

A map of the Hudson Basin River Watch area. The map shows the outline of the Hudson River basin, with the Hudson River and Mohawk River labeled. The city of Albany is marked with a black square, and New York City is marked with a black square at the bottom of the river. The text is overlaid on the map.

# Hudson Basin River Watch

NYS DEC Hudson River Estuary Program

Hudson River Estuary Citizen Monitoring and Administration Project

Final Report

Contract #COO3882

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ALBANY

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Hudson Basin River Watch (HBRW) supports the Hudson River Estuary Program goal of ecosystem monitoring and education activities in the Hudson River Estuary and its watershed. HBRW supplemented existing school-based volunteer monitoring programs with increased emphasis on training and encouraging watershed groups to monitor throughout the Hudson River estuary watershed. HBRW provided the following services:

1. Facilitated **eleven (11)** volunteer water quality monitoring workshops throughout the estuary to recruit community groups and volunteers.
2. Worked with volunteer groups to develop **fourteen (14)** “State of the Watershed” reports, for streams within the Hudson River estuary watershed, and submitted them to appropriate audiences, including DEC.
3. Populated web site [www.hudsonbasin.org](http://www.hudsonbasin.org) with water quality monitoring data, watershed reports, and new data quality assurance and control protocols
4. Created a technically competent committee to initiate, and support the design of, a tidal estuary volunteer monitoring program.
5. Continued to provide technical assistance to teachers, and school classes. Facilitated **three (3)** Clean Water Congresses in the Hudson Valley.

The following final report describes accomplishments for the period July 1, 2002 through June 30, 2003 and includes an analysis of the Hudson River Estuary Watershed and a Hudson River Volunteer Estuary Monitoring Plan.

### Volunteer Participants and Training

HBRW conducted 11 water quality monitoring workshops. Over 200 volunteers participated representing 7 watershed groups, 14 environmental organizations, 16 schools, 7 County Soil and Water Districts, and 1 County Planning department. The scope of these sessions included instruction in the design and implementation of a stream monitoring program, and in performing stream-monitoring studies. HBRW provided on-going support and coordination services to the newly trained participants listed above.

HBRW continued to develop partnerships with key organizations supporting school and citizen monitoring efforts, including the Adirondack and Clearwater chapters of Trout Unlimited, Westchester Department of Planning, Schoharie River Center, Sawmill River Coalition, New York City Soil and Water Conservation District and Nassau, Putnam, and Franklin County Soil and Water Conservation Districts.

### State of the Hudson River Estuary Watershed

The Hudson River Estuary Watershed is generally polluted with sediment, nutrients, and pathogens. The Upper and Mid-Hudson tributaries are least impacted, though all contribute some pathogens and sediment to the Estuary. The Lower Hudson Estuary is the most impacted which is reflected in the chemical, biological and physical surveys.

Watershed groups and school-based volunteers have documented significant erosion, high turbidity, low macroinvertebrate populations, and low alkalinity.

HBRW has initiated and designed the Hudson River Volunteer Estuary Monitoring Program to expand service throughout the Hudson River marine and tidal ecosystem (see enclosed Hudson River Volunteer Estuary Monitoring Plan.)

### Lower Hudson Estuary

#### **Beaver Dam Brook**

On Oct. 6, 2002 a training workshop was conducted at Harvey School using the Beaver Dam Brook (aka the Stone Hill River) as a study site. The Beaver Dam Brook is a tributary to the Muscoot Reservoir in the Croton Reservoir System. The training was for members of the Croton Watershed Clean Water Coalition.

Beaver Dam Brook appears to be slightly impaired. Although the diversity of species was healthy at site 1, the number of macroinvertebrate present at site 2 was alarmingly low. Testing done by DEP in 1999 indicated a slightly impaired stream by nutrient and pathogens. The physical survey in this area indicated heavy use and erosion along the sides of the brook that might adversely impact the macroinvertebrate community with silt and sand.

Additional chemical sampling during storms might also help determine if the wastewater treatment plant is contributing to the problem. Modifications to the existing trail system to keep people away from the majority of the stream banks and delineating specific trail routes and specific crossing areas for horses might help reduce siltation.

#### **Saw Mill River**

On June 29, 2002 the Saw Mill River Coalition conducted a steamwalk and training that included HBRW Tier I and Tier II physical and biological analysis. Data was collected at one site off Mill River Road (9A) at the border of Hastings and Yonkers. The data collected fell outside the parameters established for a healthy stream and indicated that the Saw Mill River at this site was impaired. Macroinvertebrate numbers collected were insufficient to conduct a Tier II biological assessment. The primary cause of the impairment was determined to be excess of organics washing in to the river from storm drains and other sources.

Suggested solutions include refuse clean ups and education; mapping, and stencilling storm drains; monitoring storm runoff; and a continuing regular macroinvertebrate sampling.

## **Hudson River at Piermont Pier**

On Oct. 10 and 29, 2002 and April 21, 2003 a total of 102 students, teachers and staff from Lamont-Doherty Earth Observatory sampled the Hudson River. The Hudson River Monitoring program at the Piermont Pier has been established to do chemical, physical site and benthic macroinvertebrate monitoring by High School students under the supervision of their teachers and Lamont science staff. The program was established with the goals of:

1. Establishing baseline data on the various estuary measurements being collected.
2. Identify seasonal changes, and/or analyze conditions that effect change.
3. Developing critical thinking in the student participants
4. Establishing a sense of stewardship to the river, and an understanding of the effects of various processes on the river
5. Establish a mentoring relationship between interested students and scientists and graduate students at Lamont.

A summary of observations indicate that D/O was low at the river bottom (3mg/L), nutrient loading was within reasonable limits. No SAV was present. Phragmites and Purple Loosestrife dominate the shoreline. There was significant turbidity on all sampling days. Chemical monitoring stations are set up in four different locations on the pier to represent differing environments and small ecosystem differences. See full report for discussion and results.

### Mid-Hudson Estuary

## **Palmaghatt Kill**

The Wallkill River Task Force (6 participants) conducted an assessment of the Palmaghatt Kill in the Town of Gardiner, New York on May 19, 2003 with the assistance of Hudson Basin River Watch (HBRW) Mid-Hudson Coordinator, Martha Cheo.

The Palmaghatt Kill downstream from the Awosting Reserve appears to be healthy. All chemical indicators fell within New York State standards or River Network's guidelines for a healthy stream except for alkalinity. However, a "highly sensitive" alkalinity result is expected for a first order stream draining the inert quartzite conglomerate of the Shawangunk Ridge. Although the dissolved oxygen level was above the state standard minimum average, the low oxygen saturation level is of some concern. For a 10<sup>0</sup>C stream, oxygen levels should be around 11.0 ppm to be closer to 100% saturated. For future sampling, it is recommended that the Wallkill River Task Force analyze oxygen levels monthly for a year or more to get a better sense of how this indicator varies under different seasonal conditions. It would also be helpful to monitor pH and alkalinity to determine if the Palmaghatt's lack of buffering capacity results in the pH falling below the state standard. It is also recommended that in future analyses, the group uses more of the QAQC guidelines recently adopted by HBRW, such as calibrating test kits with a blank and known standard, and conducting duplicate analyses. This would increase the confidence we can have in the data results.

For the most part, the benthic macroinvertebrate analysis shows that the stream is healthy. The “slightly impacted” rating from the Percent Model Affinity (PMA) may be due to the fact that the Palmaghatt Kill is a first order stream with nearly 100% canopy cover. Such streams tend to have a predominance of shredders, particularly stoneflies. “Small shredder” stoneflies contributed to 40 of the 80 points that the PMA varied from the model community. With all other benthic macroinvertebrate metrics yielding a “non impacted” rating, we can feel confident that the community has not been degraded much from human activity.

If the Awosting Reserve development proceeds, it would be useful to continue regular monitoring of this site to determine the level of impact such a large scale development has on a small first order stream.

## **Rondout**

Friends of the Rondout monitored the water quality of the Rondout Creek in the Town of Rosendale in the fall of 2002 with the assistance of Hudson Basin River Watch (HBRW) Mid-Hudson Coordinator, Martha Cheo. A chemical analysis was completed on September 21, 2002 and a benthic macroinvertebrate analysis was completed on October 6, 2002.

Overall, the Rondout Creek at the Snyder Field appears to be healthy. Conditions were slightly stressed in the first sampling day in late September due to drought conditions, particularly reflected in the low dissolved oxygen reading (3.8 ppm is lower than the 4.0 ppm standard). Oxygen levels seemed to rebound to normal levels by the second sampling day in early October after some rainfall (8.5 ppm). Orthophosphate levels in the first sampling day (average of 0.25 ppm) were lower than the levels that correspond to “impact certain” (0.30 ppm) but higher than what corresponds to “impact likely” (0.15 ppm). Results could be better verified if a duplicate dissolved oxygen sample was taken on the second sampling date and the orthophosphate kit was calibrated with a blank and standard on the first date. For future sampling, it is recommended that Friends of the Rondout analyze oxygen and orthophosphate levels monthly for a year or more to get a better sense of how these indicators vary under different seasonal conditions, and follow up with Tier 3 analysis if problems are suspected. It would also be helpful to monitor for E.coli or Fecal coliforms, since the site is used for swimming.

The “slightly impacted” rating from the Percent Model Affinity (PMA) may be due to the fact that the sample was not preserved. Often live sample analysis results in a non-random selection of organisms, with smaller organisms such as midges being overlooked. Midges contributed to 19 of the 60 points that the PMA varied from the model community. Preserving future samples before analysis would be recommended to ensure representative selection of smaller organisms. However, the dominance of netspinner caddisflies also contributed to the PMA difference. A late spring or summer sampling of the BMI community would be helpful, to observe how the caddisfly population differs from the fall sampling.

## Upper Hudson Estuary

### **Poesten Kill**

The physical habitat of the Poesten Kill appeared good the majority of chemical data fell within healthy limits and the screening criteria for benthic macroinvertebrates indicate non-impacted water quality. Alkalinity was recorded at 18 mg/L which may account for the wide ranging pH values in previous surveys conducted by the USGS and NYSDEC from the headwaters to the confluence with the Hudson River. Typically, alkalinity greater than 20 mg/L would provide good buffering capacity for a watershed to maintain a balanced pH level.

The regular and complete physical, chemical, and biological testing of the Poesten Kill by the Junior Museum of Troy would provide valuable data and documentation on any adverse changes of the streams water quality.

### **Patroon Creek**

Over the past three years of data collection by The Essential School at Albany High, it is evident that the stream is impacted. The dissolved oxygen, pH and phosphate levels are all within the normal range. The impact is seen over the years in the high levels of nitrates and alkalinity, and in the almost total absence of macroinvertebrate life.

Some recommendations include clean up, reducing construction run-off, increasing community involvement, keeping in touch with NYS DEC, and posting data on the web site to alert residents and officials of potential problems.

Upper Hudson, Mohawk and Bronx River (7 watershed reports from Mohawk, Upper Hudson and Bronx River, tributaries of the HR Estuary):

### **Millington Brook**

Millington Brook had the best water quality, with biological assessments of slightly to non-impacted and a physical habitat rated as good to excellent. The 2002 HBRW Stream Bioassessment Institute monitored Millington Brook and headwater Cataract Brook during a 5-day Institute in August of 2002. Overall, physical assessment of all sites was favorable. Alkalinity, pH, conductivity, nitrate nitrogen, phosphorus, and water temperature at each site were consistent with a healthy stream. Biological indices are strongly supportive of non-impacted water.

### **Hudson River at Hadley**

Hadley-Luzerne HS has monitored the Upper Hudson River for the past six ears. Leaching septic tanks appear to be causing elevated levels of phosphates and E. coli (coliform) in Mill Brook and Hudson Rivers. Physical site evaluations indicate significant

algal growth. The River Watch program will continue to monitor these sites and plan to test storm drain runoff in the coming year.

### **White Creek**

Physical site assessments conducted in May of 2003 of White Creek ranged from fair to poor. The biological assessment profile indicated slightly to non-impacted water quality conditions. Nitrates were elevated at above recommended levels for healthy trout habitat. Although chemical and biological parameters were generally favorable, the low oxygen saturation of the stream and the rise in conductivity and nitrates indicate contaminants that could be detrimental to the health of, and intended use of, the stream. The findings of this and prior studies indicate that there are impacts adversely affecting the creek's classification as a Class C (T) stream. Such impacts have the potential to limit the creek's intended uses, including its ability to sustain a population of trout. Such impacts undoubtedly have the potential to adversely affect the surrounding community.

### **Schoharie Creek**

Schoharie Creek, located in a forested and agricultural area, is slightly to non-impacted based on the biota. Significant findings at all testing sites included elevated total coliform and E. coli counts, possibly from point sources, excessive algae growth on the substrate, an altered biological community from the excess organic contaminants entering the system, and at two sites supersaturated oxygen saturation levels.

### **Lisha Kill**

The Environmental Study Team of Niskayuna High School has begun a long term monitoring project of the Lisha Kill in Niskayuna, NY. Physical, biological and chemical tests were performed and all fell within acceptable limits. The Lisha Kill appeared very healthy and unaffected by pollutants. EST plans to expand the program and monitor the Lisha Kill biannually at additional upstream sites.

### **Sandsea Kill**

According to data collected, the Sandsea Kill slightly affected by the presence of significant runoff. Macroinvertebrate data indicate a biotic integrity index between good and fair. Chemical tests indicate normal ranges of nutrients. Overall the Sandsea Kill was in good condition.

### **Bronx River**

Edgemont Junior HS Research Group conducted Tier II studies of the Bronx River at Edgemont and White Plains. The biological survey indicated that the stream is severely impacted. The Physical/habitat survey found undesirable conditions for macroinvertebrate survival. It appears that development of land has had an impact on the water quality of the Bronx River. Elevated levels of chlorides and phosphates were found as well.

## Data/Web Site

The HBRW web site [www.hudsonbasin.org](http://www.hudsonbasin.org) now contains a tricolor map of the Hudson Basin representing each major sub-basin: Upper, Mohawk, and Lower basins. Reports and surveys conducted by HBRW participants in each major sub-basin are linked to downloadable PDF files that include: summary, background information, data results, discussion, conclusions, solutions, an overall water quality assessment, and additional supportive information.

Once again the most notable challenge is data entry, reporting, and use. HBRW program directors and regional coordinators have discovered over time that volunteers are eager to get outside and into the streams, but do not have the requisite follow-through to report their carefully collected data as useful information via the HBRW website database. We are tackling this challenge with a shift in emphasis from education to stewardship over the next three years, and to that end, we have brought together a new collaboration of Hudson River activists and watershed groups.

## Hudson River Volunteer Estuary Monitoring Plan

In December 2002 Hudson Basin River Watch organized the Hudson River Volunteer Estuary Monitoring Committee to initiate and design a program to serve educators and the public from New York Harbor to the Troy Dam. During a series of three meetings over 6 months, HBRW worked with the committee to design the program and a plan of action.

## School-Based Program

HBRW served over 100 school-based volunteer monitoring projects with one-on-one technical and stream-side assistance, and 3 Clean Water Congresses.

HBRW published and mailed the RiverWatcher newsletter to over 800 recipients. Downloadable electronic versions are available on the HBRW web site.

The Capital Region Clean Water Congress was held at Union College and attended by approximately 150 students, teachers, citizens and government officials. Eight schools and 1 environmental organization were involved making up a total of 10 teams participating in the Mock Stream Analysis, a lab practical where teams were tested on their ability to correctly conduct water chemistries and properly identify macroinvertebrate specimens following HBRW protocols. Each team participating in the Mock Stream Analysis was also required to orally present their findings based on their analysis of their samples. Additionally, 5 schools and 1 environmental organization provided poster displays on their stream monitoring programs and submitted written scientific reports of their studies, which are available on the HBRW web site.

The Croton Watershed Student Conference and Hudson River Symposium were both held at locations in Westchester County in the spring of 2002. Over 200 students, teachers, and volunteers participated in the presentation of water quality studies, and land use workshops.

Hudson Basin River Watch completed a three-year project with the Community Science Institute to improve and expand volunteer data quality and data assurance protocols (see enclosed Executive Summary of HBRW Pilot Project).