Session O3: No Money, New Issues. How Do We Address Emerging Threats? Room A106

3:30 – 5:00 pm

0119
O3-1

Leveraging Monitoring Networks to Meet Multiple Water Quality Data Needs

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In today's economic climate, many State monitoring agencies are facing decreasing revenue and must adapt existing programs to meet monitoring data needs. Since its inception in 1970, the Pennsylvania of Department of Environmental Protection (PA-DEP) has operated and maintained a long-term, fixed station water quality monitoring network (WQN or Network) of approximately 160 stations on rivers, streams and lakes throughout the state for the collection of water and biological samples. Originally, the purpose of the Network was to monitor water quality conditions on a broad scale. Stations were primarily located in major streams to cumulatively monitor large basins for trend analyses. Originally, the main WQN data utility was for PA-DEP NPDES permit reviewers in developing discharge limits. Over the years, stations were discontinued or added, and WQ analytical parameters were tweaked to meet emerging/changing program needs. Examples: Selected reference waters (minimally disturbed streams) were added for reference water and biological condition development; selected stations within the Chesapeake Bay drainage were enhanced to monitor nutrient and sediment loading; parameters were added to selected stations in support of various emerging needs (such as deep shale gas monitoring; emerging contaminant surveys; radionuclide monitoring); and selected stations may be enhanced to collect data for localized monitoring projects.

0157
O3-2

Coordinated Monitoring Efforts in Shale-Gas Plays: Case Study Pennsylvania Marcellus Monitoring

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With the turn of the millennium and developments in High Volume Hydraulic Fracturing technology, shale gas plays have become a go-to source for natural gas extraction. The largest shale gas play is found in the Appalachians with the combined Marcellus and Utica Shale formations. Since 2005, close to 7,000 Marcellus wells have been permitted in Pennsylvania with 2,600 permitted in 2010 and 2011. As a result, water quality has risen to the top of environmental health concerns in Pennsylvania. Not one monitoring entity in the state can keep up with the rate of drilling – therefore a coordinated multi-layer (agency, volunteer, academic, etc.) monitoring approach is required.

In collaboration with diverse organizations, academic institutions, and government agencies, the Alliance for Aquatic Resource Monitoring (ALLARM) developed a volunteer-based protocol with the goal of monitoring small streams and their watersheds for early detection of the impacts from Marcellus Shale gas extraction in Pennsylvania. Additionally, ALLARM aims to empower Pennsylvania citizens with scientific tools to monitor and protect their own streams from potential impacts. After seven months of research and development, ALLARM began disseminating trainings throughout the state in the summer of 2010. To date, 31 trainings have taken place, with approximately 700 volunteers in attendance. Without a strong statewide collaborative effort, volunteer water-monitoring mobilization within the Marcellus Shale region of Pennsylvania would not have been possible.

In this presentation, attendees will be introduced to the science behind the Marcellus Shale, Pennsylvania's coordinated multi-layer Marcellus monitoring initiative, the development of the ALLARM protocol, and the role of volunteer monitors in protecting Pennsylvanian streams from potential impacts of natural gas drilling.

0255
O3-3

Volunteer Road Salt Monitoring: Assessing Impacts of Winter Safety Measures on Stream Quality in Wisconsin

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Across the northern United States, road salting is carried out to help keep our roadways safe during winter months. However, it is a process that is not without potential negative effects on aquatic biota. The United States Geological Survey (USGS) carried out an initial study in Wisconsin in which they found that a substantial number of urban streams were toxic to fish and other aquatic life during road salt runoff periods. Subsequent research collaboration between USGS and the Water Action Volunteers Stream Monitoring Program in Wisconsin was initiated to expand the number of streams and area surveyed. In winter 2011, 21 volunteers from Madison and Milwaukee were trained to conduct conductivity monitoring using economical specific conductance meters, and to collect grab samples for chloride analysis. During winter months, volunteers monitored every other week and during "triggered" events when specific conductance levels were known to exceed a certain level at a continuously monitored USGS site in Milwaukee. The volunteers continued to monitor monthly following the road salt application season. Linear regression results suggests that the specific conductance meters used by the volunteers provide a valid surrogate measure of chloride at these sites when specific conductance was above 950 µS/cm (r^2 = 0.98, n = 41). Of the 33 sites monitored, six exceeded USEPA acute water quality criteria and 13 exceeded USEPA chronic water quality criteria for chloride levels during winter months. No sites have exceeded these criteria outside of the road salt application season.

0551
O3-4

Development of a Statewide Volunteer Monitoring Program for Aquatic Invasive Species: Challenges and Lessons Learned in Michigan

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Volunteers have monitored the quality of Michigan's inland lakes since 1974. The Cooperative Lakes Monitoring Program (CLMP) historically focused on trophic state indicators, including water clarity, total phosphorus, chlorophyll, and dissolved oxygen. Recently, the CLMP expanded to include aquatic plant monitoring in response to public concern about nuisance plant growth. The first plant monitoring program added was a training-intensive and time-consuming protocol that results in a map of the entire aquatic plant community. The data generated are an outstanding baseline for lake plant management, but the amount of training and effort limits enrollment to less than five lakes per year. In 2007, a new "Exotic Aquatic Plant Watch" program was piloted, in which volunteers are trained to survey for a limited list of invasive plants of highest environmental concern. The training session was immediately popular. Volunteers already participating in the CLMP program were clearly interested in learning how to identify problem invasive plants, but enrollment in the monitoring program was extremely low (1-3 lakes/year) in 2007 and again in 2008. The pilot enrollment goal of twenty lakes was reached in 2009 after the participation fee was reduced, the volunteer experience requirements for enrollment were relaxed, and promotion of the program increased. Unfortunately, many of the enrolled lakes did not submit reports. In 2010, the written protocol and training were updated to address the main reasons why these volunteers reported that they failed to submit data, that is, to emphasize the importance of reporting negative results and of conducting local monitoring to complement plant survey and management work contracted to professionals. Also, the requirement to use GPS and online mapping was relaxed to allow other methods of reporting species locations. Likely as a result of these adjustments, the target number of lakes completed the survey that year, allowing for thorough review of the data generated by the program. In 2011, the Exotic Aquatic Plant Watch was formally adopted into the CLMP with a strong quality assurance component, and now provides lake communities and the state environmental quality agency with valuable invasive plant data to inform management and assess control efforts.