

**Wet Weather Characterization of Selected Rhode Island Baseline Monitoring
Stations**

Principle Investigators

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Introduction

Since 1991, the Civil and Environmental Engineering Department (CVE) has conducted research for the Rhode Island Department of Environmental Management (RI DEM) by establishing a Baseline Monitoring Program for the rivers of Rhode Island. The purpose of the program was to establish a long term, water quality database, under dry weather, or steady state conditions.

This study was the first wet weather study attempted on any Baseline Monitoring Station. The station selected for the study was the Beaver River site, BL06. This site was chosen because it had a U.S.G.S. gauging station, was near the University of Rhode Island where the water quality analysis was conducted, and was an average representation of the watersheds of the baseline stations.

Principle Findings and Significance

The weather during spring through fall of 2002 was very dry, and the majority of the storm events during that period failed to meet the wet weather criteria set for the study. On September 26-27, 2002 a storm event was captured for this study. Although the duration and rainfall intensity of the event was not optimal, the unpredictability of the weather patterns over the previous several months was a major factor in the decision to sample this storm.

The sampling runs started at 1600 on September 26 and the last sample was taken at 1600 on September 27. Sample intervals were 4-6 hours depending on the rainfall intensity, with a total of six sampling runs completed. Twenty-one water quality constituents were evaluated for the study resulting in 126 analyses run for the wet weather event.

A significant difference between this wet weather event and the dry weather monitoring that occurred previously was the increased fecal coliform counts. The rest of the data is consistent with the average dry weather between 1996 and 2002. The small differences between dry and wet weather can also be explained by the low intensity and amount of rainfall. The intensity was very light (0.05 inches/ hr or less) and the total was 0.65 inches over a 24 hour sampling interval.

The results do indicate that there may be some FC contamination associated with wet weather events, as indicated by the large increase in FC concentration. The low ammonia numbers indicate that the source of the FC is not close to the baseline station. All other parameters didn't show an appreciable change during the storm.

A representative sample of the data is shown in Table 1 Conventional Pollutant Concentrations and in Table 2 Biological and Other Dissolved Contaminants.

Table 1 Conventional Pollutant Concentrations

Time	Temp	Conductivity	D.O.	pH	Turbidity	Cl	TSS	VSS
(hour)	(°C)	(mmho/cm)	(mg/L)		(NTU)	(mg/L)	(mg/L)	(mg/L)
1730	16.0	100	8.70	6.38	2.95	15.0	1.92	1.80
2330	15.2	79	8.75	5.80	1.85	10.8	0.98	0.86
0600	15.0	79	8.40	6.09	2.55	10.4	1.48	1.44
0945	15.0	80	8.35	6.22	1.75	10.2	1.58	1.42
1215	15.5	80	8.40	6.22	2.45	9.6	1.64	1.32
1600	16.0	79	8.40	6.25	1.85	10.1	1.56	1.40

Table 2 Biological and Other Dissolved Contaminants

FC	BOD ₅	NH ₃ - N	NO ₃ - N	PO ₄ - P	TP	Na	Hardness	Diss Cu	Diss Pb	Diss Cd	Diss Fe
CFU/100ml	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
150	0.43	0.071	0.42	0.013	0.069	7.19	10.13	1.10	0.95	0.15	194
930	0.48	0.048	0.63	0.007	0.065	7.31	9.76	0.70	0.90	0.17	352
1,700	0.52	0.064	0.81	0.005	0.042	8.48	9.56	0.35	0.40	0.05	397
1,400	0.57	0.040	0.57	0.004	0.014	7.59	9.87	0.70	0.95	0.03	266
1,300	0.45	0.046	0.65	0.004	0.010	6.15	11.16	0.60	0.75	0.01	334
1,800	0.35	0.059	0.93	0.004	0.006	6.41	10.25	0.65	0.60	0.15	732