Seventh National Monitoring Conference

Monitoring from the Summit to the Sea

April 25 - 29, 2010
Sheraton Denver Downtown
Denver, Colorado

Conference Program

NATIONAL WATER QUALITY MONITORING COUNCIL
Working Together for Clean Water
NWQMC

Welcome to the Seventh National Monitoring Conference!!

Dear Colleagues:

We are delighted to see you in Denver to explore water monitoring issues—from the summit to the sea! We look forward to this week's information exchange as 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 170 technical posters, and 20 extended sessions, including workshops and short courses. Of special note, this year's conference features:

- National, regional, and state findings on lakes, groundwater, rivers and streams, and coastal systems
- Integrated land-to-sea assessments, including the National Monitoring Network for U.S. Coastal Waters
- Elements for a proposed long-term national groundwater monitoring network
- Management issues, including nutrient enrichment and criteria, effects of urbanization, and climate change
- Drinking water issues, including emerging contaminants such as pharmaceuticals
- Tools and networking for enhanced state and regional councils and volunteer monitoring programs
- Advancements in sensor technology and real-time monitoring in lakes, estuaries, rivers, and streams
- Bio-assessment and other statistical techniques and tools, including new approaches to trend analyses

The Conference Program provides a general overview of conference activities and contains:

- A summary on the **National Water Quality Monitoring Council**, its mission, membership, and selected accomplishments and priorities
- Recognition of **Conference Sponsors**
- Background on this year's recipients of the **Elizabeth J. Fellows**, **Vision**, and **YSI Foundation Awards**
- **Acknowledgments** to conference planners
- **Conference exhibitors**
- **Conference agenda**, listing times and locations for all sessions, posters, workshops, and short courses
- **Poster presentations**, categorized by water topic
- Biographies of conference **plenary speakers**
- **Index of abstracts and posters** as they relate to Council priorities, including state and regional councils, volunteer monitoring, monitoring for multiple objectives, assessment and statistical tools, sensors and real-time monitoring, National Monitoring Network for U.S. Coastal Waters, and data management and information dissemination.

All abstracts for platform and poster presentations have been provided to each attendee on a CD. PowerPoint presentations will be made available on the Council's website (http://acwi.gov/monitoring/) following the conference.

Sincerely yours,

Charles S. Spooner
Co-Chair, U.S. Environmental Protection Agency

Pixie A. Hamilton
Co-Chair, U.S. Geological Survey

Welcome volunteer monitors!

We welcome you to this 2010 conference and encourage your participation in the many presentations and workshops, particularly those highlighting the broad spectrum of volunteer monitoring activities.

Across the country – and indeed throughout the world – volunteer monitors watch over watersheds, often those that would otherwise go unmonitored. They monitor the condition of streams, rivers, lakes, reservoirs, estuaries, coastal waters, wetlands, and wells. They do this because they want to help protect or restore a favorite water body near where they live, work, or relax. They do this to ensure safe drinking water. They do this for their community, their family, their children and grandchildren. They educate themselves, their community, and decision-makers. They recognize the importance of their role as watershed stewards. They make a difference.

Volunteer monitoring began in the 1970s. Many volunteer monitoring programs have been going strong for more than 20 years, providing an unparalleled long-term record of water quality. Volunteers conduct physical, chemical, and biological monitoring. They measure Secchi depth in lakes, identify benthic macroinvertebrates in streams, and monitor bacteria levels in beach waters. They make visual observations of habitat, land uses, and storm impacts, and assess the abundance and diversity of plants, fish, birds, and other wildlife. Some have undertaken more exotic activities such as examining water samples for toxic phytoplankton and monitoring the health of coral reefs. Volunteers count and catalog beach debris, participate in restoring degraded habitats, and help monitor the success of restoration efforts.

As the volunteer monitoring movement has grown and matured, programs have increasingly emphasized data quality and documentation so that their data can be more widely shared and used. Among the challenges volunteer programs face in coming years is learning how best to manage and share their quality-assured data and results, how to maintain sustainable programs, and how to build strong partnerships with potential users of their data.

Talk to state agency staff about uses of volunteer monitoring data and you will probably hear about the state's biennial water quality assessment and impaired waters reporting under sections 305(b) and 303(d) of the Clean Water Act. And, indeed, in many states, quality-assured volunteer data are increasingly being used for these critical state needs. But volunteer organizations are quick to point out that state-level uses are just part of the equation. Volunteer monitoring is for the most part a local activity with local impacts. Watershed associations, lakefront homeowner associations, and other community groups use their monitoring data to guide their own restoration projects and management activities. They present their data to local planning committees or town councils to support proposals for protective ordinances and policies. Volunteer monitoring is, in fact, key to understanding our waters.

We invite all conference participants to take advantage of workshops, presentations, and informal exchanges with the members of our vibrant volunteer monitoring community here at the conference.

For our waters,

The Volunteer Monitoring Conference Planning Sub-Committee

Table of Contents

NATIONAL WATER QUALITY MONITORING COUNCIL

Working Together for Clean Water

NWQMC

Selected Council Highlights and New Products for Your Water Needs

The National Water Quality Monitoring Council (Council) provides a national forum for coordination of comparable and scientifically defensible methods and strategies to improve water quality monitoring, assessment and reporting, and promotes partnerships to foster collaboration, advance the science, and improve management within all elements of the water quality monitoring community. Vital to this role, the Council provides a voice for monitoring practitioners across the Nation and fosters increased understanding and stewardship of our water resources.

The Council was created in 1997 as a vehicle for bringing together diverse expertise needed to develop collaborative, comparable, and cost-effective approaches for monitoring and assessing our Nation's water quality (http://acwi.gov/monitoring). The approaches are fundamental to the successful management and sustainability of our waters, and are increasingly important because water issues are becoming more complex, resources are tighter, and the demand for high-quality water continues to grow in order to support a complex web of human activities and aquatic ecosystem needs.

Each year, thousands of government agencies, Tribes, academic researchers, volunteers, industry and other organizations dedicate significant resources to monitor, assess, protect, and restore our water resources and watersheds across the U.S. Despite such efforts, understanding the condition of the Nation's waters has been limited and fragmented by differences in monitoring designs, sampling and analytical methods. It has also been hampered by inconsistent metadata, data management, and information dissemination. Council goals are thereby set to improve data comparability and reliability; data management, assessment, sharing, and reporting; and collaboration. The goals are accomplished through its workgroups *Collaboration and Outreach, Water Information Strategies,* and *Methods and Data Comparability Board* and through its role with the National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries ("Network"). The Network was initiated by the Council in 2004 in response to a recommendation by the U.S. Commission on Ocean Policy, and provides critical information for national and regional management of coastal ecosystems and their tributaries.

Council goals pursued by its workgroups and the Network are increasingly achievable as technology and expertise advance in data collection and exchange, assessment, and reporting. As a result, the Council and its partners have made significant advances in its priorities, including data management and information dissemination; compatible web services; state and regional councils; volunteer monitoring; assessment and statistical tools; sensors and real-time monitoring; and integrated land-to-sea assessments through the Network. Multiple Council products and services are now available to help meet water needs across the Nation (described below).

The Council is representative of federal, state, interstate, tribal, local, and municipal governments; watershed and environmental groups; the volunteer monitoring community; universities; and the private sector, including the regulated community. Representatives generally serve 3 to 4 year terms.

The Council is co-chaired by the U.S. Geological Survey (USGS) and U.S. Environmental Protection Agency (EPA) and is chartered as a subgroup of the Advisory Committee on Water Information (ACWI) under the Federal Advisory Committee Act.

Council members are organized into work groups, including: Collaboration and Outreach, Water Information Strategies, and the Methods and Data Comparability Board. Workgroup participation is open to non-Council members.

The Council meets three times each year. The meetings are open to non-members through web seminars and teleconferencing. For information on upcoming meetings and topics, contact Pixie Hamilton, pahamilt@usgs.gov, (804) 261-2602 or Wendy Norton, wenorton@usgs.gov, (703) 648-6810.

Council Workgroups

Methods and Data Comparability Board (Methods Board) – Provides a forum for evaluating and promoting methods that facilitate comparability among water-quality monitoring and analytical methods. A major focus currently is on quality control and data management of sensor data by an Aquatic Sensor Workgroup under the Methods Board. (**Contacts:** Dan Sullivan, djsulliv@usgs.gov, (608) 821-3869 and Gayle Rominger, grominger@ysi.com, (937) 767-7241)

Water Information Strategies Workgroup – Defines and promotes strategies for monitoring designs; data management, access, and exchange; data integration and analysis; and information reporting to address water needs. A major focus by WIS, along with the Methods Board, is to develop a system that guides scientists and managers with a range of statistical information, procedure references, and tools, and that assists in designing monitoring programs to meet specific objectives and converting data into information. (**Contacts:** Peter Tennant, ptennant@orsanco.org, (513) 231-7719, Mary Skopec, mary.skopec@dnr.iowa.gov, (319) 335-1579, Doug McLaughlin, douglas.mclaughlin@wmich.edu, (269)-276-3545, Leslie McGeorge, leslie.mcgeorge@dep.state.nj.us, (609) 292-1254, and Dan Sullivan, djsulliv@usgs.gov, (608) 821-3869)

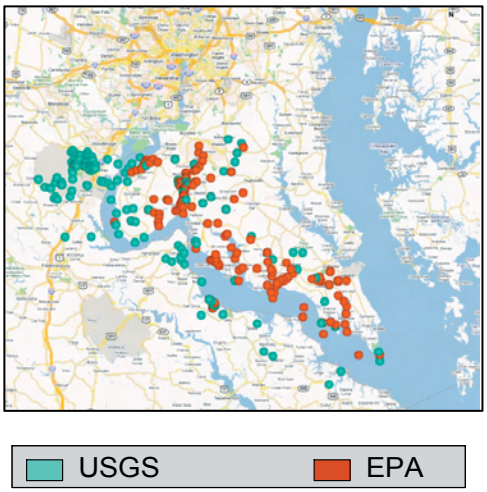
Collaboration and Outreach Workgroup – Works to build partnerships that foster collaboration and communication within the water-quality monitoring community. **(Contact:** Tracy Hancock, thancock@usgs.gov, (804) 261-2618)

Selected Highlights, Accomplishments, and Council Products for Your Water Needs

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 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.



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.

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 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. (**Contacts:** Nate Booth, nlbooth@usgs.gov, (608) 821-3822 and Kristen Gunthardt, gunthardt.kristen@epa.gov, (202) 566-1194)

Guides for Sensors Are Now Available through a Council Supported Public/Private Partnership

Four products developed through the sensor partnership are now available, including: (1) a checklist for users related to calibration and record keeping to ensure that data are of known and documented quality; (2) a deployment guide to assist in siting and maintaining sensors in the field; (3) data elements (or metadata) for sensors; and, (4) a glossary of terms.

Freshwater sensor manufacturers have played an active role, along with governmental and non-governmental organizations, to develop guides for deploying sensors, with YSI co-chairing and funding much of the effort. Future efforts will extend the public/private partnership to the Alliance for Coastal Technologies to integrate sensor information with NEMI; develop data management capabilities for sensor data; and assess the relevance and utility of sensor data to meet management needs. Additional information can be found at http://watersensors.org. (**Contacts:** Dan Sullivan, djsulliv@usgs.gov, (608) 821-3869 and Gayle Rominger, grominger@ysi.com, (937) 767-7241)

National Environmental Methods Index Celebrates Its Tenth Year

The National Environmental Methods Index (NEMI) celebrates its 10th year in 2010 as an online resource of laboratory methods and field protocols, including more than 1,100 methods for chemical, biological and physical monitoring (http://www.nemi.gov). Recent improvements to NEMI include a user-friendly format for enhanced accessibility by stakeholders. "MethodsML" is being explored, which is an XML standard for analytical methods. Collaboration is ongoing with EPA's Forum on Environmental Management to leverage comparability among methods and laboratory services across the Nation. (**Contact:** Dan Sullivan, djsulliv@usgs.gov, (608) 821-3869)

Physical Habitat Data Are Included as National Data Elements

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). 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. (**Contact:** Dan Sullivan, djsulliv@usgs.gov, (608) 821-3869)

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

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

A white paper, released at the 7th Council's biennial 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). (**Contacts:** Doug McLaughlin, douglas.mclaughlin@wmich.edu , (269)-276-3545, Leslie McGeorge, leslie.mcgeorge@dep.state.nj.us, (609) 292-1254, and Dan Sullivan, djsulliv@usgs.gov, (608) 821-3869)

Online Newsletter Released – *The National Water Monitoring News*

The first issue of the Council's bi-annual, online newsletter for the water monitoring community, released at the Council's 7th biennial conference in Denver, highlights activities of the national Council and those of state, regional, and tribal councils, watershed partnerships, and volunteer monitoring groups. Articles are included on monitoring success stories and other relevant topics on monitoring designs and assessments; related upcoming events, conferences, and links; and grant timelines (http://acwi.gov/monitoring). (**Contact:** Tracy Hancock, thancock@usgs.gov, 804-261-2618)

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

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 15 Councils and partnerships across the Nation. 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. Three web seminars have been hosted to date, which highlighted a presentation by Virginia's Monitoring Council on an online database tool and the integration of citizen monitoring data into the state assessment report, as well as presentations on new web technologies and social media tools for the water monitoring community. (**Contact:** Tracy Hancock, thancock@usgs.gov, 804-261-2618)

A citizen monitor with Alliance for Chesapeake Bay prepares to collect water samples near the U.S. Naval Academy, where submerged aquatic vegetation is being replanted. Some citizen data were used in Bay studies of these aquatic plants, which are vital to the Bay's health. (Photo by Bob Murphy, Alliance for Chesapeake Bay.)

Volunteer Monitoring Community Continues to Grow

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 7th biennial conference in Denver. (**Contact**: Linda Green, lgreen@uri.edu, (401) 874-2905)

Integrated Land-to-Sea Assessments Advance the National Monitoring Network Concepts

The National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries ("Network") provides 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/index.html). This 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), and regional associations representing a broad community of users, including coastal and inland states, tribes, researchers, and non-governmental organizations.

Through Coastal Action Money provided in support of the Ocean Research Priorities plan, design concepts of the Network have been implemented since 2007 in three areas, including Lake Michigan, led by the Great Lakes Commission; Delaware Bay, led by the Delaware River Basin Commission; and San Francisco Bay, led by the San Francisco Estuary Institute. Activities are coordinated with IOOS regional associations, including the Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA), Great Lakes Observing System (GLOS), and Central and Northern California Ocean Observing System (CenCOOS).

Activities in the three Network areas are successfully improving 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 are 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. In addition, the projects continue to provide added value in innovative technology and monitoring, such as in real-time monitoring with sensors and autonomous underwater vehicles (AUVs), which also is transferrable to other parts of the Nation.

More detailed information on land-to-sea assessments in the three Network areas and other U.S. coastal waters is available at http://acwi.gov/monitoring. (**Contacts:** Pixie Hamilton, pahamilt@usgs.gov, (804) 261-2602 and Tracy Hancock, thancock@usgs.gov, (804) 261-2618)

Additional information on Council activities can be obtained through the Council website, http://acwi.gov/monitoring/ and through the Council Co-Chairs, Chuck Spooner, USEPA, spooner.charles@epa.gov, (202) 566-1174 and Pixie Hamilton, USGS, pahamilt@usgs.gov, (804) 261-2602.

Sponsors

Thank You!

To our generous sponsors who have made the 2010 National Monitoring Conference a success!

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Elizabeth Jester Fellows Award

Elizabeth Jester Fellows headed the Assessment and Watershed Protection Division in EPA's Office of Water until November 2000. She dedicated her career to natural resources management, environmental protection, and public service. She envisioned the creation of the National Water Quality Monitoring Council (NWQMC) and advocated for the development of a national framework for collecting, assessing, and communicating water quality monitoring information. In her memory, the NWQMC has established the Elizabeth Jester Fellows Award to recognize individuals for outstanding achievement, exemplary service, and distinguished leadership in the field of water quality monitoring.

In recognition of his contributions to water quality monitoring, the National Water Quality Monitoring Council is pleased to present

the 2010 Elizabeth Jester Fellows Award to

Dr. Robert C. Ward
(Retired) Professor, Director
Colorado Water Resources Research Institute
Colorado State University
Fort Collins, Colorado

Dr. Robert C. Ward is dedicated to improving the state of the science of water quality monitoring through the delivery of quality education, development of coherent water monitoring systems, and promotion of the development of water quality information that the public and decision makers can understand, trust, and use to further improve water resources. Dr. Ward taught two generations of students in operations research, engineering design, and water quality monitoring during his 35-year tenure at Colorado State University (CSU) and through his "Short Course on Water Quality Monitoring Network Design." His seminal text on this topic and the monitoring network design he helped develop in New Zealand stand as testament to his work. His profession of goal-oriented monitoring was reflected in the Interim Task Force on Monitoring products,

as well as the National Water Quality Monitoring Council's (NWQMC) Framework for Water Quality Monitoring. Internationally he has served on the Scientific Organizing Committee for four Europe-wide conferences on water quality monitoring.

Dr. Ward represented academia on the NWQMC. He was a major contributor and editor of the September 2003 special report on "Seeking a Common Framework for Water Quality Monitoring," describing the Council's Framework for Water Quality Monitoring Programs that was published in the journal Water Resources IMPACT. He also chaired the Council's Water Information Strategies workgroup for its first eight years, on which his influence is still reflected.

In 2006, Dr. Ward received the University Council on Water Resources' (UCOWR) Warren A. Hall Medal in recognition of his distinctive scholarly accomplishments in the water resources field. UCOWR recognized Dr. Ward for his service as Director of the Colorado Water Resources Research Institute for fourteen years during which he also served as President of first UCOWR and then the National Institutes for Water Resources. He served as Interim Vice Chancellor for Academic Affairs of the CSU system and was designated a Life Member of the Colorado Water Congress. Nationally, he was a leader in the National Association of State Universities and Land-Grant Colleges (now known as the Association of Public and Land-Grant Universities).

Dr Ward was involved in American Water Resources Association (AWRA) for many years. He served as a Director for the Mountain District from 1995 to 1997. He also received the AWRA Icko Iben Award in 2006 for promotion of communication among disciplines concerned with water resource problems.

Dr. Ward provided the initial impetus to launch the Colorado Water Quality Monitoring Council (CWQMC). Based on his involvement in the NWQMC, he approached the Colorado Department of Public Health and Environment and the U.S. Geological Survey about starting a Colorado Chapter of the Council. Through his "behind the scene" support and guidance, a charter was written and the CWQMC was formed in 2000. This Council is still active today.

For nearly two decades, Dr. Ward served as an organizer and participant in the South Platte Forum. This forum provided an avenue for a timely, multi-disciplinary exchange of information and ideas important to resource management in the South Platte River Basin in Colorado. For his contributions, Dr. Ward received the 2006 Friend of the South Platte Forum Award.

Congratulations, Robert!

Vision Award

The Council's Vision Award was established to recognize an individual or group at the National Water Quality Monitoring Conference 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.

Mr. Terry Fleming

U.S. Environmental Protection Agency, Region 9

Terry Fleming has demonstrated strong leadership skills and dedication in the development and implementation of statewide monitoring strategies and programs for the state of California. Terry has consistently demonstrated an ability to encourage teamwork and collaboration among a diverse array of partners. As a result, California has produced a thorough, comprehensive monitoring strategy that successfully addresses the ten elements of the national program guidance for an effective monitoring program.

With Terry's leadership, the state's Surface Water Ambient Monitoring Program (SWAMP) developed and maintains the infrastructure (i.e., standard procedures, quality assurance and control, and consistent data formats) to ensure that data are comparable and of known, documented quality. The infrastructure provides the foundation for the design, implementation, and reporting of the SWAMP statewide and regional assessments. SWAMP is now collaborating with other Water Board programs to integrate water quality monitoring into the SWAMP structure. In addition, systems are now in place to provide public access to the data.

Terry and the SWAMP workgroup developed some key statewide monitoring priorities and plans for implementation. In 2007, the SWAMP embarked on a two-year effort to assess fish contamination in lakes and reservoirs statewide. The first year's results revealed significant contamination in sport fish throughout the State resulting in several new proposed 303d listings for impairment. The second year's results will be reported in spring 2010. In 2009, the program initiated 2-years of monitoring in coastal areas and will rotate to rivers and streams in 2011. Work on indicator development for the statewide aquatic life use survey of perennial streams has produced a robust statewide bioassessment program. The program supports development of biological objectives that allow the use of bioassessment information in a regulatory context to protect the state's stream resources. Terry's vision, drive and sense of humor have played an integral role in developing and implementing these statewide programs.

In addition to Terry's pivotal role in the SWAMP program, he is equally engaged in the CA Clean Beach Initiative, which coordinates beach monitoring and BMP implementation. Most recently, Terry joined the CA Water Quality Monitoring Council, representing EPA Region 9. He is bringing to the Council the same skills and knowledge that he willingly brings to SWAMP.

YSI Foundation "Minding the Planet" Award

The YSI Foundation, the philanthropic arm of YSI Incorporated, is allocated an annual amount of funds, based on financial results, for charitable giving to a multitude of causes. Since its inception in 1990, the Foundation has donated more than $2.8 million around the world; thereby practicing good corporate citizenship and demonstrating its commitment to its core values. The Foundation grants have funded a variety of projects, including university environmental science scholarships, high school scholarships, large scale restoration projects, a wetlands data center, science museum children programs, and equipment for fishermen who lost their livelihood in the December 2005 tsunami.

In 2006, the Foundation launched its new "Minding the Planet" grant program to specifically support environmental projects aimed at protecting and restoring water resources and natural habitats.

In 2008, in honor of our 60th Anniversary, at the National Water Quality Monitoring Conference in Atlantic City, YSI awarded a special $60,000 grant to Columbia Riverkeeper located in Hood River, Oregon for a water quality monitoring program used to train volunteers to collect water quality data on the Columbia River, the Pacific Northwest's longest river. This grant was for capacity building so that volunteers could monitor 100 sites total in backwaters and mainstem eddies for riparian restoration or protection in order to provide temporary cool-water refuges for juvenile salmonids and other native species. With more monitoring, volunteers soon identified and prioritized at least five restoration sites by 2009, one site per community.

In 2009, at the Coastal and Estuarine Research Foundation Conference in Portland, Oregon, the University of West Florida received a $25,000 grant from the YSI Foundation to synthesize water quality data and address issues of climate change. With this grant, a graduate student project was funded, which helped analyze nutrient and continuous dissolved oxygen data from five National Estuarine Research Reserves in the Eastern Gulf of Mexico and Florida Atlantic coast to determine the rate of primary production and net ecosystem metabolism. This work provided insights to help local and regional managers address water quality issues within their sensitive estuarine and coastal aquatic habitats.

The YSI Foundation, along with the employee-owners of YSI, are also pleased to have the opportunity to publicly acknowledge and applaud at this conference the very critical work that all of the hundreds of local volunteer monitoring organizations are doing to improve the quality of the nation's water.

Acknowledgments

The Council offers its gratitude to those who served on the 2010 Conference Planning Committee and its Subcommittees. The Council also acknowledges the commitment and hard work of all those who served as abstract review team leaders and members, session moderators, workshop/short course facilitators and trainers, and speakers. Many thanks go to all of the environmental monitoring professionals who prepared presentations, posters, and exhibits for this conference. Listed below are the numerous individuals who participated in organizing the 2010 conference:

Conference Planning Committee Chairs

Charles Spooner, USEPA

Doug Glysson, USGS

Jeff Schloss, University of NH

Conference Planning Committee

Maggie Craig, Tetra Tech, Inc.

Philip Forsberg, NALMS

Linda Green, University of RI

Pixie Hamilton, USGS

Tracy Hancock, USGS

Jim Laine, WV DEP

Barry Long, National Park Service

Kim Martz, USGS

Wendy Norton, USGS

Gayle Rominger, YSI

Gary Rowe, USGS

Mary Skopec, IA DNR

Dan Sullivan, USGS

Cathy Tate, USGS

David Tucker, City of San Jose, CA

Sarah Unz, NALMS

Local Planning Committee

Daniel Beley, CO DPHE

Joan Carlson, US Forest Service

Karl Hermann, USEPA

Barry Long, National Park Service

Dave Mueller, USGS

Gary Rowe, USGS

Cathy Tate, USGS

Katie Walton-Day, USGS

Robert Ward, Professor Emeritus, CSU

Awards Committee

Val Connor, CA SWRCB

Pixie Hamilton, USGS

Tracy Hancock, USGS

Gary Kohlhepp, MDNRE

Wendy Norton, USGS

Tony Olsen, USEPA

Chris Piehler, LA DEQ

Charles Spooner, USEPA

David Tucker, City of San Jose, CA

Volunteer Monitoring Planning Committee

Danielle Donkersloot, NJ DEP

Linda Green, University of RI

Barb Horn, CO Division of Wildlife

Alice Mayio, USEPA

Conference Information

Registration

Conference registration is located on the Concourse Level of the Plaza Building.

Hours:

Sunday, April 25	5:00 pm – 7:00 pm
Monday, April 26	7:00 am – 5:30 pm
Tuesday, April 27	7:00 am – 5:30 pm
Wednesday, April 28	7:00 am – 5:30 pm
Thursday, April 29	7:00 am – 12:00 pm

Meal Functions

All meals listed below are provided to all full conference registrants on Monday, Tuesday, Wednesday & Thursday. Daily registrants receive all meals on the day that they attend the conference.

Continental Breakfast

Monday, April 26	7:30 am – 8:00 am	Governors Square Foyer
Available to morning Extended Session participants only.		
Tuesday, April 27	7:00 am – 8:00 am	Exhibit Hall
Wednesday, April 28	7:00 am – 8:00 am	Exhibit Hall
Thursday, April 29	7:00 am – 8:00 am	Ballroom

Morning Break

Monday, April 26	10:30 am – 10:45 am	Exhibit Hall
Tuesday, April 27	9:30 am – 10:00 am	Exhibit Hall
Wednesday, April 28	9:30 am – 10:00 am	Exhibit Hall
Thursday, April 29	9:30 am – 10:00 am	Ballroom

Lunch

Monday, April 26	12:30 pm – 1:30 pm	Exhibit Hall
Tuesday, April 27	11:30 am – 1:00 pm	Exhibit Hall
Wednesday, April 28	11:30 am – 1:00 pm	Exhibit Hall
Thursday, April 29	11:30 am – 1:30 pm	Ballroom

Afternoon Break

Monday, April 26	3:00 pm – 3:30 pm	Exhibit Hall
Tuesday, April 27	2:30 pm – 3:30 pm	Exhibit Hall
Wednesday, April 28	2:30 pm – 3:30 pm	Plaza Foyer

Exhibit & Poster Receptions

Monday, April 26	5:00 pm – 7:00 pm	Exhibit Hall
Tuesday, April 27	5:00 pm – 7:00 pm	Exhibit Hall

Conference Exhibitors

Abraxis LLC
54 Steamwhistle Dr.
Warminster, PA 18974-1450
info@abraxiskits.com
www.abraxiskits.com
215.357.3911

ACZ Laboratories, Inc.
2773 Downhill Dr.
Steamboat Springs, CO 80487
sales@acz.com
www.acz.com
800.334.5493

Agilent Technologies
2553 Thunderbird Ln.
Evergreen, CO 80439
contact_us@agilent.com
www.agilent.com
303.662.4268

Aqualytical
11760 Commonwealth Dr.
Louisville, KY 40299
www.ciagent.com
866.242-4368

Aquatic Informatics
Ste. 1100 – 570 Granville St.
Vancouver, BC V6C 3P1
Canada
info@aquaticinformatics.com
www.aquaticinformatics.com
877.870. 2782

bbe Moldaenke GmbH
Wildrosenweg 3
24119 Kiel-Kronshagen
Germany
bbe@bbe-moldaenke.de
www.bbe-moldaenke.de
+49 0431 380 40 0

Blue Water Satellite
440 E. Poe Rd., Ste. 203
Bowling Green, OH 43402
www.bluewatersatellite.com
419.728.0060

Campbell Scientific, Inc.
815 W. 1800 N.
Logan, UT 84321
info@campbellsci.com
www.campbellsci.com
435.753.2342

Carnet Technology
6097 Oakley Palestine Rd.
Terry, MS 39170
www.carnettechnology.com
601.857.8641

Charm Sciences, Inc.
659 Andover St.
Lawrence, MA 01843
info@charm.com
www.charm.com
978.687.9200

ChemWare
900 Ridgefield Dr., Ste. 150
Raleigh, NC 27609
info@chemware.com
www.chemware.com
919.855.8716

Clean Lakes, Inc.
PO Box 3548
Coeur d'Alene, ID 83816
info@cleanlake.com
www.cleanlake.com
208.665.1475

EcoAnalysts, Inc.
1420 S. Blaine St., Ste. 14
Moscow, ID 83843-2876
info@ecoanalysts.com
www.ecoanalysts.com
208.882.2588

Energy Laboratories, Inc.
PO Box 30916
Billings, MT 59107
eli@energylab.com
www.energylab.com
800.735.4489

EnviroTech Instruments / Green Eyes
1517 Technology Dr., Ste. 101
Chesapeake, VA 23320
mail@envirotechinstruments.com
www.envirotechinstruments.com
757.549.8474

Fluid Imaging Technologies, Inc.
65 Forest Falls Dr.
Yarmouth, ME 04096
info@fluidimaging.com
www.fluidimaging.com
207.846.6100

Forston Labs
4098 Trouble Trail
Fort Collins, CO 80524
info@forstonlabs.com
www.forstonlabs.com
800.301.1259

FTS
1065 Henry Eng Place
Victoria, BC V9B 6B2
Canada
sales@ftsinc.com
www.ftsinc.com
800.548.4264

Geotech Environmental Equipment
2650 E. 40th Ave.
Denver, CO 80205
www.geotechenv.com
800-833-7958

GFS Chemicals, Inc.
PO Box 245
Powell, OH 43065
sales@gfschemicals.com
www.gfschemicals.com
877.534.0795

Greenspan Analytical
c/o Goyen Valve Corp.
1195 Airport Rd.
Lakewood, NJ 08701
www.goyen.com
732.364.7800

Hach Hydromet
PO Box 389
Loveland, CO 80539
sales@hachenvironmental.com
www.hydrolab.com
800.949.3766

IDEXX
1 IDEXX Dr.
Westbrook, ME 04092
water@idexx.com
idexx.com
800.321.0207

In-Situ Inc.
221 E. Lincoln Ave.
Fort Collins, CO 80524-2533
www.in-situ.com
800.446.7488

LaMotte Company
PO Box 329
802 Washington Ave.
Chestertown, MD 21620
www.lamotte.com
800.344.3100

National Water Quality Monitoring Council
acwi.gov/monitoring/

North American Lake Management Society
PO Box 5443
Madison, WI 53705-0443
info@nalms.org
www.nalms.org
608.233.2836

Pine Environmental Services
7332 S. Alton Way
Bldg. 13, Ste. E
Centennial, CO 80112
sales@pine-environmental.com
www.pine-environmental.com
303.741.3800

Practical Stats
9278 Lark Sparrow Dr.
Highlands Ranch, CO 80126-5232
ask@practicalstats.com
www.practicalstats.com
303.870.4921

Satlantic Inc.
3481 N. Marginal Rd.
Halifax, NS B3K 5X8
Canada
info@satlantic.com
www.satlantic.com
902.492.4780

Sequoia Scientific, Inc.
2700 Richards Rd., Ste. 107
Bellevue, WA 98005-4200
info@sequoiasci.com
www.sequoiasci.com
866.212.2226

Solinst Canada Ltd.
35 Todd Rd.
Georgetown, ON L7G 4R8
Canada
instruments@solinst.com
www.solinst.com
800.664.2023

Technical Associates
7051 Eton Ave.
Canoga Park, CA 91303
tagold@nwc.net
www.tech-associates.com
818.883.7043

Teledyne Isco, Inc.
4700 Superior St.
Lincoln, NE 68504
iscoinfo@teledyne.com
www.isco.com
402.464.0231

Tetra Tech
400 Red Brook Blvd., Ste. 200
Owings Mills, MD 21117
jeffrey.white@tetratech.com
www.tetratech.com
410.356.8993

Thermo Scientific
166 Cummings Center
Attn. Sokhom Bin
Beverly, MA 01915
www.thermo.com
800.636.6162

Turner Designs
845 W. Maude Ave.
Sunnyvale, CA 94085
sales@turnerdesigns.com
www.turnerdesigns.com
877.316.8049

US Geological Survey
Hydrologic Instrumentation Facility
Building 2101
Stennis Space Center, MS 39529
mhbrooks@usgs.gov
wwwhif.er.usgs.gov
228.688.2607

US Geological Survey
National Water-Quality Assessment Program (NAWQA)
413 National Center
Reston, VA 20192
nawqa_whq@usgs.gov
water.usgs.gov/nawqa/
703.648.5716

US Environmental Protection Agency
Office of Water
1200 Pennsylvania Ave NW 4503T
Washington, DC 20460
spooner.charles@epa.gov
www.epa.gov/ow/
202.566.1174

WET Labs, Inc.
PO Box 518
620 Applegate St.
Philomath, OR 97370
sales@wetlabs.com
www.wetlabs.com
541.929.5650

YSI, Inc.
1725 Brannum Ln.
Yellow Springs, OH 45387
environmental@ysi.com
www.ysi.com
800.765.4974

2010 National Monitoring Conference-at-a-Glance

Sunday, April 25

7:30 am – 5:00 pm	**Field Trip 1**: Mining and the Treatment of Mine Drainage
8:00 am – 5:00 pm	**Field Trip 2**: Demonstration and Training in the National Wetland Condition Assessment Field Methods
1:00 pm – 5:00 pm	**Field Trip 3**: Field Demonstration of Methods for Water-Quality Sampling & Monitoring – Part 1 of the "Monitoring Framework"

Monday, April 26

7:30 – 8:00	Breakfast for Workshop Participants – Governors Square Foyer								
8:00 – 10:30	**Extended Session 1** Cancelled		**Extended Session 2** Plenary Seminar for Continuous Real-Time Monitoring: Direct Measures and Surrogates Rm. 14	**Extended Session 3** Using NHD and State GIS Information to Improve National Aquatic Resource Survey Designs Rm. 11	**Extended Session 4** Guidelines for Design, Sampling, Analysis, and Interpretation for Cyanobacterial Toxin and Taste-And-Odor Studies in Lakes and Reservoirs Rm. 10		**Extended Session 5** Building a Case for Causes of Biological Impairment Rm. 12		
10:45 – 12:30	**Opening Plenary and Award Presentations** – Plaza Ballroom F								
12:30 – 1:30	Lunch – Exhibit Hall (Plaza Ballrooms A-E)								
	A1	**A2**	**A3**	**A4**	**A5**	**A6**	**Extended Session 6**	**Extended Session 7**	**Field Trip 4**
1:30 – 3:00 **Concurrent Session A**	Continuous Real-Time Monitoring: Operation and Data Evaluation Rm. 14	Indices of Biotic Integrity for Wetlands Rm. 17	Developing Nutrient Criteria 1 Rm. 15	Lessons Learned from National Assessments Rm. 11	Strategies for Growing a Volunteer Monitoring Program Rm. 12	Monitoring and Assessing Groundwater Vulnerability 1 Rm. 16	Building Successful State, Regional, and Tribal Water Monitoring Councils, Part 1 Rm. 9	Man vs. Stats, Part 1 Rm. 10	Tour of the USGS National Water-Quality Lab - Part 2 of the "Monitoring Framework"
3:00 – 3:30	Break – Refreshments in Exhibit Hall (Plaza Ballrooms A-E)								
	B1	**B2**	**B3**	**B4**	**B5**	**B6**	**Extended Session 6**	**Extended Session 7**	**Field Trip 4**
3:30 – 5:00 **Concurrent Session B**	Evaluation and Application of New Technologies for Real-time Monitoring Rm. 14	Developing New Biological Assessment Tools Rm. 17	Developing Nutrient Criteria 2 Rm. 15	Monitoring the Effects of Development on Hydrology and Water Quality Rm. 12	Modeling Ecological Conditions Rm. 11	Monitoring and Assessing Groundwater Vulnerability 2 Rm. 16	Building Successful State, Regional, and Tribal Water Monitoring Councils, Part 2 Rm. 9	Man vs. Stats, Part 2 Rm. 10	Tour of the USGS National Water-Quality Lab - Part 2 of the "Monitoring Framework"
5:00 – 7:00	***Exhibit and Poster Reception*** – **Exhibit Hall** (Plaza Ballrooms A-E and Plaza Foyer)								

Tuesday, April 27

7:00 – 8:00	Breakfast – Exhibit Hall (Plaza Ballrooms A-E)							
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**Extended Session 8**	**Extended Session 9**
8:00 – 9:30 **Concurrent Session C**	Monitoring Stressors and Impacts to Lakes and Reservoirs Rm. 17	Monitoring for Stormwater Management Effectiveness Rm. 16	Interpreting Water Quality Data Rm. 14	Downstream Impacts from Mined Lands 1 Rm. 15	National Monitoring Network: Monitoring Water Quality from Inland to Coastal Ecosystems Rm. 12	PAHs and Coal-Tar-Based Pavement Sealcoat: Stormwater Management, Toxicology, and Public Policy Rm. 11	Sensors Basics: Tools to Enhance the Quality and Comparability of Sensors Data for Continuous Real-Time Monitoring, Part 1 Rm. 10	Emerging Applications of the Biological Condition Gradient (BCG) Rm. 9
9:30 – 10:00	Break – Refreshments in Exhibit Hall (Plaza Ballrooms A-E)							
	D1	**D2**	**D3**	**D4**	**D5**	**D6**	**Extended Session 8**	**Extended Session 9**
10:00 – 11:30 **Concurrent Session D**	Wetlands Condition Monitoring and Assessment Rm. 17	New Tools and Approaches in Data Analysis and Reporting Rm. 11	Elements of a Long-Term National Ground-Water Monitoring Network and a State-Scale Example Rm. 16	Downstream Impacts from Mined Lands 2 Rm. 15	Effective Communication Leads to Action Rm. 12	Pharmaceuticals and Other Emerging Contaminants Above and Below the Water's Surface Rm. 14	Sensors Basics: Tools to Enhance the Quality and Comparability of Sensors Data for Continuous Real-Time Monitoring, Part 2 Rm. 10	Biological Condition Gradient (BCG) Development and Calibration at State, Regional, and National Levels Rm. 9
11:30 – 1:00	Lunch – Exhibit Hall (Plaza Ballrooms A-E)							
	E1	**E2**	**E3**	**E4**	**E5**	**E6**	**Extended Session 10**	**Extended Session 9**
1:00 – 2:30 **Concurrent Session E**	Continuous Real-Time Monitoring: Applications in Lakes and Estuaries Rm. 14	Monitoring BMP Effectiveness Rm. 16	Integrating Probabilistic and Targeted Monitoring Rm. 11	Modeling at a Regional Scale Rm. 12	Volunteers and State Agencies: Collaborating for Better Decisions Rm. 17	Contaminant Effects on Aquatic Ecosystem Health 1 Rm. 15	Emerging New Approaches to Water Quality Trend Analysis, Part 1 Rm. 10	Using Stressor-Response Relationships to Address Hydrological and Nutrient Issues Rm. 9
2:30 – 3:30	Exhibit and Poster Viewing – Exhibit Hall (Plaza Ballrooms A-E)							
	F1	**F2**	**F3**	**F4**	**F5**	**F6**	**Extended Session 10**	**Extended Session 9**
3:30 – 5:00 **Concurrent Session F**	Continuous Real-Time Monitoring: Applications in Rivers and Streams Rm. 14	Regional Scale Wetlands Monitoring and Assessment Rm. 16	Water Quality Exchanges Improve Data Access and Sharing Rm. 11	Using Probabilistic Monitoring to Support State and Tribal Programs Rm. 12	Innovation and Longevity in Volunteer Monitoring Programs Rm. 17	Contaminant Effects on Aquatic Ecosystem Health 2 Rm. 15	Emerging New Approaches to Water Quality Trend Analysis, Part 2 Rm. 10	Using the BCG and Stressor-Response Information in an Urbanizing Setting Rm. 9
5:00 – 7:00	***Exhibit and Poster Reception*** – **Exhibit Hall** (Plaza Ballrooms A-E and Plaza Foyer)							

Wednesday, April 28

7:00 – 8:00	Breakfast – Exhibit Hall (Plaza Ballrooms A-E)							
	G1	**G2**	**G3**	**G4**	**G5**	**G6**	**Extended Session 11**	
8:00 – 9:30 **Concurrent Session G**	Continuous Real-Time Monitoring: Regulatory Perspectives Rm. 14	Biological Monitoring with Volunteers Rm. 17	Watershed Scale Protection and Restoration Assessments Rm. 11	Examining Nutrient Processing at Multiple Scales Rm. 16	Results and Importance of Comparability Studies Rm. 12	Evaluating Contaminant Trends in Surface-Water Quality: Streams and Rivers Rm. 15	Data Flow through the Monitoring Framework, Part 3 – USGS Data from the Lab to the Public Rm. 9	
9:30 – 10:00	Break – Refreshments in Exhibit Hall (Plaza Ballrooms A-E)							
	H1	**H2**	**H3**	**H4**	**H5**	**H6**	**Extended Session 12**	**Extended Session 2**
10:00 – 11:30 **Concurrent Session H**	Statewide Bioassessment Rm. 16	Your Stream Overfloweth: Case studies in Monitoring Stormwater Quality Rm. 14	Using Data Sharing as a Pathway to Collaboration Rm. 11	Monitoring Network Design: Implementing Large Scale Solutions Rm. 12	Harmful Algal Blooms and Cyantoxins: How (Blue) Green is my Water? Rm. 17	Evaluating Contaminant Trends in Lakes and Reservoirs using Sediment Cores Rm. 15	Science-Based Environmental Report Cards and Indicators from the Watershed to the National Scale Rm. 2	Closing Interactive Panel Discussion for Continuous Real-Time Monitoring Rm. 10
11:30 – 1:00	Lunch – Exhibit Hall (Plaza Ballrooms A-E)							
	I1	**I2**	**I3**	**I4**	**I5**	**I6**	**Extended Session 13**	**Extended Session 14**
1:00 – 2:30 **Concurrent Session I**	Biological Assessments - Survey Design and Sampling Considerations Rm. 16	Tracking What Flows Downhill: Microbial Source Tracking Rm. 12	21st Century Technical Tools for Water Quality Assessments Rm. 14	Integrated Land-to-Sea Assessments Based on Multiple Networks Rm. 11	Contaminants in Groundwater Rm. 15	Prioritization of Chemicals for New Methods Development Rm. 17	Is Your Monitoring Program Producing Measurable Results and How Do You Know?, Part 1 Rm. 9	The National Lakes Assessment – Just How Good are the Nation's Lakes and Reservoirs, Part 1 Rm. 10
2:30 – 3:30	Break – Plaza Foyer							
	J1	**J2**	**J3**	**J4**	**J5**	**J6**	**Extended Session 13**	**Extended Session 14**
3:30 – 5:00 **Concurrent Session J**	Coastal and Estuarine Assessments Rm. 12	Developme nt of Reference Condition for Different Purposes and at Different Scales Rm. 16	Integrating Water Quality Indicators to Support Monitoring and Assessment Decisions Rm. 17	Overcoming Barriers to Monitoring Collaboration and Partnerships Rm. 11	Evaluating Contaminant Trends in Groundwater Quality Rm. 15	Endocrine Disrupting Compounds - Identification, Sources, and Effects Rm. 14	Is Your Monitoring Program Producing Measurable Results and How Do You Know?, Part 2 Rm. 9	The National Lakes Assessment – Just How Good are the Nation's Lakes and Reservoirs, Part 2 Rm. 10
5:15 – 6:30	Methods Board Meeting – Room 17							
5:15 – 6:45	Volunteer Monitoring Meeting – Room 10							
6:00 – 9:00	USGS Continuous Water Quality Committee – Room 9							

Thursday, April 29

7:00 – 8:00	Breakfast – Plaza Ballroom ABC							
	K1	**K2**	**K3**	**K4**	**K5**	**K6**	**Extended Session 15**	**Extended Session 16**
8:00 – 9:30 **Concurrent Session K**	Water Quality Monitoring in Coastal and Marine Environments Rm. 12	Geospatial Assessments of Water Quality Rm. 16	Modeling of Nutrient Transport and Loadings Rm. 14	Monitoring Partnerships: Promoting Water Resource Stewardship and Protection Rm. 11	Transport and Distribution of Mercury through Aquatic Ecosystems Rm. 15	Agrochemical Monitoring Rm. 17	Working with Watershed Tools and Data to Get (and Show) Results, Part 1 Rm. 9	National Aquatic Resource Surveys: Transferring Technical Tools and Approaches, Part 1 Rm. 10
9:30 – 10:00	Break – Plaza Ballroom ABC							
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**Extended Session 15**	**Extended Session 16**
10:00 – 11:30 **Concurrent Session L**	Monitoring Hydrology: A Critical Consideration for the Interpretation of Water Quality and Biological Assessment Data Rm. 12	Climate Change: Monitoring Impacts on Water Quality and Quantity Rm. 15	Linking Sources and Stressors to Water Quality Rm. 17	Unique Collaborative Approaches for Successful Outcomes Rm. 11	Biomagnification of Mercury through Food Webs Rm. 16	Contaminant Threats to Drinking Water Rm. 14	Working with Watershed Tools and Data to Get (and Show) Results, Part 2 Rm. 9	National Aquatic Resource Surveys: Transferring Technical Tools and Approaches, Part 2 Rm. 10
11:30 – 1:30	**Closing Plenary Luncheon** – Plaza Ballroom ABC							
1:45 – 5:00	Monitoring and Assessment Partnership, a meeting of US EPA, States, and Tribes interested in enhancing the National Aquatic Resource Surveys – Rm. 14							
1:45 – 5:00	USGS National Water Quality Meeting: The Field – Rm. 11, The Data – Rm. 12, The Labs – Rm. 16, The Future – Rm. 17							
2:00 – 3:30	**Field Trip 5**: Tour of EPA Region 8 Office Green Building and Green Operations							

Plenary Agendas

Opening Plenary and Award Presentations

Monday, April 26, Plaza Ballroom F

10:45 am **Welcome to the 2010 National Monitoring Conference**
Pixie Hamilton, U.S. Geological Survey, NWQMC Co-Chair

10:50 am **Welcome to Denver**
Martha E. Rudolph, Executive Director, Colorado Department of Public Health and Environment

11:00 am **Introduction of Anne Castle**
Pixie Hamilton

11:05 am **The National Perspective**
Anne J. Castle, Assistant Secretary for Water and Science, U.S. Department of the Interior

11:30 am **Introduction of Tracy Mehan**
Charles Spooner, U.S. Environmental Protection Agency, NWQMC Co-Chair

11:35 am ***Flying Blind No More: Data and Monitoring as Indispensable Tools of Water Management***
G. Tracy Mehan III, Principal, The Cadmus Group and Former Assistant Administrator for Water, U.S. Environmental Protection Agency

12:00 pm **Presentation of the YSI Foundation Minding the Planet Grant**
Gayle Rominger, YSI

12:05 pm **Presentation of the Vision Award**
Val Connor, California State Water Resources Control Board

12:10 pm **Presentation of the Elizabeth Jester Fellows Award**
Charles Spooner

12:15 pm **Charge to Conference Participants**
Charles Spooner

Closing Plenary and Luncheon

Thursday, April 29, Plaza Ballroom ABC

11:30 am **Luncheon**

12:15 pm **Welcome to Closing Luncheon**
Pixie Hamilton, U.S. Geological Survey, NWQMC Co-Chair

12:20 pm **Introduction of Thomas Tidwell**
Sherry Hazelhurst, U.S. Forest Service

12:25 pm ***Water Delivery from Forests in an Era of Climate Change: Landscape-Scale Conservation***
Thomas L. Tidwell, Chief, U.S. Forest Service

12:50 pm **Introduction of Robert Hirsch**
Pixie Hamilton

12:55 pm ***Water Monitoring for a Changing World***
Robert M. Hirsch, Research Hydrologist and Former Associate Director for Water, U.S. Geological Survey

1:20 pm **Conference Closing & Invitation to 2012 Conference**
Charles Spooner, U.S. Environmental Protection Agency, NWQMC Co-Chair

Plenary Speakers

Anne J. Castle

Assistant Secretary for Water and Science, Department of Interior Washington, D.C.

Since June 2009, Anne Castle has served as the Assistant Secretary for Water and Science in the Department of Interior where she oversees water and science policy and has responsibility for the Bureau of Reclamation and the U.S. Geological Survey. As a partner in the Denver, Colorado office of Holland &Hart LLP from 1981 to 2009, Castle had an extensive practice that included litigation and multi-party negotiations involving water issues, water related transactions, and advice on water policy and strategy. Her clients included a wide assortment of water users. While at Holland & Hart she was elected to chair the firm's management committee and served in that position from 2001 to 2004. Castle has served on the South Platte River Basin Task Force; as chair and elected member of the Board of Directors, Genesee Water and Sanitation District; and as a member of the Colorado Ground Water Commission.

Castle has been listed in Best Lawyers in America for water law in 2007 and 2008. The Women's Vision Foundation selected her for its prestigious Woman of Vision award in 2008, recognizing positive, enlightened leadership and active promotion of the advancement of women within the law firm and in the community. She is featured in the November 2008 issue of Law Practice magazine in its leadership profile series.

G. Tracy Mehan, III

Principal, The Cadmus Group, Inc., Arlington, Virginia

G. Tracy Mehan, III, is Principal with The Cadmus Group, Inc., an environmental consulting firm, since 2004. Mehan served as Assistant Administrator for Water at the U.S. Environmental Protection Agency from 2001 to 2003. In that capacity he directed both the Clean Water and Safe Drinking Water Acts programs including permitting, infrastructure finance, wetlands regulation, standards and watershed management. During his tenure, he developed new policies and guidance on watershed-based permitting and water quality trading, and promoted expanded ambient water quality monitoring and innovative approaches to meeting the challenge of the infrastructure financing gap. He served as Environmental Stewardship Counselor to the 2004 G-8 Summit Planning Organization (2004).

Mehan also served as director of the Michigan Office of the Great Lakes (1993-2001), as Associate Deputy Administrator of EPA in 1992, and as director of the Missouri Department of Natural Resources from 1989 to 1992. In that capacity he managed the state's environmental, parks, historic preservation, geology and other programs. He represented the State of Missouri in all negotiations over the management of the Missouri River, as well as matters pertaining to water diversions including tribal reserved water rights potentially impacting main stem flows downstream.

Mehan is a graduate of Saint Louis University and its School of Law, and currently is an Adjunct Professor in Environmental Law at George Mason University School of Law. Presently, Mehan serves on the Water Science and Technology Board and the Committee on the Mississippi River and the Clean Water Act for the National Research Council of the National Academies. He has also served as an independent expert judge for the Municipal Water Conservation Achievement Award Program (2006) sponsored by The U.S. Conference of Mayors and its Urban Water Council. Mehan is a former board member for the Great Lakes Protection Fund and currently serves on the Boards of Directors of the Potomac Conservancy, the Great Lakes Observing System and the Clean Water America Alliance.

Thomas L. Tidwell

Chief, Forest Service, Washington, D.C.

Tom Tidwell grew up in Boise, Idaho, and graduated from Washington State University. He has spent 32 years with the Forest Service in a variety of positions. He began his Forest Service career on the Boise National Forest in fire, and has since worked on eight different national forests, in three regions. He has worked at all levels of the agency in a variety of positions, including District Ranger, Forest Supervisor, and Legislative Affairs Specialist in the Washington Office, where he worked on the planning rule, the 2001 roadless rule and the Secure Rural Schools County Payments Act. Tom served as the Deputy Regional Forester for the Pacific Southwest Region, with primary responsibility for fire and aviation management, recreation, engineering, state and private forestry and tribal relations. Under Tom's leadership, there was a significant increase in the Region's effectiveness to reduce hazardous fuels, and improved cooperation with CALFIRE on wildland fire suppression. Prior to this assignment, Tidwell served as the Regional Forester for the Northern Region, with responsibility for the national forests and grasslands in northern Idaho, Montana, North Dakota and portions of South Dakota. As the Regional Forester, Tom encouraged and supported community-based collaboration to find resolution on how and where to use active management to restore forest health and address wildfire threat to communities, and to provide protection for the values of unroaded landscapes. Tom's field experience includes working from the rural areas of Nevada and Idaho all the way to the urban Forests in California and the Wasatch-Cache National Forest in Utah, where he served as Forest Supervisor during the 2002 Winter Olympics.

Tom has extensive fire experience, beginning as a firefighter, and accumulating nineteen years as an agency administrator responsible for fire suppression decisions. Tom is married to Kim, and they have one daughter, MacKenzie.

Dr. Robert M. Hirsch

USGS Research Hydrologist, Reston, Virginia

Robert M. Hirsch currently serves as a Research Hydrologist at the USGS. From 1994 to 2008, he served as the Chief Hydrologist of the U.S. Geological Survey (USGS), responsible for all USGS water monitoring, assessment, and research programs. During his USGS tenure, Hirsch has played an instrumental role in developing several major USGS water quality and quantity programs, including: 1) the National Water Quality Assessment (NAWQA) Program: 2) the National Streamflow Information Program (NSIP); and 3) the National Water Information System Web (NWISWeb). Hirsch is a Fellow of the American Association for the Advancement of Science and an active member of the American Geophysical Union and the American Water Resources Association. Since 2003 he has served as the co-chair of the Subcommittee on Water Availability and Quality of the Committee on Environment and Natural Resources of the National Science and Technology Council, and in this role he has been instrumental in developing interagency priorities for water science and technology.

Hirsch earned a Ph.D. from the Johns Hopkins University Department of Geography and Environmental Engineering. He is co-author of the textbook "Statistical Methods in Water Resources," and has received numerous honors, including the 2006 American Water Resources Association's William C. Ackermann Medal for Excellence in Water Management, and rank of Meritorious Senior Executive by the President of the United States. Hirsch is a recipient of the USGS "Eugene M. Shoemaker Award for Lifetime Achievement in Communications."

He began his USGS career in 1976 as a hydrologist and has conducted research on water supply, water quality, pollutant transport, and flood frequency analysis. Since returning to a research position he has focused his efforts on methods for better documenting and understanding long-term changes in water quantity and quality in rivers. He is exploring century-scale trends in flooding nationwide and nutrient transport trends over several decades in rivers tributary to the Chesapeake Bay and the Gulf of Mexico.

Field Trips

Field trip attendees should meet in the Plaza Lobby of the Sheraton 15 minutes before your field trip is scheduled to depart.

Field Trip 1 – Mining and the Treatment of Mine Drainage

Sunday, April 25| 7:30 am – 5:00 pm | Price: $65

Note: Blizzard conditions in the mountains could cause cancellation of this trip.

This trip presents glimpses of the beginning and the end of mining operations and contains a mine tour sandwiched between tours of two water treatment facilities. We begin with a tour of the Breckenridge, Wellington-Oro Mine water treatment plant (that utilizes biologically augmented sulfide precipitation) followed by an underground tour of the Country Boy mine and museum. Lunch at a restaurant in Dillon, Colorado (bring your own cash). On the way back to Denver we will tour the Argo tunnel treatment plant as an example of another mine drainage treatment technique (traditional hydrated-lime iron precipitation). A visit to the Idaho Springs visitor center will occur, time pending. Bus time will include discussions of the history of mining in Colorado and techniques used to help identify locations for remediation of mining activity.

Additional Information: Participants should dress in layers prepared for cold weather outside and underground. Field gear is best as one could get dirty during the underground mine tour. Travel over a high mountain pass (elevation approx. 11,500 feet). Weather may be cold, snowy.

Field Trip 2 – Demonstration and Training in the National Wetland Condition Assessment Field Methods

Sunday, April 25 | 8:00 am – 5:00 pm | Price: No fee to attendees, but registration is required.

Learn about wetlands and help finalize field methods for the 2011 National Wetland Condition Assessment (NWCA). EPA invites states, tribes, and other interested parties to participate in a field-based, interactive workshop to demonstrate the proposed field methods for the 2011 NWCA. Participants will be transported to a nearby wetland site and trained by expert EPA and state wetland ecologists on the draft NWCA field methods. Participants will have the opportunity to implement all components of the field manual, including: establishing the assessment area and vegetation plots, identifying plant species, excavating soil pits and collecting soil samples, pore water samples, and algae samples. EPA will then solicit feedback on the overall usability of the methods and use the input to help finalize the field methods before the 2011 survey.

Additional Information: Participants must be dressed for the field. Some walking will be required, mostly on paved trails.

Field Trip 3 – Field Demonstration of Methods for Water-Quality Sampling & Monitoring

Sunday, April 25| 1:00 pm – 5:00 pm | Price: $20

Part 1 of the "Monitoring Framework"

This field trip is the first part of a tour through the NWQMC "Monitoring Framework," using USGS procedures to provide an example of the life-history of water-quality data from "collecting field data" through "conveying results and findings." On this afternoon field trip, USGS staff will demonstrate methods for stream-sample collection, sample processing, and continuous monitoring at the "Super Gage" on Clear Creek at Golden, on the west side of the Denver area.

Additional Information: Participants must be dressed for the field. Some walking will be required, mostly on paved trails.

Field Trip 4 – Tour of the USGS National Water-Quality Lab

Monday, April 26| 1:30 pm – 5:00 pm | Price: $20

Part 2 of the "Monitoring Framework"

This field trip is the second part of a tour through the NWQMC "Monitoring Framework." This half-day trip will be to the USGS National Water-Quality Laboratory (NWQL) at the Denver Federal Center. The NWQL combines a national research facility and production lab that produces state-of-the-art, low-level environmental chemistry analyses. The tour will include all aspects of the analytical process, from when the sample arrives at the lab, through various analytical methods, to data review and reporting. We'll also have a chance to meet with the Research & Development staff to discuss their work on new analytic methods.

Additional Information: Participants will need a picture ID, such as a driver's license, for entry to the Federal Center.

Field Trip 5 – Tour of EPA Region 8 Office Green Building and Green Operations

Thursday, April 29| 2:00 pm – 3:30 pm | Price: No fee to attendees, but registration is required.

We are pleased to invite you to visit our EPA Region 8 Office building at 1595 Wynkoop Street, which stands as a tangible example of our mission "to protect human health and the environment." We have developed a one hour tour program that will introduce you to the design features, green products, innovative technologies and business practices that make this building a model of sustainability.

EPA Region 8 is working to decrease its impact on the natural environment by working in a high performance, green building and paying close attention to the environmental impact of our daily activities. The building Region 8 Headquarters occupies achieved the gold rating under the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) and was designed and constructed in a more environmentally friendly way than a traditional building. Features that help decrease environmental impact include:

- Extensive use of daylight to reduce need for artificial light
- A vegetated green roof to control storm water and decrease urban heat island effect
- Waterless urinals and low-flow plumbing fixtures to decrease water use
- High recycled content materials throughout the building help preserve resources

Region 8's Environmental Management System helps us improve our environmental performance by quantifying the impact of our operations (e.g., electricity, water, material consumption and transportation) and taking actions to reduce those impacts.

Additional Information:

- Bring a government-issued picture ID (i.e., a driver's license) with you on the day of the tour. You will be asked to show this ID as you enter the lobby.
- Arrive 15 minutes before the start of your tour. No Earlier. Unless arranged in advance. Our security screening process is similar to screening at the airport. You will be asked to walk through a magnetometer (removing metal objects from your pockets) and your coats, bags, etc. will be x-rayed. We regret that we do not have facilities to check coats or bags.
- You will be provided with a visitor badge after you pass through security. Please wear this at all times while you are in the building.
- Photography is not allowed in the building. We have a library of building photos that are available.

Extended Sessions

Most extended sessions carry a registration fee. You may register for one of these great sessions at the Registration Desk. **Seating is limited, so register early!**

Extended Session 1 – Cancelled

Extended Session 2 – Plenary Seminar for Continuous Real-Time Monitoring: Direct Measures and Surrogates

Monday, April 26 | 8:00 – 10:30 am | $20 to attend this plenary and the closing session on Wednesday, April 28 | Room 14

Organized by Andy Ziegler, USGS

Speakers will introduce sessions for the continuous real-time monitoring session track of the conference – monitor operation and data evaluation, sensor basics, evaluation and application of real time nitrogen sensors, continuous monitor applications in lakes and estuaries, continuous monitor applications in rivers and streams, status of the NWQMC sensor workgroup, and regulatory perspectives. Andy Ziegler (USGS) will present an overview of worldwide real-time water quality monitoring and networks. Stewart Rounds (USGS) will present a history of long-term continuous water-quality monitoring in Oregon. Mario Tamburri (Alliance for Coastal Technologies) will present on tools required for coastal monitoring and ocean observing. Heather Powell (NEON, Inc.) will present an overview of the current design of the NEON water-quality network to define baseline water conditions in reference watersheds in the US. Future directions will be offered by each of the speakers as an introduction to the technical and closing sessions.

Closing Interactive Panel Discussion for Continuous Real-Time Monitoring

Wednesday, April 28 | 10:00 – 11:30 am | $20 to attend the plenary session on Monday, April 26 and this closing session | Room 10

Organized by Andy Ziegler, USGS

Andy Ziegler (USGS) will moderate a panel discussion to summarize future directions in continuous real-time water quality monitoring. The panel will be composed of the moderators from each of the continuous real-time water-quality monitoring technical sessions. Session moderators include Reed Green (USGS), Ken Hyer (USGS), Janice Fulford (USGS), Dan Sullivan (USGS), Rob Ellison (YSI), and Chuck Spooner (EPA).

The following questions, introduced in the plenary seminar and discussed during the conference, will be the focus for this session:

- Where do we need to go? (What isn't getting done that is needed for instruments, protocols, databases, etc.?)
- Why aren't we there? (What are the technological and other impediments?)
- How do we fill these gaps to get where we need to go?

Extended Session 3 – Using NHD and State GIS Information to Improve National Aquatic Resource Survey Designs

Monday, April 26 | 8:00 – 10:30 am | $20 | Room 11

Organized by Tony Olsen, US EPA

The objective of this workshop is to develop approaches for integrating GIS data layers (e.g., NHD) used by states and the National Aquatic Resource Surveys in their probability monitoring designs. Integrating these sample frames will not only improve the quality of the information used for the survey designs but also further the long-term goal of integrating state and NARS survey designs. The Wadeable Streams Assessment, National Lake Assessment, National Rivers and Streams Assessment and National Coastal Assessment survey designs relied mainly on NHD-Plus for the sample frames. Concurrently, many state probability survey designs used either NHD-Plus or a derivative of NHD as their sample frames. In several instances, state sample frames have been integrated into the NARS sample frames, most recently for the National Coastal Assessment. When state and NARS designs are implemented, site evaluations are conducted providing information that can be used to improve the sample frames (e.g., whether a lake is actually a lake or a stream site has flowing water). This workshop will discuss how sample frames are currently constructed by states and NARS staff. Then participants will identify procedures that will improve integration of state and NARS sample frames and incorporate site evaluation information into NHD.

Extended Session 4 – Guidelines for Design, Sampling, Analysis, and Interpretation for Cyanobacterial Toxin and Taste-And-Odor Studies in Lakes and Reservoirs

Monday, April 26 | 8:00 – 10:30 am | $20 | Room 10

Organized by Jennifer Graham and Keith Loftin, USGS

Cyanobacteria cause a multitude of water-quality concerns, including the potential to produce toxins and taste-and-odor compounds. Toxins and taste-and-odor compounds may cause significant economic and public health concerns and are of particular interest in lakes, reservoirs, and rivers that are used for drinking-water supply, recreation, or aquaculture. Federal and state agencies, resource managers, drinking-water treatment-facility operators, lake associations, and local officials increasingly are faced with decisions about managing cyanobacterial blooms that affect local economies and public awareness, exposure, and health. Many different approaches have been used in the design, sample collection, and analysis of studies addressing cyanobacterial toxins and taste-and-odor compounds and consistent, reliable guidance is not readily available. The purpose of this session is to provide guidance for the design, sample collection, sample analysis, and interpretation for studies of cyanobacteria and associated toxins and taste-and-odor compounds. The session will combine lecture and discussion, and provide numerous examples based on experience and real data.

Extended Session 5 – Building a Case for Causes of Biological Impairment

Monday, April 26 | 8:00 – 10:30 am | $20 | Room 12

Organized by Susan Cormier, US EPA

This short course will explore the arguments used to develop a case for or against possible causes of biological impairments. Participants will be introduced to the philosophical and scientific foundations of causation and the four broad types of environmental assessments. They will gain a working knowledge of planning, analysis, and synthesis used in causal assessment described by the U.S. EPA Stressor Identification process and the resources available at www.epa.gov/caddis. In particular, students will become familiar with refutation, diagnosis, and weight of evidence as a means for identifying probable causes of biological impairment. Diverse and multiple causes will be discussed such as temperature, conductivity, toxicity, sediment, and eutrophication. Examples will be drawn from case studies of streams and watersheds from around the United States.

Extended Session 6 – Building Successful State, Regional, and Tribal Water Monitoring Councils

Monday, April 26 | 1:30 – 5:00 pm | Room 9

Organized by Tracy Hancock, USGS, John Hummer, Great Lakes Commission, & Abby Markowitz, Condatus Consulting

This session is a facilitated, interactive panel discussion, focusing on forming, building, and sustaining successful water monitoring councils, whether at the State, Regional, or Tribal level. Panelists will contribute case study examples from various types of councils as well as alternatives to formal monitoring councils (e.g., partnerships and alliances). We will explore various ways stakeholders organize to share water monitoring information (e.g., an annual or water quality issue-oriented meeting). In addition to case study presentations, the session will include substantial time for questions and discussion among all the participants. We look forward to your suggestions as to how the National Water Quality Monitoring Council might assist with the formation and growth of monitoring councils, such as facilitating communication and collaboration among councils in various phases of development and discussion.

Extended Session 7 – Man vs. Stats

Monday, April 26 | 1:30 – 5:00 pm | $20 | Room 10

Organized by Dennis Helsel, Practical Stats

Data can be dangerous – not like the textbook cases presented back in your college course. Dangers such as skewness, outliers and nondetect values lurk, ready to strike. This workshop will teach basic survival skills for analysis of environmental data. Survival skills include when to transform data and why, how to handle outliers, and advantages of newer nonparametric and permutation tests for scientific data analysis. Common pitfalls of traditional methods will be discussed. Danger signs in regression will be taught so you can spot them in the field. Attending this workshop will clear up misconceptions, point to further resources, and get you heading in the right direction.

Extended Session 8 – Sensors Basics: Tools to Enhance the Quality and Comparability of Sensors Data for Continuous Real-Time Monitoring

Tuesday, April 27 | 8:00 – 11:30 am | $20 | Room 10

Organized by Dan Sullivan, USGS

Users of water-quality sensors will learn basic concepts in data quality and be introduced to tools that have been developed to promote the generation of field measurements of known and documented quality. Participants will take part in an interactive discussion to compile and examine different aspects of data quality, including data usability, reliability, validity, and measurement quality. This will be followed by a demonstration of simple hands-on activities that trigger discussion of the sources of measurement error and other aspects of data quality. This session will also include perspectives from sensor manufacturers on what they emphasize is necessary to achieve a high level of data quality and what quality assurance activities are needed in field monitoring. Last but not least, participants will also learn how to enhance the representativeness of their data when they deploy their sensors.

Extended Session 9 – Defining the Relationship between Disturbance, Stressors and Biological Condition at State, Regional and National Levels

Series of four 90-minute sessions | $20 for one or all four sessions

Emerging Applications of the Biological Condition Gradient (BCG)

Tuesday, April 27 | 8:00 – 9:30 am | Room 9

Facilitated by Susan Jackson, US EPA

In this session, we examine how the BCG framework can be used to understand and enhance protection of aquatic resources. Emerging applications of the BCG in water quality management are presented including discussion of collaboration among states in the North East, establishing biological thresholds protective of aquatic life use, and strengthening implementation of state antidegradation policies. Potential for application of the BCG framework in the EU is also discussed.

Presentations:

- Emerging Applications of the Biological Condition Gradient (BCG): Moving Beyond BCG 101!, Susan Davies, ME
- The Northeast Managers' Pilot Project, Kerry Strout, New England Interstate Water Pollution Control Commission
- Use of the BCG to help characterize the quality of reference sites, Jackson, Passmore, Hammer, Laidlaw, Davis, Yuan
- The Application of Tiered Aquatic Life Use (TALU) Principles in Developing a Biotic Index for Pennsylvania's Antidegradation Program, Brian Chalfant, PA
- Comparison of the Biological Condition Gradient and the Water Framework Directive, Wayne Davis, US EPA and Christian Feld, University of Duisberg-Essen, Germany

Biological Condition Gradient (BCG) Development and Calibration at State, Regional, and National Levels

Tuesday, April 27 | 10:00 – 11:30 am | Room 9

Facilitated by Ellen Tarquinio, US EPA and Dave Courtemanch, ME

In this session, we will examine the development and calibration of the biological condition gradient model at different spatial scales and the implications for cross-jurisdicational collaboration. Key opportunities and issues will be identified and discussed including different perspectives on solutions and paths forward. Application of the BCG as a framework for interpretation of national surveys will be explored. Analysis of results of different BCG modeling and calibration exercises will be presented. A multiscaled BCG model for estuaries but with potential application to inland systems will be presented.

Presentations:

- Exploring the possibilities for developing and using the BCG at the state/national/regional scale, Ellen Tarquinio, US EPA and Dave Courtemanch, ME
- Biological Assessment: How far can we generalize a quantitative BCG model?, Jeroen Gerritsen, Tetra Tech , Inc.
- Development of Estuarine BCG – a model for multi-scale BCG (individual habitat and habitat mosaic), Giancarlo Cicchetti, US EPA
- Development of BCG at the national scale- while we do have experience with BCG at state and regional scales, let's begin the discussion about where we go from here and explore the potential and the issues related to applying the BCG at a national scale, Chris Yoder, MBI
- Panel Discussion

Using Stressor-Response Relationships to Address Hydrological and Nutrient Issues
Tuesday, April 27 | 1:00 – 2:30 pm | Room 9

Facilitated by Susan Jackson, US EPA and Dave Courtemanch, ME

In this session, we examine the possibilities and issues in using the BCG framework and stressor-response relationships to prevent or mitigate the impacts of altered hydrology and nutrient enrichment. Current applications of stressor-response relationships in State water quality programs are discussed as well as the management application of a scientific model relating the hydrogical regime to biological condition. Using nutrient criteria as an example, an examination of the issues and opportunities in using response-stressor relationships in criteria development will be presented, kicking off a discussion session with the panel of speakers.

Presentations:

- Introduction to the session: issues and opportunities, Susan Jackson and Dave Courtemanch
- Relating biological condition and hydrology in Ohio, Chris Yoder, MBI
- Developing the relationship between hydrological regime (flow) and biological condition, Eloise Kendy, The Nature Conservancy
- Maine's Freshwater Nutrient Criteria, Tom Danielson, ME
- Using stressor-response relationships to derive candidate nutrient criteria, Lester Yuan, US EPA
- Open Discussion of Issues and Opportunities

Using the Biological Condition Gradient (BCG) and Stressor-Response Information in an Urbanizing Setting
Tuesday, April 27 | 3:30 – 5:00 pm | Room 9

Facilitated by Gerard McMahon, USGS

In this session, we examine how the BCG framework can be used to understand and manage water quality in urbanizing stream ecosystems. Data from a gradient-based USGS study of the "Effects of Urbanization on Stream Ecosystems" are used to assess the relation between urbanization, reach scale stressors, and algae, invertebrate, and fish communities, using both correlation/regression approaches and a Bayes Net Approach. The Bayes Net approach is used to explicitly assess the network of relations between watershed and reach scale stressors, macroinvertebrates, and BCG tiers. Management approaches are discussed that address specific stressors identified in these analyses.

Presentations:

- Opportunities and challenges to using BCG and stressor-response information in an urbanizing setting, Gerard McMahon, USGS and Susan Davies, ME
- Stream studies in 9 metropolitan areas of the USA: understanding the effects of urbanization across the nation, Larry Brown, USGS
- Using a Bayesian Network Approach to Model the Effects of Urbanization on the Condition of Benthic Macroinvertebrate Assemblages in the Northeast U.S. as Defined by the Biological Condition Gradient, Roxolana Kashuba, Duke University
- The Integration of Monitoring and Modeling to Implement Effective Watershed Management Plans, Neely Law, Center for Watershed Protection
- Open Discussion of Issues and Opportunities

Extended Session 10 – Emerging New Approaches to Water Quality Trend Analysis

Tuesday, April 27 | 1:00 – 5:00 pm | $20 | Room 10

Organized by Bob Hirsch, USGS

Over the past 30 years, a variety of statistical approaches have been developed for the analysis of trends in water quality data. Practitioners are often troubled by the question: which method should I use, given my data set and my goals? This session will focus on how this question might be answered. It will draw on the ideas and experience of several experienced developers and users of these methods. It will also explore some of the common problems with many of the methods and describe some of the new approaches that are being applied to overcome these problems. These new developments that will be discussed include consideration of the following data set characteristics:

1. Data sets with large fractions of the data being censored values ("less thans")
2. Very rich data sets spanning several decades with several hundred observations
3. Regional data sets with large numbers of contemporaneous observations but with very low sampling frequency
4. Methods that consider the role of streamflow history in addition to current streamflow as important determinants of water quality
5. Methods that incorporate large spatial data sets (geographic snapshots) repeated over time to assess trends

Extended Session 11 – Data Flow through the Monitoring Framework, Part 3 – USGS Data from the Lab to the Public

Wednesday, April 28 | 8:00 – 9:30 am | $30 | Room 9

Organized by Dave Mueller, USGS

This seminar is the third part of a tour through the NWQMC "Monitoring Framework", using the flow of USGS data as an example. Part 1 is a field trip to a river sampling site (Sunday afternoon) and part 2 is a tour of the USGS National Water-Quality Laboratory (Monday afternoon). This third session will begin with a review of sampling and lab analysis, and then follow the data through the remaining steps of the monitoring process:

- Compiling and managing data
- Assessing and interpreting data
- Conveying results and findings

Presentations in this seminar will emphasize the quality-assurance measures USGS takes within this process to ensure that the best possible information on water-quality is disseminated to the public.

Extended Session 12 – Science-Based Environmental Report Cards and Indicators from the Watershed to the National Scale

Wednesday, April 28 | 10:00 – 11:30 am | Room 2

Organized by Tracy Hancock, USGS

This facilitated, interactive panel discussion will focus on the use of indicators in water-quality and watershed assessments and management, particularly indicator system development and how indicators developed at smaller scales (e.g., watershed) can be nested to inform larger scale (e.g., state or national) assessments. Panelists will discuss how indicators for disparate environmental and other system components can be aggregated into a single reporting process. These issues will be discussed during state and federal institution presentations, including discussion of the water indicators under development as a component of the National Environmental Status and Trends (NEST) effort, and USEPA's water condition indicators as a component of their National Water Program measures.

Panelists:

- Mary Skopec, Supervisor, Watershed Monitoring and Assessment Section, Iowa Department of Natural Resources (facilitator)
- Denice Shaw, Office of Research and Development, U.S. Environmental Protection Agency
- Leslie McGeorge, Administrator, Water Monitoring and Standards, New Jersey Department of Environmental Protection
- Fraser Shilling, Scientist, Department of Environmental Science and Policy, University of California at Davis
- Bob Hirsch, Research Hydrologist, U.S. Geological Survey
- Carol Murray, Senior Systems Ecologist and Principal, ESSA Technologies Ltd.

Extended Session 13 – Is Your Monitoring Program Producing Measurable Results and How Do You Know?

Wednesday, April 28 | 1:00 – 5:00 pm | $20 | Room 9

Organized by Barb Horn, Rocky Mountain Watershed Network and Colorado Division of Wildlife

The title question is one every monitoring program should be asking itself at some frequency, regardless of whether it is a governmental agency, private or a volunteer monitoring program. Each monitoring program was started for some set of reasons, in some context and evolves over time, usually reacting to the situation and resources of the moment. Whether your monitoring program is 50 years old or brand new, is a state agency implementing the Clean Water Act or a volunteer program monitoring a local stream, our efforts should be relevant. The ability to document relevance keeps funders, constituents and volunteers happy but most importantly tells us if we are really protecting and preserving our waterways. If we are the voices for our waterways, we need to be able to monitor our progress. How do you know your monitoring efforts are relevant, making a difference or producing measurable results? Have you ever evaluated your monitoring program in context with your organization's mission, motivation or needs of volunteers collecting the data or targeted decision maker's information needs?

In this workshop, you will evaluate your monitoring program for its ability to produce measurable results. You will learn how to design a measurable effort if you have not started monitoring. We will identify target decision makers, quantify their information needs and evaluate how that affects:

1) Study design elements (what you do, when, where, how, why and managing raw data),

2) Turning raw data into information, delivery of information or the data-pathway, data management for information

3) How to evaluate monitoring for measurable results in a systematic manner

Colorado's River Watch Program will be provided as a case study to conduct this evaluation. This river watch program is over 20 years old, produces chemical, biological and physical data primarily for Colorado's Clean Water Act processes such as listing of 303(d) impaired stream segments, major basin criteria hearings and to develop criteria such as nutrient standards.

This interactive session will employ the Rocky Mountain Watershed Network's Monitoring and Assessment Design Workbook evaluation tool to evaluate Colorado's program along with your program. Each participant will receive a session workbook and CD of the entire workbook.

Extended Session 14 – The National Lakes Assessment – Just How Good are the Nation's Lakes and Reservoirs – Technical Underpinnings of the NLA and Applications for Statewide Lakes Surveys

Wednesday, April 28 | 1:00 – 5:00 pm | $20 | Room 10

Organized by Neil Kamman, Vermont Agency of Natural Resources

The National Lakes Assessment (NLA) reports on the quality of lakes and reservoirs using consistent multi-media indicators of ecological integrity, recreational suitability, and water quality, at national and ecoregional scales, using a probability-based approach. The NLA is of particular interest to state lakes programs and to statewide and smaller-scale lake associations. The NLA has been conducted in full partnership with states and states' own partners (e.g., lake associations, volunteer groups, allied governmental organizations) in a transparent collaborative fashion. The NLA team has executed the survey in a manner that is highly compliant with NWQMC's mission to "Communicate, Collaborate, and Coordinate" by following all steps in the monitoring cycle. This session is one method by which the NLA team will simultaneously communicate results, coordinate follow-up state survey analyses, and collaborate on the planning of future national lake survey initiatives.

This session is being presented by nine members of NLA analysis team. Presenters will provide details on how the NLA was carried out, while providing training in the use of some of the tools developed by the survey team. The first half will focus on what was done to develop and use the NLA results. Participants will be introduced very briefly to the overall survey results, and then be provided detailed information on the derivation of reference conditions, the development of the biological indicators of the survey, and uses of the data to develop extended regional assessments. The second half of the session will be dedicated to how individuals can use the survey data. Analysis team members will demonstrate how to conduct assessments using advanced "R" statistics, and also a simple Excel-based tool that is packaged and ready-to-go. Participants will also understand how the physical habitat indicators used in the NLA can be calculated using field data from non-NLA lakes, and also how to evaluate and interpret estimates of relative and attributable risk that relate lake stressors to biological impact.

Extended Session 15 – Working with Watershed Tools and Data to Get (and Show) Results

Thursday, April 29 | 8:00 – 11:30 am | $30 | Room 9

Organized by Cynthia Curtis, US EPA

In this hands-on workshop, participants will pull together data and online tools and customize them to their watershed. Participants will leave the workshop with useful materials and contacts to apply to their own watershed work. Tools that are covered include EPA's My Environment, Enviromapper for water, Google Earth, STORET (watershed summary), Data2 Maps (D2M), NPS outreach tool, and Audacity (modify a PSA for a local watershed). Participants should bring their laptops for this hands-on training.

Extended Session 16 – National Aquatic Resource Surveys: Transferring Technical Tools and Approaches

Thursday, April 29 | 8:00 – 11:30 am | $20 | Room 10

Organized by Sarah Lehmann, US EPA

The U.S. Environmental Protection Agency, states, and tribes are conducting a series of national aquatic resource surveys. Often referred to as probability-based surveys, these surveys are designed to assess the status of the nation's waters, identify key stressors, promote collaboration across jurisdictions in providing comparable water quality assessments, and help build state/tribal water monitoring program capacity. An important aspect of these surveys is building and transferring tools associated with the National Aquatic Resource Surveys (NARS) implementation and data assessment. The objective of this workshop is to provide background information on the NARS and then to focus on several key tools available for states, tribes, and others to use in applying NARS data. These technical tools and discussions include screening for reference sites, modifying "R" code to produce population estimates using a probabilistic dataset and examining important aspects of and results from comparability studies. Participants will receive electronic copies of the "R" code presented during the session as well as the Wadeable Streams Assessment and National Lakes Assessment datasets. Participants will have the opportunity to ask questions about these tools, learn how to use them, and provide direct feedback to the NARS team on improving and expanding the available tools.

Concurrent Session Presentations

Monday, April 26

Session A1: Continuous Real-Time Monitoring: Operation and Data Evaluation

Room 14
1:30 – 3:00 pm

Moderator: Robert Ellison, YSI

1:35 pm *U.S. Geological Survey Real-Time Water-Quality Data on the Web in 2010*, **Bradley Garner**, USGS

1:55 pm *Water-quality monitors have improved! Evaluation of real-time water-quality monitoring in the Little Arkansas River Basin near Wichita, Kansas, 1998-2009*, **Trudy Bennett**, USGS

2:15 pm *Value Engineering Study of US Geological Survey Continuous Water-Quality Monitor Data Collection and Processing*, **Kevin Richards**, USGS and **Robert Ellison**, YSI

2:35 pm *Targeting Field Investigations Using Continuous Water Quality Monitoring in the North Bosque and Leon River Watersheds*, **Chuck Dvorsky**, Texas Commission on Environmental Quality

Session A2: Indices of Biotic Integrity for Wetlands

Room 17
1:30 – 3:00 pm

Moderator: Gary Kohlhepp, Michigan Department of Natural Resources and Environment

1:35 pm *The Development of Monitoring Methodologies and Indices of Biotic Integrity for North Carolina Wetlands*, **Virginia Baker**, North Carolina Department of Environment and Natural Resources

1:55 pm *Vegetation Index of Biotic Integrity (VIBI) for Headwater Wetlands in Colorado's Southern Rocky Mountains: Development, Calibration, and Application*, **Joanna Lemly**, Colorado Natural Heritage Program

2:15 pm *Vegetation Index of Biotic Integrity for Ohio Wetlands*, **Mick Micacchion**, Ohio Environmental Protection Agency

2:35 pm *Amphibians as Indicators - Development and Use of the Amphibian Index of Biotic Integrity for Ohio Wetlands*, **Mick Micacchion**, Ohio Environmental Protection Agency

Session A3: Developing Nutrient Criteria 1

Room 15
1:30 – 3:00 pm

Moderator: Charles Rhoades, US Forest Service

1:35 pm *Nutrient Criteria and Standards for Forested Headwater Streams: An Overview of Issues and Solutions*, **George Ice**, National Council for Air and Stream Improvement

1:55 pm *Characterizing Variability of Stream Chemistry at U.S. Forest Service Experimental Forests - Applicability to Development of Numeric Nutrient Criteria for Headwater Forests*, **Charles Rhoades**, US Forest Service

2:15 pm *Comparing Reference Stream Nutrient Concentrations to Harm-to-Beneficial-Use Concentrations Derived from Regional Nutrient Dose-Response Studies: Implications for Setting Nutrient Criteria*, **Michael Suplee**, Montana Department of Environmental Quality

2:35 pm *Developing Numeric Nutrient Criteria in Florida*, **Jeffery Vowell**, Florida Division of Forestry

Session A4: Lessons Learned from National Assessments

Room 11
1:30 – 3:00 pm

Moderator: Jason Jones, Arizona Department of Environmental Quality

1:35 pm *National Rivers and Streams Assessment Project - Ohio's Experience*, **Gregg Sablak**, Ohio Environmental Protection Agency

1:55 pm *Integrating Modeling and Surveys for More Effective Assessments*, **Gretchen Oelsner**, US EPA

2:15 pm *National Aquatic Resource Survey Core Indicators – Appropriate to Determining Arctic and Sub-Arctic Aquatic Ecosystem Status?*, **Douglas Dasher**, Alaska Department of Environmental Conservation

2:35 pm *The 2007 National Lake Assessment - Findings and Lessons from Wisconsin*, **Timothy Asplund** and **Paul Garrison**, Wisconsin Department of Natural Resources

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Session A5: Strategies for Growing a Volunteer Monitoring Program

Room 12
1:30 – 3:00 pm

Moderator: Jason Pinchback, Texas Stream Team, River Systems Institute

1:35 pm *Monitoring with Community Based AmeriCorps Programs*, **Danielle Donkersloot**, New Jersey Department of Environmental Protection

1:55 pm *EPA's Volunteer Monitoring Equipment Loan Program in New England*, **Tom Faber**, US EPA

2:15 pm *Using Publicity and Community Outreach to Retain Citizen Stream Monitoring Volunteers*, **Kristine Stepenuck**, University of Wisconsin-Extension

2:35 pm *Using eLearning to Support Water Quality Data Management*, **Dave Wilcox**, Gold Systems, Inc.

Session A6: Monitoring and Assessing Groundwater Vulnerability 1

Room 16
1:30 – 3:00 pm

Moderator: Wayne Lapham, USGS

1:35 pm *Groundwater Vulnerability - An Overview of Concepts and Assessment Methodolgies*, **Mike Wireman**, US EPA

1:55 pm *Evaluation of Recharge in Selected Aquifer Systems of the United States Using Tracers of Groundwater Age – What Does it Say About Groundwater Vulnerability?*, **Peter McMahon**, USGS

2:15 pm *Evaluating Aquifer Susceptibility and Vulnerability in Selected Aquifers of the United States: An Improved Modeling Strategy that Incorporates Prediction Uncertainty and Effects of Aquifer Complexity*, **Tristan Wellman**, USGS

2:35 pm *Effects of Development on Groundwater Quality in the Denver Basin, Colorado*, **Suzanne Paschke**, USGS

Session B1: Evaluation and Application of New Technologies for Real-time Monitoring

Room 14
3:30 – 5:00 pm

Moderator: Janice Fulford, USGS

3:35 pm *Continuous Monitoring of Nitrate plus Nitrite and Dissolved Organic Carbon using Ultraviolet-Visible Spectrophotometry in Two New Jersey Rivers*, **Lawrence Feinson**, USGS

3:55 pm *Experiences Using UV Nitrate Sensors for Continuous, In-Situ Measurements*, **Janice Fulford**, USGS

4:15 pm *Comparison of Periodic Sampling and Continuous Monitoring for Determining Effects of Seasonality and Stream Discharge on Nitrate-Nitrogen Concentrations in Agricultural Watersheds*, **Rob Middlemis-Brown**, USGS

4:35 pm *Seeing the light: Applications of in situ optical measurements for understanding dissolved organic matter dynamics in river systems*, **Brian Pellerin**, USGS

Session B2: Developing New Biological Assessment Tools

Room 17
3:30 – 5:00 pm

Moderator: Ellen Tarquinio, US EPA

3:35 pm *A stream algal bioassessment incorporating the Biological Condition Gradient to evaluate tiered aquatic life uses in Maine*, **Tom Danielson**, Maine Department of Environmental Protection

3:55 pm *A Benthic Invertebrate Index for the Nearshore Ocean Waters of New Jersey - Its Development and Application*, **Robert Schuster**, New Jersey Department of Environmental Protection

4:15 pm *Modeling Macroinvertebrate Multi-metric Index Scores in Connecticut's Rivers and Streams Using Landscape Variables -An Approach to Support Restoration Goals and Anti-degradation Policy*, **Chris Bellucci**, Connecticut Department of Environmental Protection

4:35 pm *Water microbioms – indicators of water quality*, **Toomas Neuman**, Biotap LLC

Session B3: Developing Nutrient Criteria 2

Room 15
3:30 – 5:00 pm

Moderator: **Leslie McGeorge, New Jersey Department of Environmental Protection**

3:35 pm *Assessing Nutrient Impacts in New Jersey Waters*, **Debra Hammond**, New Jersey Department of Environmental Protection

3:55 pm *A linked set of nutrient and biological criteria for the protection of designated uses for Vermont lakes and wadeable streams*, **Neil Kamman**, Vermont Department of Environmental Conservation

4:15 pm *Development of Nutrient Criteria for Lakes and Reservoirs in Northern Plains States*, **Lan Tornes** and **Mark Deutschman**, Houston Engineeering, Inc.

4:35 pm *Numeric Nitrogen Criteria for Streams to Protect Downstream Estuarine Waters in Florida*, **James Hagy**, US EPA

Session B4: Monitoring the Effects of Development on Hydrology and Water Quality

Room 12
3:30 – 5:00 pm

Moderator: **Karl Hermann, US EPA**

3:35 pm *Online Database, Retrospective Assessment, and Monitoring Program of Water Quality in the Upper Yampa River Basin, Northwestern Colorado, 1975-2009*, **Nancy Bauch**, USGS

3:55 pm *Water-Quality Characteristics of Watersheds in Metropolitan Atlanta, Georgia, 2003-2007*, **Jacob LaFontaine**, USGS

4:15 pm *Trend Analysis for Selected Analytes, South Platte River, Denver, CO*, **Jon Novick**, Denver Department of Environmental Health

4:35 pm *Urban Steam Monitoring Network: Monitoring and Assessment of Chemical, Habitat and Watershed Influences on Aquatic Life in Kansas City Urban Streams*, **Gary Welker**, US EPA

Session B5: Modeling Ecological Conditions

Room 11
3:30 – 5:00 pm

Moderator: **Daren Carlisle, USGS**

3:35 pm *Predicting Environmental Reference Conditions in Streams from Watershed Geology*, **John Olson**, Utah State University

3:55 pm *NWSA's Physical Habitat Approach - Combining knowledge of habitat requirements with mechanisms of geomorphic and anthropogenic influence on stream channel form*, **Philip Kaufmann**, US EPA

4:15 pm *Establishing Thermal Reference Conditions: Development of Stream Temperature Models in Support of Biological Monitoring and Assessment in the Western USA*, **Ryan Hill**, Utah State University

4:35 pm *Predictive models for streamflow characteristics and assessment of hydrological alteration*, **Daren Carlisle**, USGS

Session B6: Monitoring and Assessing Groundwater Vulnerability 2

Room 16
3:30 – 5:00 pm

Moderator: **Michael Rupert, USGS**

3:35 pm *Local Government Perspective on Conducting Water Resource Investigations for Optimal Watershed Management*, **Ray Merry**, Eagle County Department of Environmental Health, Colorado

3:55 pm *Predicting the Probability of Groundwater Contamination in the Eagle River Watershed Valley-Fill Aquifer, North-Central Colorado, Using Groundwater Age and Low-Level Volatile Organic Compounds*, **Michael Rupert**, USGS

4:15 pm *Parameter and predictive uncertainty analyses for unsaturated zone nitrogen fate and transport models*, **Bernard Nolan**, USGS

4:35 pm *An Invaluable $25 Investment: Using Isotopes to Better Characterize the Groundwater Quality of the Gila Valley Sub-Basin, Southeastern Arizona*, **Douglas Towne**, Arizona Department of Environmental Quality

Session C1: Monitoring Stressors and Impacts to Lakes and Reservoirs

Room 17
8:00 – 9:30 am

Moderator: Neil Kamman, Vermont Agency of Natural Resources

8:05 am *Assessing Seasonal Inputs of Dissolved Pesticides to the Salton Sea from the Alamo River*, **James Orlando**, USGS

8:25 am *Monitoring the Quality of Water, Sediment, and Aquatic Biota of Lake Powell through the National Park Service and U.S. Geological Survey's Water Quality Assessment and Monitoring Program*, **Robert Hart**, USGS

8:45 am *Shorezone Water-Quality Monitoring Program for Lake Tahoe, California and Nevada*, **Timothy Rowe**, USGS

9:05 am *Measuring the effects of lakeshore development on littoral habitat and macroinvertebrates*, **Kellie Merrell**, Vermont Department of Environmental Conservation

Session C2: Monitoring for Stormwater Management Effectiveness

Room 16
8:00 – 9:30 am

Moderator: Peter Tennant, ORSANCO

8:05 am *Monitoring Stormwater: Do's, Don'ts, Why's and How's*, **Thomas Ballestero**, University of New Hampshire

8:25 am *UDFCD Stormwater BMP Monitoring Program*, **Holly Piza**, Urban Drainage and Flood Control District, Denver, CO

8:45 am *Urban Stormwater BMP Performance and Cost Effectiveness in the Capitol Region Watershed District*, **Melissa Baker**, Capitol Region Watershed District, Saint Paul, MN

9:05 am *Using Stormwater Ponds in East Tampa to Promote Sustainable, Healthy Communities: A Community Partnership Approach*, **Maya Trotz**, University of South Florida

Session C3: Interpreting Water Quality Data

Room 14
8:00 – 9:30 am

Moderator: Richard Mitchell, US EPA

8:05 am *Data Uncertainty Estimation Tool for Hydrology and Water Quality (DUET-H/WQ): Estimating Measurement Uncertainty for Monitoring and Modeling Applications*, **Daren Harmel**, USDA-ARS

8:25 am *Multivariate Methods with Nondetects*, **Dennis Helsel**, Practical Stats

8:45 am *Serial Correlation and Trend Option Basics in the Era of Frequent Data Measurements*, **Roy Irwin**, National Park Service

9:05 am *Increasing Awareness, Understanding, and Availability of Statistical Methods for Water Quality Monitoring and Assessment*, **Douglas McLaughlin**, National Council for Air and Stream Improvement

Session C4: Downstream Impacts from Mined Lands 1

Room 15
8:00 – 9:30 am

Moderator: Katie Walton-Day, USGS

8:05 am *Monitoring spatial and temporal loading patterns to understand contamination from hard-rock mining*, **Briant Kimball**, USGS

8:25 am *Collaborative Efforts to Characterize a Watershed Impacted by Abandoned Mines Using Multiple Sampling Techniques: A Case Study for Lefthand Creek Watershed, CO*, **Alice Conovitz**, Integral Consulting Inc.

8:45 am *Characterization of water quality in a hydrothermally altered and historically mined watershed, Warden Gulch, Colorado*, **Erik Oerter**, Colorado Geological Survey

9:05 am *Impact of historic uranium mining and current mine development operations on water resources in the Grand Canyon Region, Coconino and Mohave Counties, Arizona*, **Donald Bills**, USGS

Session C5: National Monitoring Network: Monitoring Water Quality from Inland to Coastal Ecosystems

Room 12
8:00 – 9:30 am

Moderator: Pixie Hamilton, USGS

8:05 am *The National Water Quality Monitoring Network – Now and into the Future*, **Pixie Hamilton**, USGS

8:25 am *San Francisco Bay Water Quality: Lessons Learned from Four Decades of USGS Observations*, **Tara Schraga**, USGS

8:45 am *Lake Michigan National Monitoring Network Demonstration Pilot - Preliminary Results and Future Plans*, **Charles Peters**, USGS

9:05 am *Progress of the Delaware River Basin Demonstration Project of the National Water Quality Monitoring Network*, **Eric Vowinkel**, USGS

Session C6: PAHs and Coal-Tar-Based Pavement Sealcoat: Stormwater Management, Toxicology, and Public Policy

Room 11
8:00 – 9:30 am

Moderator: Barbara Mahler, USGS

8:05 am *Pavement Sealcoat, PAHs, and the Environment: An Introduction*, **Barbara Mahler**, USGS

8:25 am *PAHs and Parking Lots: A Field Study on PAHs Exported From Sealed and Unsealed Parking Lots at the UNH Stormwater Center*, **Alison Watts**, University of New Hampshire

8:45 am *Contribution of PAHs from Coal-Tar Pavement Sealcoat to 40 U.S. Lakes Evaluated Using Mass-Balance Receptor Modeling*, **Peter Van Metre**, USGS

9:05 am *Low-Hanging Fruit in PAH Reduction: Developing and Implementing a Ban on Coal Tar Pavement Products in the District of Columbia*, **Hamid Karimi** and **Brian Van Wye**, District of Columbia Department of the Environment

Session D1: Wetlands Condition Monitoring and Assessment

Room 17
10:00 – 11:30 am

Moderator: Sherry Hazelhurst, US Forest Service

10:05 am *Forging the Link between Wetland Monitoring & Assessment and "Traditional" Water Monitoring Programs*, **David Davis** and **Michelle Henicheck**, Virginia Department of Environmental Quality

10:25 am *Applying Tiered Aquatic Life Uses and the Biological Condition Gradient Model to Maine Wetlands*, **Jeanne DiFranco**, Maine Department of Environmental Protection

10:45 am *Comparison of Three Tiered Wetland Assessment Methods for use on Wetlands in the Prairie Pothole Region*, **Christina Hargiss**, North Dakota State University

11:05 am *Developing a Level 1-2-3 Approach to Wetland Assessment and Monitoring in Montana*, **Karen Newlon**, Montana Natural Heritage Program

Session D2: New Tools and Approaches in Data Analysis and Reporting

Room 11
10:00 – 11:30 am

Moderator: Dave Wilcox, Gold Systems, Inc.

10:05 am *H2O Info – A Web-Based Citizen's Tool for Turning Real-Time Water Quality Monitoring Data into Information*, **Christopher Magruder** and **Mike Benedict**, Milwaukee Metropolitan Sewerage District

10:25 am *Water Quality Report Card*, **Warren Kimball**, Massachusetts Department of Environmental Protection

10:45 am *Design and Compilation of a Water Resources Geodatabase for the Rio Grande Basin – San Acacia, New Mexico to Fort Quitman, Texas*, **Thomas Burley**, USGS

11:05 am *Outreach Tools for Obtaining Park Vital Sign Monitoring Data*, **Barry Long**, National Park Service

Session D3: Elements of a Long-Term National Ground-Water Monitoring Network and a State-Scale Example

Room 16
10:00 – 11:30 am

Moderator: David Wunsch, New Hampshire Geological Survey

10:05 am *Challenges for Long-Term Implementation of a National Groundwater Monitoring Network*, **Robert Schreiber**, Camp Dresser & McKee

10:25 am *An Example of Using Baseline, Surveillance, Unstressed, and Targeted Monitoring in the Evaluation of Changing Conditions of Ground-Water Quantity and Quality*, **Rick Copeland**, Florida Geological Survey

10:45 am *Lessons Learned: Florida's Status and Trend Surface and Ground Water Monitoring Programs*, **Rick Copeland**, Florida Geological Survey

11:05 am *Status of Pilot Projects for the Proposed National Ground Water Monitoring Network*, **William Cunningham**, USGS

Session D4: Downstream Impacts from Mined Lands 2

Room 15
10:00 – 11:30 am

Moderator: Doug Glysson, USGS

10:05 am *Copper exposure-response relationships derived from monitoring data and their utility to risk management of the Clark Fork River, MT*, **Daniel Cain**, USGS

10:25 am *Influence of Dissolved Organic Matter in Determining Aquatic Copper Toxicity in Iron-Rich Environments*, **Kathleen Smith**, USGS

10:45 am *Assessment of Nonpoint Source Chemical Loading Potential to Watersheds Containing Uranium Waste Dumps Associated with Uranium Exploration and Mining, San Rafael Swell, Utah*, **Mike Freeman**, USGS

11:05 am *Phase I- Jordan River, Utah, Riparian Restoration for the Midvale Slag Superfund Site*, **Erna Waterman**, US EPA and **Terry Kenney**, USGS

Session D5: Effective Communication Leads to Action

Room 12
10:00 – 11:30 am

Moderator: Linda Green, University of Rhode Island

10:05 am *Getting the Message Out: Communicating Water Science*, **Kara Capelli**, USGS

10:25 am *Peer-reviewed Papers to Podcasts and Beyond: Disseminating the Findings from a Long-term Monitoring Study*, **Camille Flinders**, National Council for Air and Stream Improvement

10:45 am *"SWAPS" - Effective Information Exchange at the Watershed Level*, **Barb Horn**, Colorado Division of Wildlife

11:05 am *It makes perfect sense to me, why can't they understand? Conveying technical information to a non-technical audience*, **Shelley Stanley**, City of Northglenn, CO

Session D6: Pharmaceuticals and Other Emerging Contaminants Above and Below the Water's Surface

Room 14
10:00 – 11:30 am

Moderator: Jim Laine, West Virginia Department of Environmental Protection

10:05 am *Combined Sewer Overflows as a Source of Hormones to Surface Water*, **Patrick Phillips**, USGS

10:25 am *Emerging Contaminants in the Columbia River Basin: Examining Sources and Investigating Impacts on the Foodweb*, **Jennifer Morace**, USGS

10:45 am *Occurrence of EDC/PPCPs in Arizona Waters and Impact of Recreational Activities*, **Chao-An Chiu**, Arizona State University

11:05 am *Potential for Biodegradation of Contaminants of Emerging Concern in the Environment*, **Paul Bradley**, USGS

Session E1: Continuous Real-Time Monitoring: Applications in Lakes and Estuaries

Room 14
1:00 – 2:30 pm

Moderator: Reed Green, USGS

1:05 pm *Real-Time Monitoring in the Fraser River Estuary, British Columbia: A Federal-Provincial Water Quality Monitoring and Surveillance Buoy*, **Jennifer MacDonald**, Environment Canada

1:25 pm *Measuring constituent flux in a tidal environment: suspended-sediment flux in San Francisco Bay*, **David Schoellhamer**, USGS

1:45 pm *Monitoring the spatially and temporally variable Great Lakes nearshore using continuously towed instrumentation*, **Glenn Warren**, US EPA

2:05 pm *Real-Time Lake and Reservoir Meteorological and Vertical Water-Quality Monitoring*, **W. Reed Green**, USGS

Session E2: Monitoring BMP Effectiveness

Room 16
1:00 – 2:30 pm

Moderator: Greg Pettit, Oregon Department of Environmental Quality

1:05 pm *The USDA Forest Service's National Best Management Practice Program*, **Pamela Edwards**, US Forest Service

1:25 pm *Demonstrating Success in the Beaty Creek Watershed: Benefits of Continuous Flow-Weighted Data and Paired Watershed Monitoring*, **Stacey Day**, Oklahoma Conservation Commission

1:45 pm *The Good, the Bad and Everything in Between: Evaluating Water Quality Indices and Their Use in Monitoring Agricultural BMPs and Aquatic Ecosystem Health in a Southern Alberta River*, **Janet Scott**, University of Alberta

2:05 pm *High Level Indicators of Oregon's Forested Streams*, **Shannon Hubler**, Oregon Department of Environmental Quality

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Session E3: Integrating Probabilistic and Targeted Monitoring

Room 11
1:00 – 2:30 pm

Moderator: Dave Chestnut, South Carolina Department of Health and Environmental Control

1:05 pm *Assessment Results from Probabilistic Sampling of Wisconsin's Streams*, **Michael Miller**, Wisconsin Department of Natural Resources

1:25 pm *Notes on a Method for Integrated Biological and Water Quality Stream Surveys*, **Robert Miltner**, Ohio Environmental Protection Agency

1:45 pm *Use of Biological Monitoring Results at Multiple Spatial Scales: Site Specific to Area Wide*, **James Stribling**, Tetra Tech, Inc.

2:05 pm *An Approach for Combining Targeted Diagnostic Monitoring and Probabilistic Ecological Monitoring to Assess the Extent of Impairment in California Streams*, **John Hunt**, University of California, Davis

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Session E4: Modeling at a Regional Scale

Room 12
1:00 – 2:30 pm

Moderator: Charlie Crawford, USGS

1:05 pm *Upper Gera Watershed (Germany) – Areal Assessment of Water-Quality Monitoring and Associated Model Application*, **Marcel Wetzel**, Friedrich-Schiller-University, Germany

1:25 pm *Sources of Suspended Sediment in the Chesapeake Bay Watershed: A Regional Application of the SPARROW Model*, **John Brakebill**, USGS

1:45 pm *Analyzing SPARROW Data to Quantify Changes in Salt Load from Irrigation*, **Travis James**, USDA-Natural Resources Conservation Service

2:05 pm *SPARROW Decision Support*, **Nathaniel Booth**, USGS

Session E5: Volunteers and State Agencies: Collaborating for Better Decisions

Room 17
1:00 – 2:30 pm

Moderator: Elizabeth Herron, University of Rhode Island

1:05 pm *The Evolution of Virginia Volunteer Water Monitoring Programs: From Public Engagement to Influencing Policy*, **Chris French**, Alliance for the Chesapeake Bay

1:25 pm *Developing Volunteer Monitoring Programs to Support State Agency Restoration Efforts*, **Ginger North**, Delaware Nature Society

1:45 pm *Uses of Missouri Stream Team Data*, **Chris Riggert**, Missouri Department of Conservation

2:05 pm *Citizen Monitoring and TMDL Programs Partner to Identify E. coli Sources, Build Media Relations, Build Trust*, **Jason Pinchback**, Texas Stream Team, River Systems Institute

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Session E6: Contaminant Effects on Aquatic Ecosystem Health 1

Room 15
1:00 – 2:30 pm

Moderator: Kathy Kuivila, USGS

1:05 pm *Monitoring for Current-Use Pesticides in Amphibians and the Water and Sediment in Their Habitat*, **William Battaglin**, USGS

1:25 pm *Measuring Tissue Concentrations to Link Current-use Pesticide Exposure to Aquatic Ecosystem Health*, **Kelly Smalling**, USGS

1:45 pm *Identifying Sources of Toxicity to Hyalella in the Santa Margarita Watershed*, **Matthew Rich**, MACTEC Engineering and Consulting, Inc.

2:05 pm *Patterns of Fish and Macroinvertebrate Communities Exposed to Pulp and Paper Mill Effluent in Four US Receiving Streams*, **Camille Flinders**, National Council for Air and Stream Improvement

Session F1: Continuous Real-Time Monitoring: Applications in Rivers and Streams

Room 14
3:30 – 5:00 pm

Moderator: Ken Hyer, USGS

3:35 pm *Continuous Water Quality Monitoring in the Upper Clear Creek/Standley Lake Watershed – Westminster, Colorado*, **Andrew Cross**, City of Westminster, Colorado

3:55 pm *Real-Time Water-Quality Monitoring and Regression Analysis to Estimate Constituent Concentrations in the Menomonee River Watershed, Milwaukee, Wisconsin*, **David Graczyk**, USGS

4:15 pm *Computing Time-Series Suspended-Sediment Concentrations and Loads from In-Stream Turbidity-Sensor and Streamflow Data*, **Patrick Rasmussen**, USGS

4:35 pm *Trends in Selenium concentration and load in the Gunnison and Colorado Rivers determined using surrogate data from continuous monitors*, **Ken Leib**, USGS

Session F2: Regional Scale Wetlands Monitoring and Assessment

Room 16
3:30 – 5:00 pm

Moderator: Barbara Scott, Kentucky Division of Water

3:35 pm *Probability-Based Sample Designs for Wetland Condition Assessment: Lessons Learned from Real-World Applications in the Rocky Mountains*, **Joanna Lemly**, Colorado Natural Heritage Program

3:55 pm *Gulf of Mexico Coastal Wetlands: A Regional Assessment Perspective*, **Michael Scozzafava**, US EPA

4:15 pm *Toward a Mid-Atlantic Regional Wetlands Condition Assessment*, **Sarah Miller**, Pennsylvania State University

4:35 pm *Establishing a Wetlands Monitoring Program in North Carolina with emphasis on a Piedmont Watershed and a Coastal Plain Watershed*, **Rick Savage**, North Carolina Department of Environment and Natural Resources

Session F3: Water Quality Exchanges Improve Data Access and Sharing

Room 11
3:30 – 5:00 pm

Moderator: Danielle Donkersloot, New Jersey Department of Environmental Protection

3:35 pm *Water Quality Data Management and Exchange Among Tribes through a Tribal Consortium*, **Osa Odum**, Northwest Indian Fisheries Commission

3:55 pm *New Jersey's Ambient Water Quality Data Exchange System*, **Paul Morton**, New Jersey Department of Environmental Protection

4:15 pm *The Ocean Data Partnership Exchange Network (ODPX): Building a consensus-based system for discovery, accessibility, and interoperability of diverse water data in the Northeast US and Canada*, **Paul Currier**, New Hampshire Department of Environmental Services

4:35 pm *The USGS-USEPA Water-Quality Data Exchange*, **Nathaniel Booth**, USGS

Session F4: Using Probabilistic Monitoring to Support State and Tribal Programs

Room 12
3:30 – 5:00 pm

Moderator: Sarah Lehmann, US EPA

3:35 pm *Increasing State Biological Monitoring Capabilities Using Probabilistic Monitoring Strategies*, **Jason Hill**, Virginia Department of Environmental Quality

3:55 pm *Probabilistic Monitoring on Arizona Streams*, **Jason Jones**, Arizona Department of Environmental Quality

4:15 pm *Texas' Contributions to the National Probabilistic Surveys and Future Direction of the State's Biological Monitoring Program*, **Anne Rogers**, Texas Commission on Environmental Quality

4:35 pm *Probabilistic Wadeable Streams Survey in Puerto Rico*, **James Kurtenbach**, US EPA

Session F5: Innovation and Longevity in Volunteer Monitoring Programs

Room 17
3:30 – 5:00 pm

Moderator: Barb Horn, Colorado Division of Wildlife

3:35 pm *Volunteer Monitoring: A Sound Investment*, **Julie Vastine**, Dickinson College

3:55 pm *Success Stories: the Northeast's Long-Term Lake Volunteer Monitoring Programs*, **Linda Green**, University of Rhode Island

4:15 pm *River Watch's Evolution Over the Past 20 Years*, **Sarah Tolan**, Colorado River Watch

4:35 pm *Using Volunteers to Collect Ground Water Information: Examples from New Hampshire*, **David Wunsch**, New Hampshire Geological Survey

Session F6: Contaminant Effects on Aquatic Ecosystem Health 2

Room 15
3:30 – 5:00 pm

Moderator: Jerry Diamond, Tetra Tech, Inc.

3:35 pm *Diagnostic Tools to Evaluate Impacts of Trace Organic Compounds on Aquatic Populations and Communities*, **Jerry Diamond**, Tetra Tech, Inc.

3:55 pm *Monitoring Contaminant Exposure of Endangered Species: Lethal, Non-lethal and Surrogate Approaches*, **Adria Elskus**, USGS

4:15 pm *Sediment toxicity testing: (1) Contaminants of emerging concern and (2) Methods for conducting exposures with early life stages of freshwater mussels*, **Chris Ingersoll**, USGS

4:35 pm *A USGS Partnership to Investigate Freshwater Mussel Health Decline: Clinch River Basin in Virginia and Tennessee*, **Jennifer Krstolic**, USGS

Session G1: Continuous Real-Time Monitoring: Regulatory Perspectives

Room 14
8:00 – 9:30 am

Moderator: Chuck Spooner, US EPA

8:05 am *Working Together: Updates on Measurement, Monitoring, and Laboratory Science Issues*, **Lara Autry**, US EPA

8:25 am *Effectively Managing Water Resources by the Use of Near Real-Time Water Quality Monitoring in Partnership with Industry*, **Renée Paterson**, Newfoundland and Labrador Department of Environment and Conservation

8:45 am *Nowcasting to Protect Public Water Supply: Using Real Time Data in a Flow and Transport Model to Evaluate a Spill Emergency*, **Robert Limbeck**, Delaware River Basin Commission

9:05 am *Water Temperature: How to Measure and Interpret the Data*, **Philip Russell**, Littleton/ Englewood Wastewater Treatment Plant, Colorado

Session G2: Biological Monitoring with Volunteers

Room 17
8:00 – 9:30 am

Moderator: Kristine Stepenuck, University of Wisconsin-Extension

8:05 am *Invasive Species Monitoring Approaches for Volunteer Programs*, **Elizabeth Herron**, University of Rhode Island

8:25 am *Amphibian Monitoring with the Georgia Adopt-A-Stream Volunteer Program*, **Tara Muenz**, Georgia Environmental Protection Division

8:45 am *Utilizing Volunteers for Big River Biological Monitoring*, **Amy Meier**, Missouri Department of Conservation

9:05 am *Utilization of Large Scale Rapid Screening with Marine Plankton Toxicity Tests by a Citizen Monitoring Group*, **Justin Hohn**, San Diego Coastkeeper

Session G3: Watershed Scale Protection and Restoration Assessments

Room 11
8:00 – 9:30 am

Moderator: Michael Scozzafava, US EPA

8:05 am *A Technical Guide for Identifying and Protecting Healthy Watersheds*, **Laura Gabanski**, US EPA and Corey Godfrey, The Cadmus Group

8:25 am *Recovery Potential Screening for Prioritizing Restoration in Maryland Watersheds*, **Douglas Norton**, US EPA

8:45 am *Assessing Wetland Wildlife Habitat Acquisition and Restoration Opportunities at the Watershed Scale: Milwaukee River Basin, WI*, **Thomas Bernthal**, Wisconsin Department of Natural Resources

9:05 am *Demonstration of an Urban Stream Restoration Project to Reduce Sediment and Nutrient Loadings in the Illinois River Watershed*, **Sandi Formica**, Watershed Conservation Resource Center, AR

Session G4: Examining Nutrient Processing at Multiple Scales

Room 16
8:00 – 9:30 am

Moderator: Jane Caffrey, University of West Florida

8:05 am *Applying SPARROW to Determine the Source and Delivery of Phosphorus to Lakes in the Northeastern and Mid-Atlantic Regions of the United States*, **Richard Moore**, USGS

8:25 am *Principal nutrient sources and transport mechanisms in the Missouri River Basin, where reservoirs and irrigation contribute to a distinctive nutrient cycling signature*, **Juliane Brown**, USGS

8:45 am *Influence of Nutrients and Other Factors on Agricultural Stream Ecosystems: Integrating Bioassessment and Experimental Information*, **Christopher Mebane**, USGS

9:05 am *Seasonal Variations in Stream Metabolism in Four Environmental Settings across the United States*, **Jerad Bales**, USGS

Session G5: Results and Importance of Comparability Studies

Room 12
8:00 – 9:30 am

Moderator: Ellen Tarquinio, US EPA

8:05 am *A comparison of assessment outcomes based on macroinvertebrate condition indices from the New England region using National Wadeable Stream Assessment probability sites*, **David Neils**, New Hampshire Department of Environmental Services

8:25 am *Evaluation of the Lake Macroinvertebrate Integrity Index (LMII) and Alternate Indices for Eastern US Lakes and Reservoirs*, **Sheila North**, Dynamac Corp co/US EPA

8:45 am *Assessing Aquatic Life Use Support on a Great River*, **Peter Tennant**, ORSANCO

9:05 am TBD

Session G6: Evaluating Contaminant Trends in Surface-Water Quality: Streams and Rivers

Room 15
8:00 – 9:30 am

Moderator: Robert Ward, Professor Emeritus, Colorado State University

8:05 am *A Quarter Century of Declining Suspended Sediment Fluxes in the Mississippi River*, **Brian Hughes**, USGS

8:25 am *Water-Quality Data-Assessment of Long-Term Time Trends, Weser River Basin, Germany – A Case Study*, **Timothy D. Steele**, TDS Consulting Inc.

8:45 am *Temporal and spatial trends of pharmaceuticals in the Rhine*, **Peter Stoks**, Association of Rhine River Water Works, Netherlands

9:05 am *Trends in Pesticide Concentrations in Corn-Belt Streams, 1996–2006*, **Aldo Vecchia**, USGS

Session H1: Statewide Bioassessment

Room 16
10:00 – 11:30 am

Moderator: Cathy Tate, USGS

10:05 am *The Maryland Biological Stream Survey: Evolution of a Probability-based Monitoring Program*, **Ronald Klauda**, Maryland Department of Natural Resources

10:25 am *The Surface Water Register: an empirically improved sample frame for monitoring Kansas rivers and streams*, **Elizabeth Smith**, Kansas Department of Health and Environment

10:45 am *Integrating Water Resource Monitoring Data from Diverse Sources: The Willamette Basin (Oregon) Rivers and Streams Assessment*, **Michael Mulvey**, Oregon Department of Environmental Quality

11:05 am *California's Sophisticated State Bioassessment Program and the Challenge of Translating its Tools into a Successful Citizen Monitoring Program*, **James Harrington**, California Department of Fish and Game

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Session H2: Your Stream Overfloweth: Case Studies in Monitoring Stormwater Quality

Room 14
10:00 – 11:30 am

Moderator: Gregg Good, Illinois Environmental Protection Agency

10:05 am *Local Urban Stormwater Monitoring, Results, and Implications for Future Management*, **Matthew Loyas**, Capitol Region Watershed District, Saint Paul, MN

10:25 am *Sediment Transport from Urban, Urbanizing, and Rural Areas in Johnson County, Kansas, 2006-08*, **Casey Lee**, USGS

10:45 am *Sediment and Phosphorus Evaluation of an Urban Watershed in the Illinois River Watershed*, **Sandi Formica**, Watershed Conservation Resource Center, AR

11:05 am *The impact of stormwater on occurrence of pathogenic and antibiotic-resistant bacteria in urban surface waters*, **Lisa Reynolds Fogarty**, USGS

Session H3: Using Data Sharing as a Pathway to Collaboration

Room 11
10:00 – 11:30 am

Moderator: Barb Horn, Colorado Division of Wildlife

10:05 am *Environmental Visualization Tools*, **Cristina Grosso**, San Francisco Estuary Institute

10:25 am *Use of a Wiki Portal for Watershed Management: An Integrated Approach*, **Soumya Chennapragada**, San Diego Coastkeeper

10:45 am *KCWaters.org – An Interactive Venue to Share Data, Connect Partners, and Help Protect Waterbodies in the Kansas City Metropolitan Area*, **Jeffery Robichaud**, US EPA

11:05 am *USGS-Pakistan Science and Technology Exchange – Creation of a Water Resources Data System for Pakistan*, **Sandy Williamson**, USGS

Session H4: Monitoring Network Design: Implementing Large Scale Solutions

Room 12
10:00 – 11:30 am

Moderator: Gary Kohlhepp, Michigan Department of Natural Resources and Environment

10:05 am *New Zealand's National Rivers Water Quality Network (NRWQN) – 21 years old and still going strong*, **David Smith**, New York City Department of Environmental Protection (retired)

10:25 am *Regional Ambient Fish Tissue Monitoring Program*, **Laura Webb**, US EPA

10:45 am *Longitudinal Spatial Patterns in Riverine Ecological Indicators in the Pacific Northwest; Implications for River Survey Design*, **Alan Herlihy**, Oregon State University

11:05 am *Pennsylvania's Monongahela River Basin Conductivity Monitoring Network*, **Tony Shaw**, Pennsylvania Department of Environmental Protection

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Session H5: Harmful Algal Blooms and Cyantoxins: How (Blue) Green is my Water?

Room 17
10:00 – 11:30 am

Moderator: Jennifer Graham and Keith Loftin, USGS

10:05 am *Efforts in California to address risk from cyanotoxins and the significance of cyanotoxin ecotoxicology*, **Regina Linville**, California Office of Environmental Health Hazard Assessment

10:25 am *Recreational Exposure to Microcystins during Algal Blooms in Small Lakes*, **Lorraine Backer**, National Center for Environmental Health, CDC

10:45 am *Developing a Harmful Algal Bloom Integrated Observing System for the Gulf of Mexico*, **Ann Jochens**, Texas A&M University

11:05 am *Monitoring to Determine Geosmin Sources and Concentrations in a Northern Colorado Reservoir*, **Jill Oropeza**, City of Fort Collins Utilities, CO

Session H6: Evaluating Contaminant Trends in Lakes and Reservoirs using Sediment Cores

Room 15
10:00 – 11:30 am

Moderator: Peter Van Metre, USGS

10:05 am *Zinc and Copper Isotopes as Tracers of Anthropogenic Contamination in Lake Sediments*, **David Borrok**, University of Texas at El Paso

10:25 am *Application of paleolimnology to a large river to reconstruct metal and organic contaminant inputs*, **Marc Desmet**, ENTPE, France

10:45 am *Sediment Profiles and Accumulation Rates of Mercury and Methylmercury during the Past ~ 100 years, Great Salt Lake, Utah*, **David Naftz**, USGS

11:05 am *Is Sediment Quality Getting Better or Worse? Evaluation of Historical Trends in Lake-Bottom Sediment Using an Overall Measure of Contamination*, **Barbara Mahler**, USGS

Session I1: Biological Assessments – Survey Design and Sampling Considerations

Room 16
1:00 – 2:30 pm

Moderator: Karl Hermann, US EPA

1:05 pm *The condition of stream biological communities and the factors that influence them: A national perspective based on land use*, **Daren Carlisle**, USGS

1:25 pm *Monitoring Water Quality at the Epicenter of Aquatic Biodiversity*, **Fred Leslie**, Alabama Department of Environmental Management

1:45 pm *South Carolina's Integrated Indices Approach for Assessing Water Quality, Sediment Quality and Biotic Condition and Its Uses by Resource Managers*, **Robert VanDolah**, South Carolina Department of Natural Resources

2:05 pm TBD

Session I2: Tracking What Flows Downhill: Microbial Source Tracking

Room 12
1:00 – 2:30 pm

Moderator: Dave Chestnut, South Carolina Department of Health and Environmental Control

1:05 pm *New Jersey's Application of Microbial Source Tracking Techniques in Recreational Waters*, **Robert Schuster**, New Jersey Department of Environmental Protection

1:25 pm *Occurrence and Sources of Escherichia coli in Metropolitan St. Louis Streams, October 2004 through September 2007*, **Jerri Davis**, USGS

1:45 pm *A multifaceted approach to microbial source tracking within the natural environment*, **Megan Monroe**, Tetra Tech, Inc.

2:05 pm *Semi-quantitative evaluation of fecal contamination by human, ruminant, and alternate sources in Upper Fountain Creek, Colorado*, **Don Stoeckel**, Don Stoeckel Environmental

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Session I3: 21st Century Technical Tools for Water Quality Assessments

Room 14
1:00 – 2:30 pm

Moderator: Sandy Williamson, USGS

1:05 pm *Ecosystem Services Monitoring and Valuation for Better Environmental Decision-making*, **Michael McDonald**, US EPA

1:25 pm *Better Monitoring Program Management through the ATTAINS System*, **Charles Kovatch**, US EPA

1:45 pm *Data Management, Integration and Sharing at the State and Regional Level*, **Dave Wilcox**, Gold Systems, Inc.

2:05 pm *Where's the Data? Improvements in Access to USGS Water Data*, **Yvonne Stoker**, USGS

Session I4: Integrated Land-to-Sea Assessments Based on Multiple Networks

Room 11
1:00 – 2:30 pm

Moderator: Pixie Hamilton, USGS

1:05 pm *Using multiple lines of information to develop eelgrass-based nutrient criteria for New Hampshire's Great Bay Estuary*, **Ru Morrison**, NERACOOS, NH

1:25 pm *Bight Regional Monitoring Program: Coordinating existing programs to provide large scale regional assessments in southern California*, **Stephen Weisburg**, Southern California Coastal Water Research Project

1:45 pm *A Preliminary Evaluation of Trinity River Sediment and Nutrient Loads into Galveston Bay, Texas, During Two Periods of High Flow*, **Michael Lee**, USGS

2:05 pm *Combining monitoring programs observations with models to characterize water quality variability and the role of nitrogen loading: informing management of Narragansett Bay*, **Henry Walker**, US EPA

Session I5: Contaminants in Groundwater

Room 15
1:00 – 2:30 pm

Moderator: Gary Rowe, USGS

1:05 pm *Distribution of Naturally-Occurring Perchlorate in Groundwater in the Southwestern US*, **Miranda Fram**, USGS

1:25 pm *Virus Concentrations in Non-Disinfected Groundwater Used for Drinking: Association with Community Rates of Acute Gastrointestinal Illness*, **Mark Borchardt**, Marshfield Clinic Research Foundation, WI

1:45 pm *Natural Contamination of Domestic Wells in Rural Northern Nevada*, **Ralph Seiler**, USGS

2:05 pm *Predicting the probability of arsenic occurrence in groundwater from bedrock wells in New Hampshire for Environmental Public Health Tracking*, **Joseph Ayotte**, USGS

Session I6: Prioritization of Chemicals for New Methods Development

Room 17
1:00 – 2:30 pm

Moderator: Herb Buxton, USGS

1:05 pm *Disinfection By-Products: Research Plans of the United States Geological Survey*, **Michelle Hladik**, USGS

1:25 pm *Prioritization of High-Production-Volume Chemicals for Assessing Water Resources*, **John Zogorski**, USGS

1:45 pm *Pharmaceuticals in the Environment: A Prioritization for Analytical Methods Development*, **Edward Furlong**, USGS

2:05 pm *Prioritizing Pesticide Compounds for Water Quality Assessment Based on Potential Importance to Human and Ecological Health*, **Julia Norman**, USGS

Session J1: Coastal and Estuarine Assessments

Room 12
3:30 – 5:00 pm

Moderator: Greg Colianni, US EPA

3:35 pm *Water Quality Status of the Nation's Coasts: Incorporating the Nearshore Great Lakes into the National Coastal Condition Assessment*, **Treda Grayson**, US EPA

3:55 pm *Regional Assessment of Sediment Contamination from Marshes to the Continental Shelf: Results of the Western Component of the U.S. EPA National Coastal Assessment*, **Walter Nelson**, US EPA

4:15 pm *Partnering with USEPA to Document Water Quality in our Coastal National Parks*, **Eva DiDonato**, National Park Service

4:35 pm *Linking Monitoring Efforts in the Mississippi River Watershed with Monitoring of Hypoxia in the Gulf of Mexico*, **Nancy Rabalais**, Louisiana Universities Marine Consortium

Session J2: Development of Reference Condition for Different Purposes and at Different Scales

Room 16
3:30 – 5:00 pm

Moderator: Tom Sanders, Colorado State University

3:35 pm *Landscape Assessment and Predictive Tools: Methods Guidance for Monitoring, Assessment, and Other Clean Water Act Programs*, **Jim Harrison**, US EPA

3:55 pm *Large River Bioassessment: Challenges and Approaches Used for the Delaware River*, **Robert Limbeck**, Delaware River Basin Commission

4:15 pm *A Framework for Selecting Least Impacted Reference Streams based on Landscape Models for use in Assessing Biotic Integrity of Wadeable Streams in Wisconsin*, **Jana Stewart**, USGS

4:35 pm *Selecting Reference Sites across Ecoregions: The Rocky Mountain ReMAP*, **Linda Vance**, Montana Natural Heritage Program

Session J3: Integrating Water Quality Indicators to Support Monitoring and Assessment Decisions

Room 17
3:30 – 5:00 pm

Moderator: Tony Shaw, Pennsylvania Department of Environmental Protection

3:35 pm *Long-term Monitoring: Exploring an Integrated Approach*, **Douglas Yeskis**, USGS

3:55 pm *Integrated sampling on the Monongahela and Allegheny Rivers; Two Components of the Great River Ecosystem in the Central Basin*, **Rick Spear**, Pennsylvania Department of Environmental Protection

4:15 pm *Susquehanna River Basin Commission's Environmental Review of Water Withdrawals: Integrating Water Quality, Biological, and Habitat Information into Water Quantity Decision Making*, **Jennifer Hoffman**, Susquehanna River Basin Commission

4:35 pm *Effective Integrated Physical, Chemical, and Biological Aquatic Monitoring in the Pacific Island National Parks*, **Anne Farahi**, National Park Service

Session J4: Overcoming Barriers to Monitoring Collaboration and Partnerships

Room 11
3:30 – 5:00 pm

Moderator: Tracy Hancock, USGS

3:35 pm *Collaborative Interagency Efforts in Sampling, Analyzing, and Developing Models for Arsenic and Methyl Mercury Levels in Florida*, **Rick Copeland**, Florida Geological Survey

3:55 pm *A Cooperative Bi-National Approach to Monitoring the St. Marys River Great Lakes Connecting Channel*, **Gary Kohlhepp**, Michigan Department of Natural Resources and Environment

4:15 pm *Great Lakes Cooperative Science and Monitoring Initiative: Cooperative science to help manage the Great Lakes*, **Paul Horvatin**, US EPA

4:35 pm *Partnership Approach to Optimization of the Chesapeake Bay Program's Bay and Basin Water Quality Monitoring Program 2007-09: Process Review, Lessons Learned*, **Peter Tango**, USGS

Session J5: Evaluating Contaminant Trends in Groundwater Quality

Room 15
3:30 – 5:00 pm

Moderator: Christopher Carlson, US Forest Service

3:35 pm *Trends in Groundwater Quality: Integration of National Network and Regional-Scale Studies*, **Bruce Lindsey**, USGS

3:55 pm *Decadal-Scale Changes of Nitrate in Ground Water of the United States, 1988-2004*, **Michael Rupert**, USGS

4:15 pm *Decadal-Scale Changes in Dissolved-Solids Concentrations in Groundwater Used for Public Supply, Salt Lake Valley, Utah*, **Susan Thiros**, USGS

4:35 pm *Towards understanding how human and aquifer processes interact to produce trends in groundwater quality*, **Jeffrey Starn**, USGS

Session J6: Endocrine Disrupting Compounds – Identification, Sources, and Effects

Room 14
3:30 – 5:00 pm

Moderator: Kathy Lee, USGS

3:35 pm *What is an Endocrine Disrupting Chemical?*, **Larry Barber**, USGS

3:55 pm *Reproductive disruption of fishes by endocrine-active wastewater effluents*, **Alan Vajda**, University of Colorado, Denver

4:15 pm *Distribution of hormones, pharmaceuticals, and other anthropogenic waste indicators in areas of the Potomac River watershed impacted with fish kills and intersex fish*, **James Gray**, USGS

4:35 pm *Endocrine Active Chemicals in Surface Waters: Developing a Consistent Approach to Evaluate Fate and Aquatic Organism Responses*, **Kathy Lee**, USGS

Thursday, April 29

Session K1: Water Quality Monitoring in Coastal and Marine Environments

Room 12
8:00 – 9:30 am

Moderator: Pixie Hamilton, USGS

8:05 am *Benefits of Integrated Physical, Chemical, and Biological Marine Monitoring in Pacific Island National Parks*, **Tahzay Jones**, National Park Service

8:25 am *Connecticut Department of Environmental Protection Long Island Sound Water Quality Monitoring Program: What are we missing, a comparison of monthly survey data and data from a special 72 hour survey*, **Matthew Lyman**, Connecticut Department of Environmental Protection

8:45 am *Combining Routine Monitoring and Research to Understand Estuarine Biogeochemistry*, **Jonathan Sharp**, University of Delaware

9:05 am *Monitoring in the Ahupua'a*, **Michael Tomlinson**, University of Hawaii at Manoa

Session K2: Geospatial Assessments of Water Quality

Room 16
8:00 – 9:30 am

Moderator: Douglas Norton, US EPA

8:05 am *Applying the National Hydrography Dataset Plus (NHDPlus) to Water Quality Assessments*, **Tommy Dewald**, US EPA

8:25 am *Water Clarity Monitoring of Wisconsin Lakes via Remote Sensing*, **Steven Greb**, Wisconsin Department of Natural Resources

8:45 am *Using GIS to Analyze the Environmental Impacts of Mining on Water Resources in the State of West Virginia*, **Edmund Merem**, Jackson State University

9:05 am *National Assessment of Impaired Waters Within or Near US Fish and Wildlife Service Properties*, **Douglas Norton**, US EPA

Session K3: Modeling of Nutrient Transport and Loadings

Room 14
8:00 – 9:30 am

Moderator: Steve Preston, USGS

8:05 am *Application of Regional Regression Models of Nutrient Transport to Water-Quality Assessments in the Southeastern U.S.*, **Anne Hoos**, USGS

8:25 am *Limitations / Needs in Data to Support Regional Water-Quality Modeling*, **Stephen Preston**, USGS

8:45 am *Allocation of Nutrient Inputs to the Laurentian Great Lakes by Source and River Basin Using SPARROW Models*, **Dale Robertson**, USGS

9:05 am *The Regionalization of National-Scale SPARROW Models for Stream Nutrients*, **Gregory Schwarz**, USGS

Session K4: Monitoring Partnerships: Promoting Water Resource Stewardship and Protection

Room 11
8:00 – 9:30 am

Moderator: Barry Long, National Park Service

8:05 am *Interior Agency Water Quality Partnership: New Process, Same Great Results*, **Mark Nilles**, USGS

8:25 am *Strengthening USGS International Partnerships focused on Water Quality, Water Supply, and Sustainability in the Developing World*, **Jo Leslie Eimers**, USGS

8:45 am *15 Years of Monitoring Water Quality Across Southcentral Alaska Through the Citizens' Environmental Monitoring Program Partnership*, **Rachel Lord**, Cook Inletkeeper, Homer, AK

9:05 am *Partnering to Support Monitoring Programs*, **Alyse Greenberg**, Stony Brook-Millstone Watershed Association, NJ

Session K5: Transport and Distribution of Mercury through Aquatic Ecosystems

Room 15
8:00 – 9:30 am

Moderator: Lia Chasar, USGS

8:05 am *Methylmercury in aquatic ecosystems of the United States*, **Mark Brigham**, USGS

8:25 am *Dissolved organic matter, organic matter optical properties and mercury in rivers and streams*, **George Aiken**, USGS

8:45 am *Increased Atmospheric Mercury Deposition near Major Urban Areas*, **Peter Van Metre**, USGS

9:05 am *Effects of Forest Type and Fire on Mercury Deposition in Boreal Ecosystems*, **Randy Kolka**, US Forest Service

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Session K6: Agrochemical Monitoring

Room 17
8:00 – 9:30 am

Moderator: Mary Skopec, Iowa Department of Natural Resources

8:05 am *Agrochemical surface water monitoring - interpreting results from the Atrazine ecological exposure monitoring study*, **Paul Hendley**, Syngenta Crop Protection Inc

8:25 am *Pyrethroid Insecticides: Collection, Analysis and Occurrence*, **Michelle Hladik**, USGS

8:45 am *Fungicides: Analysis, Occurrence, and Fate of an Understudied Group of Pesticides*, **Kathryn Kuivila**, USGS

9:05 am *Monitoring Colorado's Groundwater for Agricultural Chemicals and Long-Term Contamination Trends*, **Karl Mauch**, Colorado Department of Agriculture

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Session L1: Monitoring Hydrology: A Critical Consideration for the Interpretation of Water Quality and Biological Assessment Data

Room 12
10:00 – 11:30 am

Moderator: Timothy Rowe, USGS

10:05 am *Confounding Factors and Lessons Learned: Monitoring the Hydrology of Headwater Streams of the Gulf Coastal Plain*, **Kristopher Brown**, Louisiana State University

10:25 am *Monitoring Tidal Water Elevation and Water Quality in Four Embayments of Long Island Sound, New York to Assess Tidal Wetland Loss*, **Richard Cartwright**, USGS

10:45 am *Nutrient sampling, concentrations, and corresponding loads during the historic June 2008 flooding in eastern Iowa*, **Laura Hubbard**, USGS

11:05 am *Century-scale trends in flood peak discharges in the United States*, **Karen Ryberg**, USGS

Session L2: Climate Change: Monitoring Impacts on Water Quality and Quantity

Room 15
10:00 – 11:30 am

Moderator: Barry Long, National Park Service

10:05 am *An Exploratory Evaluation of the Effects of Climate Change on the Water Quality of the South Platte River in Denver, Colorado*, **Jon Novick**, Denver Department of Environmental Health

10:25 am *Red River Valley Tile Drain Water Quality Assessment: A Study of Water Quality on Saline Soils*, **Roxanne Johnson**, North Dakota State University

10:45 am *Monitoring Approaches Adapted by Southwest Usa Tribal and Municipal Water Providers to Address Water Supply Challenges Associated with Drought and Climate Change*, **Steven Sagstad**, Civil & Environmental Consultants and **Deborah Patton**, Rural Community Assistance Corporation

11:05 am *Ecological Monitoring Strategies for Freshwater Systems in Alaska's National Parks*, **Jeff Shearer**, National Park Service

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Session L3: Linking Sources and Stressors to Water Quality

Room 17
10:00 – 11:30 am

Moderator: Chris Piehler, Louisiana Department of Environmental Quality

10:05 am *Assessing the Condition of Streams in the San Gabriel River Watershed (California): Integration of Multiple Indicators*, **Scott Johnson**, Aquatic Bioassay and Consulting Laboratories

10:25 am *Assessing Ecological Conditions of U.S. Coastal Ocean Waters: Expansion of EMAP from Estuaries to the Offshore Environment*, **Jeff Hyland**, NOAA

10:45 am *Problems and prospects of the application of Soil and Water Assessment Tool (SWAT) Model for the identification of nonpoint source pollution "hotspots" in a flat coastal agricultural watershed in humid tropics*, **Durga Poudel**, University of Louisiana at Lafayette

11:05 am *2010 Release of the U.S. EPA Causal Analysis Diagnosis and Decision Information System (CADDIS)*, **Amina Pollard**, US EPA

Session L4: Unique Collaborative Approaches for Successful Outcomes

Room 11
10:00 – 11:30 am

Moderator: Erick Burres, California State Water Resources Control Board

10:05 am *The Collective Action Continuum: Identifying Critical Elements for Environmental Improvement*, **Jenny Biddle**, George Mason University

10:25 am *Georgia Adopt-A-Stream Database: Beyond the Data*, **Allison Hughes**, Georgia Department of Natural Resources

10:45 am *Development of Comprehensive Volunteer Water Quality Monitoring Education and Support in Response to Agency-directed Targeted Watershed Improvements: Lessons Learned*, **Channah Rock**, University of Arizona

11:05 am *From Citizen Science to Volunteer Monitoring: Seeking hybridization of disparate models for more meaningful public engagement in environmental monitoring*, **Candie Wilderman**, Dickinson College

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Session L5: Biomagnification of Mercury through Food Webs

Room 16
10:00 – 11:30 am

Moderator: Mark Brigham, USGS

10:05 am *Assessing Impairment of Tomales Bay due to Mercury*, **Kat Ridolfi**, San Francisco Estuary Institute

10:25 am *Contaminants in Sport Fish of California Lakes and Reservoirs*, **Val Connor**, California State Water Resources Control Board

10:45 am *Mercury in National Park Units of the Western Great Lakes Region: Assessing Bioaccumulation in Aquatic Food Webs*, **James Wiener**, University of Wisconsin–La Crosse

11:05 am *Characterizing mercury bioaccumulation and biomagnification in streams across large environmental gradients*, **Lia Chasar**, USGS

Session L6: Contaminant Threats to Drinking Water

Room 14
10:00 – 11:30 am

Moderator: Greg Delzer, USGS

10:05 am *Quality of Water from Public-Supply Wells in the United States*, **Patricia Toccalino**, USGS

10:25 am *Anthropogenic Organic Compounds in Source and Finished Water of Community Water Systems that Withdraw from Streams*, **James Kingsbury**, USGS

10:45 am *EPA's Third Contaminant Candidate List – Evaluating Unregulated Drinking Water Contaminants*, **Thomas Carpenter**, US EPA

11:05 am *The Next Generation of Drinking Water Disinfection By-Products*, **Susan Richardson**, US EPA

Poster Presentations

The following posters will be displayed on Monday, April 26. Join us 5-7 pm at the Exhibit and Poster reception. Poster presenters will be available to answer questions during this time.

Continuous Monitoring, Autosamplers

001 *MiniSipper: a New High-capacity, Long-duration, Automated In-Situ Water Sampler*, **Thomas Chapin** and **Andrew Todd**, USGS

002 *Continuous in situ measurement of dye tracer and physical water quality properties for characterization of overlapping plumes from wastewater treatment facilities discharging to the Missouri River*, **Eric Christensen**, USGS

003 *Continuous Active Low-Flow Extraction Laboratory and Field Evaluations*, **Brent Hepner**, Aqualytical Services Inc.

004 *New and Evolving Technologies For Monitoring and Control*, **Troy Hertog**, Siemens Water Technologies

005 *Evaluation of Regenerated Cellulose Dialysis Membrane Diffusion Samplers for Monitoring Groundwater Quality*, **Thomas Imbrigiotta**, USGS

006 *Implementation Monitoring: Use of Automated Samplers to Effectively Document Water Quality Improvements*, **Jeanette Lamb**, Oklahoma Conservation Commission

007 *Advancements in Continuous Sensor Technologies and Application to Stormwater Monitoring in California*, **Stephen McCord**, Larry Walker Associates

008 *Real Time Monitoring of Urban Water Bodies for Research and Educational Use*, **Ryan Mesmer**, Louisiana State University

009 *Advances in the Automated Monitoring Program in Atlantic Canada*, **Denis Parent**, Environment Canada

010 *Evaluation of time-integrating sediment samplers for assessment of occurrence and concentrations of hydrophobic organic contaminants in small streams*, **Mark Sandstrom**, USGS

011 *Temperature Effects on Conductivity Calibration of Continuous Monitors*, **Evan Tillman**, USGS

012 *Luminescence Sensors: The future of Dissolved Oxygen Monitoring*, **Evan Tillman**, USGS

013 *Assessment of the Cross-Sectional Variability of Water Quality Parameters in the Snake River as a Result of Measurement Location*, **Alexandra Etheridge**, USGS

Nutrients, Algae

014 *Diurnal Fluctuations in Nutrients and Continuously Monitored Parameters in Two Idaho Rivers*, **Andrew Tranmer**, USGS

015 *Cyanobacterial Toxins Found in Upper Klamath Lake, Oregon: Implications for Endangered Fish*, **Kathy Echols**, USGS

016 *A New Fast, Accurate Method for Algae Identification and Enumeration*, **Mary Fabisiak**, City of Westminster, Colorado

017 *Change-Point Analysis for Nutrient Criteria in the Midwest*, **Jeffrey Frey**, USGS

018 *Trends in Water Quality in the Southeastern United States, 1973-2005*, **Douglas Harned**, USGS

019 *Geosmin and Microcystin Occurrence in Two Piedmont Reservoirs, Spartanburg County, South Carolina, 2007 – 2008*, **Celeste Journey**, USGS

020 *A Comparison of Algal, Macroinvertebrate, and Fish Assemblage Indices for Assessing Low-Level Nutrient Enrichment in Wadeable Ozark Streams*, **Billy Justus**, USGS

021 *Assessing the Effects of Nutrients on Algal Responses in Agricultural Streams: The Importance of Seasonal Variations*, **Kathy Lee**, USGS

022 *Influence of Nutrients, Habitat, and Streamflow on Indicators of Eutrophication in Agricultural Streams: Applications for Developing Nutrient Criteria*, **Terry Maret**, USGS

023 *The Dunkard Creek TDS Crisis That Became A Disaster*, **Duane Nichols**, Upper Monongahela River Association

024 *Application of a Quantitative ELISA Screening Procedure Suitable for Shipboard Analysis of Marine Algal Toxins in Shellfish Tissue*, **Jaclyn Pitt**, Abraxis LLC

025 *Post-harvest Nitrogen Leaching and Retention in Riparian Forest Buffers Killed by Mountain Pine Beetle*, **Charles Rhoades**, US Forest Service

026 *Change in Streamwater Nitrogen Export and Soil Nitrogen Dynamics during a Mountain Pine Beetle Infestation of Subalpine Watersheds*, **Charles Rhoades**, US Forest Service

027 *Development of Sensitive Immunoassay Formats for Algal Toxin Detection*, **Fernando Rubio**, Abraxis LLC

028 *Microcystin and Taste and Odor Compound Occurrence, Fate and Transport in Central Indiana Surface Waters*, **Lenore Tedesco**, Indiana University

029 *Cyanobacterial Occurrence and Toxicity in central Indiana Drinking Water Reservoirs with an Assessment of Statewide Occurrence*, **Lenore Tedesco**, Indiana University

030 *Water Quality and Phytoplankton Community Composition in a Source Water Reservoir, Lake Houston near Houston, Texas, April 2006 – September 2008*, **Mike Turco**, USGS

031 *Multiple Lines of Evidence for Spatial Diagnosis of Catchment Water Quality: Sources and Pathways of Nutrients*, **Kirsten Verburg**, CSIRO Land and Water

032 *Monitoring Nutrient Contributions to the Lower Missouri and Upper Mississippi Rivers*, **Gary Welker**, US EPA

033 *Oxygen isotopic composition of phosphate: A new tool for monitoring phosphate sources and cycling*, **Megan Young**, USGS

Mining, Energy

034 *National Water-Quality Assessment (NAWQA) Program Black River Synoptic Study of the Effects of Mining in the Viburnum Trend, Southeastern Missouri, 1993 and 1995*, **Suzanne Femmer**, USGS

035 *Developing water budgets for unconventional oil and gas production: A study in the Williston Basin, Montana and North Dakota*, **Seth Haines**, USGS

036 *Approaches to Volunteer Monitoring in Mining Communities*, **Grady Harper**, North Fork River Improvement Association (AmeriCorps*VISTA)

037 *How Do You Monitor a Pebble?*, **Pete Penoyer** and **Barry Long**, National Park Service

038 *Organic compounds in surface waters near lead-zinc mine and milling operations*, **Colleen Rostad**, USGS

039 *Assessment of Potential Uranium Ore Migration from a Uranium Mill by Monitoring Sediments from Ephemeral Streams, Sagebrush, and Cores from Cottonwood Trees near the Ute Mountain Ute Reservation, Utah*, **Ryan Rowland**, USGS

040 *Impacts of Mining-Derived Metals on Riffle-Dwelling Crayfish and In-Situ Toxicity to Juvenile Crayfish in the Big River of Southeast Missouri, USA*, **Christopher Schmitt**, USGS

041 *Assessing and Monitoring the Effects of Mining-Derived Metals on Crayfish and Sculpin*, **Christopher Schmitt**, USGS

042 *Distribution of Mining-Related Metals in Streambed Sediment of the Viburnum Trend Subdistrict and Sediment core from Clearwater Lake, Southeastern Missouri*, **Christopher Schmitt**, USGS

043 *Cause and Effect Survey of Brine Discharges in South Fork Tenmile Creek, Pennsylvania*, **Rick Spear**, Pennsylvania Department of Environmental Protection

044 *Monitoring Strategies to Assist Remediation of Abandoned Draining Mines*, **Katherine Walton-Day**, USGS

Modeling

045 *Linking landscape characteristics and stream nitrogen in the Oregon Coast Range: empirical modeling of water quality monitoring data*, **Effie Greathouse**, Oregon State University

046 *Evaluation of the Soil and Water Assessment Tool for Predicting Hydrology and Nutrients at Unmonitored Sites in the Cedar River Watershed*, **Kasey Hutchinson**, USGS

047 *Water Quality Measurement Network for Validation and Development of Catchment Models*, **Holm Kipka**, Friedrich-Schiller-University Jena, Germany

048 *Regression Models of Selected Constituents in Two Tributaries to Lake Houston near Houston, Texas, 2005–07*, **Michael Lee**, USGS

049 *Assessing the effect of uncertainties associated with estimated model parameters and small–scale geologic heterogeneity on basin-scale projections of water-quality trends, Salt Lake Valley, Utah*, **Jeffrey Starn**, USGS

050 *Monitoring for Modeling*, **William Elliot**, US Forest Service

Climate Change

051 *Predicting the Effects of Future Climates on Forest Watersheds*, **William Elliot**, US Forest Service

052 *Earth System Observation Network (ESON): a long-term monitoring program in the San Juan Mountains, CO that addresses climate change and its impacts on land, water, air, life & humans*, **Rob Blair**, Mountain Studies Institute, Colorado

Bioassessment

053 *Development of Biological Objectives for Wadeable Streams in California*, **Val Connor**, California State Water Resources Control Board

054 *Applying non-linear (fuzzy) classification rules for grouping streams with similar biological potential in Colorado*, **Ben Jessup**, Tetra Tech, Inc.

055 *Monitoring burrowing mayflies (Hexagenia spp.) in nearshore waters of the Laurentian Great Lakes*, **Don Schloesser**, USGS

Management, Protection, Restoration

056 *Air Quality Management Implications of Forest Service Water Quality Data*, **Ricardo Cisneros** and **Don Schweizer**, US Forest Service

057 *Using long-term ambient water quality data to inform thermal criteria revisions: A case study on the South Platte River, CO*, **Alice Conovitz**, Integral Consulting Inc.

058 *Alternatives for HUC 12 Prioritization during Watershed Management Plan Development: Upper Illinois River Watershed*, **Brian Haggard**, Arkansas Water Resources Center

059 *Linking Changes in Management and Riparian Physical Functionality to Water Quality and Aquatic Habitat*, **Don Kozlowski**, University of Nevada, Reno

060 *North Dakota Discovery Farms: Monitoring Agricultural Runoff in Small Watersheds*, **Kathleen Macek-Rowland**, USGS

061 *Tools and Approaches for Effective Water Quality Monitoring of BMPs for Stream Systems*, **Ginger Paige**, University of Wyoming

062 *Watershed management and decision making in the Region of the Great Bend of the Wabash River*, **Sara Peel**, Wabash River Enhancement Corporation

063 *Use of a Public-Private Partnership to Establish a Regionally Coordinated Water Monitoring Network to Aid in Watershed Decision Making*, **Anthony Seeman**, Iowa Soybean Association

064 *Snake River Watershed (Colorado) – An Assessment of Recent Time-Trends in Monitoring Data*, **Timothy D. Steele**, TDS Consulting Inc.

065 *Challenges and Unintended Consequences: Managing Water Quality in the Lower Yakima River, Washington*, **Daniel Wise**, USGS

066 *Environmental Challenges and Sustainable Solutions for Protecting Water Resources: Integrating Education, Research, and Community Partnerships*, **Eileen Zerba**, Princeton University

067 *Ongoing Efforts of a Public Engineering and Construction Management Agency to Address the Requirements of the NPDES Permit for Construction Stormwater Discharges*, **John Baum**, US Army Corps of Engineers

Lakes, Reservoirs

068 *Addressing Invasive Mussel Concerns at 9 Reservoirs in Northern California*, **John Baum**, US Army Corps of Engineers

069 *Estimating Trophic Status for Michigan Inland Lakes by Relating Field Measurements to Satellite Imagery*, **Lori Fuller**, USGS

070 *Long-term Monitoring with Sediment Cores*, **Paul Garrison**, Wisconsin Department of Natural Resources

071 *Tracking the Impact of Land Use and Sustainable Practices on Lake Water Quality*, **Robert Hackett**, Elon University

072 *Lake Success: Water Quality Monitoring at a Dam Remediation Site*, **Heather Jackson**, US Army Corps of Engineers

073 *Use of Long-Term Monitoring Networks to Evaluate the Effects of Deposition and Climate on Remote Lakes in the Rocky Mountains*, **Alisa Mast**, USGS

074 *Historical Data Evaluation and Supplemental Water Quality Monitoring at Lake Isabella in Preparation for Dam Remediation*, **Alison Plant**, US Army Corps of Engineers

075 *Long-Term Reservoir Monitoring Using Volunteer Field Scientists*, **Anthony Thorpe** and **Daniel Obrecht**, University of Missouri

Coastal, Wetlands

076 *An Overview of Monitoring, Assessment and Regulations of the Wetlands on Navajo Nation*, **Krishna Baskota**, Navajo Nation

077 *Coral Disease, Environmental Drivers, and Coral-Microbial Interactions*, **Laura Hunt**, University of Texas at Arlington

078 *Southeastern Wetlands Workgroup (for U.S. EPA Office of Water and Region 4)*, **Kimberly Matthews**, RTI International

079 *Monitoring Ecological functions in Bung Khong Long Non-Hunting Area, Ramsar Site, Thailand*, **Kamalaporn Kanongdate**, Brandenburg University of Technology, Germany

080 *Monitoring the effectiveness of Ramsar Convention on wetland Ramsar sites: Case study Ramsar Sites Thailand*, **Kamalaporn Kanongdate**, Brandenburg University of Technology, Germany

Groundwater

081 *A Coupled Empirical Model for Understanding Groundwater Contributions to Temporal Trends in Stream Chemistry on the Basis of Routine Monitoring Data*, **Scott Ator** and **Joel Blomquist**, USGS

082 *Problems and Solutions Using Real-Time Geochemical Property Monitoring to Identify Sources of Groundwater under the Influence of Surface Water*, **Christopher Braun**, USGS

083 *Use of Spring Data in a Ground-water Level Monitoring Network: Surveillance and Trend Monitoring in the Evaluation of a Long-term Period of Below Normal Rainfall*, **Rick Copeland**, Florida Geological Survey

084 *Distribution and characteristics of springs and wetlands in headwater basins of the Fraser Experimental Forest, Colorado*, **Kathleen Dwire**, US Forest Service

085 *Innovative Surface and Groundwater Monitoring and Assessment of Energy Development in the Northern Piceance Basin*, **Robert Lange**, Bureau of Land Management

086 *Using specific-conductance profiles and fixed-depth loggers to determine freshwater-lens thickness changes and aquifer properties during recharge events, Northern Guam Lens, Guam*, **Todd Presley**, USGS

087 *Assessment of Potential Uranium Emissions from a Uranium Mill on the Ground- Water, Surface-Water, and Air Quality of the Ute Mountain Ute Reservation, Southeastern Utah, 2007 – 2009*, **Anthony Ranalli**, USGS

088 *Evaluating the potential occurrence of ^{210}Po in US groundwater using uranium concentrations and gross alpha radioactivity*, **Michael Rosen**, USGS

The following posters will be displayed on Tuesday, April 27. Join us 5-7 pm at the Exhibit and Poster reception. Poster presenters will be available to answer questions during this time.

Field Methods

001 *Complications associated with nutrient and dissolved oxygen monitoring in low-gradient headwater streams*, **Den Davis**, Louisiana State University

002 *Assessing Differences in Water Clarity Measurements among Transparency Tube Models and Users*, **Kristine Stepenuck**, University of Wisconsin-Extension

003 *Integrating diel studies into large-scale monitoring programs*, **Megan Young**, USGS

Analytical Methods, Tools

004 *Chemical Constituents in Groundwater from Multiple Zones from the Snake River Plain Aquifer at the Idaho National Laboratory, Idaho*, **Roy Bartholomay**, USGS

005 *Rapid Toxicity Assessments (RTAs) to Optimize Water Quality Testing Budgets*, **Bryan Bjorndal**, Assure Controls, Inc.

006 *Green analytical methods for water quality testing*, **Ellen R. Campbell**, Nitrate Elimination Co., Inc.

007 *Determination of Human-Use Pharmaceuticals by Large-Volume Injection, High-Performance Liquid Chromatography/Tandem Mass Spectrometry*, **Edward Furlong**, USGS

008 *Comparison of Cytotoxicity Bioassay, Protein Phosphatase Inhibition and Liquid Chromatography/ Tandem Mass Spectrometry for the Determination of Microcystins in Alberta Lakes*, **Dorothy Yu Huang**, University of Calgary

009 *Tracing Sources of Nitrate, Organic Matter, and Water in the Willamette River Basin, from the Headwaters to Portland, Using Stable Isotopic Techniques*, **Carol Kendall**, USGS

010 *Tracing Sources and Biogeochemical Cycling of Ammonium and Nitrate in the Sacramento River and Northern San Francisco Bay Using Stable Isotope Techniques*, **Carol Kendall**, USGS

011 *Detecting the neurotoxin BMAA in cyanobacteria and fish by LC-MS/MS*, **David Kinniburgh**, University of Calgary

012 *Determination of Rapid Settling Turbidity Samples*, **Jon Schiller**, Hach Company

013 *Comparison of Soluble Nitrate Reductase and Granular Copperized Cadmium Reducing Agents for Routine, Colorimetric Nitrate Determinations in Water*, **Charles Patton**, USGS

014 *Adapting Automated Discrete Analyzers for Routine Nutrient Determinations at a Large Water Quality Laboratory*, **Eric Schwab** and **Charles Patton**, USGS

015 *Verifying the Use of Specific Conductance as a Surrogate for Chloride in Saltwater Matrices*, **Cristina Windsor**, In-Situ Inc.

016 *Developing a Quick "Portable" Extraction Technique for Urban Water Contaminants*, **Laura Webb**, US EPA

Microbiology, Source Tracking

017 *Comparison of Methods for E. Coli and Total Coliform*, **Laura Webb**, US EPA

018 *Occurrence and Distribution of Pathogen and Source Markers in Water from a Pennsylvania River Monitoring Network, 2008-2009*, **Joseph Duris**, USGS

019 *Multi-Tracer Mapping of Municipal Wastewater Plumes Discharging from Aquifer to Ocean in Hawaii*, **Charles D. Hunt, Jr**, USGS

Data Management, Sharing

020 *EPA Tools for Water Quality Monitoring Data Sharing at the National Level*, **Kevin Christian**, US EPA

021 *Improving Ambient Monitoring Water Quality Data Access, Standardization, Interoperability and Integration in California*, **Val Connor**, California State Water Resources Control Board

022 *A Collaborative Water Quality Knowledge and Information Network – WQIN*, **Fernanda Dalcanale**, Colorado State University

023 *The Colorado Water-Quality Data Repository*, **Jean Dupree**, USGS

024 *A Partnership for Developing Ecosystem Indicators and Tools for the Gulf of Maine*, **Adria Elskus**, USGS

025 *Synthesizing Nutrient Data across the U.S. Forest Service Experimental Forest and Range Network – Methodological Challenges and Opportunities*, **Effie Greathouse**, Oregon State University

026 *An Integrated List of Data Elements: Unifying Concepts in Action*, **Revital Katznelson**, UC Berkeley Extension

027 *Innovative Approaches to Make Water Quality Data Available from EPA STORET*, **Charles Kovatch** and **Deepti Puri**, US EPA

028 *A Geospatial Platform for Accessing Data and Communicating With Security and Water Quality Monitoring Systems*, **Dan Kroll**, Hach Company

029 *A Web-Accessible Aquatic Biological Database System: BioData and BioShare*, **Dorene MacCoy**, USGS

030 *Using Web Portals to Present Meaningful Information*, **Jon Marshack**, California State Water Resources Control Board

031 *Upper Clear Creek Watershed (Colorado) – An Exemplary Water-Quality Monitoring Case Study Revisited*, **Maggie Pierce**, Colorado Department of Public Health and Environment

Interpreting & Communicating Water Quality

032 *Review of Waterbody Assessment Methodologies*, **Lindsay Griffith**, Brown and Caldwell

033 *Volunteers, Data, and the Public – Meaningful Stream Information*, **Jean Lemmon** and **Cheryl Cheadle**, Oklahoma Conservation Commission

034 *Development of Urban Stream Water Quality Indices in the Kansas City Urban Streams Network*, **Gary Welker**, US EPA

035 *Communicating Volunteer Monitoring Data*, **Jinnieth Woodward**, Alliance for Aquatic Resource Monitoring (ALLARM), Dickinson College

Contaminant Threats, Effects

036 *Volatilization of Polycyclic Aromatic Hydrocarbons (PAHs) from Pavement Surfaces and Relation of Fluxes to Pavement Surface Type*, **Christopher Braun**, USGS

037 *Quality of Water from Private Wells in Principal Aquifers of the United States, 1991-2004*, **Leslie DeSimone**, USGS

038 *Exploring the role of photochemical processes on the fates and effects of endocrine disrupting chemicals*, **James Gray**, USGS

039 *Determination of steroid hormones in environmental samples by GC/MS/MS with isotope dilution*, **James Gray**, USGS

040 *Mid-Columbia River Toxics Monitoring Project*, **Lillian Herger**, US EPA

041 *Concentrations Polycyclic Aromatic Hydrocarbons (PAHs) in Settled House Dust and Their Relation to Coal-Tar-Based Pavement Sealcoat*, **Barbara Mahler**, USGS

042 *Occurrence Patterns of Antibiotics in Human and Agricultural Waste and Their Transport in Surface and Groundwater*, **Michael Meyer**, USGS

043 *Advancing endocrine disrupting compound analysis through integrated technology and workflow solutions*, **Cecilia Mazza**, Waters Corporation

044 *Minimizing Sample Turn-around Time When Dealing With Chemicals of Concern in Water Matrices*, **Cecilia Mazza**, Waters Corporation

045 *Temporal and spatial variations in PCB contamination of sediments and source apportionment in a section of the Rhone River, France*, **Gwenaelle Roux**, ENTPE, France

046 *Assessment of Contaminants of Emerging Concern in Surface Water and Fish from U.S. Urban Rivers*, **Leanne Stahl**, US EPA

047 *Reconstructing Trends in Water Quality and Atmospheric Deposition Using Lake and Reservoir Sediment Cores*, **Peter Van Metre**, USGS

048 *WERF Trace Organic Compounds Database Management System for Analyzing Impacts of Trace Organic Compounds on Aquatic Populations and Communities*, **Jeffrey White**, Tetra Tech, Inc.

Agrochemical Monitoring, Effects Of Agriculture On Water Resources

049 *Atrazine ecological exposure monitoring program: study design and conduct*, **Christopher Harbourt**, Waterborne Environmental Inc.

050 *National SSURGO based modeling at the field scale: Comparative exposure potential via PRZM modeling and determining depth to a restrictive or claypan layer*, **Paul Miller**, Waterborne Environmental Inc.

051 *Design and implementation of a study to determine the occurrence and fate of fungicides in aquatic ecosystems*, **Timothy Reilly**, USGS

052 *Foliar Fungicides in Nebraska Streams*, **Mark Sandstrom**, USGS

053 *A new approach in studying the sources of salinization in the Rio Grande*, **Anna Szynkiewicz**, University of Texas at El Paso

Mercury

054 *Assessment of Methylmercury Source Areas in Headwater Catchments in South Carolina and New York*, **Paul Bradley**, USGS

055 *Mercury Trends in Fish from U.S. Rivers and Lakes, 1969 – 2005*, **Mark Brigham**, USGS

056 *Spatial and Temporal Trends in Atmospheric Deposition in the Pensacola Bay Watershed*, **Jane Caffrey**, University of West Florida

057 *The NADP's Mercury Deposition Network: lessons from a continental-scale monitoring network*, **David Gay**, University of Illinois

058 *Evaluating Mercury Issues Resulting from Historical Mining Activities at Two U.S. Army Corps of Engineers Managed Reservoirs in Northern California*, **Daniel Holmberg**, US Army Corps of Engineers

059 *Long-Term, Statewide, Multi-Scale Monitoring of Mercury and Methylmercury in Indiana Watersheds, 2002–2009*, **Martin Risch** and **Amanda Egler**, USGS

060 *Spatial Patterns of Mercury Concentrations in Stream Biota of Forested Catchments in New York and South Carolina*, **Karen Riva-Murray**, USGS

061 *MercNet: A Comprehensive Framework to Monitor Responses to Changing Mercury Loads*, **David Schmeltz**, US EPA

062 *Factors Influencing Mercury Bioavailability and Accumulation in Ozark Stream Ecosystems*, **Christopher Schmitt**, USGS

063 *Mercury in Fish, Bed Sediment, and Water from U.S. Streams, 1998–2005*, **Barbara Scudder**, USGS

National Assessments

064 *Rates, Reasons, and Patterns for Site Attrition in the EPA's National Aquatic Resource Surveys*, **Jennifer Linder**, Tetra Tech, Inc.

065 *Lac du Flambeau Tribal Participation in the National Lake Assessment: Benefits of Local Level (10-digit HUC "Watershed Units") Involvement in National Assessments*, **Gretchen Watkins**, Lac du Flambeau Band of Lake Superior Chippewa Indians

Monitoring Programs, Networks

066 *Application of National Lake Assessment Tools and Approaches in New Jersey Department of Environmental Protection's Ambient Lake Monitoring Network: Successes and Challenges with Integrating the State and National Scale Assessments*, **Debra Hammond**, New Jersey Department of Environmental Protection

067 *The Evolution of the Missouri Ambient Water-Quality Monitoring Network*, **Miya Barr**, USGS

068 *Status Network Water Quality Sampling within the St. Johns River Water Management District: The Second Sampling Cycle (2004 to 2008)*, **Aisa Ceric**, St. Johns River Water Management District

069 *Establishing a Monitoring Network to Characterize Changes in the Groundwater System along the All American Canal, Southeast California*, **Alissa Coes** and **Michael Land**, USGS

070 *Collaborative Monitoring and Quantifying Decreasing Selenium Concentration and Load Trends in the Lower Gunnison Basin*, **David Kanzer**, Gunnison/Grand Valley Selenium Task Forces, CO

071 *Collaborative Development of a North American Spatial Framework for Rivers Assessment and Classification*, **Sheila North**, Dynamac Corporation c/o US EPA

072 *Implementation of EMAP procedures on the Missouri River from the Fort Peck Dam, Montana, to Fort Buford, North Dakota*, **Laurie Shafer**, Fort Peck Assiniboine & Sioux Tribes Office of Environmental Protection, Montana

073 *Expanding the Montana Volunteer Water Quality Monitoring Network and Moving Toward Data Use for TMDL Planning*, **Adam Sigler**, Montana State University

074 *Monitoring Volunteers*, **Tony Williams**, The Coalition for Buzzards Bay, MA

Partnerships

075 *Supporting Volunteer Water Quality Monitoring Efforts Throughout the USA*, **Linda Green**, University of Rhode Island Cooperative Extension

076 *Alaska's Statistical Monitoring Survey's – Implementation through Partnerships*, **Terri Lomax**, Alaska Department of Environmental Conservation

077 *Enhancing Communication with Project Partners*, **Cassandra Pfeifle** and **Mary Giorgino**, USGS

Councils

078 *Water Quality Activities within the Group on Earth Observations (GEO)*, **Steven Greb**, Wisconsin Department of Natural Resources

079 *Lake Michigan Monitoring Coordination Council: A Framework for Collaboration*, **John Hummer**, Great Lakes Commission

080 *The California Water Quality Monitoring Council*, **Karen Larsen**, California State Water Resources Control Board

081 *New Jersey Water Monitoring Council: Promoting Coordination, Communication and Collaboration Across a State Water Monitoring Community*, **Leslie McGeorge**, New Jersey Department of Environmental Protection

082 *Tributary and Near-Shore Monitoring Coordination in the Lake Michigan Watershed*, **Charles Peters**, USGS

083 *Collaborative Trend Monitoring of Ambient Water Quality in the Upper Sacramento River Watershed*, **Alisha Wenzel**, California Regional Water Quality Control Board, Central Valley Region

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