

National Water Monitoring News



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The National Water Quality Monitoring Council brings together scientists, managers, and citizens to ensure information about the quality of our water resources is accurate, reliable, and comparable. The Council fosters collaborative and cost-effective approaches to improve and advance the science of water-resources monitoring.



Fish kill in Boca Ciega Bay, associated with Red Tide bloom. Photo taken September 22, 2018 by Dave Tomasko.





National Water Quality Monitoring Council

Working together for clean water



Words from the Council Co-chairs

Welcome to the 17th edition of the National Monitoring News!

Seasons Greetings to Friends, Members, and Supporters of the Council!

We are pleased to let you know preparations for the 11th National Monitoring Conference that will be held March 25-29, 2019, in Denver, Colorado are proceeding nicely. The full Council met face-to-face November 6-8 in Boise, Idaho for the first time since December 2016. A major focus of the meeting was for the Conference Planning Committee (CPC) to get together in person and begin finalizing the conference program; this involved accepting/rejecting over 500 abstracts for 280 oral presentation slots, formulating technical sessions and tracks based on this year's themes, and reviewing proposals for championed sessions, workshops, training classes, and panel discussions. Major progress was made in Boise and the CPC hopes to send out acceptance notices to speakers and poster presenters no later than mid-December. Also, our partners at NALMS should have the 11th NMC online registration site up and running sometime in December. We are excited for this opportunity to bring together a diverse group of water-quality stakeholders, including federal, state, tribal and local water professionals, non-profits, academia, and volunteer citizen scientists, for a week of stimulating presentations, state-of-the-art trainings and collaboration in Denver next March. Please check the conference website for updates, or contact one of the CPC co-chairs (Lareina Guenzel (guenzel.lariena@epa.gov), Tim Oden (toden@usgs.gov), or Marie DeLorenzo (marie.delorenzo@noaa.gov) with your conference questions.

Other topics covered at the face-to-face meeting in Boise included an overview of current features of the Water Quality Portal (WQP) and progress made in implementing goals outlined in a strategic plan for the WQP approved by the Council in 2016. The portal now serves between 10 and 40 billion records per month, mainly because we have transitioned from individuals using the WQP to local, state, tribal, and federal organizations making daily data retrievals from the WQP via web services. Hence the WQP development team shared a draft of a revised strategic plan that focuses on upgrading the WQP in key areas such as system performance, data quantity and quality, data display, and the sustained marketing campaign to educate current portal users and solicit additional data contributions. Also discussed were new initiatives to establish common formats for submitting and disseminating monitoring data collected by citizen science/volunteer monitoring groups. Such efforts using innovative social media approaches and web apps to get quickly get data into the cloud so it can be accessed by others. This is consistent with ongoing efforts to build an "Internet of Water" where water data of all kinds is easily accessible to the public, academia, water resource managers, monitoring agencies and industry. We are pleased to note that the "open data" approach advocated by the Internet of Water sponsors is exemplified by the work the Council and its partners have done in developing and enhancing the Water Quality Portal.

In closing we are pleased to report that two important products of the Council, the Water Quality Portal and the National Monitoring Conference, are moving forward to the benefit of all our members and stakeholders. However, there is also plenty of other work being conducted by various Council work groups and we would encourage you to read the meeting minutes from the Boise meeting for updates on individual work group activities (access the minutes here). We would also like to acknowledge the hard work being done in the field by those of you conducting water-quality monitoring for states and tribes, volunteer and citizen science organizations, federal agencies and academia, some of whose efforts are described in articles appearing in this newsletter. We hope you enjoy reading this edition and as always appreciate your feedback and contributions!

Best Regards,

Gary Rowe, USGS Co-Chair
[growinge@usgs.gov](mailto:growe@usgs.gov)

Susan Holdsworth, EPA Co-Chair
holdsworth.susan@epa.gov



National Council Highlights

Welcome to Our New Members!

Kathleen Weathers (GLEON Representative): Dr. Kathleen C. Weathers received her master's degree from Yale University and Ph.D. from Rutgers University, USA. She is the G. Evelyn Hutchinson Chair of Ecology and Senior Scientist at the Cary Institute of Ecosystem Studies in Millbrook, New York, USA. Dr. Weathers is an elected a Fellow of the American Association for the Advancement of Science (AAAS) and the Ecological Society of America (ESA). She is co-chair of the grassroots Global Lakes Ecological Observatory Network (GLEON; www.gleon.org). Weathers carries out biogeochemical research in ecosystems around the world focusing on carbon, nitrogen, sulfur, and other elemental cycling. Much of her research is focused on understanding how biology influences geochemical cycles (e.g., how lake cyanobacteria affect nutrient cycles, trees influence nitrogen cycling, or how fog and ecosystems interact) at the spatial scale of landscapes and in the face of global environmental change; she is the author of more than 120 peer reviewed papers and books on ecosystem science and landscape heterogeneity. She also works at the interface of science and citizen science focusing on lakes and watersheds. She and colleagues have co-developed, with citizen scientists, cyberinfrastructure and an app for worldwide freshwater data collection (www.lakeobserver.org). She is volunteer research director for the Lake Sunapee Protective Association (an outreach and education organization: www.lsqa.org) and chair of their scientific advisory committee.



Madeline Magee (Great Lakes Representative) is the Great Lakes and Mississippi River Monitoring Coordinator for the Wisconsin Department of Natural Resources. Her role is to oversee implementation of monitoring activities in Lakes Superior and Michigan and the Mississippi River, including monitoring in Wisconsin's Great Lakes Areas of Concern, long-term monitoring on the Great Lakes and Mississippi River, and Great Lakes coastal beach monitoring. She started this position in May 2018. Prior to that, she was a postdoctoral research associate at the University of Wisconsin Center for Limnology researching cold-water fish habitat changes with climate change. Madeline has a Bachelor of Civil Engineering degree from the University of Minnesota and a PhD in Civil and Environmental Engineering from the University of Wisconsin-Madison.

Scott Miller (BLM Representative) is an aquatic ecologist with the US Bureau of Land Management (BLM) and an assistant professor in the Department of Watershed Sciences at Utah State University (USU). Scott is the aquatic Lead for the BLM's [Assessment, Inventory, and Monitoring Strategy](#) and Co-Director of the BLM/USU [National Aquatic Monitoring Center](#). He received his Ph.D. in aquatic ecology from Oregon State University in 2007. As a community ecologist, his work and research seek to understand who lives with whom and why and how natural and anthropogenic disturbances alter species' distributions. The main focus of such studies is aquatic insects, but Scott also works with freshwater fishes and riparian vegetation. Scott actively works with states and federal agencies to develop bioassessment indices to meet Clean Water Act reporting requirements. He is also active in the development, implementation and evaluation of long-term monitoring programs to assess aquatic condition and trend on public lands.



11th NATIONAL MONITORING CONFERENCE



Working Together for Clean Water

March 25 - 29, 2019

Denver, Colorado



Please join us March 25-29, 2019 in Denver, Colorado for the National Water

Quality Monitoring Council's (NWQMC) 11th National Monitoring Conference. This conference provides opportunities for water stakeholders – federal, state, tribal and local water professionals, non-profits, academia, and volunteer citizen scientists – to network, develop new skills and partnerships, and exchange information.

ABSTRACTS: The abstract submission time frame closed on 9/14/18. Abstract sorting, review and program development is underway. Authors will be notified by January 1, 2019 if their abstract has been accepted. Thank you, Council members and friends who are helping with the abstract review and planning efforts!

REGISTRATION is Now Open!! Visit the [NALMS website](#) for detailed information!

TENTATIVE FIELD TRIPS/TOURS INCLUDE:

- Denver Water Recycling Plant
- Denver's National Atmospheric Deposition Program air monitoring site
- Next Generation Field Methods
- Binney Water Purification Facility
- Chatfield Farms riparian restoration
- Denver's new green infrastructure projects
- Farmer best management practices to improve water quality
- Core laboratory and National Water Quality Laboratory
- Mine and acid mine drainage treatment plant
- Hayman Fire Tour
- Tour and hike at Red Rocks Amphitheatre.
- Tour and hike at Rocky Mountain Arsenal

Need more information? For exhibitor and sponsorship information, contact Alyssa Schulte (sponsorship@nalm.org). To be placed on our mailing list, contact Philip Forsberg, (forsberg@nalm.org). For general conference information, contact Lareina Guenzel, (guenzel.lareina@epa.gov), Timothy Oden (toden@usgs.gov), or Marie Delorenzo (marie.delorenzo@noaa.gov).

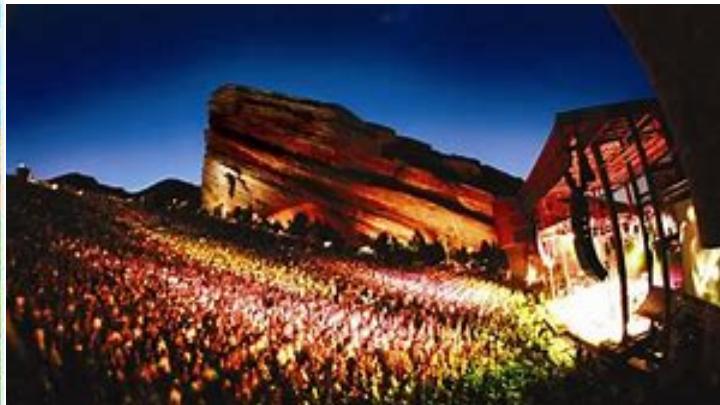


Photo: VISIT DENVER



Nitrogen has an Identity Problem? Ask DatAbby

Dear DatAbby: Isn't nitrogen just nitrogen? We collect nitrogen data on our local river and wanted to share that data with decision makers. They asked us a bunch of questions about our data, like what type of nitrogen did we collect and what method we used to analyze it. They seemed almost more focused on that information than the actual data. We were able to provide them the information they needed but what is all the fuss of over nitrogen?

Signed: Prefer my nitrogen in a can of Guinness, Jean

Dear Guinness Jean: We should discuss this over a beer, but since we can't here's my draw. Data is just data; it is not information until we have more context and information about the numbers. That includes the type of nitrogen and the methods used. Nitrogen, like many indicators, has multiple forms.

Nitrogen can occur in the environment, as ammonia, nitrate or nitrite, all together comprise total nitrogen. When you add all these together, you get total nitrogen. Add now, the various ways to analyze all these nitrogen forms, colorimetry, cadmium reduction, wet deposition, spectrophotometry to name a few. Each of these methods measure all four nitrogen forms in varying degrees of precision and accuracy. Precision and accuracy of any analyses is critical to know when interpreting nitrogen results, so that the decision maker can ensure that when making conclusions, recommendations, and taking action from the data, the data quality are sufficient to make the decision.

Not all decisions are equal when it comes to data quality. The data quality, precision and accuracy, required to manage the

ammonia in a small fish tank is relatively lower than the data quality necessary to manage ammonia discharge from a waste water treatment facility serving a large population. Costs implications are magnitudes different. Therefore, more information is required in the latter situation and often more rigorous methods and study design.

Nitrogen is one of many indicators that are complex in how and where they occur in the environment along with various methods of collection and analyses. It is a best management practice for every monitoring program to provide basic

information on what you are monitoring (form) and methods of collection and analyses **with every result**. Getting methods is easy, if you don't already have them in your quality assurance plan. The NWQMC has an excellent resource in their National Environmental Methods Index (NEMI), nemi.gov. If you don't see a method, you can add it. The National Water Quality Portal, www.waterqualitydata.us/, results upload template contains drop down menu's for all indicators and methods citations from EPA, American Public Health Association, USGS, American Society for Testing Materials, National Oceanographic and Atmospheric Administration and other credible sources.

By providing all the information about your data you enable decision makers to use your data over and over, creating a larger and long-lasting impact. Data users are being responsible when asking for this information, so congratulate them and ask them out for a beer!

That is my advice! **DatAbby**

No data management question is too small or big for DatAbby, send your questions via barb.horn@state.co.us?



Do you have water-quality monitoring topics or issues you would like to see in the next edition of the newsletter or covered in a webinar? Are there topics you would like the National Water Quality Monitoring Council to address in coming months and years? If so, feel free to reach out and let us know about your ideas.

Please contact us by emailing NationalMonitoringCouncil@gmail.com with "Suggestion Box" in the subject line, or visit our website to submit a suggestion. We will do our best to address concerns and issues that are raised by our audience.



Collaboration Through Partnerships

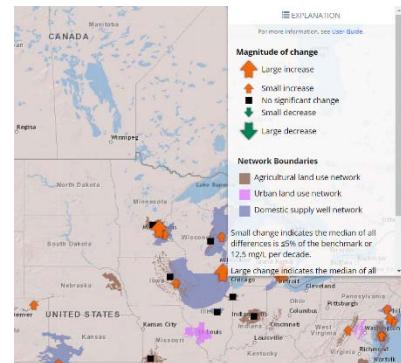
USGS updates web tool for visualizing changes in groundwater quality

The U.S. Geological Survey (USGS) National Water Quality Program has updated its interactive web tool which maps decadal changes in groundwater quality across the Nation. The web tool, [Decadal Change in Groundwater Quality](#), now includes more groundwater well networks and more data analyzed over a longer time span.

In the update, groundwater quality data were added for an additional 218 wells in 6 well networks, increasing the number of wells to 1,718 and the number of well networks to 73. Additionally, data for 14 well networks resampled during 2012–14 were incorporated, allowing the user to visualize changes across three roughly decadal sampling events for those networks: 1990s, 2000s, and 2010s.

Using the web tool, users can view changes in both inorganic and organic constituent concentrations in groundwater, including chloride, nitrate, several pesticides, and some drinking water disinfection byproducts. The website also includes a description of the methods used to evaluate changes in groundwater quality and a link to the complete set of data.

For additional information on the Decadal Change in Groundwater Quality web tool, or for data and methods used, contact Bruce Lindsey (b.lindsey@usgs.gov).



A USGS employee sampling groundwater.
(Photo credit: Stefan Voss, USGS)

USGS releases major updates to Health-Based Screening Levels (HBSLs)

The U.S. Geological Survey (USGS) National Water Quality Program has updated information in its searchable online [database of Health-Based Screening Levels](#) (HBSLs) for sources of drinking water. All HBSL values in the database have been updated to reflect the U.S. Environmental Protection Agency's (EPA) most recent methods and exposure assumptions for establishing drinking-water guidelines. HBSLs were added, changed, or removed for 107 contaminants, including 4 contaminants for which HBSLs were replaced with new EPA Human Health Benchmarks for Pesticides (HHBPs). The update increases the number of contaminants with HBSLs from 155 to 175.

HBSLs are non-enforceable benchmark concentrations of contaminants in water. These screening levels supplement federal drinking-water standards and guidelines, which do not yet exist for many of the hundreds of contaminants analyzed in sources of drinking water. Using HBSLs can help provide a human-health context when evaluating the quality of drinking water sources and to prioritize monitoring efforts.

The USGS database of more than 800 contaminants allows users to easily find toxicity information used to develop HBSLs along with guidance on the use of drinking-water benchmarks. For user convenience, the online HBSL database also provides current EPA drinking-water benchmarks (Maximum Contaminant Levels (MCLs) and HHBPs).

For additional information on the database, contact Julia Norman (jnorman@usgs.gov).



Photo credit: USGS

USGS studies identify complex mix of stressors affecting health of Midwestern streams

U.S. Geological Survey (USGS) scientists have linked physical and chemical “stressors” associated with extensive agricultural and urban development to the health of small Midwestern streams. Stressors—such as development along stream banks and excessive fine-grained sediment, nutrients, and pesticides—are adversely affecting the health of fish, macroinvertebrate, and(or) algal communities in virtually all 100 small streams studied across 11 Midwestern states by the U.S. Geological Survey in 2013.

Three recent USGS studies—one each on [fish](#), [macroinvertebrate](#), and [algal](#) communities—utilize statistical models to identify the most important stressors among hundreds of parameters measured. The results of the studies are summarized in a newly published [USGS fact sheet](#). While each of the 100 streams studied had a unique combination of physical and chemical stressors affecting biological condition, some management practices may address multiple stressors. Management practices designed to address one type of stressor—restoring riparian zones for example—likely improve stream quality with respect to other physical and chemical stressors.

The Midwest study is the first of five [Regional Stream Quality Assessments \(RSQA\)](#) by the USGS. Findings provide the public and decision makers with information regarding which human and natural factors are the most critical to stream quality. Small streams were assessed in the Midwest (2013), the [Southeast \(2014\)](#), the [Pacific Northwest \(2015\)](#), the [Northeast \(2016\)](#), and [coastal California \(2017\)](#). The studies are part of the USGS [National Water Quality Program’s National Water Quality Assessment Project](#).

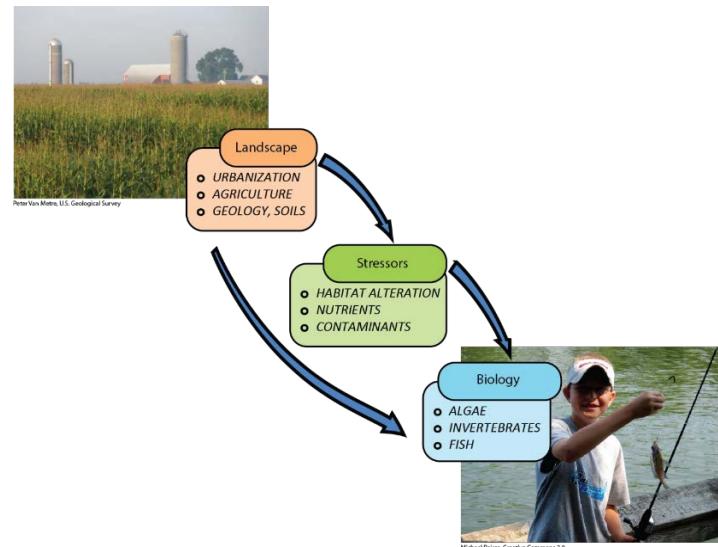
For additional information on the studies, contact RSQA team lead Pete Van Metre (pcvanmet@usgs.gov).

A Watershed Tool and National Data Library to Help Users Compare Watershed Characteristics

The U. S. EPA’s Watershed Index Online (WSIO) Team would like to announce recent updates to the WSIO Tool, indicator library, and website (www.epa.gov/wsio). The WSIO is a powerful platform that brings together a comparative watershed analysis tool and a national watershed indicator data library. The EPA developed this free tool and library to enable public or private resource managers, citizens, and others to compare watersheds across any geographic area of interest.

The WSIO Tool has been revised to use open source software that allows users to perform watershed analysis within and across state boundaries. If you are familiar with the Recovery Potential Screening (RPS) Tool or an older version of the WSIO Tool, we encourage you to check out our newest version and see how it can work for you.

Don’t need a tool, but interested in a library of water quality relevant indicator data? No problem! Our WSIO Indicator Data Library is available for download at our website. This database of 460+ indicators at the HUC12 scale is a one-of-a-kind collection of information that is periodically updated. Indicators represented within are nationally measured and sorted into Base, Ecological, Stressor, and Social categories useful for watershed comparison. This powerful library of geospatial information is also used within



USGS scientists are using statistical models to determine how urban and agricultural land use and the resulting alteration of stream conditions are affecting the health of Midwestern streams.

these other EPA-developed tools and programs: The RPS Tool, Preliminary Healthy Watershed Assessments, and How's My Waterway?

Already using the WSIO Tool or Data Library? We would love to know about it! For more information, contact Elizabeth Smith at smith.elizabeth@epa.gov

Additional information links:

www.epa.gov/wsio

www.epa.gov/rps

www.epa.gov/hwp/download-2017-preliminary-healthy-watersheds-assessments

watersgeo.epa.gov/mywaterway/mywaterway.html



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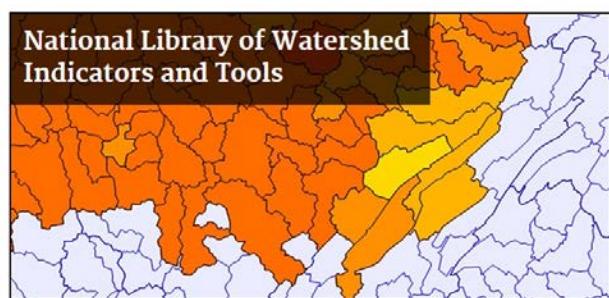


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Watershed Index Online (WSIO)



Featured Programs/Projects/News:

- NEW: Try out the 2018 WSIO Tool!
- Download data tables with 460 watershed indicators
- Download state-specific watershed screening tools

About Watershed Index Online

- [Introducing WSIO](#)
- [WSIO Benefits](#)
- [Watershed Indicator Data Library](#)

Watershed Comparison Tools

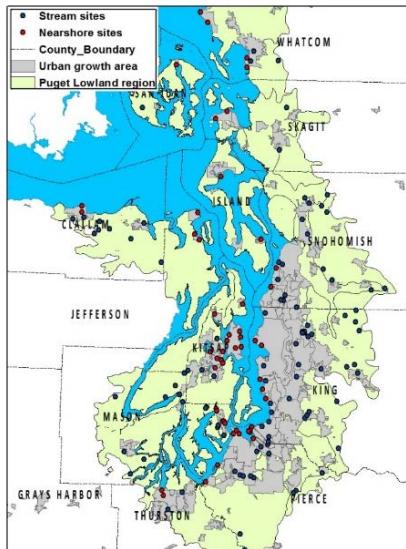
- [Download and Use the WSIO Tool](#)
- [State-Specific Recovery Potential Screening \(RPS\) Tools](#)

Related EPA Topics

- [Healthy Watersheds](#)
- [Recovery Potential Screening](#)
- [Healthy Watersheds Protection](#)
- [How's My Waterway](#)
- [Water Quality Assessment \(ATTAINS\) Information System](#)

Spotlight on States

Stormwater Action Monitoring (SAM) in Western Washington



Stormwater Action Monitoring (SAM) sampling locations in streams and Puget Sound nearshore.

Local governments in Western Washington state spend hundreds of millions of dollars per year implementing stormwater management programs. Stormwater Action Monitoring (SAM) is a collaborative program with over 90 Western Washington municipal stormwater permittees contributing funds for studies to improve the understanding of the conditions of our receiving waters, impacts of stormwater, and effectiveness of stormwater management activities.

In 2015-2016, water and sediment chemistry and biological health were evaluated in small streams and the Puget Sound nearshore as part of the SAM program. This monitoring was done at spatially balanced sites that were identified using the Generalized Random Tessellation Stratified (GRTS) survey design. This probabilistic design enabled site-specific monitoring information to provide a representative, regional-scale assessment of the entire study area.

Conditions of biological endpoints (Benthic Index of Biotic Integrity [B-IBI]) in streams, and bioaccumulation of contaminants in nearshore mussels) were evaluated in relation to various indicators of urban development. The main stressors for the biologic endpoints in the receiving waters appeared to be poor watershed canopy cover and increased impervious cover. Toxic chemicals including heavy metals (copper, lead, and zinc), organics (polycyclic aromatic hydrocarbons, PAHs; polychlorinated biphenyls, PCBs; and poly-brominated diphenyl ethers, PBDEs) and nutrients were positively linked to urban development.

SAM's ongoing long-term regional monitoring will allow us to continue to evaluate regional changes in receiving water conditions over time. This will help us understand whether overall stormwater management efforts are protecting and improving receiving water health across the region. For more information, visit ecology.wa.gov/SAM.

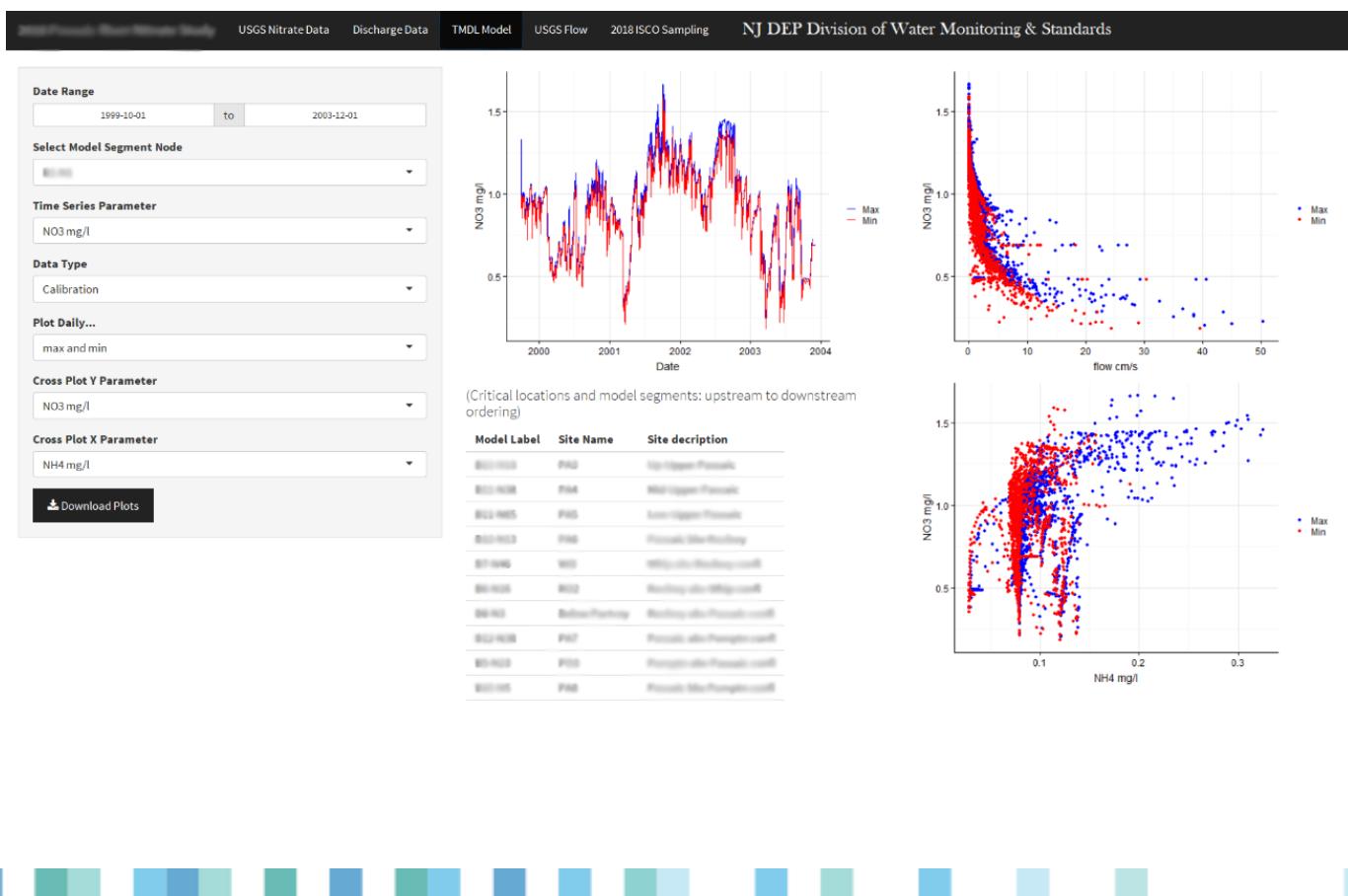


Another Useful Application Developed Using R

An open-source software, R and open source edition of RStudio were used to develop an interface/dashboard that facilitates interactive accessing, downloading, mapping and plotting of precipitation, water quality, permitted surface water dischargers and flow data. Data is pulled “live” from online databases like the [Water Quality Portal](#). Additionally, the application uses results from US EPA’s Water Quality Analysis Simulation Program (WASP) model output and ongoing discrete and continuous water quality data being collected by the New Jersey Department of Environmental Protection. Subsequently, Visual Basic Scripting, was used to deploy this application on the intranet for simultaneous interdepartmental use without requiring prior download of R or RStudio, programming experience, or a website/server host.

This application significantly improves the efficiency of analyzing water quality related data used for source-track down or assessment projects for various water quality parameters. The application enables multiple users to investigate the data through interactive methods including graphs, maps and tables. The data tables function as standalone summaries or supplements to the other visualizations. The application also summarizes the multivariate data spatially using circle markers adding geographical context to spatially relate data points and review parameter specific data by location.

This application helps identify data trends, mutual interdependencies between different parameters and potential stressors and serves as an excellent decision-making tool. The tool can be packaged and recreated for other projects that require water quality data analysis. This application of R and RStudio demonstrates the benefit of integrated data analysis using open source software to combine spatial, graphical and tabular visualizations of water quality data for a watershed. For more information on this project contact David Rosenman at David.Rosenman@dep.nj.gov or Joseph Aiello at Joseph.FAiello@dep.nj.gov.

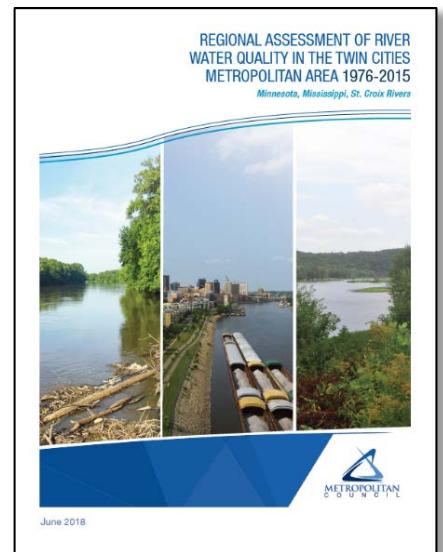


Understanding Long-Term Water Quality for the Mississippi, Minnesota, and St Croix Rivers in the Twin Cities Metro Area

Covering 3,000 square miles and hundreds of jurisdictions, the Twin Cities metropolitan area in Minnesota, is rich with water resources – rivers, lakes, streams, wetlands, and aquifers. The area developed around its three major rivers – the Mississippi, the Minnesota, and the St. Croix – which have shaped the identity of the region and contribute immeasurably to the quality of life of its three million residents. Protecting these water resources is the purpose of regional policies established in the *Thrive MSP 2040* development planning framework and the *Water Resources Policy Plan* of the Metropolitan Council, the regional governmental body for integrated planning and intergovernmental services.

The Metro Council recently completed a comprehensive assessment of water quality of the region's three major rivers covering a 40-year period. Using a newer statistical model (QWTREND) that accounts for variations in river flow, this study examined nine select water quality parameters at ten monitoring sites across three rivers. Based on the data from 1976 to 2015, analysis shows concentrations of sediment, bacteria, and phosphorus had a generally decreasing trend in the rivers, while nitrogen and chloride increased. Study results provide a base of technical information to support sound water resource decisions by the Metro Council, state agencies, watershed districts, conservation districts, and county and city governments.

The Metro Council plays an active, long-term role in addressing water quality issues in the region. Through its Environmental Services Division, the Council constructs, owns, operates, and periodically upgrades eight centralized wastewater treatment plants. In addition, the Council monitors roughly 200 lakes, 21 streams and over 150 river miles in the metro area to document and assess impacts of point and nonpoint source pollution on the area waterbodies. The information about the Council and the river report can be found at metrocouncil.org/Wastewater-Water.aspx. For more information, contact Dr. Hong Wang (hong.wang@metc.state.mn.us).



New Watershed Assessment Tool Launched

Three Rivers QUEST (3RQ), a regional water quality monitoring organization, is pleased to announce the launch of its new database - **WATERS** (Watershed Assessment Tools for Education and Research Studies). Data from their old database has been transferred to WATERS, which features include the ability to query by parameter, so members can more easily compare data. In addition, WATERS mobile platform works on Android, iPhone, and iPads. WATERS serves to provide data management solutions to watershed groups and schools affiliated with the 3RQ program in the Upper Ohio River Basin. If your group is interested in being involved, please contact us at ThreeRiversQUEST@gmail.com. Additionally, if you are interested but outside of the Upper Ohio River Basin – let us know!

A screenshot of the WATERS mobile application's home screen. At the top, there is a header with the 3RQ logo and the text "Allegheny Monongahela Ohio". Below the header is a navigation bar with options for "Home", "Data Entry", "Data Logger Import", and "Field/Lab Sample Data Entry". On the left side of the main content area, there is a sidebar with options for "Data Logger Profile", "Create a Data Logger Profile", and "Edit Data Logger Profiles". The main content area itself is currently empty.



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The Home page of WATERS mobile app.

Northern Virginia and Prince William Soil and Water Conservation Districts Partner in Volunteer Water Quality Monitoring Training and Certification

Prince William and Fairfax Counties are two of the fastest suburbanizing Counties in the Washington DC Metro area. This additional development is a challenge to water quality in Northern Virginia (NOVA) as it results in the increase of non-point source pollutants. Growing amounts of impervious surfaces also lead to increased stormwater flow. This further causes erosion, widening of stream channels and sedimentation. Anti-icing and de-icing chemicals used during winter are also impacting the streams' health.

In 2016, Northern Virginia and Prince William Soil and Water Conservation Districts partnered to promote water quality awareness in NOVA under the Virginia Save Our Streams (VASOS) program, an Izaak Walton League Program. This program trains and educates residents on water quality monitoring (benthic macroinvertebrates data and some basic chemical data like pH, dissolved oxygen, among others). This data is sent to the Virginia Department of Environmental Quality (DEQ) under its Citizens Monitoring program. Volunteers under this program also help to cover some data gaps that VADEQ staff cannot cover.

This partnership has added over 30 new certified volunteer water quality monitors and over 75 residents have gained useful knowledge about water quality in their local streams. The 2018 training saw a doubling in the number of participants compared to 2017. This shows NOVA residents care about the health of their local stream and are seeking ways to protect them.

For more information, contact Veronica Tangiri (waterquality@pwsbcd.org).



NOVA Volunteer Water Quality Monitoring Field Session - 2018 Spring Training and Certification.



Skagit County wants everyone to #PoopSmart

Skagit County's Clean Water Program recently pushed out their new PoopSmart campaign at www.poopsmart.org. The goal? Getting to the bottom of local water quality problems. Channeling the humor of everyone's inner five-year old, they're encouraging people to spread the word (not the turd!) to manage livestock, pet, and human waste better.

"We've been focused on fecal matters for a while, but we still haven't reached our goal. It's time for a new approach," said Pollution Identification and Correction Coordinator Karen DuBose. The project was funded by EPA's National



Estuary Program, and organizers hope to be able to offer copies of the website and promotional materials to other jurisdictions that would like to use the campaign. Until then, anyone wanting to join the movement is welcome to download and use the social media toolkit available at www.poopsmart.org. For more information, contact Karen DuBose at kdubose@co.skagit.wa.us.

Citizen Scientists help with Winter Salt Watch

On an icy morning, we might be grateful to see a salt truck driving down the street. But road salts and deicers eventually end up in waterways, creating toxic conditions for fish and wildlife – and threatening human health. Excess salt also corrodes pipes throughout our drinking water systems, which can leach lead and other dangerous metals into our drinking water. Last winter, the Izaak Walton League launched the Winter Salt Watch initiative to help identify and solve excess road salt problems across the country.

Winter Salt Watch originated when League staff noticed piles of road salt outside their national headquarters after a small snow event. They had been regularly monitoring chloride levels in our nearby stream, Muddy Branch, and were able to assess the effect road salt was having on water quality. After the snow melted, chloride levels in the stream reached almost 1,000 parts per million (ppm) – more than 4 times the level considered safe by the U.S. Environmental Protection Agency!

For a limited time (roughly four weeks), the League offered free chloride test kits to any volunteer who wanted to check how road salts were affecting their local streams. Volunteers were asked to post their results (through a photo) to the Water Reporter website using a free mobile app. This helped identify road salt hot spots in communities across the country. Izaak Walton League sent over 260 test kits to 25 states and received over 60 online reports last winter. The Izaak Walton League is now a partner in the Virginia Salt Management Strategy, an ongoing effort directed by the Virginia Department of Environmental Quality. More importantly, people in communities nationwide focused on excess piles of road salt last winter – and started cleaning them up.

For more information, visit the Winter Salt Watch web page (iwa.org/saltwatch), which provides outreach tools and tips to help citizens advocate for better road salting practices.



Photo credit: Izaak Walton League



Photo credit: Muddy Branch Alliance



Tools and Technology

Empowering Real-Time Nutrient Data to Transform Decision-Making

The [Nutrient Sensor Action Challenge](#) is in full swing, but there's still time to register! \$100,000 in prizes will go to up to two teams that demonstrate how nutrient sensor information can be translated into actions to address a nutrient problem. States, tribes, interstates, academics, communities, and other organizations are eligible to participate. Click the link above to learn more and submit your proposal to use data to inform decision making.

EPA, in collaboration with other agencies, is seeking demonstrations of the use of data and information from nutrient sensors to inform decisions and actions that address nutrient management. This is Stage II of the Challenge; Stage I was a call for action plans, which was completed September 2017. **Participation in Stage I of the Challenge is not a requirement for participation in Stage II.**

The Challenge: Excess nutrients (nitrogen and phosphorus) in the nation's waters is one of the costliest and most challenging environmental problems we face. Over the last 50 years, the amount of nutrients entering our waters has escalated and is now one of the top causes of water quality impairment. Protecting human health and the environment from adverse impacts of excessive nutrients is a national priority.

Many organizations and communities are interested in making use of sensors to provide improved spatial and temporal data that can help inform decisions and actions to protect and restore our nation's water resources. This Challenge calls for teams to design and implement an approach that utilizes nutrient sensors and resulting data to improve decisions and actions resulting in more effective nutrient management.

Innovating Lake Erie – IoT, Blue Economy, and a Smart Great Lake

Innovation has long been a part of life and work on the Great Lakes. The unique water resources of this region set the stage for the greatest period of technological advancement the world has ever seen and continue to drive one of America's most dynamic regional economies. Yet, despite their essential role in our commerce, industry, and entrepreneurship, the Lakes are consistently undervalued as an economic asset and catalyst of innovation.

This systemic undervaluation of our Great Lakes has not gone unnoticed. The [Cleveland Water Alliance](#), a collection of forward-thinking research institutions, industry leaders, environmental organizations, and public utilities, came together to develop a new way of thinking about regional economic development. Their vision is centered on the creation of the [Blue Economy](#): an economic system where innovating and monetizing solutions to water-based challenges (such as harmful algal blooms) replaces continued environmental pollution as the key driver of our regional growth.

This is the vision that prompted the Cleveland Water Alliance to team up with DigitalC to create Erie Hack, a \$100,000 regional innovation challenge that activated over 200 techies, creative thinkers, and entrepreneurs from the U.S. and Canada to tackle Lake Erie's key challenges with creative tech solutions. In its first year, the program generated over 40 innovative solutions to water challenges, engaged over 100 partner organizations and attracted coverage from over 150 press outlets globally as it put the region's best minds to work for the precious resource. Some of the top performing solutions included:



- **Extreme Comms Lab (Buffalo):** Underwater WiFi for real-time sub-surface data transmission and early detection of water quality concerns.
- **Fish.ai.io (Cleveland):** Mobile machine learning to identify fish catches, access relevant regulations, share catches on social media, and log catch data.
- **Plex Net LLC (Toledo):** 3D-printed aquatic drones designed to detect, remediate, and repurpose harmful algae blooms.
- **Micro Buoy (Detroit):** Inexpensive nano-sensors for phosphorous and lead and long-lasting micro-battery power source.
- **Water Warriors (Cleveland):** Gamefied application and handheld spectroscopy that combines youth education with validated citizen science.

As Cleveland Water Alliance, DigitalC, and the ecosystem of partners began to accelerate these solutions across the region, an unexpected synergy emerged: Internet of Things (IoT) solutions for nutrient monitoring. The need for more frequent and granular phosphorus and nitrogen data to evaluate the success of investments in Harmful Algae Bloom (HAB) mitigation is a significant opportunity in Lake Erie and across the globe. Just months after the conclusion of the Erie Hack, we embraced this opportunity by launching Internet of H2O with US Ignite. This targeted innovation challenge activated a handful of strategically positioned companies and research groups to pilot inexpensive, real-time data solutions for nutrient monitoring that could be validated by outside research support.

Cleveland Water Alliance's partners quickly realized that regional urgency around HABs offers a unique opportunity: An IoT system for Lake Erie is needed to keep people safe and reduce nutrient pollution. Now, under the auspices of a NOAA Ocean Technology Transfer grant, the group is working to build out a HAB warning system as a first step towards what we are calling the "Smart Lake." The short-term goal is to build a series of data products that will help keep our public safe. The long-term goal is to leverage these products as models for how to support the build out of a broader data infrastructure for the Lake. For more information, contact Max Herzog (mherzog@clewa.org).

Upcoming Conferences and Workshops

The Idaho Water Quality Workshop, January 2019

The Idaho Water Quality Workshop will be hosted at Boise State University January 29-31, 2019. Join other attendees to discuss water quality methods, results and policy. Since 1990, this workshop has provided a forum for technical dissemination of water quality topics, as well as opportunities to network and share information. Attendance at the workshop is free.

Citizen Science Association Conference, March 2019

Join the [Citizen Science Association](#) in Raleigh, North Carolina during the week of March 13-17th for their biennial meeting. They encourage attendees to deepen their own work as they share diverse perspectives and practices in the realm of citizen science.



Sediment and Hydrology Interagency Conference, June 2019

The SEDHYD 2019 Conference again brings together federal and non-federal scientists, engineers, and managers from various natural resources disciplines in Reno, Nevada. Papers include recent accomplishments in research and technical developments in the physical, chemical, and biological aspects of sedimentation. Papers also describe the development and use of numerical models addressing issues of water quality and quantity, and sediment erosion, transport, and deposition. The conference uses mixed formats, including formal presentations, poster sessions, mini-workshops and model demonstrations. Organizers also plan a competition for the best student paper.



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To submit an article, conference announcement, publication, or photo for our Spring 2019 Newsletter, contact chopkins@usgs.gov.

