

US Models of Volunteer Monitoring



Julie Vastine

Alternate Volunteer Monitoring Representative

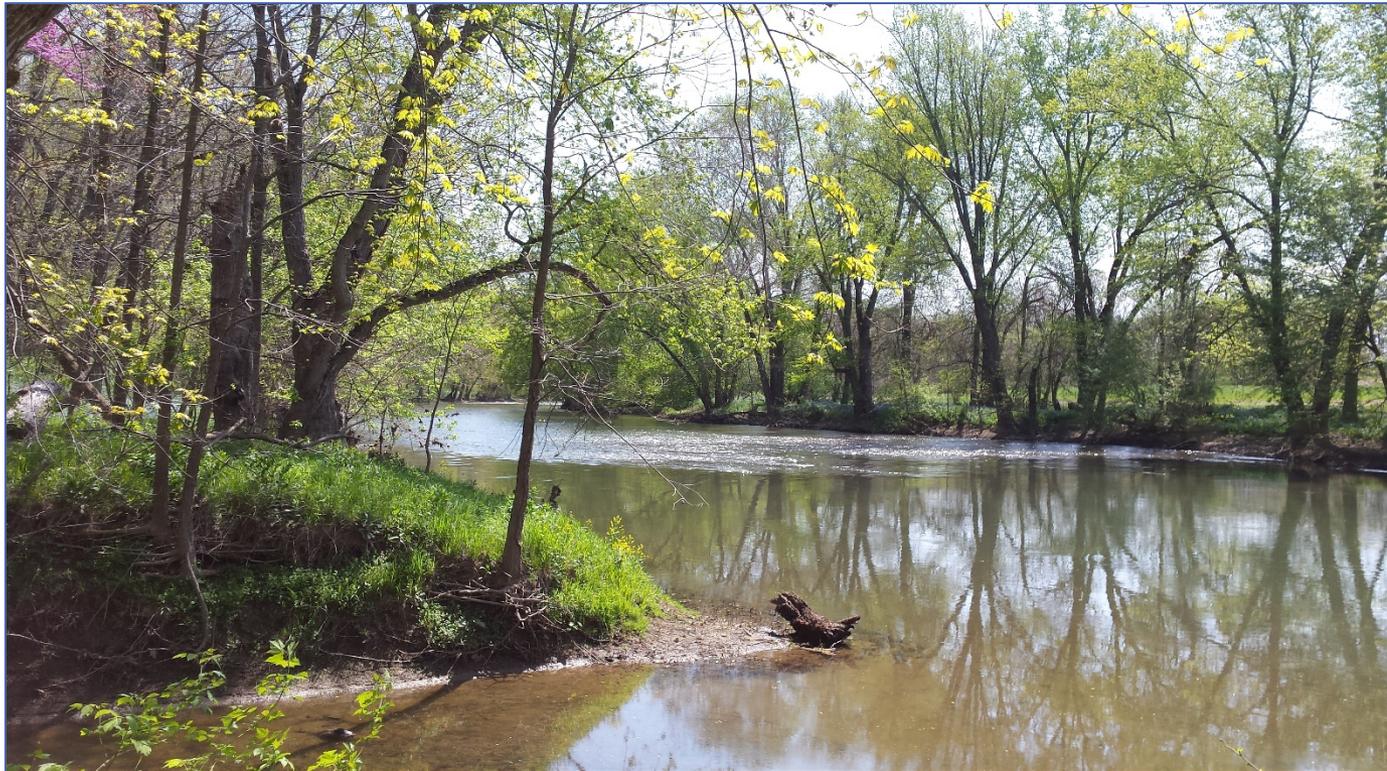
Dickinson

Agenda:

- Connection between citizen science and volunteer monitoring
- What is volunteer monitoring
- Key tools
- Models by water body
- Challenges and strengths
- Opportunities
- Q&A



Citizen Science & Volunteer Monitoring



Thank you Tina Phillips (Cornell Lab of Ornithology) for the Citizen Science images. Thank you Kris Stepenuck (University of Vermont), she surveyed over 380 volunteer monitoring programs nationwide!

“C” Science

- Citizen Science
- Community Science
- Civic Science
- Community-based research
- Informal Science
- Public Participation in Scientific Research
- Participatory Action Research



Citizen Science Models

NSF Funded Report

- Led to AISE or AISL funding tracks
- Framework for classifying citizen science models

Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education

A CAISE Inquiry Group Report
July 2009

Citizen Science Models

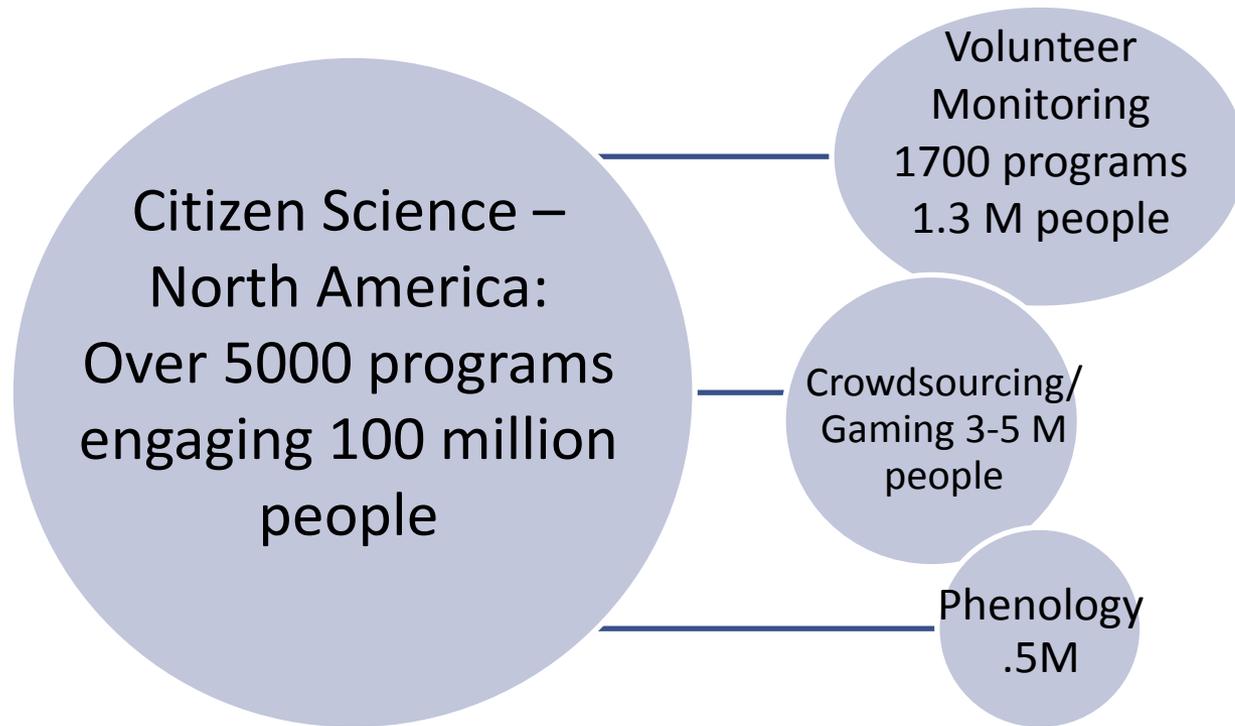
Table 1. Models for Public Participation in Scientific Research

Step in Scientific Process	Steps included in Contributory Projects	Steps included in Collaborative Projects	Steps included in Co-created Projects
Choose or define question(s) for study			X
Gather information and resources			X
Develop explanations (hypotheses)			X
Design data collection methodologies		(X)	X
Collect samples and/or record data	X	X	X
Analyze samples		X	X
Analyze data	(X)	X	X
Interpret data and draw conclusions		(X)	X
Disseminate conclusions/translate results into action	(X)	(X)	X
Discuss results and ask new questions			X

X = public included in step; (X) = public sometimes included in step

² The authors are not implying that all scientific research includes all of these steps or that there is a defined “order” to scientific investigation. Rather, we articulate these steps to outline a range of common research activities in which members of the public might participate.

Citizen Science (umbrella of networks) & Volunteer Monitoring (pillar network)

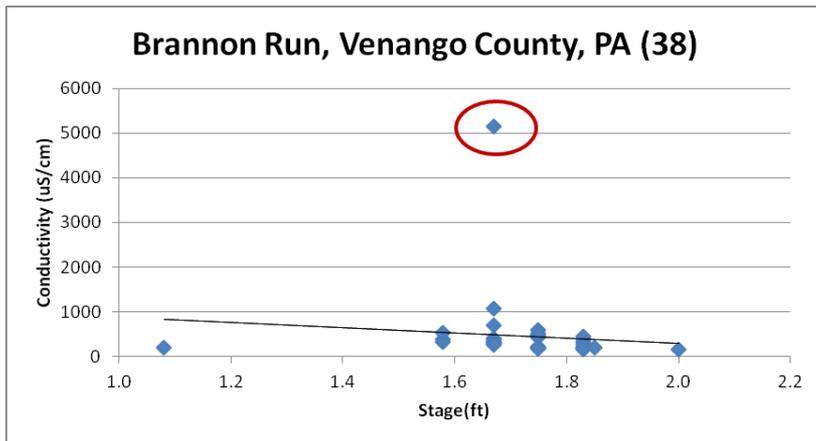


Shared Goal: Collect data that make an impact.

Where does aquatic citizen science or volunteer monitoring fit in?

Current research by Cornell Lab of Ornithology...

- Data use by many entities including the volunteers
- Strong quality assurance measures



Matching appropriate data with policy goals



Water monitoring one of the key examples

www.wilsoncenter.org/sites/default/files/clearing_the_path_eli_report.pdf

Big picture – National Volunteer Monitoring

- Citizens involved in data collection
- US: 1968 – 2016
- 48 out of 50 states have active programs
- Over 1,700 programs
- 1.3 M people

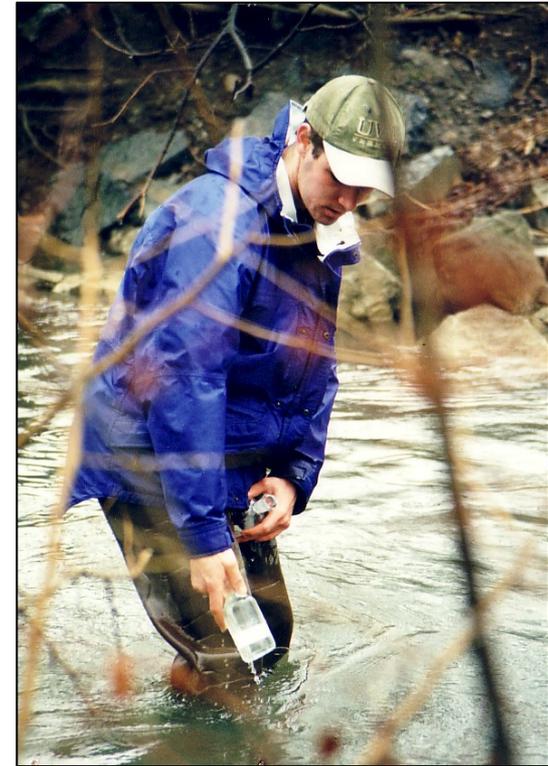


TEXAS STREAM TEAM



History of Volunteer Monitoring

- Oldest program (1968)
- Water Quality Act (1987) – emphasized public involvement



Clean Water Act:

“assemble and evaluate all existing and readily available water quality-related data and information.” Including data “for which water quality problems have been reported by local, state, or federal agencies; members of the public; or academic institutions.”

History continued...

- 1990s & 2000s – federal funding to support, thank you EPA and USDA!
- Increase in past 20 years
 - 1994 – 517 programs
 - 1998 – 800 programs
 - 2009 – 900 programs
 - 2015 – 1675 programs



Big Picture

NWQMC - Volunteer Mon x

acwi.gov/monitoring/vm/programs/vm_map.html

Apps Dickinson College Gateway

- Publications
- Webinars
- Partners
 - Volunteer Monitoring
 - State and Regional Councils
 - Success Stories
- Meetings
 - Meeting minutes
 - ACWI meeting schedule
 - Other meetings of interest
- Members
 - Calendar
 - Sharepoint

2. The US EPA's [National Directory of Volunteer Monitoring Programs](#). Please consider listing or updating your group's information in this EPA directory by contacting [Alice Mayjo](#).

The MAP LEGEND is in the top, left corner of the map. There you will find the ORANGE circles represent monitoring programs and the GREEN diamonds represent monitoring subprograms.

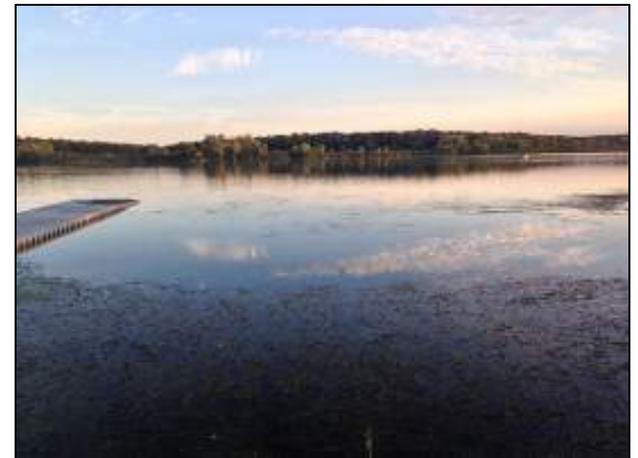
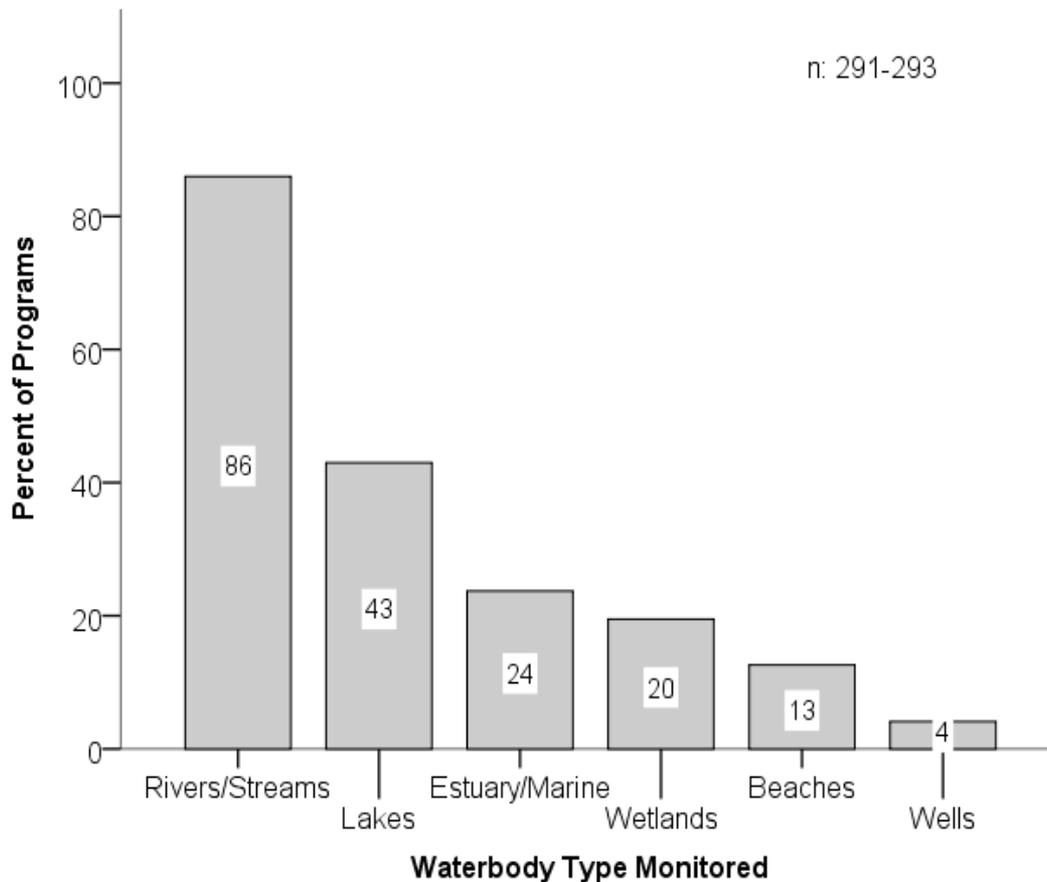
View Larger Map

POWERED BY esri

Missing Nevada and North Dakota.

Type of Water Body Monitored by Volunteers

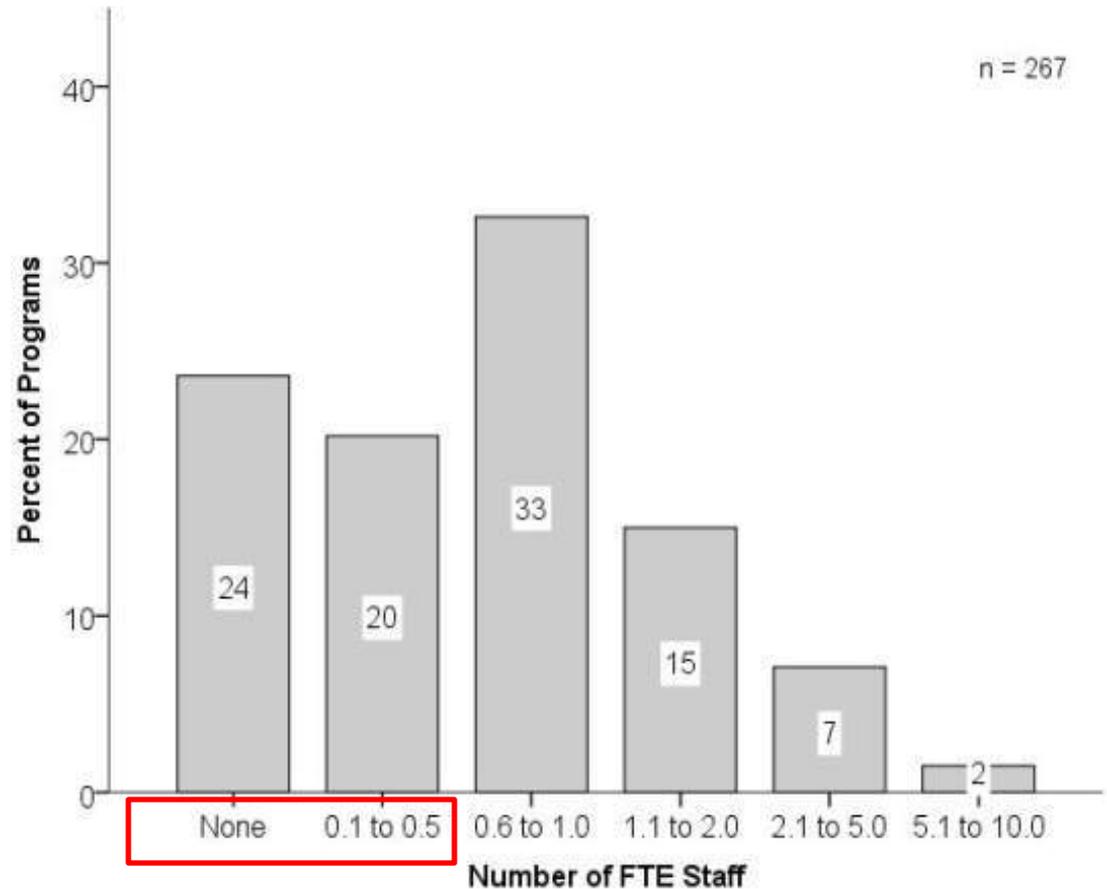
Most monitor rivers/streams and lakes.



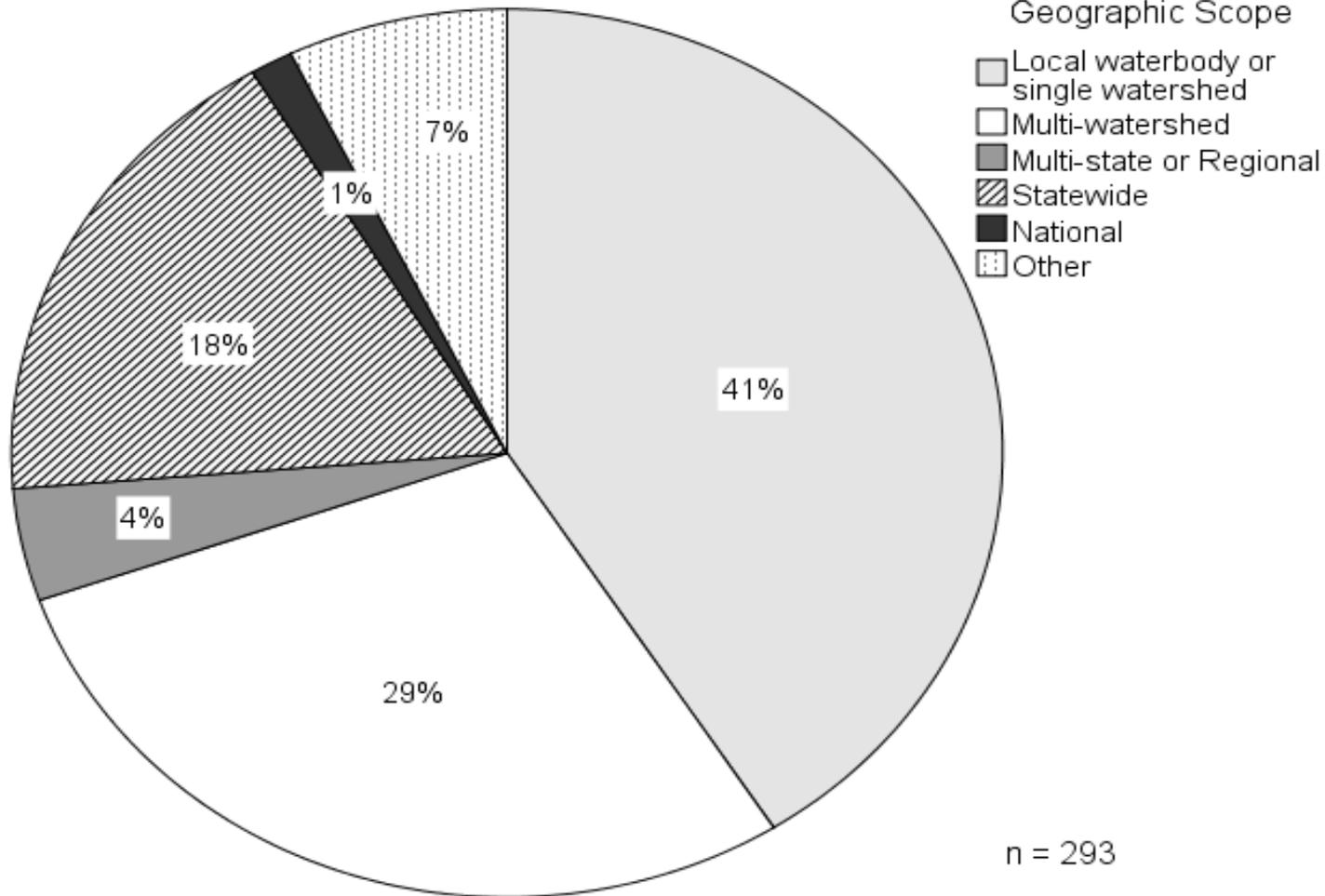
Images: Kris Stepenuck and Joanna Griffin

Program size

- Of 1700 Support >1300 sub-programs
- Huge range of sizes
 - 1-5500 sites (114 sites on average)
 - 2-10,000 volunteers/year (377 on average)
 - 1-10 full time staff (1 on average)



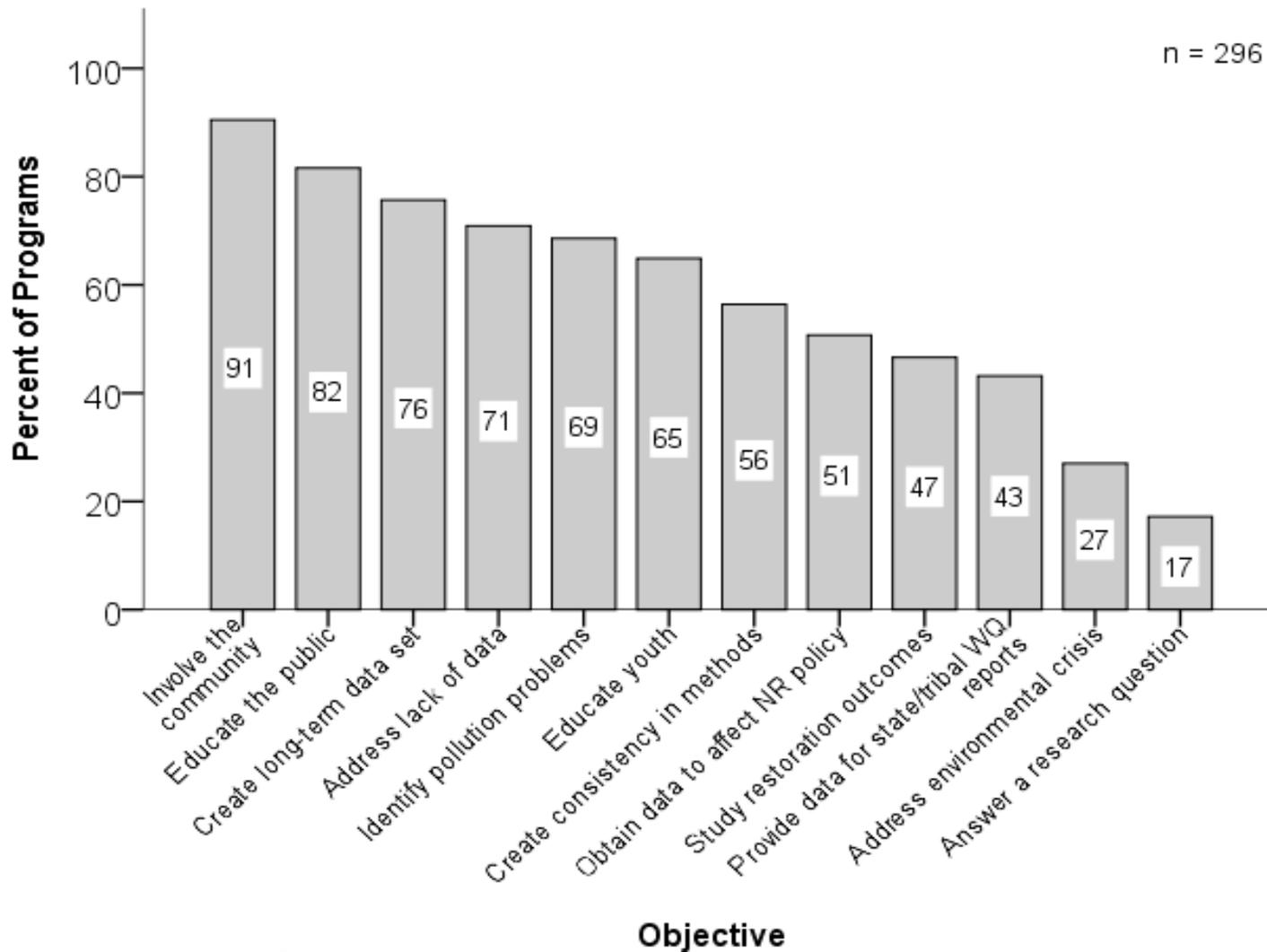
Geographic scope



Most operate in a single watershed

Kristine Stepenuck, PhD

Program objectives



- Wide variety of objectives
- 8% entirely school-based

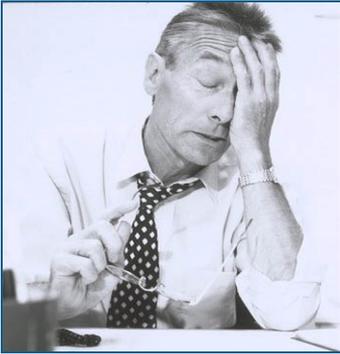
Kristine Stepenuck, PhD

Program Structure– Role of Service Provider

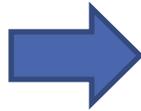
- State agency coordinator
- State contracted/funded coordinators
- Extension
- NGO Service Providers



Technical Support Model



Community Concern



Technical Assistance -
Study Design/QAPP



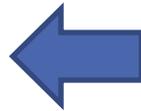
Monitoring trainings



Data collection &
quality verification



Data interpretation



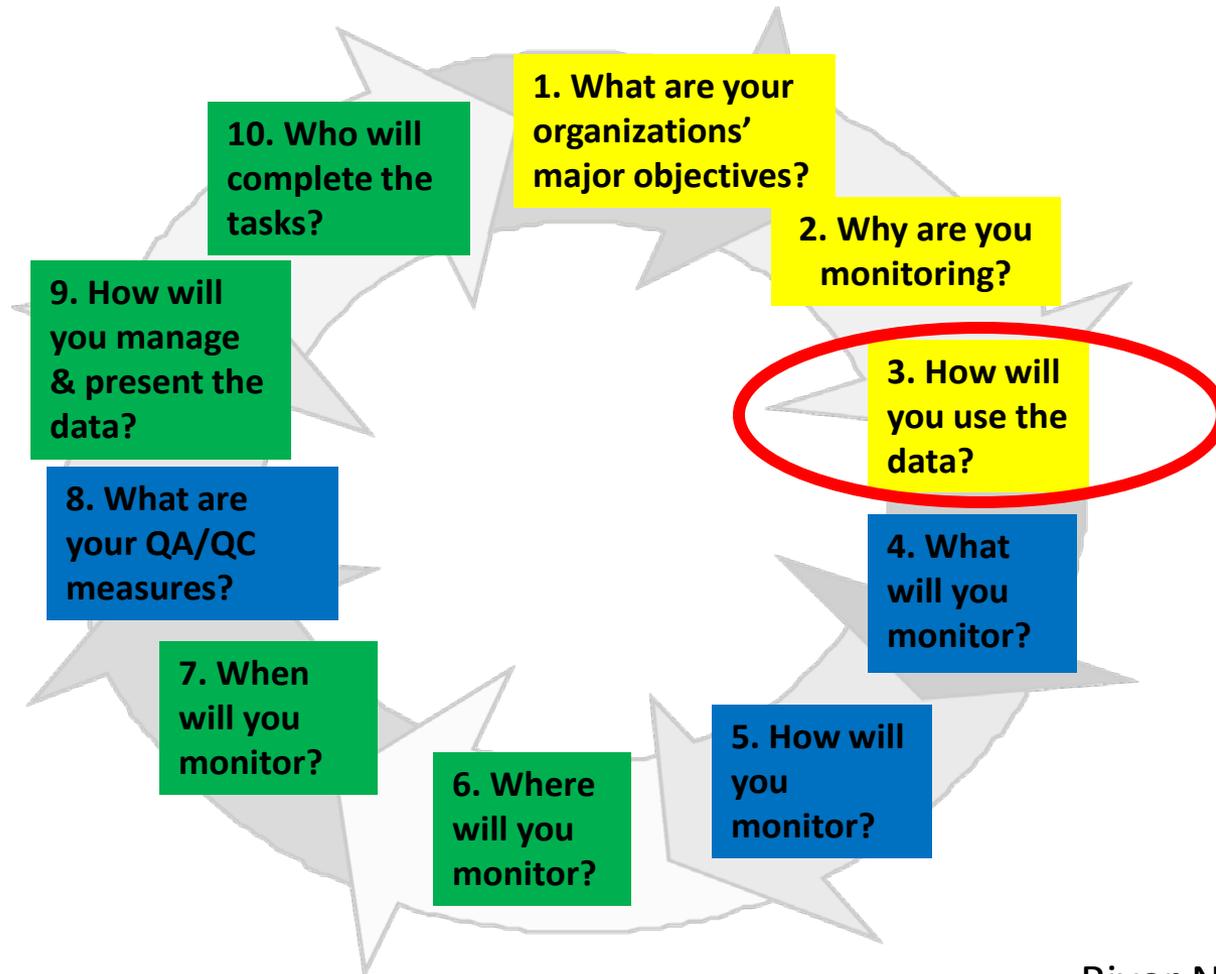
Communities use data to
protect and restore
waterways

Monitoring Mantras

- All data of known quality have use
- Must match intended use with quality of data collected



Tools - Study Design Process



Continuum of VolMon Data Use

Education/
Awareness



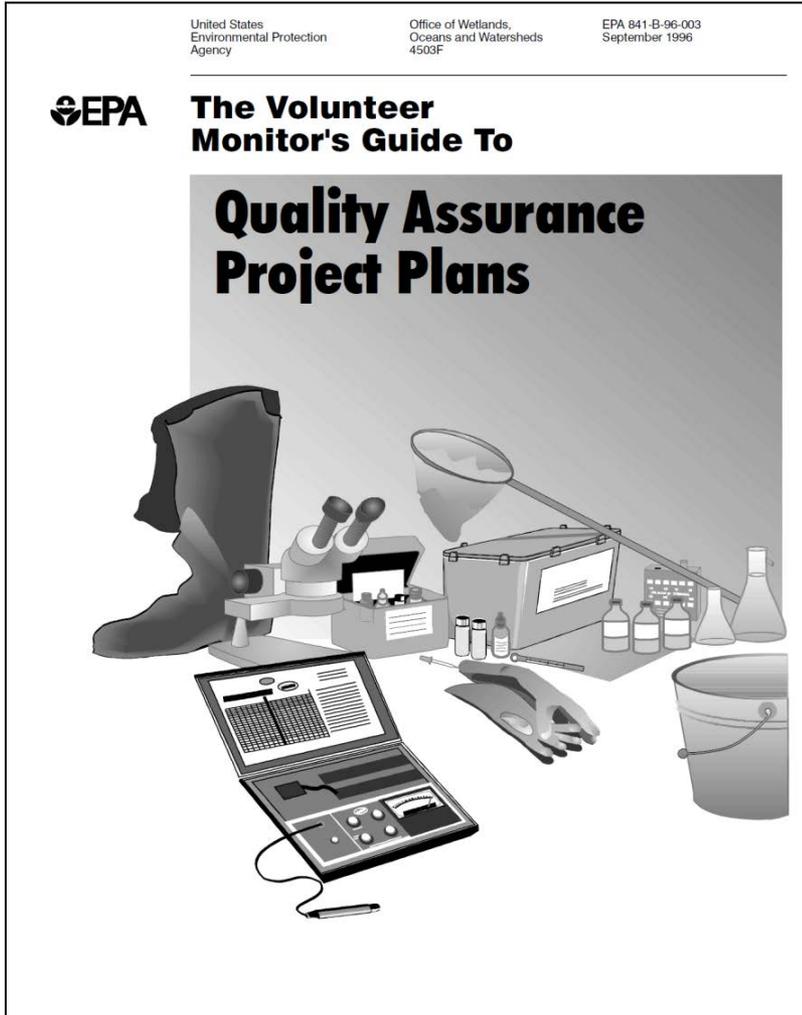
Assess
Impairment



Legal &
Regulatory



Tools – EPA VolMon QAPP

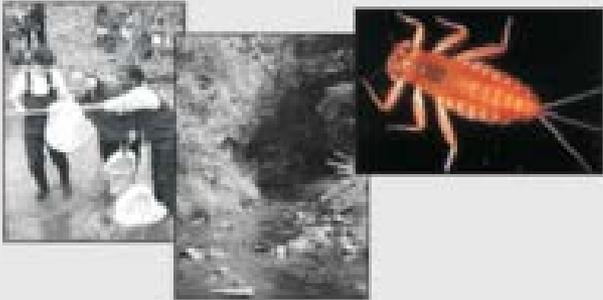


Models of Volunteer Monitoring



Streams & Rivers – Collectors Model

**MARYLAND STREAM WADERS
VOLUNTEER
STREAM MONITORING MANUAL**



**MARYLAND DEPARTMENT OF NATURAL RESOURCES
MONITORING AND NON-TIDAL ASSESSMENT DIVISION**

**1-877-620-8DNR x8623
email streamwaders@dnr.state.md.us**

 **MARYLAND**
DEPARTMENT OF
NATURAL RESOURCES

CHESAPEAKE BAY AND
WATERSHED PROGRAMS
MONITORING AND
NON-TIDAL ASSESSMENT



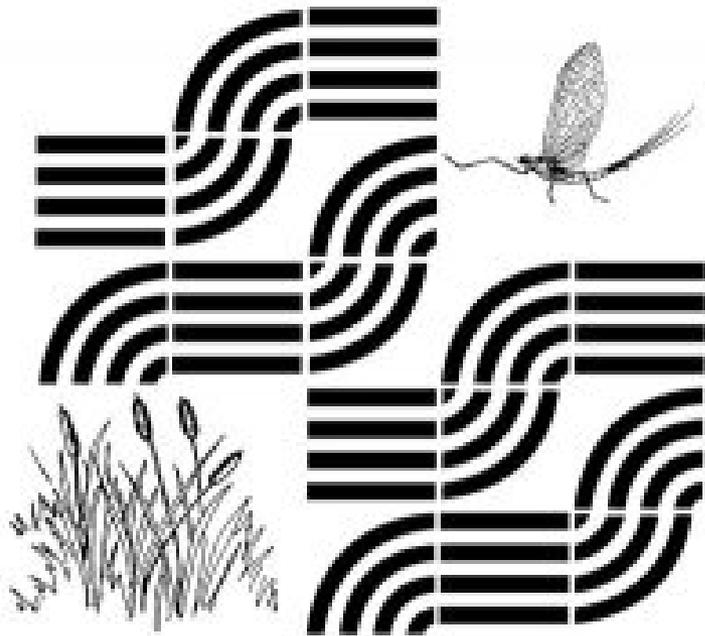
Revised January 2008



Phosphorus Monitoring Program

Streams & Rivers – Standardized Programs

Volunteers collect samples and analyze

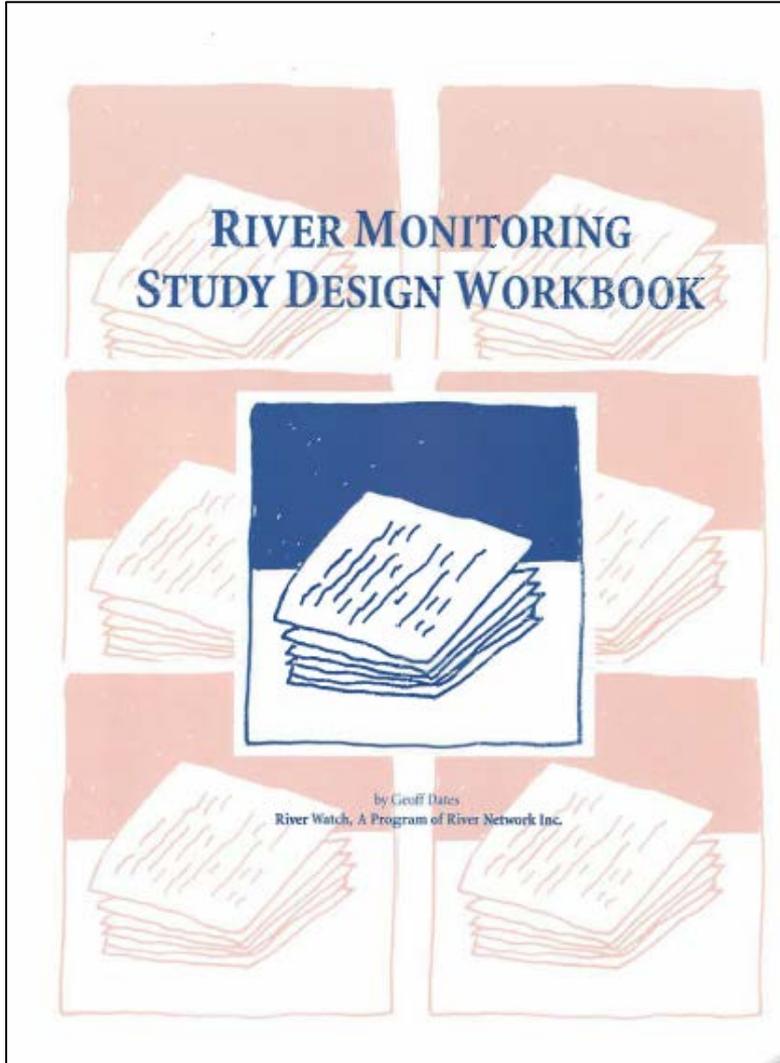


Georgia Adopt-A-Stream

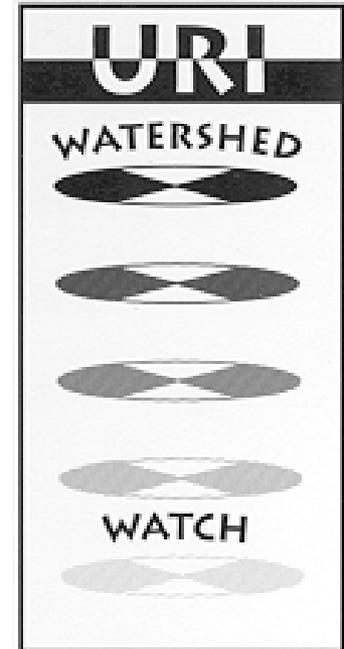


Streams & Rivers – Co-Created Approach

Volunteers do all steps of scientific process



Lakes, Estuaries – Hybrid Field and Certified Lab



Oceans – work with certified lab or build your own lab



Data Use Tools – Tiered Frameworks

Level	Appropriate Data Uses	QA/OC Protocols
III	<ul style="list-style-type: none"> List or delist waters on the 303(d) Impaired waters list Assesses waters for 305(b) Report Use with DEQ data for TMDL development All uses listed in Levels I and II 	<ul style="list-style-type: none"> DEQ-approved Quality Assurance Project Plan and field or lab SOPs. Field and/or laboratory audit required. Group provides calibration and quality control associated information to DEQ when submitting data. This information must meet the specific criteria stated in the QAPP.
II	<ul style="list-style-type: none"> Identify waters for DEQ follow up monitoring Track performance of TMDL implementation All uses listed in Level I 	<ul style="list-style-type: none"> DEQ-approved Quality Assurance Project Plan and approved field or lab SOPs At this level, there may be deviation from an approved method if it can be demonstrated that the method collects data of similar quality to an approved method.
I	<ul style="list-style-type: none"> Education Baseline information Notification of Possible Pollution Events Local Land Use Decisions Special Studies 	<ul style="list-style-type: none"> No Quality Assurance Project Plan (QAPP) or SOP required by DEQ. Uniform methodology recommended. QAPP, SOPs and/or lab methods do not meet DEQ quality assurance/quality control requirements. There is no Virginia Water Quality Standard for parameter the method measures.

Data Use Tools – Guidance on data submission and use

Technical Guidance for the Office of Water Quality External Data Framework
09-23-2015



TECHNICAL GUIDANCE FOR THE OFFICE OF WATER QUALITY EXTERNAL DATA FRAMEWORK

PREPARED BY:

Jody Arthur

Watershed Assessment and Planning Branch

Watershed Assessment and Planning Branch

Indiana Department of Environmental Management (IDEM)

Office of Water Quality

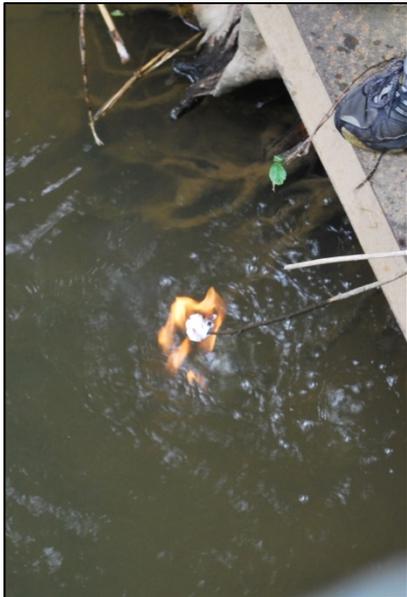
100 North Senate Avenue

MC65-40-2 Shadeland

Indianapolis, Indiana 46204-2251

September 23, 2015

Example of Data Use by Volunteers



Challenges

- Localized programs
 - Types of data
 - Data storage
- No national entity
- Fragmented shared community of knowledge



Strengths - Power of volunteers

- Local connection, buy-in, impact
- Local expertise
- More boots on the ground (e.g. PA)
- Local eyes, ears, voices of waterways



December 2002
Factsheet II
(Updated Nov 2010)



United States Department of Agriculture
National Institute of Food and Agriculture

Why Volunteer Water Quality Monitoring Makes Sense

University of Rhode Island University of Wisconsin

Engages Citizens in Watershed Protection and Enhancement

Assessments of existing volunteer monitoring efforts within Extension¹ suggest that volunteer water quality monitoring programs provide a unique opportunity to engage citizens in watershed protection and enhancement efforts. These programs have a unique capacity to:

- Address Extension program themes
- Help communities make informed decisions and improve water quality
- Capture the excitement and attention of local communities and citizens to water quality issues
- Obtain long-term data or new data on water bodies that otherwise may go unmonitored due to budget or staffing constraints
- Improve exposure of and help direct programming of other Cooperative Extension water quality programs

Kelly Addy, Linda Green, Elizabeth Herron, and Kris Stepenuck
Addresses CSREES Themes

The Cooperative State Research, Education, and Extension Service (CSREES) Water Quality Program, with help from Cooperative Extension (CE) programs of each state and territory, identified eight topical themes for research, education and extension. These themes are: Animal Waste Management, Drinking Water and Human Health, Environmental Restoration, Nutrient and Pesticide Management, Pollution Assessment and Prevention, Watershed Management, Water Conservation and Agricultural Water Management, and Water Policy and Economics. Volunteer water quality monitoring can effectively address each of these themes. Volunteers learn the background to these water quality issues, gather valuable water quality data, and share information with the local community. In addition, volunteers often become involved in watershed management and their data help guide environmental decisions.

Helps Communities Make Informed Decisions and Improve Water Quality

Through monitoring, volunteers learn how the quality of surface and ground water is affected by our actions on the land and how we can protect our water resources. In turn, monitors help to educate the local community on water quality issues, thereby protecting drinking water quality and human health.

Volunteers share their water quality information with conservation commissions, planning boards, and watershed/lake associations.
"We have cooperation with research scientists who help to focus the ideas and train the "watchers" to tell their stories and information." Ann Reid, Great Bay Watch, NH

Volunteers often become local decision makers, serving on these commissions and boards, and even pursuing elected office.
"We have actually seen volunteers proudly list their monitoring activities as a reason to elect them to public office."
Linda Green, URI Watershed Watch, RI



¹ The value of volunteer water quality monitoring was assessed in two USDA CSREES projects. The first project, *Assessing the Scope of Cooperative Extension Volunteer Water Quality Monitoring Programs*, took place during 1995-96 and encompassed written and/or oral interviews with CE State Water Quality Coordinators and individual CE-sponsored program coordinators. The second project, *National*

Outcomes... VolMon = Change

- Education
- Personal behavior change
- Increased civic engagement
- Community education
- Local/county government
- Strengthened collaborations
- State/federal agency data use

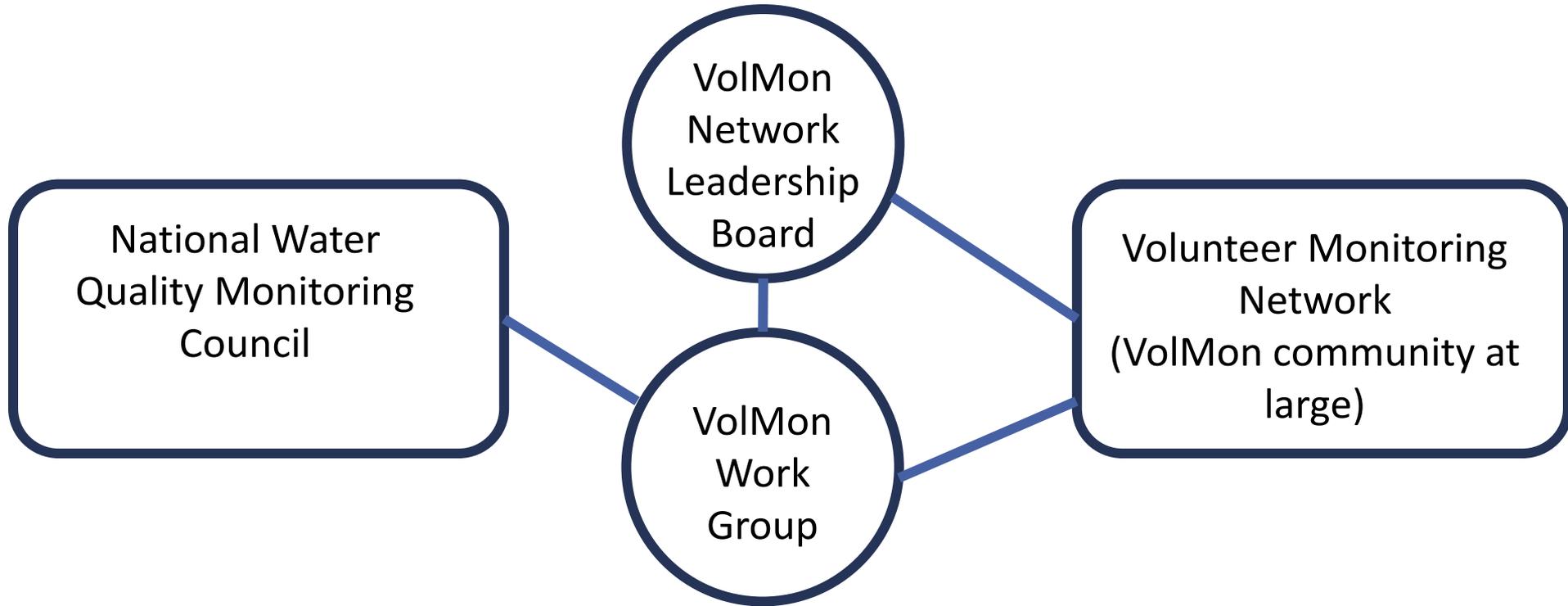


Opportunities

- Research!
- Guide to Volunteer Monitoring (2/2017)
- Citizen Science Association
- NACEPT
- Water Quality Data Collaboration
- Council Work Group



Council Work Group



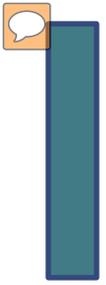


National Advisory Council for Environmental Policy and Technology (NACEPT)

2016 Report

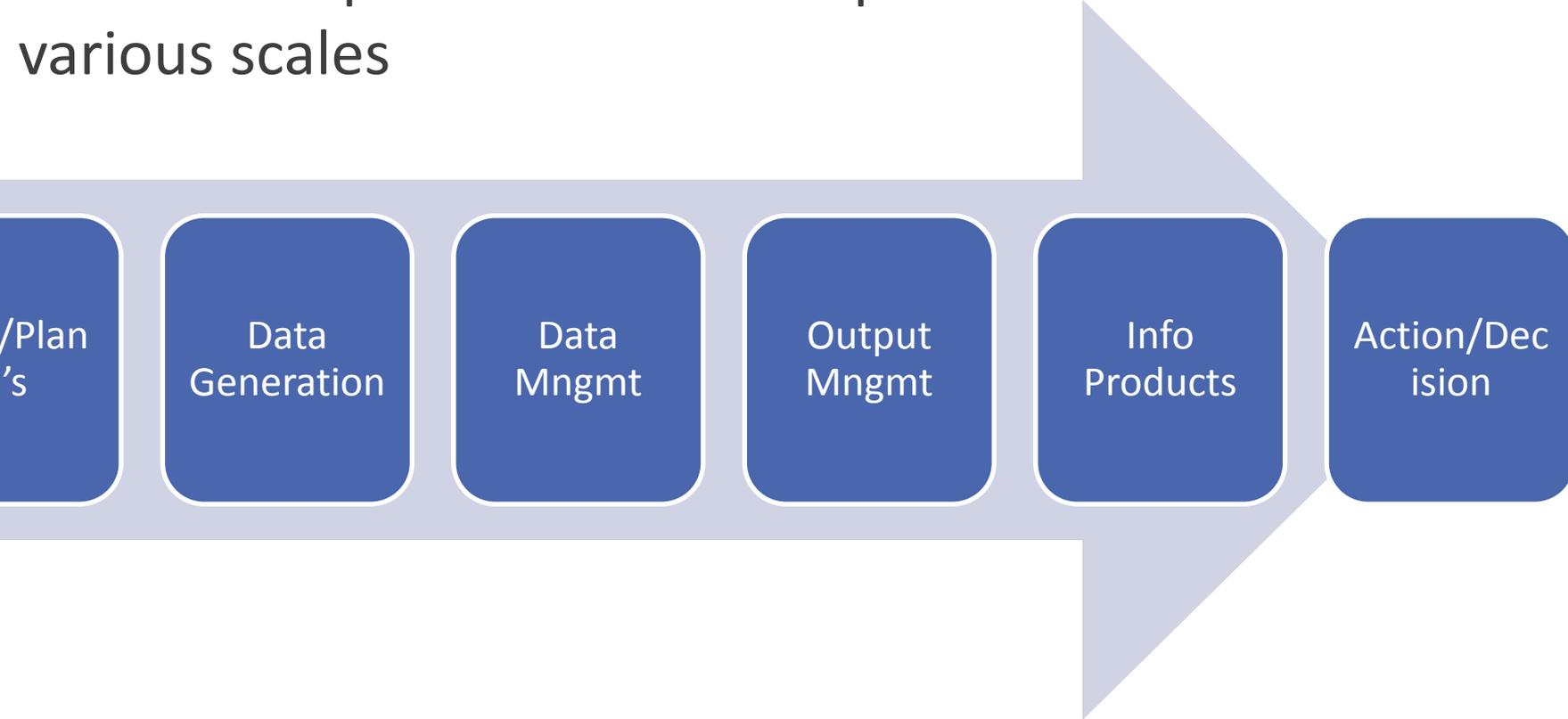
Environmental Protection Belongs to the Public:
A Vision for Citizen Science at EPA

- 
- NACEPT – 2 year committee, EPA asks to research a topic
 - Fall 2016 EPA asked committee to assess EPA's approach to citizen science and how to integrate citizen science into its mission
 - First year report will be presented on December 13th (pre election plans) to EPA Administrator, Acting Deputy and engage senior staff, along with a discussion
 - Other venues are in motion to publicize report
 - Four high level categories with 13 specific recommendations
 - Barb Horn is on committee and link to report will be provided once available, and briefing if desired



Water Quality Data Collaboration Temporary Name

- Birthed after NWQMC Conference
- Solve multiple issues for multiple entities at various scales



Need/Plan
/?'s

Data
Generation

Data
Mngmt

Output
Mngmt

Info
Products

Action/Dec
ision



VM Study
Design Training

Get Portal used
more

EPA leader in CS

Address data
quality

**Water Data Collaboration
To Address**

VM/CS want data
used

Output Info Product
Community

Multiple challenges

See VM station
info

Involving 11 + Entities

Data input manage
community

Access ALL data,
determine Quality

NWQMC Vol
Mon- Network

- 
- Looking for NSF and/or Data Exchange funds next fall
 - Group working on concept details

Those involved:

- NWQMC – Danielle, Julie, Mary
- EPA – Dwayne and Laura
- CSU – Erams, One Water Solutions
- River Network – Adam Griggs, Nicole Silk
- Leonard Rice – Consultants
- Open environment. Org, open waters

Barb Horn leading the charge at this point

Questions?

