

# Getting Going in Community-based Water Monitoring

Linda Green

Kris Stepenuck & Elizabeth Herron

Building Bridges: Citizens, Science and Policy workshop  
NALMS, Banff, Alberta November 2016

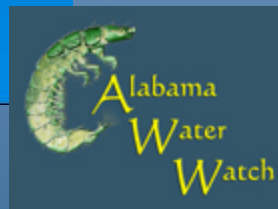
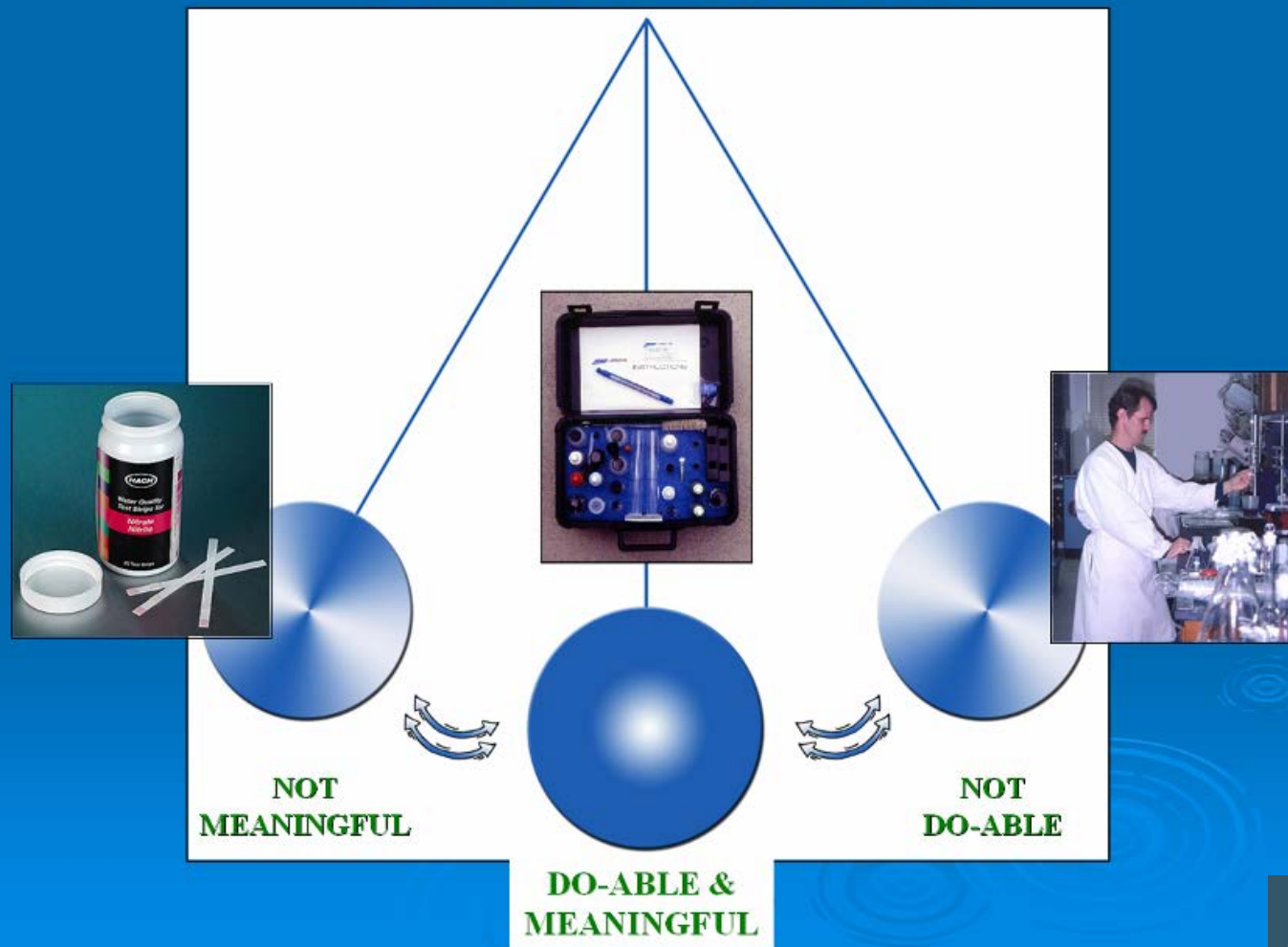


# Successful Programs Make A Difference

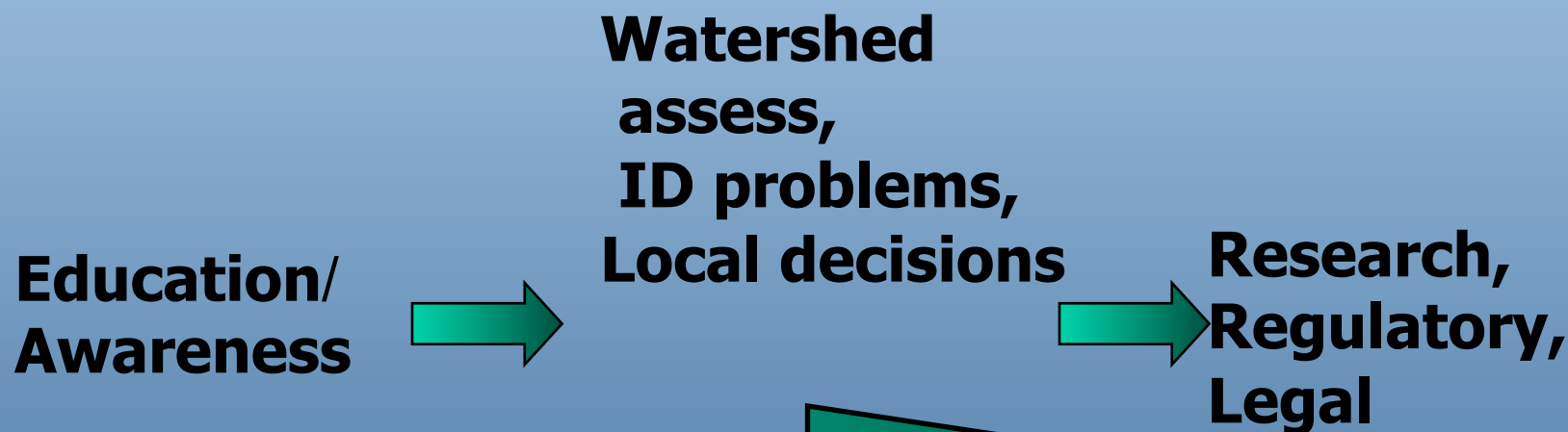
- 💧 Raise **awareness**
- 💧 Involve people in **real science**
- 💧 Create an **informed constituency**
- 💧 Promote individual **actions &/or** community **responsibility**
- 💧 Provide info on places **where** **sometimes no one else is looking**
- 💧 Identify & address **local problems**



# ***The AWW Approach***



# Continuum of Volunteer/CB Monitoring



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



# Continuum of Volunteer/CB Monitoring



**Education/  
Awareness**



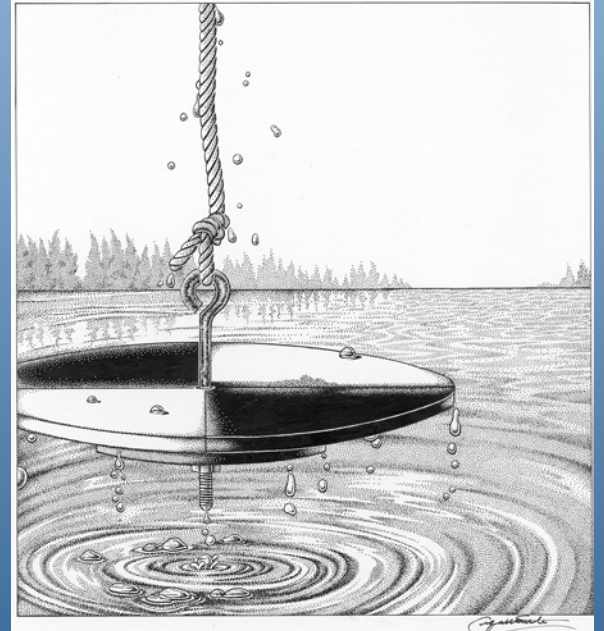
**Watershed  
assess,  
ID problems,  
Local decisions**



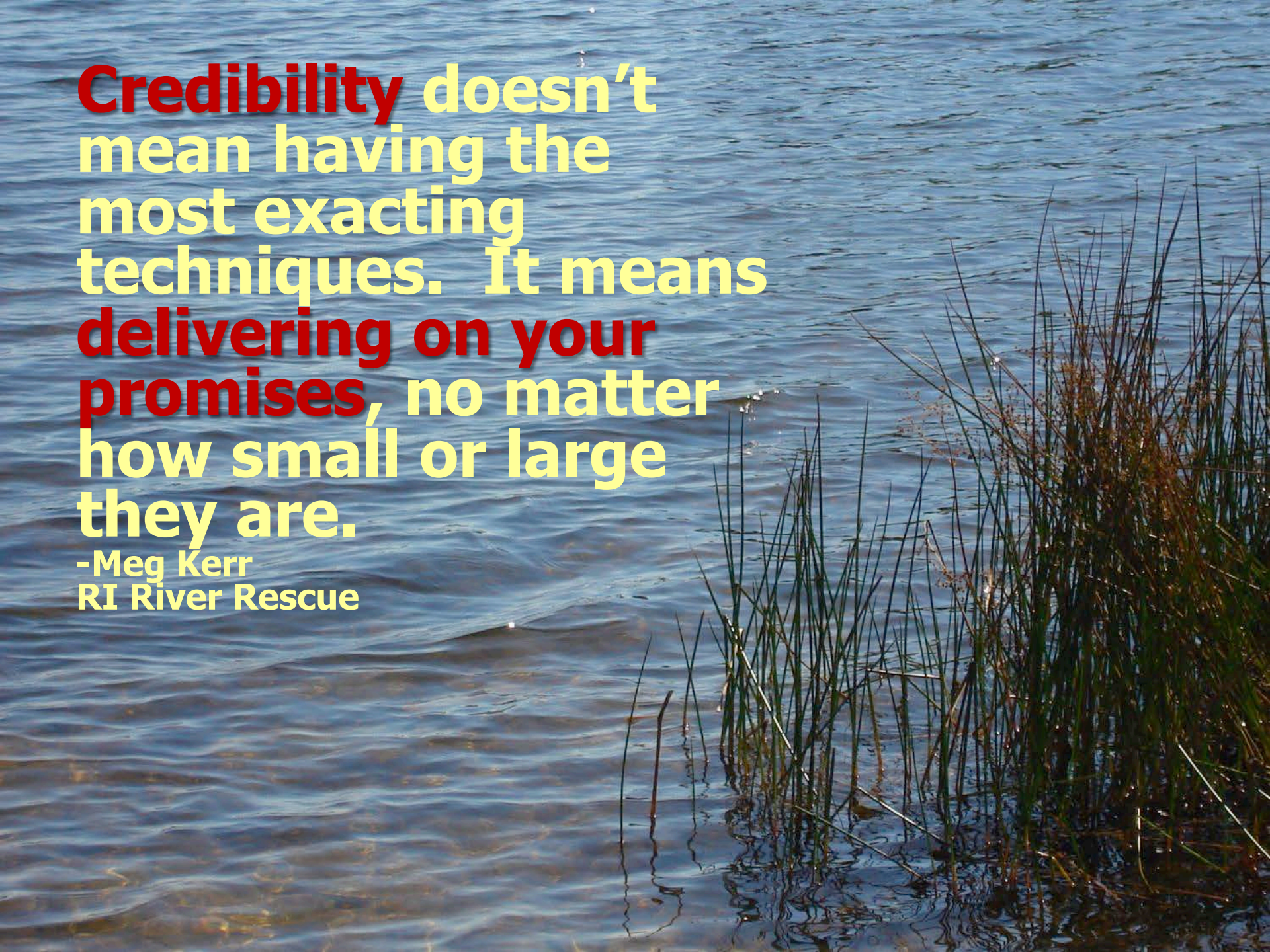
**Research,  
Regulatory,  
Legal**

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

# Most Widely Used Monitoring Tools?





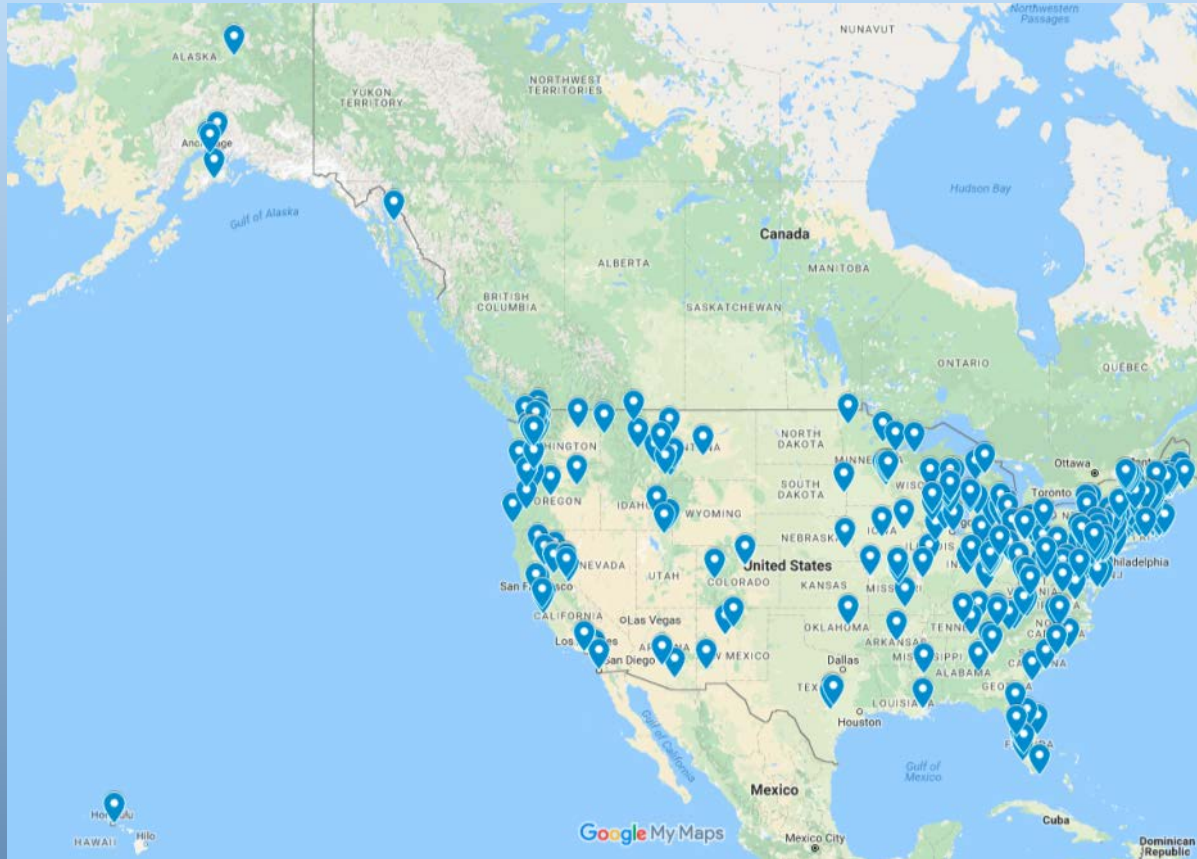


**Credibility** doesn't  
mean having the  
most exacting  
techniques. It means  
**delivering on your  
promises**, no matter  
how small or large  
they are.

-Meg Kerr  
RI River Rescue



# Volunteer Water Monitoring Across the US



**351 stand-alone or parent programs**  
**1675 affiliated programs**

<http://www.volunteermonitoring.org/programs> , 2015



ABOUT PROGRAMS JOBS RESEARCH GUIDE FOR GROWING PROGRAMS RESOURCES CONTACTS


## USA VOLUNTEER WATER MONITORING NETWORK



### Guide for Growing Programs

Volunteer monitoring can be a tremendous asset to water quality and quantity protection and restoration efforts. While volunteers contribute their efforts to these citizen science initiatives for “free,” these cost-effective programs require a great deal of planning and ongoing management. Luckily, many resources have been developed over time that can be shared among programs, helping to build a strong volunteer water monitoring citizen science community across the US and beyond.

A “Guide for Growing Volunteer Monitoring Programs” was developed to help direct program coordinators to many of these useful resources. The Guide is set up as a series of modules (that are chock full of external links) that can be used alone or in conjunction with other sections depending upon the needs of individual programs. Use the links below to access the various modules:



Credit: Robert Korth and UW-Extension Lakes

SEARCH

#### UPCOMING EVENTS

Citizen Science Association Conference, May 17-20, 2017, St. Paul, MN; Call for abstracts open until Oct. 10!

[www.volunteermonitoring.org](http://www.volunteermonitoring.org)

14 years on 12 years of funding (2000 – 2012)

## Guide for Growing Extension Volunteer Monitoring Programs

[Volunteermonitoring.org/guide-for-growing-programs/](http://Volunteermonitoring.org/guide-for-growing-programs/)

### Factsheet Modules

- I. Volunteer Water Quality Monitoring
- II. Why Volunteer Water Quality Monitoring Makes Sense
- III. Getting Started: Finding Resources in the *Guide for Growing CSREES Volunteer Monitoring Programs*
  - a. Additional Resources; b. Matrix of Monitoring Activities
- IV. Designing Your Monitoring Strategy: Basic Questions and Resources to Help Guide You
- V. Training Volunteer Water Quality Monitors Effectively
- VI. Building Credibility: Quality Assurance and Quality Control for Volunteer Monitoring Programs
- VII. Sharing Information Through Internet Exchanges
- VIII. Volunteer Management and Support
- IX. Considerations for Planning Your Program's Data Management System
- X. From the Trenches - Tips and Tools for Better Presentations
- XI. Fundraising for Volunteer Monitoring
- XII. Tools for Effective Outreach
- XIII. Volunteer Monitoring of Bacteria in Surface Waters
- XIV. Bacteria Monitoring in Surface Waters - Methods
- XV. Presenting Bacteria Data Effectively
- XVI. Evaluating Your Volunteer Water Quality Monitoring Program

### Designing Your Monitoring Strategy: Basic Questions and Resources to Help Guide You

University of Rhode Island      University of Wisconsin

Elizabeth Herron, Kris Stepenuck, Linda Green and Kelly Addy

#### Getting Started in Volunteer Water Quality Monitoring?

This factsheet focuses on helping new program coordinators get their programs up and running. Our goal is to provide you with questions to consider, steps to follow, examples of what's worked and direct you to some of the many resources available to assist you in your monitoring efforts.

There are numerous potential monitoring program goals and monitoring activities available to meet those goals. It is essential to accurately identify what you want your volunteer monitoring to accomplish and how you want your data to be used before you consider specifically what and how you want to monitor. In fact, the first step in determining **WHAT** to monitor is deciding **WHY** you want to monitor.

#### Why Extension Volunteer Water Quality Monitoring Programs Got Started

Volunteer water quality monitoring encompasses a wide range of activities, meeting a diversity of needs. Replies to a recent inquiry of Extension-based volunteer monitoring programs provided a variety of reasons for starting a program. They included:

- To create a long term, credible, data set (address need for data), often due to a lack of watershed monitoring by state or other agencies;
- To educate the public about water quality issues;
- To develop and educate youth (school-based and other youth programs);
- To create consistency in methods, data management, and coordinated use of data between basins, volunteer groups, and agencies;
- To address public interest about why and how monitoring is done and what the results mean;
- To foster community involvement with water resources;
- To respond to a crisis in the shellfish industry caused by poor water quality conditions;
- To address concerns about drinking water quality in private wells.

The program design process discussed in this module includes several basic components:

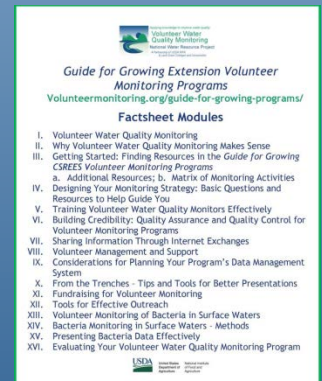
1. defining the question(s) to answer (e.g., is the water safe for swimming?);
2. characterizing how the data will be used (e.g., education or regulatory compliance); and
3. identifying the resources available for accomplishing your goals.



This is the fourth in a series of factsheet modules which comprise the *Guide for Growing CSREES Volunteer Monitoring Programs*, part of the National Facilitation of Cooperative State Research Education Extension Service (CSREES) Volunteer Monitoring Efforts project. Funded through the USDA CSREES, the purpose of this four-year project is to build a comprehensive support system for Extension volunteer water quality monitoring efforts nationally. The goal is to expand and strengthen the capacity of existing Extension volunteer monitoring programs and support development of new groups. Please see <http://www.uswaterquality.org/volunteer/> for more information.

# Soup to Nuts

- 💧 **Introductory factsheets (I-III)**
  - 💧 Background, cheerleading, basics
- 💧 **Start with the End in Mind (IV, VI, XVI)**
  - 💧 Why before what, QA/QC, evaluation
- 💧 **The People in your program (V, VIII, XI)**
  - 💧 Training, Vol mgt/support, fundraising
- 💧 **Broadcasting your message (X, XII)**
  - 💧 Presentation, outreach tips
- 💧 **Monitoring Bacteria (XIII, XIV, XV)**





The background of the slide is a photograph of a body of water, likely a lake or a wide river. The water is a deep blue-grey color with gentle ripples. In the lower right foreground, there is a cluster of tall, thin reeds or grasses, some of which are brown and dry, while others are green. The text is overlaid on the water portion of the image.

**Start With the End in Mind**

**Why are you starting a  
monitoring program?**

# Successful Citizen Science/Volunteer Monitoring Programs are. . .

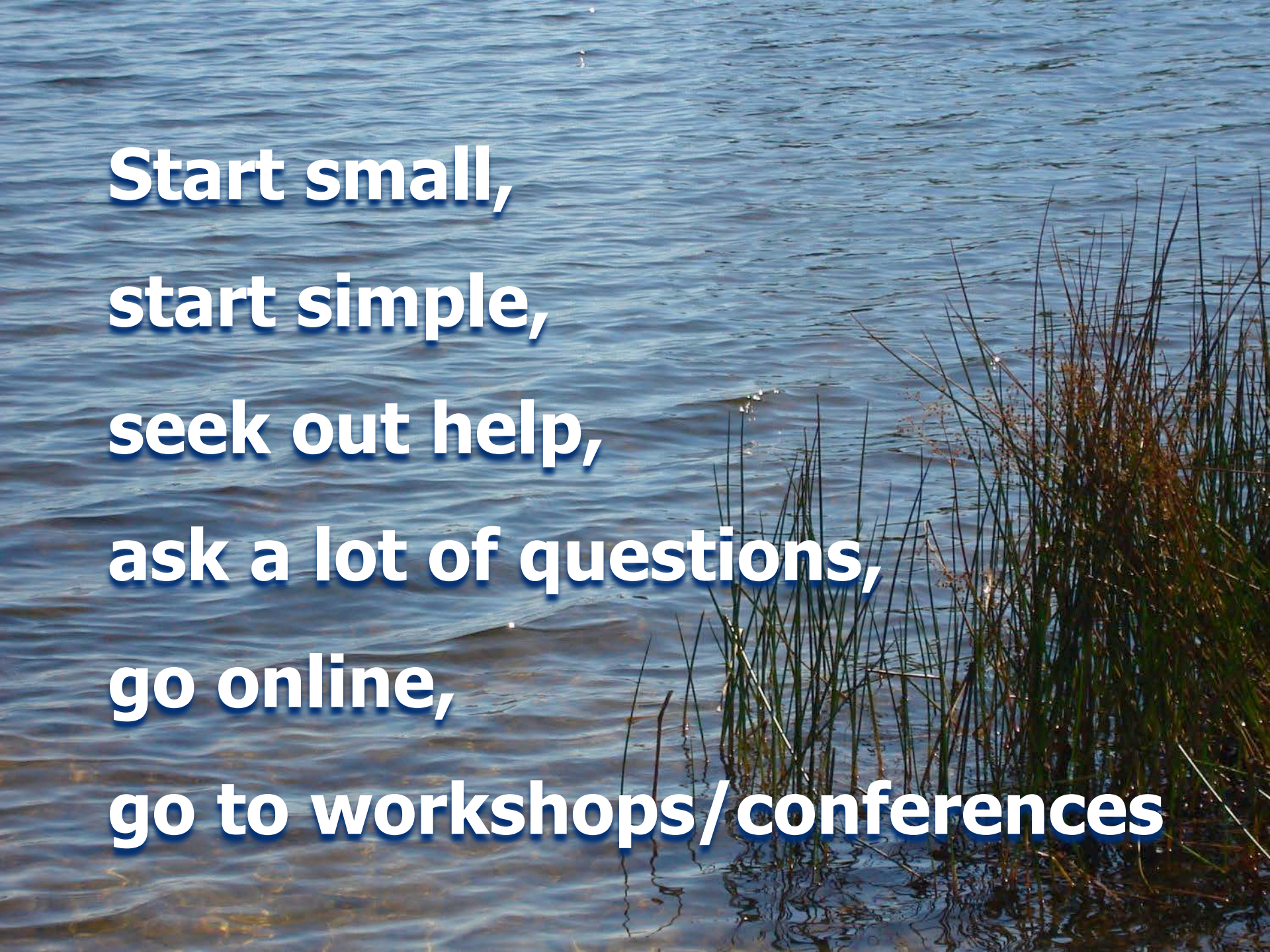
- 💧 **Well-organized**
- 💧 **Sound scientific basis**
- 💧 **Respectful of their volunteers**
- 💧 **Strong organizational support**
- 💧 **Report & use results**
- 💧 **Make a difference**



# **A Sound Scientific Basis means ...**

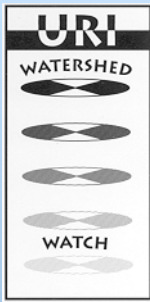
- 💧 **Clear monitoring goals and questions**
- 💧 **Written study design**
- 💧 **Clear documentation of instructions for all monitoring activities**
  - ✓ **Based on established methods!**
- 💧 **Monitoring scope and complexity appropriate to group's capabilities**
- 💧 **QA appropriate to data use**





**Start small,  
start simple,  
seek out help,  
ask a lot of questions,  
go online,  
go to workshops/conferences**

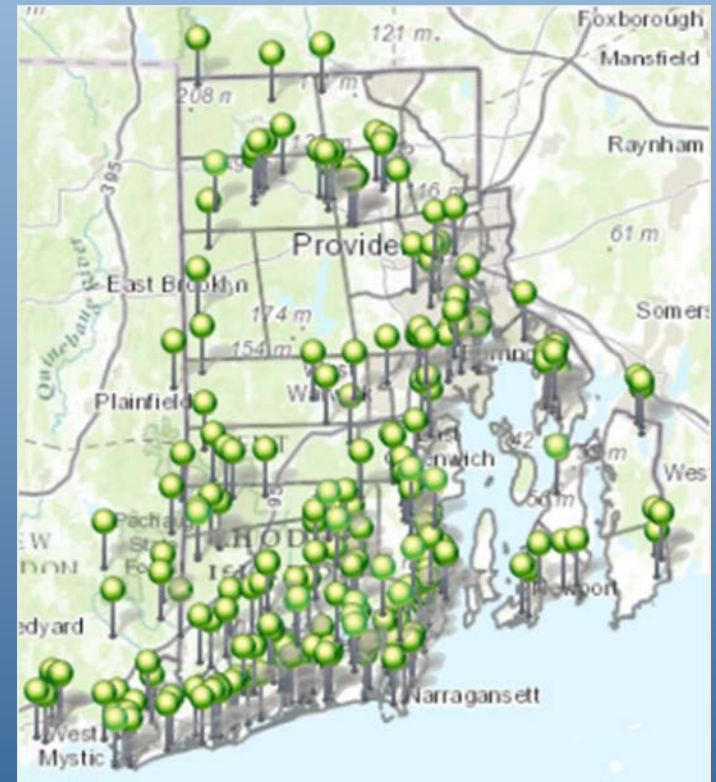
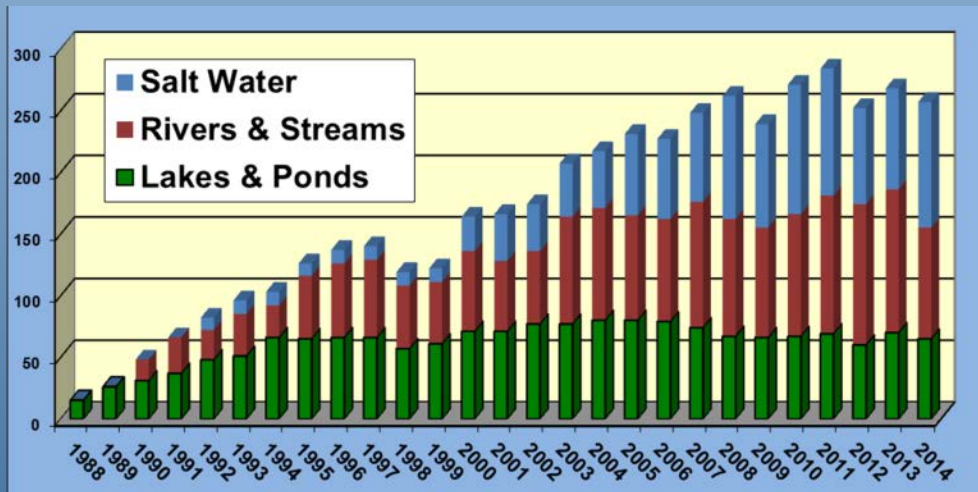




# URI Watershed Watch

*Long term volunteer water quality monitoring*

- 💧 Began in 1988 with 14 lakes in 1 watershed, May - Oct
- 💧 ~350 volunteer monitors, 250+ sites
- 💧 180+ waterbodies
- 💧 2 staff, 4 students



[www.uri.edu/watershedwatch/](http://www.uri.edu/watershedwatch/)

# URI Watershed Watch: Essential Ingredients

- 💧 science-based
- 💧 bottom-up approach
- 💧 involve concerned citizens & orgs.
- 💧 educational, not regulatory
  - long term data source
- 💧 provide good, useful information
- 💧 supportive home org/stable funding
  - 45 sponsors (distributed funding)



# Combination of Field & Lab

## Field monitoring

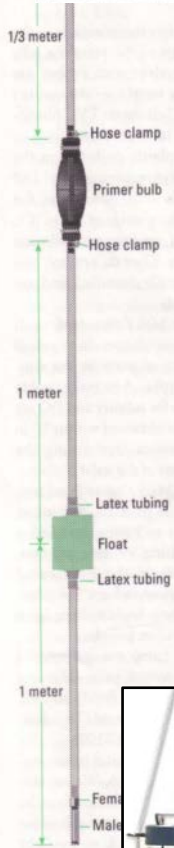
- Water clarity
- Temperature
- Chlorophyll
- Diss. Oxygen
- Salinity
- Recent weather

## Laboratory

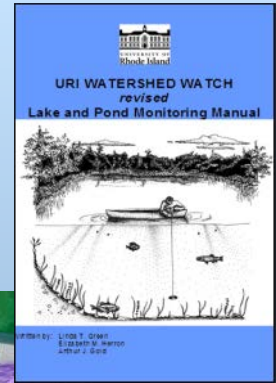
- pH & alkalinity
- Bacteria
  - Enterococci
  - Fecal coliform
- Nutrients
- Chlorophyll

State-certified lab since 2005

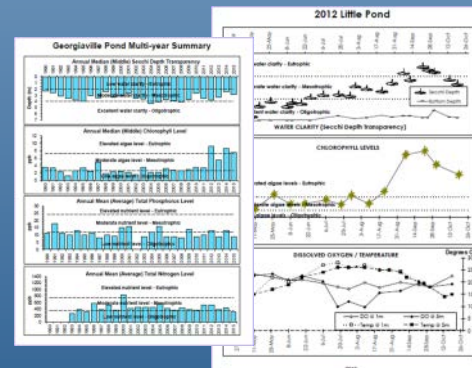
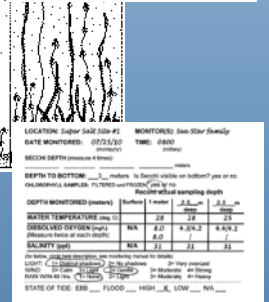
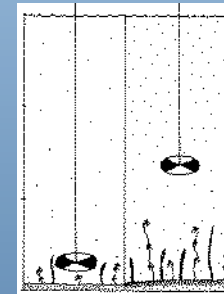




- 💧 Volunteer recruitment
- 💧 Volunteer coordination
- 💧 Volunteer training
- 💧 Monitoring manuals
- 💧 Monitoring supplies
- 💧 Monitoring schedule
- 💧 Analytical services
- 💧 Charts and graphs



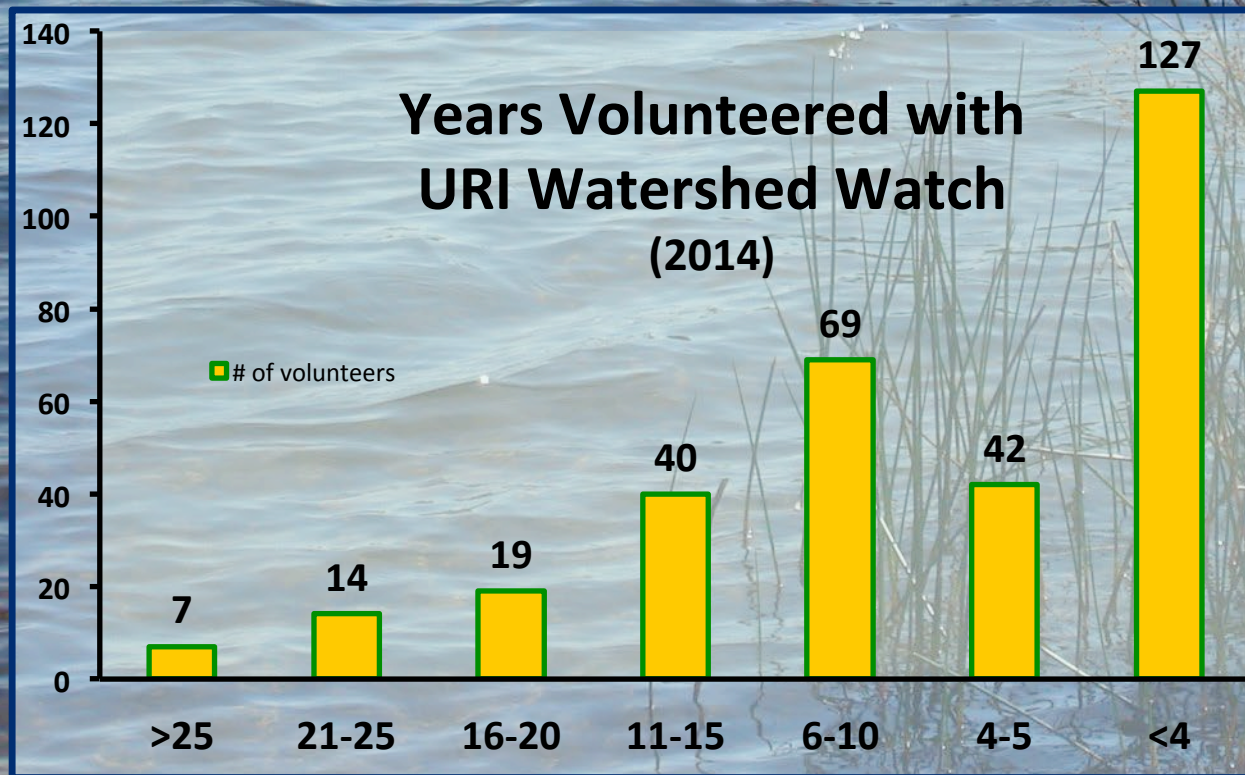
WATER-DEPENDENT NETWORK				
2022 WATER QUALITY MONITORING SCHEDULE				
LAKES, RESERVOIRS, AND POND				
Month	Location	Frequency	Parameter	Notes
April	1	1	Water Quality	Water Quality (Temperature, pH, Dissolved Oxygen, Conductivity, Turbidity, Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Chlorophyll a, Secchi Disk, and Water Color)
May	2	1	Water Quality	Water Quality (Temperature, pH, Dissolved Oxygen, Conductivity, Turbidity, Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Chlorophyll a, Secchi Disk, and Water Color)
June	3	1	Water Quality	Water Quality (Temperature, pH, Dissolved Oxygen, Conductivity, Turbidity, Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Chlorophyll a, Secchi Disk, and Water Color)
July	4	1	Water Quality	Water Quality (Temperature, pH, Dissolved Oxygen, Conductivity, Turbidity, Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Chlorophyll a, Secchi Disk, and Water Color)
August	5	1	Water Quality	Water Quality (Temperature, pH, Dissolved Oxygen, Conductivity, Turbidity, Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Chlorophyll a, Secchi Disk, and Water Color)
September	6	1	Water Quality	Water Quality (Temperature, pH, Dissolved Oxygen, Conductivity, Turbidity, Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Chlorophyll a, Secchi Disk, and Water Color)
October	7	1	Water Quality	Water Quality (Temperature, pH, Dissolved Oxygen, Conductivity, Turbidity, Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Chlorophyll a, Secchi Disk, and Water Color)
November	8	1	Water Quality	Water Quality (Temperature, pH, Dissolved Oxygen, Conductivity, Turbidity, Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Chlorophyll a, Secchi Disk, and Water Color)
December	9	1	Water Quality	Water Quality (Temperature, pH, Dissolved Oxygen, Conductivity, Turbidity, Total Suspended Solids, Total Phosphorus, Total Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Chlorophyll a, Secchi Disk, and Water Color)



LOCATION	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	GEOMEAN
	Most Probable Number of Enterococci per 100 ml. ....						
	See watercolor and data collection data.						
afford	21.8	54.8	114.6	16.4	21.6	79.8	38.6
in	6.2	40.8	43.6	43.6	10	32	38.9
BD	0.7	18.4	145.4	215.2	143.4	-	63.9
the 2	135.4	DRY	DRY	28.9	4.8	48.9	170.7
to Road	11.9	22.2	47.4	167.8	-	10	48.8
Pine Island	40.8	4.2	3.1	75.8	95.2	4.3	30.1
the 2	20.8	20.8	176	50	25.8	-	80.1
bury Lane	43.2	47.8	215.4	64.8	64.8	73	76.6
the Trail	5.2	28.8	30.8	32.4	30	53.9	57.2
noted Rd	31	42.9	356	34.5	31	76.5	75.9
Coyote Pond	86	329	320	54.4	21	117	141
the Dungeness	161	429	320	54.4	21	147.8	140.4
on Waterpark	367	648.8	161.8	216	196.3	67.5	



**People monitor what they care about. They monitor what has meaning to them, otherwise it is an assignment or a task.**





The background of the slide is a photograph of a body of water, likely a lake or a slow-moving river. The water is a deep blue-grey color with gentle ripples. In the lower right corner, there is a dense cluster of tall, thin reeds or grasses that are partially submerged in the water. The text is overlaid on the upper half of the image.

**Volunteer monitoring,  
citizen science, &  
community-based programs  
are  
cost effective – *not* cost free.**





**“We do not use/involve/engage  
volunteers because they are  
worthless ...**

**We do so because they are  
PRICELESS”**

Attribution unknown- *not* L Green



**Thanks!**  
**lgreen@uri.edu**  
**401-874-2905**  
**[www.uri.edu/watershedwatch/](http://www.uri.edu/watershedwatch/)**