Scientists, Water Managers Collaborate on Use of Paleoclimatological Streamflow Reconstructions

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Hydroclimatic variability is frequently a factor in water management decisions and policies, yet the range of conditions considered by managers is typically limited to conditions that prevailed in the 20th century when instrumentation records became available. However, policy makers and water managers have begun to consider dendrochronological (tree-ring) reconstructions of streamflow, which can go back hundreds of years, as an additional resource for decision making. The recent drought in the Southwest has motivated paleoscientists and water managers to collaborate on the application of paleoclimatic data to water resources management.

Successful local collaborations with water managers in the Colorado Front Range prompted NOAA scientists to address the larger regional concerns of the Colorado River Basin. A recent workshop brought together paleoclimatologists, hydrologists, climate scientists, and resource managers to focus on broadening the use of paleoclimatic data in water resource management and decision making.

The NOAA Office of Global Programs funded the workshop, which was held May 5 in Tucson, hosted by the University of Arizona's Institute for the Study of Planet Earth and Climate Assessment for the Southwest. More than 50 invited scientists and water resources managers attended, representing all seven Colorado River Basin states.

Representatives of several water providers, including Denver Water and the Salt River Project in Arizona, introduced participants to current water management applications of tree-ring reconstruction of streamflow. A panel of water managers discussed the potential usefulness and limitations of these long-term records to their work. Scientists then explained how hydroclimatic reconstructions are generated.

Breakout groups met to allow scientists to gather comments and suggestions from water managers on how paleodata could be better incorporated in decision making. Issues that arose were both strategic (for example, how tree-ring reconstructions of flow can be used to inform long-term planning, and what limitations apply to their use) and tactical (needs for updated or additional tree-ring data and reconstructions at particular stream gauges, and additional hydroclimatic metrics to be reconstructed). Participants were also interested in improved characterization of uncertainty in reconstructions and in having access to reconstruction time series that show a range of probabilities.

Participants agreed that better communication between scientists and managers is necessary. Managers recommended that scientists could more effectively promote their work to water managers and less technical audiences through newsletters, journals, and meetings of water and engineering professional societies.

Additional information on the workshop is available at www.ispe.arizona.edu/climas/conferences/CRBpaleo/agenda.html.

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CHIWAWA Coordinates Water-Management Education and Desal Research

from the Center for Environmental Resource Management, University of Texas at El Paso

With major inland water desalination plants in the works, El Paso and

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Alamogordo will turn to a virtually limitless supply of brackish water for their future water needs. And an increasingly thirsty world is looking to water managers and researchers in the Southwest for keys to creating sustainable water supplies through desalination.

To focus their efforts, El Paso Water Utilities Board, City of Alamogordo, University of Texas at El Paso, Texas A&M University, and New Mexico State University have joined forces to provide opportunities for research, education, and outreach related to water management and desalination technology. The partnership is known as CHIWAWA: the Consortium for Hi-Technology Investigations in Water and Wastewater.

CHIWAWA plans to be the driver behind a variety of regional activities, including:

- the organization of conferences, training programs, short courses, and meetings on issues related to water treatment, conservation, water resources management, and desalination;
- joint research in desalination technologies, brine management, and assessment of brackish water supplies; and
- cooperative efforts to inform and assist all stakeholders in the region's water supply.

Members plan to request $4 million in funding from Congress for CHIWAWA for the 2006 fiscal year.

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UA Receives $14 Million Water Quality Grant

from the University of Arizona

The detection, remediation, and prevention of water contamination in the Southwest and its human health effects will be a major thrust of the University of Arizona's Superfund Basic Research Program (SBRP) over the next five years. The program will also investigate ways to reduce airborne contamination from abandoned mine tailings.

Nine research projects will focus on two major types of contaminants: arsenic and halogenated organic solvents such as trichloroethylene. Some of the projects will examine the human health effects of the contaminants; others will develop better methods to detect and clean up contaminated sites.

The new projects, funded by a recent five-year $14 million grant renewal from the National Institute of Environmental Health Sciences, will improve hazardous waste management in Arizona and the Southwest and can serve as a model for arid and semi-arid regions around the world.

Removing arsenic from drinking water is a challenge facing water utilities throughout the West because the Environmental Protection Agency has reduced the maximum allowable concentration of arsenic in drinking water, effective next January.

Arsenic can be removed from water, but arsenic-laden removal media pose a waste disposal problem. When such waste products are dumped in a landfill, microorganisms in the landfill free the arsenic, which can then percolate through the soil and eventually enter the groundwater.

SBRP researchers want to develop better ways to remove arsenic from drinking water and to dispose of the arsenic residues. "We want to help prevent another hazardous waste problem from developing 10 to 15 years from now," said Raina M. Maier, SBRP's associate director and a UA professor in the Department of Soil, Water and Environmental Science.

Another problem throughout the West is water and air contamination from abandoned mine tailings, the piles of rubble and processed ore that remain at mining sites. Arsenic, lead, and other heavy metals are sometimes found in high concentrations in tailings piles. SBRP researchers are developing easy, low-cost ways to revegetate tailings piles with native plants. The scientists will search for ways to reduce or eliminate the need for site preparation, fertilizer, or maintenance.

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