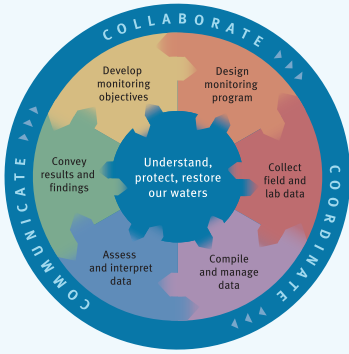




# NWQMC

## NATIONAL WATER QUALITY MONITORING COUNCIL

*Working Together for Clean Water*



# National Water Monitoring News

National Council Highlights

Collaboration through Partnerships

Methods - Across the Board

National Monitoring Network

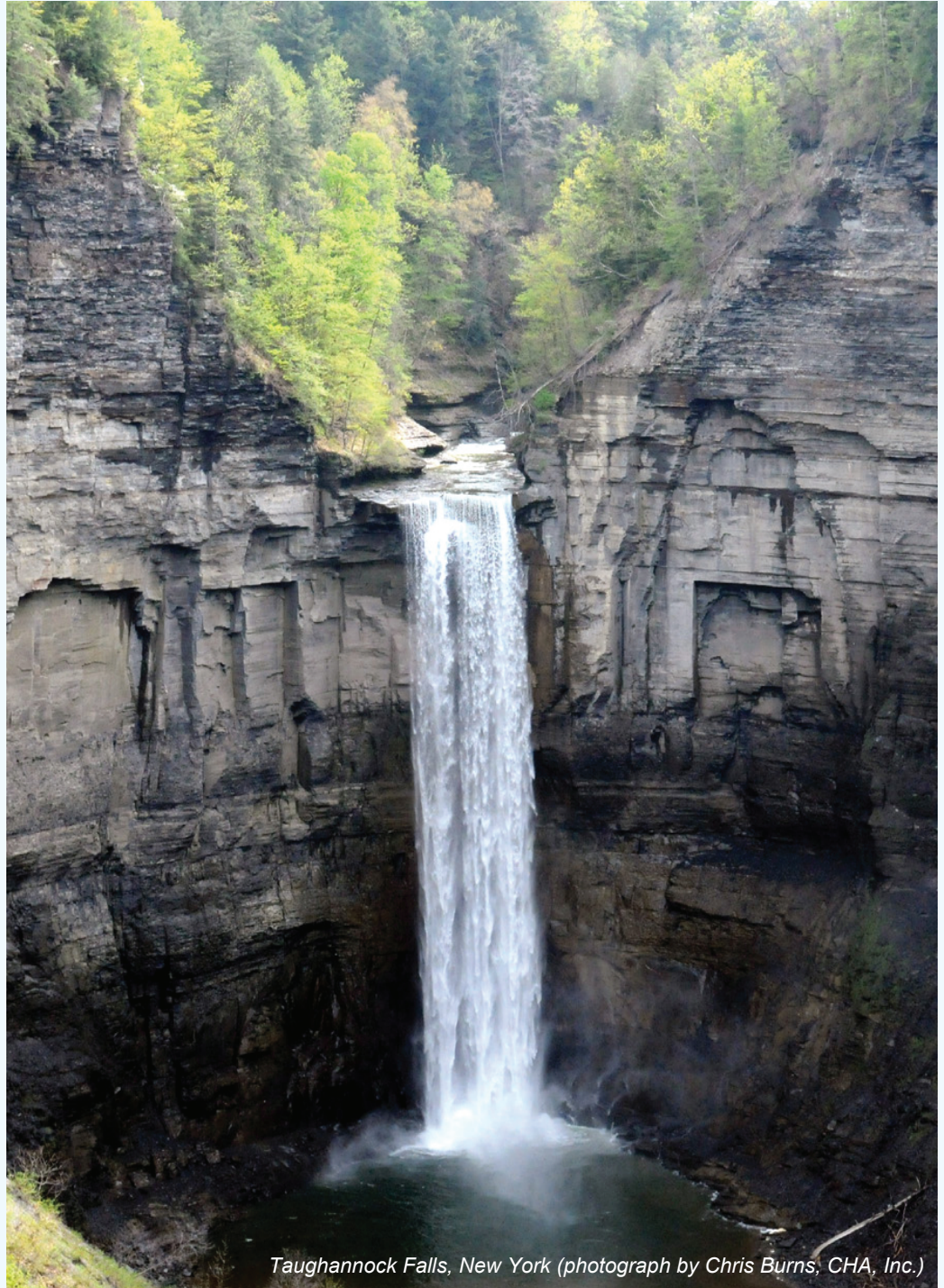
*The National Water Quality Monitoring Council provides a voice for monitoring practitioners across the Nation and fosters increased understanding and stewardship of our water resources.*

## Highlights

- Welcome to our Newsletter
- Partnerships and Collaboration
- Council Web Seminars
- 7th National Conference
- Web Services for Water-Quality Data
- Aquatic Sensor Guides
- NEMI Celebrates 10th Year
- Physical Habitat Data
- Statistics and Assessment tools
- National Monitoring Network Updates
- Ground Water Network Pilots Announced
- Volunteer Monitoring Community Grows
- National Tribal Water Council



*Volunteer monitor collects brown trout for aquatic habitat assessment surveys in Colorado.*



*Taughannock Falls, New York (photograph by Chris Burns, CHA, Inc.)*

The National Water Quality Monitoring Council  
 Editor: Tracy Hancock  
 (804) 261-2618 (phone) • email: [thancock@usgs.gov](mailto:thancock@usgs.gov)  
<http://acwi.gov/monitoring/>



## Welcome to Our Newsletter – *National Water Monitoring News!*

Welcome to the first edition of the National Water Quality Monitoring Council (“Council”) newsletter! As Co-Chairs of the Council, we are excited about this readily accessible forum of communication among water practitioners across the Nation. We view it as another vital tool to continue to promote partnerships, foster collaboration, advance water assessments and science, improve monitoring strategies, and move us all closer towards managing, protecting, and sustaining our waters needed to support our complex web of human activities and ecosystem needs.

This newsletter is about information exchange – interesting and informational articles and links to stay up-to-date on water monitoring, assessments, data management, and reporting. It’s about you and meeting your evolving needs for water information, as well as serving as your voice to other water practitioners across the Nation – whether they are associated with state, interstate, tribal, local, and municipal governments; watershed and environmental groups; the volunteer monitoring community; universities; the private sector; or the general public.

We encourage you to be an active part of this forum – and specifically to share your successes and challenges in monitoring, upcoming conferences, related internet links, and other water-related information. If you have an article idea or would like to write something yourself, don’t hesitate to contact our editor, Tracy Hancock, [thancock@usgs.gov](mailto:thancock@usgs.gov), (804) 261-2618. New articles and ideas are always welcome!

This first edition highlights multiple products and services that the Council has worked on over the last two years, and that are now available to help meet your water needs (<http://acwi.gov/monitoring>). Specifically, you will learn about

- ✓ User-friendly and compatible web services (known as the Water-Quality Exchange) and the beginnings of a single, water-data portal that allows retrieval of data from multiple sources in common formats for direct use in mapping, statistical, and modeling applications.
- ✓ New guides for deploying real-time monitoring with sensors.
- ✓ Highlights from the Council’s 7<sup>th</sup> Biennial Conference in Denver in April 2010 with new findings on the quality of the Nation’s waters and recent innovations and cutting-edge tools in water-quality monitoring, assessment, and reporting.
- ✓ Highlights from web seminars involving state, regional, and tribal councils, as well as watershed groups and alliances, from across the Nation.
- ✓ The volunteer water community and its continuing role monitoring across the Nation.
- ✓ Integrated land-to-sea assessments in San Francisco Bay, Lake Michigan, and Delaware Estuary that are providing important information about the health of our oceans and coastal ecosystems and inland influences on coastal waters.
- ✓ Plans for an online system that will guide scientists and managers with a range of statistical information and assessments tools.

So, on behalf of the whole Council and all the contributors to this issue, we welcome you and look forward to your input and future communication!

Sincerely yours,

Pixie Hamilton, USGS Co-Chair  
[pahamilt@usgs.gov](mailto:pahamilt@usgs.gov)

Chuck Spooner, EPA Co-Chair  
[spooner.charles@epa.gov](mailto:spooner.charles@epa.gov)

## Communication, Collaboration, and Coordination Through Partnerships

### Online “How to Tool Kit” for Creating and Sustaining Partnerships and Councils

The Council strives to support the creation and sustaining of partnerships among the water monitoring community, including state, regional, and tribal councils, as well as watershed groups and alliances, and currently interacts with more than 17 Councils and partnerships across the Nation ([http://acwi.gov/monitoring/stcouncil\\_contacts.html](http://acwi.gov/monitoring/stcouncil_contacts.html)). Through the development of a “How To Tool Kit” and hosting of web seminars, information is exchanged on success stories and challenges, support and funding, membership and operation, monitoring conferences, data and information exchange, leveraging resources, and building commonality in water management ([http://acwi.gov/monitoring/regional\\_councils.html](http://acwi.gov/monitoring/regional_councils.html)).



#### Tool Kit includes:

- Factsheet on “Accomplishing More Together” ([http://acwi.gov/monitoring/pubs/fs/collaboration\\_factsheet\\_2008.pdf](http://acwi.gov/monitoring/pubs/fs/collaboration_factsheet_2008.pdf))
- Power Point presentations for creating and sustaining partnerships and councils ([http://acwi.gov/monitoring/regional\\_councils\\_files/rc\\_howto.html](http://acwi.gov/monitoring/regional_councils_files/rc_howto.html))
- Examples of water quality monitoring collaborative efforts ([http://acwi.gov/monitoring/success\\_stories.html](http://acwi.gov/monitoring/success_stories.html))
- Web Seminars ([http://acwi.gov/monitoring/regional\\_councils.html](http://acwi.gov/monitoring/regional_councils.html))

### Council Hosts Web Seminars for State, Regional and Tribal Councils and Watershed Partnerships

The Council hosts quarterly web seminars (webinars) involving state, regional, and tribal councils, as well as watershed groups and alliances and the volunteer community from across the Nation for up-to-date information exchange.

Three web seminars have been hosted to date, which highlighted the following presentations:

- Updates on the California, Florida, and Lake Michigan Monitoring Councils
- Ideas to facilitate use of data and data sharing among the National and individuals councils;
- Status of tribal monitoring groups;
- Integration of citizen monitoring data into Virginia’s state assessment report and an online database tool managed by the Virginia Monitoring Council;
- New web technologies and social media tools for the water monitoring community.

We encourage you to be an active part of these webinars and, specifically, to share your successes and challenges in monitoring. If you have a webinar idea or would like to present something yourself, don’t hesitate to contact the organizer of the webinar series, Tracy Hancock. Suggestions and participation are always welcome!

**For more information, contact:** Tracy Hancock, Chair, Collaboration and Outreach Workgroup, [thancock@usgs.gov](mailto:thancock@usgs.gov), 804-261-2618.

### Council Hosts Its 7th Biennial National Conference

A centerpiece forum for communication and collaboration among the monitoring community is the Council’s biennial national conference. The 7th national conference in Denver, Colorado on April 25-29, explores many water monitoring issues—from the summit to the sea. More than 700 water practitioners from all backgrounds—including governmental organizations, tribes, volunteers, academia, watershed and environmental groups, and the private sector—showcase new findings on the quality of the Nation’s waters and highlight new innovations and cutting-edge tools in water-quality monitoring, assessment, and reporting. This year’s program is rich in content and scope, including nearly 290 platform presentations, more than 120 technical posters, and 15 workshops and short courses. All platform and poster presentations are available to each attendee on a CD and the Internet (<http://acwi.gov/monitoring/>).



**For more information, contact:** Chuck Spooner, [spooner.charles@epa.gov](mailto:spooner.charles@epa.gov), (202)-566-1174, Jeff Schloss, [jeff.schloss@unh.edu](mailto:jeff.schloss@unh.edu), (603) 862-3848 and Doug Glysson, [gglysson@usgs.gov](mailto:gglysson@usgs.gov), (703) 648-5019.

## Award Recipients at the 2010 National Monitoring Conference

### *Elizabeth J. Fellows Award*



Dr. Robert C. Ward, (Retired) Professor and Director of the Colorado Water Resources Research Institute at the Colorado State University is the recipient of the 2010 Elizabeth Jester Fellows Award. This award recognizes individuals for outstanding achievement, exemplary service, and distinguished leadership in the field of water-quality monitoring.

### *Vision Award*



Mr. Terry Fleming, with the U. S. Environmental Protection Agency, Region 9, is the recipient of the Council's Vision Award. This award was established to recognize an individual or group that has demonstrated extraordinary vision and leadership in the field of water quality monitoring on a local/regional level and has brought together scientists, managers, and communities to observe and understand the interconnectivity of physical, chemical, and biological aspects of the Earth's watersheds, estuaries, and oceans.

## YSI Foundation's 5th Minding the Planet Grant

Friends of the North Fork, Shenandoah River, Woodstock, Virginia, is the Recipient of the \$25,000 Minding the Planet grant. The YSI Foundation awards this grant to fund a locally-based group whose water quality improvement efforts are impacting wider reaching policies and decisions.

## Plenary speakers at the 2010 National Monitoring Conference

**Anne J. Castle**  
Assistant Secretary for  
Water and Science,  
Department of Interior,  
Washington D.C.



**G. Tracy Mehan, III**  
Principal, The Cadmus Group,  
Inc.,  
Arlington, Virginia



**Thomas L. Tidwell**  
Chief, Forest Service,  
Washington D.C.

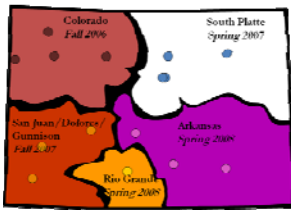


**Dr. Robert M. Hirsch**  
USGS Research Hydrologist,  
Reston, Virginia



## Spotlight on the Colorado Water Quality Monitoring Council

### Colorado's Data Sharing Network - How to Foster Effective Information Exchange at the Watershed Level



Products of Colorado Water Quality Monitoring Council's Data Sharing Network are SWAPS. These are rotating, one-day events where participants exchange targeted, place-based information on their local monitoring and assessment activities, priorities, needs and concerns. Dots represent locations of specific one day SWAP events.

The information, that is exchanged, is documented on a fact sheet, posted on the website and distributed to participants, adjacent watersheds, and state and regional decision makers. Also, on the ground monitoring collaborations are negotiated.

Each SWAP participant is categorized into "data generator", "data user", "both" or entities are lumped by common monitoring and assessment needs and concerns. These categories provide a communication strategy for the CWQMC to ask for financial and in-kind support, conduct "data nag updates" and market services. SWAPS are a cost effective voice for local efforts to be heard within the watershed, across watersheds, at a state level and for state level information to reach the local level.

Contributed by: Barb Horn, Barb.Horn@state.co.us, (970) 382-6667.

Effective action requires adequate information in the right place at the right time between the right audiences. The Colorado Water Quality Monitoring Council (CWQMC) (<http://www.coloradowaterquality.org/>) exists to strategically facilitate communication that progresses movement along the action continuum of data generation, sharing, translation to information and use. The purpose is to drive and guide watershed restoration and protection activities, policies and regulations in the most cost effective manner - so water is clean and available in sufficient amounts for all users.



The Colorado Water Quality Monitoring Council hosted a SWAP in the Rio Grande Basin during the spring of 2008 where participants shared their water monitoring needs and challenges in an attempt to identify monitoring gaps and possibilities for increasing monitoring efficiency throughout the watershed. (Photograph by Chris Burns, CHA, Inc.)

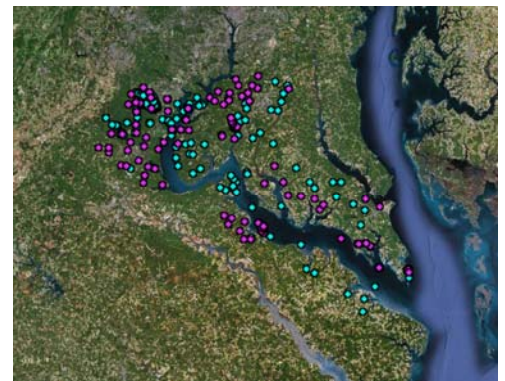
A flagship communication product and service of the CWQMC's Data Sharing Network are called SWAPS. These SWAPS work in collaboration with two other CWQMC services, a statewide interactive map and a STORET database. SWAPS are targeted, place-based, local level, one-day events where participants exchange or "swap" their monitoring and assessment activities,

## Compatible Web Services Available for Water Quality Exchange

Compatible web services and a shared data exchange, called the Water Quality Exchange (WQX), are now available that allow retrieval of data from multiple sources in common formats for direct use in mapping, statistical, and modeling applications. The ability to retrieve data in common formats simplifies the task of bringing together a wide range of information that can be used to describe and better understand the status and trends of water quality in our Nation's streams, groundwater and estuaries. Chemical, physical, and biological data from the USGS National Water Information System (NWIS) (<http://qwwebservices.usgs.gov>) and data housed in the EPA Storage and Retrieval (STORET) (<http://storetnwis.epa.gov/storetqw/portal.html#>) are readily accessible online in a compatible format that employs data elements developed through the Council. Data collected by USGS and by states and tribes (submitted to EPA-STORET) thereby conform to a common nomenclature for biological and physical elements, chemical substances, chemical groups, sites, types, and sampling media. In total, over 150 million water-quality results are available from the two systems.

Efforts are ongoing for the continued development of simple web forms and querying capabilities on the Internet with user-friendly mapping tools, as well as access from a single, national, water-data portal (available in 2010).

The USGS/EPA activities began in 2003, resulting from an interagency *Agreement on the Management of Water Quality Data*, supported by the Advisory Committee on Water Information. USGS and EPA continue to work with data managers associated with



Application of the Water Quality Exchange (WQX) along the lower Potomac River yields a merged dataset that includes 161 USGS-NWIS and 169 EPA-STORET sites.

other Federal agencies, including USDA's Agricultural Research Service (ARS) to integrate its STEWARDS data system, housing water, conservation and other land data, with the WQX.

Efforts also are ongoing with NOAA and the Integrated Ocean Observing System (IOOS), associated regional associations, and the Northeast Coastal and Ocean Data Partnership on extending the WQX and common web services to coastal data and improving capabilities beyond discrete data to include continuous and sensor data.

**For more information, contact:** Nate Booth, [nlbooth@usgs.gov](mailto:nlbooth@usgs.gov), (608) 821-3822 or Kristen Gunthardt, [gunthardt.kristen@epa.gov](mailto:gunthardt.kristen@epa.gov), (202) 566-1194.

## Methods – Across the Board

The Methods and Data Comparability Board ("Board") is a partnership of water-quality experts from federal agencies, states, municipalities, industry, and private organizations who share a commitment to developing water-quality monitoring approaches that facilitate collaboration and comparability amongst all data-gathering organizations. The Board strives to, through its partnerships, recommendations, and the products it develops, enhance our ability to achieve real environmental gains while making the best use of the limited resources available for water-quality monitoring. The Board, like its parent National Water Quality Monitoring Council, is co-chaired by USGS and US EPA.

### New Aquatic Sensors Workgroup (ASW)



The Aquatic Sensor Workgroup (ASW, <http://watersensors.org/>) is a unique public-private partnership formed to address the need for quality-assurance and quality-control guidance for the emerging arena of real-time monitoring. Members of this group hail from industry, government, and academia. The first phase of efforts from the ASW, begun after the 6<sup>th</sup> National Monitoring Conference in 2008, is called the Sensors Quality Assurance Initiative (see "Guidelines for Aquatic Sensors" sidebar for more).

Looking into the future, the ASW will continue to focus on information and products that support quality assurance for sensors and sensor data. An effort is underway to adapt the products from the QA Initiative to additional sensors including optical sensors and other new technologies. A major new effort to look at data management for sensors has begun; a draft white paper is available for review. This new effort is just underway and we encourage anyone interested in learning more about it to contact the ASW co-chairs.

**For more information, contact:** Dan Sullivan, [djsulliv@usgs.gov](mailto:djsulliv@usgs.gov), (608) 821-3869 and Gayle Rominger, [rominger@ysi.com](mailto:rominger@ysi.com), (937) 767-7241.

### National Environmental Methods Index Celebrates Its Tenth Year



In 2010, the National Environmental Methods Index (NEMI, <http://www.nemi.gov/>) celebrates its tenth year as an online resource of laboratory methods and field protocols, including more than 1,100 methods from over 30 different sources. New and updated methods continue to be added to NEMI, and we continue to work to make NEMI relevant to more users. NEMI is partnering with the Alliance for

Coastal Technologies (ACT, <http://www.act-us.info/>), a NOAA-funded database of sensors information, to create a one-stop shop of information on analytes for which both traditional analytical and real-time sensors are available. In addition, collaboration is with EPA's Forum on Environmental Measurements (<http://www.epa.gov/fem/>) to leverage comparability among methods and laboratory services across the Nation. Finally, we are exploring the creation of an XML standard ("MethodML") to facilitate exchange of analytical methods information across multiple databases.

**For more information, contact:** Dan Sullivan, [djsulliv@usgs.gov](mailto:djsulliv@usgs.gov), (608) 821-3869.



The Council, through the National Environmental Methods Index (NEMI), provides guidance to water monitoring groups on a variety of field and analytical methods including sample collection, preparation, and processing. (Photograph by Barry Martasian)

#### *Guides for Aquatic Sensors are now available through a Council Supported Public/Private Partnership*

*Freshwater sensor manufacturers have played an active role, along with governmental and non-governmental organizations, to develop guides for deploying sensors, with YSI, Inc. co-chairing and funding much of the effort. Four products developed through the sensor partnership are now available, including:*

- *QA Matrix is a quality assurance checklist for users related to calibration and record keeping to ensure that data are of known and documented quality.*
- *Field Deployment Guide to assist in sitting and maintaining sensors in the field and to enhance the representativeness and reliability of the data collected.*
- *Sensors Data Elements (or metadata) for sensors are the "who, what, why, when, where, and how" of environmental monitoring results.*
- *Glossary of Terms supporting documentation is available on the ASW website that defines the terminology used in ASW products.*

## Physical Habitat Data Are Included as National Data Elements



The Nature Conservancy coordinates a freshwater mussel survey on the Clinch River, Tennessee. The Clinch has one of the highest concentrations of globally rare and imperiled fish and freshwater mussels of any river in the nation. Freshwater mussels are indicators of water quality, and the Clinch provides drinking water to 50,000 people in the area.

*(Photograph by Danny White, The Nature Conservancy)*

available to water information practitioners, including decision-makers, water quality scientists and engineers, and statisticians, it could lead to more efficient monitoring program designs and more consistent interpretations of environmental data. To address this need, the NWQMC has recently formed a Water Quality Statistics and Assessments (WQSA) workgroup composed of individuals representing federal and state agencies, academic institutions, and the private sector. The workgroup plans to use create a web-based tool, perhaps based on NEMI, to help water- resources data users find and use a wide range of water quality-related statistical and assessment methods. The WQSA encourages your input and participation in this effort and we encourage anyone interested in learning more about it to contact the co-chairs.

Contributed by: Doug McLaughlin, douglas.mclaughlin@wmich.edu, (269) 276-3545.

Approved data elements for physical habitat are available for streams, which expand the already available key data elements (or “core metadata”) for chemical, microbiological, toxicity testing, and biological population/community data ([http://acwi.gov/methods/pubs/wdqe\\_pubs/wqde\\_trno3.pdf](http://acwi.gov/methods/pubs/wdqe_pubs/wqde_trno3.pdf)). A Council priority is to continue to promote the use of all data elements among the water community to help facilitate comparisons and integration of data collected by multiple organizations.

Contributed by: Dan Sullivan, djsulliv@usgs.gov, (608) 821-3869.

## New Water Quality Statistics and Assessment (WQSA) Workgroup

Continued challenges for the water monitoring community include designing monitoring programs and assessing and interpreting data. These steps often involve the use of statistical procedures for project planning and data analysis to, for example, water quality status and trends. Currently, written guidance documents on the selection and use of these procedures, as well as a number of computer programs and calculation tools, are available from many sources. If this information were more readily

**White Paper is released on Council Goals for Water Quality Statistics and Assessment Tools**

*A white paper, released at the Council's 7<sup>th</sup> National Conference in Denver, describes the development of a system that will guide scientists and managers with a range of statistical information, procedure references, and tools, and will assist in designing and analyzing monitoring data to meet specific assessment and research objectives (<http://acwi.gov/monitoring>).*

## Integrated Land-to-Sea Assessments and the National Network for Coastal Waters

Demonstrations of integrated land-to-sea assessments in San Francisco Bay, Lake Michigan, and Delaware Estuary provide critical information about the health of our oceans and coastal ecosystems and inland influences on coastal waters for improved resource management (<http://acwi.gov/monitoring/network/>).

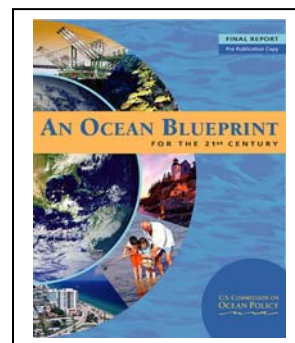
### The Network is a continuum of observations in:

- Estuaries
- Nearshore
- Offshore and Exclusive Economic Zone
- Great Lakes
- Coastal Beaches

### With flow and flux from:

- Rivers (Hydrologic Unit Code 6)
- Coastal Streams
- Atmosphere
- Groundwater
- Wetlands

These assessments support concepts that were laid out in a *National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries* (or “Network”) that was designed by the Council and more than 80 stakeholders in response to a recommendation in *An Ocean Blueprint for the 21<sup>st</sup> Century* by the U.S. Commission on Ocean Policy in 2004.



The Network is, in reality, comprised of a “network of networks” and represents an integrated, multidisciplinary, and multi-organizational approach that leverages diverse sources of data and information; augments existing monitoring programs; and links observational capabilities. These networks include federal agencies, the Integrated Ocean Observing System (IOOS)

(<http://ioos.gov/>), and regional associations representing a broad community of users, including coastal and inland states, tribes, researchers, and non-governmental organizations (<http://usnfra.org/>).

Since 2007, Network concepts have been piloted and implemented in San Francisco Bay, Lake Michigan, and Delaware Estuary. Gap analyses and new monitoring have been funded by USGS in the three areas in support of the Ocean Research Priorities Plan, as well as through partnerships with local, state, regional, and federal organizations.

Activities in the three areas are coordinated with key organizations and IOOS regional associations, including the Great Lakes Commission and Great Lakes Observing System (GLOS); the San Francisco Estuary Institute and Central and Northern California Ocean Observing System (CenCOOS); and, the Delaware River Basin Commission and Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA). The Delaware project also is part of a multi-regional effort along the eastern seaboard that includes the Southeast Coastal Ocean Observing Regional Association (SECOORA) and the Northeastern Regional Association of Coastal and Ocean Observing Systems (NERACOOS). More information on the multi-regional effort is at: <http://acwi.gov/monitoring/network/>.

Integrated assessments in San Francisco Bay, Lake Michigan, and Delaware Estuary are successfully using new technologies, such as real-time monitoring with sensors and autonomous underwater vehicles (AUVs), along with more traditional monitoring. The assessments are helping to improve estimates of oceanic and land-based inputs of sediment, nutrients, and contaminants to U.S. coastal waters and estuaries, and improving assessments on the sources, amounts, timing, and severity of natural and anthropogenic stressors on coastal ecosystems. Findings will be useful to compare responses of different estuarine and coastal waters to these stressors, which help to facilitate water-management decisions in other U.S. waters.

Highlights on selected nutrient issues and ongoing monitoring in the three Network areas are below.

**San Francisco Bay** has historically been resilient to degradation from nutrient enrichment and not known for hypoxia or harmful algal blooms as found in other areas, such as Chesapeake Bay (despite relatively similar, elevated nutrient loadings). One manifestation of this resilience has been relatively low concentrations of chlorophyll *a* (an indicator of phytoplankton biomass). Concentrations of chlorophyll *a*, however, have been increasing steadily since 1999. Natural climatic and anthropogenic factors may play a role, including decreasing turbidity (monitored in real time) related to damming and flood control; increasing sources of phytoplankton biomass from the Pacific Ocean; and, decreasing clam populations, which are a major consumer of phytoplankton. These large physical and biological shifts occurred after a dramatic shift in the climatic system in 1999, signaled as sign reversals of the Pacific Decadal Oscillation and North Pacific Gyre Oscillation.

**Related information** is available at:  
<http://sfbay.wr.usgs.gov/access/wqdata/index.html> and  
[http://sfbay.wr.usgs.gov/sediment/cont\\_monitoring/](http://sfbay.wr.usgs.gov/sediment/cont_monitoring/)

**Lake Michigan:** Elevated nutrient loadings from point and nonpoint sources of pollution from agricultural and urban land and the atmosphere are resulting in excessive growth of algae and other nuisance plants (eutrophication). Phosphorus has been identified as the primary nutrient of concern and hence “targets” for phosphorus loads were established in the 1970s and 1980s through Great Lake Water Quality Agreements. Subsequent actions resulted in decreased phosphorus loadings that have reduced eutrophication in the open lake. Since 1980, phosphorus loadings to Lake Michigan have remained below the targeted loads. Eutrophication issues, however, such as related to nuisance growth of cladophora, now occur in some nearshore areas and embayments. Continued monitoring and tracking of nutrient sources and loads from the upstream watersheds and water quality in the nearshore are therefore critical.

**Related information** is available at: <http://wi.water.usgs.gov/lmmcc/> and  
<http://www.epa.gov/glnpo/glri/>



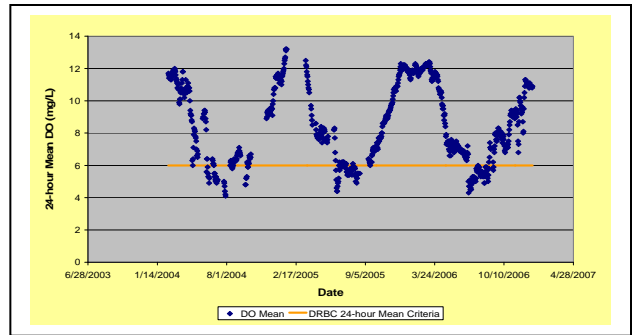
Hydrologists collect water samples for analysis of long-term trends in nutrients, dissolved oxygen, chlorophyll *a* and other constituents in San Francisco Bay.



Automated underwater vehicles (AUVs) are used in the bay of Green Bay and the Milwaukee harbor environments, and produce continuous high-resolution data for chlorophyll *a*, temperature, conductivity, dissolved oxygen, pH, turbidity, and blue-green algae. (Note: AUVs, such as the YSI Ecomapper shown above, are available from a variety of manufacturers.)



**Delaware Estuary:** Up until the late 1970s, low dissolved oxygen was prevalent in the estuary, such as in vicinity of Philadelphia, creating anoxic dead zones that affected local aquatic species and migratory fish. Introduction of water-quality regulations resulted in improved water quality and living resources (such as restored fin fish populations). Most regions of the estuary currently meet the established water-quality criteria. However, ongoing real-time monitoring demonstrates that low sags in dissolved oxygen still occur during certain times of the year, such as in the summer. Ammonia may be a lead factor in reducing dissolved oxygen in the estuary. Low dissolved oxygen can be harmful to certain species, and research suggests that the established water-quality goals for dissolved oxygen may not protect important species in the estuary, including current and candidate threatened and endangered species, such as the Atlantic sturgeon. Continued management of dissolved oxygen and development of criteria for nutrients are therefore needed to protect living resources in Delaware Estuary.



Continuous data for dissolved oxygen on the Delaware River at Reedy Island Jetty in Delaware show levels below the 24-hour mean criteria (orange line) established by the Delaware River Basin Commission. Low dissolved oxygen can be harmful to certain species, such as the juvenile sturgeon.

**Related information** is available at: Delaware River Basin Commission: <http://www.state.nj.us/drbc/> and USGS <http://nj.usgs.gov/projects/2454BSB/natmonitornet/>

For more detailed information, photos, graphics, and contacts for these areas, as well as information on integrated assessments in other coastal areas, access: <http://acwi.gov/monitoring/network/>

## National Ground Water Network Pilots Announced



A nationwide, long term ground-water quantity and quality monitoring framework will provide information necessary for the planning, management, and development of ground-water supplies to meet current and future water needs, and ecosystem requirements.

*(Photograph by Lynne S. Fahlgvist, USGS)*

The federal Subcommittee on Ground Water (SOGW) was convened as a subcommittee of the Advisory Committee on Water Information (ACWI), and charged with developing a framework for building a national ground water monitoring network, which will compliment the efforts of the National Council for monitoring the nation's coastal watersheds and tributaries. The final SOGW report, which contains guidance for the design of a national network, also has recommendations for water quality parameters, and data elements for ground-water quality data, which can be used for guidance as states or other entities either build, or improve their ground water monitoring networks. The SOGW announces five Pilot Project Partners in the development of the National Ground Water Monitoring Network. These are Illinois-Indiana, Minnesota, Montana, New Jersey, and Texas. For more information, check the SOGW website at: <http://acwi.gov/sogw/index.html>.

**For more information, contact:** Bob Schreiber, [SchreiberRP@cdm.com](mailto:SchreiberRP@cdm.com), (617) 452-6251 or Bill Cunningham, [wcunning@usgs.gov](mailto:wcunning@usgs.gov), (703) 648-5005.

### Consider Groundwater Partners for Your Monitoring Council

State Monitoring Councils offer a great way for volunteer groups, state and federal science and regulatory agencies, and academic researchers to coordinate efforts, share data, and enhance collaborations for the most efficient use of resources for monitoring their state's water resources. Hydrologists, biologists, and ecologists understand the important interrelationship that ground water plays with surface water in providing base flow for streams during low flow conditions, and providing clear, cold water inflow into streams that host cold water species of fish, and other fauna. However, ground water is often the invisible fraction of the water cycle equation, because it is stored and flows out of sight underground. Thus, its critical role in maintaining the health of rivers, lakes, and streams is often overlooked by the public and policy makers. In this regard, it is important to engage and include agencies and groups that monitor ground water in your state as you create or build partnerships for your state's water council. A survey conducted in 2007 by a consortium of professional associations and groups representing ground water professionals revealed that 39 of the 50 states have either a state or regional ground water quality monitoring network in operation, so there are groups dedicated to ground water monitoring out there to partner with.

**Contributed by:** David Wunsch, New Hampshire State Geologist, SOGW and NWQMC member, [dwunsch@des.state.nh.us](mailto:dwunsch@des.state.nh.us), (603) 271-6482.

## Volunteer Monitoring Community Continues to Grow



A volunteer lake monitor views a Secchi disk through a view tube to monitor water clarity (or transparency,) an important indicator of water quality. (Photograph by Elizabeth Herron)

Across the country, thousands of people from all walks of life are engaged in volunteer water-quality monitoring. Currently there are about 900 programs in the nation listed in the EPA's on-line National Directory of Environmental Monitoring Programs (<http://www.epa.gov/owow/monitoring/dir.html>). There are a number of other terms used to describe these activities, for example volunteer environmental monitoring, community-based monitoring, citizen monitoring, watershed stewardship and citizen science, to name a few. Volunteer monitoring programs range in size from a few people monitoring a local stream in their community to Texas-sized programs with local and county coordinators (<http://txstreamteam.rivers.txstate.edu/>). The host organization for these programs can be a state environmental agency, a University Extension program, a national environmental program, a community-based organization, or a Tribal group. Most programs fall along a continuum from educational/awareness, to watershed assessment-monitoring for local decision-making, to regulatory/research oriented programs. These programs and their participants are an integral part of the monitoring community, and are playing an increasingly important role each year.

The Council continues to support the volunteer monitoring community through web seminars, meetings, and conferences in which information is exchanged on volunteer efforts at local and national levels. The information exchange helps to better define the role of the volunteer community in state monitoring and assessment programs, and to share benefits and challenges associated with running a volunteer monitoring program. Planning for each national Council conference includes securing travel assistances for volunteer program coordinators; much appreciation is extended to YSI, Inc. for providing travel support to the Council's 7<sup>th</sup> biennial conference in Denver. To learn more about volunteer monitoring visit <http://www.epa.gov/owow/monitoring/volunteer/> for EPA manuals, the National Directory, and on-line versions of "The Volunteer Monitor", the national newsletter of volunteer watershed monitoring. The U. S. Department of Agriculture Environmental Volunteer Monitoring Network's website at <http://www.usawaterquality.org/volunteer/> has extensive and comprehensive information for getting started and growing a volunteer monitoring program, as well as a wealth of other volunteer monitoring-related information.

### *Roles of Volunteer Monitors*

- *Citizen scientist who is doing the monitoring*
- *Community steward involved in outreach and taking action as a result of his/her findings*
- *Educator who is informally educating their neighbors, community, or more formally involved in the classroom*

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## Managing and Sharing Volunteer Data for State and National Assessments



AmeriCorps members are trained in water-quality monitoring of New Jersey's many streams and rivers. (Photo courtesy of the New Jersey Watershed Ambassador Program, AmeriCorps)

One of the many hurdles facing the water monitoring community is managing and sharing data. This task is usually the most challenging and time consuming. Watershed Association members want the data to be turned into an educational tool, much like the "State of the Watershed Report" just published by Stony Brook Millstone Watershed Association (<http://www.thewatershed.org/>). However, these groups also want their water quality data to be utilized by State water quality managers in their water quality assessment process. It is necessary to know the quality of data used for regulatory purposes like the Integrated Water Quality Monitoring and Assessment Report (305b and 303d) (<http://www.state.nj.us/dep/wms/bwqsa/integratedlist2008Report.html>). Each organization has very specific data format needs and each looks at data differently, the task of sharing data is nearly impossible.

With this in mind, how does a volunteer monitoring program do it all? The EPA has supported the use of volunteer collected data since 1988. Volunteer monitoring coordinators at the State level provide assistance to volunteer monitoring groups to help design their sampling network, and providing equipment, training and other resources. One of the most recent national resources now available to the monitoring community is the use of online EPA STORET Data Warehouse. Through EPA

support, many states have been working on their own data exchange networks and EPA has also developed their own water quality exchange system (WOX).

These types of data systems now make it easier for States, Tribes, universities and volunteers to submit and share water quality monitoring data over the internet. These volunteer groups can now submit data directly to the publicly-accessible state sponsored data exchange sites like New Jersey's or the EPA STORET Data Warehouse using the WOX framework. The purpose of these tools is to assist water quality professionals and data managers with knowing the types of data available for their use. Once the volunteer program staff becomes familiar with these tools and begins using these tools, their task of managing and sharing their data becomes easier. These tools will ultimately allow for greater data usage and program recognition at the local, state, and national levels. To learn more about the EPA tool, please visit, <http://www.epa.gov/storet/wqx/index.html>. To learn more about the NJ volunteer data system, please visit <http://www.state.nj.us/dep/wms/bwqsa/vm/>.

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## Spotlight on Virginia Water Monitoring

### Integration of Citizen Monitoring Data into Virginia's State Assessment Report and On-line Database Tool



A citizen monitor with Virginia prepares to collect water samples. Some volunteer monitoring data were used in Chesapeake Bay studies, which are vital to the Bay's health. *(Photo courtesy of the Alliance for Chesapeake Bay)*

Volunteer monitors play an important role in protecting Virginia's natural resources. Although the Virginia Department of Environmental Quality (VADEQ) has a large network of professional monitoring stations, Virginia is a water rich state with over 50,000 miles of streams and rivers, 2,500 square miles of estuaries, and 100 significant lakes (public water supply and/or > 100 acres).

Virginia has an active community of volunteer monitors. To help expand the monitoring network across the state, VADEQ began implementing a three level approach for volunteer monitoring data submitted to the agency. Volunteer data is helpful in many ways including: community education; indication of unusual conditions; collecting baseline information to prioritize monitoring needs; assisting with special studies and documenting restoration efforts; and providing additional data for statewide water-quality assessment reports. VADEQ does not use volunteer data as direct evidence in enforcement actions.

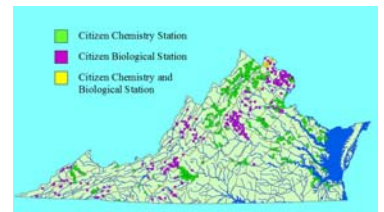
In 2009, VADEQ received volunteer data from over 1,300 stations which helped in characterizing water quality conditions for 3,600 stream miles. This level of contribution is due to the continued commitment of a dedicated monitoring community. In addition, VADEQ has long provided technical support to groups by assisting with training of volunteers and help in evaluating monitoring equipment and methods. Finally, when funding is available, VADEQ provides grants to groups to help enhance monitoring efforts.

More information about volunteer monitoring efforts in Virginia is available at the website <http://www.deq.virginia.gov/cmonitor>. This website provides useful links to volunteer groups as well as providing a methods manual and database portal for downloading and uploading of volunteer data.

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Training session of volunteers in preparation for sampling the Rappahannock River. In Virginia, volunteer data is used for community education, for indicators of environmental conditions, and provides additional data for statewide water-quality assessment studies. *(Photograph courtesy of the Virginia Department of Environmental Quality)*



Volunteer monitoring data collected from over 1,300 stations across the state of Virginia helps the Virginia Department of Environmental Quality in characterizing water-quality conditions for 3,600 stream miles.

## Tribal Water Quality News

### The National Tribal Water Council (NTWC)



The National Tribal Water Council (NTWC)

([www.nationaltribalwatercouncil.org](http://www.nationaltribalwatercouncil.org)) is a technical and scientific body created to assist the Environmental Protection Agency, federally recognized Indian Tribes, including Alaska Native Tribes, and their associated tribal communities and tribal organizations, with research and information for decision-making regarding water issues and water-related concerns that impact Indian and Alaska Native tribal members, as well as other residents of Alaska Native Villages and Indian Country in the United States. The NTWC represents Tribes on the National Water Quality Monitoring Council and Dave Fuller, with the Port Gamble S'Klallam Tribe (<http://www.pgst.nsn.us/>), currently serves in this capacity. Staff from the Yukon Inter-Tribal watershed Council and the Coordinated Tribal Water Quality Program of the Northwest Indian Fisheries Commission (<http://www.nwifc.org/about-us/habitat/coordinated-tribal-water-quality-program/>) will be making presentations at the 7<sup>th</sup> National Monitoring Conference.

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### Spotlight on the Yukon River Inter-Tribal Watershed Council

The Yukon River Inter-Tribal Watershed Council (YRITWC) (<http://yritwc.org/AboutUs/AboutUs/tabid/56/Default.aspx>) is an Indigenous grassroots organization, consisting of 70 First Nations and Tribes, dedicated to the protection and preservation of the Yukon River Watershed. The YRITWC accomplishes this by providing Yukon First Nations and Alaska Tribes in the Yukon Watershed with technical assistance, such as facilitating the development and exchange of information, coordinating efforts between First Nations and Tribes, undertaking research, and providing training, education, and awareness programs to promote the health of the Watershed and its Indigenous peoples. YRITWC is now sharing their newsletter "Currents" in electronic form. (<http://www.yritwc.org/Media/Newsletter/tabid/76/Default.aspx>)

**For more information, contact:** Jon Waterhouse, [jwaterhouse@yritwc.org](mailto:jwaterhouse@yritwc.org), (907) 451-2530.

### Spotlight on the Coordinated Tribal Water Quality Program of the Northwest Indian Fisheries Commission



Skokomish Tribe environmental program assistant, Jen Green, takes a water sample from Hood Canal. The tribe has sampled the canal for fecal coliform and other bacteria as well as excessive nutrients, such as nitrogen from fertilizers (*Photo courtesy of the Coordinated Tribal Water Quality Program of the Northwest Indian Fisheries Commission*)

The Coordinated Tribal Water Quality Program (CTWQP) of the Northwest Indian Fisheries Commission (<http://www.nwifc.org/about-us/habitat/coordinated-tribal-water-quality-program/>) was developed in 1990 by the 27 federally recognized tribes in the State of Washington. Tribes have worked with the EPA to implement the CTWQP for the past 20 years. EPA funds are enabling the tribes to conduct water quality programs critical to the management of their treaty protected resources, and to provide for the health of their members and the environment. The CTWQP is designed to further the ability of tribes to organize and begin addressing the water quality concerns that are threatening their reservations and treaty protected resources. Water pollution in Washington threatens the health of tribal members and their treaty resources without respect to political boundaries. Tribal jurisdictions interlock with many other jurisdictions, including some of the most densely populated and industrial areas in the state.

**For more information, contact:** Billy Frank, [mbfrank@nwifc.org](mailto:mbfrank@nwifc.org), (360) 528-4320 or Fran Wilshusen, [fran@nwifc.org](mailto:fran@nwifc.org), (360) 528-4351.

#### **Goals of the National Tribal Water Council:**

- Raise awareness of a wide range of water related issues pertaining to the health of tribal communities and the quality of tribal aquatic resources and watersheds.
- Promote information exchange.
- Facilitate the exposure of tribal water program managers and staff to best management practices for addressing water quality concerns.
- Encourage the enhancement of tribal water protection program development and implementation.
- Provide a platform to inform tribes on a wide variety of issues related to ground, surface, and drinking water.
- Promote community water protection education and awareness.
- Assist in the development, establishment, and sustaining of comprehensive tribal water protection programs.