NEW JERSEY VOLUNTEER MONITORING SUMMIT

SUMMARY PROCEEDINGS

May 5 & 6, 1995

Rutgers University
Institute for Marine & Coastal Sciences

SPONSORED BY:

New Jersey Marine Sciences Consortium
NJ Sea Grant College Program
New Jersey Department of Environmental Protection

SUMMARY PROCEEDINGS PREPARED BY:

New Jersey Marine Sciences Consortium
Education Program
Building 22, Fort Hancock
Sandy Hook, NJ 07732
(908) 872-1300

Prepared: October, 1995

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ACKNOWLEDGEMENTS

The New Jersey Volunteer Monitoring Summit was convened as part of the New Jersey Volunteer Monitoring Project. The New Jersey Volunteer Monitoring Project was sponsored by the New Jersey Department of Environmental Protection (NJ DEP) Division of Science and Research. The Division of Science and Research provides scientific and technical information to the Department of Environmental Protection, coordinates efforts on standard-setting and complex contamination issues that cross environmental media lines, and acts as the Department's research and development branch. The research program provides a scientific base for the DEP's regulatory, enforcement and legislative actions.

The Volunteer Monitoring Project was conducted by the staff of the New Jersey Sea Grant Education and Outreach Program including John Tiedemann, Director, Liesl Hotaling, Outreach Program Coordinator, and Kerry Lynch, Marine Specialist. The New Jersey Sea Grant Education and Outreach Program is a program of the New Jersey Marine Sciences Consortium (NJMSC) and is funded, in part, by the NOAA Office of Sea Grant and Extramural Programs, U.S. Department of Commerce, under Grant No. NA-36-RG0505. NJMSC is a private, non-profit organization comprised of member colleges, universities and private groups interested in marine affairs. Sea Grant is a unique partnership with public and private sectors combining research, education, and technology transfer for public service. This national network of universities meets changing environmental and economic needs of people in our coastal, ocean and Great Lake regions.

The New Jersey Volunteer Monitoring Summit was held on May 5 & 6, 1995 at the Rutgers University Institute for Marine and Coastal Sciences. The Institute conducts and integrates research efforts on estuarine, marine and coastal processes for New Jersey and the surrounding region.

Editor's Note: Overviews of each presentation made at the New Jersey Volunteer Monitoring Summit were provided by each invited speaker and synthesized into this summary proceedings. Therefore, the reader of this document may find inconsistency between style of the individual summaries. Furthermore, the views expressed herein are those of the authors and do not necessarily reflect the views of NJ DEP, NOAA or any of its sub-agencies. The U.S. Government is authorized to produce and distribute reprints for governmental purpose notwithstanding any copyright notation that may appear hereon.

Edited by John Tiedemann and Liesl Hotaling, New Jersey Marine Sciences Consortium.

New Jersey Sea Grant Publication Number NJSG-95-326.

NEW JERSEY VOLUNTEER MONITORING SUMMIT
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INTRODUCTION

Volunteers and volunteer organizations are part of the American lifestyle. During the past two decades citizen volunteers have become more involved in participating in the management of our natural resources. Some have become active as a result of environmental education efforts while others have responded to local or regional issues that may have a direct impact on their quality of life.

During the past decade trained citizen volunteers have emerged as an extremely useful mechanism in helping to collect various types of monitoring data necessary for effectively managing aquatic ecosystems. Citizen volunteer water monitoring programs can provide for ongoing monitoring of ecological conditions and aid in detecting episodic events and identifying trends or changes in habitats and water quality. Data collected by volunteers can provide resource managers with information on the health and vitality of aquatic ecosystems and be useful to scientists investigating problems such as nonpoint source pollution, nutrient enrichment and eutrophication, the development and distribution of nuisance algal bloom, and identification of critical fish and wildlife habitats.

Citizen monitoring programs are also excellent educational tools. These programs heighten public awareness and understanding about the importance of natural resources and the need for proper management of these resources and create a sense of environmental stewardship among the volunteers and other citizens that they reach.

The U.S. Environmental Protection Agency (EPA) has been actively involved in supporting the nation's volunteer monitoring movement since 1988. EPA has endorsed the use of properly trained volunteers for conducting certain ambient monitoring tasks that can be useful in characterizing water resources and identifying water quality problems and trends and the agency has co-sponsored four national conferences dealing with citizen volunteer water monitoring. They have also been instrumental in supporting the development of the *Volunteer Monitor*, a national newsletter on volunteer monitoring, and provided funds to publish a national directory of citizen volunteer monitoring programs.

In addition to these activities, EPA has worked on the development of a variety of methods and guidance manuals to support citizen volunteer monitoring efforts and advocated the use of volunteer data by state and local governments. For example, various EPA programs being implemented under the Clean Water Act such as the Nonpoint Source (Section 319), Clean Lakes (Section 314), and the National Estuary Programs encourage citizen participation and support state-level volunteer monitoring efforts programs. EPA's guidance to states for the preparation of biennial state water quality assessment reports (Section 305b) also identifies volunteer data as a legitimate source of information.

Over the past several years a variety of citizen-based volunteer monitoring programs have begun to actively collect water quality and aquatic resource data in New Jersey. Although the New Jersey Department of Environmental Protection (NJ DEP) has not officially endorsed any of these citizen monitoring programs, they have expressed an interest in utilizing some of the data collected by volunteers. To that end, in 1994 the NJ DEP contracted the New Jersey Marine Sciences Consortium to assist with development of a base of knowledge related to volunteer monitoring efforts underway in the state.

One of the tasks undertaken as part of the New Jersey Volunteer Monitoring Project was to convene a statewide workshop designed to bring together appropriate state and federal agency representatives, selected scientists, and coordinators of citizen volunteer monitoring programs, watershed associations, and environmental commissions in order to facilitate an exchange of ideas, methods, and protocols pertinent to designing, implementing and managing volunteer monitoring efforts in New Jersey.

The specific goals and objectives of the New Jersey Volunteer Monitoring Summit included:

- Discuss the role of citizen volunteer monitoring in pollution control and watershed management;
- Highlight the essential ingredients for designing and implementing successful monitoring programs;
- Highlight the essential ingredients for providing useful and credible information;
- Discuss ways to manage programs, including motivating volunteers, maintaining volunteer interest, and funding strategies;
- Exchange ideas and techniques for hand-on training when developing monitoring procedures and protocols;
- Create an opportunity to network and exchange information with managers of other programs; and
- Facilitate the building of a successful partnership between citizen volunteer monitoring programs and the New Jersey Department of Environmental Protection.

NEW JERSEY VOLUNTEER MONITORING SUMMIT

WORKSHOP AGENDA

May 5

8:00 - 9:00	Registration
9:00 - 9:30	**Welcome and Opening Remarks** Janice McDonnell, Rutgers University IMCS John Tiedemann, NJ Sea Grant College Program Branden Johnson, NJ Dept of Environmental Protection
9:30 - 10:15	**Keynote Speaker** Cindy Zipf, Clean Ocean Action
10:15 - 10:30	Question and Answer/Discussion
10:30 - 10:45	Morning Coffee Break
10:45 - 11:45	**Morning Session**
	• **Citizen Volunteer Water Quality Monitoring for Science and Management** Joe Farrell, Delaware Sea Grant MAS
	• **Rapid Bioassessment Monitoring Techniques** Al Korndoerfer, New Jersey Department of Environmental Protection
12:00 - 1:30	Lunch and Viewing of Displays and Networking
1:30 - 2:30	**Afternoon Session**
	• **Panel Discussion - The Role of Citizen Volunteer Monitoring in Pollution Control** Meg McQuarrie, Clean Ocean Action Carol Elliott, Alliance For A Living Ocean Eleanor Bochenek, NJ Sea Grant MAS
	• **Panel Discussion - Citizen Involvement in Watershed Management** Virginia Loftin, NJ Dept of Environmental Protection Dennis Reynolds, NY/NJ Baykeeper Fred Stine, Delaware Riverkeeper
2:30 - 2:45	Afternoon Break
2:45 - 3:45	**Discussion, Summary and Wrap-up** John Tiedemann, NJ Sea Grant College Program

NEW JERSEY VOLUNTEER MONITORING SUMMIT

WORKSHOP AGENDA

May 6

8:30 - 9:00	Registration
9:00 - 9:30	**Welcome and Opening Remarks** Janice McDonnell, Rutgers University IMCS John Tiedemann, NJ Sea Grant College Program Branden Johnson, NJ Dept of Environmental Protection
9:30 - 10:15	**Developing QA/QC Procedures and Protocols** Floyd Genicola, NJ Dept of Environmental Protection
10:15 - 10:30	Question and Answer/Discussion Session
10:30 - 10:45	Morning Coffee Break
10:45 - 11:45	**Morning Session**
	• **Data Management, Interpretation, and Analysis** Tod Fairbanks, Stonybrook-Millstone Watershed
12:00 - 1:00	Lunch
1:00 - 2:00	**Afternoon Session**
	• **Motivating Volunteers and Maintaining Volunteer Interest** John Tiedemann, NJ Sea Grant College Program
	• **Funding Strategies** Tom Kellers, Monmouth County Planning Board
2:00 - 2:15	Break
2:15 - 3:15	**Afternoon Session**
	• **Hands-on Training - Methods and Technology** Moderator: Diane Calesso, Jim Kurtenbach, US Environmental Protection Agency
3:15 - 3:30	**Summary and Wrap-up** John Tiedemann, NJ Sea Grant College Program

NEW JERSEY VOLUNTEER MONITORING SUMMIT

SUMMARY PAPERS

KEYNOTE ADDRESS

Cindy Zipf
Clean Ocean Action
P.O. Box 505 Sandy Hook
Highlands, NJ 07732

Clean Ocean Action (COA) is a broad-based coalition of over 175 conservation, fishing, boating, diving, women's businesses, service and community groups. Our goal is to improve the degraded water quality of the marine waters off the New Jersey/New York coast. In order to accomplish this, Clean Ocean Action acts to identify the sources of pollution and mount an attack on each source by using research, public education, and citizen action. Through these actions, it is hoped that our public officials will be convinced to enact and enforce measures which will clean up and protect our ocean and protect our marine resources.

Clean Ocean Action utilizes volunteers to help spread the Clean Ocean Action message. Volunteers participate in COA activities by motivating local businesses and local officials to become involved in ocean and coastal issues. Citizen volunteers are also a direct link to fund raising efforts associated with our activities.

Every spring and fall, COA holds coastwide volunteer beach clean-ups, known as the annual *Clean Ocean Action Beach Sweep Program*. Our hands-on approach helps volunteers learn more about the problems associated with floatables and marine debris and educates participants about how to reduce waste. The Beach Sweep Program has spanned a decade and has allowed me to gain some insight into planning and implementing an effective volunteer monitoring program that I wish to share with all of you as we embark on the presentations and discussions ahead of us here at the New Jersey Volunteer Monitoring Summit:

- Volunteer monitoring programs are powerful educational tools that can motivate citizens and foster their involvement in environmental issues.
- Volunteer monitoring programs need to be planned in a manner that links the monitoring efforts to the end users of the data to be generated.
- Volunteer monitoring programs need to define specific goals and objectives that are clearly articulated to the participating volunteers.
- Volunteer monitoring programs should establish a community connection and establish partnerships with elected officials, governmental agencies, scientists, and the business community.

- Volunteer monitoring programs should establish an educational connection and establish partnerships with upper elementary and secondary schools in order to assist them with incorporation of environmental monitoring activities within their curriculum.

- Volunteer monitoring programs must strive to produce credible, useful information and, once generated, the data must be used by the program in some manner, whether for scientific purposes such as conducting a trend analysis, for policy purposes to stress the need for legislative action, or for public education purposes.

Finally, in order for volunteer monitoring programs to endure, volunteer monitoring program coordinators must continuously foster citizen involvement and interest by keeping volunteers motivated. This can be accomplished by:

- Assigning tasks that are challenging but equate to an individuals talents, capabilities, interests and needs.

- Instilling a sense of pride in the work done on behalf of your organization by the volunteers.

- Providing rewards and acknowledgement of work well done.

- Providing positive feedback to the volunteers so that they see the value of their efforts and the end use of the information that they are collecting.

The factors and considerations above, coupled with the insights that the other speakers will be providing at the Volunteer Monitoring Summit, should enable volunteer monitoring program coordinators to better plan and implement activities that will result in collection of information that can be used for a variety of purposes, including resource management, decision making and public education.

CITIZEN VOLUNTEER WATER QUALITY MONITORING FOR SCIENCE AND MANAGEMENT

The Inland Bays Citizen Monitoring Program

Joseph G. Farrell
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Thank you for inviting me to participate in the New Jersey Volunteer Monitoring Summit. It's an honor for me to have the opportunity to tell you about our experience with the Delaware Inland Bays Citizen Monitoring Program and how we've tried to support the information needs about the inland bays watershed. We've learned a lot along the way.

In the fall of 1990, we (University of Delaware, Sea Grant Marine Advisory Service) received a grant from the U.S. EPA, through the Inland Bays Estuary Program, to initiate a volunteer water quality monitoring program for Delaware's inland bays. The inland bays and their tributaries cover about 34 square miles in southern Delaware and drain a 255 square mile watershed rich in agriculture and tourism. Nutrient over-enrichment and habitat loss have been identified as the two high priority environmental problems facing the bays.

Citizen monitoring was viewed as a way to collect long-term water quality information on the inland bays and to increase public participation and interest in managing and protecting the bays.

From the beginning, our emphasis has been collecting information that can be used to increase the understanding of the inland bays watershed and to support resource management decisions. While we have always tried to maintain a strong public education element in our program, that goal is secondary to collecting information of known quality that is used to support decision making.

We spent the first six months talking to resource managers, marine scientists, and coordinators of other volunteer monitoring programs about everything from identifying gaps in data collection to sampling protocols to recruiting volunteers. We were fortunate to be able to draw on the expertise of scientists at the University of Delaware's College of Marine Studies, state resource managers who were intrigued with how volunteers could support their program goals, and program coordinators from the Alliance for the Chesapeake and Rhode Island Salt Pond Watchers who had maintained successful volunteer monitoring programs over a number of years.

We will begin our fifth year of sampling this spring. The U.S. EPA provided funding

support for the first three years. In the fourth year, we led a hand-to-mouth existence, but ended up getting a small contract from the Delaware Department of Natural Resources and Environmental Control (DNREC) to conduct a clam reseeding program. Last year we received a line item appropriation from the Delaware General Assembly. We have developed a Memorandum of Agreement with DNREC which we hope will provide the basis for an ongoing relationship (and source of funding) with the state.

We maintain a base monitoring program that has varied in size from 20-30 sites. We collect and analyze samples for dissolved oxygen, water depth and clarity, salinity, pH, air and water temperature, and weather conditions on a weekly basis. We also collect samples for nutrient concentrations and bacteria levels at a subsample of these sites.

Many of our volunteers also participate in special projects--projects of fixed durations that are intended to answer specific questions. These include the clam reseeding project, a macroalgae survey, a benthic faunal study, and this spring we will evaluate the impact of stormwater on a dead-end lagoon system in the town of South Bethany.

I believe our credibility is the key to our success in forging relationships with state agency managers and university scientists. We deliver data of known quality to answer specific questions or analyze trends. The key to our credibility is a written Quality Assurance Plan that EPA made us do before we began the program. This is a living document. We revise and update the plan on an ongoing basis. Any volunteer program that is interested in having the data used for anything more than public education needs to have one of these. (EPA has a good guidance document available.)

Don't forget volunteer feedback. Volunteers want to know how the data they collect is being used. As program manager, I consider my most important task to be making sure that the data do get used!

We use a variety of outreach education and volunteer recognition methods to keep volunteers interested in the program, although I think their sense of stewardship is the prime motivator. Included are our quarterly newsletter, the *Volunteer Monitor*, site-specific data summaries, volunteer recognition lunches, an annual summer picnic, a seminar series at the University of Delaware's College of Marine Studies, semi-annual quality control workshops, news media relations highlighting volunteers, and a program exhibit for local environmental events.

If anyone has any questions about starting a volunteer program, I would be happy to share our experience with you.

RAPID BIOASSESSMENT MONITORING TECHNIQUES

Biomonitoring in New Jersey

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Water Monitoring Management - Bureau of Water Monitoring
CN 422
Trenton, NJ 08625-0422

What is Biomonitoring?

Biomonitoring is *a water quality based approach to pollution assessment which uses measurable impacts to the biota as the way to establish the severity and causality of the pollution.*

The Department uses two types of biomonitoring, instream biosurveys and aquatic toxicity testing. Instream biosurveys are most applicable to volunteer biomonitoring efforts.

What is a Biosurvey?

A biosurvey, also known as Ambient (Instream) Biological Sampling, is *the collection of a representative sample of the organisms living in the waterbody in order to measure the characteristics of the biological community.*

Why are Biosurveys a Useful Approach?

- Biota are good indicators of ecological integrity
- Holistic measure of pollution impacts
- Integrated ecological measure of environmental stresses
- Biomonitoring often is the only means of evaluating impacts
- Relatively inexpensive
- Easily understood results

There are a variety of methods available within the umbrella of biomonitoring, each specific to the portion of the ecological community being used as an indicator of overall ecological health.

Biosurvey methods utilize different taxonomic groups including phytoplankton, zooplankton, periphyton, macrophytes, benthic macroinvertebrates, and fish.

The most commonly used methods relate to monitoring the community structure and population density of Phytoplankton, Benthic Macroinvertebrates, and Fish. The U.S. EPA

has standardized the collection, analysis, and data reduction of these and other biomonitoring samples in protocols designed to minimize the per sample manpower costs; those methods can be found in the following document:

> *Rapid Bioassessment Protocols For Use In Streams And Rivers: Benthic Macroinvertebrates And Fish.* U.S. EPA, Office of Water Publication Number EPA/444/4-89-001.

Rapid Bioassessment Protocols

Rapid Bioassessment protocols are a cost effective means of conducting biosurveys that have been proven by the U.S. EPA, NJ DEP, and other States.

Rapid Bioassessment utilizes a tiered system (Protocols I, II, and III). When designing a biosurvey project using these rapid bioassessment protocols, the following variables must be taken into account:

Station Siting

Comparable habitat between stations
(Single habitat v. Multihabitat sampling)

Control Stations

(Site specific & Regional)

New Jersey has incorporated the ecoregion concept, as promoted by U.S. EPA, into its biomonitoring control (reference) station network. The ecoregion concept capitalizes upon the intrinsic ecological similarity between geographically separated areas of the continent.

The strengths of the **Ecoregion Concept** include the fact that it accounts for effects of habitat on biological quality; it provides for ecologically relevant mapping; and it allows one station to represent a whole Ecoregion.

Bracket impact source(s)

(delineate impact and recovery zones)

Summary of Rapid Bioassessment Protocols

There are three Protocols for Benthic Rapid Bioassessment:

Protocol I

Screening or reconnaissance tool; Determine if impairment exists; Indicate generic cause of impairment

Protocol II
Characterize impairment under ***three ratings***; Indicate generic cause of impairment

Protocol III
Characterize impairment under ***four ratings***; Indicate generic cause of impairment

Rapid bioassessment sampling and data management and analysis protocol requirements are different for each of the three protocols:

Rapid Bioassessment Sampling Requirements

Protocol I
Cursory examination; Determine relative abundance; Field ID's

Protocol II
Multi-habitat sampling; 100 Organisms sub-sample ID'ed either in field or lab; ID's to family level

Protocol III
Multi-habitat sampling; 100 Organisms sub-sample ID'ed either in field or lab; ID's to genus/species level

Rapid Bioassessment Data Management & Analysis

Protocol I
Minimal - presence or absence of impairment

Protocol II
Integrated assessment of metrics measuring at family level

Protocol III
Integrated assessment of metrics measuring at genus/species level

Biosurvey Data: How Is It Used?

In summary, how can biosurvey data be utilized by either the New Jersey Department of Environmental Protection or other environmental protection agencies?

- Prioritizing quality monitoring
- Documentation of recovery
- Helps in identification of pollution and its source(s)

THE ROLE OF CITIZEN VOLUNTEER MONITORING IN POLLUTION CONTROL

The New Jersey Community Water Watch Program

Megan McQuarrie
Clean Ocean Action
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Highlands, NJ 07732

Clean Ocean Action is relatively new to the world of water quality monitoring. While our focus has been on ocean water quality, we realize that all waters are interconnected. Clean oceans are dependent upon the quality of the water that feeds into them. In 1994, we decided to expand our focus to inland waterways by sponsoring three Ameri Corps volunteers under the New Jersey Community Water Watch (NJCWW) Program. The goal of the program is to begin urban restoration by focusing on cleaning up inland waterways and establishing a community based water watch program.

Our Water Watchers are responsible for coordinating an education program to teach the communities about their waterways and the specific pollution problems associated with them. The organizers have established a network of volunteers who test the water monthly. Any unusual results are sent to the County Environmental Planner and the Department of Environmental Protection.

We view this program as an excellent extension of our Nonpoint Source Pollution (NPS) Education Program. In order to better manage NPS, Clean Ocean Action and the American Littoral Society have joined in an effort to reach the heart of the problem, people. The NJCWW program allows us to expand our efforts and provide graphic examples of how people contribute to water pollution. The Water Watch organizers have been able to help us identify specific problems by working directly on the water. It is also an interactive and graphic means of illustrating to the community the devastating impacts the people pollution can have on the health of a waterway and subsequently the community.

During the nine months that they have worked with Clean Ocean Action, the Water Watchers have organized two clean-ups, a storm drain stenciling activity, lectured to over 90 different school and community groups, and established a network of volunteer water monitors.

For Clean Ocean Action, citizen monitoring has allowed us to expand our educational efforts in the way of pollution control. More importantly, it has also provided our volunteers with a sense of pride and accomplishment. Rather than just discussing the problems, they are helping us to collect data, clean up the pollution, and educate others. It has become an integral part of our organization.

THE ROLE OF CITIZEN VOLUNTEER MONITORING IN POLLUTION CONTROL

The Crab Connection

Carol Elliott
Alliance For A Living Ocean
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Ship Bottom, NJ 08008

"The Crab Connection" stenciling project is a public awareness program designed to call attention to the fact that what washes or is dropped down the storm drains on Long Beach Island and the mainland flows to and pollutes the bay and ocean - nonpoint source pollution.

Nonpoint Source Pollution is the greatest threat to New Jersey water quality. Contaminants generated by the general public become part of our water cycle and may be ingested by plants, fish, animals and humans. The pollutants come from the runoff of our everyday activities such as the fertilizers and pesticides from lawn care, oil from automobiles, boat discharges, animal waste, septic systems, and littering, which wash down our stormdrains and into the bay.

Studies by the NJ DEP in 1991 concluded the "nonpoint source pollution was responsible for 70% of all beach closings in the state." It also accounts for the failure of many of our state's streams, rivers, and estuaries to meet federal clean water goals.

It became apparent that the public needed to know the facts about nonpoint source pollution. Hence, Dottie Reynolds, a volunteer from the Alliance for a Living Ocean, developed *The Crab Connection* stenciling program in 1991. The original crab stencil was designed by Vinnie Tucci, then a 7th grader at Southern Regional Middle School.

The stenciling can be done at the convenience of the volunteers doing the work. *Crab Connection* stenciling kits are kept at the Alliance for a Living Ocean office at 204 Centre St., Beach Haven. Interested persons need to call (609) 492-0222 to reserve a kit. No fee is charged because most of the materials, such as the paint from the MAB Paint Store in Ship Bottom, are donated. Other stenciling material, such as auto draining paper, was donated by Beach Haven Auto. Today we also use metal stencils designed and donated by Vitols Tool and Machine Corp., in Philadelphia.

Before setting out to stencil, an ALO volunteer demonstrates how to use the contents of the crab kit. At that time, the kit is also double checked to ensure that all necessary materials are included.

Each kit contains a crab stencil. We use the metal stencils on our eco-tours and those made

from the auto draining paper are given out to the general public. Even though the metal ones are nice, they are not as safe for inexperienced hands because they are sharp. In addition to the stencil, paint brushes, ALO blue latex paint, a plastic bag to cover the dirty stencil and brushes, paper towels, hand wipes, a broom and a record list are included.

It is suggested that you first sweep the area in front of the stormdrain to remove any loose dirt or sand. Place the stencil on the clean spot. With just a small amount of paint on the brush, dab the paint onto the crab stencil. Leave the stencil in place for a minute or two after painting so the paint will dry and the crab does not smear when the stencil is removed. For our records, mark down the street areas on which you have stenciled the crabs.

All dirty equipment can be placed in the plastic bag provided and put into the crab kit. The kit is returned to the Alliance office on completion of the stenciling so it can be cleaned and replenished for the next person.

At the end of the year, we tally the number of stormdrains stenciled and report this information to the Center for Marine Conservation.

THE ROLE OF CITIZEN VOLUNTEER MONITORING IN POLLUTION CONTROL

Zebra Mussel Monitoring and Awareness

Eleanor Bochenek, Ph.D.
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The zebra mussel (*Dreissena polymorpha*) is a small freshwater shellfish native to eastern Europe that attains a maximum length of one to two inches. This D-shaped bivalve has alternating light and dark bands on its shell and usually grows in clusters containing thousands of individuals that attach to hard substrates by small threads called byssal threads, in shallow surface waters (6-30 feet deep).

The non-native zebra mussel was accidently introduced into the Great Lakes region in 1986, from bilge water released by European transoceanic ships. They have since spread throughout the Great Lakes and their connecting waterways; the St. Lawrence River; the Erie Canal; several of the Finger Lakes (Cayuga, Canandaigua, Consesus, Keuka and Seneca); the headwaters of the Susquehanna River; the Acathafalaya, Allegheny, Arkansas, Cumberland, Genesee, Hudson, Illinois, Mississippi, Mohawk, Monongehela, Ohio, Oswego, Ottawa, Tennessee, and Vertegris Rivers; the Kawartha chain of lakes in the Canadian Province of Ontario; and many isolated lakes.

Zebra mussels have an enormous capacity to reproduce which enables them to spread to other water bodies at alarming rates. Females can produce more than 30,000 eggs per season. Fertilized eggs develop into free swimming larval veligers that remain suspended in currents for three to four weeks. They then settle and attach to hard surfaces and mature within a year. Adult mussels can withstand drying for several days with their shells closed.

The zebra mussel has already caused a monumental amount of economic damage by fouling power plant, industrial and public drinking water intake pipes, damaging boat hulls, engine cooling systems, docks, navigation buoys, and littering beaches.

Zebra mussels do not have natural predators in the United States and as a result, their exploding populations are disrupting natural food chains and threatening native fish and mussel populations. These mussels compete with resident fish and native mussels for planktonic food. Threatened and endangered native freshwater bivalves are at risk because they cannot compete with zebra mussels for available food and space.

Zebra mussels are dispersed naturally by birds, turtles, and currents and by human activity. Researchers have shown that some of the primary vectors for spreading zebra mussels are natural dispersion, barge traffic, and recreational boaters.

Many New Jersey boaters travel to the Great Lakes, Hudson River, Finger Lakes and other infested waterways to our north for pleasure boating and fishing and could potentially introduce the zebra mussel to a New Jersey waterbody. Larvae could be carried in bilge water or engines of boats transported from one waterbody to another. Even anglers fishing from banks and wading in zebra mussel infested streams, rivers, and lakes could potentially introduce the zebra mussel to New Jersey. For example, many bass tournaments are held throughout the state and participants could potentially spread zebra mussels as they travel from one tournament to another. Furthermore, bait dealers located throughout New Jersey purchase bait such as minnows from other states and that bait could be shipped in water containing zebra mussel larvae which could be carried in bait bucket water and later unintentionally dumped into a local waterway.

Because of the potential spreading of zebra mussels via mechanisms described above, it has been estimated that zebra mussels might find their way into many New Jersey waters within the next few years. In order to prevent the widespread introduction of zebra mussels in New Jersey, it is suggested that water users take precautions now, particularly recreational boaters, by following recommended preventative practices to help slow the spread of the mussels.

Zebra Mussel Watch Program

Many of the first zebra mussel populations in a waterway are accidentally discovered by users of the waterway and not by early detection monitoring systems utilized by industries. This highlights the fact that citizens can prove to be extremely useful in monitoring for the zebra mussel. To capitalize on this fact, Sea Grant has developed a zebra mussel watch program which utilizes trained volunteers to monitor for zebra mussels in waterbodies in the Delaware River drainage basin and other waterways around the state. Over 50 volunteers have been trained to monitor various streams, rivers and lakes.

No equipment is needed to monitor for zebra mussels. Volunteers select a particular area of a stream, river, or lake and then check the aquatic weeds, docks, rocks, and other objects on the bottom for zebra mussels once a month from April through October.

Individuals interested in joining the zebra mussel watch can contact the Sea Grant Marine Advisory Service at (908) 349-1152.

In addition to the volunteer monitoring efforts, public assistance in reporting zebra mussel sightings at new locations is essential to help prevent their spread to other inland lakes and rivers.

How to Identify Zebra Mussels

- Zebra mussels look like small clams with a yellowish or brownish "D"-shaped shell, usually with alternating dark- and light-colored stripes (hence the name zebra).

- They can be up to two inches long, but most are under an inch. Zebra mussels usually grow in clusters containing numerous individuals and are generally found in shallow (6-30 feet), algae-rich water.

- Zebra mussels are the ONLY freshwater mollusc that can firmly attach itself to solid objects - submerged rocks, dock pilings, boat hulls, water intake pipes, etc.

If You Locate a Zebra Mussel

- Note the date and precise location where the mussel or its shell(s) were found.

- Take the mussel with you (several, if possible) and store in rubbing alcohol or place it in a plastic bag and freeze it (in any case, DO NOT throw the mussel back into the water).

- IMMEDIATELY call Dr. Eleanor Bochenek, New Jersey Sea Grant Zebra Mussel Project Coordinator at (908) 349-1152.

CITIZEN INVOLVEMENT IN WATERSHED MANAGEMENT

The New Jersey Waterways Audit

Virginia Loftin
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Office of Enforcement Coordination
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The New Jersey Waterways Audit is an activity for New Jersey Water Watch volunteers and citizens of New Jersey that uses ongoing volunteer efforts to supplement water surveillance and monitoring information collected by the New Jersey Department of Environmental Protection (DEP). Our goal for the Waterways Audit is to have all of the waterways in New Jersey visually inspected for signs of pollution at least once a year. The information received from the Waterways Audit will be entered into the Geographic Information System (GIS) to be mapped into a visual display of the waterways that are being monitored by citizen volunteers. This will give the DEP a clear picture of the waterways that have been audited, those that have been affected by pollution incidents, and waterways that appear not to be impacted. The information provided by volunteers regarding pollution incidents will be used by the Office of Enforcement Coordination to initiate appropriate remedial responses within DEP.

The Waterways Audit form gives examples of objects, conditions or situations that may indicate a possible source of pollution. Please take a Waterways Audit form with you the next time you perform your regular Water Watch activities or the next time you walk the banks or shores of your local waterway. If you should discover an environmental emergency in the course of conducting the audit, the New Jersey Waterways Audit form will detail what information is needed by the DEP. The DEP Environmental Emergency Action Line phone number is included so that a response can be provided as quickly as possible. You are encouraged to perform a Waterways Audit even if you live near a "pristine" water body. Information about clean water is just as valuable as reports of pollution incidents. You are most familiar with your local water resource and are best able to recognize when conditions on your adopted waterway are good or when something is wrong. All information regarding audited waterways will be included in the GIS map and database.

Since we introduced the New Jersey Waterways Audit project to Water Watch groups and expanded the request to environmental commissions, I have been strongly encouraged with the positive response from our Water Watch volunteers as well as unassociated citizens who are interested in the quality of their local waterways. I am now in the process of mapping the responses in GIS and as I get more familiar with the system, I've found that it has amazing capabilities. We can overlay our volunteer survey data with information about impacted/impaired waters, biomonitoring stations, 305(b) information, etc. I am pleased

with your response to our request for citizen-gathered information and by your willingness to provide us not only with completed surveys, but in many cases with large scale maps and photographs.

Our plans for the future include sending Waterways Audit forms to all high school science classes in the state. We think that this would be a good lesson for students on providing valuable information to the DEP as well as learning about some problems in local waterways and how to identify them.

I want to thank all volunteers who have contributed information to the Waterways Audit GIS database so far, and encourage others to survey local water bodies and their surrounding areas. I want to emphasize that all data is meaningful. Its good news for us to learn that there are many waterways in the state that do not appear to be impacted by pollutants or where litter cleanups have resulted in otherwise unsightly waterways becoming attractive and desirable for recreational use again.

We need help from citizens in the state to achieve our goal of having all of New Jersey's waterways surveyed by volunteers. Thank you for your efforts to improve your adopted water resource. If you have any questions regarding the New Jersey Waterways Audit or any Water Watch activities, please call DEP's Office of Enforcement Coordination at (609) 984-5388.

CITIZEN INVOLVEMENT IN WATERSHED MANAGEMENT

The New York/New Jersey Baykeeper Program

Dennis Reynolds
New York/New Jersey Baykeeper Program
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Where New York and New Jersey's largest rivers meet the Atlantic Ocean is a network of waterways known as the New York/New Jersey Harbor Estuary. It includes the Upper and Lower Bays of New York Harbor, Jamaica Bay, Newark Bay, Raritan and Sandy Hook Bays, The Arthur Kill, The Kill Van Kull, and all the rivers and tributaries that flow into this productive, thriving estuarine system.

The Harbor Estuary is an oasis of life in an area that has been heavily impacted by development and industrialization. In the shadows of Manhattan's skyline and the oil refineries on the Arthur Kill, the Harbor's diverse environment provides a home not only for humans, but also for hundreds of species of plants, fish, and animals. The Harbor Estuary is also one of the most important stopovers on the Atlantic Flyway for migrating birds - including waterfowl, waders, songbirds, and raptors. Over 200 species of birds call the harbor home during some time of the year.

The Baykeeper is the citizen environmental steward and watchdog for the New York/New Jersey Harbor Estuary. The Baykeeper was established in 1990 as a program of the American Littoral Society - a national, non-profit public interest organization founded to encourage a better understanding of aquatic environments and provide a unified voice advocating marine and shore protection.

Working to seek solutions to environmental problems in the Harbor-Estuary, the Baykeeper focuses attention on issues that affect the future of its ecosystem; acts as a citizen conservation advocate on the waterways and their shores; stops polluters; monitors water quality and land use; and emphasizes the Harbor-Estuary's ecological productivity and its value as a recreational and cultural resource for all of the 15,000,000 people who live near it.

Baykeeper volunteers are involved with habitat clean-up and restoration, water quality monitoring, educational and administrative work, and other efforts. For each of these volunteer-based activities, the Baykeeper provides training programs and runs a yearly volunteer monitor meeting. Specifically, the Baykeeper Program conducts and coordinates the following projects.

A Citizen Water Quality Monitoring Program. Over 75 volunteers from around the Harbor monitor 26 individual testing sites for a variety of criteria, including pH and dissolved oxygen. Additional testing sites are being added.

An Urban Outreach Initiative. An outreach coordinator works with communities on environmental programs facing urban areas and with inner city youth groups to foster a sense of respect for and understanding of the value of the Harbor.

A Hotline for Environmental Emergencies. If you catch or find deformed wildlife, if you see oil spills, dumping, or fish kills, you can report your sightings to the 24-hour Baykeeper hotline at **1-800-822-9577** for immediate action.

Commercial and Sport Fish Restoration. Aimed at restoring runs of anadromous (migrating) fish to Harbor waters, this program has identified impediments to migration in the Harbor Estuary, and will work to remove them or establish fish ladders to increase the numbers of migratory species to these once productive waters.

A Baykeeper Auxiliary for Boat Owners. Commercial fishermen, tour boat operators, and private citizens are joining together to protect the environmental and recreational value of the Harbor by establishing a fleet presence on Harbor waterways.

Land Conservancy Program. The land conservancy program coordinator initiates the formation of land conservancies and assists existing conservation efforts to help permanently protect wildlife habitats and open space in and around the Harbor-Estuary.

A Speaker's Bureau. Members of the Baykeeper staff are available for speaking engagements, with slide show presentations of the Harbor, its wildlife, and key Estuary habitats.

CITIZEN INVOLVEMENT IN WATERSHED MANAGEMENT

Grassroots Action for Local Streams - State of the Watershed

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The Delaware Riverkeeper Network trains and assists local citizen groups in conducting research so that they become intimately familiar with the land-use and natural resource issues of their home watersheds. Information gathered, both from in the field and from existing Federal, State and local agency data, is summarized, mapped and illustrated to create a State of the Watershed Report and action agendas for the citizens to implement. The Watershed Reports can then be utilized to inform municipal decision-makers, riparian land owners, students and other watershed residents of the current *state of the watershed.* In areas where this process is underway, the citizens have become an effective voice in support of the natural resources of the watershed, and they have even had some fun doing it too. The three key components of a State of the Watershed report are:

Stream Fact Sheets

Using the Delaware Riverkeeper Network format, volunteers produce Stream Fact Sheets which summarize existing information obtained from County Planning Commission's resource inventories, state 305B water quality reports, and agencies such as the Natural Resources Conservation Service, County Conservation Districts and the United States Geological Survey and state conservation groups. "Living histories" from long-time watershed residents can also be valuable. Riverkeeper interns help research and compile agency data and information in Delaware Riverkeeper Network's resource library. The Fact Sheets highlight water quality, notable flora and fauna, land use, pertinent natural resource issues, potential threats, dischargers and local resources.

Stream Surveys

Stream and watershed surveys are conducted as part of the Delaware Riverkeeper Network. Volunteers systematically map stream segments and document problem areas, such as stream bank erosion, sedimentation pollution, riparian areas that lack adequate vegetated buffers (lawn, developments, roadways) and describe land use and other features of each tributary's headwaters. A simple photo essay and/or slide presentation is produced depicting problems, amenities and overall character of each stream and watershed.

Water Quality Assessments

Riverkeeper staff train and assist volunteer to conduct macroinvertebrate surveys (where appropriate) and chemical monitoring at several sites on the stream to create water quality profiles to supplement and compare to existing agency water quality data.

Putting Volunteer-Gathered Data and Information To Use

Data and information that sits on the shelf or in some computer data base is being under-utilized. Riverkeeper, and the many other organizations that assist citizens with watershed protection can and do help citizens utilize their data. However, the individual should not rely solely on those organizations to do something with the information.

A local resident, gathering data on local streams can and should take the responsibility for educating their local land-use decision makers that (1) this information exists, (2) what that information means, and (3) the data and the volunteer can be a valuable resource for their future decisions. The information and your knowledge as a local volunteer streamwatcher can add credibility to your opinions and stances regarding land-use decisions that may impact water quality.

Your information does not have to stop at local government either. Local schools are frequently looking for parents and local citizens to share this type of project and the relevance of it to their students. Plus, you'll be planting the seeds for future monitors. Scouts, Rotary Clubs, church groups, and other civic associations have also expressed interest in hearing about citizen-gathered data and what it means.

Most people get involved with citizen action because they are concerned and want to make a difference. Gathering the data is the very important first step. Putting it to use is the critical and logical next step.

DEVELOPING QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES AND PROTOCOLS

Quality Assurance Issues and the Measurements Process

Avoiding the Three Types of Errors: Systematic (Bias), Random (Unpredictable), or Blunders

- **Standard Operating Procedures**
- **Approved Versus Acceptable Methods**
- **Quality Assurance Project Plans**

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The New Jersey Department of Environment Protection issues an annual Quality Assurance (QA) Management Plan each fiscal year. Within that plan the Department states that it administers programs and regulations that require environmental data of documented quality. The plan states that the NJ DEP's QA program must include documentation of management's environmental principles and objectives, organizational responsibilities, and policies and procedures for the generation, compilation, review, and use of data of documented quality. One of the tasks of the NJ DEP Office of Quality Assurance (OQA) is to develop and administer the QAMP and oversee the QA activities associated with all the Department's environmental programs. The OQA also administers the Department's Laboratory Certification Program for analyses under the Safe Drinking Water Act (SDWA) and the Water Pollution Control Act (WPCA).

In support of the Department's desire to assess and assist the state's volunteer-monitoring groups, the OQA surveyed its WPCA laboratories as to their willingness to provide containers, chemical and temperature preservation, and analytical services to those groups. Of four-hundred certified laboratories, sixty indicated partial or full assistance in these areas including the analysis of microbiology, limited chemistry, metals, organic, and bioassay. This database information was distributed to the attendees of the Volunteer Monitoring Summit.

Secondly, the OQA suggested the concept of "approved volunteer monitoring groups" for future consideration by the Department in having their participation in providing select programs within NJ DEP with auxiliary data. The approval would have three main elements (approved QAPP, PEs, and on-site assessment) and would be specific to an approved Quality Assurance Project Plan for a finite term, usually one year. The approval would be limited to

the testing of water quality parameters (limited chemistry and microbiology). If "EPA acceptable" rather than Code of Federal Regulations approved methods are employed, the approval would be based on an OQA assessment of quality of the EPA acceptable method. Certification requires the use of codified methods. (Editors note: As of this writing, such an approval process is not available from the NJ DEP; however, it might be available in the future if budgetary and other constraints can be resolved).

The "approved volunteer monitoring groups" would have testing and reporting of EPA performance evaluation (PE) samples or third-party QA materials during the term of the approval. The results of the PEs or QA material would be reported to the OQA and within final reports from the volunteer groups.

Each QAPP approval would include an annual on-site assessment, a technical systems audit (TSA), by the OQA.

Finally, the OQA presented background information on the quality assurance issues and the measurement process, avoiding the three (3) types of errors: systematic (bias), random (unpredictable), or blunders. The use of QA objects including developing comprehensive standard operating procedures (SOPs), approved versus acceptable methods, and quality assurance project plans (QAPPs) were suggested.

These QA issues were presented at the level that the Department would normally expect for use as data in its decision-making process. These QA issues were shown to the leaders of volunteer monitoring groups in their consideration for what may be included in their programs. The Department programs that may in the future decide to use volunteer monitoring data may wish to have some or most of these QA issues covered in the approved QAPP.

For the near term and on a personnel resource availability, the OQA is available to assist volunteer monitoring groups with technical advice, field TSAs, quality assurance project plan reviews on a general basis. If Department programs desire to engage volunteer monitoring groups on gathering auxiliary data, the OQA will perform those functions as a work-related task.

DATA MANAGEMENT, INTERPRETATION AND ANALYSIS

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The Stony Brook Millstone Watershed covers 265 square miles crossing the six counties of Mercer, Hunterdon, Somerset, Middlesex and Monmouth in New Jersey. The watershed drains into two major streams, the Millstone River and the Stony Brook. Water in the Upper Millstone River moves slowly through the Costal Plain while the Lower Millstone River, and the Stony Brook drain through the steeper Piedmont region. Carnegie Lake is at the edge of the Piedmont and Costal Plain and joins the Stony Brook to the Millstone River through its long, narrow, shallow manmade basin.

The Stony Brook Millstone Watershed Association has monitored 15 to 20 sites along these streams and lakes since 1992. Chemical and physical data are collected every two weeks. In addition we test several sites for algae growth and macro invertebrate biological monitoring has begun this year. Community volunteers measure water and air temperature, pH, turbidity, nitrates, phosphates and dissolved oxygen using a LaMotte field kit. Sites are selected to monitor sub-watersheds but usually not to bracket a single point source discharge site such as a sewerage treatment plant or golf course. Data are collected on a pre-coded form and sent to the watershed office to be checked and computerized. We run various statistics on the data to aid in the detection of problems with the sample sites and to summarize the large amount of data. In addition, our stream watch program has a quality assurance system that monitors the progress of the stream monitors and their reagents.

To complete the loop from the collectors to the computer and back to the collectors charts, we produce graphs that help monitors visualize problem areas. We also produce other graphics for presentations to advisory committees, strategic planning committees, visitors to the watershed headquarters, governmental organizations and for education in the local schools and companies.

The data are further analyzed using the algal data to help explain the chemical and physical results. Typical data show elevated nitrates and phosphates downstream from sewerage treatment plants. These elevated nutrients correlate well with increased growth of the filamentous green algal species of Spirogyra, Cladophora and Hydrodictyon. Year-to-year the lake sites show the typical algal successional growth patterns also correlating with levels of nutrients and temperature.

In the future macro invertebrate identification data will be added, helping interpretation of results. The next level of integration of results will be with the use of the GIS system. We will correlate our chemical, physical and biological results with land use, geology, weather and other parameters that will be available through the GIS system.

Although we are a young organization of stream watchers, we feel that we are on the correct path with our procedures and plans. Of course we are always looking for new methods and ideas that will help us to continue to improve our monitoring process.

MOTIVATING VOLUNTEERS AND MAINTAINING VOLUNTEER INTEREST

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Ingredients for Effective Management of Volunteer Monitoring Programs

With proper planning, organization and management, citizen-based environmental monitoring programs can be excellent tools for collecting baseline data, monitoring environmental conditions, supplementing ongoing scientific endeavors, or generating public awareness of critical environmental issues. The challenge to managers of volunteer programs is to strive to become the best manager possible.

The ingredients for effective management of volunteer-based environmental monitoring programs include:

- Organizing for action by focusing the program in areas where there will be a good chance of success and impact from the activities.

- Planning a strategy that entails setting objectives (e.g., collecting data, monitoring conditions, motivating citizen action, etc.) and goals (e.g., types and quantity of data sought, time frame for collection, products to be produced, identifying users of this information, etc.).

- Recruiting effective volunteers, including some professionals who possess a variety of special skills, education, and experience that will benefit the program.

Ingredients for Maintaining Motivation in Volunteer Monitoring Programs

As outlined above, proper organization and planning are critical to implementing a citizen environmental monitoring program. However, once up and running there are a multitude of things in need of attention in order to maintain the momentum of the program and maintain motivation in volunteers.

The satisfying factors that involve feelings of achievement, growth and recognition that a person experiences in a job are known as motivators. Prime motivators include recognition for accomplishments, challenging work, increased responsibility, and opportunities for growth and development. In environmental monitoring an additional motivator is a knowledge of the importance of the data being collected or work being performed.

Managers of volunteer monitoring programs must continually focus on holding peoples interest in the program. The best motivator to keep volunteers on the job is the work itself. Tasks offered to volunteers must be full of motivators and must allow the volunteer opportunities for developing new skills, gaining self awareness and self-esteem and the chance to "become" or "self-actualize".

Regardless of their objectives, one of the most important criteria for a program manager to evaluate is whether the program is maintaining participation and attracting new people. Managers of citizen monitoring programs and environmental organizations must keep volunteers motivated and generate support for their efforts by utilizing all available methods of public participation and education. Therefore, the prime motivator to keep volunteers on the job is designing tasks and supervising volunteers in a way that allows for and encourages growth. By working together closely, managers and citizens can produce results that meet and often exceed the goals and objectives of environmental monitoring programs.

The ingredients for maintaining motivation in volunteer-based environmental monitoring programs include:

- Communicating the importance of the data being collected and work being performed.
- Providing sound training and ongoing learning opportunities.
- Providing opportunities for personal growth and development.
- Recognizing a volunteers special talents or areas of interest and assigning tasks to fit those interests/talents.
- Giving experienced volunteers increased responsibility.
- Providing accessibility to program managers.
- Communicating with volunteers through publications, meetings, phone networks, reports and newsletters.
- Recognizing individual and group efforts through awards or certificates of appreciation and other means that acknowledge outstanding contributions and call attention to the program and its accomplishments.

FUNDING STRATEGIES

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Introduction

We knew we wanted to develop an environmental planning structure in Monmouth County using watersheds and/or watershed assemblages as planning and management units. We also knew we wanted as much official and citizen participation as we could get. We recognized the work that other groups in the County were doing, and structured our effort to support their programs. We therefore knew from the beginning what we wanted to accomplish.

We did not worry about what our effort would cost or whether or not funding was available to get started. I call this approach the "Fields of Green" method. If the program had any value, that value would be recognized by the community and support would be forthcoming. If the support was not there, we were wasting our time and would have to appraise the program to decide what the next step might be. We followed two very pragmatic rules: "People like to go with winners", and "For a nickel more, you can go first class." We therefore developed a structure, and sold the structure to municipalities and citizen groups never forgetting the famous words uttered to Kevin Costner, "Build it, and they will come".

Program Structure

Without going into detail, we were able to map and organize Monmouth County into nine Environmental Planning Regions based on watershed assemblages. With the support of the County Planning Board and Environmental Council, Regional Environmental planning Councils were established in each of the Regions.

We knew we wanted to assemble detailed Environmental Resource Inventories in each of the Regions, and the Inventories would contain environmental data that would enable planners, engineers, and municipal leaders to make decisions on empirical values. The data would permit us to calibrate computer models by establishing a body of baseline information. It would also enable us to measure environmental changes over time.

Water Resources was to be a major element of the Inventories, and we knew we would need water quality data and stream discharge data on a sub-watershed basis if our work was going to have any significance. We then structured the program with a sharp focus on collecting that data , and asked the Regional Councils to assemble volunteer data collection teams to do the work.

We knew we would need support for the purchase of test kits to get things moving, so we talked to the vendors first, and asked them to support a field workshop to demonstrate how the equipment was used, its price, and how to order. Concurrently, we asked each of the County Environmental Council members to be regional coordinators to begin the task of assembling the data collection teams.

We suggested going to the High Schools so, for the long haul, we would have a chance to institutionalize the data collection process. We asked the municipal environmental commissions to support the process by purchasing test kits for donation to the schools. At the same time, citizens who heard of the work we wanted to do, stepped forward and asked what they could do to help get a program underway.

Naturally, we suggested they make a cash donation to the municipal environmental commission, or purchase test kits directly and donate them to the data collection teams. We tracked the donations so we could monitor where the test kits were going. This information is vital, because if no data is forthcoming, yet test equipment is in hand, we need to follow up and find out what the problem is.

Where Are We Now

We mapped all the sub-watersheds in the County and provided a field address for a data collection site for each one. There are over 200 data collection points County-wide, representing 174 sub-watersheds.

There are approximately (I say approximately because volunteers come and go in the early stages) 40 volunteer teams generating data from approximately 80 data collection sites. There are an additional 40 sites "on deck". The data comes to me by mail, and I monitor the progress of each team with the help of the County Environmental Council Coordinators.

Cash donations and purchases total over $16,000. This value demonstrates good community support and has been helpful in attracting grant funding directed to continuing the planning process.

The "Fields of Green" funding approach has been a "bottoms up" effort. It has received support from the municipalities, the County, the State DEP, and, we believe, the federal government. We are just getting started and the future looks bright. I hope we will be having as much fun in ten years as we are having now.

HANDS-ON TRAINING, METHODS AND TECHNOLOGIES

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The New Jersey Volunteer Monitoring Summit provided me with an opportunity to disseminate EPA's information on Quality Assurance/Quality Control, Quality Assurance Project Plans, and EPA grants, as well as present the regional Mobile Volunteer Display and distribute EPA publications pertinent to volunteer monitoring to all of the conference attendees.

In addition, hands-on training for implementing stream monitoring was presented by Jim Kurtenbach of EPA.

Stream Monitoring

Jim Kurtenbach demonstrated techniques used for Rapid Bioassessments at a local stream. Jim is EPA's regional expert on Rapid Bioassessment techniques used to assess water quality of streams. These techniques involve collecting and identifying macroinvertebrates present in stream riffles.

EPA's new Volunteer Stream Monitoring: A Methods Manual outlines the Rapid Bioassessment sampling procedures for use by volunteer monitoring programs. The manual was released this past spring for field testing. It is expected to go through one more revision before final publication during spring '96. Volunteer groups around the country, which are already familiar with Rapid Bioassessment techniques, were asked to field test the manual. Four volunteer monitoring groups in New Jersey will be field testing the procedures during the 1995 sampling season: the South Branch Watershed Association, East Brunswick High School, the Walpack Valley Environmental Education Center, and the County College of Morris.

Quality Assurance/Quality Control (QA/QC)

The Summit was an important step in determining the needs and interests of volunteers, and the best ways to match these needs and interests with those of local, state and federal agencies. Data collected by volunteers is used primarily for public education and screening of potential problems within a watershed. In order for data to be used by water quality managers, a more standardized method of collecting, organizing and presenting the data is needed. This is why Quality Assurance/Quality Control (QA/QC) procedures have been adopted for volunteer programs. QA/QC procedures rely heavily on the development of a Quality Assurance Project Plan (QAPP).

Quality Assurance Project Plan (QAPP)

A QAPP is a very specific outline of plans and procedures generated by the user. It concentrates on the level of sampling and documentation required to meet the objectives of the ultimate user of the data. It forces the individual(s) interested in developing the monitoring program to carefully think through the project from start to finish, thus ensuring that the monitoring will answer these objectives. It is a dynamic document that undergoes changes and develops as the users needs change and develop. There are 25 specific sections to a QAPP that need to be addressed. The simplest way to approach a QAPP is by addressing each section as a specific question/issue that needs to be answered as it pertains to the specific monitoring program. In some instances, a section may not even apply to your monitoring program, however at least you will be forced to consider a response.

EPA headquarters is preparing a manual to assist volunteers writing QAPPs which is expected to be completed in 1996. In the meantime, you may refer to Appendix A of the EPA Volunteer Estuary Monitoring: A Methods Manual, which provides some old terminology and standards on preparing a QAPP. It refers to a QAPP as a QAPjP (the j has since been dropped). It also lists 16 items that need to be addressed instead of the 25 I previously mentioned. The reason for the discrepancy is that some of the original items have been broken down into two or more separate items. If you give careful consideration to these 16 items, you will address the items necessary to conduct an efficient and effective monitoring survey, and have an advanced understanding when the new manual is released next year.

EPA Grants

EPA provides funds via grants to the states through various provisions of the Clean Water Act (CWA) to control pollution. These grants include: nonpoint source control grants (Section 319 of the CWA), Clean Lakes water quality assessment grants (Section 314) and National Estuary Program grants (Section 320). Since the summit, Barnegat Bay has been added to the list of 28 estuaries nationwide currently receiving or scheduled to receive grants under the National Estuary Program.

Each year EPA issues Environmental Education Grants under Section 6 of the National Environmental Education Act. Grants of up to $25,000 are awarded by EPA regional offices, while grants over this amount are awarded by EPA headquarters. Each year I send out applications for these grants to the volunteer groups listed in the National Volunteer Monitoring Guide and will now include groups from the newly issued New Jersey Citizen Volunteer Water Quality and Aquatic Resource Monitoring Program Guide.

If your volunteer group is selected to receive funding from any EPA source, you will be required to write a QAPP before any money is released to your program.

I advise volunteer groups about funding available from EPA, but it is also important for

volunteers to form partnerships with local businesses, schools, (elementary, secondary, and colleges), local governmental offices (Environmental Commissions), and other federal agencies. The Proceedings of the Fourth National Citizens' Volunteer Monitoring Conference has several articles discussing how to establish these important partnerships.

Mobile Volunteer Display

I have created a mobile display entitled *Volunteer Monitors in Action* which was exhibited at the summit. Over thirty volunteer groups from New York and New Jersey are pictured along with descriptions of their volunteers collecting water samples, taking notes, conducting surveys, identifying macroinvertebrates, etc. I would like to see this display grow. Please contact me if you would like to submit pictures of your volunteers to be included in future exhibits.

EPA Publications

The following EPA publications were made available to conference attendees:

1. National Directory of Citizen Volunteer Environmental Monitoring Programs, Fourth Edition. EPA 841-B-94-001, January 1994. Contains information on 519 volunteer monitoring programs across the nation.

2. Proceedings of the Third National Citizens' Volunteer Water Monitoring Conference. EPA 841/R-92-004, September 1992. Presents proceedings from the third national conference held in Annapolis in 1992.

3. Proceedings of the Fourth National Citizen's Volunteer Water Monitoring Conference EPA 841-R-94-003, February 1995. Presents proceedings from the fourth national conference held in Portland, Oregon in 1994.

4. Starting Out in Volunteer Water Monitoring. EPA 841-B-92-002, August 1992. A brief fact sheet on how to become involved in volunteer monitoring.

5. Volunteer Estuary Monitoring: A Methods Manual. EPA 842-B-93-004, December 1993. Presents information and methods for the volunteer monitoring of estuarine waters.

6. Volunteer Lake Monitoring: A Methods Manual. EPA 440/4-91-002, December 1991. Discusses lake water quality issues and presents methods for the volunteer monitoring of lakes.

7. Volunteer Monitoring. EPA 800-F-93-008, September 1993. A brief fact sheet on volunteer monitoring, including examples of how volunteer monitors have improved the environment.

8. Volunteer Monitoring on the Nonpoint Source Electronic Bulletin Board System. A 2-page fact sheet on EPA's electronic forum for volunteer monitors.

9. Volunteer Water Monitoring: A Guide for State Managers. EPA 440/4-90-010, August 1990. Discusses the importance of volunteer monitoring, quality assurance considerations, and how to plan and implement a volunteer program.

If you would like a copy of any of these publications please contact me.

In addition, the national newsletter *The Volunteer Monitor* is published monthly by EPA to exchange surface water assessment information among states and other interested parties. To subscribe to this free publication please write to:

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I wish you the best of luck in all your monitoring endeavors.

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VOLUNTEER MONITORING INFORMATION SOURCES

New Jersey Department of Environmental Protection

In order to promote citizen involvement in local water quality issues and supplement water surveillance and monitoring activities of State agencies, the New Jersey Department of Environmental Protection sponsors the New Jersey Waterwatch Program and the New Jersey Waterways Audit Program. For information on participating in these efforts, or to receive a free subscription to *WaterLines*, the newsletter of the New Jersey Water Watch Program, contact:

Ms. Virginia Loftin
NJ DEP Enforcement Coordination
CN 422
Trenton, NJ 08625-0409
(609) 984 - 3588
(609) 292 - 1803 (FAX)

For quality assurance/quality control information and assistance, including a listing of laboratories willing to work with volunteer monitoring groups at discount rates contact:

Mr. Floyd Genicola
NJ DEP Office of Quality Assurance
CN 424
Trenton, NJ 08625-0409
(609) 984 - 0855
(609) 777 - 1774 (FAX)

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency has also developed a number of publications that may be of help to volunteer monitoring programs. For copies of these materials or further information on EPA's volunteer monitoring activities contact:

Ms. Diane Calesso
U.S. EPA - Region II
2890 Woodbridge Ave.
Edison, NJ 08837
(908) 906 - 6999
(908) 321 - 6166 (FAX)

Ms. Alice Mayo
U.S. EPA 4503
401 M Street SW
Washington, D.C. 20460
(202) 260 - 7018

To receive a free subscription to the *Volunteer Monitor*, an EPA sponsored national newsletter on volunteer monitoring contact:

Eleanor Ely, Editor
1318 Masonic Avenue
San Francisco, CA 94117
(415) 255-8049

As part of the U.S. Environmental Protection Agency Nonpoint Source Electronic Bulletin Board System is a free service that provides federal, state and local agencies, private organizations, businesses, and concerned individuals with timely, relevant nonpoint sours information. The service also includes a volunteer monitoring component developed to encourage the free flow of ideas among those engaged in volunteer monitoring activities nationwide. Additional information on this service can be obtained from:

U.S. Environmental Protection Agency
Office of Water
NPS Information Exchange (4503F)
401 M Street, SW
Washington, D.C. 20460
(202) 260 -1517 (FAX)