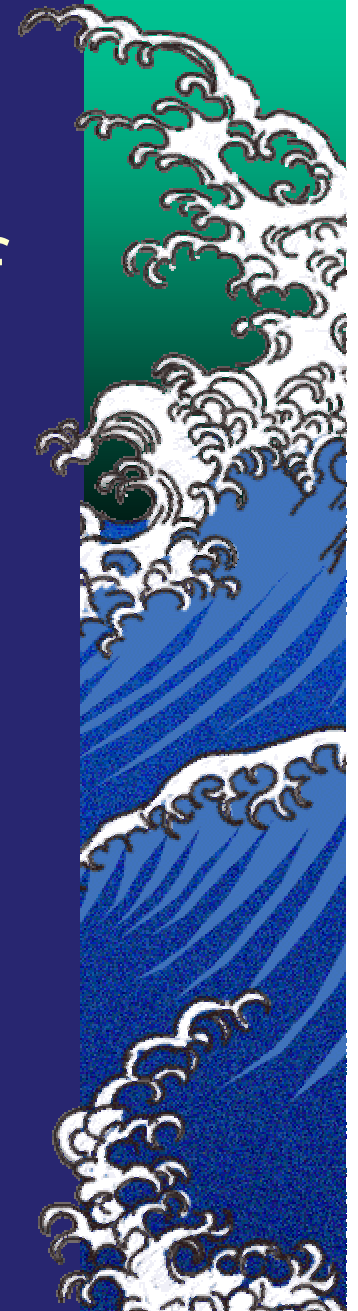


Successes and Challenges of Volunteer Monitoring

New Jersey Monitoring Council
May 25, 2005

Linda T. Green

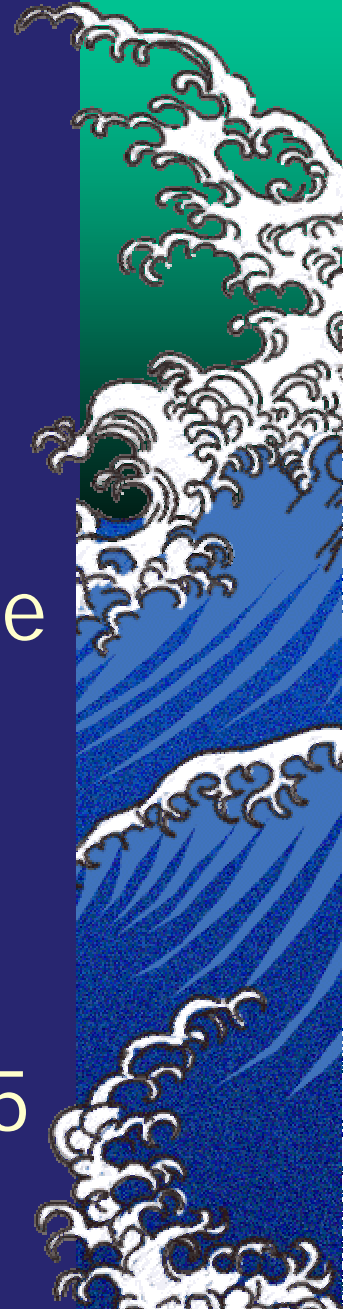
National Water Quality Monitoring Council
University of Rhode Island Cooperative Extension
USDA Cooperative State Research Education
Extension Service (CSREES)



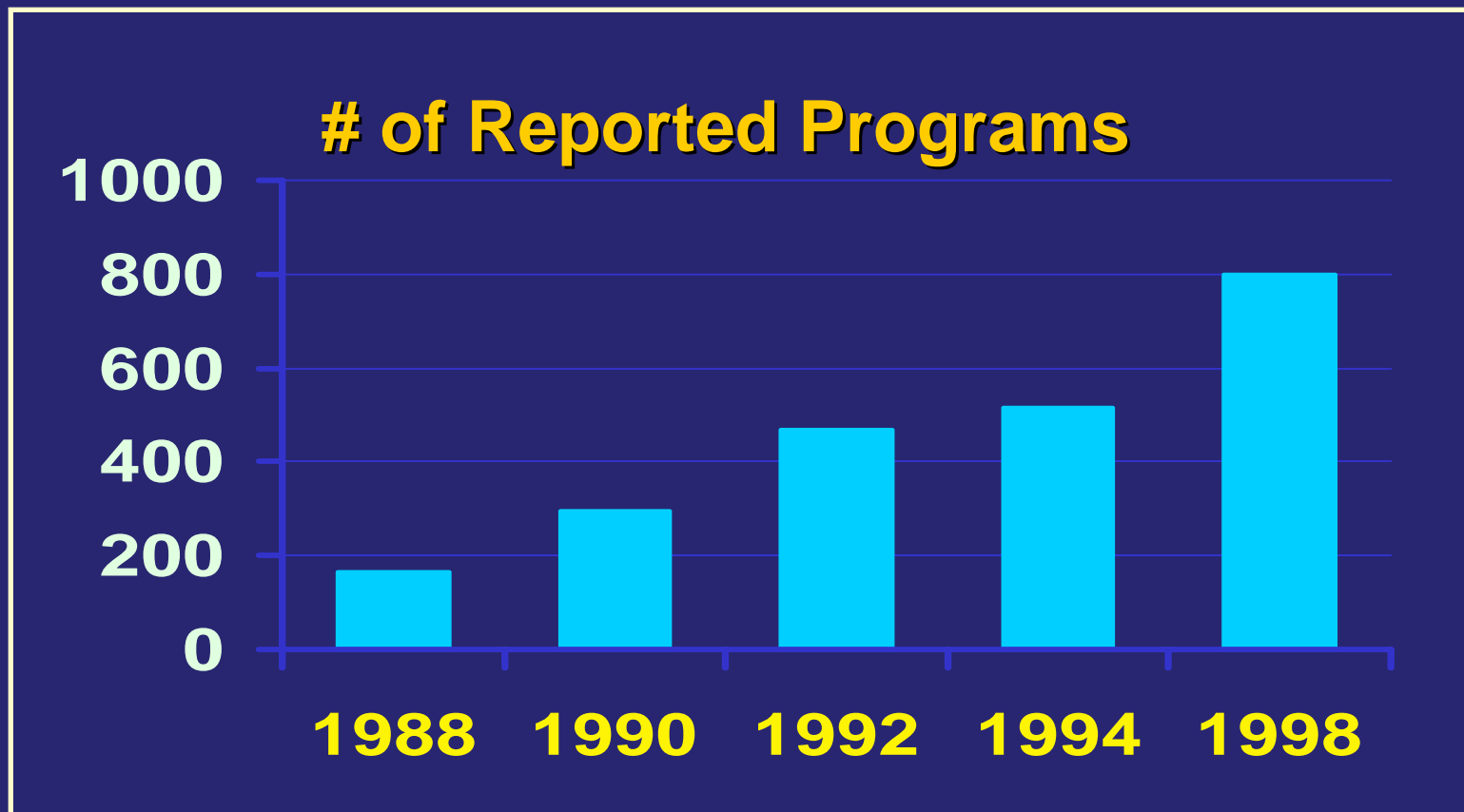


Pioneering Programs

- ◆ National Weather Service (1890)
- ◆ 1900 National Audubon Society
- ◆ 1954 National Marine Fisheries Service
- ◆ Stream Monitoring - (Maryland - 1969)
- ◆ Lakes - (Maine, Minnesota, Michigan, NH) – 1971-1978
- ◆ Estuaries – RI, Chesapeake Bay -1985

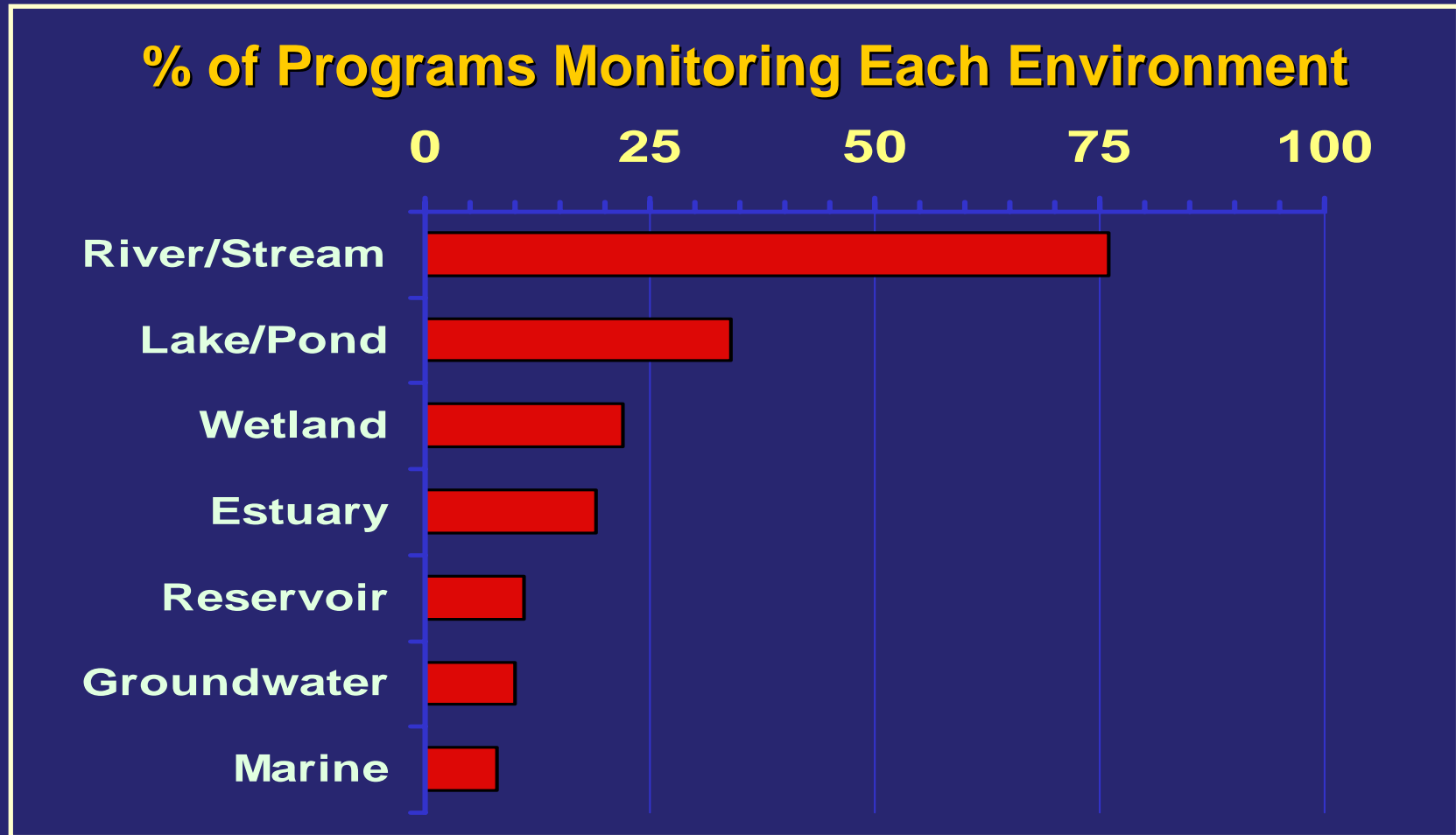


Volunteer Monitoring Came of Age in the 1990s*



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

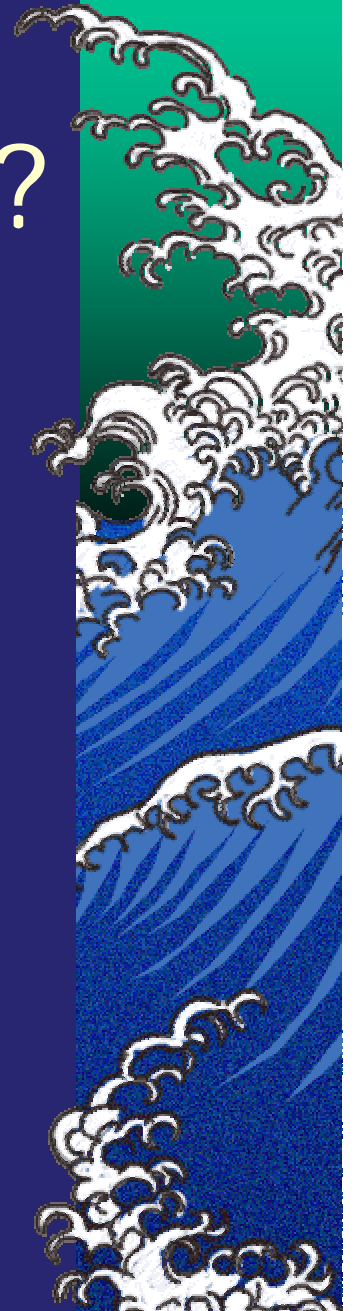
Ecosystems Monitored*



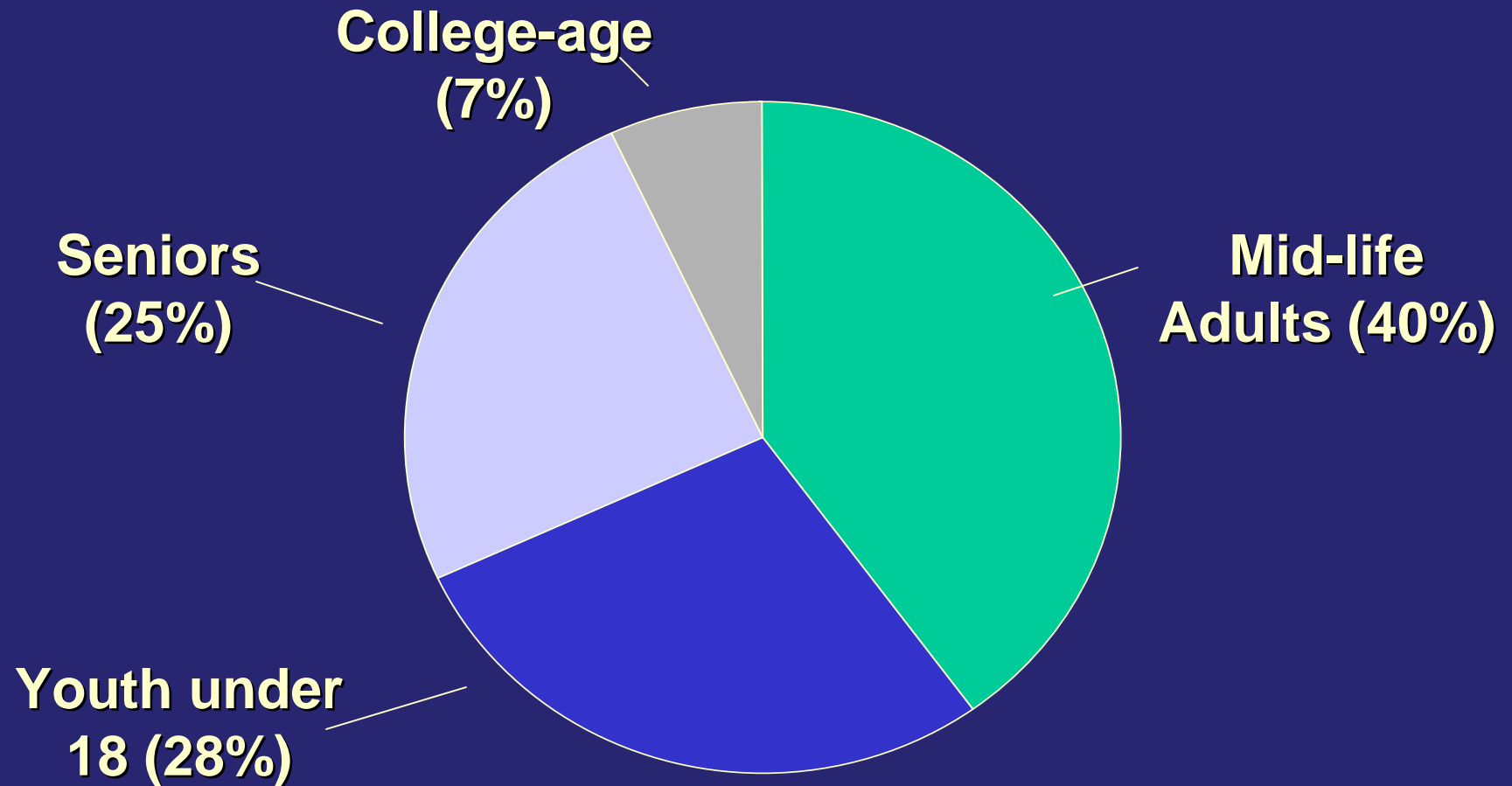
* Nat'l Dir. of Envir. Mon. Progs. - 5th Ed.

What Is Volunteer Monitoring?

- ❖ People who willingly, diligently and regularly assess water quality of various environments in their free time.
- ❖ People who watch over the health of their watersheds because they care.
- ❖ People who advocate for improvement and/or protection of their waters



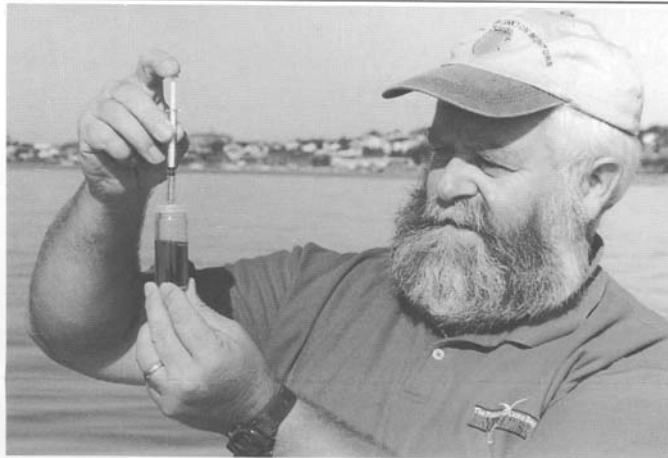
Who Are These Volunteers?



Volunteer Monitors are Community Educators



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.

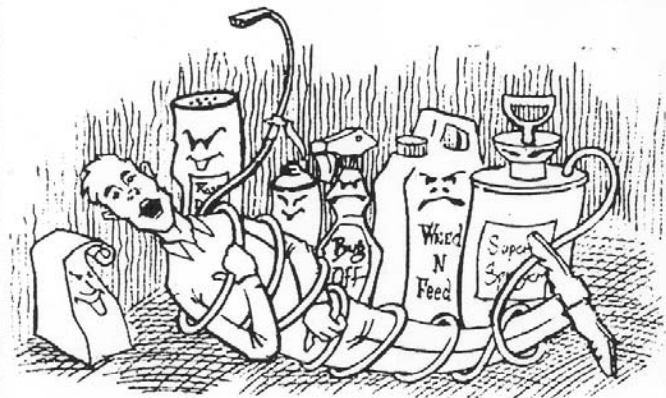
"Also, prevent disposal problems by purchasing only as much pesticide as you need for a given job and by giving away excess usable chemicals to someone else who will apply them properly.

"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:



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.

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

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

] Workshop attended by
~120 homeowners
and applicators

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



Volunteer Monitors Are Citizen Scientists



Top Parameters Lakes & Rivers*

River/Streams

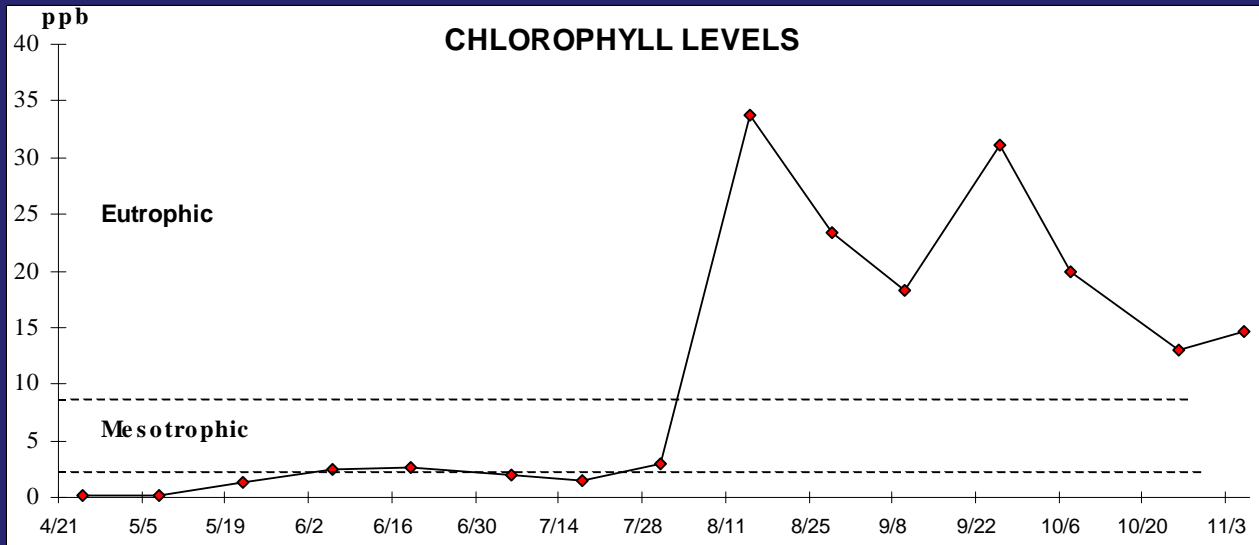
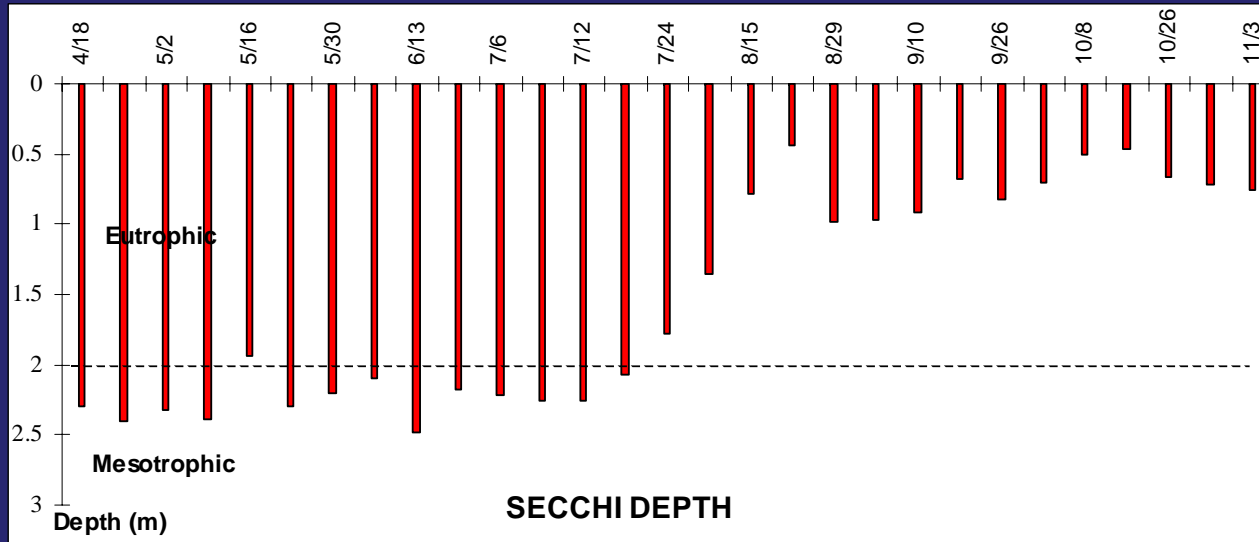
- ❖ Water Temp. (88%)
- 💧 pH (78%)
- 💧 Macroinverts (76%)
- 💧 Diss. Oxygen (73%)
- 💧 Nitrogen (53%)
- 💧 Flow/water level (51%)

Lakes

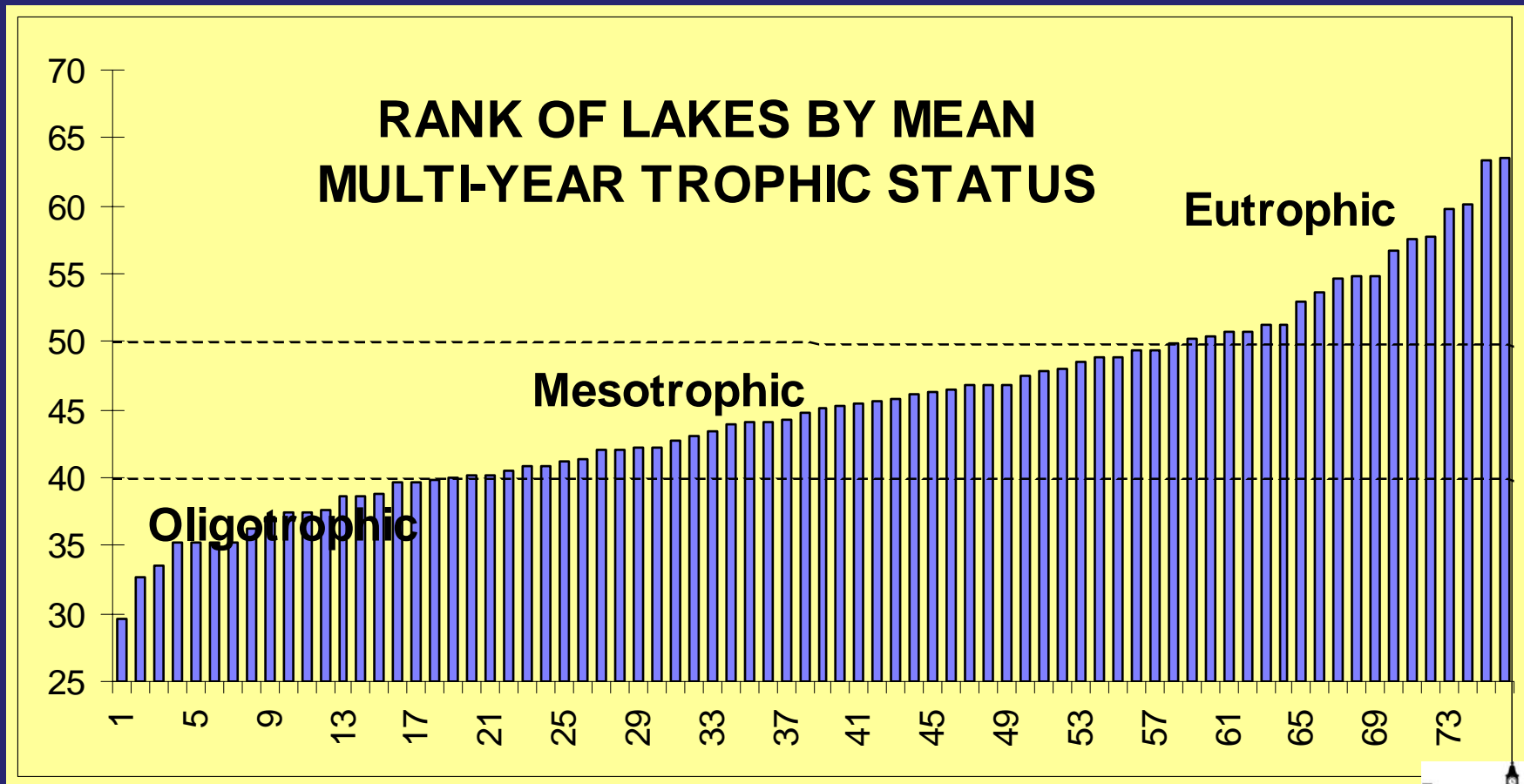
- ❖ Secchi trans. (88%)
- 💧 Water Temp. (74%)
- 💧 Phosphorus (66%)
- 💧 Diss. Oxygen (58%)
- 💧 Chlorophyll (51%)
- 💧 pH (45%)

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

Meadowbrook Pond



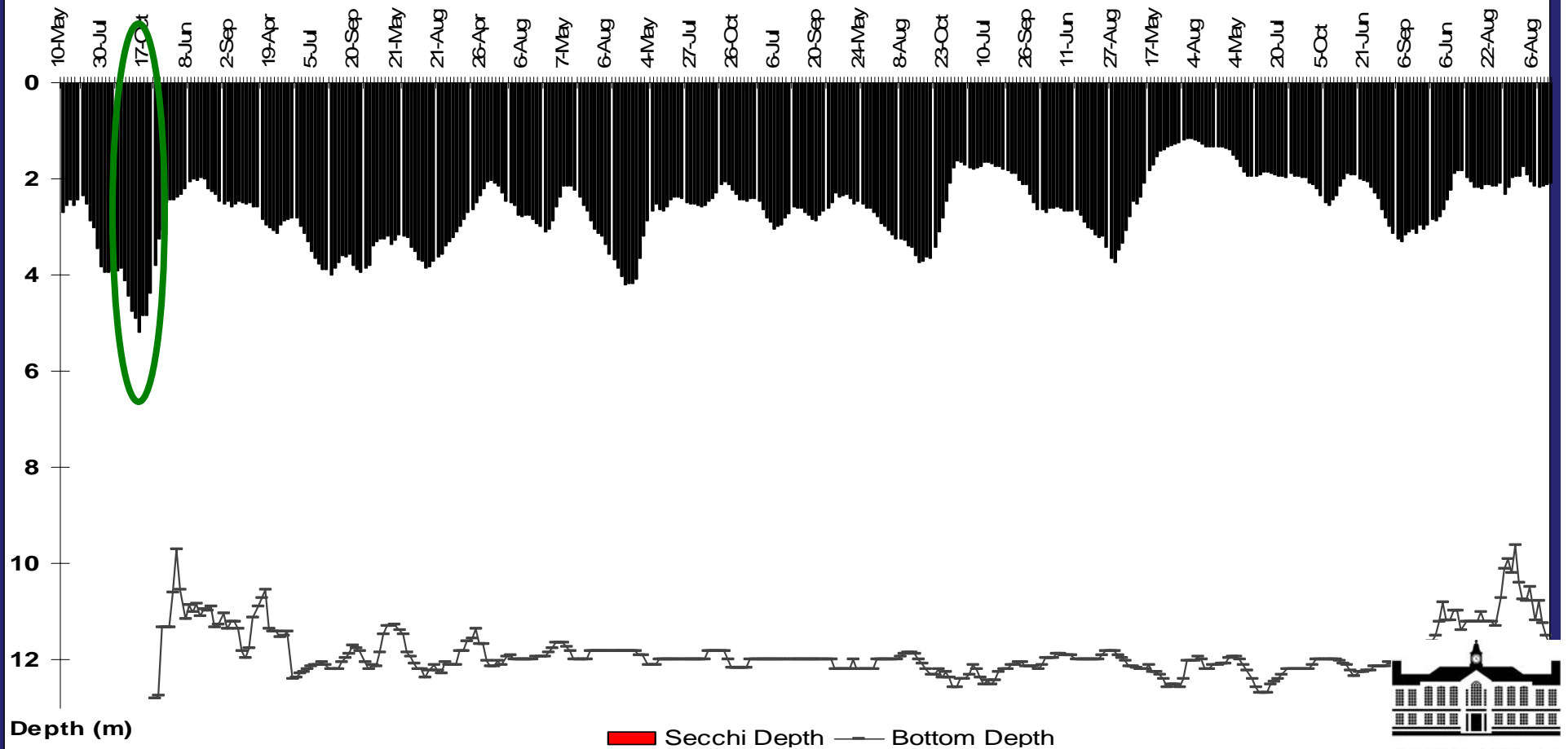
Distribution of Lakes by P TSI



URIWW Locations with 3 or more years of data only

Source of Long term Data

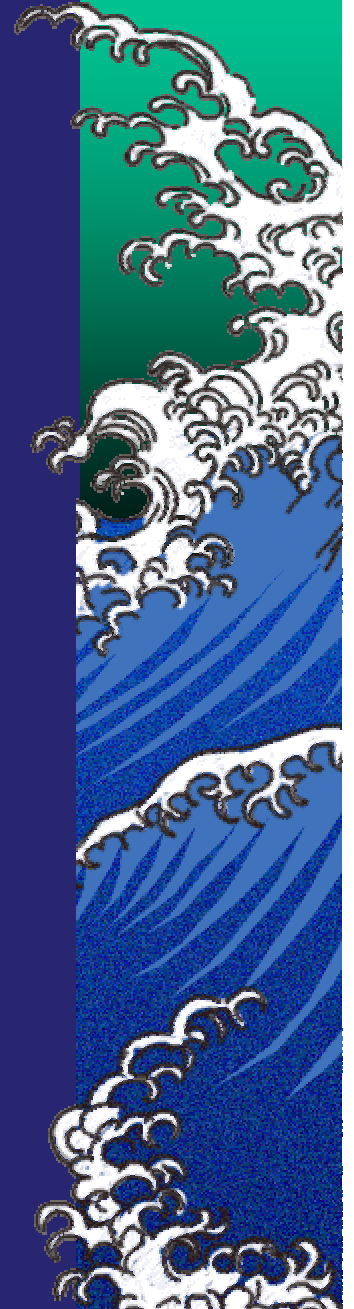
Watchaug Pond - Water Clarity 1988 - 2004, running averages



Total Maximum Daily Load (TMDL)

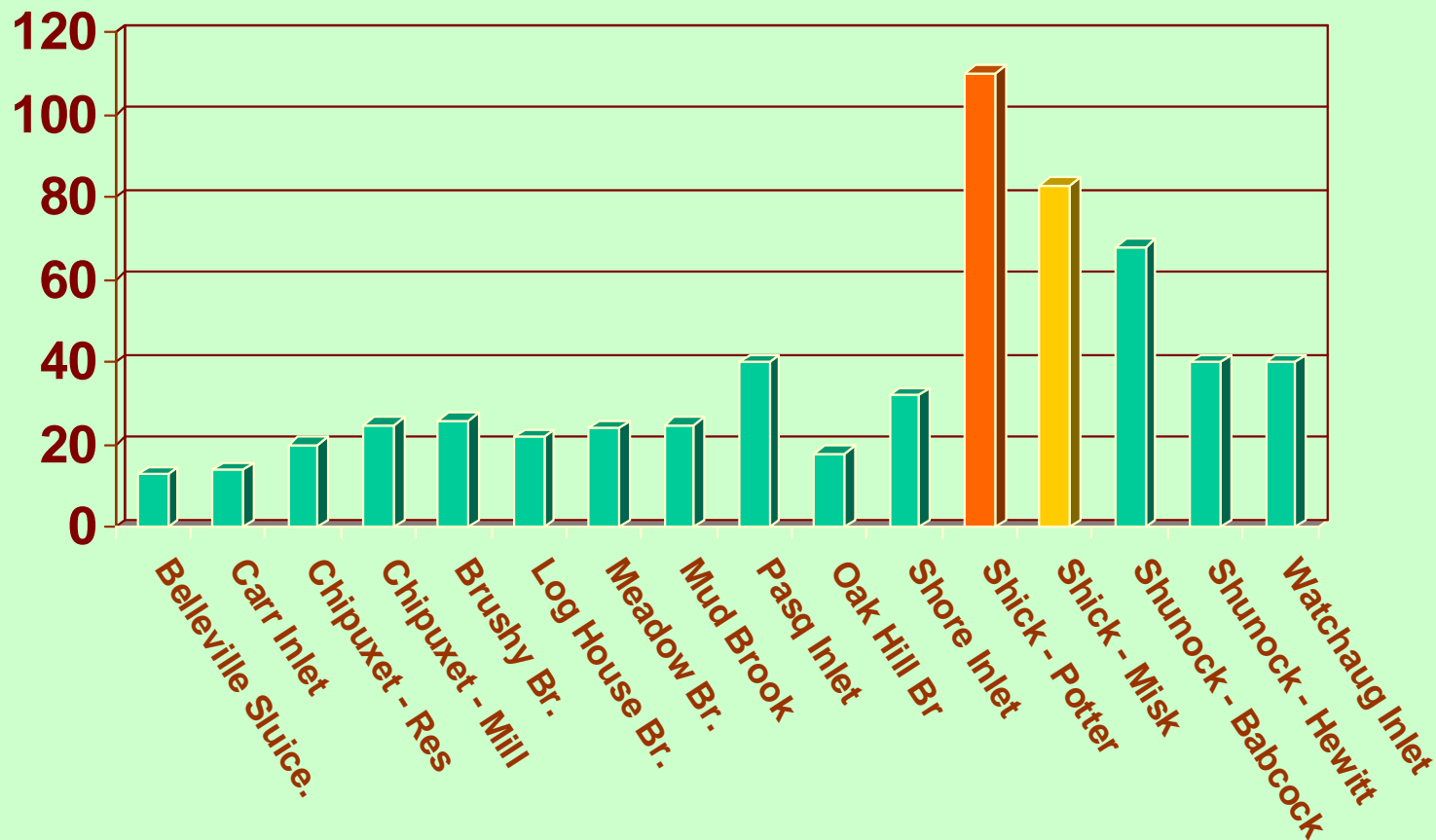
URIWW data used to

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



Lower Order Streams, Southern RI - 1991

TP
ppb



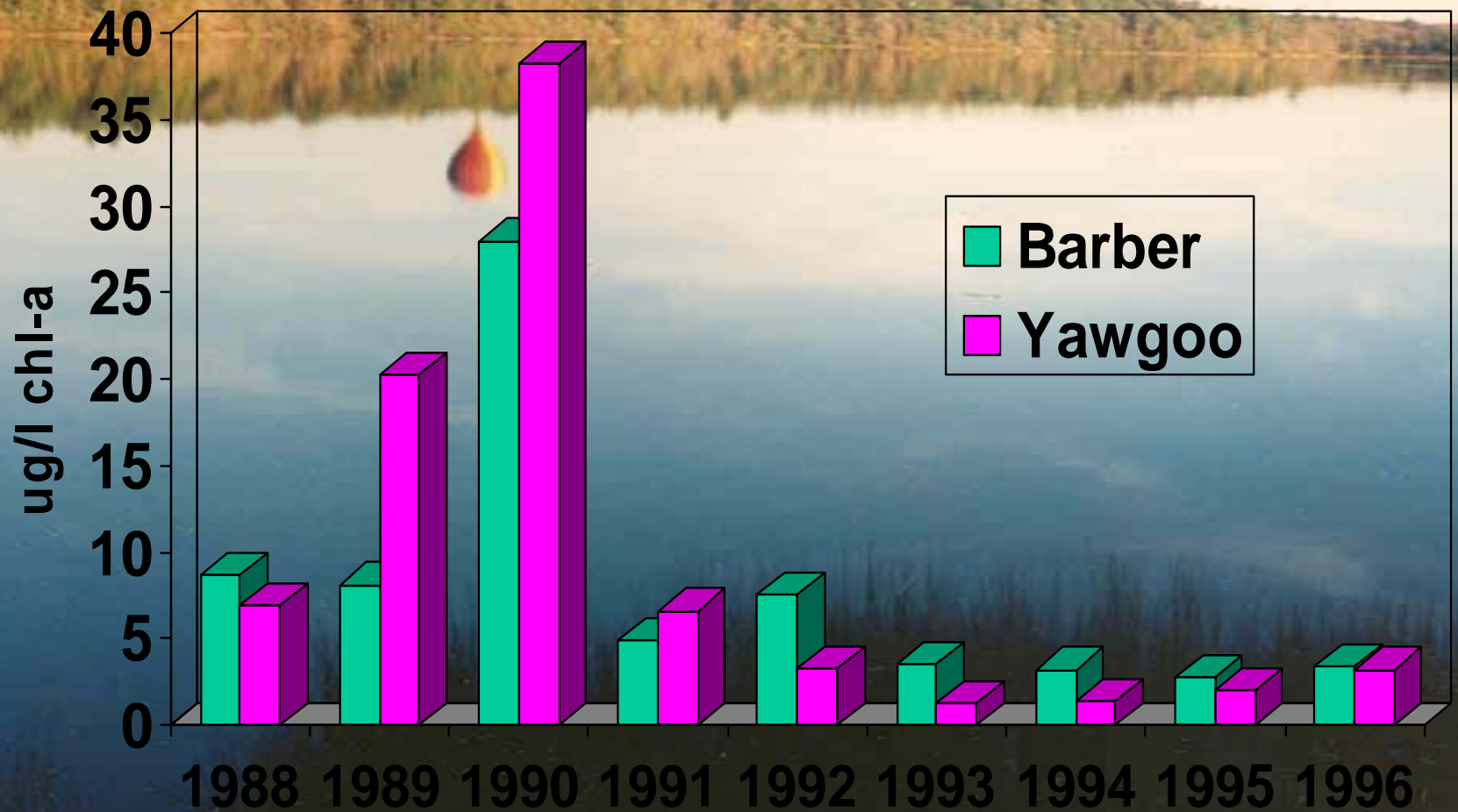
Illegal Shellfish Processor

No provision for proper waste disposal

- ❖ 1975 to 1988 unlined sewage lagoons (= above ground detention basins)
 - ❖ 10 mg/l total P in lagoons
 - ❖ 1 mg/l total P in groundwater
 - ❖ 1130 mg/l Cl in groundwater

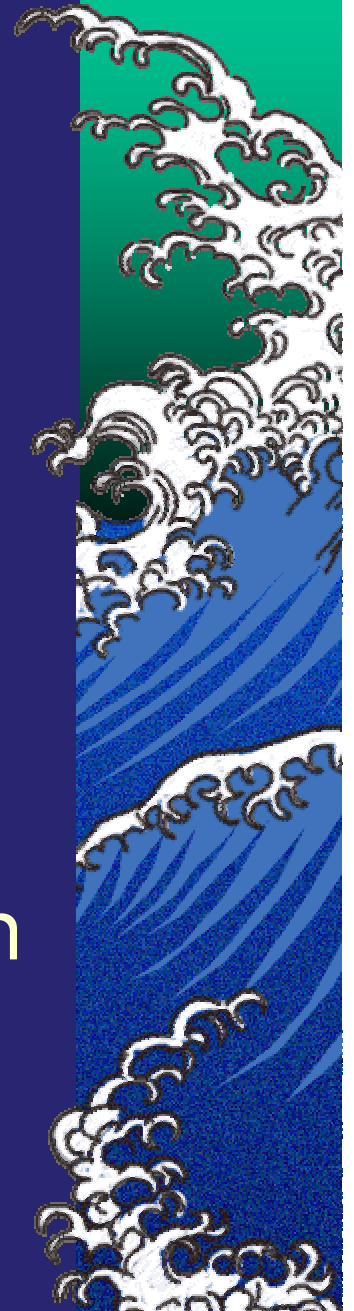
0.025 mg/l P in lakes = algae blooms

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



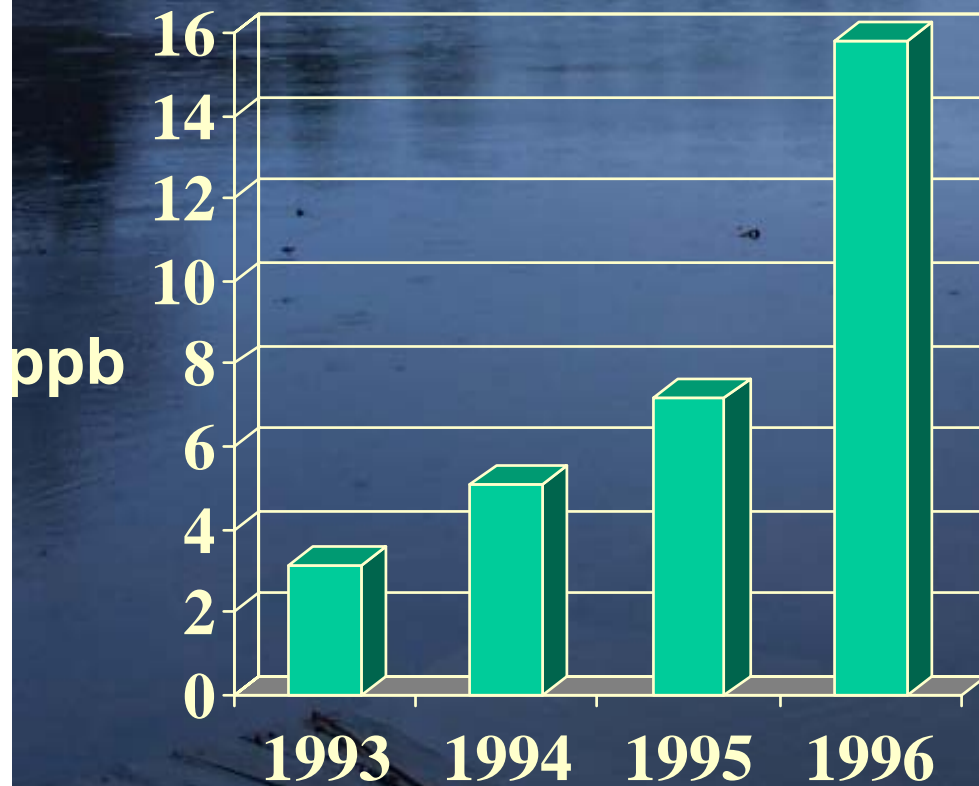
“It is in the marriage of credible data and increased stewardship behavior that the true potential and vitality of citizen monitoring begins to emerge.”

-Steven Hubbell, Colorado River Watch



Stafford Pond

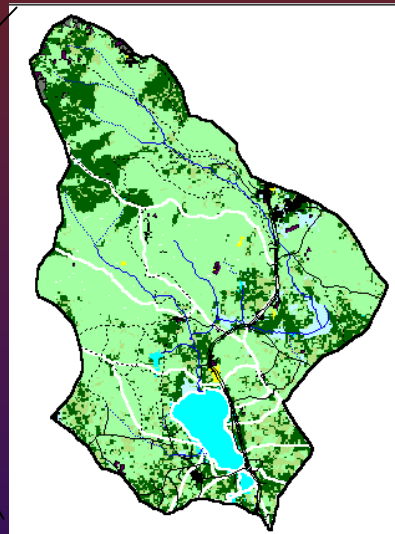
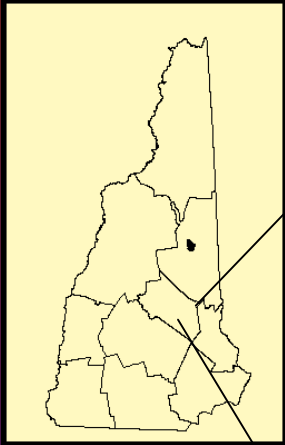
Algal Concentration



❖ 314/319 Grants

- ❖ Diagnostic study
- ❖ Public Education Project
 - ❖ Home*A*Syst
 - ❖ Targeted Factsheets
 - ❖ Residential guide

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



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

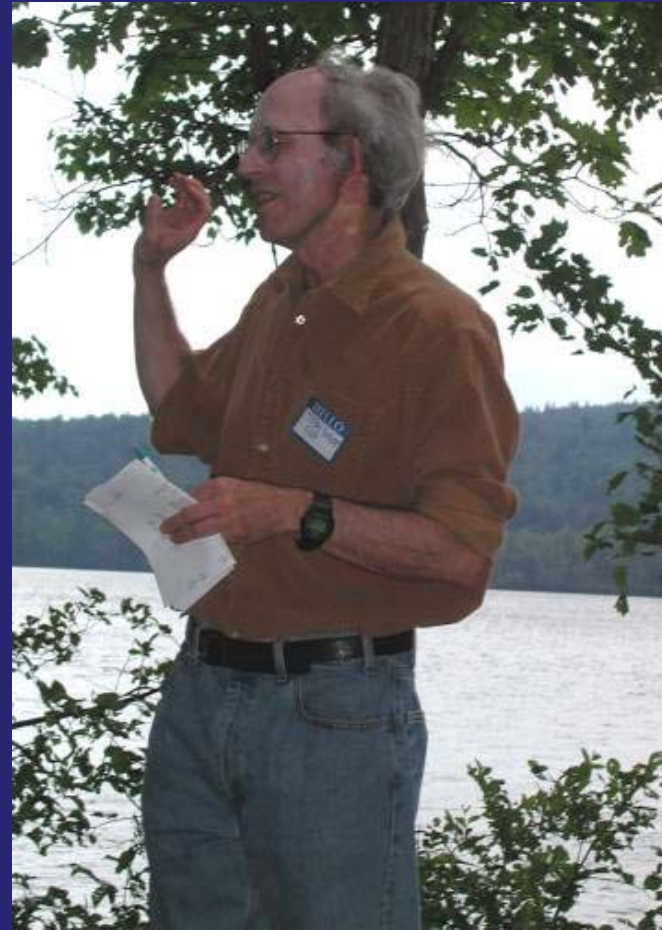
'...it is this type of model
project that we at the EPA want
to support and continue to see
occur ... '

-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’



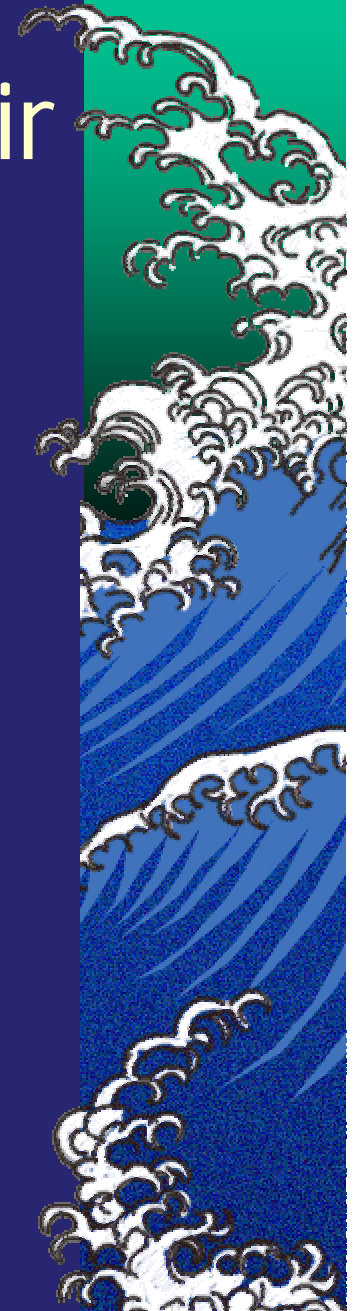
*-Toby Page
Lake Chocorua Association*

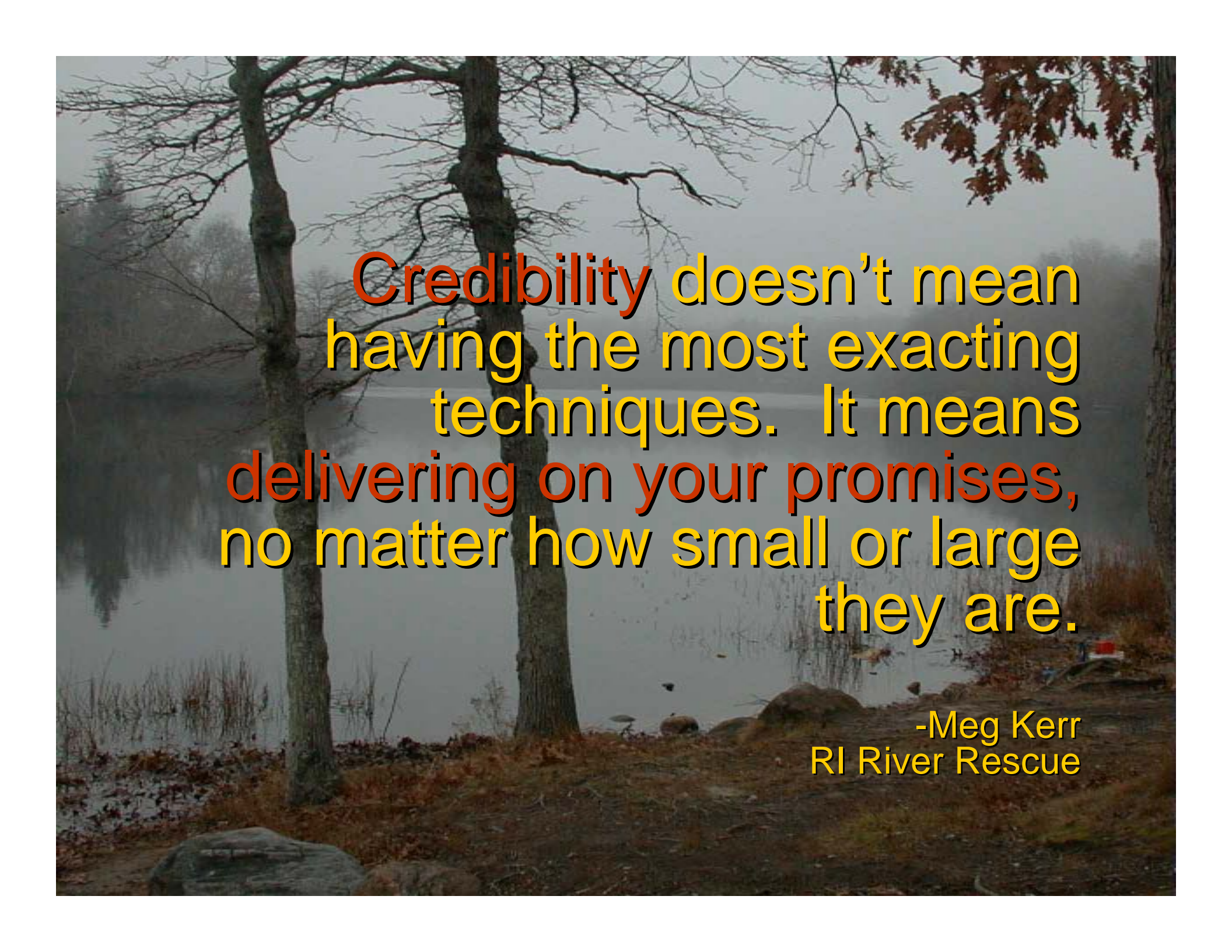


UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

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



A photograph of a river scene with trees and a quote. The background shows a calm river with trees on the banks, some with bare branches and some with autumn leaves. The sky is overcast and misty. The quote is centered over the image.

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

Main Uses of Volunteer Data

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

The Providence Journal

SATURDAY

March 25, 2000

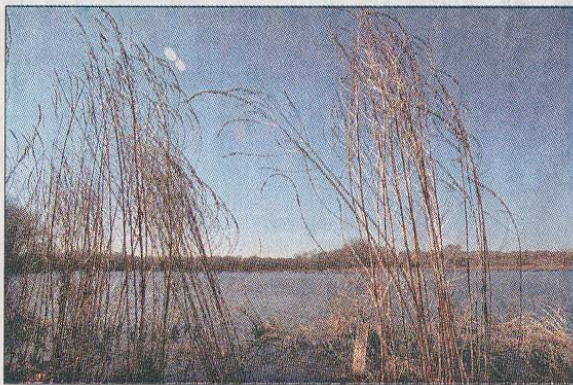
50 cents

\$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.

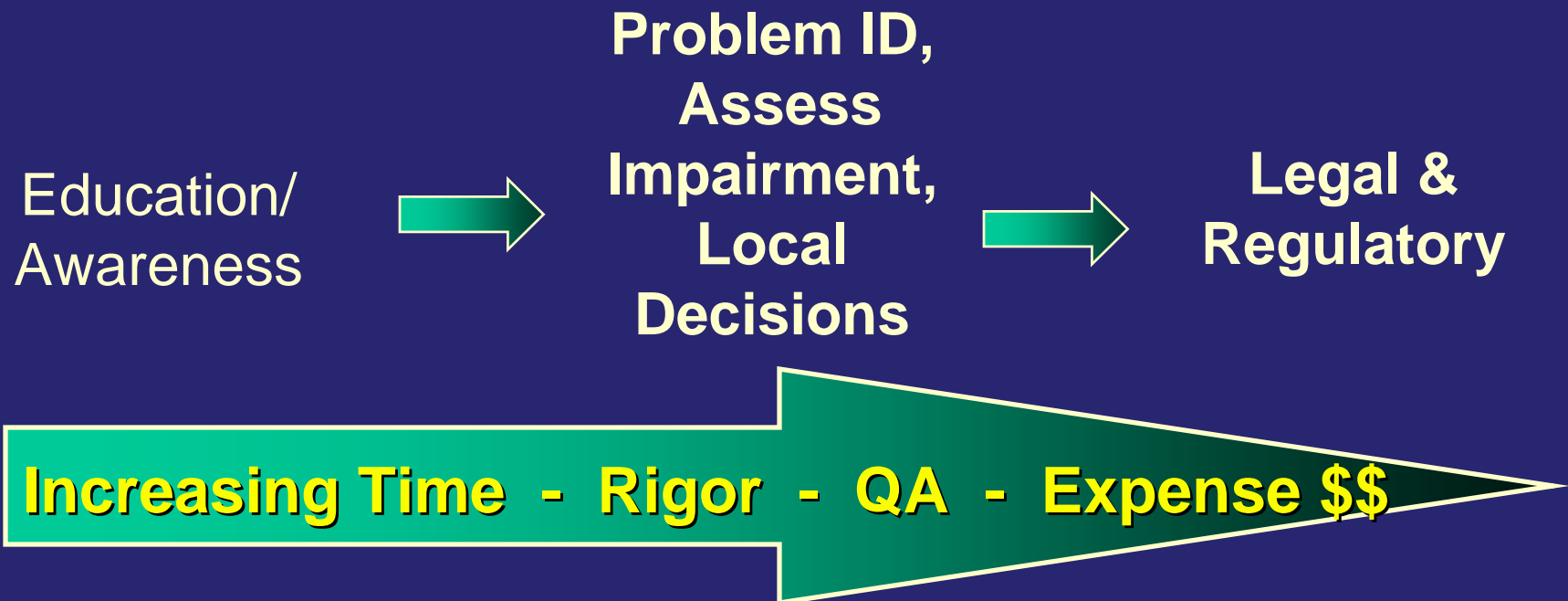
Reports submitted by hundreds of volunteers for URI’s Watershed Watch program showed that last summer’s drought lowered

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

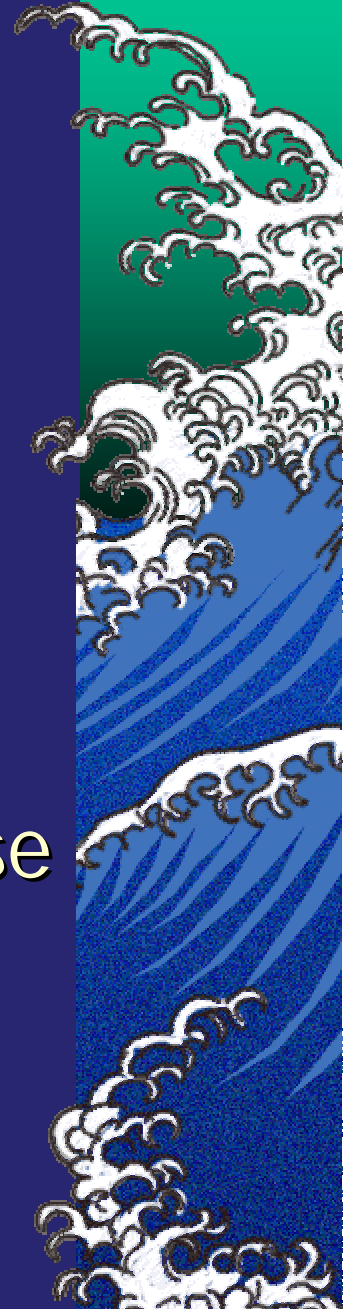
The Continuum of Monitoring Data Use



Geoff Dates, River Network

NJ - Options for Involvement

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



Tier C: Community &/or Watershed Assessment- NJ

Quality Needed

Data Users

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

Data Use

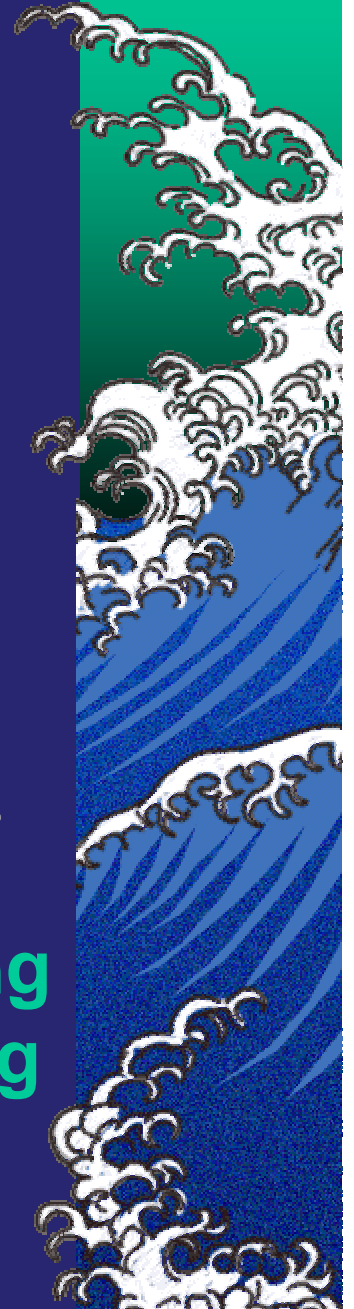
- Assess current conditions
- Track trends
- Source track down of Nonpoint source pollution

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

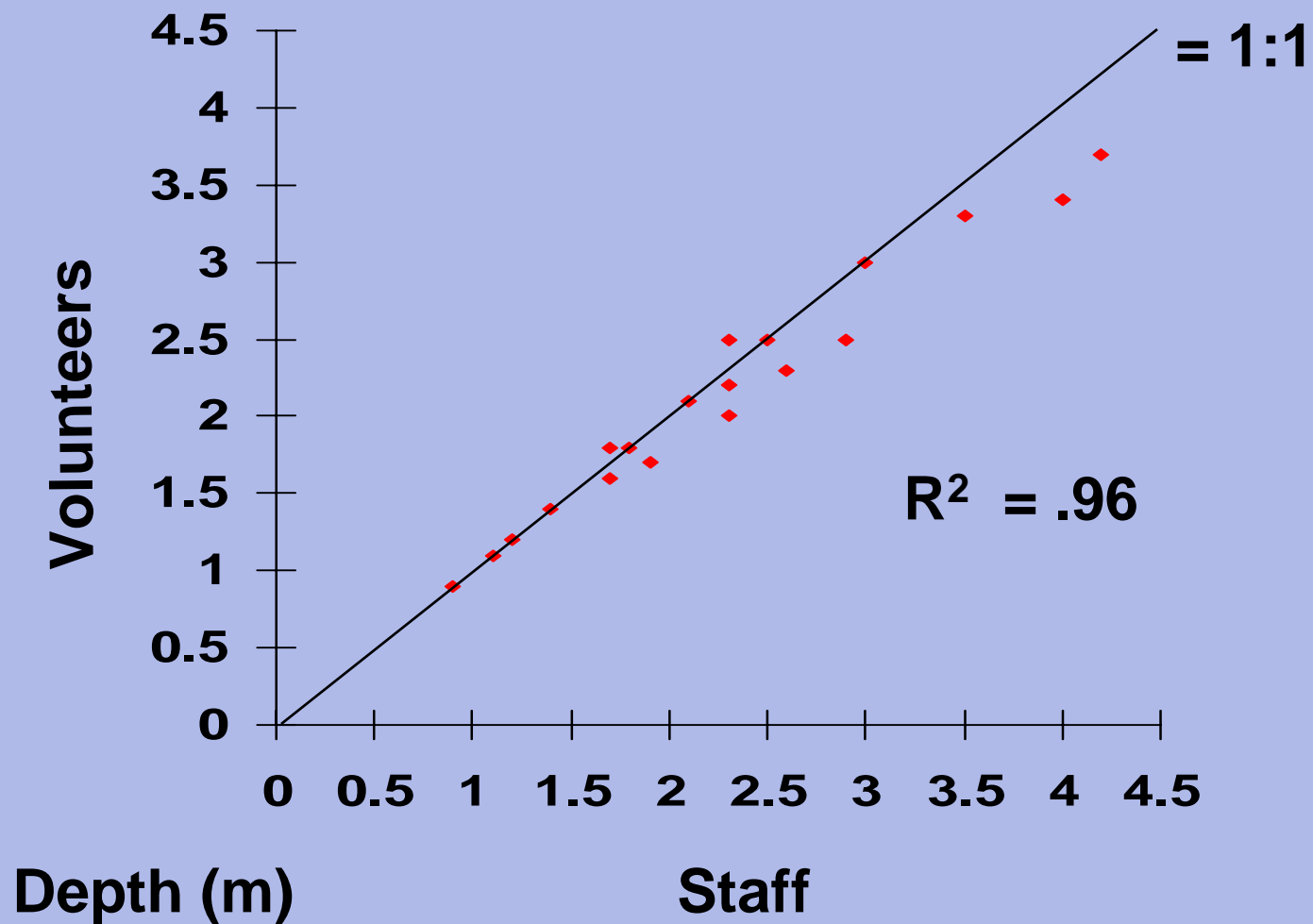
Quality is Assured through:

- ❖ 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.



Secchi Comparison Plot



Methodology: Professional Vs. Volunteer

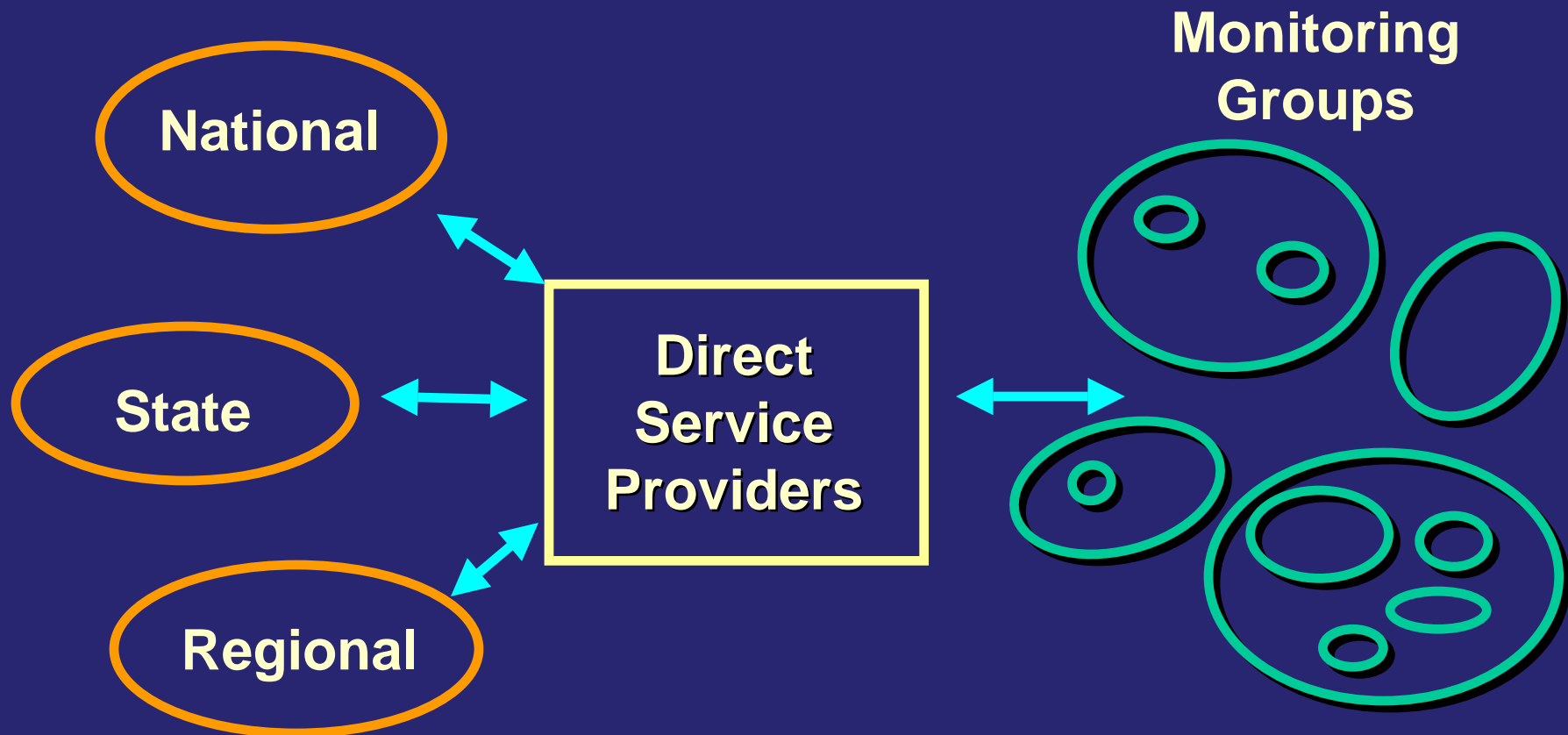


Sampling and analytical methods used are generally comparable to those used by professionals.

Volunteers typically use kits or send samples to professional laboratories.

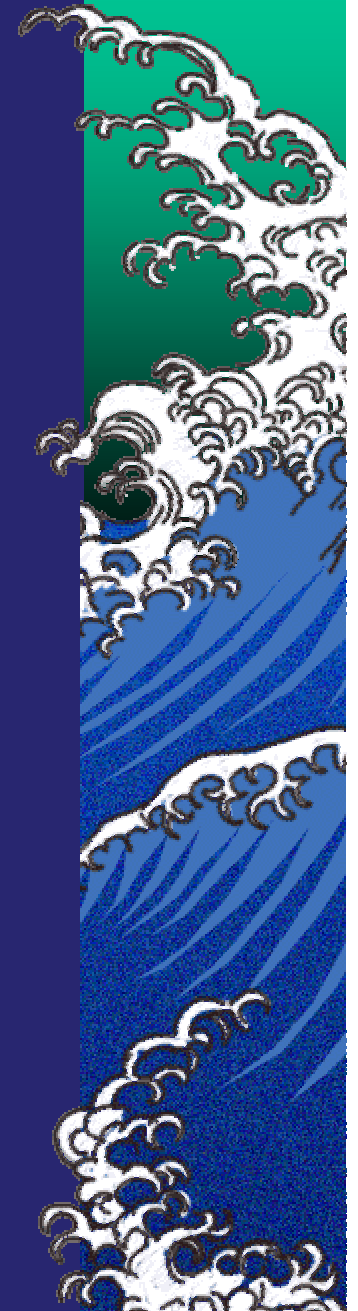


The Volunteer Monitoring "System"



Strong Support by the US EPA

- **Numerous Web sites**
- **Guidance documents**
 - ◆ Volunteer Lake Monitoring: A Methods Manual
 - ◆ Volunteer Estuary Monitoring: A Methods Manual
 - ◆ Volunteer Stream Monitoring: A Methods Manual
 - ◆ The Volunteer Monitor's Guide to Quality Assurance Project Plans
- ***Volunteer Monitor* Newsletter**
- ***National Directory of Volunteer Programs***
- **Volunteer Monitoring List serve (~300 program coordinators)**
- **Workshops**



www.usawaterquality.org/volunteer

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

EPA Volunteer Monitor Listserv Select Archives **NEW!**

Training Modules

Other National Facilitation Projects ➔

- NEMO
- Best Education Practices
- Pollution Assessment and Prevention
- Increasing Tribal Involvement in the Water Quality Network



[River and Lake Restoration: Changing Landscapes](#)

July 12-14, 2005
 Redwood, Maine

Guide for Growing Programs

- Getting Started (914 K pdf file)
- Why Monitoring Makes Sense (582K pdf file)
- Designing Your Monitoring Strategy (1.6 M pdf file)
- Monitoring Matrix (90 K pdf file)
- Effective Training (986 K pdf)
- Monitoring Equipment Suppliers (437KB pdf file)
- Direct Links to Monitoring Programs' Manuals (online)
- Building Credibility (1.5 M pdf file) **NEW!**
- Volunteer Management
- Outreach Tools
- Locating Support and Funding

Special Topics

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



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.



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



Mark your calendars for the
Fifth National Monitoring Conference
Monitoring Networks: Connecting for Clean Water
May 7-11, 2006 – San José, California

In May 2006, the **National Water Quality Monitoring Council** (NWQMC) will present its 5th National Monitoring Conference, *Monitoring Networks: Connecting for Clean Water*. The conference will highlight how various networks – including monitoring designs, information exchanges, and the Internet – connect all of us working for clean water. Networks promote and foster the communication, collaboration, and coordination integral to each of the elements of the Council’s *Framework for Monitoring*. These human, technological, and programmatic support systems create the connections we need to better understand, protect, and restore our water resources.



Of special note...

The conference will provide an expanded national forum for volunteer monitoring program coordinators to exchange information, develop skills, and build better networks. Also, the USGS National Water-Quality Assessment (NAWQA) Program will

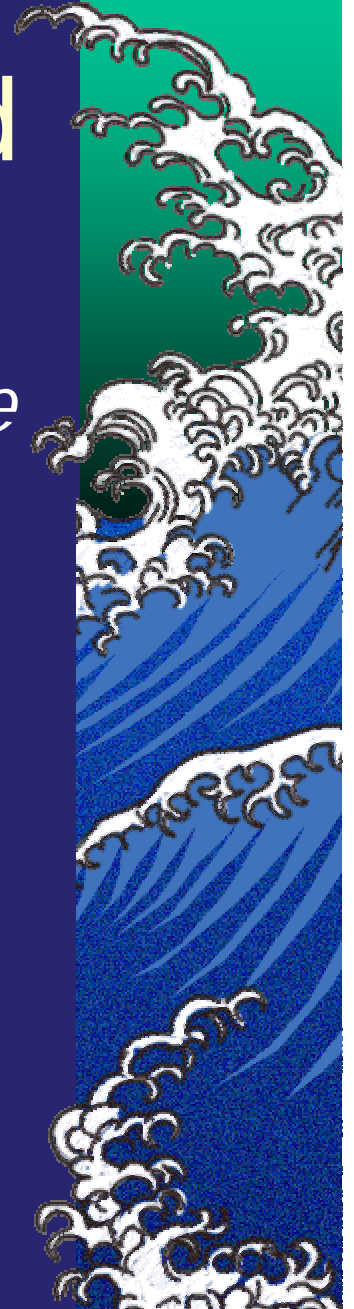
Key themes will focus on:

- Designing monitoring programs and networks at different scales to address multiple objectives
- Linking and sharing data among multiple users
- Establishing and sustaining state/regional monitoring councils, partnerships, and coalitions

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



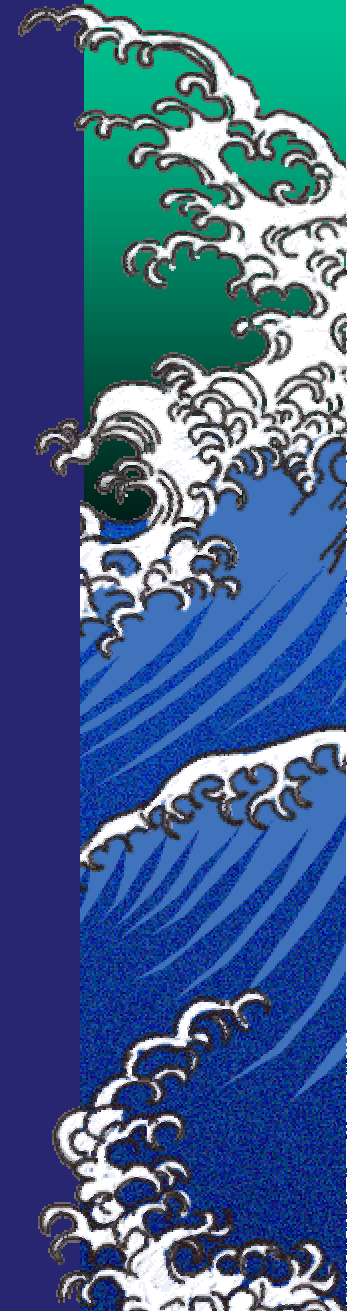
Challenges

❖ Methodology

- ❖ How real time does it have to be? How exact?
- ❖ Volunteer – professional comparisons
- ❖ Involving vs using volunteers
 - ❖ monitoring vs sample collecting
- ❖ Liability issues

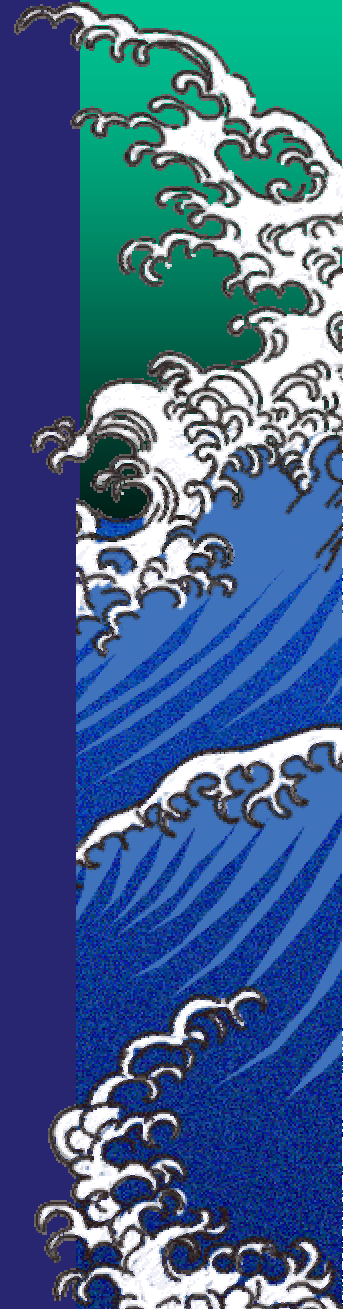
❖ The ever-rising QC bar

- ❖ Will the data stand up in court? Should it have to?
- ❖ Prescriptive techniques vs performance based
- ❖ Data validation issues
- ❖ QAPP's



Challenges

- ❖ Data Handling
 - ❖ Databases vs spreadsheets
 - ❖ Who's data is it anyway?
 - ❖ What route does it take thru an agency
 - ❖ STORET –easier to STOR than RET
- ❖ Funding
 - ❖ Cost-Effective **NOT** cost free
 - ❖ Start-up funding easier than continuation
 - ❖ Community support essential

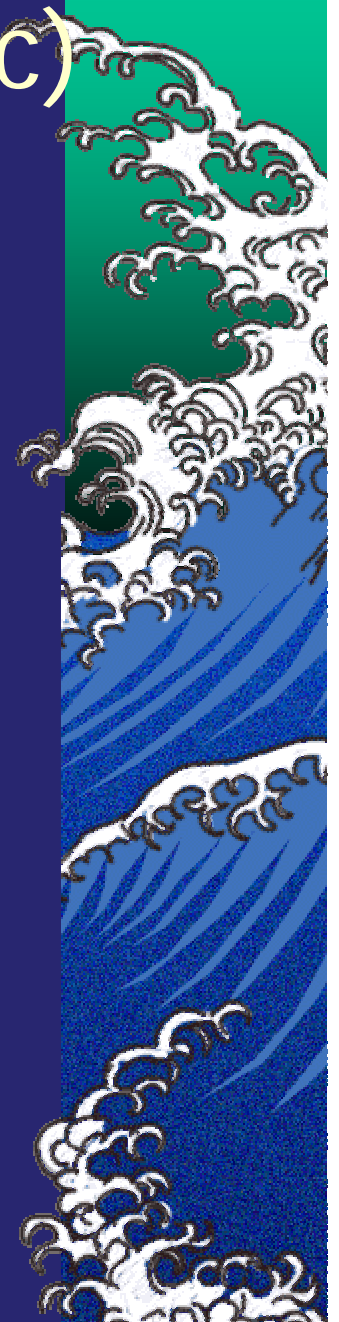


Reality of Using Volunteer Collected Data

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

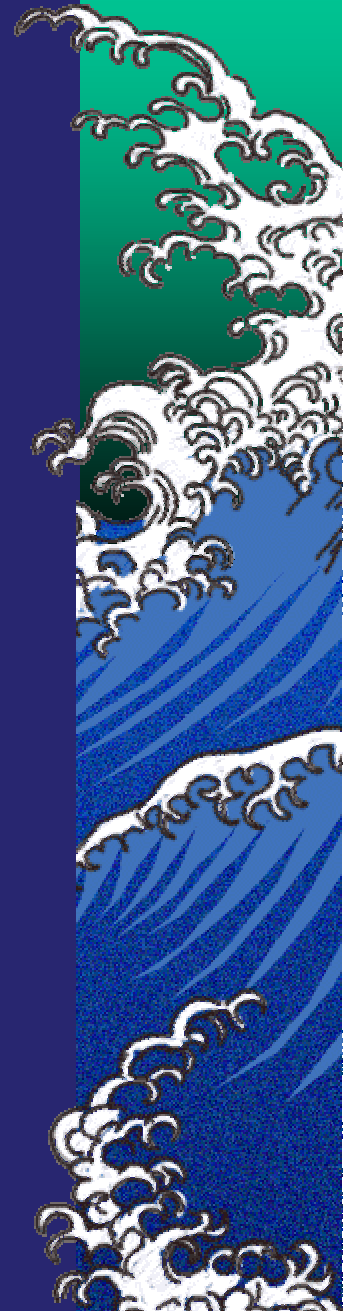
Agency Questions (probabilistic)

- ★ What is the **condition** of the nation's surface, ground, estuarine, and coastal waters?
- ★ Where, how and why are water quality conditions changing **over time**?
- ★ **Where** are problems related to water quality and **what is their cause**?
- ★ Are **programs** to address problems **working effectively**?
- ★ Are water quality **goals and standards** **being met**?



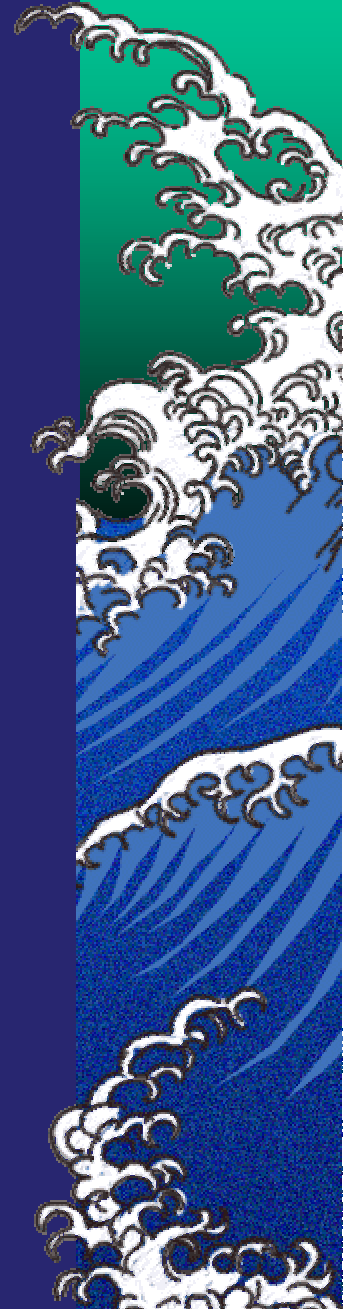
Community and Individual Concerns (targetted monitoring)

- I want to find out what's in my water.
- I think there's something wrong with my lake/river/bay.
- Is it safe to swim in the water?
- Is it safe to drink this water?



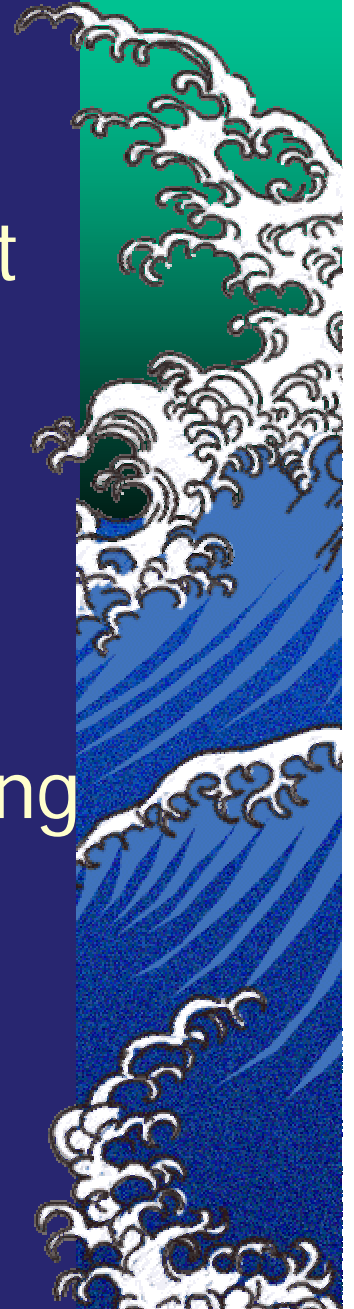
Development of Meaningful Indicators for the Community

- ❖ Agency needs vs organizations needs
 - ❖ Hypoxia vs no trout
 - ❖ Hypereutrophication vs pea soup



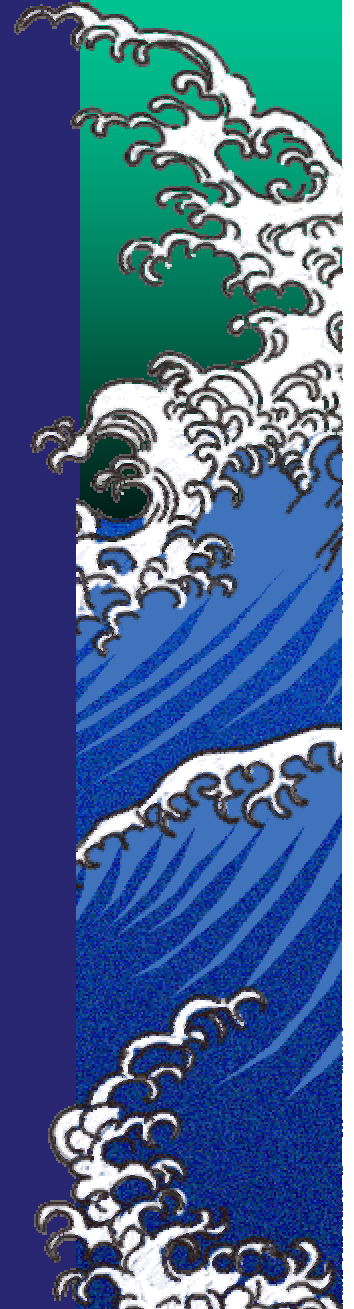
... and issues

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



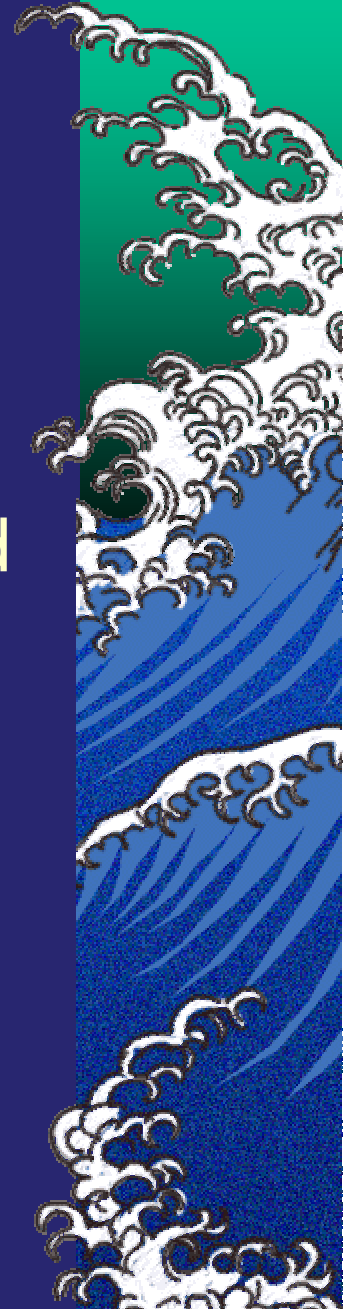
Successes

- ❖ 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



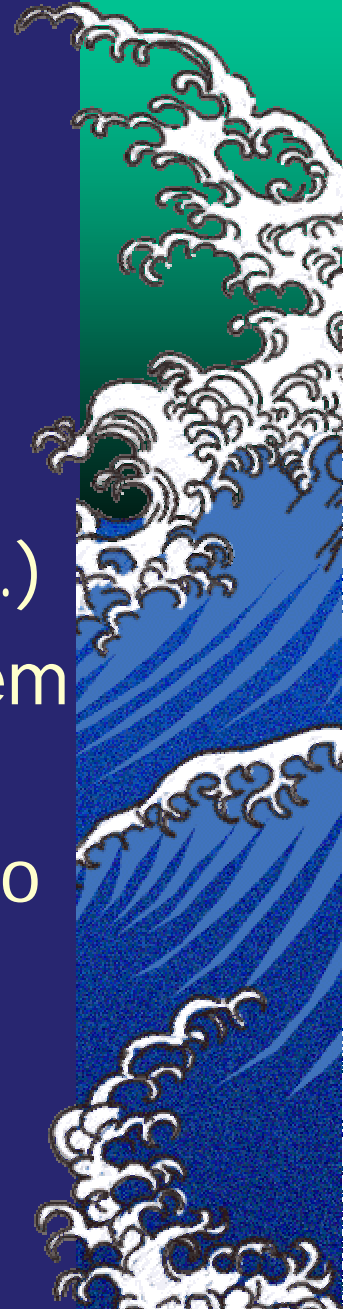
Successes

- ❖ 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



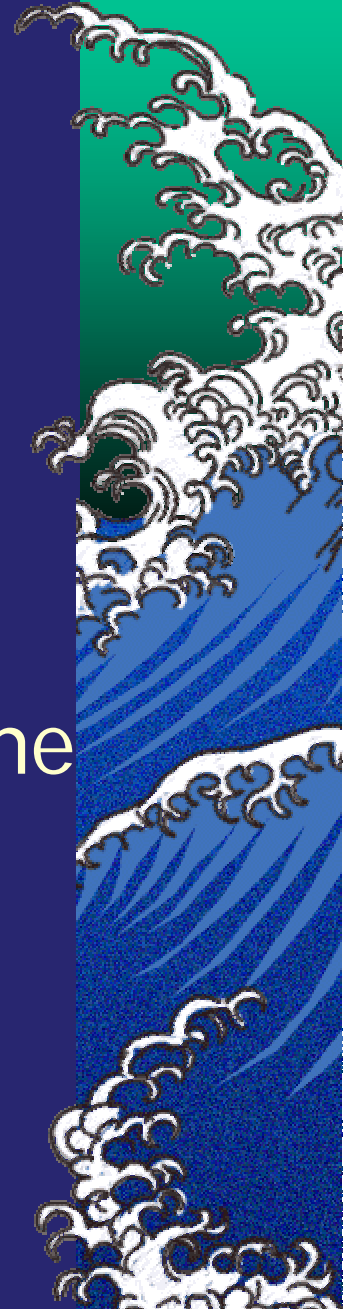
Successes

- ❖ 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



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



Volunteers- The Wave of the Future for Watershed Planning and Implementation - C. Snyder, PA DEP



Remember that only 18% of US waters have been assessed

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Thank you!