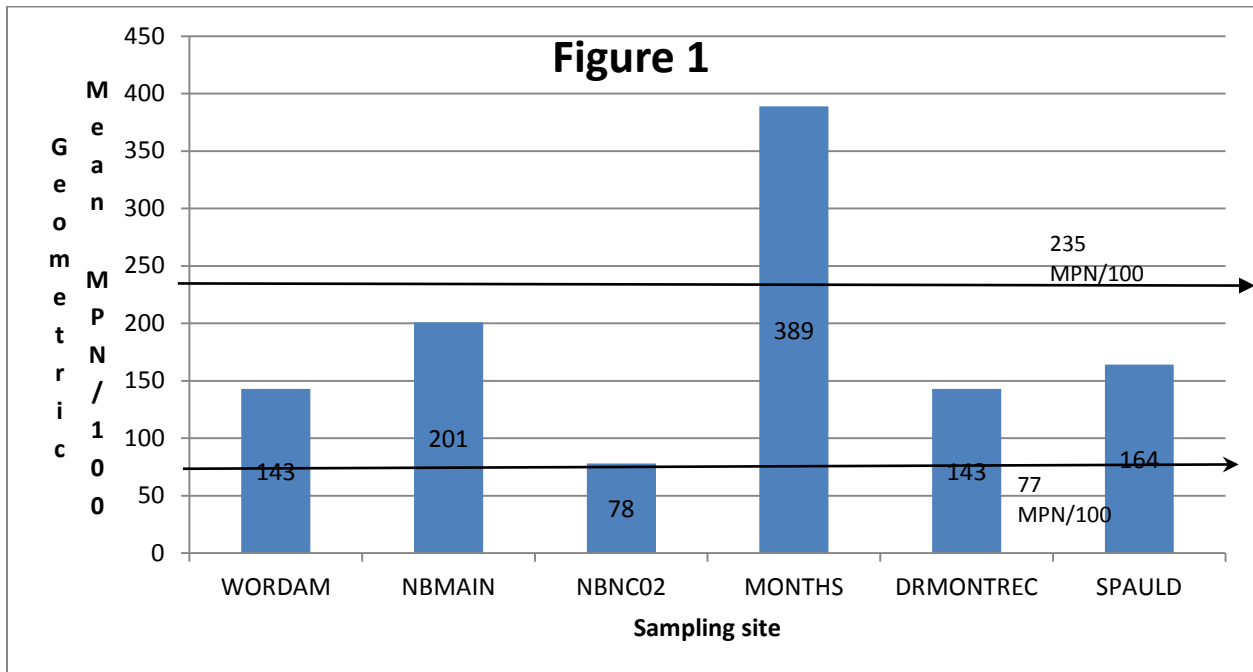
***Bacteria testing and recreational contact:*** The Winooski River and its tributaries are used for recreational purposes (swimming, paddling and fishing) by many residents of the 4RP area. Members of the Partnership collected bacteria data in 2008 and 2010 on eighteen recreational sites. In 2011, the Partners collected data on sites that have exceeded State and Federal standards in past testing and added data collection at additional recreational sites, including swimming holes on the Dog River.

The Partners collected and submitted data from six recreational sites to State laboratory for analysis:

<u>Location</u>	<u>Waterbody</u>	<u>Site Abbreviation</u>
Worcester Dam Swimming Hole	North Branch	WORDAM
Mill Road Swimming Hole	North Branch	NBMAIN
North Branch Nature Center Bridge	North Branch	NBNC02
Montpelier Recreation Fields	North Branch	DRMONTREC
Montpelier High School Access	Winooski River	MONTHS
Spaulding Falls	Jail Branch	SPAULD

The results for these sites are displayed in Figure 1. Only one site, NBNC02 (78 MPN/100), was close to the Vermont water quality standard of 77 MPN/100. Four of the six sites (WORDAM, NBMAIN, DRMONTREC and SPAULD) averaged between the Vermont standard and the EPA standard of 235 MPN/100. MONTHS exceeded the EPA standard on three of four sampling dates and averaged 389 MPN/100. MONTHS is the boat access at Montpelier High School.

The Partners also processed samples from these sites through an in-house Quanti-Tray method. The Partners also processed an additional nine site only through the Quanti-Tray method. In general, the results produced by the State lab and the in-house Quanti-Tray system were consistent. All results are included in Appendix A.



**Storm water outfall monitoring:** The Friends of the Winooski River and Stone Environmental have conducted comprehensive storm water outfall monitoring in Barre City (2006), Montpelier (2008), Berlin (2008), Northfield (2008), Richmond (2010), and Waterbury (2010). A total of 460 outfalls were monitored during dry weather and if flowing a number of tests were conducted. In a number of cases (~30), dry weather flow indicated the presence of one or more pollutants. The Friends and Stone would work with municipal public works departments or businesses to trace, locate, and, if possible, correct the source of the contaminant. These projects were conducted under grants or contracts with defined budgets and end dates. In 2011, the Friends with support from Stone conducted some follow-up monitoring on the most egregious outfalls.

Table 1 compares the 2011 results with the original results. In several cases, the outfalls show a considerable reduction in bacteria, others do not. In addition to *E. coli*, the outfalls were tested for ammonia, chloride, conductivity and detergents. These parameters can help determine if high bacteria count is due to the presence of wastewater or cause by something else.

The Friends and Stone had intended to work with Barre and Montpelier to conduct additional follow up in the fall of 2011. This would have involved the collection of additional samples within the stormwater drainage system. However, with closure of the lab facility due to TS Irene, we did not have a means of processing the samples. We plan additional follow up in 2012.

**Table 1—Outfall monitoring results**

Town	Outfall	2011 Date	MPN/100			Initial Test year	2011 Ammonia mg/L	2011 Total Cl mg/L	2011 MBAs mg/L	2011 Cond µs/cm
			2011 Count	Previous Count	Add'l Previous Count					
Barre	EB-04	8/2	50	1050	700	2006	0.25	0.1	0.75	1670
Barre	GB-04	8/2	345	4900	1400	2006	0.5	0.01	0.2	588
Barre	GB-05	8/2	2419	1900	800	2006	0.25	0.12	0.1	1453
Barre	SB-07	8/2	727	0	NA	2006	0.15	0.09	0.2	1599
Barre	SB-13	8/2	921	TNTC	NA	2006	0.3	0.13	0.2	1265
Montpelier	NB-010	7/19	114	12000	NA	2008	0.2	0.04	0.2	569
Montpelier	NB-130	7/19	276	1780	NA	2008	0.2	0	0.1	825
Montpelier	WR-500	7/19	172	336	NA	2008	0.2	0.07	0.05	456
Montpelier	WR-460*	7/19	NA	14100	NA	2008	0.25	0.04	0.2	1181
Montpelier	WR-690	7/19	7	NA	NA	NA	0.2	0.07	0.3	1801

\* could not get a water sample for E. coli

**Urban Water Quality Parameters:** The Partners had intended to do event based sampling on small streams entering the Winooski and/or Stevens Branch in Montpelier and Barre. We had requested a total of twelve tests each for chloride, total phosphorus and turbidity. Due to staffing issues, we had not been able to conduct this sampling. We expect to pursue this in the spring and summer of 2012 assuming the availability of laboratory services. We will also take field measurements for pH, conductivity and temperature using Partnership equipment. We will also compare turbidity readings using a turbidity meter.

Appendix A: Comparison of State Lab and In-house results

Date	Site Name	Site ID	Result	Result	Lab Result Dupe Result	Blank
7/12	Worcester Dam Swimming Hole	WORDAM	All invalid	209.82	218.72	< 1
7/12	Mill Road Swimming Hole	NBMAIN	due to	248.9		
7/12	North Branch Nature Center					
7/12	Bridge	NBNC02	processing	28.82		
7/12	Mill Pond Park Access	MILLPD	error			
7/12	Mouth of the North Branch	MOUTH				
7/12	Montpelier High School Access	MONTHS		816.41		
7/12	Stevens Branch along Rt 302	SB03				
7/12	Two Rivers Center Access	2RIVERS01				
7/12	Dog River at Montepplier Rec Fields	DRMONTREC		111.9		
7/12	Riverton Access Point	DRRIVERTON				
7/12	Dog River Swim Hole at Lord Rd	DRREC01				
7/12	Spaulding Falls on Jail Branch	SPAULD		127.4		
7/12	Stevens upstream of Rt 63 (Watt)	SBWATT				
7/12	Stevens Br above Prospect St	SB01				
7/12	Stevens Branch below Rt 62	SB02				
7/26	Worcester Dam Swimming Hole	WORDAM	107.6	155	161	1
7/26	Mill Road Swimming Hole	NBMAIN	139.6	261		
7/26	North Branch Nature Center					
7/26	Bridge	NBNC02	128.1	210		
7/26	Mill Pond Park Access	MILLPD	68.3			
7/26	Mouth of the North Branch	MOUTH	307.6			
7/26	Montpelier High School Access	MONTHS*	328.2/435.2	411		
7/26	Stevens Branch along Rt 302	SB03	344.8			
7/26	Two Rivers Center Access	2RIVERS01	60.9			
7/26	Dog River at Montepplier Rec Fields	DRMONTREC	123.6	150		
7/26	Riverton Access Point	DRRIVERTON	146.7			
7/26	Dog River Swim Hole at Lord Rd	DRREC01	91.0			
7/26	Spaulding Falls on Jail Branch	SPAULD	307.6	308		
7/26	Stevens upstream of Rt 63 (Watt)	SBWATT	613.6			
7/26	Stevens Br above Prospect St	SB01	344.8			
7/26	Stevens Branch below Rt 62	SB02	547.5			
*first set is using "old" colilert, second set is new.						
8/9	Worcester Dam Swimming Hole	WORDAM	58.1	70	81	1
8/9	Mill Road Swimming Hole	NBMAIN	108.1	161		
8/9	North Branch Nature Center					
8/9	Bridge	NBNC02	98.4	108		
8/9	Mill Pond Park Access	MILLPD	107.6			
8/9	Mouth of the North Branch	MOUTH	613.1			
8/9	Montpelier High School Access	MONTHS	Invalid	210		
8/9	Stevens Branch along Rt 302	SB03	272.3			
8/9	Two Rivers Center Access	2RIVERS01	59.8			
8/9	Dog River at Montepplier Rec Fields	DRMONTREC	123.6	128		
8/9	Riverton Access Point	DRRIVERTON	121.1			
8/9	Dog River Swim Hole at Lord Rd	DRREC01	133.4			
8/9	Spaulding Falls on Jail Branch	SPAULD	90.6	63		

8/9	Stevens upstream of Rt 63 (Watt)	SBWATT	461.1
8/9	Stevens Br above Prospect St	SB01	93.3
8/9	Stevens Branch below Rt 62	SB02	118.7

8/23	Worcester Dam Swimming Hole	WORDAM	
8/23	Mill Road Swimming Hole	NBMAIN	66.3
	North Branch Nature Center		
8/23	Bridge	NBNC02	50.4
8/23	Mill Pond Park Access	MILLPD	90.8
8/23	Mouth of the North Branch	MOUTH	224.7
8/23	Montpelier High School Access	MONTHS	344.1
8/23	Stevens Branch along Rt 302	SB03	410.6
8/23	Two Rivers Center Access	2RIVERS01	109.5
8/23	Dog River at Montpelier Rec Fields	DRMONTREC	114.5
8/23	Riverton Access Point	DRRIVERTON	206.4
8/23	Dog River Swim Hole at Lord Rd	DRREC01	184.2
8/23	Spaulding Falls on Jail Branch	SPAULD	209.8
8/23	Stevens upstream of Rt 63 (Watt)	SBWATT	519.2
8/23	Stevens Br above Prospect St	SB01	488.4
			325.5
8/23	Stevens Branch below Rt 62	SB02	(410.6)

				185	161
				155	115
				56	
				326	
				192	
				291	