American Water Resources Association
2009 SPRING SPECIALTY CONFERENCE
Managing Water Resources Development in a Changing Climate
May 4-6, 2009
Anchorage, AK

Monday, May 4
3:30 PM – 5:00 PM
Session 8: Policy and Management II

1. Climate Change Decision Support Tools for Water Managers – George Smith, Riverside Technology, inc., Moneta, VA

Water managers are increasingly recognizing the significance of climate change and are seeking detailed information about the resulting hydrologic impacts to include in their planning. Physically-based hydrologic models that can integrate critical parameters from climate change forecasts are required for operational forecasts of stream flow, as they can be used to directly relate altered temperature regimes to changes in snowpack, stream-flow, and other effects. Available studies, however, are often academic in nature and are usually incompatible with agency-specific, water management models or the stream flow period-of-interest. Commissioning a study for a specific watershed are usually too expensive for most municipalities and agencies. To assist water managers with affordable climate change modeling tools, Riverside Technology, inc. is designing and developing the Web-based prototype "Decision Support Tools for Assessing Hydrologic Impacts of Climate Change." These tools enable water managers to rapidly assess the impact of predicted climate change on natural flows at critical nodes along a river network. In developing these prototype decision support tools, we have identified the full range of requirements for building and supporting a fully functional decision support system, including the data needed, and the methods and infrastructure necessary to provide open and low-cost tools that can generate scenarios of future stream flow over the Internet. We also stress the value of a close, cooperative development approach that engages water resource managers and stakeholders in developing the system. This participation ensures that potential users can apply the tools effectively, and that data products are relevant and practical for operational water-management decisions.

2. Management of Agricultural Water Resources under Uncertainty for the Dual Purposes of Conservation and Enhancement - Venkatesh Uddameri, Texas A&M University - Kingsville, Kingsville, TX (co-author: E. Annette Hernandez,)

The agricultural industry is driven and therefore limited for the most part by the availability of water. Towards this end, best management practices (BMPs) have been developed that focus on the conservation or improvement of the quantity and quality of regional water resources. However, a set of uni-lateral, mandatory BMPs would not be appropriate given variations between climactic, demographic, and geographic regions; furthermore, BMP selection is currently purely voluntary. Therefore, listings of BMPs based on their appropriateness for specific regions would enhance the selection and implementation process. Ranking of BMPs involves a comparison of each alternative's characteristics and the criteria for implementation or level of conservation. Due to the multiple criteria aspect of the BMP alternatives, multi-criteria decision making (MCDM) models may be successfully employed. The subjectivity in this process manifests itself in uncertainty with a corresponding risk associated with making a decision based on that information. Fuzzy set theoretic approaches have been used to assimilate and aggregate diverse stakeholder preferences while accounting for the uncertainty in the decision making process and the generalized form of those known as intuitionistic fuzzy sets (IFS) offer a specific advantage in that both the extent of the preference and the non-preference of stakeholders are quantified and used in the decision making process. This work resulted in an IFS based framework for guiding the selection of agricultural BMPs. A case-study in a coastal semi-arid region of South Texas is presented to demonstrate the effectiveness of the framework.

3. The Implications of Climate Change on the Ohio River and the Ohio River Valley Water Sanitation Commission - Gerald Schulte, Staff, Cincinnati, OH

The Ohio River Valley Water Sanitation Commission, ORSANCO, is an interstate water pollution control agency chartered in 1948 to monitor and abate water pollution in the Ohio River valley basin. Data from a series of ORSANCO water quality monitoring locations, in conjunction with observations from more than 30

drinking water utilities that use the Ohio River as source water, may indicate that effects from climate change may be occurring on the Ohio River. Data on algae, turbidity, temperature, and flow will be presented and discussed. While the Commission's current prevue is water quality and water pollution control, in the near future it may assume certain responsibilities in water resource management. Responsibilities currently held by the Ohio River Basin Commission, may be transferred to the Ohio River Valley Water Sanitation Commission. As water resources become more precious, combing water quality and water resource management may enhance our ability to more effectively utilize, allocate, and manage water resources. This presentation will discuss ORSANCO's role in water quality, observations of water quality data that may implicate climate change effects, impacts climate change could have on water quality regulations, and ORSANCO's future role as an interstate agency in water resources management.

4. Integrating Ground Water Remediation and Sustainable Ground Water Management Practices - William Schneider, Weston Solutions Inc., Pecos, NM (co-author: Kevin Mayer)

Cleanup projects at contaminated ground water sites may extract and treat tens of millions of gallons of irreplaceable water each day. As the value of both energy and water soar, remedial efforts must ideally seek the most efficient integration of aquifer protection and cleanup with sustainable water management practices. Important public health and community acceptance factors are examined by comparing case studies of two Superfund projects in California, each extracting 30 million gallons per day from critical aquifers. At a Southern California site, the extraction and cleanup system is operated by a municipal water department and the treated water is entirely incorporated directly into the regional public water supply. In Northern California, a remedial project is operated by the existing responsible party. Surrounding communities have objected to direct use of the treated water, and the treated water is discharged to an adjacent river where water purveyors claim their rights downstream. Notable differences between these cases include historic water use practices, surface and ground water quality and availability, contaminant plume characteristics, water infrastructure design, and capital funds. A detailed evaluation of these factors, technical issues, and lessons learned will be presented with emphasis on sustainably managing ground water resources in response to future system stresses such as population growth and higher recharge variability due to climactic fluctuations.