



Fieldwork, Education & Research

Parvin Branch and Tarkiln Branch Watershed Restoration Master Plan

APPENDIX D

Water Chemistry Sampling Results Tables

Watershed Sampling

A monitoring plan was developed to gather surface water (Parvin Branch and Tarkiln Branch) and groundwater quality data. The monitoring plan included NJDEP-approved sampling protocols for collecting physical and chemical data in these resources. Appropriate protocols, sampling points, and schedules were selected for both wet weather (stormwater) and dry weather (base flow) sampling. Chemical analyses were completed by NJDEP-certified laboratories as well as by volunteers using field sampling kits. Local volunteer groups were instrumental in completing the physical and chemical assessments of the stream, including visual assessments of flow.

Surface water, groundwater and sediment sampling occurred at Parvin Branch and Tarkiln Branch from May 2005 to April 2006. During this time, Citizens United to Protect the Maurice River and its tributaries (CUPMRT) and TRC Omni collected eleven (11) sets of surface water samples at the three chemical and biological stations, PB1, PB2 and TB1, one (1) set of sediment samples from SEDS and SSN and three (3) sets of groundwater samples at monitoring wells GWN and GWS.

Water quality was measured at PB1, PB2, and TB1 on 14 dates between May 2005 and April 2006. Water samples were analyzed for a number of standard water quality parameters including nitrogen (nitrate and ammonia), phosphorus (total and dissolved), dissolved oxygen, solids (total dissolved and total suspended), iron, pH, conductivity, and temperature. Results are in **Appendix D** and in the dry weather concentration figures found in **Appendix E**. Water quality was also measured in GWN and GWS on three dates in 2005. Samples were analyzed for standard water quality parameters and priority pollutants. Results are in **Appendix D**.

Sediment samples from SEDN and SEDS were analyzed once for priority pollutants and nutrients. Based on the results of the groundwater sampling, no significant contaminants were noted in the initial priority pollutant or metals scans. In accordance with the QAPP, no further samples were analyzed. Results are in **Appendix D**.



Station	Date	Temp °C	pH s.u.	DO mg/l	Alkalinity mg/l	NH ₃ -N mg/l	Fecal Coliforms colonies/100ml	Hardness mg/l	Fe mg/l	Mn mg/l	Nitrate (NO ₃ -N) mg/l	Nitrite (NO ₂ -N) mg/l	DOPO ₄ mg/l	TP mg/l	TDS mg/l	TKN mg/l	TSS mg/l	Turbidity NTUs	
PB1	05/26/05	13.4	6.0	6.3	15	0.14	65	140	0.56	0.08	7.91	< 0.04	0.03	0.04	130	1.92	2.5	2.4	
	06/24/05	19.2	6.8	6.8	11	0.12	190	68	NR	NR	10.60	< 0.04	0.02	0.08	190	0.45	5.5	4.1	
	07/27/05	20.2	6.0	6.6	33	0.34	170	71	NR	NR	10.70	< 0.04	0.16	0.04	170	0.65	< 0.5	2.2	
	08/23/05	18.7	6.4	6.8	17	0.10	2100	68	NR	NR	9.16	< 0.04	0.01	0.04	130	0.16	3.0	2.4	
	09/28/05	16.4	6.0	5.6	14	0.11	230	72	NR	NR	5.20	< 0.04	0.01	0.03	90	0.29	4.5	1.6	
	11/14/05	16.0	6.4	4.8	18	0.07	180	36	NR	NR	7.42	< 0.04	0.02	0.07	140	0.8	3.5	2.5	
	12/05/05	8.2	6.3	6.8	16	0.08	72	65	0.48	NR	7.13	< 0.04	0.02	0.03	120	0.58	4.5	2.7	
	01/10/06	10.0	6.2	6.8	18	< 0.05	< 2	71	0.49	0.10	8.59	< 0.04	0.03	0.11	130	0.44	< 0.5	2.8	
	02/16/06	NA	NA	8.6	14	< 0.05	43	62	0.46	0.07	8.85	< 0.04	0.03	0.07	140	0.53	3.5	3.4	
	04/03/06	11.0	6.2	8.2	19	0.12	160	64	0.34	0.07	10.15	< 0.04	0.01	0.08	150	0.37	9.0	2.8	
04/24/06	14.8	6.5	6.1	48	0.19	2400	38	0.57	0.04	2.03	< 0.04	0.03	0.13	76	1.77	4.5	7.4		
PB2	05/26/05	13.6	6.9	13.5	39	0.87	10	76	6.57	0.07	3.46	< 0.04	0.03	0.08	250	3.15	11.5	34	
	06/24/05	18.2	6.7	7.6	42	0.94	< 4	52	NR	NR	2.93	< 0.04	< 0.01	0.12	310	1.45	17.0	64	
	07/27/05	19.0	6.3	5.0	52	1.06	86	84	NR	NR	2.72	< 0.04	< 0.01	0.05	300	1.40	15.0	65	
	08/23/05	17.2	6.6	5.5	57	0.11	140	53	NR	NR	1.96	< 0.04	< 0.01	0.11	240	0.24	9.5	62	
	09/28/05	16.3	6.5	5.0	43	1.46	68	56	NR	NR	1.59	< 0.04	0.03	0.12	320	2.22	26.0	70	
	11/14/05	14.7	7.0	6.0	59	1.01	24	58	NR	NR	1.34	< 0.04	0.04	0.25	340	1.82	10.5	28	
	12/05/05	6.2	6.9	7.2	49	0.84	56	64	6.20	NR	2.07	< 0.04	0.07	0.11	270	1.36	7.0	13	
	01/10/06	9.0	6.8	6.8	48	0.62	< 2	80	6.50	0.05	2.55	< 0.04	0.02	0.18	280	1.58	12.0	28	
	02/16/06	9.0	6.9	7.4	52	0.28	38	49	6.76	0.05	2.68	< 0.04	0.05	0.16	320	0.95	9.5	22	
	04/03/06	11.4	6.9	6.8	57	0.26	82	52	7.82	0.05	2.57	< 0.04	< 0.01	0.15	300	0.45	17.0	25	
04/24/06	14.3	6.8	6.6	32	0.23	500	38	5.57	0.06	1.62	< 0.04	0.05	0.23	140	2.37	16.0	27		
TB1	05/26/05	13.2	6.0	6.1	11	0.10	46	48	0.51	0.06	1.71	< 0.04	0.01	0.03	90	1.80	4.0	2.7	
	06/24/05	18.8	6.4	8.3	9.2	0.13	30	30	NR	NR	1.64	< 0.04	0.01	0.04	100	0.72	3.5	1.9	
	07/27/05	21.1	6.0	5.6	12	0.33	300	30	NR	NR	1.66	< 0.04	0.02	0.03	68	0.56	< 0.5	1.6	
	08/23/05	19.6	6.1	4.4	13	0.11	6600	18	NR	NR	1.11	< 0.04	0.03	0.1	39	0.13	18.0	6.2	
	09/28/05	Stream Dry, No Sample Obtained																	
	11/14/05	14.9	6.1	1.6	17	0.06	18	28	NR	NR	0.47	< 0.04	0.02	0.16	60	0.55	12.0	6.7	
	12/05/05	6.9	6.1	6.4	10	0.07	110	18	0.65	NR	1.15	< 0.04	0.03	0.04	53	0.58	4.0	1.7	
	01/10/06	10.0	6.0	8.1	8.8	< 0.05	< 2	30	0.60	0.12	1.52	< 0.04	0.03	0.12	62	0.77	< 0.5	2	
	02/16/06	10.3	6.0	9.4	7.6	0.05	4	25	0.47	0.06	1.66	< 0.04	0.02	0.08	86	0.36	1.0	2.2	
	04/03/06	8.2	5.8	10.8	9.6	0.08	10	4.8	0.54	0.05	1.47	< 0.04	0.02	0.06	65	0.30	3.5	2	
04/24/06	14.8	6.5	6.1	16	0.29	2300	39	0.48	0.04	0.97	< 0.04	0.03	0.11	49	1.49	4.5	9.6		

Blue fill indicates marginal wet weather event



Parameter	Units	GWN			GWS						
		5/17/2005 Value	9/14/2005 Value	12/22/2005 Value	5/17/2005 Value	9/14/2005 Value	12/22/2005 Value				
1, 1-dichloroethane	mg/l	<	1	<	1	<	1	<	1		
1, 1-dichloroethene	mg/l	<	1	<	1		<	1	<	1	
1,1,1,2-tetrachloroethane	mg/l	<	1	<	1		<	1	<	1	
1,1,1-trichloroethane	mg/l	<	1	<	1		<	1	<	1	
1,1,2,2-tetrachloroethane	mg/l	<	1	<	1		<	1	<	1	
1,1,2-trichloroethane	mg/l	<	1	<	1		<	1	<	1	
1,1-dichloropropene	mg/l	<	1	<	1		<	1	<	1	
1,2,3-trichlorobenzene	mg/l	<	1	<	1		<	1	<	1	
1,2,3-trichloropropane	mg/l	<	1	<	1		<	1	<	1	
1,2,4-trichlorobenzene	mg/l	<	1	<	1		<	1	<	1	
1,2,4-trimethylbenzene	mg/l	<	1	<	1		<	1	<	1	
1,2-dibromo-3-chloropropane	mg/l	<	1	<	1		<	1	<	1	
1,2-dibromoethane	mg/l	<	1	<	1		<	1	<	1	
1,2-dichlorobenzene	mg/l	<	1	<	1		<	1	<	1	
1,2-dichloroethane	mg/l	<	1	<	1		<	1	<	1	
1,2-dichloropropane	mg/l	<	1	<	1		<	1	<	1	
1,3,5-trimethyl benzene	mg/l	<	1	<	1		<	1	<	1	
1,3-dichlorobenzene	mg/l	<	1	<	1		<	1	<	1	
1,4 dichlorobenzene	mg/l	<	1	<	1		<	1	<	1	
2, 2dichloropropane	mg/l	<	1	<	1		<	1	<	1	
2-chlorotoluene	mg/l	<	1	<	1		<	1	<	1	
2-chlorovinyl ether	mg/l	<	1	<	1		<	1	<	1	
2-hexanone	mg/l	<	1	<	1		<	1	<	1	
4-chlorotoluene	mg/l	<	1	<	1		<	1	<	1	
Acetone	mg/l	<	5	<	5		<	5	<	5	
Acrolin	mg/l	<	1	<	1		<	1	<	1	
Acrylonitrile	mg/l	<	1	<	1		<	1	<	1	
Alkalinity, total as CaCo3	mg/l		58		71		67		53		45
Ammonia as NH3-N	mg/l		10.02		9.1		9.11		1		1.77
Antimony	mg/l	<	11.6	<	0.005		<	11.6	<	0.005	
Arsenic	mg/l	<	6.4	<	0.004		<	21.1	<	0.023	
benzene	mg/l	<	1	<	1		<	1	<	1	
Beryllium	mg/l	<	0.6	<	0.003		<	0.6	<	0.003	
bromobenzene	mg/l	<	1	<	1		<	1	<	1	
bromochloromethane	mg/l	<	1	<	1		<	1	<	1	
bromodichloromethane	mg/l	<	1	<	1		<	1	<	1	
bromoform	mg/l	<	1	<	1		<	1	<	1	
bromomethane	mg/l	<	2	<	2		<	2	<	2	
Cadmium	mg/l	<	0.8	<	0.001		<	0.8		0.002	
carbon disulfide	mg/l	<	1	<	1		<	1	<	1	
carbon tetrachloride	mg/l	<	1	<	1		<	1	<	1	
chlorobenzene	mg/l	<	1	<	1		<	1	<	1	
chloroethane	mg/l	<	1	<	1		<	1	<	1	
chloroform	mg/l	<	1	<	1		<	1	<	1	
chloromethane	mg/l	<	1	<	1		<	1	<	1	
Chromium	mg/l		5.8		0.004			4.4	<	0.003	
Cis Dichloroethene	mg/l	<	1	<	1		<	1	<	1	
cis-1,3-dichloropropene	mg/l	<	1	<	1		<	1	<	1	
Copper	mg/l	<	7.4	<	0.01			23.7		0.02	
dibromochloromehtane	mg/l	<	1	<	1		<	1	<	1	
dibromomethane	mg/l	<	1	<	1		<	1	<	1	
Dichlorodifuloromethane	mg/l	<	1	<	1		<	1	<	1	
ethylbenzene	mg/l	<	1	<	1		<	1	<	1	
Fecal Coliforms	colonies/100ml	<	2	<	4	<	4	<	2	<	4
Hardness, total as CaCo3	mg/l		14		33		40		54		48
hexachlorobutadiene	mg/l	<	2	<	2		<	2	<	2	
Hexachloroethane	mg/l	<	1	<	1		<	1	<	1	
Iron	mg/l		0.9		13		1.14		20.6		14
isopropyl benzene	mg/l	<	1	<	1		<	1	<	1	
Lead	mg/l	<	5.4	<	0.003			26.1		0.005	
m/p xylene	mg/l	<	1	<	1		<	1	<	1	
Manganese	mg/l		0.04		0.07		0.07		0.1		0.12
Mercury	mg/l	<	0.1	<	0.0005		<	0.1	<	0.0005	
methyl tertiary butyl ether	mg/l	<	1	<	1		<	1	<	1	
methylene chloride	mg/l	<	1	<	1		<	1	<	1	
Methylethyl Ketone (MEK)	mg/l	<	1	<	1		<	1	<	1	
MIBK	mg/l	<	2	<	2		<	2	<	2	
naphthalene	mg/l	<	2	<	2		<	2	<	2	
n-butyl benzene	mg/l	<	1	<	1		<	1	<	1	
Nickel	mg/l		8.3	<	0.01			6.6	<	0.01	
Nitrate as N, dissolved	mg/l		0.4		0.52	<	0.02	<	0.02		0.72
Nitrite as N, Dissolved	mg/l	<	0.04	<	0.04	<	0.04	<	0.04	<	0.04
Nitrobenzene	mg/l	<	2	<	2		<	2	<	2	
n-propyl benzene	mg/l	<	1	<	1		<	1	<	1	
Ortho-Phosphate, dissolved	mg/l		0.05		0.08		0.05		0.05		0.31
o-xylene	mg/l	<	1	<	1		<	1	<	1	
Pentachloroethane	mg/l	<	1	<	1		<	1	<	1	
Phosphorus, total as P	mg/l		0.17		0.18		0.13		0.07		1.2
p-isopropyltoluene	mg/l	<	1	<	1		<	1	<	1	



Parameter	Units	GWN			GWS						
		5/17/2005 Value	9/14/2005 Value	12/22/2005 Value	5/17/2005 Value	9/14/2005 Value	12/22/2005 Value				
sec-butylbenzene	mg/l	<	1	<	1	<	1	<	1	<	1
Selenium	mg/l	<	8.4	<	0.005	<	8.4	<	0.005	<	8.4
Silver	mg/l	<	2.8	<	0.002	<	2.8	<	0.002	<	2.8
styrene	mg/l	<	1	<	1	<	1	<	1	<	1
tert-butylbenzylne	mg/l	<	1	<	1	<	1	<	1	<	1
Tertiary Butyl Alcohol	mg/l	<	1	<	1	<	1	<	1	<	1
tetrachloroethene	mg/l	<	1	<	1	<	1	<	1	<	1
Thallium	mg/l	<	9.4	<	0.005	<	9.4	<	0.005	<	9.4
THF	mg/l	<	2	<	2	<	2	<	2	<	2
toluene	mg/l	<	1	<	1	<	1	<	1	<	1
Total Dissolved Solids	mg/l		310		320		330		230		250
Total Kjeldahl Nitrogen	mg/l		11.1		9.96		12.34		3.77		4.82
Total Suspended Solids	mg/l		32		21		32		690		53
trans-1,2-dichloroethene	mg/l	<	1	<	1	<	1	<	1	<	1
trans-1,3-dichloropropene	mg/l	<	1	<	1	<	1	<	1	<	1
trans-1,4-dichloro-2-butene	mg/l	<	1	<	1	<	1	<	1	<	1
trichloroethene	mg/l	<	1	<	1	<	1	<	1	<	1
Trichlorofluoromethane	mg/l	<	1	<	1	<	1	<	1	<	1
Turbidity	NTUs		180		22		45		340		33
vinyl chloride	mg/l	<	1	<	1	<	1	<	1	<	1
Zinc	mg/l		47.2		0.05				63		0.25



Parameter	Units	SEDS		SSN	
1, 1-dichloroethane	ug/Kg	<	620	<	620
1, 1-dichloroethene	ug/Kg	<	620	<	620
1,1,1,2-tetrachloroethane	ug/Kg	<	620	<	620
1,1,1-trichloroethane	ug/Kg	<	620	<	620
1,1,2,2-tetrachloroethane	ug/Kg	<	620	<	620
1,1,2-trichloroethane	ug/Kg	<	620	<	620
1,1-dichloropropene	ug/Kg	<	620	<	620
1,2,3-trichlorobenzene	ug/Kg	<	370	<	620
1,2,3-trichloropropane	ug/Kg	<	620	<	620
1,2,4-trichlorobenzene	ug/Kg	<	320	<	620
1,2,4-trimethylbenzene	ug/Kg	<	620	<	620
1,2-dibromo-3-chloropropane	ug/Kg	<	620	<	620
1,2-dibromoethane	ug/Kg	<	620	<	620
1,2-dichlorobenzene	ug/Kg	<	620	<	620
1,2-dichloroethane	ug/Kg	<	620	<	620
1,2-dichloropropane	ug/Kg	<	620	<	620
1,3,5-trimethyl benzene	ug/Kg	<	620	<	620
1,3-dichlorobenzene	ug/Kg	<	620	<	620
1,3-dichloropropane	ug/Kg	<	620	<	620
1,4 dichlorobenzene	ug/Kg	<	620	<	620
2-chlorotoluene	ug/Kg	<	620	<	620
2-chlorovinyl ether	ug/Kg	<	620	<	620
2-hexanone	ug/Kg	<	620	<	620
4-chlorotoluene	ug/Kg	<	620	<	620
Acetone	ug/Kg	<	1200	<	1200
Acrolin	ug/Kg	<	620	<	620
Acrylonitrile	ug/Kg	<	620	<	620
Ammonia	mg/kg	<	8	<	8
Antimony	mg/kg	<	1.7	<	1.4
Arsenic	mg/kg	<	1.5	<	1.3
benzene	ug/Kg	<	620	<	620
Beryllium	mg/kg	<	0.05	<	0.029
bromobenzene	ug/Kg	<	620	<	620
bromochloromethane	ug/Kg	<	620	<	620
bromodichloromethane	ug/Kg	<	620	<	620
bromoform	ug/Kg	<	620	<	620
bromomethane	ug/Kg	<	620	<	620
Cadmium	mg/kg	<	0.17	<	0.14
carbon disulfide	ug/Kg	<	620	<	620
carbon tetrachloride	ug/Kg	<	620	<	620
chlorobenzene	ug/Kg	<	620	<	620
chloroethane	ug/Kg	<	620	<	620
chloroform	ug/Kg	<	620	<	620
chloromethane	ug/Kg	<	620	<	620
Chromium	mg/kg	<	1.7		3.2
Cis Dichloroethene	ug/Kg	<	620	<	620
cis-1,3-dichloropropene	ug/Kg	<	620	<	620
Copper	mg/kg	<	1.2	<	0.88
dibromochloromethane	ug/Kg	<	620	<	620
dibromomethane	ug/Kg	<	620	<	620
Dichlorodifluoromethane	ug/Kg	<	620	<	620
Ethyl Ether	ug/Kg	<	620	<	620
ethylbenzene	ug/Kg	<	620	<	620
hexachlorobutadiene	ug/Kg		1000	<	620
Hexachloroethane	ug/Kg	<	620	<	620
Iron	mg/kg		1360		1750
isopropyl benzene	ug/Kg	<	620	<	620
Lead	mg/kg		3.2		9.1
m/p xylene	ug/Kg	<	620	<	620
Manganese	mg/kg		5.6		35.5
Mercury	mg/kg	<	0.028	<	0.024
methylene chloride	ug/Kg	<	620	<	620
Methylethyl Ketone (MEK)	ug/Kg	<	620	<	620
MIBK	ug/Kg	<	620	<	620
naphthalene	ug/Kg	<	370	<	620
n-butyl benzene	ug/Kg	<	240	<	620
Nickel	mg/kg	<	1.3	<	1.9
Nitrate	mg/kg	<	0.1	<	0.1
Nitrite	mg/kg	<	0.1	<	0.1
Nitrobenzene	ug/Kg	<	620	<	620
n-propyl benzene	ug/Kg	<	620	<	620
OrthoPhosphate	mg/kg	<	0.6		1.4
o-xylene	ug/Kg	<	620	<	620
Pentachloroethane	ug/Kg	<	620	<	620
p-isopropyltoluene	ug/Kg	<	620	<	620
sec-butylbenzene	ug/Kg	<	620	<	620



Parameter	Units		SEDS		SSN
Selenium	mg/kg	<	1.6	<	1.4
Silver	mg/kg	<	0.41	<	0.35
styrene	ug/Kg	<	620	<	620
tert-butylbenzyne	ug/Kg	<	620	<	620
Tertiary Butyl Alcohol	ug/Kg	<	250	<	250
tetrachloroethane	ug/Kg	<	620	<	620
Thallium	mg/kg	<	1.6	<	1.4
THF	ug/Kg	<	620	<	620
toluene	ug/Kg	<	620	<	620
Total Kjeldahl Nitrogen	mg/kg		8.9		9.5
Total Phosphorus	mg/kg		32.3		49.6
Total Solids	%		58.7		69.1
trans-1,2-dichloroethene	ug/Kg	<	620	<	620
trans-1,3-dichloropropene	ug/Kg	<	620	<	620
trichloroethene	ug/Kg	<	620	<	620
Trichlorofluoromethane	ug/Kg	<	620	<	620
vinyl chloride	ug/Kg	<	620	<	620
Zinc	mg/kg	<	6		16.9