Abstracts

Wednesday, April 30

Session F3: Continuous Monitoring: Regulatory Applications

8:00 – 9:30 am | Room 261

Adapting Methods of Near Real Time Water-quality Monitoring to Meet Scientific and Regulatory Needs

Michael Canova
US Geological Survey, Austin, Tex.

Abstract
The US Geological Survey (USGS) in cooperation with the Texas Commission on Environmental Quality (TCEQ) continuously monitors water-quality at selected sites on the Rio Grande in near real time. The Rio Grande presents unique monitoring challenges to overcome, such as the continuous build-up of calcium carbonate precipitate on submerged equipment and the frequent occurrence of sediment laden high-flow events that can bury equipment installed in the river. These challenges occasionally result in periods of lost or invalid data. USGS follows well-defined and widely-accepted guidelines for monitoring real-time water quality, but the methods did not meet certain requirements of TCEQ. The TCEQ outlined their concerns during an extensive audit of the water-quality monitoring activities on the Rio Grande. In February 2013, a three-day workshop was convened to bring together State, Federal, and private entities to reach a consensus on the methods used to validate and apply corrections to the data. Cooperatively, the overall validity of the methods in use was agreed upon, along with ways to better overcome the challenges previously mentioned. Through joint site visits, the difficulties presented by the environmental conditions at each site became apparent and a greater appreciation for the effort required to maintain water-quality monitors in challenging environments was gained by all parties. The workshop resulted in a collaborative resolution to the way corrections are applied to the data as well as key points to consider in site relocation. The agreed upon methodology has since been expanded to sites on other rivers, such as sites on the Pecos River and a new site on the Arroyo Colorado near Rio Hondo, Tex.

Utilizing Continuous Water Quality Monitoring Data for Regulatory Assessment and Discharge Permit Development along an Effluent-Dominated Segment of the South Platte River

Jordan Parman and Jim Dorsch
Metro Wastewater Reclamation District, Denver, Colo.

Abstract
The Metro Wastewater Reclamation District (District) has been actively engaged in assessing the water quality of the South Platte River downstream of Denver for 50 years. Sampling of the river has varied over the years, adapting to address regulatory concerns of the District with a large, scientifically-derived dataset. District staff currently sample 18 sites along the river, 22 groundwater monitoring wells, and two lakes that receive substantial amounts of effluent flows. The long-term water quality dataset is combined with continuous flow records in the South Platte Water Quality Model to address current regulations and to assist in the development of new regulations for a segment of the South Platte River that is effluent-dominated and influenced by a heavily managed water rights flow regime. For the past five years, the District has utilized In-Situ Multiparameter 9500 water quality probes to collect both discrete and continuously logged water quality data for the purposes of regulatory assessment (pH and dissolved oxygen) and discharge permit development. In addition, Hobo® thermisters are used to log continuous temperature records at multiple sites downstream of the District's outfalls to determine compliance with temperature standards adopted by the Colorado Water Quality Control Commission.

While the multiparameter probes and thermisters provide valuable information concerning diel variations in parameters of concern that cannot be captured during biweekly discrete monitoring events, it is critically important to conduct thorough quality control/assurance methods to ensure validity of the continuous data, especially given that the data is utilized in a regulatory and compliance context. Here, we present calibration and end-calibration data, along with statistical methods that suggest deployment time limitations due to biofouling of sensors and exposure to a wide variation of hydrologic flows conditions. However, after careful and methodical elimination of anomalous data, these continuous datasets can still be valuable in the development of site-specific water quality standards that are appropriate for the unique conditions of the South Platte River downstream of Denver.

Adaptive Management for Low Dissolved Oxygen in Grand and Hudson Lake

Lance Phillips[1], Monty Porter[1] and Darrel Townsend[2]
[1]*Oklahoma Water Resources Board, Oklahoma City, Okla.,* [2]*Grand River Dam Authority, Vinita, Okla.*

Abstract
A comprehensive monitoring and remediation effort is currently ongoing in the Grand River Basin. These efforts are necessary to meet the requirements outlined in the Grand River Dam Authority (GRDA) Federal Energy Regulatory Commission (FERC) permit (FERC, 2006). As part of the GRDA FERC re-licensing process, the GRDA has agreed to implement a water quality improvement plan intended to achieve compliance with applicable water quality standards in the tailraces of both Hudson Lake (Markham Ferry Project) and Grand Lake (Pensacola Project).

Adaptive management approaches to mitigate low downstream DO concentrations have been tested in both the Grand and Hudson tailraces since 2009. Using continuous, near real-time monitoring platforms to gather data, testing has included both pulsing from the powerhouse as well as spillage from Lake Hudson. Furthermore, DO mapping has been used to quantify spatial effects of mitigation scenarios. Based on 2011-12 testing results, a mitigation scenario has been adopted for both tailraces. At Grand Lake, using real-time water quality sensors, an email alarm system has been created to notify the powerhouse operations of lower DO conditions. Once notified, a 6 hr. reduced generation pulse coupled with turbine aeration produces enhances DO values above the water quality criterion, this will continue to be tested as a long-term solution for periods of low DO in the tailrace. Conversely, at Lake Hudson, continuous spillage from one of the Tainter gates has been implemented for mitigation of acute DO problems, and increased spillage will continue to be tested as a means to raise the stilling basin above the water quality criterion.