American Water Resources Association
2009 SUMMER SPECIALTY CONFERENCE
Adaptive Management of Water Resources II
June 29 – July 1, 2009
Snowbird, UT

Tuesday, June 30
8:30 AM – 10:00 AM
Session 15: Watershed Adaptive Management

1. Milwaukee's Next Step: Adaptive Watershed Restoration Plans - Troy Deibert, HNTB Companies, Milwaukee, WI (co-authors: Timothy Bate, William Krill, Kevin Kratt, Michael Hahn)

The Milwaukee Metropolitan Sewerage District's (MMSD) 2020 Facilities Plan and its companion effort, the Regional Water Quality Management Plan Update (RWQMPU) led by the SE Wisconsin Regional Planning Commission, were completed and approved by the Wisconsin Department of Natural Resources (WDNR) in 2007. One of the main conclusions of the project was that significant improvements to surface water quality in the Greater Milwaukee Watersheds can only be achieved through regional implementation of extensive measures to reduce pollution from nonpoint sources. Currently, no real framework exists to implement the broader recommendations from the project to reduce nonpoint stormwater pollution in a cost effective manner. A disagreement between the MMSD and the WDNR regarding the State's regulatory program, which is based on performance standards as opposed to water quality within the receiving water, changed the course of the implementation process from Third Party TMDLs to Watershed Restoration Plans. Therefore, adaptive, phased Watershed Restoration Plans (WRPs) are being developed as the next step in the implementation of a truly science-based watershed improvement effort. The WRPs will include an adaptive management and adaptive implementation approach that will allow proposed controls to be implemented, monitored, refined and revisited so that effective implementation of the recommendations can be achieved. This paper discusses some of the key implementation framework considerations and the future path envisioned that will ultimately lead to significant improvements to water quality in the greater Milwaukee area.

2. Using Adaptive Management in the Recovery of Endangered Species in the San Juan River Basin, USA - Mark McKinstry, Bureau of Reclamation, Salt Lake City, UT

The San Juan River Basin is the second largest of the three sub-basins that comprise the Upper Colorado River Basin. It drains about 38,000 square miles of the Four-Corners area of Colorado, Arizona, New Mexico, and Utah. From its origins in Colorado, the San Juan River flows approximately 350 miles to Lake Powell, intercepted along the way by Navajo Reservoir where the water is stored for use in the San Juan and Rio Grande basins and for delivery to the lower Colorado River Basin. The San Juan Recovery Implementation Program was begun in 1992 and authorized by Congress in 2000 to protect and recover endangered fishes (Colorado pikeminnow [Ptychocheilus lucius] and razorback sucker [Xyrauchen texanus]) while allowing water development to proceed. The SJRIP is a nationally recognized effort which has served as a model to address other Endangered Species Act issues throughout the country. Aggressive efforts are being implemented through Program Elements and comprehensive plans to: construct fish passages, fish screens, and propagation facilities; restore and enhance aquatic habitat; improve water use efficiency; stock native fish and control competing non-native fish species; and conduct hydrologic evaluations that allow the adoption of natural-flow mimicry. All activities conducted through the SJRIP are evaluated by two technical committees (Hydrology and Biology) comprised of experts in endangered fish management, fish ecology and biology, geomorphology, hydrology, and habitat management. A Coordination Committee oversees the activities of the two technical committees and has ultimate responsibility over recovery actions. The Bureau of Reclamation and U.S. Fish and Wildlife Service work cooperatively to carry out the management activities approved by the Program participants. To ensure a scientifically defensible approach to recovery actions the SJRIP uses permanent Peer Reviewers to evaluate progress of the individual projects and the Program as a whole. Management activities are formulated in an adaptive management framework whereby specific actions are conducted and subsequently monitored to inform, and modify, future activities. The adaptive

management approach has allowed the SJRIP to make progress towards recovery in the face of uncertainty about various aspects of the biology and ecology of these endangered species.

3. Components of an Integrated Environmental Observatory Information System - Jeffery Horsburgh, Utah State University, Logan, UT (co-authors: David G. Tarboton David R. Maidment Ilya Zaslavsky)

Recently, community initiatives have emerged for the establishment of cooperative large-scale environmental observatories. Cyberinfrastructure is the backbone upon which these observatories will be built, and scientists' ability to access and use the data collected within observatories to address broad research questions will depend on the successful implementation of cyberinfrastructure. The research described in this presentation advances the cyberinfrastructure available for supporting environmental observatories. We describe the general components of an environmental observatory information system for collecting, storing, and publishing point observations data. We then describe the implementation of prototypes for each of the generalized components within the Little Bear River environmental observatory test bed, as well as across a nation-wide network of eleven observatory test bed sites. Together, these components comprise an integrated environmental observatory information system that has enabled us to not only analyze and synthesize our data to advance our understanding of the Little Bear River watershed but also manage and publish all of the observational data that we are collecting on the Internet in simple to use formats that are easily accessible and discoverable by others. Enhancements to the infrastructure for research and education that are enabled by this research will impact a diverse community, including the community of researchers involved with prospective CUAHSI/CLEANER/WATERS environmental observatories as well as other observatory efforts, research watersheds, and test beds.