Session F3: Incorporating Innovations into Network Design

Room B117-119
1:30 – 3:00 pm

0356
F3-1

Continuous Water-Quality Monitoring Throughout Virginia: Objectives, Study Designs, and Analysis of Data

Kenneth Hyer, Douglas Moyer and John Jastram

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As continuous water-quality monitoring networks continue to grow in number and size, the diversity of their applications increases. The USGS Virginia Water Science Center has maintained a growing nontidal continuous water-quality monitoring program since 2002. This monitoring program is comprised of diverse projects with differing sets of objectives, varied study designs and unique data-analysis tools. Several projects will be presented to provide an overview of this continuous water-quality monitoring program to include:

- Real-time warning networks (associated with construction activities);
- Documentation of the effectiveness of BMP implementation;
- Estimation of real-time sediment and nutrient concentrations;
- Estimation of real-time sediment and nutrient loads;
- Protection of ecological health; and
- Real-time continuous nutrient monitoring.

Finally, a description of next-generation nutrient monitoring equipment will be included.

0391
F3-2

Continuous Water Quality Monitoring in Remote Arid West Texas

Christine Kolbe and Charles Dvorsky

Texas Commission on Environmental Quality, Austin, Tex., USA

The Texas Commission on Environmental Quality (TCEQ) has developed a network of 20 continuous water quality monitoring stations in the Rio Grande watershed. The network can be seen as three separate projects in distinct regions for specific purposes.

Stations in the Upper Rio Grande have been used to redefine segment boundaries, support reintroduction of an endangered species, and monitor TDS concentration in the Rio Grande, the major source of inflows to Amistad Reservoir, a major regional water supply reservoir.

Stations in the Pecos River watershed provide much of the data documenting total dissolved solids (TDS) issues in the Pecos River and TDS loading to Amistad Reservoir. These stations also monitor long-term trends in TDS during implementation of the Pecos River Watershed Protection Plan practices to reduce TDS and increase flows. The data from these sites is also used to model dissolved oxygen/salinity in the Pecos River.

0133
F3-3

Regulatory Applications of Real-time Water Quality Data in Newfoundland and Labrador

Renee Paterson and Tara Clinton

Government of Newfoundland and Labrador Dept. of Environment and Conservation, St. John's, Newf., Canada

Monitoring and protecting the abundant natural water resources surrounding industrial operations is a high priority for the Government of Newfoundland and Labrador. Information collected through the real-time water quality monitoring stations, in partnership with industry, is being used to effectively manage and protect provincial water resources.

The expansion of industrial developments such as mining and hydroelectric projects throughout the province of Newfoundland and Labrador has necessitated the development of applications for real-time information which can be utilized as regulatory tools. The Water Resources Management Division has been working in partnership with industry to develop tools that can be utilized by the regulators as well as the industry clients. Details will be provided on the transparent web-based reporting mechanism currently in place making the water quality information available to the general public and interested stakeholders. This technology also allows for the implementation of automated email alert systems with an enhanced system of categorizing risk associated with alerts. The real-time data is also being utilized to predict non-measured parameters to ensure water quality values are compliant with existing regulatory limits. Recently, pH site specific water quality objectives have been calculated for all real-time water quality stations and are being applied to ensure the most appropriate guidelines are being used in reporting the data. Finally, details will be provided on the use of real-time groundwater wells for compliance monitoring surrounding tailing impoundment areas.

The purpose of this presentation is to provide insight into the state of the art near real-time water quality monitoring technology along with its potential application for effective monitoring and regulation of the waters surrounding industrial operations. Case studies will be presented describing the current real-time water quality monitoring networks established in partnership at industrial operations in the province and the various regulatory tools that have been implemented to pro-actively monitor and manage the water resources.

0073
F3-4

Use of Technology to Support Tributary and Near-Shore Monitoring for the Great Lakes Restoration Initiative (GLRI)

Charles A. Peters and Daniel J. Sullivan

US Geological Survey, Middleton, Wis., USA

Collaborative monitoring efforts in the tributaries, embayments (river mouths), and near-shore of the Great Lakes that support the Great Lakes Restoration Initiative (GLRI) include a significant focus on new technologies.

There are 30 GLRI tributary monitoring sites that include continuous monitoring of pH, SC, temp, DO, and turbidity that is streamed real-time onto USGS websites. All of these sites are among the 59 National Monitoring Network (NMN) design tributary sites. These sites alo have automated samplers installed that collect samples on both a fixed- interval and on an event-driven basis. Samples at all sites are analyzed for nutrients, suspended sediment, and chloride; at a subset of these sites there is also sampling for virus, bacteria, and wastewater-associated compounds (chemicals of emerging concern). Regression models will be developed at all 30 sites to relate the continuous sensor measurements to the discrete constituent measurements to provide the potential for a less expensive long-term water-quality monitoring approach and estimates of real-time loads to river mouths and the near shore.

Testing of an automated underwater vehicle (AUV) at several river mouth (embayment) sites, these embayments are also part of the NMN design, is coordinated with near-shore and river mouth towed and boat mounted sensors and ecological sampling.

Testing of advanced colorimetric dissolved organic matter (cDOM) sensors at 6-8 tributary and river mouth sites is being done using both a mobile unit along with an array of other sensors mounted on a boat. The cDOM sensors are undergoing testing and evaluation for potential use as surrogate analyses for much more expensive analyses, such as for mercury and wastewater-associated compounds.

Results of these data collection activities will be captured in a database using common data formats and exchange interfaces to support the Great Lakes Observing System (GLOS) database effort. The database will also be designed to facilitate a web based mapping application and a variety of planned modeling activities.