Creating Partnerships to Promote Citizen Science and Advocacy
We are a peer-to-peer network of people and organizations working to restore and revitalize urban waterways and neighborhoods that surround them.
Today’s Presenters

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Executive Director  
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1. Background and Partnership
2. Community Science Program
3. Science to Action

Success Stories and Lessons Learned
Background  - Orgs

(CURB)

(RK)

(BxRA)

(HRWA)
Background - CURB

Research - Education - Community
Background - CURB

Research - Education - Community
Pocantico River Watershed Alliance

Four urban subwatersheds are located in the southern-most portion of the Hudson River Estuary Watershed. Water quality samples are taken at 63 sites within the area. Photos: Hudson River Watershed Alliance and Riverkeeper
Background - Partnership

- Shared Missions
- Some Overlap
- Similar Watersheds and Issues
- Interest in Fecal Bacteria Monitoring
- Opportunity to Share Resources
  - RK Boat Capacity
  - CURB Lab (2015)
Background - Partnership

- Partnerships are personal
  - Long time colleagues/friends
  - New beginnings (River Rally!)
  - Trust

- 2016 EPA Urban Waters Grant
“Lower Hudson Urban Waters Collaborative”
  – Coordinated monitoring and outreach

$60,000
  – $12,500 RK
  – $10,000 BxRA
  – $2,000 HRWA
  – $35,500 CURB
  → $14.5k Lab Tech and Supplies

Agreements: Subaward contracts
Grassroots Outreach Expertise
Broad Regional Network
Potential for Project Replication
Annual Conference

Hudson River Watershed Alliance

Key Goals

Data to address issues

WQ data for 4 watersheds
Data Sharing
Data Interpretation

Community Benefits

Health risk awareness = reduced risk of exposure
Risk of flooding reduced from storm\water mitigation measures (long term)

Community Engagement

Citizen Science Program
Community Group Workshops
Regional Summit

Partnership Formed/Strengthened

CURB/RK/BxRA/HRWA Partnership Formed
Additional stakeholders engaged
Partnership - Difficulties

- Recognition/Media
  - Making sure everyone is credited properly
  - MOU next time
- Outside perceptions
  - BxRA challenge with permits
- Time investment
  - Partnerships are work
  - Funding is uncertain
Recognition/Media
  - Combined outreach

Expanded our reach
  - HRWA: Lower Hudson
  - BxRA: Westchester
  - CURB action-oriented w/ RK

Bigger community for volunteers

Led to new partners and initiatives
Vision:
Clean, swimmable waters
A Hudson River teeming with life
Safe and abundant drinking water supplies
EPA recommends *Enterococcus* as a fecal contamination indicator

- EPA 2012 Recreational Water Quality Criteria
- Can be used in fresh & salt water
- Found in warm-blooded animals
- Not usually harmful, but indicates harmful pathogens may be present
- Not NYS standard
How do we use *Enterococcus* to assess water quality?

**EPA Recreational Water Quality Criteria**

**Long term average**

- Geometric Mean
- 30 Enteroc/100 mL

**Not necessarily representative of...**

- the conditions at any single point in time
How do we use *Enterococcus* to assess water quality?

**EPA Recreational Water Quality Criteria**

- **Long term average**
  - Geometric Mean
  - 30 Entero/100 mL
- **Single point in time**
  - Beach Advisory Value
  - 60 Entero/100 mL

*Not necessarily representative of...*

- the conditions at any single point in time
- the conditions most of the time
How do we test for fecal contamination?
Riverkeeper Hudson River Estuary Sampling
Began in 2008
NY Harbor to Waterford
Hudson River Estuary sampling results showed tributary water quality poorer than mid-channel.

(Results from samples collected 2008-2015)
Community Science Program
400+ locations
NYC to Adirondacks & Rome

160+ community scientists
40+ organizations/labs
How does community science work?
How does community science work?
What do the data show?

<table>
<thead>
<tr>
<th>Location</th>
<th>Beach Advisory (&gt;60 cells/100 mL)</th>
<th>Acceptable (0-60 cells/100 mL)</th>
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</thead>
<tbody>
<tr>
<td>POCANTICO RIVER</td>
<td>81%</td>
<td>19%</td>
</tr>
<tr>
<td>SPARKILL CREEK</td>
<td>93%</td>
<td>7%</td>
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<tr>
<td>SAW MILL RIVER</td>
<td>89%</td>
<td>11%</td>
</tr>
<tr>
<td>BRONX RIVER (2017 ONLY)</td>
<td>90%</td>
<td>10%</td>
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</table>

*Project duration, number of sites, number of samples vary.
What do the data show?

*Project duration, number of sites, number of samples vary*
How does community science work?

Data to:
- Websites
- Email
- Presentations
- Reports
- Advocacy: letters, lobbying
Science to Action

riverkeeper.org/water-quality/citizen-data/

bronxriverwater.org
• Administered by Riverkeeper in tributary project areas throughout Hudson River Watershed
• Including Saw Mill River, Pocantico River, Sparkill Creek and Bronx River, and also many others
• Variety of partner organizations and program structures
Community scientist survey

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Participants are:
- Confident in the program and their ability to address environmental concerns
- Highly likely to participate again (76% would return, 4% would not)
Community scientist survey

- Administered by Riverkeeper in tributary project areas throughout Hudson River Watershed
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Participants are:
- Confident in the program and their ability to address environmental concerns
- Highly likely to participate again (76% would return, 4% would not)

Participants want to:
- Gather more data
- Utilize data better
Survey results: barriers to participation

Barriers to Further Participation

- Major barrier
- Moderate barrier
- Minor barrier
- Not a barrier

- I don't feel like water quality is a problem in the area
- I am not very interested in water quality
- My samples aren't needed because other monitors have it covered
- I feel that other people can collect data better than me
- I don't have enough time
- I don't have free time
- I don't trust the scientists leading the project
- I don't receive enough recognition or rewards for the time I invest
- I don't think my input and contributions are valued
- I don't understand the goals of the project
- I don't understand the project data collection and analysis protocols
- I don't think anyone does anything useful with the data
- I don't have a way to connect with and interpret the data
- I don't have a method for interpreting the data
To promote effective action based on the data, we must...

- Identify good opportunities (beyond sampling) for community scientists to speak up
- Factor follow-up into our program planning & budgeting
- Remember/recognize that volunteers already commit significant time to sampling. Perhaps look to others?

### Barriers to Further Participation

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<td>I don't think I don't have all the tools I need to do the job</td>
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<td>I don't know how to get started</td>
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<td>I have trouble communicating with others</td>
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"I don’t have enough free time"
Background - BxRA

Ecology & Restoration

Education

Recreation

Greenway

Outreach
Background - BxRA
Science to Action - Success (BxRA)

- Stormwater outfall releasing sewage directly to Bronx River
- Discovered in 2014
- Yonkers found sanitary clog from a diner and a multi-unit apartment building, fixed it!
Science to Action - Data-driven advocacy

[Graph showing Enterococcal levels, MPN/100 mL from 2014 to 2018]
Science to Action - Data-driven advocacy

[Graph showing Enterococcal levels (MPN/100 mL) for years 2014 to 2018]

- 2014: Peaks in Enterococcal levels
- 2015: Decrease in Enterococcal levels
- 2016: Minimal Enterococcal levels
- 2017: Further decrease in Enterococcal levels
- 2018: Increase in Enterococcal levels

Collection Date and Results
Science to Action – Data-driven advocacy
Science to Action - Success (BxRA)

2015

2018
Science to Action  - Success (CURB)

- Sewage pipe direct to stormwater
- 4 story mixed use building
- Yonkers TV-ed line, found issue, fixed it!
Science to Action - Communication of results

- E-blasts to participants, officials, scientists, etc.
- Community-based outreach
- Municipalities under MS4 permit
- Local and State agencies
- Enforcement officials
- Local electeds
Science to Action  - Advocating for change
Importance of alliances

- Water protection crosses boundaries and is complicated!
- Support people and communities at the forefront of water protection (New York State = Home Rule state)
- Citizen science as gateway to watershed organizing
- Celebrate successes and highlight success stories
On March 1, more than 100 environmental and political leaders attended the 2018 Lower Hudson Urban Waters Summit that was organized by CURB.

Photos: Ryan Palmer

With Support From

- New York State of Opportunity
- Hudson River Estuary Program
- United States Environmental Protection Agency
- Westchester Community Foundation
Closing Thoughts

- Critical need for more significant agency action/leadership
- Lots more work to do!
A Citizen Water Science Framework: Powered with Open Data and Technologies

**Data Production**
- Study objectives
- Monitoring questions
- Study Design (Who, what, where, how)
- Adoption of technologies
- Data Management/Analysis Design
- Program Evaluation Design

**Data Management**
- Local Data Storage
  - Excel
  - Relational database (Access, SQL, GIS)
  - Online

**Data Analysis, Visualization**
- Online Science Web Services
  - Data Vis Services
    - (Tableau, Plotly, DataHero, Chart.js, Consultants)
  - DIY Data AN/VIS
    - (Excel, R, R Shiny, SAS, Python, .d3js, GitHUBs, etc.)

**Modeling, Planning**
- Data Informs Action
  - Modeling, Planning
  - Prioritization
  - Tracking
  - Regulatory

**Data to Action**
- Communicate Science
  - Story maps
  - Report cards
  - Social media
  - Apps
  - Website
  - Data dashboards

**Open Data Portals and Data Resources**
- Online Science Web Services
- DATA PORTALS
  - WQX -> STORET -> Water Quality Portal
  - CUAHSI - Hydroshare
  - Others (Continuous, real-time, flow, state, program)

**Step 1: Preparing for Data Collection**
- Study objectives
- Monitoring questions
- Study Design (Who, what, where, how)
- Adoption of technologies
- Data Management/Analysis Design
- Program Evaluation Design

**Step 2: Monitors Collect Data**
- Paper datasheets
- App exports
- Lab reports

**Step 3: Local Data Storage**
- Excel
- Relational database (Access, SQL, GIS)
- Online

**Step 4: Analyze & Visualize Data**
- Data Vis Services
  - (Tableau, Plotly, DataHero, Chart.js, Consultants)
- DIY Data AN/VIS
  - (Excel, R, R Shiny, SAS, Python, .d3js, GitHUBs, etc.)

**Step 5: Data Informs Action**
- Modeling, Planning
- Prioritization
- Tracking
- Regulatory

**Step 6: Data to Action**
- Communicate Science
  - Story maps
  - Report cards
  - Social media
  - Apps
  - Website
  - Data dashboards

**Evaluation and Adaptive Management**
- QA Data Entry
- Download Data to Use
- Share Data/Analysis with Users
- Share Data/Products

- Public State
- 303(d)
- TMDL
- County
- Ag districts
- Etc.

- Science-Based Restoration and Prioritization
  - Watershed plans
  - Targeted restoration and protection

C/o River Network, for Pisces-led ad-hoc citsci steering committee
Before You Go...

Additional Resources: www.urbanwaterslearningnetwork.org

Upcoming Webinars:
• Using Mapping and Decision-Making Tools to Ensure Climate Equity - August 21
• Parks with Purpose: Community-Driven Green Infrastructure - September 6
• Water Trails 101: Preserving natural and cultural heritage, health, and vibrant economy - September 11
• Communicating the State of Your River: Basin Report Cards and the Swim Guide - September 18

Other Announcements:
• Link to today’s webinar recording will be sent by email
• Please complete the brief evaluation survey coming your way!

URBAN Waters Learning Network
Questions & Thanks

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