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# How many....

- Are with an agency? NGO?
- Volunteer? Coordinate a volunteer program?



What Exit are You From?





# Great Bay, Tuckerton, NJ





Oswego River, Pine Barrens, N J





NJ 8.7 million people

7,505 square miles

18,126 miles of rivers & streams

Approximately 20% of the

*State's Waters are fully assessed of  
that over 80% does not meet  
water quality standards*



# Myths of Using Volunteer Collected Data

- Quality Assurance & Quality Control
- Volunteers have “hidden agendas”
- Volunteers are not scientists

# Reality of Using Volunteer Collected Data

- We need more data at a higher frequency of collection
- EPA has been encouraging the use of volunteer collected data since 1988
- Volunteers want to do it right

# Clean Water Act

- Does Not State, “Only Monitor Waters You Can Afford to Monitor”
- It Does State, “States Must Consider using All Data of a Known Quality”

*“....some government scientists have a lingering bias against volunteer data. We have come a long way and this is a non-issue in some states, but it remains a significant constraint in other states in my opinion.”-2013*

# NJ's 4 Tiered Approach to Data Use

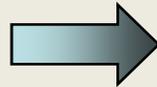
Allows for volunteers to choose level of monitoring involvement based on

- Intended purpose for monitoring
- Intended data use
- Intended data users





**Education/  
Awareness**



**Problem ID,  
Assess Impairment,  
Local Decisions**



**Legal & Regulatory**

**Tier A**

**Tier D**

**Increasing Time - Rigor - QA - Expense \$\$**

# Tier A-Environmental Education



# Tier D-Indicators & Regulatory Response

## Data Users

- NJDEP
- Local decision-makers
- Watershed associations
- Environmental organizations

## Data Use

- Assess current conditions
- Supplement agency data collection
- Research
- Evaluate best management practices (BMP) measures
- Regulatory Response

## Quality Needed

- High level of rigor
- Study design & methods need to be equivalent & recognized by agencies using data
- Training required
- QAPP approved by Office of Quality Assurance
- Audits

# Tiered Approach to Data Use

- Some states with a tiered approach
  - NY, NJ, OH, OR, MO, VA, and others
- Provides training and resources for citizen groups to conduct their own monitoring programs
  - Macro id courses, study design, data analysis and interpretation, communicating data results, lab and field methods, etc...



# Defining Data Use & Users

- Once you determine why you want to monitor
- You need to determine how you want that data to be use
- And who do you what it to be used by



# NJDEP Data Users

- Watershed Area Managers (*TIERS B,C,D*)
- Water Assessment Team/Standards (*TIER D*)
- NPS Program (*TIER C, D*)
- TMDL Program (*TIER B, C, D*)
- Other Programs or Divisions



# Regulatory Data Use is...

- Only for listing and delisting purposes?
- As a screening tool?
- Identifying hot spots for further monitoring from the agency?
- Notifying community and agency of a concern like the Gunpowder Creek example?



# Pequannock River Coalition

Why did we choose temperature monitoring?

## *Trout!*

Much of the of the Pequannock River mainstem and many river tributaries are classified as “trout production” where temperature can be a major limiting factor.

First documented fish kill caused by high river temperatures in the West Milford area in 1994 .

River temperature reached 82F.



A second fish kill occurred in the same area in 2002.

River temperature reached 83F.



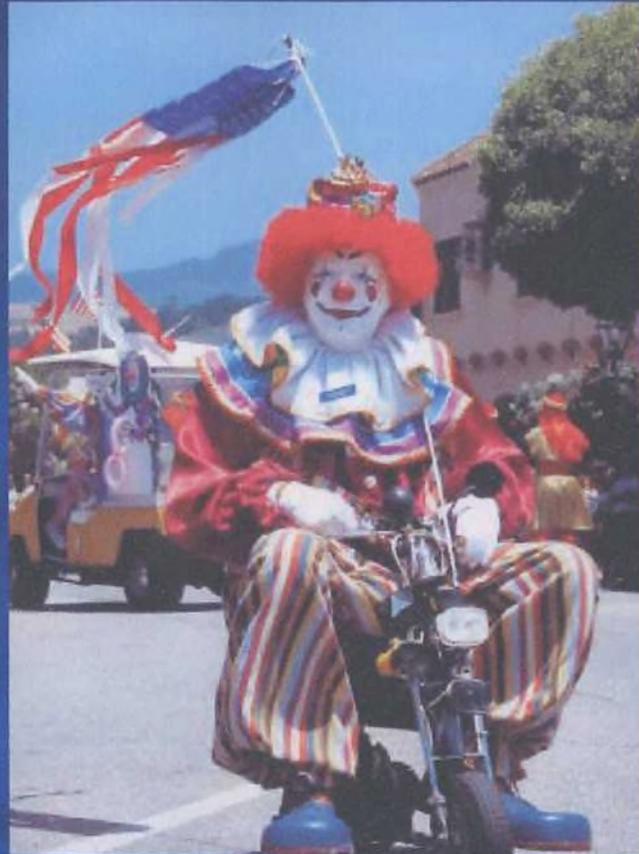
- Electronic “data loggers” are placed in the river at known monitoring locations in early summer for the whole growing season
- Stations are located where data loggers can be checked frequently
- Loggers record Temp every 30 minutes
- Early Fall they are removed & data is downloaded

Ross Kushner, Pequannock River Coalition

# Are You Certifiable? Probably!

## Requirements:

- 1 - Dedicated laboratory “manager” with experience or training.
- 2 - High-grade, approved QA/QC Plan and Procedures.
- 3 – Quarterly calibration checks of data loggers.



- 4 – Annual recalibration of NIST thermometer.
- 5 – Solid documentation of calibration tests, deployment sites, collected data, etc.
- 6 – Annual license fee (\$900).

Ross Kushner, Pequannock River Coalition

# Temperature Criteria

- Management of Reservoir Operations through NJDEP's Water Allocation Permit
- Beaver Management
- Stormwater Management through adopted Regulations
- Shading through Streambank Restoration Projects
- NJPDES Permit Requirements



# Pequannock River Characterization, Assessment & Management Plan

Results of our NJDEP funded study to identify and assess the impact of elevated water temperatures throughout the Pequannock Watershed



# Delaware River Oil Spill Volunteer Emergency Response

- Basic Study Design
- Assigned Segments
- Assessment Tip Sheets
- Data Sheets *standardized*  
w/ State Protocol

- **No** Fixed monitoring locations
- **No** QAPP
- **No** Training



# Oiled Debris in Need of Clean Up



Faith Zerbe, Delaware Riverkeeper Network

# Boom Placement & Malfunction



Faith Zerbe, Delaware Riverkeeper Network

# What did the Volunteers Document?

- 15 New Jersey tributaries suffered oiling
  - One Delaware tributary suffered oiling
  - 4 New Jersey Beaches suffered oiling
  - Three wildlife preserves suffered oiling
  - Various main stem Delaware locations
- 
- 13 streams monitored had no signs of oiling at time of monitoring (PA and DE mostly)

# Riverkeeper Data Use



- Emergency response/clean up vigilance
- Talks with Coast Guard and NRDA officials – checks on scope of oiling, reports
- Press
- Increased citizen base for advocacy issues

# Natural Resource Damage Assessment



All partners have a goal of restoring and protecting the Bay....



# Barnegat Bay Model

- All passed proficiency sampling
- All used their own equipment
- All worked under the same quality assurance project plan (living document constantly changing)
- All told where & when to monitor
- All data made publicly available



# NJDEP Procedures

- Field Procedures
- Sampling Procedures
- Methods for Sample Collection & Analysis
- Data Management



# Accomplishments

- 5524 number of samples collected
  - June 2011 to present
- 13 partners
  - 5 labs
  - 2 schools/universities
  - 2 ngos
  - Government municipal, county, regional, state and federal





# NJ WATERSHED AMBASSADORS PROGRAM



- Environmental Community Service Program
- Raise Public Awareness about Water and Watersheds
  - Partnership Projects
    - rain gardens and rain barrels
    - stream clean ups
    - training workshops
  - Environmental Presentations
  - Water Monitoring (1000 assessments per year)



# *Volunteer Biological Monitoring: Can It Accurately Assess the Ecological Condition of Streams?*

- Sampling w/ professional methods concurrently w volunteers using SOS protocol
- Solely based on presences or absences of taxa
- 35% of samples were not in agreement
- Due to inaccuracy of oversimplified numeric analysis

**Voshell, J. R, and Sarah R. Engel. 2002.**



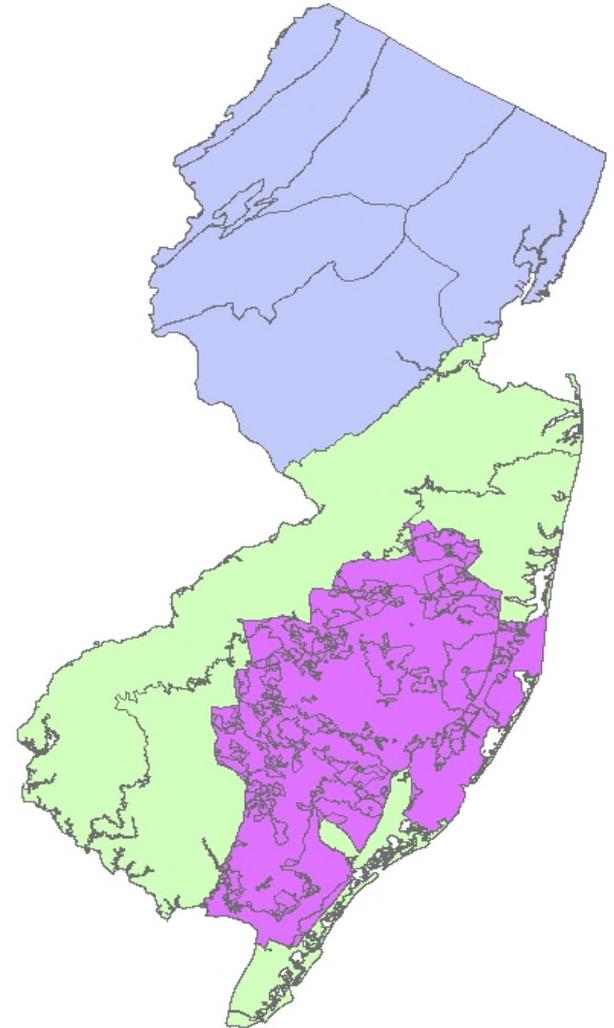
# Conclusion of Study

*“...volunteer biological monitoring programs can provide reliable information about ecological condition, but every protocol needs to be validated by standard quantitative methods.”*



# NJDEP Streamside Macroinvertebrate Protocol

- 2000-05 protocols based on presences/ absences of taxa
- 2005-2010 added counting number of individuals
  - One size fits all approach to metrics was not working
  - Unreliable in the Pinelands & Coastal Plain Ecoregions



# Better Tools for Biomonitoring

- Multimetric Index
- Sensitive to Eco Regions
  - Coastal Plain
  - Pinelands
- Aligns with NJDEP's Biological Monitoring Indices for the Eco Regions
- User friendly Stream Side Identification



# New Approach

- More Accessible to Citizen Scientists
- Reliable Assessment Tool for Eco-regions
- Cost effective Method for Assessment



# *Ah-ha Moment*

- Use for Integrated Report
  - data of a known quality
  - chemical, pathogens, physical, habitat and macroinvertebrate
- The Macroinvertebrate tell the story....
  - Recalibrated Indices
  - Excellent or Poor Quality Streams
  - List or Delist for Assessment



# Getting Started-Agency

- One point of contact for volunteers & agency staff
- Regular communication between volunteers/associations & agency
- Availability outside of normal working hours
- Training and workshops on nights & weekends



# Getting Started-Agency

- Partnerships beyond host agency via service provider network
- Assistance from other Agency programs and staff
- Work directly with schools &/or organizations
- A budget (cost effective not cost free)



# How will the Program Run?

- Will the agency look for volunteers to become part of a agency sponsored project?
- Will the agency work with existing groups that have their own monitoring projects?
- Will it be a combination of both?



# Getting Started-Agency

- Volunteer monitoring becomes part of the day to day business of the Agency
- Give & Get
- Sharing both ways
  - Annual conference
  - Track success stories
  - List serves
  - Social Media



# Budgets & Justifications

2012--*64.5 million* Americans, 26.5 % of the adult population, gave *7.9 billion hours* of volunteer service worth *\$175 billion*

NJ--Volunteer wage is \$25.33

[www.volunteeringinamerica.gov](http://www.volunteeringinamerica.gov)

[http://www.independentsector.org/volunteer\\_time](http://www.independentsector.org/volunteer_time)



# Data Management

- An afterthought
  - “It’s not prioritized and therefore not well thought out or well funded”
  - “It’s part of the solution to the perceived trust issue that gov’t agencies have with vol. data”
- Needs
  - Easier tools
  - Dynamic enough to change over time

