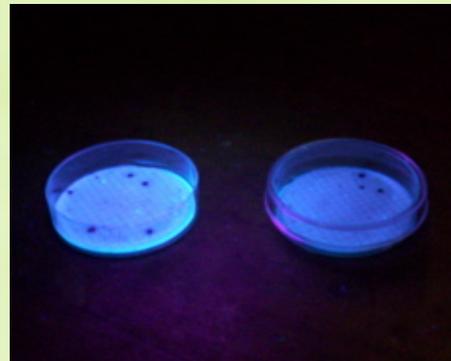
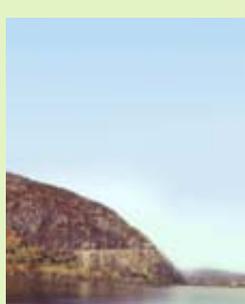


Evaluation of the  
**New York City Watershed-  
Hudson Basin River Watch**  
Volunteer Monitoring  
Pilot Project

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# Overview



- ✿ Goals & objectives of the Pilot Project
- ✿ Development & testing of Quality Assurance/Quality Control (QA/QC) model
- ✿ Evaluation of QA/QC model
- ✿ Using volunteer water quality data
- ✿ Prospects and next steps

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🌿 Hudson Basin River Watch (HBRW):

Doug Reed  
Martha Cheo  
Aaron Bennett



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## ✿ The Pilot Project Working Group:

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# Pilot Project: Two main goals



Evaluate:

- ✿ **Credibility** of volunteer water quality monitoring data
- ✿ **Potential uses** for volunteer data in New York State



# Pilot Project: Objectives

1. Evaluate quality of BMI and chemical data
2. Establish minimum QA/QC levels at HBRW's three testing tiers
3. Explore potential uses for volunteer data in New York State
4. Identify challenges in increasing interest, commitment & use of data

# Volunteer monitoring in the Hudson River Basin

## ✿ HBRW Guidance Document

- ✿ BMI (Benthic macro-invertebrates)
- ✿ Chemical (pH, alkalinity, etc.)
- ✿ For BMI and Chemical, three tiers of testing each: 1, 2, and 3



### *Hudson Basin River Watch* Guidance Document helping to coordinate monitoring of freshwater wadeable rivers throughout the watershed

Revised Draft Summer 2004

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# The QA/QC working model

- ✿ Basis for evaluating credibility of volunteer data
- ✿ Three levels of QA/QC: A, B, and C
- ✿ Maximize flexibility of volunteers to collect data and document its credibility
- ✿ Loosely based on NYS Environmental Laboratory Approval Program protocol

# QA/QC Working Model for BMI & Chemical Data

Level	BMI	Chemical
<b>A</b>	<ol style="list-style-type: none"> <li>1. Use net with 0.5-0.6 mm mesh</li> <li>2. Sample approx. 0.5 m2 of stream bottom</li> <li>3. Sample is composite of 2 fast and 2 slow areas in a riffle</li> <li>4. Clean nets thoroughly of organisms between samples</li> <li>5. Attach Physical/Habitat survey</li> <li>6. Label sampling spots on sketches in Physical Survey</li> </ol>	<ol style="list-style-type: none"> <li>1. <u>Accuracy:</u> For dissolved oxygen, conduct a super-saturation test. For pH and conductivity (meters), follow calibration procedure for every new site (every time meter is turned on). For all other (test kit) parameters, calibrate with blank and one standard at beginning of run and end of run, once for each indicator per sampling event</li> <li>2. <u>Precision:</u> Conduct one duplicate analysis for each chemical indicator per sampling event.</li> </ol>
<b>B</b>	<p><u>Same as A plus:</u></p> <ol style="list-style-type: none"> <li>1. Collect and analyze two replicate samples from at least one site per sampling event</li> </ol>	<p><u>Same as A plus:</u></p> <ol style="list-style-type: none"> <li>1. Conduct duplicate analysis for each chemical indicator on every sample</li> </ol>
<b>C</b>	<p><u>Same as B plus:</u></p> <ol style="list-style-type: none"> <li>1. Samples must be preserved in alcohol</li> <li>2. Outside professional conducts duplicate analyses of two replicate samples, once per sampling event. For each replicate sample, volunteer groups mix sub-sample back in with the rest of the sample so professional can redo the sub-sampling as well as identification.</li> </ol>	<p><u>Same as B plus:</u></p> <ol style="list-style-type: none"> <li>1. Spike one sample per indicator per sampling day</li> <li>2. Outside lab or HBRW Regional Coordinator provides one unknown standard for each chemical indicator, alternate sampling days or three times per season, whichever is less</li> <li>3. Split one sample per indicator per sampling day with an outside lab</li> </ol>

# Training volunteers in QA/QC methods

Two approaches were used:

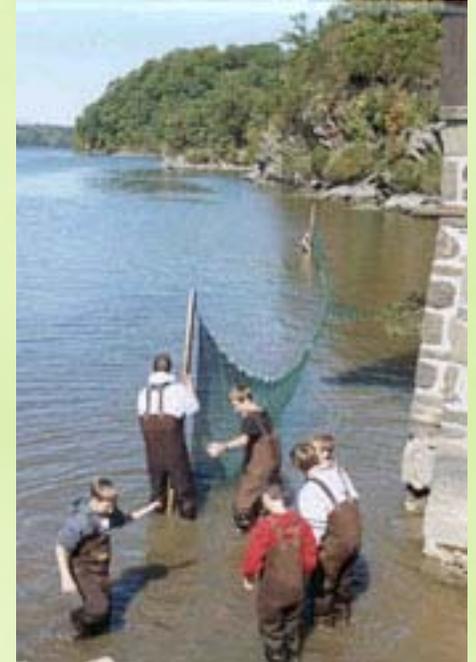
- ❁ HBRW regional coordinators working with teachers, students (grades 4-11)
- ❁ CSI-sponsored structured training workshops for teachers and adult volunteers



# Field testing the QA/QC model

✿ 21 volunteer groups:

- ✿ 19 teachers and their classes
- ✿ 2 adult groups
- ✿ 50 separate sampling events



✿ Submitted:

- ✿ 33 BMI data sets
- ✿ 34 chemical data sets

# Evaluation of field test results

Included:

- ✿ Degree of adherence to QA guidelines
- ✿ Frequency of performance of QC tests
- ✿ Evaluation of the transparency of data credibility based on QA/QC documentation
- ✿ Evaluation of the quality and usefulness of volunteer data judged to be credible

# Evaluating the model: BMI results



## ✿ Completeness

- ✿ 18 out of 35 data sets judged complete

## ✿ Credibility

- ✿ 8 out of 18: small sample sizes

## ✿ Usefulness to agencies

- ✿ Depends on data needs



# Evaluating the model: Chemistry results



## ✿ Completeness

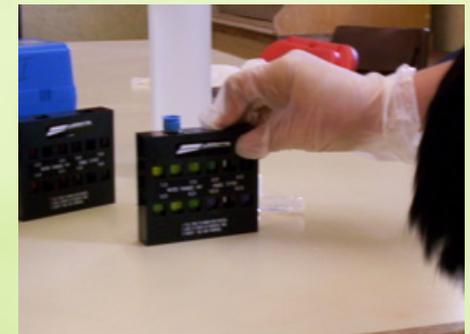
- ✿ 25 out of 34 data sets judged complete

## ✿ Credibility

- ✿ 93 out of 135 results judged credible

## ✿ Usefulness to agencies:

- ✿ Depends on data needs





# Institutional evaluation

## ✿ Three objectives:

- ✿ Investigate **how agencies** and other organizations **currently use** volunteer-collected **monitoring data**
- ✿ Evaluate the **benefits** of and **challenges** to the use of volunteer-collected data
- ✿ Identify **ways** in which volunteer **data could potentially be used** in planning and regulatory decision making

# Institutional evaluation

- ✿ 13 interviews with representatives from:
  - ✿ NYS Dept. of Envir. Conservation (DEC)
  - ✿ NYS Dept. of Health (DOH)
  - ✿ US Geological Survey (USGS)
  - ✿ State of NY Office of the Attorney General,  
NYC Watershed Inspector General
  - ✿ NYC Dept. of Envir. Protection (DEP)
  - ✿ USEPA
  - ✿ Towns: Lloyd, Yorktown Heights
  - ✿ Counties: Westchester, Orange

# Benefits and opportunities

## ✿ **Regulatory input and enforcement**

- ✿ Visual monitoring and record keeping, e.g., storm water regulations
- ✿ Statewide waters assessments

## ✿ **Community natural resource planning and management**

- ✿ Water quality implementation & restoration projects; watershed management efforts

## ✿ **Education and science**

- ✿ Hands on experience with scientific method
- ✿ Long-term ecological monitoring

# Challenges

- ✿ What's the goal?
- ✿ Data credibility
- ✿ Training volunteers
  - ✿ Funding and logistics
- ✿ Data management
- ✿ Overcoming negative perceptions
- ✿ General resource constraints



# Improving volunteer monitoring in New York State (and beyond...)

- ✿ **Incorporate QA/QC protocols** into existing methods
- ✿ **Improve volunteer access to resources** for producing & validating monitoring data
- ✿ **Increase training opportunities** for volunteer monitors
- ✿ **Strengthen collaborations** between volunteer monitoring groups and government agencies
- ✿ **Promote *production and use of volunteer monitoring data*** that meets standards for credibility

# Questions?

[www.communityscience.org/pilotproj.htm](http://www.communityscience.org/pilotproj.htm)



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