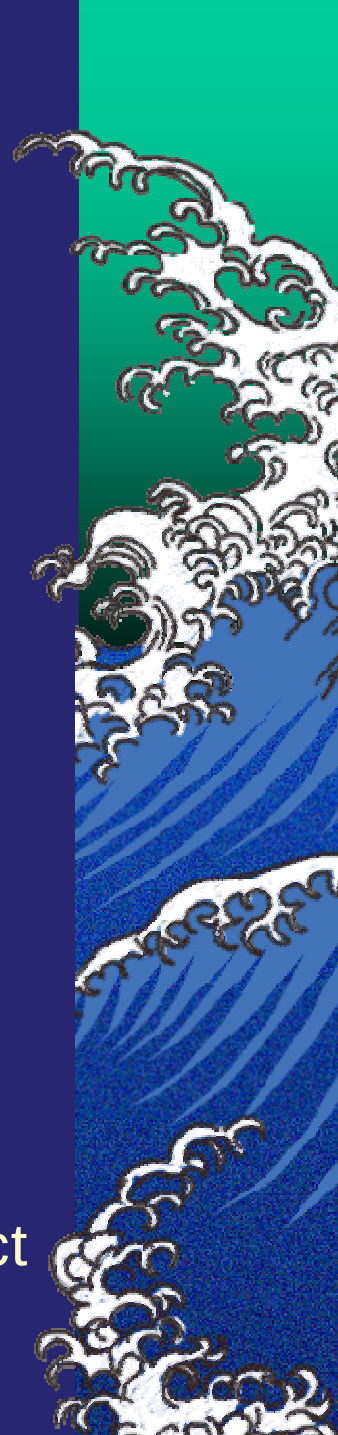
Meeting the Challenges of Volunteer Monitoring

New England Assn of Environmental Biologists
2007 Annual Conference
March 2007

Linda T. Green

URI Cooperative Extension Watershed Watch
New England Regional Water Quality Program
CSREES Volunteer Monitoring National Facilitation Project

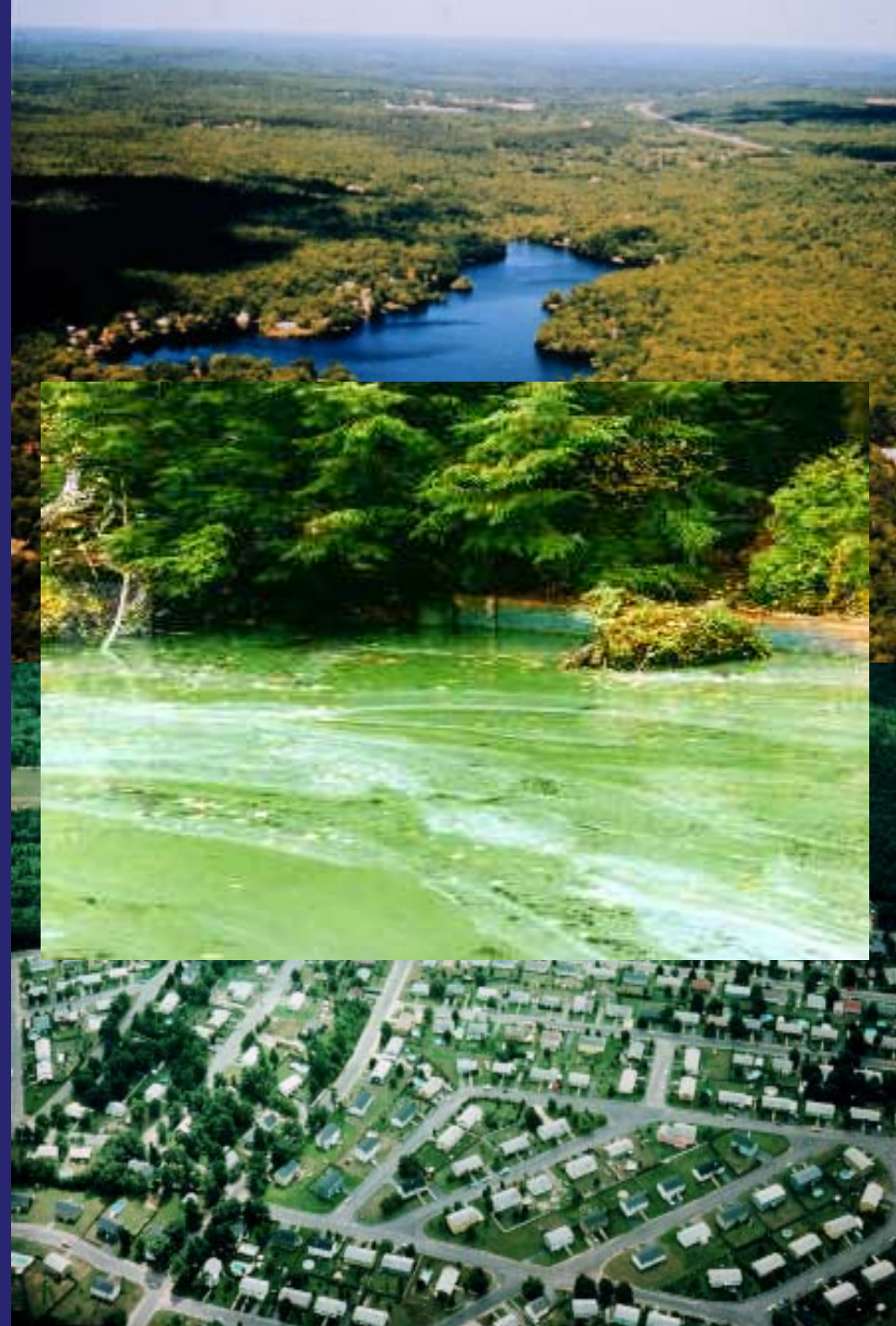


There are challenges?

- Technical-scientific
- Organizational
- Financial

View them as opportunities

WATER QUALITY IS A ***REFLECTION*** OF THE ACTIVITIES IN THE LANDS AND WATERS SURROUNDING AND LYING UPSTREAM OF ANY LOCATION

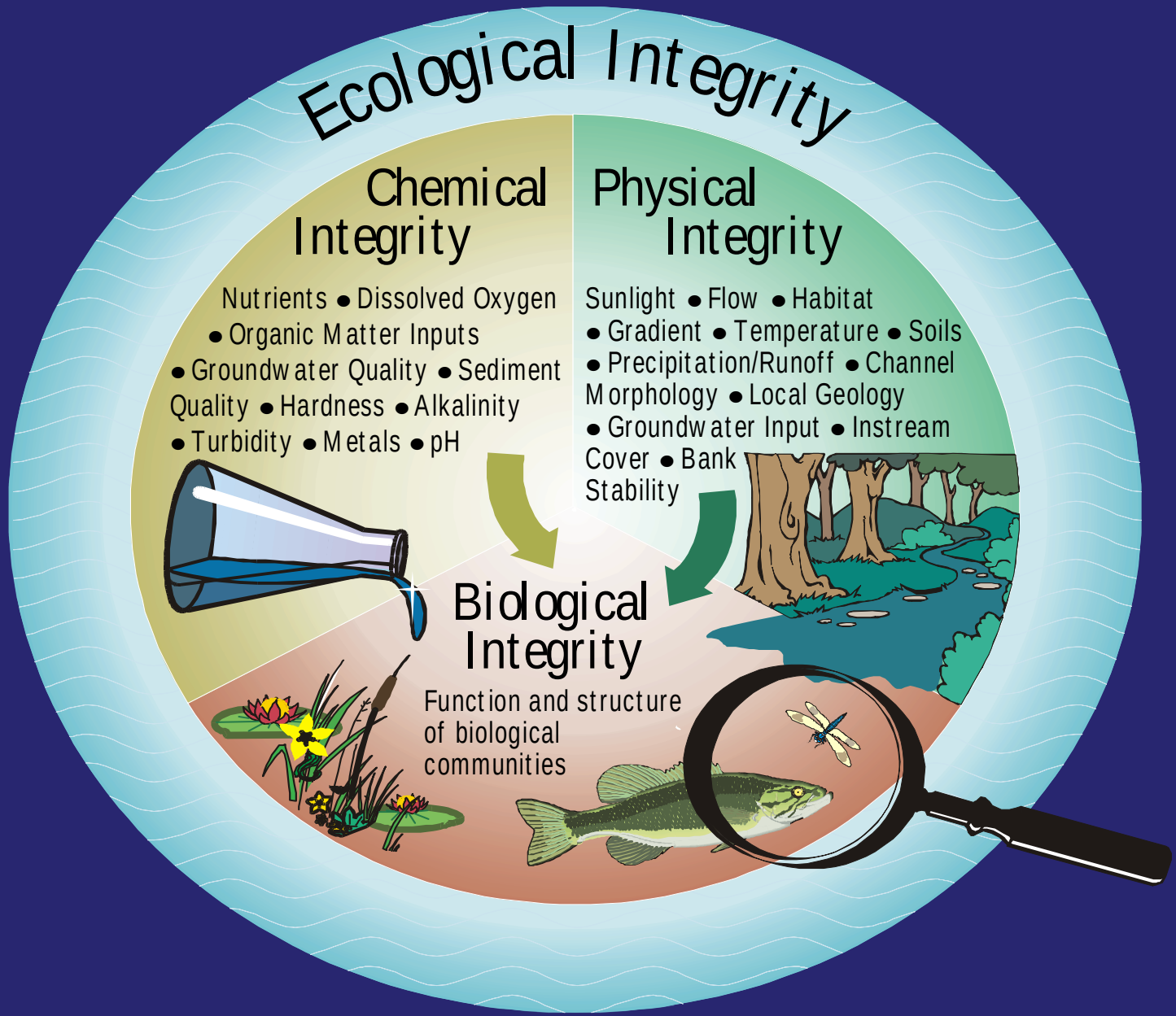


Before the Clean Water Act

Until 1948, water quality management decisions were based primarily on *society's economic and public health priorities*

Federal Water Pollution Control Act (WPCA, 1948)

- **first time that the propagation of fish and other aquatic life was articulated as a stand-alone objective of water resource protection.**
- **federal law recognized the importance of protecting waterbodies and aquatic life for their own intrinsic value, not just for their value to human society.**



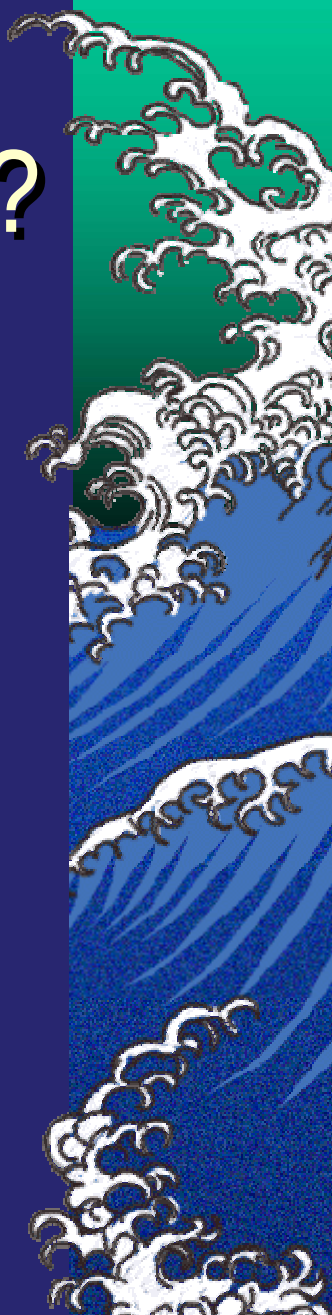
What Is Watershed Monitoring?

Measuring or observing watershed features to:

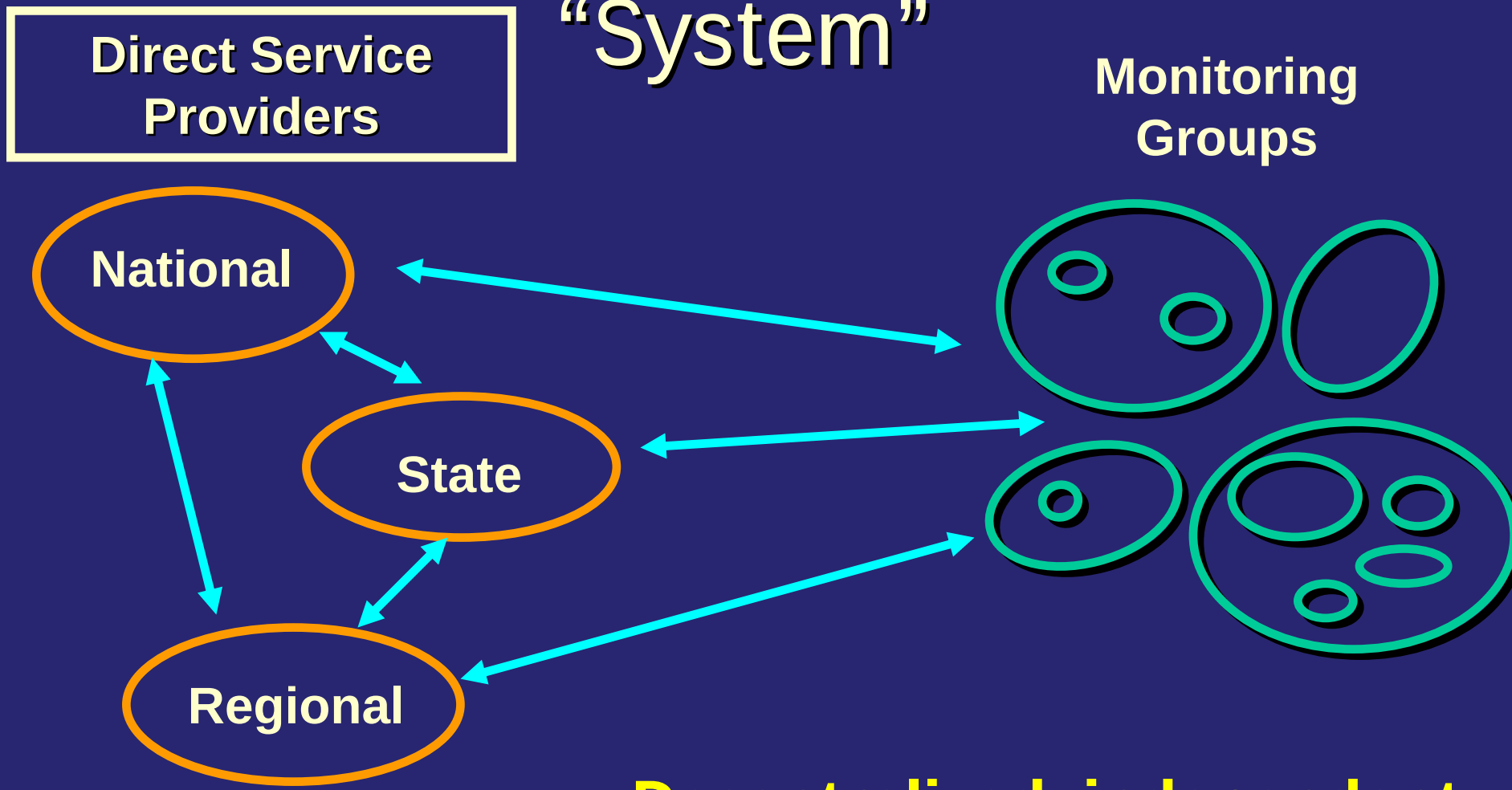
- assess ecosystem health and human use
- detect early warnings of change
- tell us whether we've achieved our management goals
- provide insight into the causes of problems

What Is Volunteer Monitoring?

- Unpaid people who willingly monitor various environments.
- People who watch over the health of their watersheds because they care.

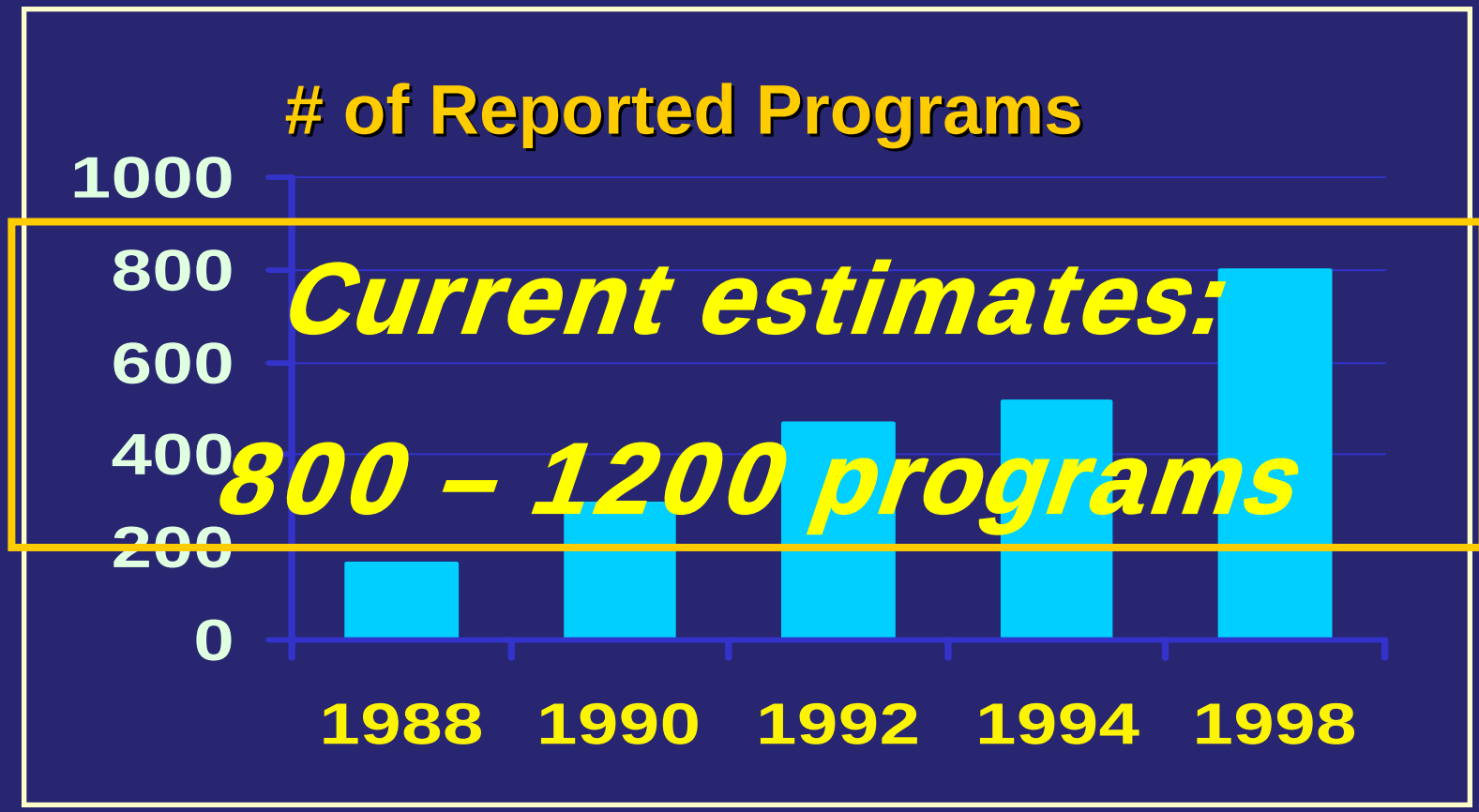


The Volunteer Monitoring "System"



Decentralized, independent

Volunteer WQ Monitoring Came of Age in the 1990s*



* Nat'l Dir. of Envir. Mon. Progs. - 5th Ed.

Characteristics of Successful Volunteer Water Quality Monitoring Programs . . .

- Well-organized
- Sound scientific basis
- Report results
- Strong institutional support
- Make a difference

A Sound Scientific Basis means...

- Clear monitoring goals and questions
- Written study design
- Clear documentation of instructions for all monitoring activities
- Monitoring scope and complexity is appropriate for capabilities
- QA appropriate for data use

National Facilitation Project factsheet: *Designing Your Monitoring Strategy*

Getting Started - Effectively

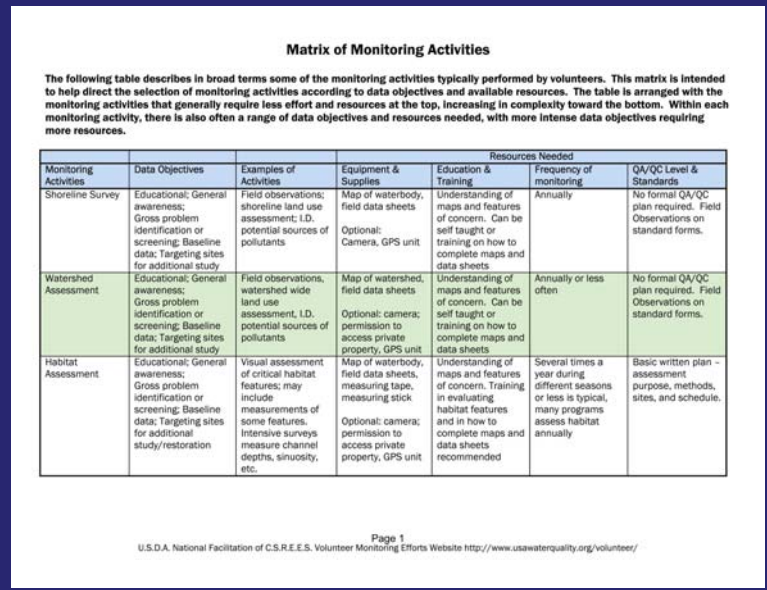
Having a well-defined purpose is critical to program success!

- Brainstorming
- Compiling information
- Assessing what is possible
- Developing a vision statement
- Setting goals and objectives

Assess What is Possible

Consider

- Skills and knowledge
- Financial resources
- Potential data uses and
- Level of commitment



Matrix of Monitoring Activities

The following table describes in broad terms some of the monitoring activities typically performed by volunteers. This matrix is intended to help direct the selection of monitoring activities according to data objectives and available resources. The table is arranged with the monitoring activities that generally require less effort and resources at the top, increasing in complexity toward the bottom. Within each monitoring activity, there is also often a range of data objectives and resources needed, with more intense data objectives requiring more resources.

			Resources Needed			
Monitoring Activities	Data Objectives	Examples of Activities	Equipment & Supplies	Education & Training	Frequency of monitoring	QA/QC Level & Standards
Shoreline Survey	Educational; General awareness; Gross problem identification or screening; Baseline data; Targeting sites for additional study	Field observations; shoreline land use assessment; I.D. potential sources of pollutants	Map of waterbody, field data sheets Optional: Camera, GPS unit	Understanding of maps and features of concern. Can be self taught or training on how to complete maps and data sheets	Annually	No formal QA/QC plan required. Field Observations on standard forms.
Watershed Assessment	Educational; General awareness; Gross problem identification or screening; Baseline data; Targeting sites for additional study	Field observations, watershed wide land use assessment, I.D. potential sources of pollutants	Map of watershed, field data sheets Optional: camera; permission to access private property, GPS unit	Understanding of maps and features of concern. Can be self taught or training on how to complete maps and data sheets	Annually or less often	No formal QA/QC plan required. Field Observations on standard forms.
Habitat Assessment	Educational; General awareness; Gross problem identification or screening; Baseline data; Targeting sites for additional study/restoration	Visual assessment of critical habitat features; may include measurements of some features. Intensive surveys measure channel depths, sinuosity, etc.	Map of waterbody, field data sheets, measuring tape, measuring stick Optional: camera; permission to access private property, GPS unit	Understanding of maps and features of concern. Training in evaluating habitat features and in how to complete maps and data sheets recommended	Several times a year during different seasons or less is typical, many programs assess habitat annually	Basic written plan – assessment purpose, methods, sites, and schedule.

Page 1
U.S.D.A. National Facilitation of C.S.R.E.E.S. Volunteer Monitoring Efforts Website http://www.usawaterquality.org/volunteer/

National Facilitation Project matrix;
EPA Stream Monitoring Methods, p. 42

Main Uses of Volunteer Data

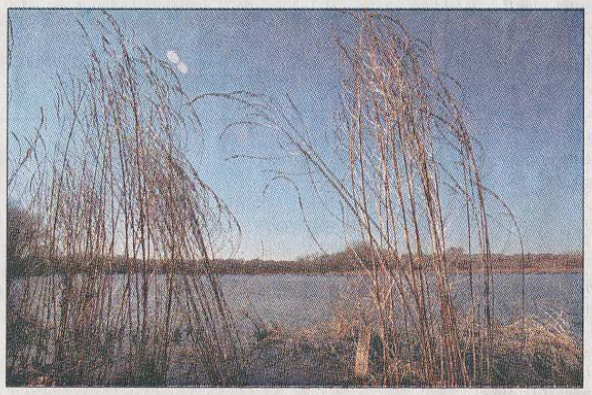
- Water Quality or Watershed Education
- Document Existing Conditions
- Problem Identification
- Local Decisions

The Providence Journal

SATURDAY
March 25, 2000
50 cents
$2.20 per week by carri

QUALITY CONTROL: URI Watershed Watch monitors are being sought for several lakes and ponds in Rhode Island, including Valley Falls Pond, in Central Falls, where tall grasses wave in the breeze in the mud flats along its shore.

Journal photo/MARY MURPHY



Rainfall – or lack of it – affects quality of state's lakes, ponds

By PETER B. LORD
Journal Environment Writer

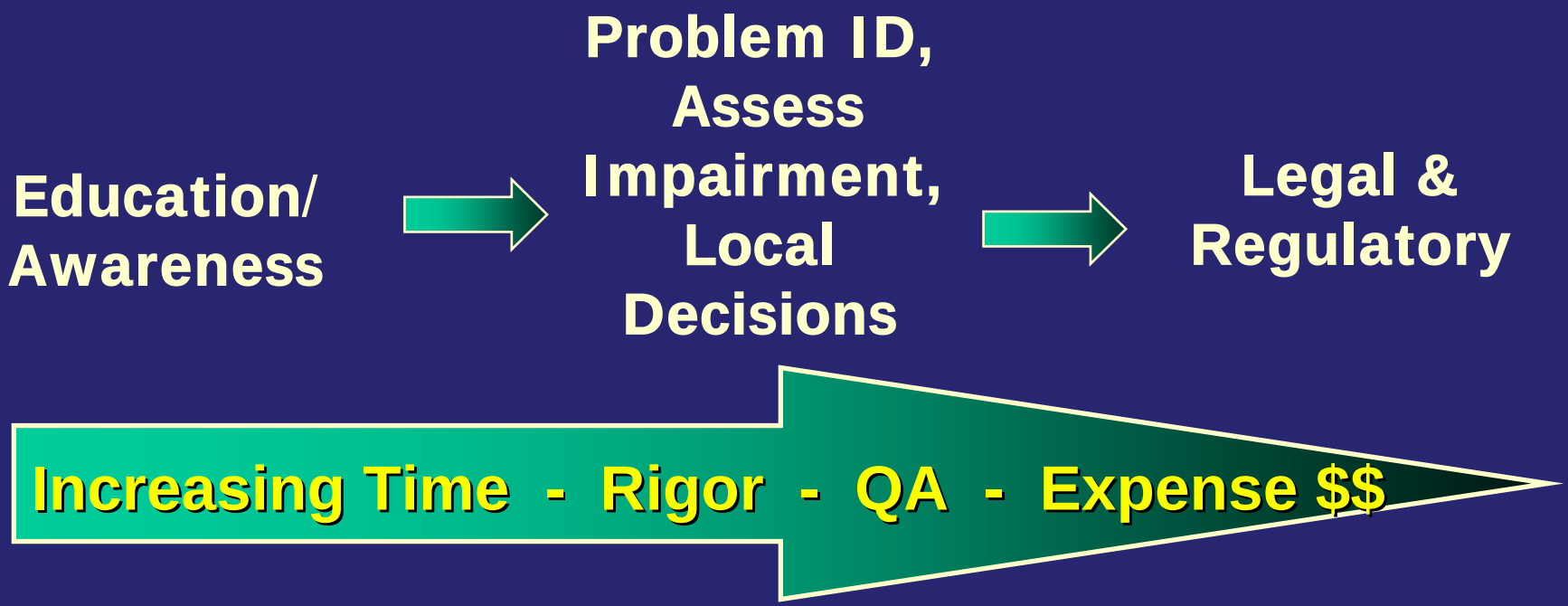
Remember last summer's drought? And the torrential rains two summers ago? Both extremes had major and unexpected effects on Rhode Island's lakes and ponds, according to data collected at the University of Rhode Island.

Reports submitted by hundreds of volunteers for URI's Watershed Watch program showed that last summer's drought lowered water levels in some lakes and ponds by 3 feet. Stillwater Pond in Smithfield and Spalding Pond in North Stonington, Conn., were so shallow that volunteers couldn't launch their boats.

The water that remained in some ponds was more polluted than usual because there was less water but the same amount of contaminants. In other ponds, however, the water was clearer because the lack of rainfall meant that contaminants weren't washed into the body.

Turn to **POND**, *Page A-4*

The Continuum of Monitoring Data Use



Geoff Dates, River Network

EPA (http://www.epa.gov/owow/)

- EPA HQ (Alice Mayio mayio.alice@epa.gov)
  - What Volunteer Monitoring Is
  - Volunteer Monitoring Methods
  - National Directory of Volunteer Monitoring Programs
  - *Volunteer Monitor* Newsletter
  - QAPP Guidance
- EPA-NE region (www.epa.gov/newengland/)
  - Diane Switzer (switzer.diane@epa/gov)

USDA CSREES
National Facilitation Project
www.usawaterquality.org/volunteer

- Build a comprehensive support system for Extension volunteer water quality monitoring efforts in the U.S.
- Expand & strengthen the capacity of existing Extension volunteer monitoring programs
- Support development of new groups

Land Grant Colleges' and Universities'

Volunteer Water Quality Monitoring

National Facilitation Project

A Partnership of USDA CSREES & the Land Grant System

NATIONAL Water Program

This Volunteer Water Quality Monitoring National Facilitation Project is designed to build a comprehensive support system for Extension volunteer water quality monitoring efforts across the country. The goal is to expand and strengthen the capacity of existing Extension volunteer monitoring programs and support development of new groups.

Volunteer Monitoring National Facilitation Project

- Project Description (382 K pdf file)
- Outreach Materials and Activities
- Nationwide Inquiry
- Online Databases

Extension Volunteer Monitoring Programs

Related Research and Educational Efforts

- Researching Volunteer Monitoring
- Using Volunteer Monitoring Data in Research
- Select Archives of Volunteer Monitoring Listserv Discussions

Training Modules

Other National Facilitation Projects ↣

- NEMO
- Increasing Tribal Involvement in the Water Quality Network
- Additional Facilitation Projects

Upcoming Events ↣

River Rally
May 18-22, 2007

Guide for Growing Programs

- Getting Started (844 K pdf)
- Why Monitoring Makes Sense (582 K pdf)
- Designing Your Monitoring Strategy (1.6 M pdf)
- Monitoring Matrix (80 K pdf)
- Effective Training (986 K pdf)
- Monitoring Equipment Suppliers (437 KB pdf)
- Direct Links to Monitoring Programs' Manuals (online)
- Building Credibility (1.5 M pdf)
- Sharing Information Through Internet Exchanges (1 M pdf)
- Volunteer Management (7 M pdf) NEW!
- Planning Your Program's Data Management System (6 M pdf) NEW!
- Outreach Tools
- Locating Support and Funding

Special Topics

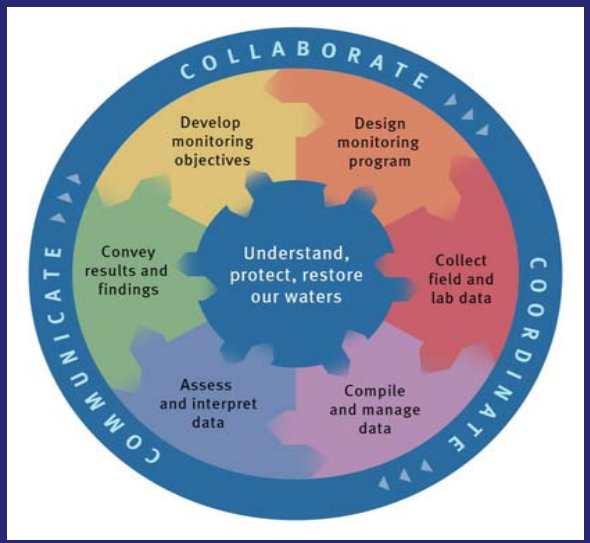
- Current Highlight: Utah Lake Watch
- Highlighted Program Archives
- Job postings
- Secchi Dip-In
- World Water Monitoring Day
- Volunteer *E. Coli* Monitoring Project

NWQMC

NATIONAL WATER QUALITY MONITORING COUNCIL

Working Together for Clean Water

The National Water Quality Monitoring Council provides a national forum to coordinate consistent and scientifically defensible methods and strategies for improving water quality monitoring, assessment, and reporting.

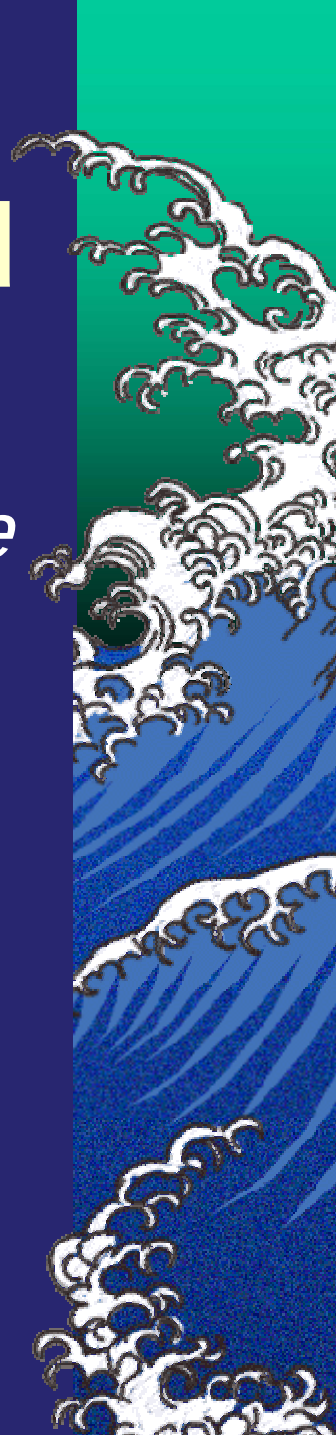


- **National Environmental Methods Index (NEMI)**
- **Water Quality Data Elements**
- **Biennial Conferences**
- **Promoting State Monitoring Councils**

State, County, Academic, and Non-profit Organizations

Provide organizational and technical service to program coordinators at all levels

- Organizational development and support
- Study design
- Technical training and support
- Analytical services
- Data management and interpretation
- Networking with other programs



New Jersey's Tiered Approach

- Volunteers to pick their level of (stream) monitoring involvement based on:
  - Intended purpose for monitoring
  - Intended data users
  - Intended data use(s)

- Tier A: Environmental Education
- Tier B: Stewardship
- Tier C: Community Assessment
- Tier D: Indicators/Regulatory Response

Tier C: Community &/or Watershed Assessment

Data Users

- Local decision-makers
- Watershed association
- Environmental organizations
- Possibly NJ DEP

Data Use

- Assess current conditions
- Track trends
- Source track down of Nonpoint source pollution

Quality Needed

- Medium/high level of rigor
- Data needs to reliably detect changes over time & space
- QAPP approved & on file w/ intended data user.
- Training required

Useful Sources to Locate Methods

- EPA Guidance Manuals
- The *Volunteer Monitor* newsletter
- LaMotte/Hach kits and catalog
- Volunteer Program websites
- Volunteer monitoring listservs
- Secchi Dip-In website (http://dipin.kent.edu/)
- Standard Methods for the Examination of Water and Wastewater

The Volunteer Monitor

THE NATIONAL NEWSLETTER OF VOLUNTEER WATERSHED MONITORING Volume 15, Number 1 • Winter 2003

University Partnerships

Sherman's Creek Conservation Association members learn about macroinvertebrate monitoring at ALLARM workshop.

the ALLARM Program

growth, change, and lessons learned

by Candie Wilderman, Alissa Barron, and Lauren Imgrund

*After 10 years of operation, we renamed our college-community partnership. The program formerly known as ALLARM would henceforth be called … ALLARM. Although the name change—from "Alliance for **Acid Rain** Monitoring" to "Alliance for **Aquatic Resource** Monitoring"—may have been subtle, it signaled a far-reaching change in the relationship between Dickinson College and volunteers from the surrounding community.*

The original ALLARM was started by the college's Environmental Studies Department in 1986 to collect more information about the impact of acid deposition on Pennsylvania's streams. The new ALLARM has a dramatically broader focus. While we have continued the acid rain monitoring, now the majority of our effort is devoted to helping community groups perform their own monitoring and research on issues of their own concern.

A continuum of models

"Citizen science" projects, including volunteer monitoring, rely on partnerships between citizens and professional scientists. These partnerships can take many forms, which may be arranged along a continuum of increasing community involvement and control. ALLARM's experience of evolving from a single-issue, "top-down" program to a multi-issue, "bottom-up" program has given us some special insights into the strengths and challenges of the different models.

The following five questions help situate a given partnership along the continuum:

1. Who defines the problem?
2. Who designs the study?
3. Who collects the samples?

continued on page 3

Don't re-invent the monitoring method!

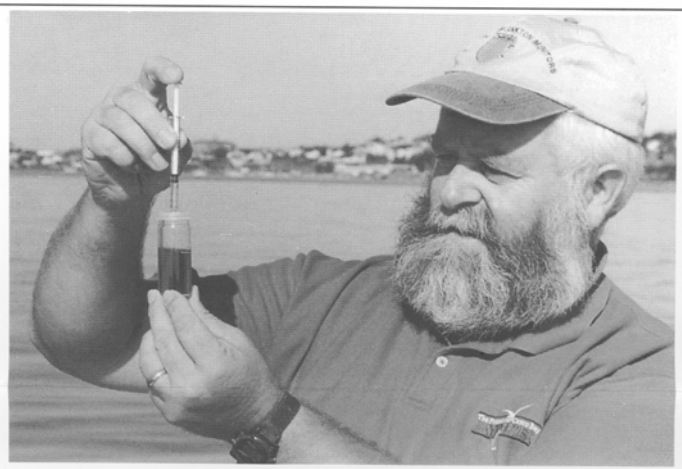
Volunteer Monitors are Community Educators

Wisconsin Research on Societal Participation*

- Experienced monitors –
  - Did not have more factual info about water quality
  - Feel more connected to those in their community concerned with environmental issues
  - are more likely to participate in political action events
    - reading, personal research (72%)
    - Talk with neighbors (72%)
    - Attend public meetings (65%)
    - Share monitoring info with others (54%)

*Overdevest, Orr, Stepenuck, 2004 NWQMC conference

Casco BayKeepers, Maine



Testing oxygen levels near Portland harbor, Joe Payne doesn't breathe easy knowing lawn care products can migrate into Casco Bay

Why weed 'n feed isn't fish food

The Casco BayKeeper explains:

"As home to the East Coast's third busiest oil port, Casco Bay faces serious risks that are easy to see.

"One that's especially threatening, however, is unseen. And it comes from our own backyards," says Joe Payne, BayKeeper and Executive Director for Friends of Casco Bay, the watchdog organization committed to protecting and improving Casco Bay.

"Some 270,000 people--a quarter of all Maine citizens--live within the Bay's watershed. The lawn and garden products we use, discard or spill, from as far away as Maine's western mountains, end up right here in the Bay."

"Weed and feed chemicals are a big concern. Containing both fertilizers and up to eight types of weed killers, these products are certainly convenient. And popular. According to state regulators, Maine do-it-yourselfers buy about 750,000 pounds of weed and feed products annually."

"Unfortunately, these chemicals pose all sorts of problems once rain water runoff carries them into streams, rivers and eventually Casco Bay.

"There, the fertilizers promote rapid growth of algae which decays, robbing the water of oxygen. Meanwhile, the herbicides can impact fish and shellfish. This double-barreled blow results in degraded water quality and environmentally challenged marine life. Who knows what effect that will eventually have on our seafood?"

Ending a hazardous trickle-down effect

"Too often folks use weed and feed products along with other pesticides because of habit, rather than necessity. Less harmful alternatives do exist, some as simple as watering and mowing your lawn properly or pulling weeds by hand.

"If you must treat your lawn, apply only on trouble spots, not the entire yard. Avoid use where grass is sparse, on steep slopes, in ditches or right next to water. And keep pesticide sprays from drifting into open water.

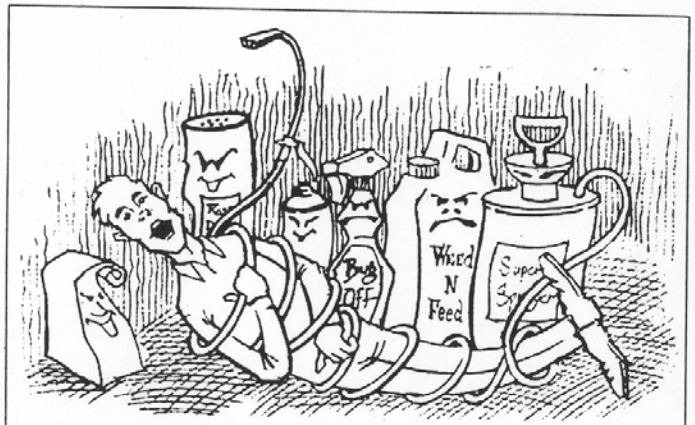
"Also, prevent disposal problems by purchasing only as much pesticide as you need for a given job and by giving away excess usable chemicals to someone else who will apply them properly.

"Advice on responsible lawn care is as close as your telephone. These agencies have helpful folks who want to help you keep weed and feed products in their place...and out of Casco Bay."

Maine Board of Pesticides Control...287-2731

University of Maine Pest Management Office...1-800-287-0279

Think first...Spray last!



Too Wound Up in Lawn Care Chemicals?

There's an escape....

Finally, an evening workshop to learn how to care for lawns and plants with less of the chemicals that harm our waterways. Meet area stewardship groups and lawn & garden pros too.

And it's free!

Discover how a beautiful landscape can protect our precious lakes, streams and coast at this important program entitled:

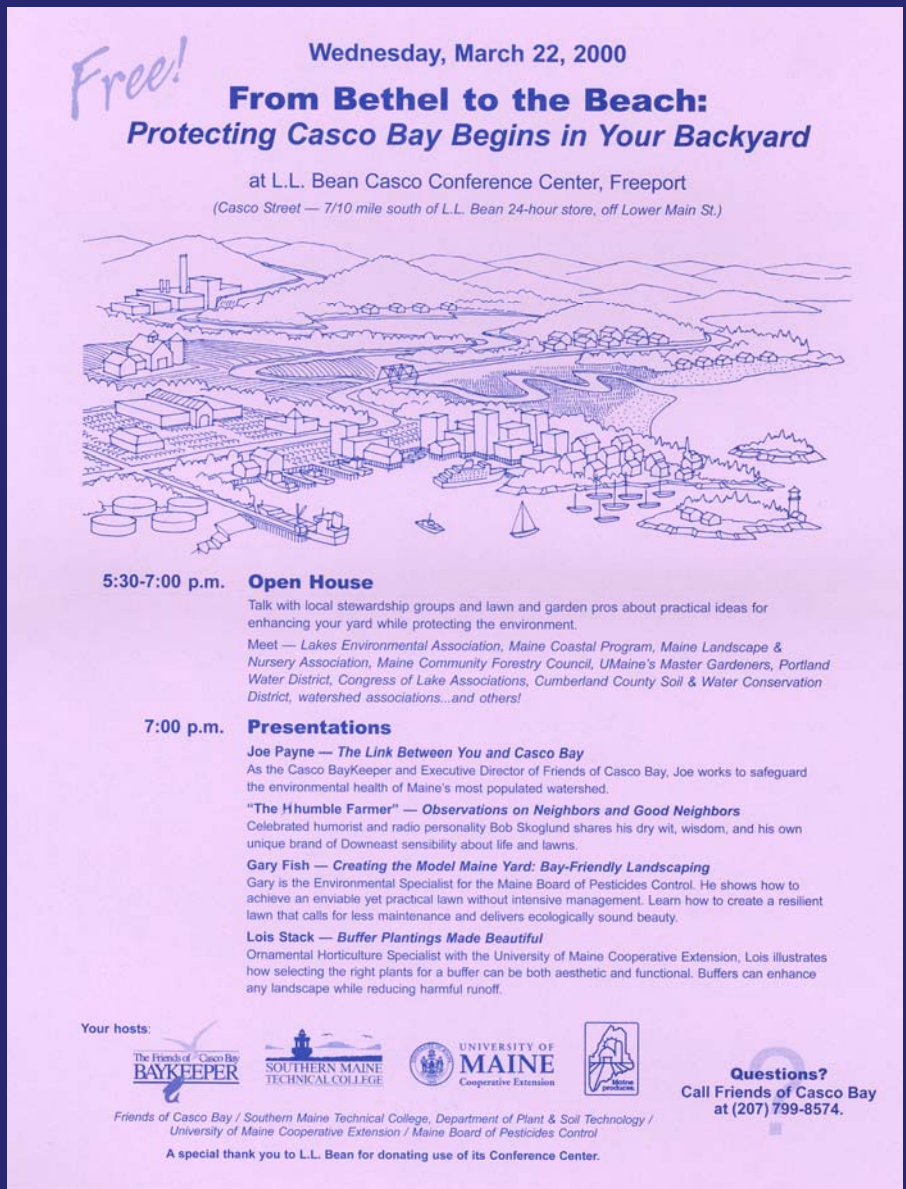
"From Bethel to the Beach, Protecting Casco Bay Begins in Your Backyard"

■Where: L.L. Bean's Casco Conference Center, 7/10th mile south of L.L. Bean's 24-hr store, Lower Main St., Freeport. ■When: Wednesday, March 22, 2000.■ What's in store: 5:30 p.m. open house, presentations from lawn and ornamental plant specialists at 7 p.m. ■That's not all: Meet "The humble Farmer," Downeast humorist and Maine Public Radio host.

for more information call 799-8574

Brought to you by The Friends of Casco Bay BAYKEEPER

Message Culminated in Action



Free!

Wednesday, March 22, 2000

From Bethel to the Beach:

Protecting Casco Bay Begins in Your Backyard

at L.L. Bean Casco Conference Center, Freeport

(Casco Street — 7/10 mile south of L.L. Bean 24-hour store, off Lower Main St.)

5:30-7:00 p.m. **Open House**

Talk with local stewardship groups and lawn and garden pros about practical ideas for enhancing your yard while protecting the environment.

Meet — *Lakes Environmental Association, Maine Coastal Program, Maine Landscape & Nursery Association, Maine Community Forestry Council, UMaine's Master Gardeners, Portland Water District, Congress of Lake Associations, Cumberland County Soil & Water Conservation District, watershed associations...and others!*

7:00 p.m. **Presentations**

Joe Payne — *The Link Between You and Casco Bay*
As the Casco BayKeeper and Executive Director of Friends of Casco Bay, Joe works to safeguard the environmental health of Maine's most populated watershed.

"The Humble Farmer" — *Observations on Neighbors and Good Neighbors*
Celebrated humorist and radio personality Bob Skoglund shares his dry wit, wisdom, and his own unique brand of Downeast sensibility about life and lawns.

Gary Fish — *Creating the Model Maine Yard: Bay-Friendly Landscaping*
Gary is the Environmental Specialist for the Maine Board of Pesticides Control. He shows how to achieve an enviable yet practical lawn without intensive management. Learn how to create a resilient lawn that calls for less maintenance and delivers ecologically sound beauty.

Lois Stack — *Buffer Plantings Made Beautiful*
Ornamental Horticulture Specialist with the University of Maine Cooperative Extension, Lois illustrates how selecting the right plants for a buffer can be both aesthetic and functional. Buffers can enhance any landscape while reducing harmful runoff.

Your hosts: The Friends of Casco Bay BAYKEEPER; Southern Maine Technical College; University of Maine Cooperative Extension; Maine products.

Questions?
Call Friends of Casco Bay at (207) 799-8574.

Friends of Casco Bay / Southern Maine Technical College, Department of Plant & Soil Technology / University of Maine Cooperative Extension / Maine Board of Pesticides Control

A special thank you to L.L. Bean for donating use of its Conference Center.

- Media campaign included full page ads
- Home & garden center brochures
- Garden show booth
- Direct mail

⇨ Workshop attended by ~120 homeowners and applicators


Volunteer Monitors Are
Citizen Scientists

The Continuum of Monitoring Data Use

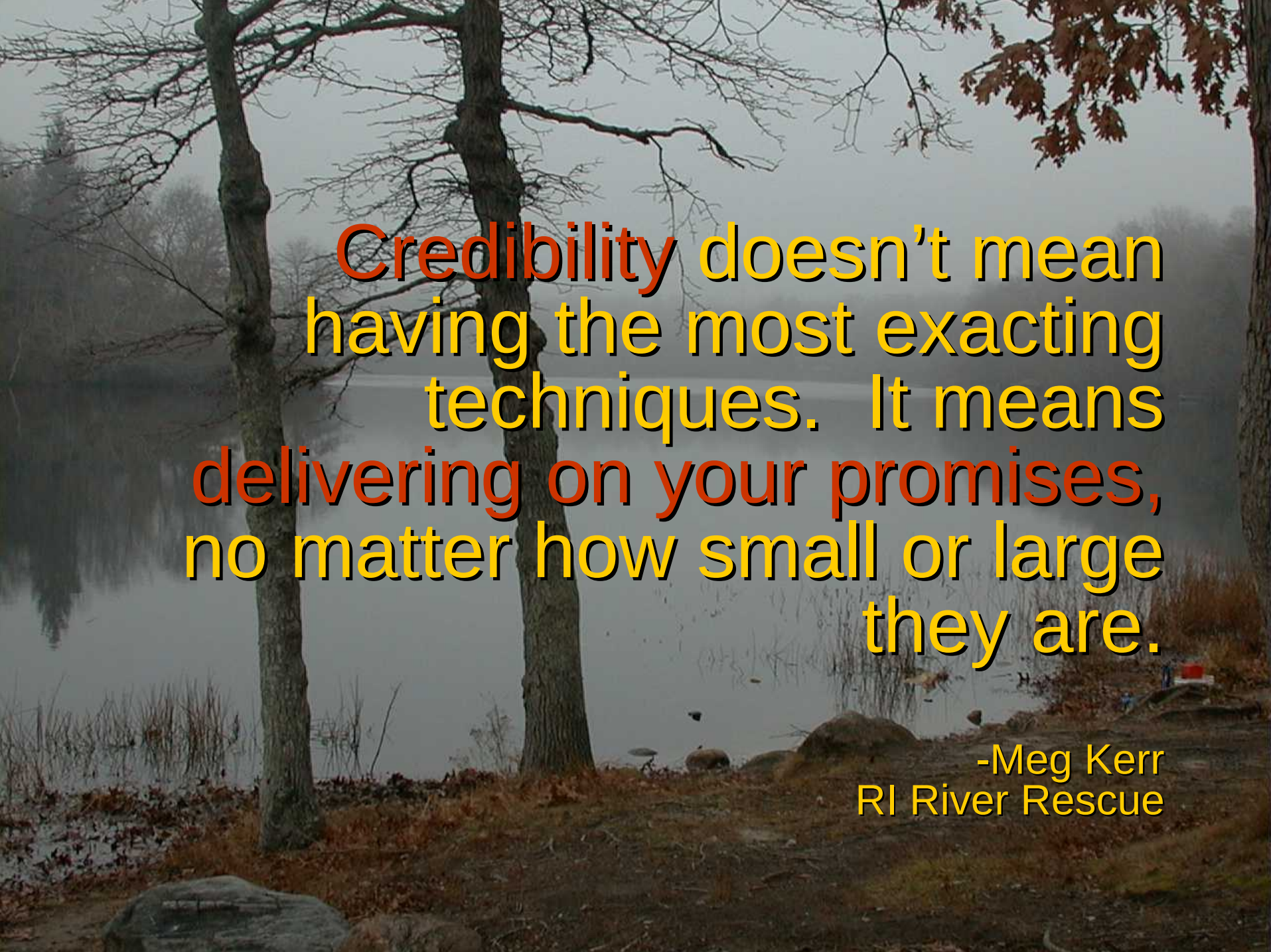
Education/ Awareness

Problem ID, Assess Impairment, Local Decisions

Legal & Regulatory

Increasing Time - Rigor - QA - Expense $$

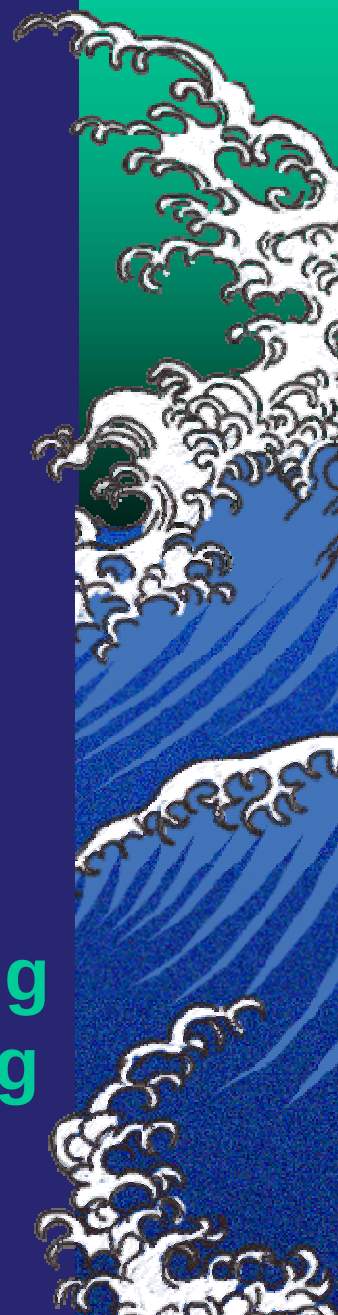
Geoff Dates, River Network


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

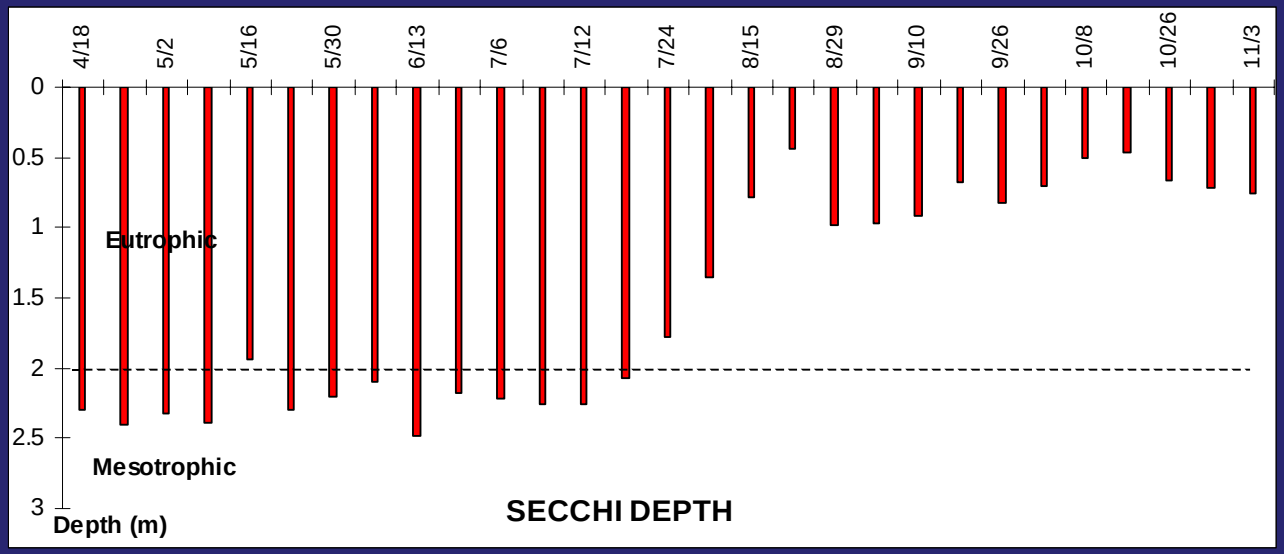
Quality is Assured through:

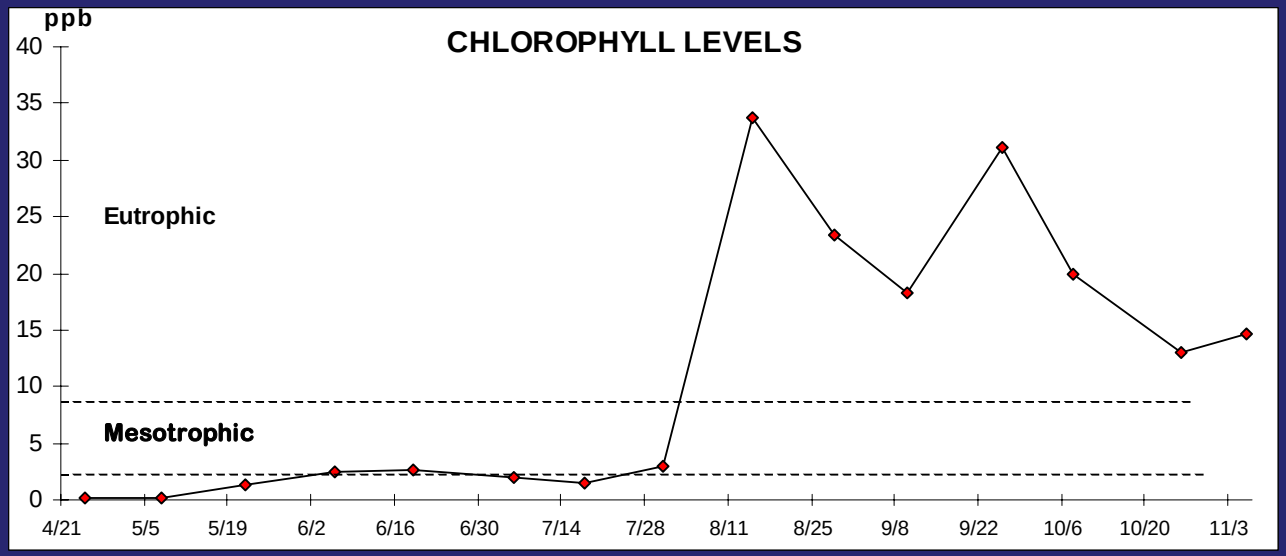
- Training
- Repetition
- Routine sampling
- Monitoring multiple indicators
- QA/QC field and laboratory testing
- Adhering to established procedures

The most important factor determining the level of quality is the cost of being wrong.



Meadowbrook Pond





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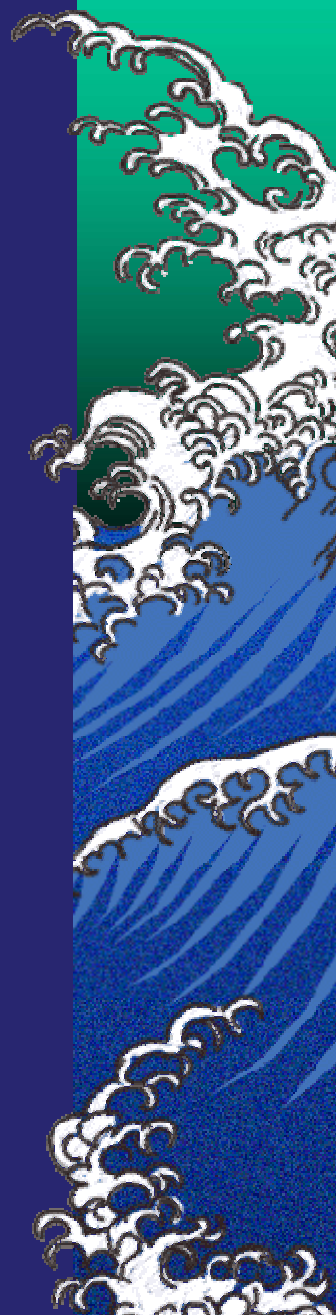
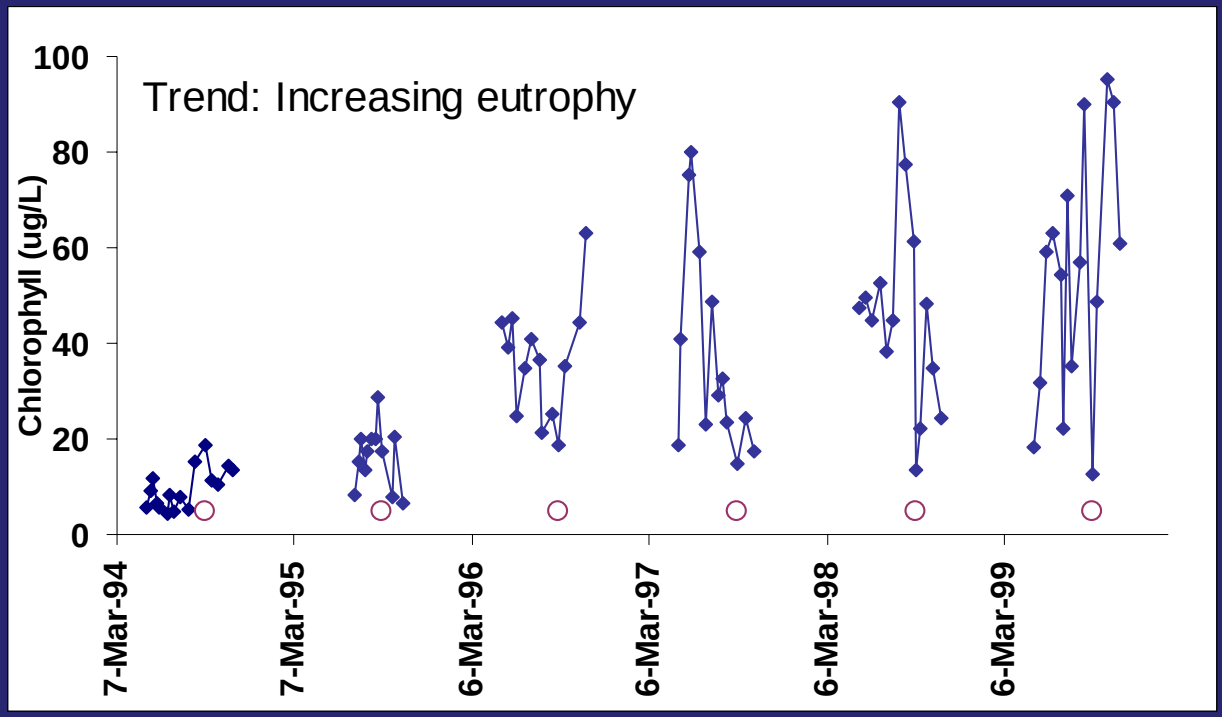
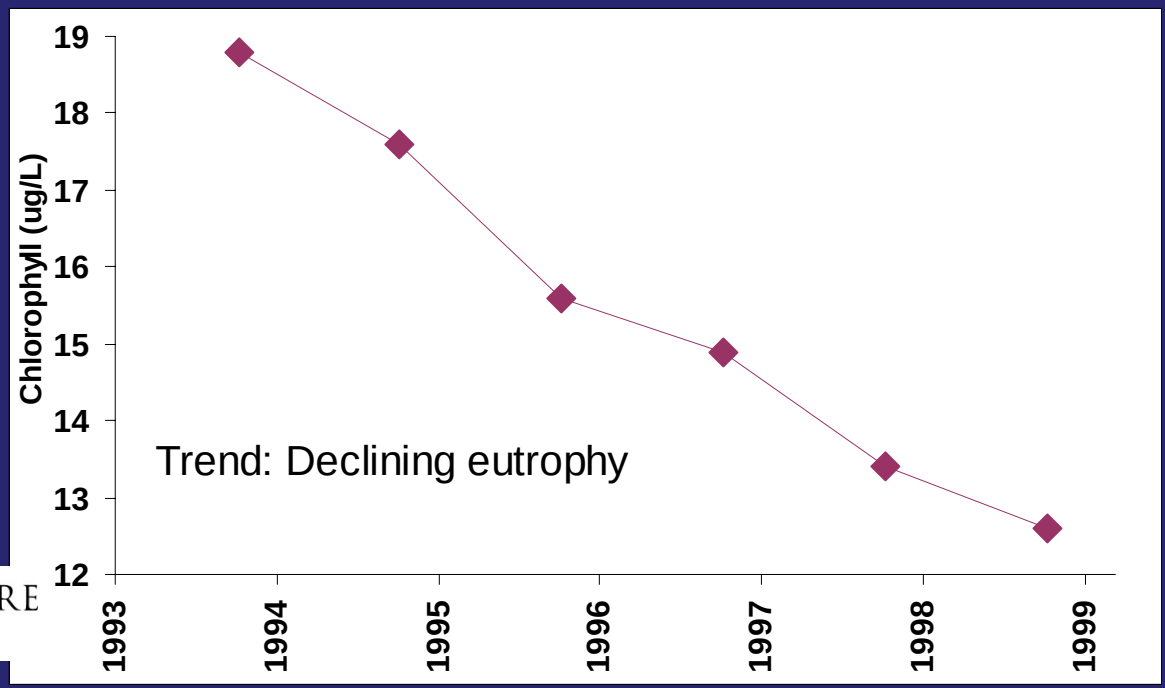
Total Maximum Daily Load (TMDL)

URIWW data used to

- **Assess impairment**
- **Develop TMDL and community “buy-in”**
- **Monitor effectiveness upon implementation**

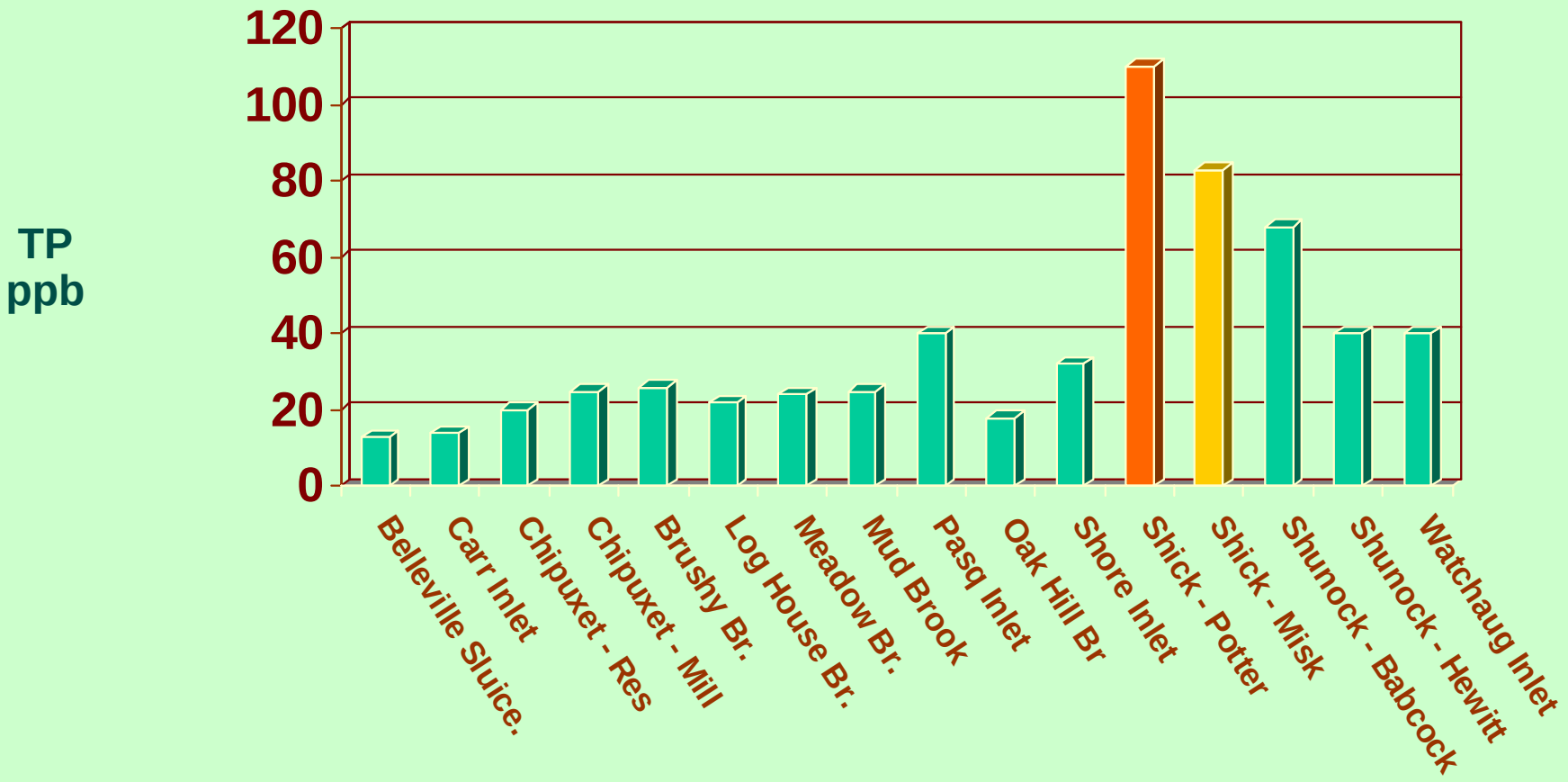






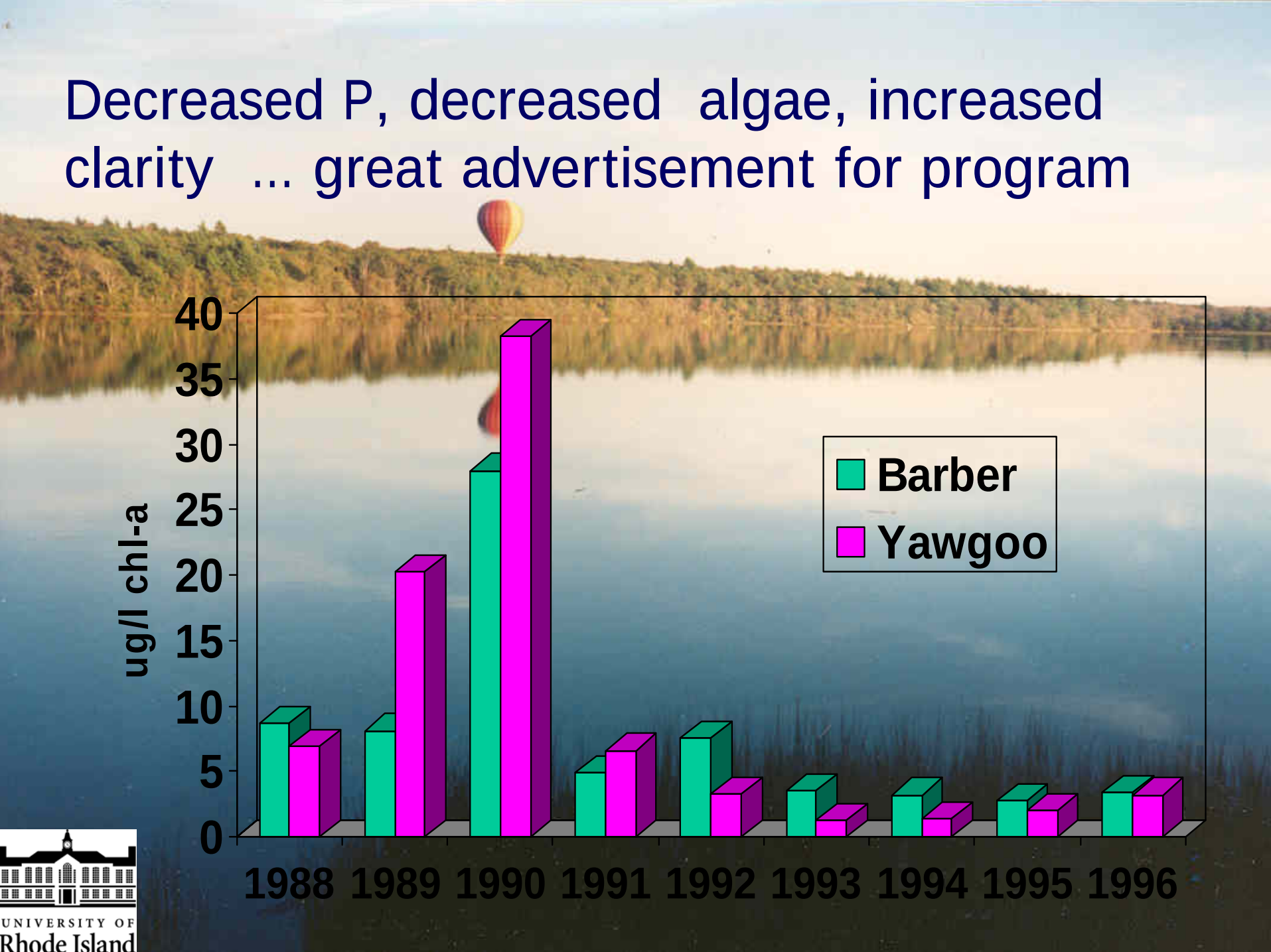
UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

Lower Order Streams, Southern RI - 1991




Illegal Shellfish Processor
No provision for proper waste disposal
UNIVERSITY OF
Rhode Island

Decreased P, decreased algae, increased clarity ... great advertisement for program



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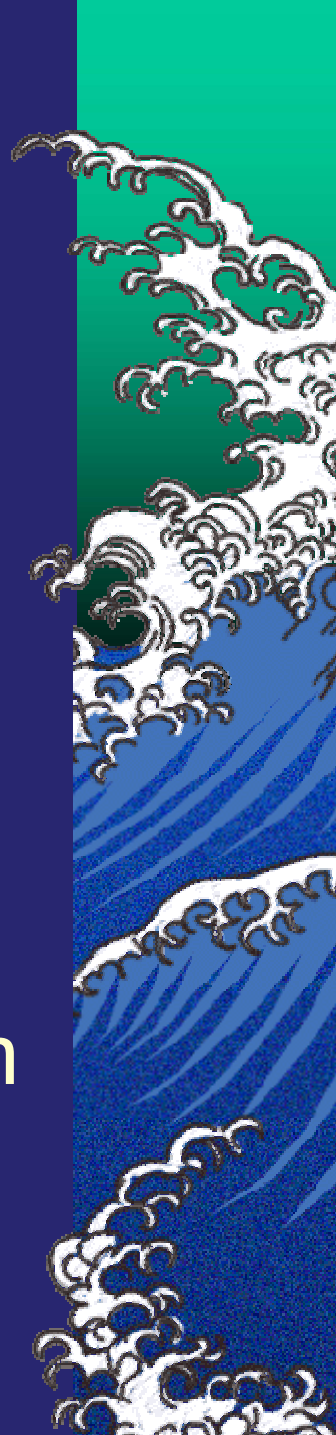
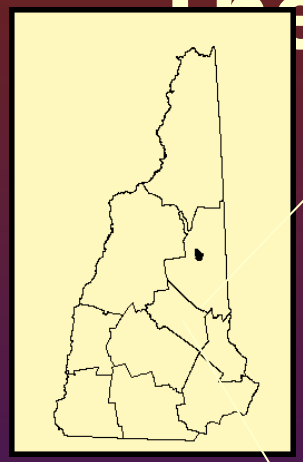
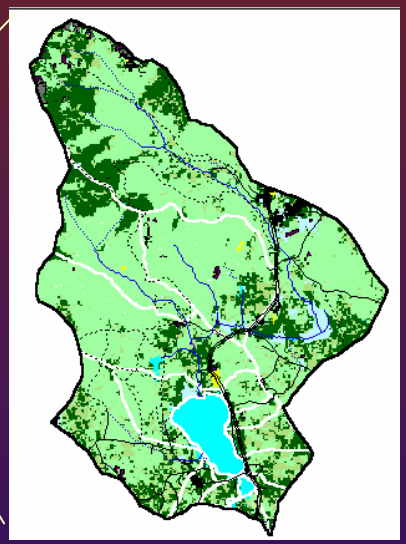
"It is in the marriage of credible data and increased stewardship behavior that the true potential and vitality of citizen monitoring begins to emerge."

-Steven Hubbell, Colorado River Watch



Lake Monitoring and NPS Program Partnerships Deliver: The Lake Chocorua Project





UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

NEW HAMPSHIRE LAKES LAY MONITORING

Jeffrey Schloss
University of New Hampshire
Cooperative Extension Water Resources
UNH Center for Freshwater Biology

(the volunteer monitors were) 'the "hub of the wheel" that made the project a success...They provided the factual data on which decisions were made. ' - -

Sherry Godlewski

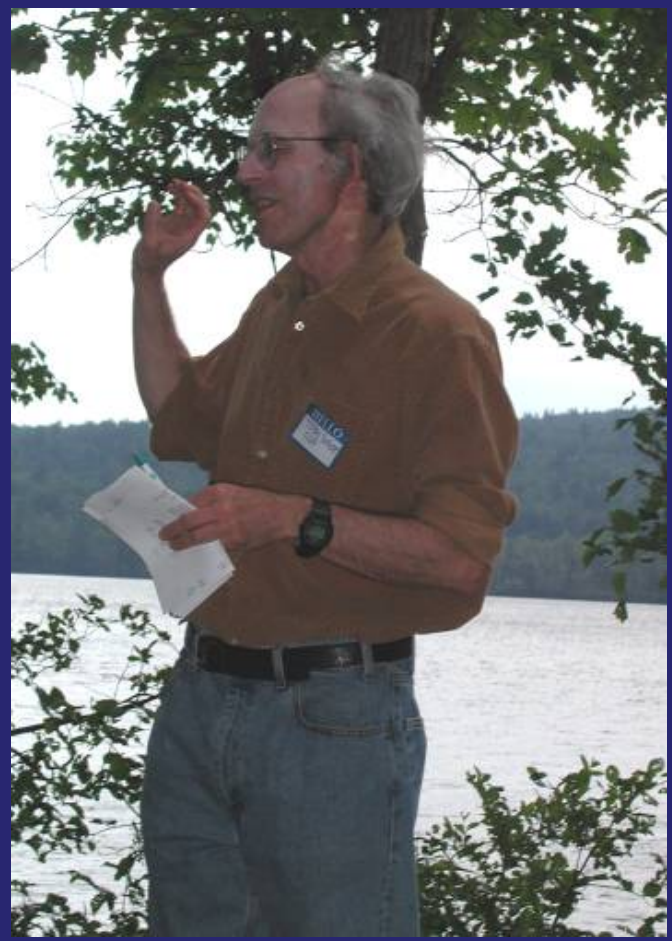
NH DES

'...it is this type of model project that we at the EPA want to support and continue to see occur ... '

-Warren Howard EPA-NE

UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

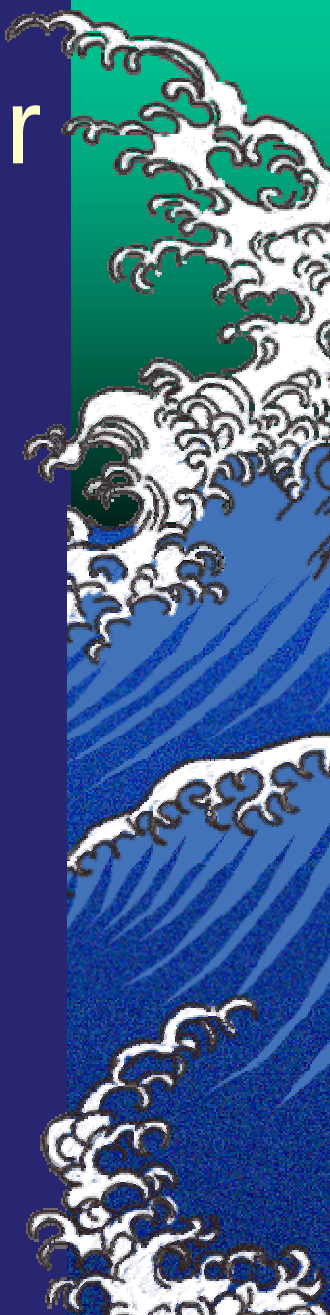
‘I don’t know when was the last time I’ve worked with 12 agencies and gotten something done’



-Toby Page
Lake Chocorua Association

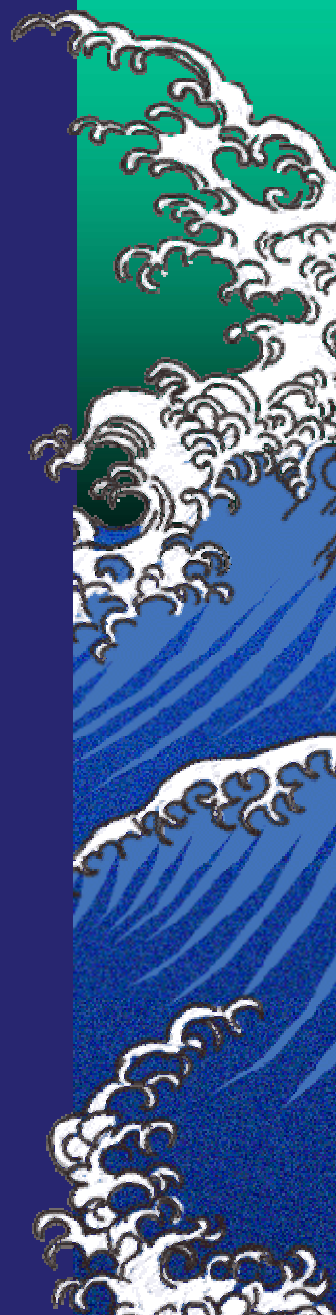
Many programs are entering their second decade of monitoring

- Clarified their purpose(s)
- Secure in their techniques
- Have jumped thru QA hoops
- Are realizing the value of their community connections



Challenges

- Perceptions
  - Can’t sample (LOL in tennis shoes)
  - Will deliberately alter samples to get _____ in trouble
  - Will take my job
  - Just not good enough for _____



Challenges

- Methodology & the Ever-rising QC bar
  - Will the data stand up in court? Should it?
  - Prescriptive techniques vs performance based
  - Data validation
  - Listing vs de-listing
- Who’s data is it anyway?
  - What route does it take thru an agency
  - Agency needs vs organizations needs
  - Storing and retrieving the growing volume

Reality of Using Volunteer Collected Data

- We need more data at a higher frequency of collection
- EPA has encouraged use of volunteer collected data
- Volunteers want to do it right

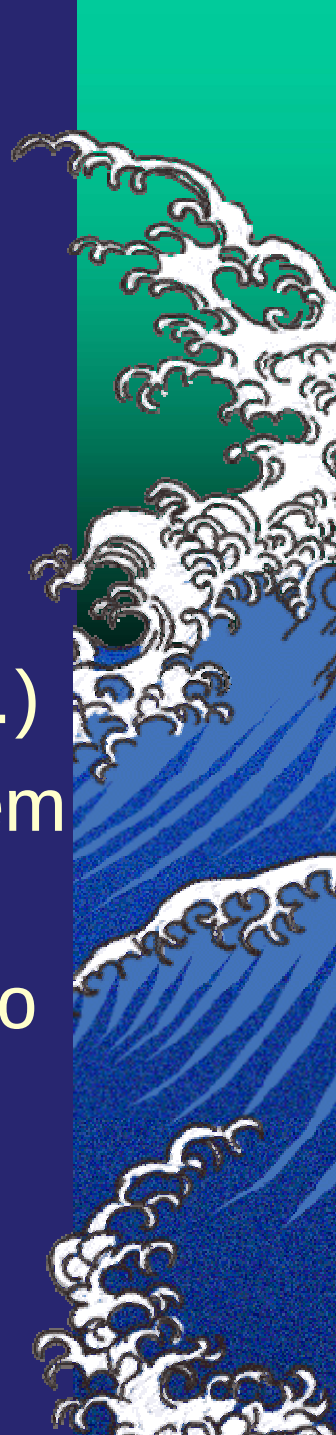
Danielle Donkersloot, NJ DEP

… and issues

- Fulfilling work is needed to keep interest
- Knowing what you want to achieve is critical
- Successful programs require good training and coordination
- Start-up funding easier to get than continuation funding
- Good ecological monitoring requires healthy organizations

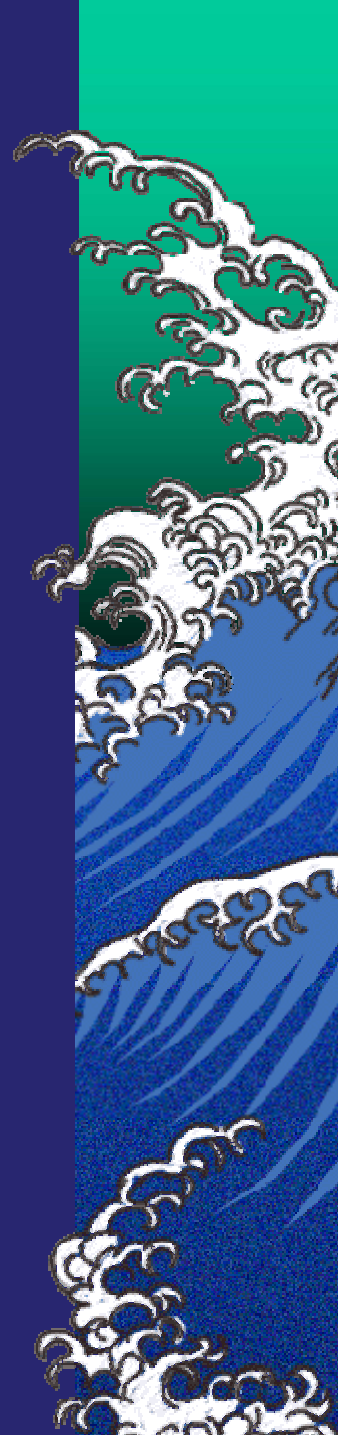
Successes

- Huge increase in number of locations monitored (~10 vol mon to 1 agency site)
- Source of long-term data (15, 20, 25 years...)
- IDs the high quality waters as well as problem areas
- Provides agency personnel the opportunity to get out in the field
- Can gain support for agency initiatives



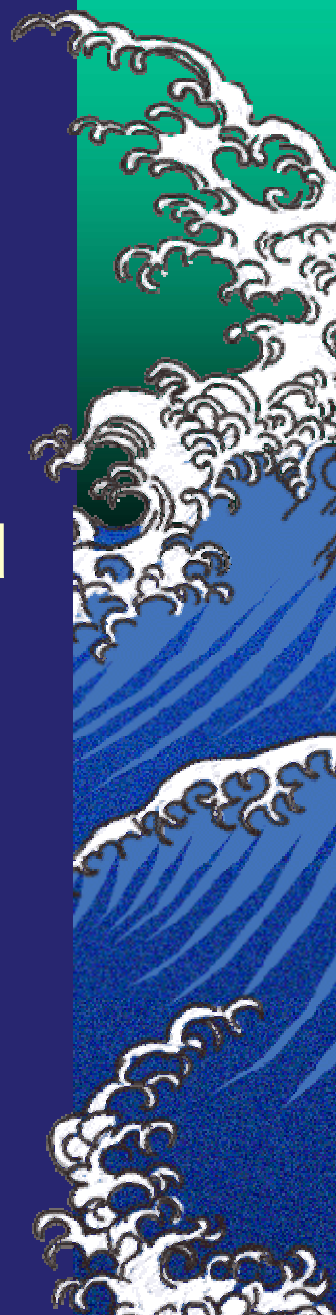
Successes

- Volunteer Monitoring originates in the community & builds strong community partnerships
- Volunteer monitoring educates the community to make informed decisions
- Volunteer monitoring provides youth with civic lessons and hands-on science
- Volunteer monitoring provides a pathway to increased civic activities/responsibility



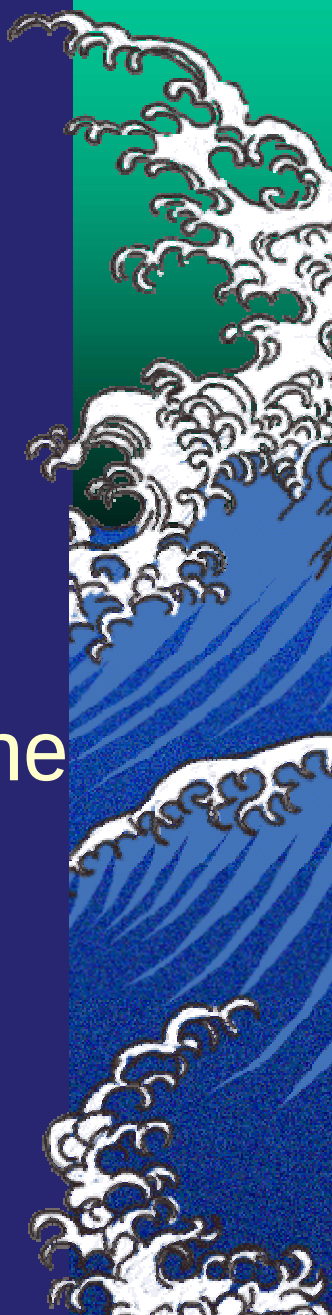
Successes

- Volunteer monitoring can build family relationships
- Volunteer monitoring can reach underserved audiences
- Volunteer monitoring tangibly connects people to their environment
  - counteracts the plastic world of TV, videos, computer games
- Ordinary people can collect good data



Volunteer Monitoring Makes A Difference

- Identifies & solves problems locally
- Involves people in real science
- Raises awareness, and educates
- Provides info on places where no one else is looking
- Creates an informed constituency
- Creates stewards




Remember that only 18% of US waters have been assessed
Abby Markowitz
Jeff Schloss
Kris Stepenuck
Elizabeth Herron
Geoff Dates
Thank you!