Abstracts

Thursday, May 1

Session J1: National-Scale Water Quality Assessments

8:00 – 9:30 am | Room 263

The National Network of Reference Watersheds

Michael McHale[1], Jeffrey Deacon[2] and William Wilber[3]
[1]*US Geological Survey, Troy, N.Y.,* [2]*US Geological Survey, Pembroke, N.H.,* [3]*US Geological Survey, Reston, Va.*

Abstract
A significant challenge faced by water-resource scientists in the public and private sectors is to determine how much of the change measured in the environment is caused by humans and how much is caused by nature. This question requires a baseline or reference against which changes can be compared. Reference conditions can also be used to measure the subtle natural changes that occur over long time periods as well as to quantify the variability of natural ecosystems across large spatial scales. A variety of agencies and organizations monitor minimally disturbed watersheds across the country. However, there is no central location where data from these reference sites can be accessed, and generally there are no consistent and commonly accepted criteria that define watershed reference conditions. In 2011, the Advisory Committee for Water Information (ACWI) authorized the National Water Quality Monitoring Council to form a work group to provide the leadership and technical guidance to establish a collaborative and multipurpose National Network of Reference Watersheds (NNRW) and monitoring sites for freshwater streams in the United States. The goal of the NNRW is to provide a web-based resource that allows users to access reference watershed information collected by federal, state, local, and non-governmental organizations in one centralized location. The NNRW is envisioned as a collaboration among organizations involved in monitoring and research in reference watersheds. This presentation will introduce the NNRW web resource and demonstrate how users can define their own reference criteria to select sites and download data that meet their specific needs.

A Multi-Scale Monitoring and Modeling Approach for Assessing the Quality of the Nation's Groundwater: Perspectives from the USGS National Water Quality Assessment Program (NAWQA)

Kenneth Belitz
US Geological Survey, San Diego, Calif.

Abstract
In 2013 NAWQA began its third decade (Cycle 3) of assessing the Nation's water quality. In the first decade (1991–2001), NAWQA assessments were implemented at the scale of Study Units – typically, large watersheds. Data and findings regarding important water-quality issues collected by the Study Units, such as the occurrence of pesticides in streams and aquifers, were then synthesized at the national scale. In the second decade (2002–2012), NAWQA continued to collect data at the study-unit scale, and in addition, implemented topical studies to better understand the factors affecting water quality. For groundwater, this included local- and regional-scale studies that examined the transport of natural and anthropogenic contaminants to public supply wells, and synthesis of NAWQA groundwater-quality data at the Principal Aquifer scale.

In Cycle 3, Principal Aquifers will be the primary scale for NAWQA's groundwater studies. In addition to addressing decadal-scale trends in groundwater quality, NAWQA will focus on assessing the quality of deep groundwater used for drinking supply and on groundwater loading of nutrients and other contaminants to streams. NAWQA will continue to collect samples from previously established networks (Flow Path Studies, Land Use Surveys, Major Aquifer Surveys), and from newly established networks at larger (Principle Aquifer Surveys) and smaller scales (Enhanced Trends Networks). Samples collected by NAWQA have been, and will continue to be, analyzed for a

broad suite of constituents including regulated and unregulated contaminants, contaminants of emerging concern, tracers of groundwater age, and indicators of geochemical condition. NAWQA will also acquire data from other sources. Water-quality data will be combined with results from statistical and groundwater flow models to map the quality of groundwater at depths used for domestic and public supply, to estimate the loading of contaminants to streams, and at scales ranging from local to National. The multi-scale monitoring and modeling approach will be used to improve understanding of the factors affecting groundwater quality, to map groundwater quality in areas of sparse data, and to forecast changes in groundwater quality that might occur in response to broad-scale changes in land use, water use, or climate.

Status and Trends of the Nation's Surface-Water Quality: The U.S. Geological Survey's National Fixed Site Network

Charles Crawford[1], Michael Yurewicz[2], William Wilber[2], Robert Gilliom[3], Jeffrey Deacon[4] and David Reutter[5]
[1]*US Geological Survey, Indianapolis, Ind.,* [2]*US Geological Survey, Reston, Va.,* [3]*US Geological Survey, Sacramento, Calif.,* [4]*US Geological Survey, Pembroke, N.H.,* [5]*US Geological Survey, Columbus, Oh.*

Abstract
A strategic Science Plan for the National Water-Quality Assessment (NAWQA) Program has been developed by the U.S. Geological Survey (USGS), which includes integration of three national water-quality monitoring networks, as well as additional new sites, to form a 313-site USGS National Fixed Site Network (NFSN). Initial implementation of the recommended NFSN is a 100- site design that conforms to current budget constraints, but forms the core for the much larger national network that is ultimately needed. The 100-site NFSN is comprised of selected sites from: (1) the NAWQA Program; (2) the National Stream Quality Accounting Network (NASQAN); and (3) the National Water Quality Monitoring Network for U.S. Coastal Waters and Their Tributaries (NMN). By unifying approaches and methods across the three networks to form the NFSN, key shared objectives are more effectively met. The 100-site NFSN focuses on assessing nutrient, sediment, and contaminant concentrations and transport in rivers and streams of major river basins throughout the Nation, particularly the Mississippi River basin, and also watersheds of critical estuaries such as Chesapeake Bay and San Francisco Bay. The NFSN includes 61 large-river sites used to assess the status and trends in regional conditions and coastal discharges, and 39 sites on smaller rivers and streams that are used to track trends in water-quality and ecosystem conditions in urban, agricultural, and undeveloped watersheds selected to represent the national diversity of environmental settings. Continuous monitoring of key water properties, including nitrate, salinity, and turbidity has begun at 6 sites equipped with state-of-the-art water-quality sensors. These continuous data greatly improve estimates of nutrient and sediment loads for selected critical sites, including the mouth of the Mississippi River before discharging to the Gulf of Mexico. To provide timely statistical summary information, annual web-based reports are being developed which will present concentrations and loads of nutrients, sediment, and other contaminants for all sites. The long-term goal for the USGS NFSN is to build toward the scale recommended in the NAWQA Science Plan, and ideally much larger, by developing partnerships with other federal, state, and regional agencies that monitor compatible sites.

Assessing the Nation's Waters: Accomplishments of the First Ten Years of the National Aquatic Resource Surveys (NARS) and Challenges for the Next Ten

Sarah Lehmann
US Environmental Protection Agency, Washington, D.C.

Abstract
In 2004, EPA and our State/Tribal partners embarked on a joint effort to assess comprehensively and consistently the quality of the Nation's rivers, streams, lakes, reservoirs, coastal waters and wetlands. Basing the effort on years of scientific research and a number of pilot projects implemented as part of the Environmental Monitoring and Assessment Program, we began implementing a series of national statistical surveys. This presentation will briefly describe the objective of the National Aquatic Resource Surveys and discuss accomplishments – including assessment results for all waterbody types – achieved over the first ten years of implementation. Additionally, the

presentation will look forward to consider some of the opportunities and challenges that NARS will be facing and working to address in the next ten years.

During the first 10 years, EPA and our state/tribal and other partners assessed the chemical, physical and biological condition of waters in the continental 48 states as well as worked on assessments in Alaska, Hawaii, and the territories. This work has confirmed our understanding that nutrients and sediment are widespread problems for our waters. It has also highlighted the importance of other factors such riparian habitat in protecting our waters. As we look to the future, there are a number of challenges and opportunities that NARS program will face in order to sustain the current momentum and to improve the program. These include technical and programmatic challenges; as well as numerous opportunities to build on lessons learned and foster further data analysis at multiple scales. Additionally, despite the many successes, the NARS program, like most monitoring programs, faces challenges from limited resources. In particular, we recognize that sustaining and improving NARS will require that we build on, strengthen, and expand our collaborative efforts in transferring information from and about statistical surveys.