BIOLOGICAL STREAM SURVEY

ROCKLAND COUNTY, NEW YORK
LOTIC SCENE INVESTIGATION (LSI)
2009 STREAM BIOMONITORING WATER QUALITY PROJECT

PREPARED FOR
HUDSON BASIN RIVER WATCH
EAST GREENWICH, NEW YORK

BY
WATERSHED ASSESSMENT ASSOCIATES, LLC
SCHENECTADY, NEW YORK

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Introduction

This report summarizes the results from the benthic samples collected for Rockland County in 2009. 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 2006-2008 data, see Rockland County reports on the Hudson Basin River Watch website http://www.hudsonbasin.org/Bioassessmentreports.htm.

Benthic kick samples were collected at 20 stations in 2009. Nineteen of the stations had been previously sampled in at least one year during 2006 – 2008; these stations were re-sampled for continued evaluation of baseline data. One new station was selected to extend monitoring efforts throughout Rockland County (Figure 2).

Figure 1. Map of 2006-2009 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).

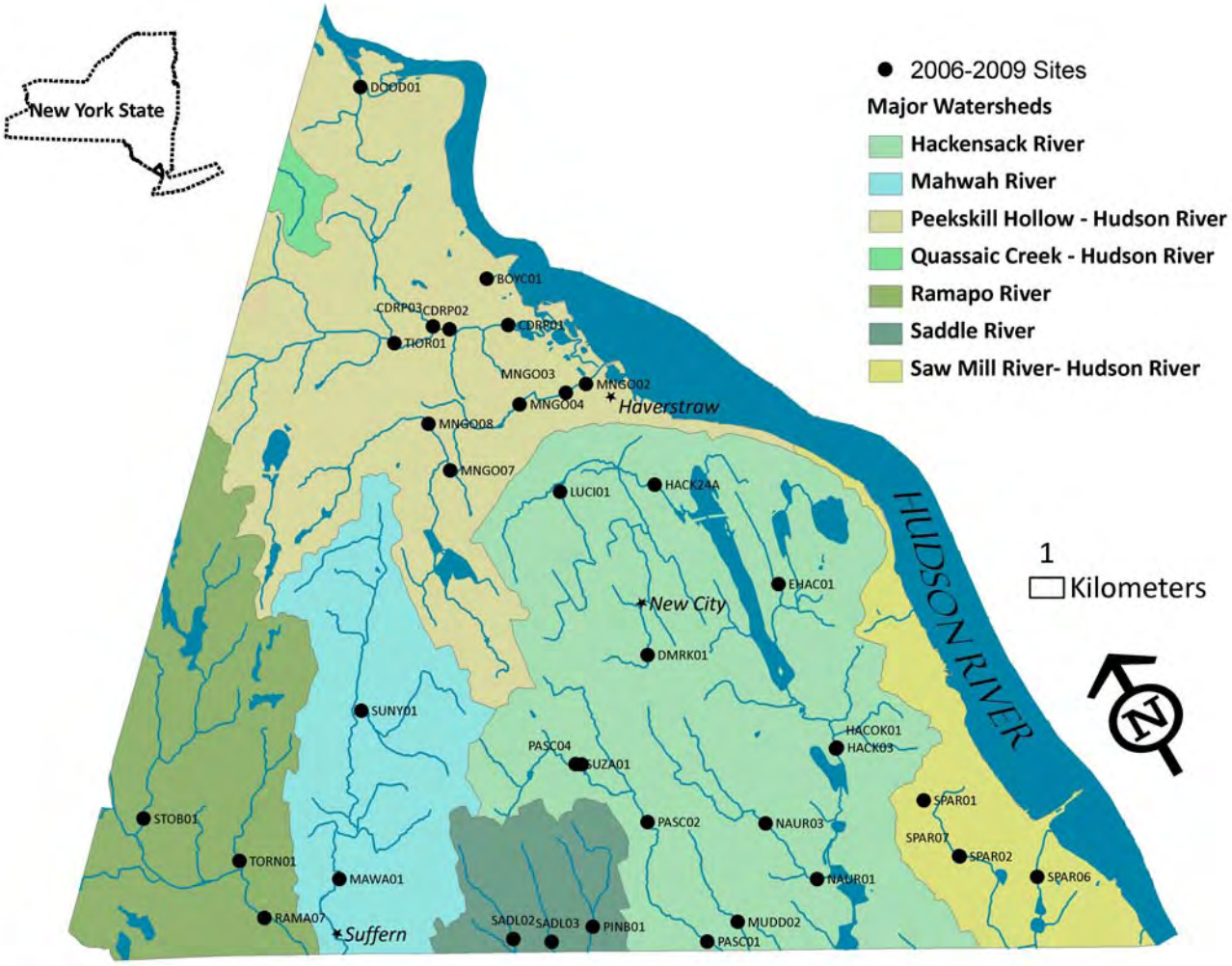
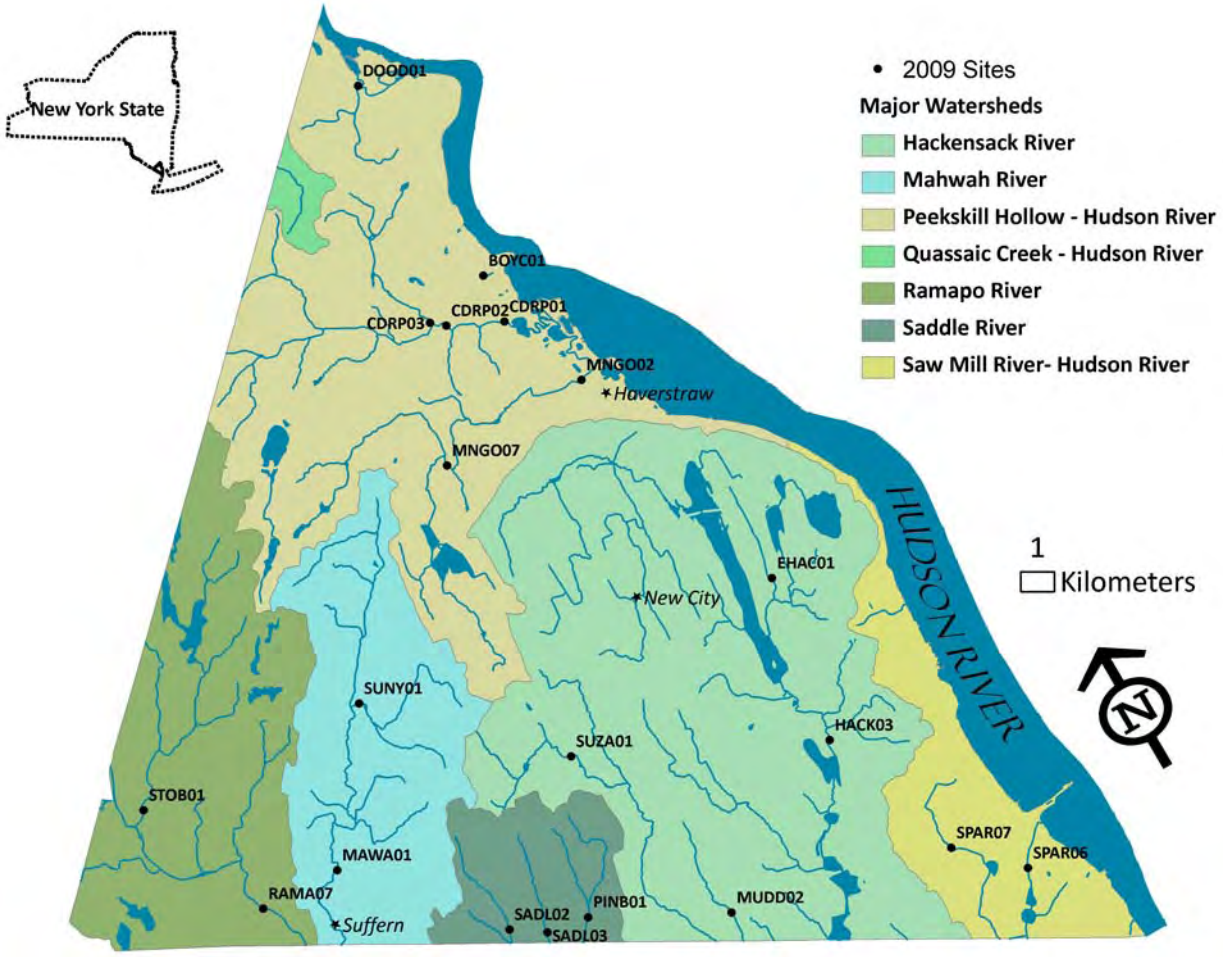


Figure 2. Map of 2009 station locations in Rockland County, NY.



Summary of Results

Biological community metrics indicated Rockland County stream water quality ranged from non-impacted to moderately impacted in 2009 (Figure 2 and Table 1). In general, Ephemeroptera-Plecoptera-Trichoptera (EPT) richness values were low and the majority of Percent Model Affinity (PMA) values were less than 50% similar to the reference "non-impacted" community structure, except at non-impacted sites (Table 1). Biotic assessment profile (BAP) scores ranged from 2.69 (East Branch Hackensack, EHAC01) to 8.2 (Stony Brook, STOB01) (Table 1). The biotic index scores (BI) were of moderate value at the majority of stations, indicating that these Rockland County streams may be impacted by excessive organic inputs. Based on the 2009 data, overall water quality condition for the County is relatively similar to 2006 and 2007, while overall water quality in 2008 appears markedly different (Figure 3). The average water flow conditions within Rockland County were lowest during 2008; this may have negatively affected benthic communities by concentrating point source pollution at some sites resulting in lower BAP scores. Several of the 2009 sampling stations were within streams originating in predominantly forested watersheds and the remainder of the stations were located in areas where the dominant land use is urbanized (Figure 4).

Figure 3. Percent of sampling stations within each water quality condition category from 2006 to 2009.

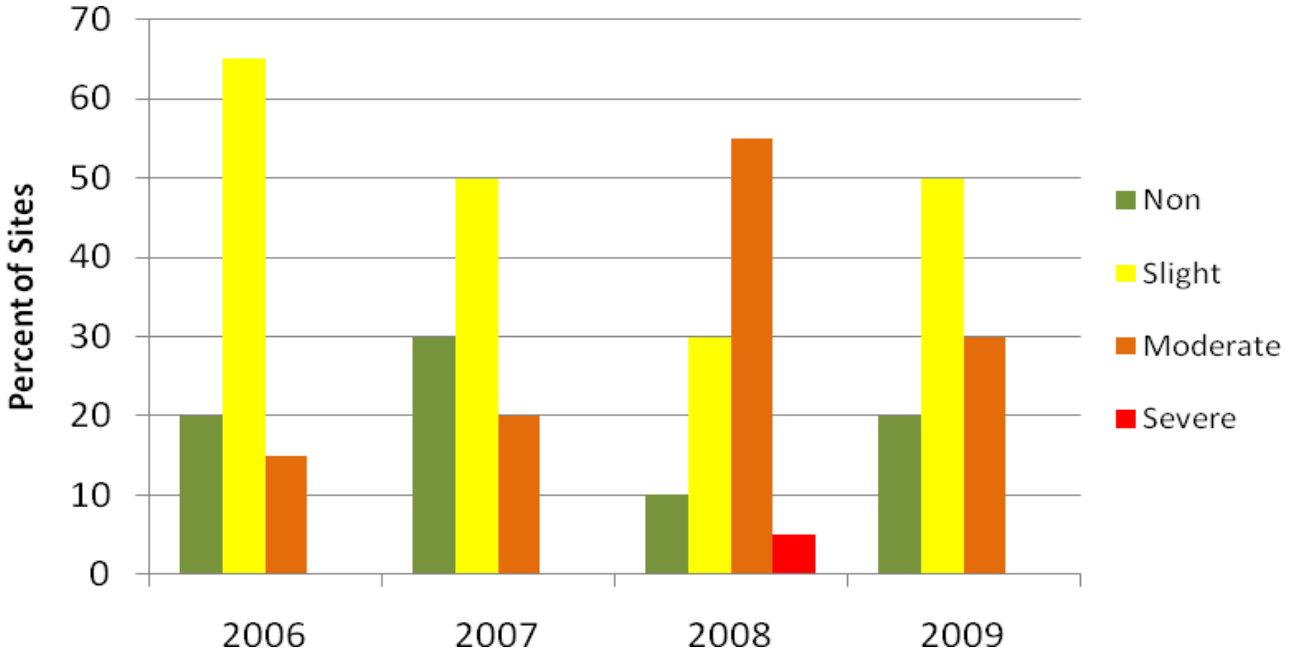


Figure 4. Locations of sampled stations in 2006-2009 in relation to land use (green areas indicate forest and pink to red indicates urbanized/developed areas).

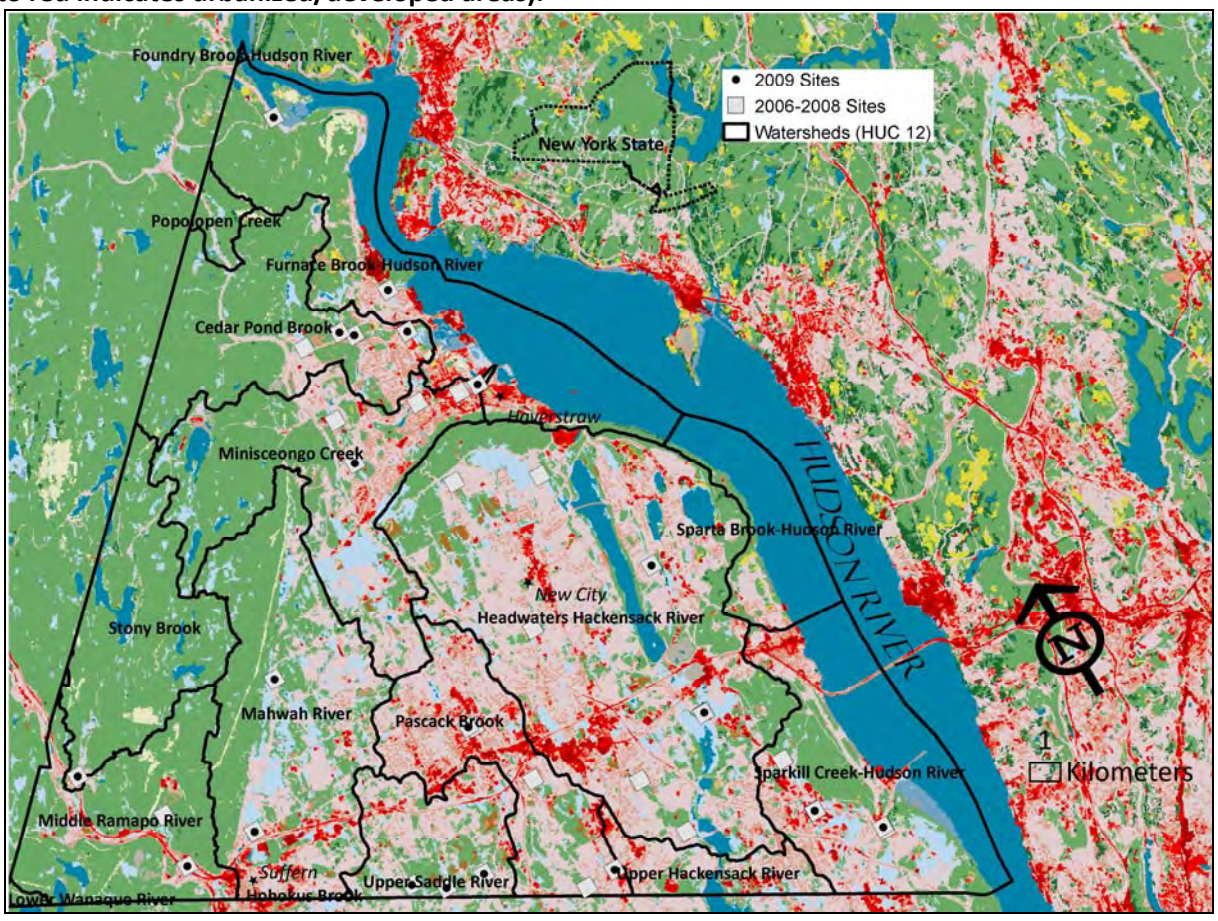


Table 1. Benthic macroinvertebrate metric scores and impact source determination percentages for the 20 stream sites sampled in 2009 throughout Rockland County, NY. Bolded numbers indicate most likely source of impact to stream community. TR= taxa richness; BI= biotic index; EPT = Ephemeroptera-Plecoptera-Trichoptera taxa; PMA= percent model affinity; BAP = biotic assessment profile; Nat=natural; NPN = non-point nutrient; Org = organic inputs; Imp= impoundment; Complex= municipal/industrial/nutrients.*Stations added in 2009; all other stations have been previously sampled at least once during 2006-2008.

		Biotic Metrics					Impact Source Determination (ISD)						
Stream Name	SAMPLE ID	EPT	BI	TR	PMA	BAP	Nat	NPN	Toxic	Org	Complex	Silt	Imp
Doodletown Brook	DOOD01	13	4.51	31	58	7.96	52	**76**	49	49	53	41	47
Minisceongo Creek	MNGO07	8	5.45	21	58	6.25	51	**95**	60	54	70	59	56
Sparkill	SPAR06	4	6	14	49	4.60	33	**88**	50	61	**85**	48	64
Upper Saddle Brook	SADL03	4	5.36	20	50	5.34	34	**80**	60	55	55	51	62
Cedar Pond Brook	CDRP02	10	4.79	24	58	6.91	46	**73**	43	49	48	39	39
Minisceongo Creek	MNGO02	7	5.32	18	66	6.23	52	**84**	48	45	63	37	38
Muddy Creek	MUDD02	2	6.48	18	64	5.09	39	**76**	67	66	46	48	39
Sunny Brook	SUNY01	5	5.38	21	55	5.74	42	**81**	54	60	53	44	54
Cedar Pond Brook	CDRP01	11	5.26	30	62	7.56	46	**90**	50	48	66	47	48
E Branch Hackensack	EHAC01	0	6.49	12	35	2.69	10	**50**	34	**52**	**50**	18	**47**
Unnamed Tributary	SUZA01	3	5.82	17	48	4.69	35	**80**	49	64	**78**	51	62
Mahwah River	MAWA01	4	5.15	17	52	5.22	40	**75**	52	57	53	39	59
Unnamed Tributary	BOYC01*	8	4.97	27	45	6.33	35	**69**	37	49	45	27	43
Hackensack River	HACK03	2	7.3	16	38	3.62	9	48	37	**61**	35	20	53
Pine Brook	PINB01	3	5.23	18	49	4.99	39	**78**	47	55	52	45	49
Ramapo River	RAMA07	13	4.77	23	66	7.58	57	**79**	43	43	67	40	47
Timp Mtn Brook	CDRP03	10	5.31	23	45	6.13	51	**78**	39	40	63	39	50
Sparkill	SPAR02	3	6.05	17	46	4.54	31	**79**	39	56	**75**	40	61
Saddle River	SADL02	6	5.15	26	56	6.41	44	**86**	53	50	56	41	46
Stony Brook	STOB01	15	3.75	23	70	8.20	49	**69**	35	42	55	43	41

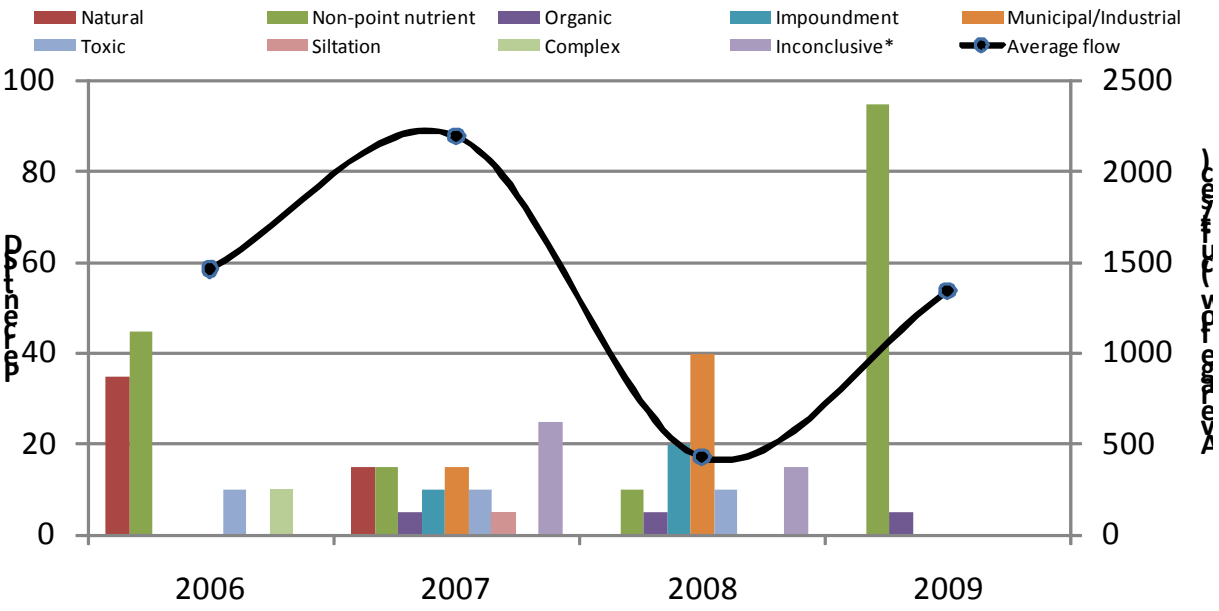
Impact source determination (ISD) values indicate that 95% of the stations are likely impacted by non-point source nutrients at 2009 stations (Table 2). The remaining station is likely impacted by organic sources. Based on 2001 National Land Cover Data (NLCD), land use is largely forested in north and southwest Rockland County and generally dominated by developed land throughout the remainder of the county (Figure 4). The 2006 ISD values indicated that most stations were likely impacted by non-point source nutrients and natural conditions; stations in 2007 were evenly distributed into all impact categories; and 2008 stations were most likely impacted by municipal/industrial, toxic, non-point source and organic sources (Table 2).

Shifts in ISD values in 2006-2009 are due in part to sampling different stations, but ISD shifts in re-sampled stations may be illustrating the effect of water flow in exacerbating point source pollution impacts (Figure 4). In 2006 and 2009 the majority of ISD results indicated benthic communities were likely impacted by natural or non-point sources. Non point sources, in general, occur from runoff during rain and storm events that carry pollutants to the stream. Thus during high rain years more non point source pollutants enter the system. However, in 2008 a large percentage of sites were impacted by municipal/industrial or toxic sources. These pollutants most often originate from a point source (i.e. a discharge pipe). During rainy years these pollutants and their effects are diluted, but during dry years they can become concentrated. Evaluations of flow data from USGS gauging stations in and around Rockland County appear to demonstrate the concentrating effects of low flow conditions in 2008. In 2007, flows were the highest compared to the other years with more evenly distributed ISD categories (Figure 5).

Table 2. Percent of stations classified within each impact source determination category. *Sites with percentages less than 50% are less conclusive.

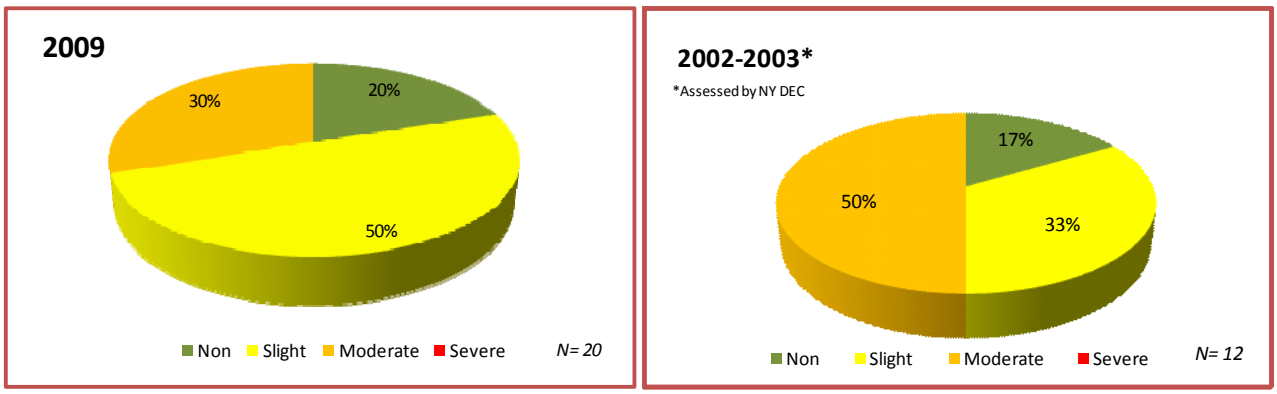
Impact Source	2006	2007	2008	2009
Natural	35	15	0	0
Non-point nutrient	45	15	10	95
Organic	0	5	5	5
Impoundment	0	10	20	0
Municipal/Industrial	0	15	40	0
Toxic	10	10	10	0
Siltation	0	5	0	0
Complex	10	0	0	0
Inconclusive*	0	25	15	0

Figure 5. Impact source determination percentages from 2006 to 2009 and the average annual flow of the 3 months prior to sample collection. Average flow (ft^3/sec) was calculated from USGS gauging stations in and around Rockland County (Ramapo River, Ramapo, NY; Mahwah, NJ; Suffern, NY; Hackensack River at West Nyack, NY; New Croton Dam Croton-On-Hudson, NY; Mahwah River near Suffern, NY).



BAP scores classified 20% of the stations as non-impacted, 50% as slightly impacted, and 30% as moderately impacted (Figure 6). Fish community reproduction is likely to be inhibited in streams with moderate water quality impact as identified by the benthic macroinvertebrate community. In 2002-2003, 50% of Rockland County streams were classified as moderately impacted by NY DEC (Figure 6). Water quality was considered slightly impacted (which might limit fish propagation) for 50% of Rockland County stream communities sampled in 2009. In 2003, 33% of the Rockland County streams assessed by NY DEC were considered to be slightly impacted (Figure 6). Twenty percent of the streams sampled in 2009 indicated non-impacted water quality, which should not limit fish survival and reproduction and may exemplify natural conditions. In 2002-2003, 17% of Rockland County streams, assessed by NY DEC, were classified as non-impacted. Overall, Rockland County streams assessed in 2009 are slightly less impacted than the streams assessed by NY DEC in 2002-2003 (Figure 6) and similarly impacted as the streams assessed in 2006 and 2007 (Figure 3).

Figure 6. Percentage of sites within each water quality impact category based on the biotic assessment scores for 2009 and Rockland County streams assessed in 2002-2003 by NY DEC.



Recommendations

A rotating basin monitoring program is needed to accurately capture water quality condition, detect sequential change, and identify likely sources of impact throughout Rockland County. As evidenced by this report, 2006-2009 monitoring data illustrates the variability of water quality condition in Rockland County and depending on the location, how water quality condition for the County may be interpreted. We recommend a four year rotating monitoring plan. Rockland County basins would be divided into three sections: (1) Popolopen Brook, (2) Upper Hackensack River and Rockland Lake, and (3) Upper Ramapo River, Mahwah River, and Upper Saddle River. Data will be collected from 10 new stations, 5 previously sampled stations, and 5 long-term monitoring stations each year. Sampling effort in the fourth year will focus on filling data gaps and re-evaluating selected areas of concern.

A rotating basin water quality monitoring program, based on stream benthic communities, will assist Rockland County to better understand the changing conditions of aquatic ecosystems throughout the County, will provide additional perspective for the allocation of resources to restoration /conservation projects and planned development activities, and will aid evaluation of best management practices (BMPs). The inclusion of long-term monitoring stations will help to better understand the long-term water quality condition of Rockland County streams including the effects of BMPs, development or restoration projects, and possibly, climate change.

Rockland County has accumulated 4 years of biomonitoring data; this enables the County to better assess water quality and impact source trends to assist the County to protect and conserve water resources. We therefore recommend, upon completion of 2010 data analysis, the creation of a comprehensive report that will detail water quality trends countywide from 2006-2009, and will assess individual watersheds to evaluate relative differences among Rockland County basins. The report should also identify areas of concern for future investigations and recommend potential solutions to problems identified in the watershed.

Appendix

A Field Data Summary page was created for each of the stations sampled, including: site location, number, sampling date, physical and chemical data, and site photos. Raw benthic macroinvertebrate data for each station is available upon request.

Field Data Summary

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

Stream name: **Stoney Brook** Watershed: **Ramapo** ID: **STOB**
Municipality: **Ramapo** County/State: **Rockland Co., NY** Station: **01**
Location: **Just above Sevens Lakes Rd., bridge**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **9:12 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.16428**
Longitude: **-74.183183**
Decimal Degrees

Physical Characteristics	
Width (meters)	**8**
Depth (meters)	**0.25**
Current (cm/sec)	**60**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**15**
Rubble (6.35 - 25.4 cm)	**25**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**25**
Silt (0.004 - 0.06 cm)	**10**
Embeddedness (%)	**25**
Chemical Measurements	
Temperature (C)	**21.76**
Specific conductance (umhos)	**81**
DO (mg/l)	**7.43**
DO % saturation	**84.8**
Baro pressure (mm)	**752.7**
pH	**7.31**
Salinity (PSS)	**0.04**
Biological Attributes	
Canopy (%)	**60**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	**Y**
Plecoptera	**Y**
Trichoptera	**Y**
Coleoptera	
Megaloptera	
Odonata	**Y**
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Very good**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Ramapo River** Watershed: **Ramapo** ID: **RAMA**

Municipality: **Ramapo** County/State: **Rockland Co., NY** Station: **07**

Location: **Just above Forth St., bridge**

Date sampled: **Wednesday, August 19, 2009**

Arrival time at station: **9:47 AM**

Field personnel: **J. Kelly Nolan**

Latitude: **41.12526**
Longitude: **-74.16466**
Decimal Degrees

Physical Characteristics	
Width (meters)	**25**
Depth (meters)	**0.2**
Current (cm/sec)	**75**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**10**
Rubble (6.35 - 25.4 cm)	**20**
Gravel (0.2 - 6.35 cm)	**30**
Sand (0.06 - 2.0 cm)	**20**
Silt (0.004 - 0.06 cm)	**20**
Embeddedness (%)	**40**
Chemical Measurements	
Temperature (C)	**23.18**
Specific conductance (umhos)	**372**
DO (mg/l)	**7.81**
DO % saturation	**91.4**
Baro pressure (mm)	**754.6**
pH	**7.45**
Salinity (PSS)	**0.18**
Biological Attributes	
Canopy (%)	**40**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	**Y**
Plecoptera	**Y**
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Very good**
Notes/observations:	

Flow

Flow

Field Data Summary

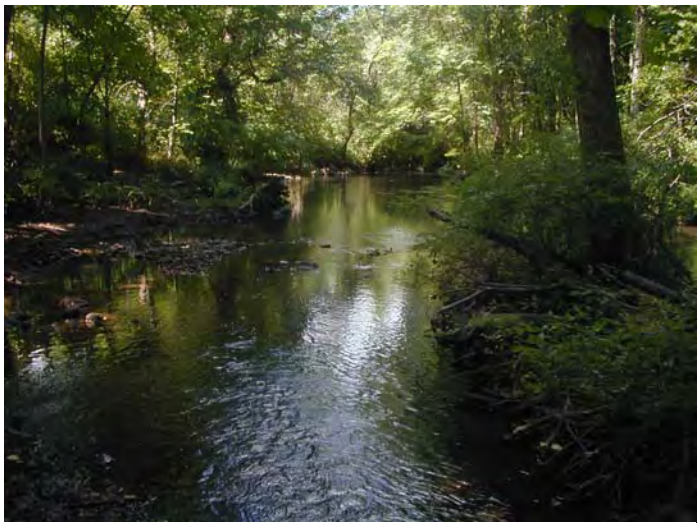
Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Stream name: **Mahwah River** Watershed: **Passaic** ID: **MAWA**
Municipality: **Antrim** County/State: **Rockland Co., NY** Station: **01**
Location: **100 meters above Montebello Rd bridge**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **10:25 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.1242**
Longitude: **-74.1361**
Decimal Degrees

Physical Characteristics	
Width (meters)	**12**
Depth (meters)	**0.25**
Current (cm/sec)	**60**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**10**
Rubble (6.35 - 25.4 cm)	**35**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**15**
Silt (0.004 - 0.06 cm)	**15**
Embeddedness (%)	**40**
Chemical Measurements	
Temperature (C)	**21.78**
Specific conductance (umhos)	**937**
DO (mg/l)	**8.15**
DO % saturation	**93.1**
Baro pressure (mm)	**754.1**
pH	**7.92**
Salinity (PSS)	**0.46**
Biological Attributes	
Canopy (%)	**70**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	**Y**
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	**Y**
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Poor**
Notes/observations:	

Flow



Flow

Field Data Summary

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

Stream name: **Sunny Brook** Watershed: **Passaic** ID: **SUNY**
Municipality: **Antrim** County/State: **Rockland Co., NY** Station: **01**
Location: **Just below Haverstraw Rd bridge**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **11:02 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.15924**
Longitude: **-74.09836**
Decimal Degrees

Physical Characteristics	
Width (meters)	**4**
Depth (meters)	**0.2**
Current (cm/sec)	**50**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**15**
Rubble (6.35 - 25.4 cm)	**25**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**25**
Silt (0.004 - 0.06 cm)	**15**
Embeddedness (%)	**40**
Chemical Measurements	
Temperature (C)	**26.17**
Specific conductance (umhos)	**575**
DO (mg/l)	**6.08**
DO % saturation	**75.2**
Baro pressure (mm)	**752.5**
pH	**7.91**
Salinity (PSS)	**0.28**
Biological Attributes	
Canopy (%)	**50**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	**Y**
Coleoptera	
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	**Y**
Decapoda	
Gammaridae	**Y**
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Poor**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Upper Saddle Brook** Watershed: **Passaic** ID: **SADL**
Municipality: **Monsey** County/State: **Rockland Co., NY** Station: **03**
Location: **Just off Cherry Lane**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **11:36 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.08668**
Longitude: **-74.0938**
Decimal Degrees

Physical Characteristics	
Width (meters)	**5**
Depth (meters)	**0.2**
Current (cm/sec)	**45**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**10**
Rubble (6.35 - 25.4 cm)	**25**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**20**
Silt (0.004 - 0.06 cm)	**20**
Embeddedness (%)	**50**
Chemical Measurements	
Temperature (C)	**20.75**
Specific conductance (umhos)	**594**
DO (mg/l)	**7.72**
DO % saturation	**86.2**
Baro pressure (mm)	**753.1**
pH	**7.91**
Salinity (PSS)	**0.29**
Biological Attributes	
Canopy (%)	**80**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	
Odonata	**Y**
Chironomidae	**Y**
Simuliidae	
Decapoda	**Y**
Gammaridae	
Mollusca	
Oligochaeta	**Y**
Other macroinvertebrates	
Field faunal condition	**Poor**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Saddle River** Watershed: **Passaic** ID: **SADL**
Municipality: **Monsey** County/State: **Rockland Co., NY** Station: **02**
Location: **Just above Hillside Ave bridge**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **12:10 PM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.08078**
Longitude: **-74.08292**
Decimal Degrees

Physical Characteristics	
Width (meters)	**3**
Depth (meters)	**0.2**
Current (cm/sec)	**60**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**10**
Rubble (6.35 - 25.4 cm)	**50**
Gravel (0.2 - 6.35 cm)	**20**
Sand (0.06 - 2.0 cm)	**40**
Silt (0.004 - 0.06 cm)	**10**
Embeddedness (%)	**50**
Chemical Measurements	
Temperature (C)	**20.09**
Specific conductance (umhos)	**646**
DO (mg/l)	**7.85**
DO % saturation	**86.5**
Baro pressure (mm)	**754**
pH	**7.8**
Salinity (PSS)	**0.31**
Biological Attributes	
Canopy (%)	**25**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	**Y**
Coleoptera	
Megaloptera	**Y**
Odonata	
Chironomidae	**Y**
Simuliidae	**Y**
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	
Other macroinvertebrates	Leech
Field faunal condition	**Poor**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Pine Brook** Watershed: **Passaic** ID: **PINB**
Municipality: **Chestnut Ridge** County/State: **Rockland Co., NY** Station: **01**
Location: **Just above Pinebrook Rd bridge**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **1:04 PM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.07867**
Longitude: **-74.06771**
Decimal Degrees

Physical Characteristics	
Width (meters)	**2.5**
Depth (meters)	**0.2**
Current (cm/sec)	**55**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**20**
Rubble (6.35 - 25.4 cm)	**20**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**20**
Silt (0.004 - 0.06 cm)	**15**
Embeddedness (%)	**45**
Chemical Measurements	
Temperature (C)	**26.96**
Specific conductance (umhos)	**543**
DO (mg/l)	**9.73**
DO % saturation	**122.1**
Baro pressure (mm)	**752.6**
pH	**8.28**
Salinity (PSS)	**0.26**
Biological Attributes	
Canopy (%)	**80**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	**Y**
Gammaridae	
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Poor**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Unnamed tributary** Watershed: **Passaic** ID: **SUZA**
Municipality: **Spring Valley** County/State: **Rockland Co., NY** Station: **01**
Location: **Just below North Main St bridge**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **1:42 PM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.11794**
Longitude: **-74.04364**
Decimal Degrees

Physical Characteristics	
Width (meters)	**8**
Depth (meters)	**0.2**
Current (cm/sec)	**45**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**10**
Rubble (6.35 - 25.4 cm)	**20**
Gravel (0.2 - 6.35 cm)	**20**
Sand (0.06 - 2.0 cm)	**25**
Silt (0.004 - 0.06 cm)	**25**
Embeddedness (%)	**50**
Chemical Measurements	
Temperature (C)	**25.68**
Specific conductance (umhos)	**633**
DO (mg/l)	**5.51**
DO % saturation	**0.31**
Baro pressure (mm)	**750.1**
pH	**7.84**
Salinity (PSS)	**0.31**
Biological Attributes	
Canopy (%)	**65**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	**Y**
Decapoda	**Y**
Gammaridae	**Y**
Mollusca	
Oligochaeta	**Y**
Other macroinvertebrates	
Field faunal condition	**Poor**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Muddy Creek** Watershed: **Hackensack** ID: **MUDD**
Municipality: **Orangetown** County/State: **Rockland Co., NY** Station: **02**
Location: **Just below Washington Ave bridge**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **2:46 PM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.06003**
Longitude: **-74.02350**
Decimal Degrees

Physical Characteristics	
Width (meters)	**3**
Depth (meters)	**0.2**
Current (cm/sec)	**45**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**0**
Rubble (6.35 - 25.4 cm)	**10**
Gravel (0.2 - 6.35 cm)	**50**
Sand (0.06 - 2.0 cm)	**20**
Silt (0.004 - 0.06 cm)	**20**
Embeddedness (%)	**75**
Chemical Measurements	
Temperature (C)	**23.93**
Specific conductance (umhos)	**1185**
DO (mg/l)	**6.64**
DO % saturation	**79.5**
Baro pressure (mm)	**755.3**
pH	**7.67**
Salinity (PSS)	**0.59**
Biological Attributes	
Canopy (%)	**20**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	**Y**
Plecoptera	
Trichoptera	**Y**
Coleoptera	
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	**Y**
Decapoda	
Gammaridae	**Y**
Mollusca	
Oligochaeta	**Y**
Other macroinvertebrates	Leech
Field faunal condition	**Good**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Sparkill** Watershed: **Hudson** ID: **SPAR**
Municipality: **Orangetown** County/State: **Rockland Co., NY** Station: **06**
Location: **Just below New St. bridge**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **3:34 PM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.0303**
Longitude: **-73.925797**
Decimal Degrees

Physical Characteristics	
Width (meters)	**12**
Depth (meters)	**0.35**
Current (cm/sec)	**65**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**20**
Rubble (6.35 - 25.4 cm)	**22**
Gravel (0.2 - 6.35 cm)	**20**
Sand (0.06 - 2.0 cm)	**20**
Silt (0.004 - 0.06 cm)	**20**
Embeddedness (%)	**50**
Chemical Measurements	
Temperature (C)	**23.41**
Specific conductance (umhos)	**659**
DO (mg/l)	**7.54**
DO % saturation	**88.7**
Baro pressure (mm)	**760.3**
pH	**7.71**
Salinity (PSS)	**0.32**
Biological Attributes	
Canopy (%)	**30**
Aquatic vegetation	
Algae suspended	
Algae filamentous	**Y**
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	**Y**
Plecoptera	
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	**Y**
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	**Y**
Other macroinvertebrates	
Field faunal condition	**Good**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Sparkill** Watershed: **Hudson** ID: **SPAR**
Municipality: **Orangetown** County/State: **Rockland Co., NY** Station: **07**
Location: **Just below Rt 340 bridge**
Date sampled: **Wednesday, August 19, 2009**
Arrival time at station: **4:01 PM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.044600**
Longitude: **-73.945133**
Decimal Degrees

Physical Characteristics	
Width (meters)	**4.5**
Depth (meters)	**0.3**
Current (cm/sec)	**60**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**20**
Rubble (6.35 - 25.4 cm)	**20**
Gravel (0.2 - 6.35 cm)	**20**
Sand (0.06 - 2.0 cm)	**20**
Silt (0.004 - 0.06 cm)	**20**
Embeddedness (%)	**50**
Chemical Measurements	
Temperature (C)	**21.85**
Specific conductance (umhos)	**677**
DO (mg/l)	**7.78**
DO % saturation	**88.8**
Baro pressure (mm)	**759.5**
pH	**7.74**
Salinity (PSS)	**0.33**
Biological Attributes	
Canopy (%)	**75**
Aquatic vegetation	
Algae suspended	
Algae filamentous	**Y**
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	**Y**
Coleoptera	
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	**Y**
Other macroinvertebrates	
Field faunal condition	**Poor**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Hackensack River** Watershed: **Hackensack** ID: **HACK**
Municipality: **West Nyack** County/State: **Rockland Co., NY** Station: **03**
Location: **Just below Western Highway bridge**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **7:46 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.08605**
Longitude: **-73.96227**
Decimal Degrees

Physical Characteristics	
Width (meters)	**30**
Depth (meters)	**0.4**
Current (cm/sec)	**40**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**5**
Rubble (6.35 - 25.4 cm)	**15**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**25**
Silt (0.004 - 0.06 cm)	**30**
Embeddedness (%)	**50**
Chemical Measurements	
Temperature (C)	**25.37**
Specific conductance (umhos)	**486**
DO (mg/l)	**2.32**
DO % saturation	**28.4**
Baro pressure (mm)	**760.1**
pH	**7.06**
Salinity (PSS)	**0.23**
Biological Attributes	
Canopy (%)	**20**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	
Coleoptera	
Megaloptera	**Y**
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	**Y**
Gammaridae	
Mollusca	
Oligochaeta	**Y**
Other macroinvertebrates	
Field faunal condition	**Very poor**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Unnamed tributary** Watershed: **Hudson** ID: **BROD**
Municipality: **Nyack** County/State: **Rockland Co., NY** Station: **01**
Location: **Old Mt. Rd. and N. Broadway**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **8:46 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.10589**
Longitude: **-73.91665**
Decimal Degrees

Physical Characteristics
- Width (meters)
- Depth (meters)
- Current (cm/sec)

Substrate (%)
- Rock (>25.4 cm or bedrock)
- Rubble (6.35 - 25.4 cm)
- Gravel (0.2 - 6.35 cm)
- Sand (0.06 - 2.0 cm)
- Silt (0.004 - 0.06 cm)

Embeddedness (%)

Chemical Measurements
- Temperature (C)
- Specific conductance (umhos)
- DO (mg/l)
- DO % saturation
- Baro pressure (mm)
- pH
- Salinity (PSS)

Biological Attributes
- Canopy (%)

Aquatic vegetation
- Algae suspended
- Algae filamentous
- Diatoms
- Macrophytes

Occurance of macroinvertebrates
- Ephemeroptera
- Plecoptera
- Trichoptera
- Coleoptera
- Megaloptera
- Odonata
- Chironomidae
- Simuliidae
- Decapoda
- Gammaridae
- Mollusca
- Oligochaeta
- Other macroinvertebrates

Flow

Flow

Field faunal condition **N/A**

Notes/observations:

Stream is completely armored; not sampled.

Field Data Summary

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

Stream name: **East Branch Hackensack River** Watershed: **Hudson** ID: **EHAC**
Municipality: **Valley Cottage** County/State: **Rockland Co., NY** Station: **01**
Location: **Just above Svahan Drive culvert**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **9:05 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.13114**
Longitude: **-73.95028**
Decimal Degrees

Physical Characteristics	
Width (meters)	**2**
Depth (meters)	**0.15**
Current (cm/sec)	**40**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**5**
Rubble (6.35 - 25.4 cm)	**10**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**30**
Silt (0.004 - 0.06 cm)	**30**
Embeddedness (%)	**60**
Chemical Measurements	
Temperature (C)	**23.02**
Specific conductance (umhos)	**555**
DO (mg/l)	**2.14**
DO % saturation	**24.9**
Baro pressure (mm)	**758.1**
pH	**7.2**
Salinity (PSS)	**0.27**
Biological Attributes	
Canopy (%)	**60**
Aquatic vegetation	
Algae suspended	
Algae filamentous	**Y**
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	
Coleoptera	
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	**Y**
Mollusca	
Oligochaeta	**Y**
Other macroinvertebrates	
Field faunal condition	**Very poor**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Minisceongo Creek** Watershed: **Hudson** ID: **MNGO**
Municipality: **Haverstraw** County/State: **Rockland Co., NY** Station: **02**
Location: **Aprox 100 meters below Sampsondale Road bridge**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **9:43 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.20281**
Longitude: **-73.971933**
Decimal Degrees

Physical Characteristics	
Width (meters)	**8**
Depth (meters)	**0.25**
Current (cm/sec)	**75**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**20**
Rubble (6.35 - 25.4 cm)	**25**
Gravel (0.2 - 6.35 cm)	**20**
Sand (0.06 - 2.0 cm)	**20**
Silt (0.004 - 0.06 cm)	**15**
Embeddedness (%)	**40**
Chemical Measurements	
Temperature (C)	**22.54**
Specific conductance (umhos)	**584**
DO (mg/l)	**10.5**
DO % saturation	**116.1**
Baro pressure (mm)	**761**
pH	**8.18**
Salinity (PSS)	**0.28**
Biological Attributes	
Canopy (%)	**20**
Aquatic vegetation	
Algae suspended	
Algae filamentous	**Y**
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	**Y**
Plecoptera	
Trichoptera	**Y**
Coleoptera	
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	**Y**
Mollusca	
Oligochaeta	**Y**
Other macroinvertebrates	
Field faunal condition	**Good**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Minisceongo Creek** Watershed: **Hudson** ID: **MNGO**
Municipality: **Thiells** County/State: **Rockland Co., NY** Station: **07**
Location: **Just below Thiells Mt. Ivy Road bridge**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **10:29 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.2017**
Longitude: **-74.0283**
Decimal Degrees

Physical Characteristics	
Width (meters)	**11**
Depth (meters)	**0.2**
Current (cm/sec)	**60**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**5**
Rubble (6.35 - 25.4 cm)	**15**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**25**
Silt (0.004 - 0.06 cm)	**30**
Embeddedness (%)	**60**
Chemical Measurements	
Temperature (C)	**22.22**
Specific conductance (umhos)	**458**
DO (mg/l)	**8.24**
DO % saturation	**94.7**
Baro pressure (mm)	**753**
pH	**7.95**
Salinity (PSS)	**0.22**
Biological Attributes	
Canopy (%)	**60**
Aquatic vegetation	
Algae suspended	
Algae filamentous	**Y**
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	**Y**
Plecoptera	
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	**Y**
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Good**
Notes/observations:	

Flow

Flow

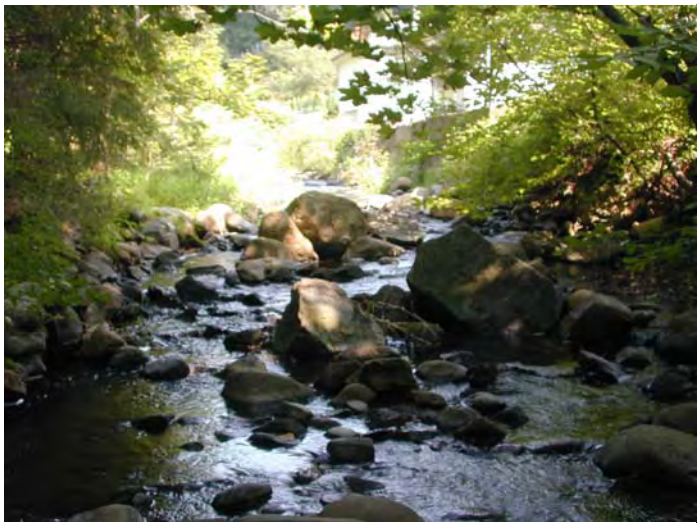
Field Data Summary

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

Stream name: **Timp Mtn. Brook** Watershed: **Hudson** ID: **CDRP**
Municipality: **Stony Point** County/State: **Rockland Co., NY** Station: **03**
Location: **Just above West Main St bridge**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **11:05 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.23683**
Longitude: **-74.00743**
Decimal Degrees

Physical Characteristics	
Width (meters)	**6**
Depth (meters)	**0.3**
Current (cm/sec)	**75**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**25**
Rubble (6.35 - 25.4 cm)	**25**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**15**
Silt (0.004 - 0.06 cm)	**10**
Embeddedness (%)	**25**
Chemical Measurements	
Temperature (C)	**23.53**
Specific conductance (umhos)	**245**
DO (mg/l)	**9.66**
DO % saturation	**113.9**
Baro pressure (mm)	**758.3**
pH	**8.37**
Salinity (PSS)	**0.12**
Biological Attributes	
Canopy (%)	**75**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	**Y**
Plecoptera	
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	**Y**
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Good**
Notes/observations:	



Flow

Flow

Field Data Summary

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

Stream name: **Unnamed tributary** Watershed: **Hudson** ID: **BOYC**
Municipality: **Stony Point** County/State: **Rockland Co., NY** Station: **01**
Location: **Just above Park Road bridge**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **11:34 AM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.24023**
Longitude: **-73.98267**
Decimal Degrees

Physical Characteristics	
Width (meters)	**2.5**
Depth (meters)	**0.2**
Current (cm/sec)	**60**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**10**
Rubble (6.35 - 25.4 cm)	**30**
Gravel (0.2 - 6.35 cm)	**30**
Sand (0.06 - 2.0 cm)	**20**
Silt (0.004 - 0.06 cm)	**10**
Embeddedness (%)	**25**
Chemical Measurements	
Temperature (C)	**21.5**
Specific conductance (umhos)	**449**
DO (mg/l)	**7.86**
DO % saturation	**89.2**
Baro pressure (mm)	**761.2**
pH	**8.14**
Salinity (PSS)	**0.22**
Biological Attributes	
Canopy (%)	**70**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	
Trichoptera	**Y**
Coleoptera	
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	**Y**
Other macroinvertebrates	
Field faunal condition	**Poor**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Cedar Pond Brook** Watershed: **Hudson** ID: **CDRP**
Municipality: **Stony Point** County/State: **Rockland Co., NY** Station: **01**
Location: **Just above Lowland Road bridge**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **12:01 PM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.2268**
Longitude: **-73.98465**
Decimal Degrees

Physical Characteristics	
Width (meters)	**14**
Depth (meters)	**0.2**
Current (cm/sec)	**75**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**10**
Rubble (6.35 - 25.4 cm)	**30**
Gravel (0.2 - 6.35 cm)	**30**
Sand (0.06 - 2.0 cm)	**15**
Silt (0.004 - 0.06 cm)	**15**
Embeddedness (%)	**40**
Chemical Measurements	
Temperature (C)	**21.02**
Specific conductance (umhos)	**363**
DO (mg/l)	**9.21**
DO % saturation	**103.1**
Baro pressure (mm)	**761.1**
pH	**8.31**
Salinity (PSS)	**0.17**
Biological Attributes	
Canopy (%)	**20**
Aquatic vegetation	
Algae suspended	
Algae filamentous	**Y**
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	**Y**
Plecoptera	**Y**
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	
Odonata	
Chironomidae	**Y**
Simuliidae	
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Very good**
Notes/observations:	

Flow

Flow

Field Data Summary

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

Stream name: **Cedar Pond Brook** Watershed: **Hudson** ID: **CDRP**
Municipality: **Stony Point** County/State: **Rockland Co., NY** Station: **02**
Location: **Just above Reservior Rd bridge**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **12:29 PM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.233916**
Longitude: **-74.003000**
Decimal Degrees

Physical Characteristics	
Width (meters)	**16**
Depth (meters)	**0.25**
Current (cm/sec)	**65**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**20**
Rubble (6.35 - 25.4 cm)	**25**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**20**
Silt (0.004 - 0.06 cm)	**10**
Embeddedness (%)	**25**
Chemical Measurements	
Temperature (C)	**21.78**
Specific conductance (umhos)	**248**
DO (mg/l)	**8.61**
DO % saturation	**98.1**
Baro pressure (mm)	**759.6**
pH	**7.92**
Salinity (PSS)	**0.12**
Biological Attributes	
Canopy (%)	**60**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	
Plecoptera	**Y**
Trichoptera	**Y**
Coleoptera	**Y**
Megaloptera	**Y**
Odonata	
Chironomidae	
Simuliidae	
Decapoda	**Y**
Gammaridae	
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Very good**

Flow

Flow

Notes/observations:

Sampled in lieu of BROD 01

Field Data Summary

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

Stream name: **Doodletown Brook** Watershed: **Hudson** ID: **DOOD**
Municipality: **Bear Mountain** County/State: **Rockland Co., NY** Station: **01**
Location: **100 meters above route 9W/202 bridge**
Date sampled: **Thursday, August 20, 2009**
Arrival time at station: **1:06 PM**
Field personnel: **J. Kelly Nolan**

Latitude: **41.30102**
Longitude: **-73.98603**
Decimal Degrees

Physical Characteristics	
Width (meters)	**6.5**
Depth (meters)	**0.2**
Current (cm/sec)	**55**
Substrate (%)	
Rock (>25.4 cm or bedrock)	**25**
Rubble (6.35 - 25.4 cm)	**25**
Gravel (0.2 - 6.35 cm)	**25**
Sand (0.06 - 2.0 cm)	**15**
Silt (0.004 - 0.06 cm)	**12**
Embeddedness (%)	**25**
Chemical Measurements	
Temperature (C)	**23.02**
Specific conductance (umhos)	**92**
DO (mg/l)	**7.6**
DO % saturation	**89.2**
Baro pressure (mm)	**761.3**
pH	**8.04**
Salinity (PSS)	**0.04**
Biological Attributes	
Canopy (%)	**80**
Aquatic vegetation	
Algae suspended	
Algae filamentous	
Diatoms	**Y**
Macrophytes	
Occurance of macroinvertebrates	
Ephemeroptera	**Y**
Plecoptera	**Y**
Trichoptera	**Y**
Coleoptera	
Megaloptera	
Odonata	
Chironomidae	
Simuliidae	
Decapoda	
Gammaridae	
Mollusca	
Oligochaeta	
Other macroinvertebrates	
Field faunal condition	**Very good**
Notes/observations:	

Flow

Flow