BIOLOGICAL STREAM SURVEY

ROCKLAND COUNTY, NEW YORK
LOTIC SCENE INVESTIGATION (LSI)
2015 STREAM BIOMONITORING WATER QUALITY PROJECT

PREPARED BY
WATERSHED ASSESSMENT ASSOCIATES, LLC
SCHENECTADY, NEW YORK

FOR
ROCKLAND COUNTY SOIL AND WATER CONSERVATION DISTRICT
POMONA, NEW YORK

Contents

Introduction 3

Figure 1. Map of 2006 - 2015 station locations in Rockland County, NY. Watershed delineation and watershed names are based on hydrological drainage units originated by the U.S. Geological Survey New York Water Science Center and U.S Department of Agriculture, New York State Natural Resources Conservation Service (published in 2008). *Indicates the name of the watershed that it is locally known as. 3

Figure 2. Map of 2015 station locations and BAP category in Rockland County, NY. Watershed delineation and watershed names are based on hydrological drainage units originated by the U.S. Geological Survey New York Water Science Center and U.S Department of Agriculture, New York State Natural Resources Conservation Service (published in 2008). *Indicates the name of the watershed that it is locally known as. 4

Summary of Results 4

Figure 3. Percentage of land use and mean BAP scores for years 2006 – 2015 within each major watershed. N = number of samples, dashed line indicates minimum and maximum scores. 5

Table 1. Benthic macroinvertebrate metric scores and impact source determination percentages for the 18 stream sites sampled in 2015 throughout Rockland County, NY. Bolded numbers indicate most likely source of impact to stream community. TR= taxa richness; BI= biotic index; EPT = Ephemeroptera-Plecoptera-Trichoptera taxa; PMA= percent model affinity; BAP = biotic assessment profile; Nat=natural; NPN = non-point nutrient; Org = organic inputs; Imp= impoundment; Complex= municipal/industrial/nutrients. NBI-N = Nutrient Biotic Index for nitrogen; NBI-P = Nutrient Biotic Index for phosphorus. 6

Table 2 Biological Assessment Profile (BAP) scores from 2006 - 2015, the relative difference between 2015 and the most previous BAP values, and the overall change in water quality status (a difference of ≥±0.5 points). 7

Table 3. Descriptions of the NYS metrics and BAP scores calculated (adapted from Smith et al. 2009). 8

Table 4. Nutrient Biotic Index (NBI) Ranges and trophic state. 8

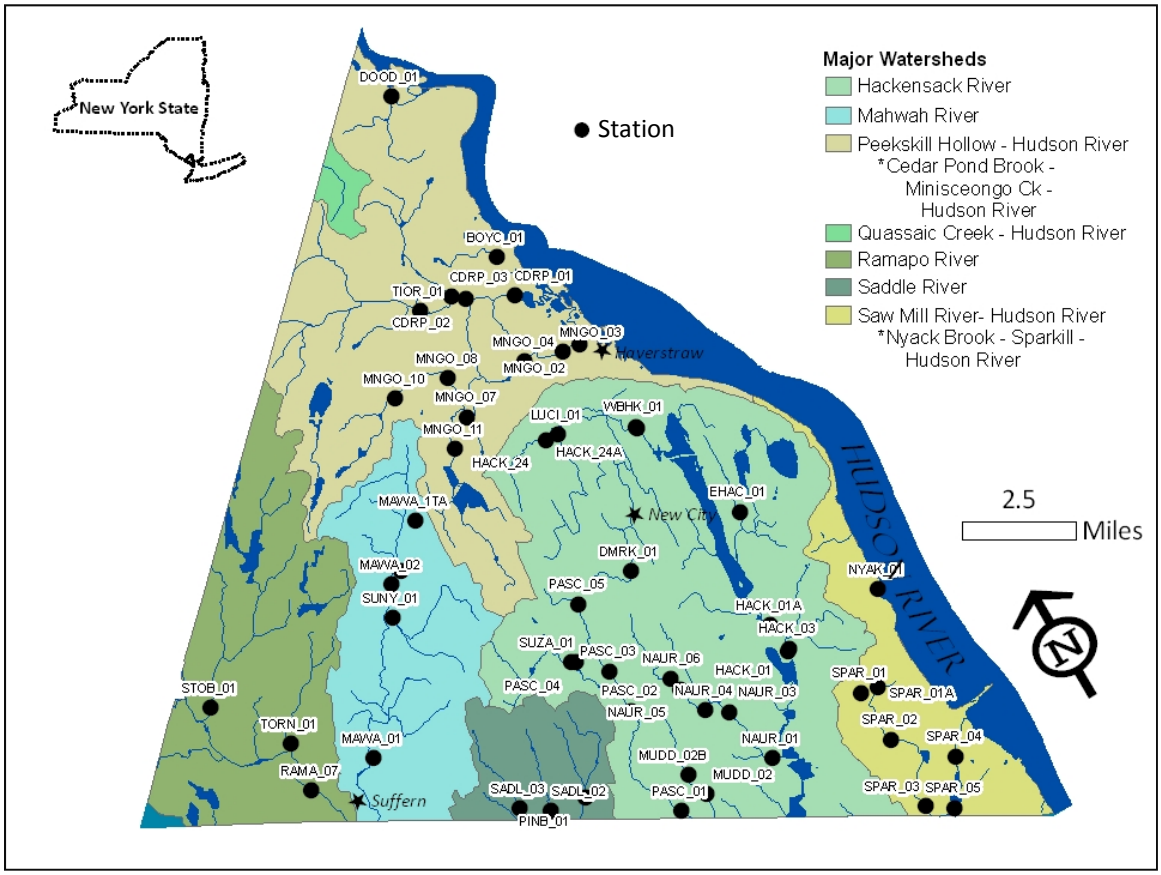
Appendix 9

Introduction

This report summarizes the results from the benthic samples collected for Rockland County in 2015. This project is supported by the Rockland County Soil and Water Conservation District. This data is part of an ongoing assessment of Rockland County stream communities since 2006 (Figure 1); for complete project overview, history, rationale, background, project goals, methods, key terminology and interpretation of 2006 - 2014 data, see Rockland County reports website: http://rocklandgov.com/departments/environmental-resources/protecting-our-streams-and-waterways/

Benthic kick samples were collected at 18 stations on September 8 and 9, 2015. All of the stations sampled had been previously sampled in at least one year during 2006 – 2014; for trend monitoring. Data was analyzed using New York State Department of Environmental Conservation (NYS DEC) methodology to determine a biological assessment profile (BAP), indicating overall water quality at each test site, Impact Source Determination (ISD) which assessed the most likely source (type of impact) affecting water quality, and the Nutrient Biotic Index (NBI) indicating the trophic state of the water at a particular station (see Table 3).

Figure 1. Map of 2006 - 2015 station locations in Rockland County, NY. Watershed delineation and watershed names are based on hydrological drainage units originated by the U.S. Geological Survey New York Water Science Center and U.S Department of Agriculture, New York State Natural Resources Conservation Service (published in 2008). *Indicates the name of the watershed that it is locally known as.



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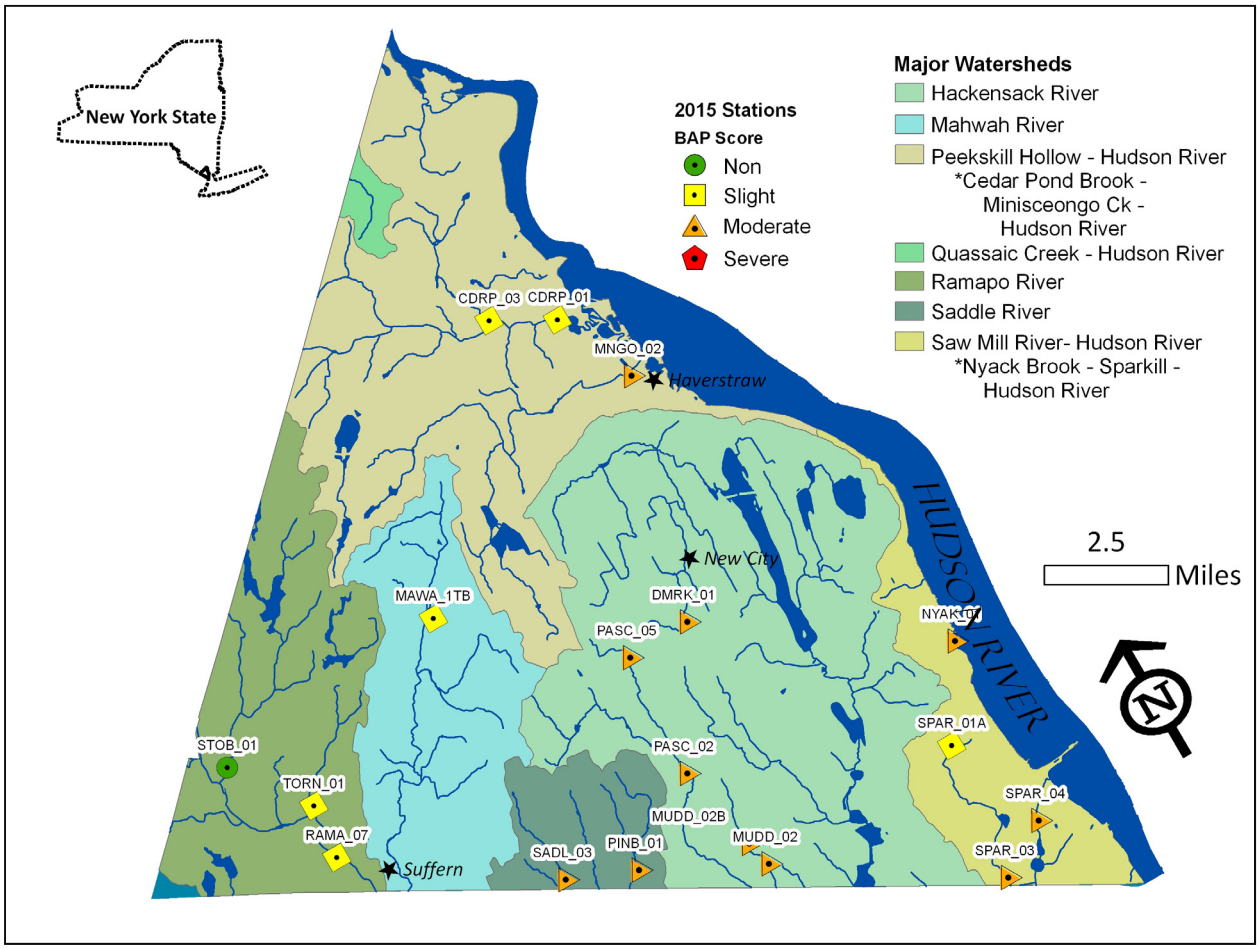

Summary of Results

The 2015 biological community metrics indicated Rockland County water quality ranged from moderately impacted to non impacted: 1 site was non impacted, 6 sites were slightly impacted, and 11 were moderately impacted (Figure 2 and Table 1).

Comparison of the biological assessment profile (BAP) for each station to prior data shows water quality declined (BAP dropped at least 0.5 points) at 8 stations, improved at 2 stations, and remained the same at 8 stations (Table 2). Of the 8 stations with declining water quality, the BAP remained within the same impact category at 4 stations and dropped into a lower water quality category at 4 stations (Table 2). Of the two stations with improved water quality one remained within the same impact category while the other, NYAK 01, changed from the severe to the moderately impacted category (Table 2).

The variability in water quality is partially a function of land use in each of the major stream basins, which affects the amount and the nature of storm water runoff. In a natural state (grassy or forested areas), rainwater seeps into the ground, where it is filtered, recharges ground water, and contributes to a steady state flow in lotic systems during times of low rainfall. Agricultural alteration of the land increases the amount of water that flows over the surface directly into streams. The result is diminished amounts of available groundwater, significant changes in river flow during wet or dry periods, and the deposition of chemicals such as fertilizer and pesticides and of animal waste directly into rivers and streams. Urban land use, with large imperious surfaces such as roads, parking lots, driveways, and rooftops results in the highest level of runoff, and is therefore the most likely to cause both flooding and stream channel erosion as large volumes of water carry urban contaminants (oil and petroleum products, road salt, industrial chemicals, lawn fertilizers and pesticides, and litter) rapidly into waterways through storm sewers or across imperious surfaces.

Since 2006, areas of Rockland County with a higher percentage of forested land have exhibited higher water quality scores than areas of considerable urban development or agriculture (figure 3). Forested areas usually contain fewer sources of pollutants and superior ability to buffer impacts; pollutants are removed from the water as it filters through the soil. The overall impact from agricultural and urban areas is dependent on numerous variables, including the amount of land dedicated to these uses, the volume of impervious surfaces, type and abundance of industry, abundance of automobiles, and management practices.

Figure 3. Percentage of land use and mean BAP scores for years 2006 – 2015 within each major watershed. N = number of samples, dashed line indicates minimum and maximum scores.

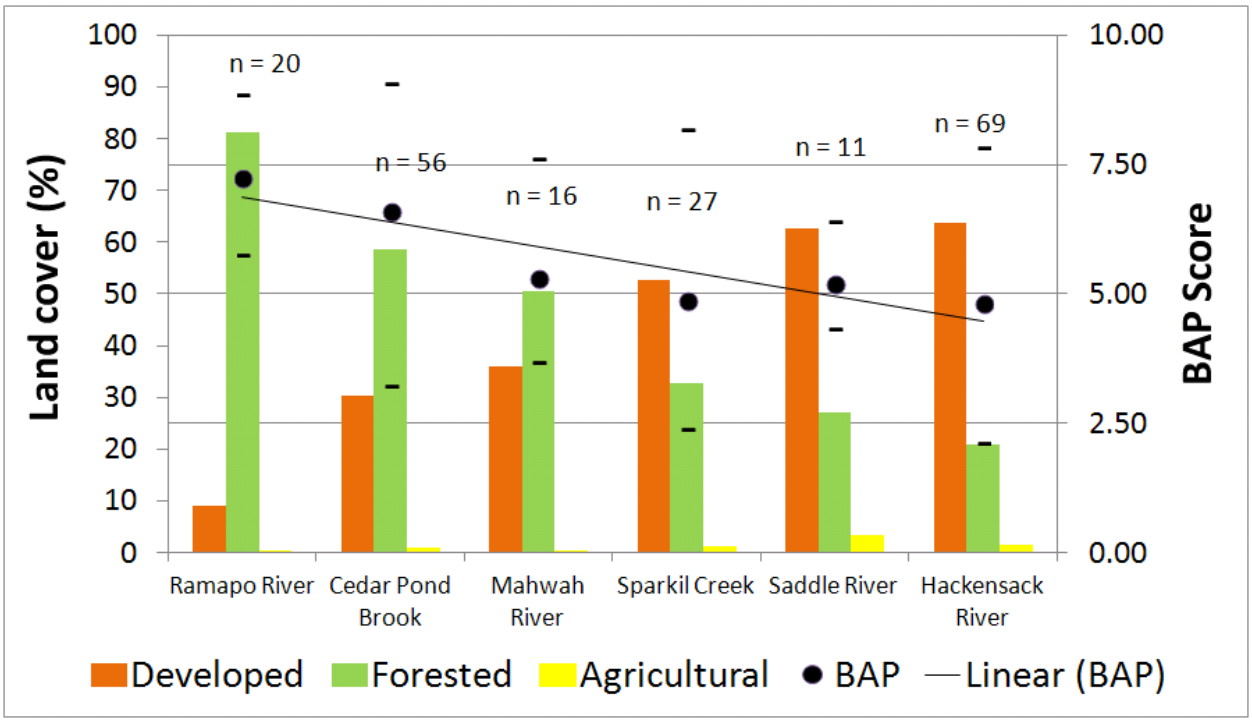

Table 1. Benthic macroinvertebrate metric scores and impact source determination percentages for the 18 stream sites sampled in 2015 throughout Rockland County, NY. Bolded numbers indicate most likely source of impact to stream community. TR= taxa richness; BI= biotic index; EPT = Ephemeroptera-Plecoptera-Trichoptera taxa; PMA= percent model affinity; BAP = biotic assessment profile; Nat=natural; NPN = non-point nutrient; Org = organic inputs; Imp= impoundment; Complex= municipal/industrial/nutrients. NBI-N = Nutrient Biotic Index for nitrogen; NBI-P = Nutrient Biotic Index for phosphorus.

Biotic metrics							Impact Source Determination (ISD)							NBI metrics	
Stream name	Station	TR	BI	EPT	PMA	BAP	Nat	NPN	Toxic	Org	Complex	Silt	Imp	NBI-P	NBI-N
Cedar Pond Brook	CDRP_01	26	5.3	10	66	6.7	45	36	35	45	29	37	42	6.57	6.76
Cedar Pond Brook	CDRP_03	31	5.3	10	63	6.6	42	41	41	42	47	44	44	7.08	7.23
Hackensack Creek	DMRK_01	20	5.7	6	48	5	31	57	40	54	59	42	**71**	6.86	7.62
Unnamed Trib	MAWA_1TB	17	3.5	10	42	6	45	**64**	43	34	53	35	57	6.77	6.17
Minisceongo Creek	MNGO_02	15	5.9	5	49	4.7	36	54	48	**62**	**67**	47	61	6.47	6.24
Muddy Creek	MUDD_02	20	6.6	5	51	4.5	23	29	47	46	47	32	40	7.23	8.00
Muddy Creek	MUDD_02B	12	4.8	3	39	4.9	33	43	49	27	**58**	32	50	7.02	7.21
Nyack Brook	NYAK_01	14	6.4	2	37	3.2	19	32	32	32	**55**	35	**60**	7.15	6.41
Pascack Brook	PASC_02	16	6.3	6	47	4.4	25	60	49	**64**	**69**	42	55	6.79	7.49
Pascack Brook	PASC_05	20	8.2	2	42	3.7	22	26	31	48	41	30	53	6.44	6.13
Pine Brook	PINB_01	19	7	3	55	4.5	27	28	25	30	24	25	30	7.56	7.81
Ramapo River	RAMA_07	15	5.2	8	66	6	**59**	**56**	**58**	31	**59**	39	49	6.34	5.66
Upper Saddle Brook	SADL_03	12	4.9	3	33	4.6	33	**67**	55	57	59	53	**63**	6.62	6.79
Sparkill	SPAR_01A	33	4.9	8	61	7.4	31	19	24	48	25	26	41	5.05	4.55
Spar Kill	SPAR_03	13	5.8	5	45	4.1	24	**62**	43	**60**	**65**	40	**60**	6.41	6.72
Spar Kill	SPAR_04	13	5.7	4	48	4	29	48	**52**	**54**	66	47	**50**	6.82	7.28
Stony Brook	STOB_01	28	3.4	16	72	8.6	61	42	31	31	32	39	39	4.84	5.69
Torne Brook	TORN_01	25	3.7	11	51	6.4	38	48	33	33	34	33	40	6.83	6.60

Table 2 Biological Assessment Profile (BAP) scores from 2006 - 2015, the relative difference between 2015 and the most previous BAP values, and the overall change in water quality status (a difference of ≥±0.5 points).

		BAP											
Stream name	Station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Diff	Change
Pascack Brook	PASC_05								4.30	3.56	3.65	0.09	No change
Sparkill Creek	SPAR_04	5.09	5.89	4.64	4.54	4.29	4.60	4.20	5.09	4.34	3.96	-0.38	No change
Sparkill Creek	SPAR_03			4.57			5.10				4.05	-1.05	Decline
Pascack Brook	PASC_02	6.39	5.55				4.20				4.39	0.19	No change
Pine Brook	PINB_01			4.37	4.99	4.19		3.73			4.48	0.75	Decline
Muddy Creek	MUDD_02	4.97	4.92		5.09	4.35	4.40	3.49	4.72	4.42	4.49	0.07	No change
Upper Saddle Brook	SADL_03			4.84	5.34		5.20	5.36	5.33	5.20	4.64	-0.56	Decline
Muddy Creek	MUDD_02B							4.23			4.94	0.71	Decline
Hackensack River	DMRK_01	6.60	6.83							5.81	4.98	-0.83	Decline
Unnamed tributary	MAWA_1TB						5.30				5.98	0.68	Improve
Ramapo River	RAMA_07	7.29	6.01	5.97	7.58	6.54	6.50	6.98	6.70	5.78	5.99	0.21	No change
Torne Brook	TORN_01			6.15		7.37		5.92			6.44	0.52	Decline
Stoney Brook	STOB_01	8.41	8.66	8.11	8.20			7.40	8.86	8.57	8.58	0.01	No change
Nyack Brook	NYAK_01						2.40				3.22	0.82	Improve
Minisceongo Creek	MNGO_02	5.31	6.58		6.23				4.96		4.66	-0.30	No change
Timp Mtn. Brook	CDRP_03	8.00	7.98		6.13		6.40				6.60	0.20	No change
Cedar Pond Brook	CDRP_01	7.20	8.61		7.56			4.62	8.47	7.63	6.68	-0.95	Decline
Sparkill Creek	SPAR_01A						8.20				7.41	-0.79	Decline

Table 3. Descriptions of the NYS metrics and BAP scores calculated (adapted from Smith et al. 2009).

Metric	Description	Sample Type	Predicted response to impact
Taxa Richness (TR)	Species richness is the total number of unique species or taxa found in the subsample. Higher species richness indicates higher water quality.	Kick	Decrease
Ephemeroptera-Trichoptera-Plecoptera (EPT) Richness	EPT Richness is the total number of taxa of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) found in a subsample. These are considered to be mostly clean-water organisms, and their presence may indicate good water quality.	Kick	Decrease
Hilsenhoff's Biotic Index (BI)	Biotic index is calculated by multiplying the number of individuals of each species or taxa by its assigned tolerance value, summing these products, and dividing by the total number of individuals. Tolerance values range from intolerant (0) to tolerant (10). High biotic index values are suggestive of organically enriched condition, while low values indicate naturally occurring, ambient communities.	Kick	Increase
Percent Model Affinity (PMA)	This is a measure of similarity to a model non-impacted community based on percent abundance in 7 major groups to measure similarity to a kick sample community of 40% Ephemeroptera, 5% Plecoptera, 10% Trichoptera, 10% Coleoptera, 20% Chironomidae, 5% Oligochaeta, and 10% Other. The lower the similarity value the greater the impact.	Kick	Decrease
Biological Assessment Profile (BAP)	BAP is the assessed impact for each station. The BAP score is the mean value of the above metrics after converting each metric score to a common scale of 0-10. The higher the BAP score, the better the assessed impact category. There are four impact categories in NYS: non-, slight, moderate, or severe impact. The NYS impact categories and representative BAP scores are; Non-Impact 7.51 – 10, Slight Impact 5.01-7.5, Moderate Impact 2.51- 5, Severe Impact 0- 2.5.	Kick	Decrease

Table 4. Nutrient Biotic Index (NBI) Ranges and trophic state.

Trophic state for NBI	NBI
Eutrophic	6.01-10
Mesotrophic	5.01-6
Oligotrophic	0-5

Appendix

A Field and Lab Data Summary page was created for each of the stations sampled, including: site location, number, sampling date, physical and chemical data, and site photos as well as the taxa identified for each sub-sample.

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Pine Brook**
River Basin: **Passaic**
County: **Rockland**
State: **NY**

Station: **PINB 01**
Coll Date: **9/9/2015 10:31:51 AM**
Site description: **Just above Pinebrook Rd bridge**

Latitude: **41.078**
Longitude: **-74.0677**
Field Crew: **cmf, kh**

Physical Characteristics	
Depth (meters):	**0**
Width (meters):	**10**
Current (cm/sec):	**10**
Canopy (%):	**80**
Substrate	
Rock (%):	**5**
Rubble (%):	**15**
Gravel (%):	**65**
Sand (%):	**10**
Silt (%):	**5**
Embeddedness (%):	**30**

Chemical Measurements	
DO (mg/L):	**1.02**
DO sat. (%):	**11.3**
Temperature (C):	**20.39**
Spec. Conduct. (umhos):	**726**
Baro pressure:	**752.6**
pH:	**7.77**
Salinity (PSS):	**0.35**

Biological Attributes	
Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	
Odonata:	
Chironomidae:	**Y**
Simuliidae:	
Decapoda:	**Y**
Gammaridae:	
Mollusca:	
Oligochaeta:	**Y**
Other macro's:	
Field Faunal Condition:	**Good**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Pine Brook**
Station: **PINB 01** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
ARHYNCHOBDELLID	Erpobdellidae	Undetermined Erpobdellidae	1
COLEOPTERA	Elmidae	Dubiraphia sp.	1
		Macronychus glabratus	2
		Stenelmis sp.	13
	Psephenidae	Psephenus herricki	6
DECAPODA	Cambaridae	Orconectes sp.	2
DIPTERA	Chironomidae	Microtendipes pedellus gr.	2
		Paratendipes sp.	13
		Stictochironomus sp.	34
		Tanytarsus sp.	2
		Tribelos sp.	1
	Culicidae	Anopheles sp.	1
EPHEMEROPTERA	Heptageniidae	Stenacron interpunctatum	4
ISOPODA	Asellidae	Caecidotea sp.	6
LUMBRICULIDA	Lumbriculidae	Undetermined Lumbriculidae	2
ODONATA	Coenagrionidae	Undetermined Coenagrionidae	1
TRICHOPTERA	Hydropsychidae	Hydropsyche betteni	1
	Philopotamidae	Chimarra aterrima?	5
TUBIFICIDA	Tubificidae	Undet. Tubificidae w/o cap. setae	3

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Sparkill**
River Basin: **Hudson**
County: **Rockland**
State: **NY**

Station: **SPAR 04**
Coll Date: **9/9/2015 8:35:54 AM**
Site description: **Just below Valentine St. bridge**

Latitude: **41.0303**
Longitude: **-73.9257**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.25**
Width (meters):	**10**
Current (cm/sec):	**45**
Canopy (%):	**5**
Substrate	
Rock (%):	**5**
Rubble (%):	**45**
Gravel (%):	**35**
Sand (%):	**15**
Silt (%):	
Embeddedness (%):	**40**

Chemical Measurements

DO (mg/L):	**4.38**
DO sat. (%):	**49.3**
Temperature (C):	**20.88**
Spec. Conduct. (umhos):	**888**
Baro pressure:	**761.2**
pH:	**8.11**
Salinity (PSS):	**0.44**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	**Y**
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	**Y**
Odonata:	
Chironomidae:	
Simuliidae:	
Decapoda:	**Y**
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	
Field Faunal Condition:	**Poor**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Spar Kill**
Station: **SPAR 04** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
AMPHIPODA	Gammaridae	Gammarus sp.	16
COLEOPTERA	Elmidae	Stenelmis sp.	6
DIPTERA	Chironomidae	Cricotopus/Orthocladius Complex	2
		Polypedilum flavum	26
		Tanytarsus sp.	2
	Simuliidae	Simulium sp.	3
EPHEMEROPTERA	Baetidae	Baetis sp.	1
ISOPODA	Asellidae	Caecidotea sp.	3
LUMBRICIDA	Lumbricina	Undetermined Lumbricina	1
TRICHOPTERA	Hydropsychidae	Cheumatopsyche sp.	26
		Hydropsyche betteni	6
	Philopotamidae	Chimarra aterrima?	2
TRICLADIDA		Undetermined Turbellaria	6

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Sparkill**
River Basin: **Hudson**
County: **Rockland**
State: **NY**

Station: **SPAR 03**
Coll Date: **9/9/2015** **9:03:41 AM**
Site description: **Just below Washington St. In park**

Latitude: **41.0205**
Longitude: **-73.9471**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.1**
Width (meters):	**6**
Current (cm/sec):	**30**
Canopy (%):	**20**
Substrate	
Rock (%):	
Rubble (%):	
Gravel (%):	**80**
Sand (%):	**15**
Silt (%):	**5**
Embeddedness (%):	**50**

Chemical Measurements

DO (mg/L):	**7.84**
DO sat. (%):	**89.1**
Temperature (C):	**21.57**
Spec. Conduct. (umhos):	**960**
Baro pressure:	**760.6**
pH:	**8.44**
Salinity (PSS):	**0.47**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	
Megaloptera:	
Odonata:	
Chironomidae:	
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	**turbellaria, planaria**
Field Faunal Condition:	**Poor**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Spar Kill**
Station: **SPAR 03** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
ARHYNCHOBDELLID	Erpobdellidae	Undetermined Erpobdellidae	1
COLEOPTERA	Elmidae	Stenelmis sp.	3
DIPTERA	Chironomidae	Chaetocladius sp.	1
		Microtendipes pedellus gr.	5
		Polypedilum flavum	19
		Tanytarsus sp.	2
		Thienemannimyia gr. spp.	1
EPHEMEROPTERA	Baetidae	Baetis intercalaris	4
TRICHOPTERA	Hydropsychidae	Ceratopsyche bronta	24
		Cheumatopsyche sp.	23
		Hydropsyche betteni	9
	Hydroptilidae	Hydroptila sp.	1
TRICLADIDA		Undetermined Turbellaria	7

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Muddy Creek**
River Basin: **Hackensack**
County: **Rockland**
State: **NY**

Station: **MUDD 02B**
Coll Date: **9/9/2015** **9:57:04 AM**
Site description: **Just above W. Crooked Hill Rd. bridge**

Latitude: **41.0681**
Longitude: **-74.0259**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.2**
Width (meters):	**5**
Current (cm/sec):	**40**
Canopy (%):	**87**
Substrate	
Rock (%):	
Rubble (%):	**15**
Gravel (%):	**75**
Sand (%):	**10**
Silt (%):	
Embeddedness (%):	**15**

Chemical Measurements

DO (mg/L):	**6.72**
DO sat. (%):	**76.2**
Temperature (C):	**21.4**
Spec. Conduct. (umhos):	**1063**
Baro pressure:	**755.8**
pH:	**8.04**
Salinity (PSS):	**0.53**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	
Odonata:	
Chironomidae:	**Y**
Simuliidae:	
Decapoda:	**Y**
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	
Field Faunal Condition:	**Good**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Muddy Creek**
Station: **MUDD 02B** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
AMPHIPODA	Gammaridae	Gammarus sp.	3
BASOMMATOPHOR	Lymnaeidae	Undetermined Lymnaeidae	1
COLEOPTERA	Elmidae	Stenelmis sp.	33
DIPTERA	Chironomidae	Chaetocladius sp.	4
		Parametriocnemus sp.	1
		Polypedilum flavum	2
		Thienemannimyia gr. spp.	3
LUMBRICULIDA	Lumbriculidae	Undetermined Lumbriculidae	2
TRICHOPTERA	Hydropsychidae	Cheumatopsyche sp.	5
		Hydropsyche betteni	3
	Philopotamidae	Chimarra aterrima?	40
TRICLADIDA		Undetermined Turbellaria	3

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Stoney Brook**
River Basin: **Ramapo**
County: **Rockland**
State: **NY**

Station: **STOB 01**
Coll Date: **9/9/2015** **3:33:06 PM**
Site description: **Just above Sevens Lakes Rd. bridge**

Latitude: **41.1642**
Longitude: **-74.1831**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.5**
Width (meters):	**10**
Current (cm/sec):	**45**
Canopy (%):	**70**
Substrate	
Rock (%):	**5**
Rubble (%):	**35**
Gravel (%):	**55**
Sand (%):	**5**
Silt (%):	
Embeddedness (%):	**15**

Chemical Measurements

DO (mg/L):	**7.9**
DO sat. (%):	**91.4**
Temperature (C):	**22.43**
Spec. Conduct. (umhos):	**138**
Baro pressure:	**749.5**
pH:	**8.27**
Salinity (PSS):	**0.06**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	**Y**
Plecoptera:	**Y**
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	**Y**
Odonata:	
Chironomidae:	
Simuliidae:	
Decapoda:	**Y**
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	
Field Faunal Condition:	**Very good**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Stony Brook**
Station: **STOB 01** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
BASOMMATOPHOR	Ancylidae	Ferrissia sp.	2
COLEOPTERA	Psephenidae	Psephenus herricki	4
DECAPODA	Cambaridae	Orconectes sp.	2
DIPTERA	Chironomidae	Micropsectra/Tanytarsus Complex	1
		Polypedilum aviceps	1
		Rheocricotopus sp.	1
	Simuliidae	Simulium sp.	2
EPHEMEROPTERA	Baetidae	Acentrella turbida	1
		Acerpenna sp.	1
		Baetis intercalaris	7
	Ephemerellidae	Eurylophella funeralis	1
	Heptageniidae	Epeorus sp.	1
		Maccaffertium modestum	19
		Maccaffertium vicarium	1
	Isonychiidae	Isonychia sp.	19
HOPLONEMERTEA	Tetrastemmatidae	Prostoma graecense	1
LUMBRICULIDA	Lumbriculidae	Undetermined Lumbriculidae	2
MEGALOPTERA	Corydalidae	Nigronia serricornis	3
ODONATA	Calopterygidae	Calopteryx sp.	2
	Gomphidae	Undetermined Gomphidae	1
PLECOPTERA	Perlidae	Acroneuria sp.	2
		Paragnetina media	1
TRICHOPTERA	Hydropsychidae	Ceratopsyche bronta	2
		Ceratopsyche sparna	3
		Cheumatopsyche sp.	3
		Hydropsyche betteni	4
	Philopotamidae	Chimarra aterrima?	11
	Psychomyiidae	Lype diversa	2

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Upper Saddle Brook**
River Basin: **Upper Saddle**
County: **Rockland**
State: **NY**

Station: **SADL 03**
Coll Date: **9/9/2015 11:08:50 AM**
Site description: **Just off Cherry Lane**

Latitude: **41.0866**
Longitude: **-74.0938**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.3**
Width (meters):	**6**
Current (cm/sec):	**40**
Canopy (%):	**80**
Substrate	
Rock (%):	**5**
Rubble (%):	**15**
Gravel (%):	**60**
Sand (%):	**15**
Silt (%):	**5**
Embeddedness (%):	**30**

Chemical Measurements

DO (mg/L):	**7.59**
DO sat. (%):	**86.6**
Temperature (C):	**21.75**
Spec. Conduct. (umhos):	**574**
Baro pressure:	**752.2**
pH:	**8.54**
Salinity (PSS):	**0.28**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	**Y**
Odonata:	
Chironomidae:	**Y**
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	**Y**
Other macro's:	**amphipoda**
Field Faunal Condition:	**Good**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Upper Saddle Brook**
Station: **SADL 03** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
AMPHIPODA	Crangonyctidae	Crangonyx sp.	2
COLEOPTERA	Elmidae	Stenelmis sp.	18
DIPTERA	Chironomidae	Chaetocladius sp.	3
		Paratanytarsus sp.	1
		Polypedilum flavum	2
	Tipulidae	Antocha sp.	1
LUMBRICIDA	Lumbricina	Undetermined Lumbricina	1
LUMBRICULIDA	Lumbriculidae	Undetermined Lumbriculidae	1
MEGALOPTERA	Corydalidae	Nigronia serricornis	2
TRICHOPTERA	Hydropsychidae	Cheumatopsyche sp.	29
		Hydropsyche betteni	8
	Philopotamidae	Chimarra aterrima?	32

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Pascack Brook**
River Basin: **Hackensack**
County: **Rockland**
State: **NY**

Station: **PASC 02**
Coll Date: **9/9/2015 12:08:51 PM**
Site description: **Just below Blue Heron Rd bridge**

Latitude: **41.0949**
Longitude: **-74.0325**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.2**
Width (meters):	**13**
Current (cm/sec):	**20**
Canopy (%):	**74**
Substrate	
Rock (%):	
Rubble (%):	**40**
Gravel (%):	**40**
Sand (%):	**15**
Silt (%):	**5**
Embeddedness (%):	**25**

Chemical Measurements

DO (mg/L):	**6.36**
DO sat. (%):	**74**
Temperature (C):	**22.94**
Spec. Conduct. (umhos):	**939**
Baro pressure:	**751.9**
pH:	**8.24**
Salinity (PSS):	**0.46**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	**Y**
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	
Odonata:	
Chironomidae:	**Y**
Simuliidae:	
Decapoda:	**Y**
Gammaridae:	
Mollusca:	
Oligochaeta:	**Y**
Other macro's:	**amphipoda, isopoda**
Field Faunal Condition:	**Poor**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Pascack Brook**
Station: **PASC 02** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
AMPHIPODA	Crangonyctidae	Crangonyx sp.	6
COLEOPTERA	Elmidae	Stenelmis sp.	3
DIPTERA	Chironomidae	Cricotopus bicinctus	1
		Cricotopus/Orthocladius Complex	2
		Polypedilum flavum	11
		Polypedilum illinoense	4
		Rheocricotopus sp.	2
		Tanytarsus sp.	3
		Thienemannimyia gr. spp.	1
EPHEMEROPTERA	Baetidae	Baetis intercalaris	4
ISOPODA	Asellidae	Caecidotea sp.	20
TRICHOPTERA	Hydropsychidae	Ceratopsyche bronta	6
		Ceratopsyche morosa	1
		Ceratopsyche sparna	1
		Cheumatopsyche sp.	23
		Hydropsyche betteni	12

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Pascack Brook**
River Basin:
County: **Rockland**
State: **NY**

Station: **PASC 05**
Coll Date: **9/9/2015** **1:10:08 PM**
Site description: **6 houses below Dwight Ave bridge**

Latitude: **41.1325**
Longitude: **-74.02846**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.4**
Width (meters):	**4**
Current (cm/sec):	**10**
Canopy (%):	**85**
Substrate	
Rock (%):	**5**
Rubble (%):	**15**
Gravel (%):	**25**
Sand (%):	**55**
Silt (%):	
Embeddedness (%):	**20**

Chemical Measurements

DO (mg/L):	**5.99**
DO sat. (%):	**70.3**
Temperature (C):	**23.18**
Spec. Conduct. (umhos):	**1171**
Baro pressure:	**748.3**
pH:	**8.59**
Salinity (PSS):	**0.58**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	
Megaloptera:	
Odonata:	**Y**
Chironomidae:	
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	
Field Faunal Condition:	**Very poor**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Pascack Brook**
Station: **PASC 05** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
ARHYNCHOBDELLID	Erpobdellidae	Undetermined Erpobdellidae	2
BASOMMATOPHOR	Ancylidae	Ferrissia sp.	1
DIPTERA	Chironomidae	Chironomus sp.	1
		Cryptochironomus sp.	3
		Dicrotendipes sp.	4
		Micropsectra sp.	4
		Paratanytarsus sp.	5
		Phaenopsectra sp.	6
		Stictochironomus sp.	9
		Tanytarsus sp.	4
		Thienemannimyia gr. spp.	2
		Tribelos sp.	1
		Zavrelimyia sp.	1
	Tipulidae	Tipula sp.	1
LUMBRICULIDA	Lumbriculidae	Undetermined Lumbriculidae	1
ODONATA	Calopterygidae	Calopteryx sp.	6
	Coenagrionidae	Argia sp.	2
TRICHOPTERA	Hydropsychidae	Cheumatopsyche sp.	2
		Hydropsyche betteni	5
TUBIFICIDA	Tubificidae	Undet. Tubificidae w/o cap. setae	40

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Hackensack Creek**
River Basin: **Hackensack**
County: **Rockland**
State: **NY**

Station: **DMRK 01**
Coll Date: **9/9/2015** **1:32:50 PM**
Site description: **Just above Sittle Torr Rd. bridge**

Latitude: **41.1328**
Longitude: **-74.0024**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.5**
Width (meters):	**5**
Current (cm/sec):	**40**
Canopy (%):	**30**
Substrate	
Rock (%):	**15**
Rubble (%):	**15**
Gravel (%):	**55**
Sand (%):	**15**
Silt (%):	
Embeddedness (%):	**55**

Chemical Measurements

DO (mg/L):	**8.7**
DO sat. (%):	**97.4**
Temperature (C):	**20.96**
Spec. Conduct. (umhos):	**494**
Baro pressure:	**753.6**
pH:	**8.38**
Salinity (PSS):	**0.24**

Biological Attributes

Aquatic vegetation	
Macrophytes:	**Y**
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	**Y**
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	
Megaloptera:	**Y**
Odonata:	
Chironomidae:	
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	**Y**
Other macro's:	
Field Faunal Condition:	**Poor**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Hackensack Creek**
Station: **DMRK 01** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
COLEOPTERA	Elmidae	Stenelmis sp.	3
DIPTERA	Chironomidae	Cardiocladius obscurus	1
		Cricotopus/Orthocladius Complex	4
		Micropsectra/Tanytarsus Complex	1
		Parametriocnemus sp.	4
		Polypedilum flavum	4
		Thienemannimyia gr. spp.	2
		Tribelos sp.	1
		Tvetenia bavarica gr.	1
	Simuliidae	Simulium sp.	2
	Tipulidae	Antocha sp.	6
		Limonia sp.	1
		Tipula sp.	1
EPHEMEROPTERA	Baetidae	Baetis intercalaris	4
		Baetis tricaudatus	1
LUMBRICIDA	Lumbricina	Undetermined Lumbricina	2
TRICHOPTERA	Hydropsychidae	Cheumatopsyche sp.	16
		Hydropsyche betteni	40
	Philopotamidae	Chimarra aterrima?	4
		Dolophilodes sp.	2

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Unnamed Trib**
River Basin: **Ramapo**
County: **Rockland**
State: **NY**

Station: **MAWA 1TB**
Coll Date: **9/9/2015** **2:14:53 PM**
Site description: **Just above Haverstraw Rd**

Latitude: **41.1707**
Longitude: **-74.0851**
Field Crew: **cmf, kh**

Physical Characteristics	
Depth (meters):	**0.2**
Width (meters):	**5**
Current (cm/sec):	**18**
Canopy (%):	**85**
Substrate	
Rock (%):	**20**
Rubble (%):	**35**
Gravel (%):	**40**
Sand (%):	**5**
Silt (%):	
Embeddedness (%):	**30**

Chemical Measurements	
DO (mg/L):	**5.98**
DO sat. (%):	**66.7**
Temperature (C):	**20.68**
Spec. Conduct. (umhos):	**782**
Baro pressure:	**748.9**
pH:	**8.23**
Salinity (PSS):	**0.38**

Biological Attributes	
Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	**Y**
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	**Y**
Odonata:	
Chironomidae:	
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	
Field Faunal Condition:	**Good**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Unnamed Trib**
Station: **MAWA 1TB** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
COLEOPTERA	Elmidae	Stenelmis sp.	5
	Psephenidae	Psephenus herricki	4
DIPTERA	Chironomidae	Cricotopus bicinctus	1
		Micropsectra sp.	2
		Polypedilum aviceps	1
		Thienemannimyia gr. spp.	1
EPHEMEROPTERA	Baetidae	Baetis flavistriga	4
		Baetis intercalaris	2
MEGALOPTERA	Corydalidae	Nigronia serricornis	7
PLECOPTERA	Leuctridae	Leuctra sp.	21
TRICHOPTERA	Glossosomatidae	Glossosoma sp.	2
	Hydropsychidae	Cheumatopsyche sp.	8
		Diplectrona sp.	12
		Hydropsyche betteni	7
	Philopotamidae	Chimarra aterrima?	15
		Dolophilodes sp.	6
	Polycentropodidae	Polycentropus sp.	2

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Ramapo River**
River Basin: **Ramapo**
County: **Rockland**
State: **NY**

Station: **RAMA 07**
Coll Date: **9/9/2015** **2:43:54 PM**
Site description: **Just above 4th St bridge**

Latitude: **41.1252**
Longitude: **-74.1646**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.4**
Width (meters):	**30**
Current (cm/sec):	**50**
Canopy (%):	**5**
Substrate	
Rock (%):	**5**
Rubble (%):	**50**
Gravel (%):	**35**
Sand (%):	**10**
Silt (%):	
Embeddedness (%):	**15**

Chemical Measurements

DO (mg/L):	**8.59**
DO sat. (%):	**102**
Temperature (C):	**23.61**
Spec. Conduct. (umhos):	**620**
Baro pressure:	**752.2**
pH:	**8.36**
Salinity (PSS):	**0.30**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	**Y**
Occurance of macroinvertebrates	
Ephemeroptera:	**Y**
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	**Y**
Odonata:	
Chironomidae:	**Y**
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	**amphipoda isopoda turbellaria**
Field Faunal Condition:	**Good**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Ramapo River**
Station: **RAMA 07** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
AMPHIPODA	Gammaridae	Gammarus sp.	3
COLEOPTERA	Psephenidae	Psephenus herricki	2
DIPTERA	Chironomidae	Cricotopus bicinctus	4
		Cricotopus trifascia gr.	1
		Cricotopus/Orthocladius Complex	2
		Polypedilum flavum	5
		Rheotanytarsus sp.	1
EPHEMEROPTERA	Baetidae	Baetis flavistriga	1
		Baetis intercalaris	37
TRICHOPTERA	Hydropsychidae	Ceratopsyche bronta	10
		Cheumatopsyche sp.	13
	Hydroptilidae	Hydroptila sp.	1
		Leucotrichia pictipes	4
	Philopotamidae	Chimarra aterrima?	14
		Chimarra obscura	2

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Torne Brook**
River Basin: **Ramapo River**
County: **Rockland**
State: **NY**

Station: **TORN 01**
Coll Date: **9/9/2015** **3:02:02 PM**
Site description: **Just below Torne Brook Rd. bridge**

Latitude: **41.1416**
Longitude: **-74.1620**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.2**
Width (meters):	**4**
Current (cm/sec):	**15**
Canopy (%):	**90**
Substrate	
Rock (%):	**10**
Rubble (%):	**30**
Gravel (%):	**50**
Sand (%):	**10**
Silt (%):	
Embeddedness (%):	**20**

Chemical Measurements

DO (mg/L):	**6.06**
DO sat. (%):	**68.8**
Temperature (C):	**22.1**
Spec. Conduct. (umhos):	**154**
Baro pressure:	**750.4**
pH:	**8.16**
Salinity (PSS):	**0.07**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	**Y**
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	**Y**
Odonata:	
Chironomidae:	
Simuliidae:	
Decapoda:	**Y**
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	
Field Faunal Condition:	**Very good**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Torne Brook**
Station: **TORN 01** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
COLEOPTERA	Dryopidae	Helichus sp.	1
	Elmidae	Oulimnius latiusculus	2
		Stenelmis sp.	1
	Psephenidae	Psephenus herricki	15
DIPTERA	Chironomidae	Corynoneura sp.	1
		Micropsectra/Tanytarsus Complex	1
		Microtendipes pedellus gr.	2
		Parametriocnemus sp.	2
		Polypedilum aviceps	4
	Ephydridae	Undetermined Ephydridae	1
	Tipulidae	Dicranota sp.	2
EPHEMEROPTERA	Baetidae	Baetis intercalaris	1
LUMBRICIDA	Lumbricina	Undetermined Lumbricina	5
LUMBRICULIDA	Lumbriculidae	Undetermined Lumbriculidae	1
MEGALOPTERA	Corydalidae	Nigronia serricornis	8
PLECOPTERA	Chloroperlidae	Sweltsa sp.	1
	Leuctridae	Leuctra sp.	4
	Perlidae	Acroneuria sp.	5
TRICHOPTERA	Hydropsychidae	Ceratopsyche sparna	3
		Cheumatopsyche sp.	13
		Diplectrona sp.	8
		Hydropsyche betteni	3
	Philopotamidae	Chimarra aterrima?	4
		Dolophilodes sp.	6
	Rhyacophilidae	Rhyacophila minor	6

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Muddy Creek**
River Basin: **Hackensack**
County: **Rockland**
State: **NY**

Station: **MUDD 02**
Coll Date: **9/9/2015** **9:34:41 AM**
Site description: **Just below East Washington Ave**

Latitude: **41.0600**
Longitude: **-74.0235**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.3**
Width (meters):	**2**
Current (cm/sec):	**30**
Canopy (%):	**5**
Substrate	
Rock (%):	
Rubble (%):	**5**
Gravel (%):	**75**
Sand (%):	**15**
Silt (%):	**5**
Embeddedness (%):	**50**

Chemical Measurements

DO (mg/L):	**6.47**
DO sat. (%):	**72**
Temperature (C):	**20.58**
Spec. Conduct. (umhos):	**907**
Baro pressure:	**756.2**
pH:	**8.12**
Salinity (PSS):	**0.45**

Biological Attributes

Aquatic vegetation	
Macrophytes:	**Y**
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	**Y**
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	
Megaloptera:	
Odonata:	
Chironomidae:	**Y**
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	**Y**
Other macro's:	
Field Faunal Condition:	**Very poor**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Muddy Creek**
Station: **MUDD 02** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
AMPHIPODA	Crangonyctidae	Crangonyx sp.	1
	Gammaridae	Gammarus sp.	16
BASOMMATOPHOR	Ancylidae	Ferrissia sp.	1
COLEOPTERA	Elmidae	Stenelmis sp.	19
DIPTERA	Chironomidae	Cricotopus/Orthocladius Complex	5
		Cryptochironomus sp.	2
		Micropsectra/Tanytarsus Complex	3
		Microtendipes pedellus gr.	7
		Paratanytarsus sp.	1
		Polypedilum flavum	1
		Rheotanytarsus sp.	2
		Stictochironomus sp.	3
		Thienemannimyia gr. spp.	4
EPHEMEROPTERA	Baetidae	Baetis flavistriga	1
	Heptageniidae	Maccaffertium sp.	1
ISOPODA	Asellidae	Caecidotea sp.	22
TRICHOPTERA	Hydropsychidae	Cheumatopsyche sp.	2
		Hydropsyche betteni	1
	Hydroptilidae	Hydroptila sp.	1
TUBIFICIDA	Tubificidae	Undet. Tubificidae w/o cap. setae	7

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Sparkill**
River Basin: **Hudson**
County: **Rockland**
State: **NY**

Station: **SPAR 01A**
Coll Date: **9/8/2015 5:45:15 PM**
Site description: **Just south of Tackamac North Park entrance**

Latitude: **41.0609**
Longitude: **-73.9389**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.1**
Width (meters):	**1.5**
Current (cm/sec):	**10**
Canopy (%):	**90**
Substrate	
Rock (%):	**5**
Rubble (%):	**55**
Gravel (%):	**35**
Sand (%):	**5**
Silt (%):	
Embeddedness (%):	**10**

Chemical Measurements

DO (mg/L):	**4.68**
DO sat. (%):	**51.2**
Temperature (C):	**20.15**
Spec. Conduct. (umhos):	**193**
Baro pressure:	**755.1**
pH:	**8.07**
Salinity (PSS):	**0.09**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	
Odonata:	**Y**
Chironomidae:	
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	
Field Faunal Condition:	**Poor**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Sparkill**
Station: **SPAR 01A** Replicate: **A**
Collection Date: **9/8/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
COLEOPTERA	Dytiscidae	Agabus sp.	1
	Elmidae	Stenelmis sp.	3
	Psephenidae	Ectopria sp.	1
		Psephenus herricki	3
DIPTERA	Ceratopogonidae	Atrichopogon sp.	1
	Chironomidae	Cricotopus sp.	2
		Micropsectra sp.	15
		Natarsia sp.	1
		Paratendipes sp.	2
		Polypedilum fallax gr.	1
		Polypedilum illinoense	1
		Polypedilum tritum	4
		Stempellinella sp.	2
		Tanytarsus sp.	10
		Thienemannimyia gr. spp.	2
		Zavrelimyia sp.	1
	Tipulidae	Pseudolimnophila sp.	1
EPHEMEROPTERA	Baetidae	Procloeon sp.	1
	Ephemerellidae	Eurylophella funeralis	6
	Leptophlebiidae	Habrophlebia vibrans	6
LUMBRICULIDA	Lumbriculidae	Undetermined Lumbriculidae	2
MEGALOPTERA	Sialidae	Sialis sp.	16
ODONATA	Calopterygidae	Calopteryx sp.	1
	Cordulegastridae	Cordulegaster sp.	1
	Gomphidae	Lanthus sp.	4
		Stylogomphus albystilus	4
PLECOPTERA	Chloroperlidae	Sweltsa sp.	1
	Leuctridae	Leuctra sp.	1
TRICHOPTERA	Leptoceridae	Mystacides sepulchralis	1
	Molannidae	Molanna sp.	1
	Psychomyiidae	Lype diversa	1
TUBIFICIDA	Tubificidae	Aulodrilus pluriseta	2
		Undet. Tubificidae w/o cap. setae	1

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Nyack Brook**
River Basin: **Hudson**
County: **Rockland**
State: **NY**

Station: **NYAK 01**
Coll Date: **9/8/2015** **5:11:12 PM**
Site description: **Just above tennis courts**

Latitude: **41.0877**
Longitude: **-73.9176**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.15**
Width (meters):	**3**
Current (cm/sec):	**110**
Canopy (%):	**55**
Substrate	
Rock (%):	**20**
Rubble (%):	**40**
Gravel (%):	**25**
Sand (%):	**10**
Silt (%):	**5**
Embeddedness (%):	**25**

Chemical Measurements

DO (mg/L):	**10.78**
DO sat. (%):	**120.2**
Temperature (C):	**20.84**
Spec. Conduct. (umhos):	**1191**
Baro pressure:	**760.9**
pH:	**8.59**
Salinity (PSS):	**0.59**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	**Y**
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	
Megaloptera:	
Odonata:	
Chironomidae:	**Y**
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	**Y**
Other macro's:	
Field Faunal Condition:	**Very poor**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Nyack Brook**
Station: **NYAK 01** Replicate: **A**
Collection Date: **9/8/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
DIPTERA	Ceratopogonidae	Atrichopogon sp.	3
	Chironomidae	Cricotopus bicinctus	12
		Cricotopus sp.	4
		Cricotopus/Orthocladius Complex	4
		Dicrotendipes sp.	1
		Limnophyes sp.	1
		Polypedilum illinoense	13
	Empididae	Hemerodromia sp.	9
	Simuliidae	Simulium sp.	2
	Tipulidae	Limonia sp.	1
HOPLONEMERTEA	Tetrastemmatidae	Prostoma graecense	3
TRICHOPTERA	Hydropsychidae	Ceratopsyche bronta	5
		Ceratopsyche sparna	2
TRICLADIDA		Undetermined Turbellaria	40

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Minisceongo Creek**
River Basin: **Hudson**
County: **Rockland**
State: **NY**

Station: **MNGO 02**
Coll Date: **9/8/2015** **4:18:00 PM**
Site description: **Aprox 100 meters below Sampsondale Road bridge**

Latitude: **41.2028**
Longitude: **-73.9719**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.4**
Width (meters):	**9**
Current (cm/sec):	**100**
Canopy (%):	**65**
Substrate	
Rock (%):	
Rubble (%):	**40**
Gravel (%):	**35**
Sand (%):	**20**
Silt (%):	**5**
Embeddedness (%):	**20**

Chemical Measurements

DO (mg/L):	**8.86**
DO sat. (%):	**103.9**
Temperature (C):	**23.38**
Spec. Conduct. (umhos):	**468**
Baro pressure:	**760.5**
pH:	**8.86**
Salinity (PSS):	**0.22**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	
Odonata:	
Chironomidae:	
Simuliidae:	
Decapoda:	
Gammaridae:	**Y**
Mollusca:	
Oligochaeta:	**Y**
Other macro's:	
Field Faunal Condition:	**Poor**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Minisceongo Creek**
Station: **MNGO 02** Replicate: **A**
Collection Date: **9/8/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
AMPHIPODA	Gammaridae	Gammarus sp.	7
COLEOPTERA	Elmidae	Optioservus sp.	1
		Stenelmis sp.	4
DIPTERA	Chironomidae	Rheotanytarsus exiguus gr.	18
	Tipulidae	Antocha sp.	1
EPHEMEROPTERA	Baetidae	Baetis intercalaris	4
HOPLONEMERTEA	Tetrastemmatidae	Prostoma graecense	1
ISOPODA	Asellidae	Caecidotea sp.	1
LUMBRICIDA	Lumbricina	Undetermined Lumbricina	1
LUMBRICULIDA	Lumbriculidae	Undetermined Lumbriculidae	1
TRICHOPTERA	Hydropsychidae	Ceratopsyche bronta	40
		Ceratopsyche morosa	18
		Ceratopsyche sparna	1
		Cheumatopsyche sp.	1
TRICLADIDA		Undetermined Turbellaria	1

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Cedar Pond Brook**
River Basin: **Hudson**
County: **Rockland**
State: **NY**

Station: **CDRP 03**
Coll Date: **9/8/2015 3:25:57 PM**
Site description: **Just above Old Rt 210 bridge**

Latitude: **41.2368**
Longitude: **-74.0074**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.2**
Width (meters):	**3**
Current (cm/sec):	**40**
Canopy (%):	**20**
Substrate	
Rock (%):	**30**
Rubble (%):	**30**
Gravel (%):	**20**
Sand (%):	**15**
Silt (%):	**5**
Embeddedness (%):	**10**

Chemical Measurements

DO (mg/L):	**8.49**
DO sat. (%):	**99.7**
Temperature (C):	**23.37**
Spec. Conduct. (umhos):	**526**
Baro pressure:	**758**
pH:	**8.22**
Salinity (PSS):	**0.25**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	
Plecoptera:	**Y**
Trichoptera:	**Y**
Coleoptera:	
Megaloptera:	**Y**
Odonata:	
Chironomidae:	
Simuliidae:	
Decapoda:	
Gammaridae:	**Y**
Mollusca:	**Y**
Oligochaeta:	
Other macro's:	**hirudinea**
Field Faunal Condition:	**Good**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Cedar Pond Brook**
Station: **CDRP 03** Replicate: **A**
Collection Date: **9/9/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
BASOMMATOPHOR	Lymnaeidae	Undetermined Lymnaeidae	2
COLEOPTERA	Elmidae	Promoresia tardella	1
		Stenelmis sp.	1
DIPTERA	Chironomidae	Cricotopus sp.	1
		Cricotopus/Orthocladius Complex	1
		Eukiefferiella devonica gr.	5
		Micropsectra sp.	1
		Microtendipes pedellus gr.	1
		Parakiefferiella sp.	1
		Rheotanytarsus exiguus gr.	6
		Tanytarsus sp.	4
		Thienemanniella sp.	1
	Simuliidae	Simulium sp.	1
	Tipulidae	Antocha sp.	11
		Tipula sp.	3
EPHEMEROPTERA	Baetidae	Acentrella turbida	6
		Baetis intercalaris	5
		Baetis tricaudatus	6
		Plauditus sp.	2
	Isonychiidae	Isonychia sp.	1
HOPLONEMERTEA	Tetrastemmatidae	Prostoma graecense	2
LUMBRICULIDA	Lumbriculidae	Undetermined Lumbriculidae	1
MEGALOPTERA	Corydalidae	Nigronia serricornis	3
ODONATA	Aeshnidae	Undetermined Aeshnidae	1
	Gomphidae	Hagenius sp.	1
		Undetermined Gomphidae	1
TRICHOPTERA	Hydropsychidae	Ceratopsyche morosa	2
		Ceratopsyche sparna	11
		Cheumatopsyche sp.	2
		Hydropsyche betteni	15
	Polycentropodidae	Polycentropus sp.	1

Stream Field Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Cedar Pond Brook**
River Basin: **Hudson**
County: **Rockland**
State: **NY**

Station: **CDRP 01**
Coll Date: **9/8/2015 3:53:56 PM**
Site description: **Just above Lowland Hill Rd.**

Latitude: **41.2268**
Longitude: **-73.9846**
Field Crew: **cmf, kh**

Physical Characteristics

Depth (meters):	**0.2**
Width (meters):	**5**
Current (cm/sec):	**60**
Canopy (%):	**10**
Substrate	
Rock (%):	
Rubble (%):	**60**
Gravel (%):	**20**
Sand (%):	**20**
Silt (%):	
Embeddedness (%):	**15**

Chemical Measurements

DO (mg/L):	**10.91**
DO sat. (%):	**123.2**
Temperature (C):	**21.19**
Spec. Conduct. (umhos):	**657**
Baro pressure:	**760.7**
pH:	**8.72**
Salinity (PSS):	**0.32**

Biological Attributes

Aquatic vegetation	
Macrophytes:	
Diatoms:	**Y**
Algae-suspended:	
Algae-filamentous:	
Occurance of macroinvertebrates	
Ephemeroptera:	**Y**
Plecoptera:	**Y**
Trichoptera:	**Y**
Coleoptera:	**Y**
Megaloptera:	**Y**
Odonata:	
Chironomidae:	
Simuliidae:	
Decapoda:	
Gammaridae:	
Mollusca:	
Oligochaeta:	
Other macro's:	
Field Faunal Condition:	**Very good**

Flow

Flow

WAA Project: RC

Lab Data Summary

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Waterbody: **Cedar Pond Brook**
Station: **CDRP 01** Replicate: **A**
Collection Date: **9/8/2015** Subsample size: **100**

Order	Family	Final Determination	Total #
AMPHIPODA	Gammaridae	Gammarus sp.	1
COLEOPTERA	Elmidae	Optioservus sp.	1
		Stenelmis sp.	1
	Psephenidae	Psephenus herricki	6
DIPTERA	Chironomidae	Cricotopus trifascia gr.	3
		Cricotopus/Orthocladius Complex	3
		Microtendipes pedellus gr.	1
		Rheotanytarsus sp.	2
		Sublettea sp.	1
		Tanytarsus sp.	1
		Tvetenia vitracies	11
	Tipulidae	Antocha sp.	4
EPHEMEROPTERA	Baetidae	Acentrella turbida	1
		Baetis intercalaris	5
		Plauditus sp.	1
	Heptageniidae	Maccaffertium sp.	10
HOPLONEMERTEA	Tetrastemmatidae	Prostoma graecense	5
LUMBRICIDA	Lumbricina	Undetermined Lumbricina	1
MEGALOPTERA	Corydalidae	Nigronia serricornis	1
TRICHOPTERA	Hydropsychidae	Ceratopsyche bronta	1
		Ceratopsyche morosa	4
		Cheumatopsyche sp.	2
		Hydropsyche betteni	6
	Hydroptilidae	Leucotrichia pictipes	23
	Philopotamidae	Chimarra aterrima?	4
TRICLADIDA		Undetermined Turbellaria	1