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 14: Climate Change Adaptation

1. Water Resource Planning and Management in Uncertain Conditions: The Relationship between Scenario-Based Planning and Adaptive Management - Kris Esterson, PBS&J, Orlando, FL

Climate change presents water managers with difficult decisions due to uncertainty in the evolution of key drivers and in the outcome of the related management response. Two planning paradigms designed for management of complex systems in uncertain conditions, scenario-based planning and adaptive management, are compared for suitability in addressing common climate change issues.

2. Adaptive Management in the Context of Climate Change: A Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources - Anne Choate, ICF International, Philadelphia, PA (co-authors: Susan Herrod Julius, Jordan M. West, Susan Asam)

The Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources (SAP 4.4) report provides a review of existing adaptation knowledge to support resource managers in taking immediate actions to meet their management goals in the context of climate change. The term "adaptation" in this report refers to adjustments in human social systems (e.g., management) in response to climate stimuli and their effects. Since management always occurs in the context of desired ecosystem conditions or natural resource management goals, SAP 4.4 examines particular goals and processes used by different organizations to fulfill their objectives. Using this approach, this report presents a series of chapters on the following resource areas: National Forests, National Parks, National Wildlife Refuges, Wild and Scenic Rivers, National Estuaries, and Marine Protected Areas. The information drawn from across these chapters is then analyzed to develop several key synthetic messages: Many existing best management practices for "traditional" stressors of concern have the added benefit of reducing climate change exacerbations of those stressors. Seven "adaptation approaches" can be used for strategic adjustment of best management practices to maximize ecosystem resilience to climate change. Levels of confidence in these adaptation approaches vary and are difficult to assess, yet are essential to consider in adaptation planning. The success of adaptation strategies may depend on recognition of potential barriers to implementation and creation of opportunities for partnerships and leveraging. The Nation's adaptive capacity can be increased through expanded collaborations among ecosystem managers and the creative re-examination of program goals and authorities. Establishing current baselines, identifying thresholds, and monitoring for changes will be essential elements of any adaptation approach. The Nation's capability to adapt will ultimately depend on its ability to be flexible in setting priorities and "managing for change." The strategies discussed in this report will be useful to federal agencies and can also be broadly applied to resource management efforts by other government or nongovernmental organizations.

3. Enhancing Reliability through Adaptive Management Strategies: A Water Utility Perspective - Alison Adams, Tampa Bay Water, Clearwater, FL

Tampa Bay Water, Florida's largest regional water supply authority, provides wholesale water for its six member governments: Hillsborough, Pasco and Pinellas Counties, and the Cities of New Port Richey, Tampa and St. Petersburg. The agency and its member governments provide nearly 260 million gallons per day of drinking water to over 2.5 million customers in the tri-county area. Tampa Bay Water was

formed in 1998; the agency's sole water supply was groundwater that was developed in the tri-county area beginning in the 1930s. Since 1998 Tampa Bay Water planned, constructed, and implemented a regionally-integrated, diverse water supply system that produces environmentally sustainable and reliable water supplies. The cornerstone of the agency's current supply system is the enhanced surface water system. By 2012, nearly 60% of the agency's water supplies will come from local surface water sources. Future changes in climate are likely to affect the water resources upon which the Tampa Bay region depends. The uncertainty caused by climate change relative to its impacts on water resources poses a daunting challenge for Tampa Bay Water and its member governments; securing reliable water supplies for future generations is important. Water supplies can become more reliable and sustainable through a comprehensive approach to water supply planning and management which includes diversifying water sources, planning future infrastructure needs, conducting risk assessments of current and future water supplies, and implementing adaptive strategies to manage uncertainties associated with climate changes. The presentation will discuss the planning and operational strategies Tampa Bay Water is using to ensure its water supplies remain reliable in a state of climate uncertainty. For example, Tampa Bay Water has developed an operating protocol that includes collection and evaluation of daily, weekly, seasonal and annual information and adjustments are made to the planned use of water supplies in response to changing conditions. This monitoring and feedback process allows the agency to adapt to changes including changes in rainfall patterns that result from climate variability. Other water utilities and water managers can conform many of these strategies to meet their specific needs.

4. Climate Change, Water Resources Management, and Planning: A Federal, Interagency Collaboration - David Raff, Bureau of Reclamation, Denver, CO (co-authors: Julie Kiang, J. Rolf Olsen, Kathleen White, Levi Brekke, Roger Pulwarty, D. Phil Turnipseed, Robin Webb)

This presentation discusses a federal perspective on managing water resources in the face of climate change with a focus on adaptive management. The U.S. Geological Survey, U.S. Army Corps of Engineers, Bureau of Reclamation, and National Oceanic and Atmospheric Administration have collaboratively managed data and information concerning water resources for many years. In 2007, these agencies formed a workgroup to consider how best to utilize climate change information in the management of the Nation's water resources. The potential for climate change increases uncertainty in long-term water resources planning, but options to manage for that uncertainty exist and can be considered now. The interagency workgroup identified a number of key points for federal water managers that reflect the need for continued and expanded monitoring, the value of incorporating additional sources of information when developing planning scenarios, and the advantages of incorporating flexibility into the decision making processes, and the opportunity for adaptive management.