



# **Citizen Science in Action – EPA Region 2**

**May 2017**

**Dr. Anahita Williamson**

**EPA Region 2**

**Director, Division of Environmental Science &  
Assessment**

# U.S. EPA Region 2 Citizen Science

## What is Citizen Science?





# U.S. EPA Region 2 Citizen Science

- ▶ Engage and Empower Communities to collect their own data and educate fellow citizens
- ▶ Participate in scientific process
  - ▶ Identifying research questions
  - ▶ Collecting & Analyzing Data
  - ▶ Interpreting Results
  - ▶ Expand scientific knowledge and literacy
- ▶ Region 2 Citizen Science Workgroup
  - ▶ Focused subcommittees
    - ▶ Air
    - ▶ Water
    - ▶ Puerto Rico & Virgin Islands



# U.S. EPA Region 2 Citizen Science 2012 Hometown Grants

- ▶ **Bronx River Alliance** – water quality monitoring to strengthen River Stewards Volunteer Monitoring Program
- ▶ **Cypress Hills Local Development Corporation (Cypress Hills & East New York)** – train local students w/air quality sensors (indoor air)
- ▶ **El Puente/Williamsburg Brooklyn** – train young people to collect water quality data
- ▶ **NY Harbor Foundation** – air/water monitoring to educate high school youth as CS volunteers
- ▶ **Sustainable South Bronx** – AirCasting Smartphone technology
- ▶ **St. Croix Environmental Association Vehicle Air Pollution Project** – train 30 St. Croix high school and university students collect & analyze vehicular traffic and air pollution data and develop recommendations based on their research



# **U.S. EPA Region 2 Citizen Science Trainings & Workshops**

- ▶ 2012
  - Inaugural CS Workshop in NYC and NJ
- ▶ 2013
  - Credible Data Training (NYC, NJ, Buffalo) & MyEnvironment Webinars
- ▶ 2014
  - 2-Day Caribbean Science/Citizen Science Workshop
  - ORD RARE Project with ORD, Region 2, Ironbound Community in Newark, NJ
- ▶ 2015
  - Launch of Equipment Loan Program & Training (NYC, NJ, PR, VI)
- ▶ 2016
  - Equipment Loan Program Year 2 (NY/NJ – Spring, PR/VI – Summer/Fall)

# Tonawanda Case Study





# U.S. EPA Region 2 Citizen Science Equipment Loan Program

- ▶ Open to all citizen scientists/community groups in U.S. EPA Region 2 (New York, New Jersey, Puerto Rico, and the US Virgin Islands) and Tribal Nations throughout Region 2
- ▶ Successfully launched in 2015 for water quality meters
  - ▶ Spectrophotometer (Colorimeter) – Nutrient & Chemical analysis
  - ▶ YSI meters – Temperature, pH, Conductivity, Salinity
  - ▶ GPS units
  - ▶ Turbidity Tubes
- ▶ For 2016 program Bacteriological (Pathogens) added for analysis of Enterococcus, Total Coliforms, E.Coli
  - ▶ NY/NJ application period complete
  - ▶ PR/VI to launch in summer!
- ▶ **Potential expansion into Air monitoring and Trash-Free Waters equipment**



# U.S. EPA Region 2 Citizen Science Quality Assurance

- ▶ To ensure that environmental information collected and/or used by Citizen Scientists is useable and credible.
- ▶ A Quality Assurance Project Plan (QAPP) documents the project planning process.
- ▶ It provides in one document, a clear, concise and complete plan for describing the environmental information collection and/or use activities associated with a project.

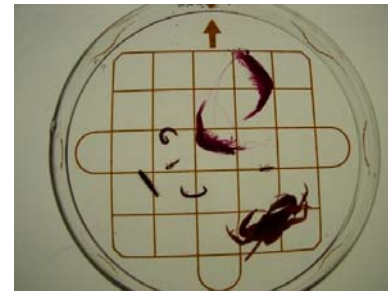




# FY16- Citizen Science Puerto Rico

## National Monitoring Day

- ▶ Coordinated by the San Juan Bay Estuary Program
- ▶ The World Water Monitoring Challenge provided kits for 5 water quality parameters to be used at over 150 sites in Puerto Rico:
  - ▶ pH (Acidity)
  - ▶ Dissolved Oxygen (DO)
  - ▶ Turbidity (Clarity)
  - ▶ Temperature
  - ▶ e.coli (New for 2017!)
- ▶ EPA Region 2 will provide training on Benthic macroinvertebrate (stream insect) analysis
- ▶ San Juan Bay Estuary Program will provide training on kits and measuring bacteria in surface water samples



# U.S. EPA Region 2 Citizen Science Puerto Rico National Monitoring Day

- ▶ Bacteria one of the main pollutants not meeting water quality standards in ambient water samples in Puerto Rico
- ▶ In 2016, Pilot Bacterial Screening Test with 20 volunteers in San Juan Bay Estuary for e.coli using 2 test types:
  - ▶ Compartment Bag Test – inexpensive, simple equipment
  - ▶ Colilert by Idexx with Quantitray
- ▶ Split analysis using both test types
- ▶ Since compartment bag yielded comparable results, is now included in Monitoring Day test kits





# U.S. EPA Region 2 Citizen Science Puerto Rico National Monitoring Day

- ▶ Aquatic macroinvertebrates used in established monitoring programs in US and Europe to make water quality determinations
  - ▶ Macroinvertebrates of streams and rivers include:
    - ▶ insects (caddisflies, beetles, dragonflies)
    - ▶ crustaceans (shrimp, crayfish, crabs)
    - ▶ mollusks (snails, mussels, clams), and worms
  - ▶ Typically collected with fine mesh nets
- ▶ EPA training 90 volunteers in 3 locations throughout Puerto Rico on sample collection, evaluation and interpretation



# U.S. EPA Region 2 Citizen Science

## Future Efforts in Trash-Free Waters

- ▶ Assess potential TFW needs within Region 2

- ▶ Additional equipment loan program
- ▶ Monitoring events
- ▶ Workshops
- ▶ Training
- ▶ Standard practices
- ▶ Quality Assurance



- ▶ Want to hear from public on gaps and desires



# **U.S. EPA Region 2 Citizen Science Forum Microplastics/Citizen Science Syracuse Workshop**

- ▶ Co-Sponsored by EPA Region 2 and SUNY ESF on  
October 11, 2016
- ▶ Workshop highlighted:
  - ▶ Historical research & Future research needs
  - ▶ Importance of standardizing sampling and analytical methodologies
  - ▶ How organizations aggregating citizen science efforts can assist in filling these research gaps.
  - ▶ Participants introduced to preferred methods of microplastics sampling
  - ▶ Breakout Session – Small group discussions



# U.S. EPA Region 2 Citizen Science Forum

## Microplastics Trawl Train-the-Trainer

- ▶ Initial training performed in NJ, collaboration with:
  - ▶ US EPA Region 2 & HQ
  - ▶ 5 Gyres, Inc.
  - ▶ NY/NJ Baykeeper
  - ▶ Monmouth University
- ▶ EPA partner with San Juan Bay Estuary Program in April 2017 to provide “Train-the-Trainer” to 12 citizen scientists in microplastics trawl collection methods and analysis





# U.S. EPA Region 2 Citizen Science Forum

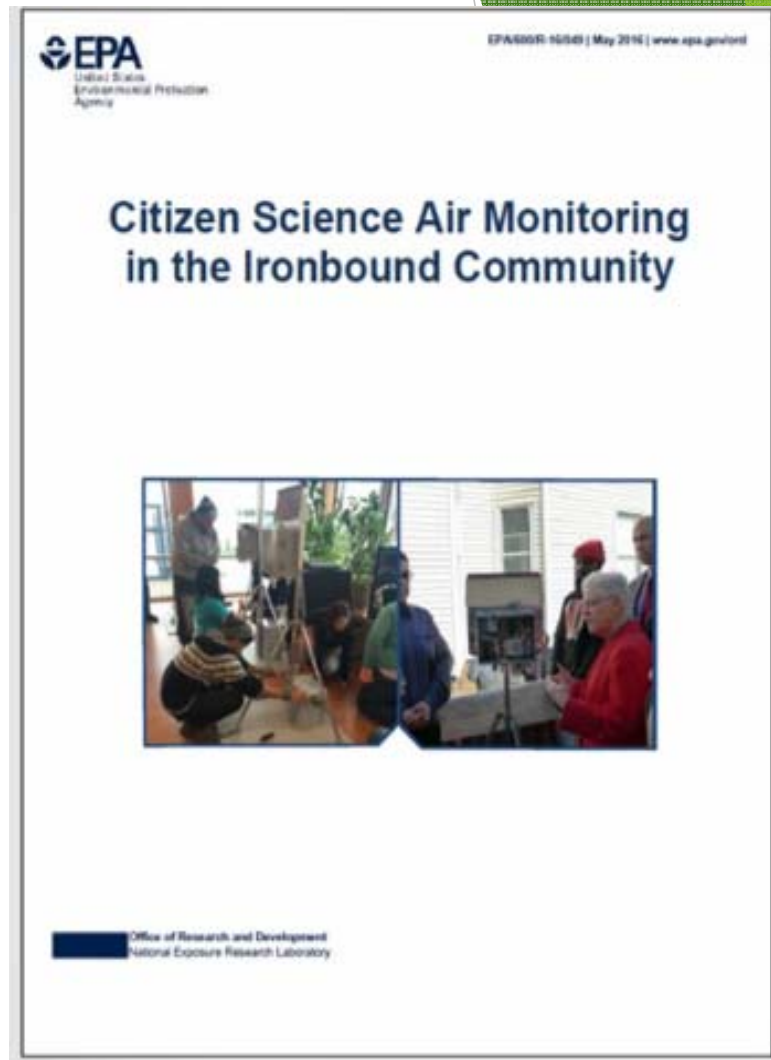
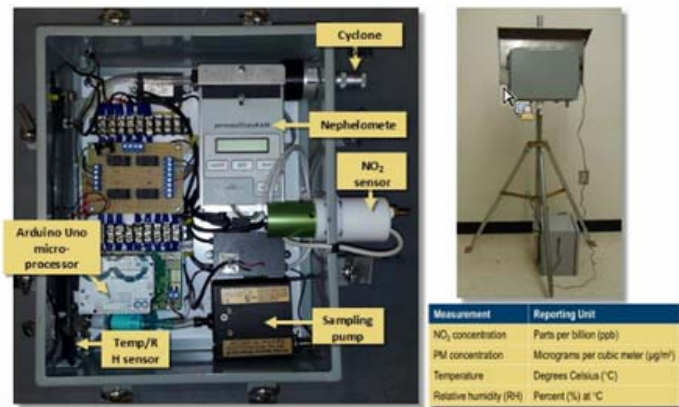
## Microplastics Trawl Train-the-Trainer

- ▶ 45 volunteers trained on shoreline sampling on Boqueron & Escambron Beaches



**2014-15:** R2 partners with NJ's Ironbound community and EPA's Office of Research and Development to design and build 4 Citizen Science Air Sensor Monitors (CSAMs) for use by the community.

### The Sensor POD-CSAM





## 2016-17: Air Sensor project in Tallaboa-Encarnación, PR

- 10 units designed and fabricated by EPA's Office of Research and Development
  - PM2.5
  - Total VOCs
  - NO2
  - T and RH
- Deployed in the community for 6 months
- Data currently being analyzed

Image: units being co-located alongside regulatory monitors in nearby Ponce, PR.







**Typical  
deployments**





# U.S. EPA Region 2 Citizen Science Current and Future Efforts

- ▶ Interdivisional Citizen Science Workgroup Established
  - ▶ Three Workgroup Subcommittees: Air, Water and Puerto Rico/U.S. Virgin Islands
    - ▶ Region 2 Program Office Staff
    - ▶ State Representatives – New York & New Jersey
    - ▶ Regulatory Agency in Puerto Rico – Environmental Quality Board
- ▶ Purpose
  - ▶ Knowledge transfer
  - ▶ Sharing best practices
  - ▶ Collaborating on events/workshops/projects
  - ▶ Discussing data visualization, usage & communication

# U.S. EPA Region 2 Citizen Science Citizen Science Efforts





# **U.S. EPA Region 2 Citizen Science Program**

## **Questions?**

**Dr. Anahita Williamson**

**Director, EPA Region 2**

**[Williamson.Anahita@epa.gov](mailto:Williamson.Anahita@epa.gov)**

**732-321-6754**

**Division of Environmental Science & Assessment**

# U.S. EPA Region 2 Citizen Science Final Thoughts

