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FOR IMMEDIATE RELEASE

Tree-Ring Data Reveal Greater Variations in Colorado River Flows Than Previously Assumed; Extended Droughts Are Recurrent, May Become More Severe Because of Higher Temps

LAS VEGAS -- Tree-ring based reconstructions of the Colorado River's flow over hundreds of years show that average annual flows vary more than previously assumed and that extended droughts are not uncommon, says a new report from the National Research Council. Future droughts may be longer and more severe because of a regional warming trend that shows no signs of dissipating, the report adds. It also states that a preponderance of evidence suggests that rising temperatures will reduce the river's flow and water supplies. Coping with water shortages is becoming more difficult because of rapid population growth, and technology and conservation will not provide a panacea for dealing with limited water supplies in the long run, the report warns.

The Colorado River basin covers 240,000 square miles and extends over seven states and a portion of northwestern Mexico. The river's annual average flow of roughly 15 million acre-feet of water is used by tens of millions of Americans for drinking and other household uses, agriculture, landscape irrigation, hydroelectric power, and rafting and other recreational activities. The river also is home to diverse ecological habitats and is central to hundreds of miles of beautiful vistas that it carved out over millions of years, including the Grand Canyon.

Exceptionally dry conditions in much of the Colorado River basin in recent years, along with new streamflow reconstructions based on tree-ring data, prompted the Research Council to convene a committee to examine how hydroclimatic trends might affect the river's future flows.

For many years, understanding of the river's flow was based primarily on records from stream gages. But the tree-ring data is transforming that understanding by demonstrating that the river occasionally shifts into decades-long periods in which average flows are lower, or higher, than the 15 million acre-feet average of the gaged record. In particular, the tree-ring reconstructions show that the years 1905-1920 were exceptionally wet, which is significant because the Colorado River Compact that governs the allocation of water between upper and lower basin states was signed in 1922, when it was assumed that annual average river flow was closer to 16.4 million acre-feet. Tree-ring data also indicate that extended droughts are a recurrent feature of the basin's climate.

The tree-ring reconstructions, coupled with temperature trends and projections, suggest that extended droughts will recur and may be more severe than recent droughts, the report says. Many different climate models point to a warmer future for the Colorado River region, the committee noted, although projections of future precipitation are more uncertain. Significant warming in the region over the past few decades is shifting the peak spring snowmelt to earlier in the year and contributing to increases in water demands, especially during the summer, the committee found. Warmer temperatures also result in more water being lost to evaporation.

The committee also looked at how a steadily rising population and related increases in water demand will affect Colorado River water management. The population across the western United States has grown rapidly in recent decades. Arizona saw a roughly 40 percent rise in population since 1990, for instance, while Colorado's population grew by 30 percent in the same period. Despite some successful water conservation efforts, urban water use in the region has increased significantly along with the expanding population. For example, water consumption in Clark County, Nevada, which includes Las Vegas, doubled between 1985 and 2000.

Increasing urban demands for water are often met through sales, leases, or transfers of water rights from agricultural users. Although 80 percent of available water in the West is devoted to agriculture, this allocation is finite, the committee warned, and water transfer agreements will be limited in their ability to satisfy growing, long-term demand. In addition, such agreements may be inhibited by their potential effects on third parties, such as downstream farmers or ecosystems. Technology and conservation measures are useful and necessary for stretching existing water supplies, the committee acknowledged, but any gains in water supply will be eventually absorbed by the growing population.

The combination of limited water supplies, rapidly increasing populations, warmer regional temperatures, and the specter of recurrent drought point to a future in which the potential for conflict among existing and prospective new water users will prove endemic, the report concludes. This will inevitably lead to increasingly costly, controversial, and unavoidable trade-offs among water managers, policymakers, and their constituents.

It was therefore a welcome development when the seven Colorado River basin states presented preliminary proposals for managing water shortages in a letter last February to the U.S. secretary of the interior, the committee said. Such interstate cooperation will prove increasingly valuable, and likely essential, in coping with future droughts and water demands. Likewise, a commitment to two-way communication between scientists and water managers will be critical. In addition, the federal government should ensure that the U.S. Geological Survey has the resources to maintain and expand the Colorado River gaging system, which collects streamflow measurements essential for sound water-management decisions.

Many water managers in western states and cities have developed innovative programs and policies for extending limited urban water supplies, but there have been few attempts to synthesize the results from these efforts across the region, the committee noted. And despite advances in understanding of the basin's hydrology and climate, knowledge is lacking on other important topics, such as the environmental effects of water transfers and how best to forecast water demand. The committee noted that urban water demands are far more prominent today than in earlier eras when the compact and other agreements, treaties, and laws governing the river were forged.

The committee called for a collaborative, comprehensive basinwide study of urban water practices and pressing issues in water supply and demand, which should be used as a basis for action-oriented water planning. The collaboration involved in preparing such a report could also promote better communication among federal agencies, states, and municipalities. The proposed study could be conducted by the Colorado basin states, federal agencies, universities in the region, or some combination thereof. The basin states should work with Congress on a strategy to commission and fund the study.

The Research Council study was sponsored by the National Academies, U.S. Bureau of Reclamation, California Department of Water Resources, Metropolitan Water District of Southern California, and the Southern Nevada Water Authority. The National Academies is made up of the National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council. They are private, nonprofit institutions that provide science, technology, and health policy advice under a congressional charter. The National Research Council is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering. A committee roster follows.

Copies of Colorado River Basin Water Management: Evaluating and Adjusting to Hydroclimatic Variability will be available from the National Academies Press; tel. 202-334-3313 or 1-800-624-6242 or on the Internet at http://www.nap.edu. Reporters may obtain a pre-publication copy from the Office of News and Public Information (contacts listed above).

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