

THE FIRST STEP IN REPAIRING THE COLORADO RIVER'S BROKEN WATER BUDGET: SUMMARY REPORT¹

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To say that the Colorado River is important to the semi-arid Southwest would be a vast understatement: it's a partial water supply for 40 million people, a source of irrigation water for 5.5 million acres, the driver of 4,200 megawatts of hydropower generating capacity, and home to more National Parks and recreation opportunities than any region of the country. It is, as many writers have observed, the "American Nile." It is also, however, an incredibly overworked and threatened resource, and virtually all research to date suggests that the situation is likely to worsen without significant reforms.

As university-based researchers focused on the river, those of us comprising the Colorado River Research Group (CRRG)² are encouraged by the public attention the river has received in recent years, and applaud the numerous studies that have delved deep into the relevant issues. However, we cannot help but observe that the mountains of new data and technical studies may have unintentionally hidden what is, in reality, a conceptually simple problem with an equally simple and inescapable solution: water users consume too much water from the river and, moving forward, must strive to use less, not more. Any conversation about the river that does not explicitly acknowledge this reality is not helpful in shaping sound public policy. On the other hand, embracing this reality opens the door for countless innovations and reforms that can sustain the economic, environmental and social benefits that we desire from the Colorado. But in dozens of cases throughout the basin, water user groups continue to pursue more and more consumption from the river, and the "hard truths" about the basin's water budget go unheeded.

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¹ The issues in this Summary Report are explored in more detail in a supporting Technical Report, which includes links and citations for the material presented herein. (See www.coloradoriverresearchgroup.org.)

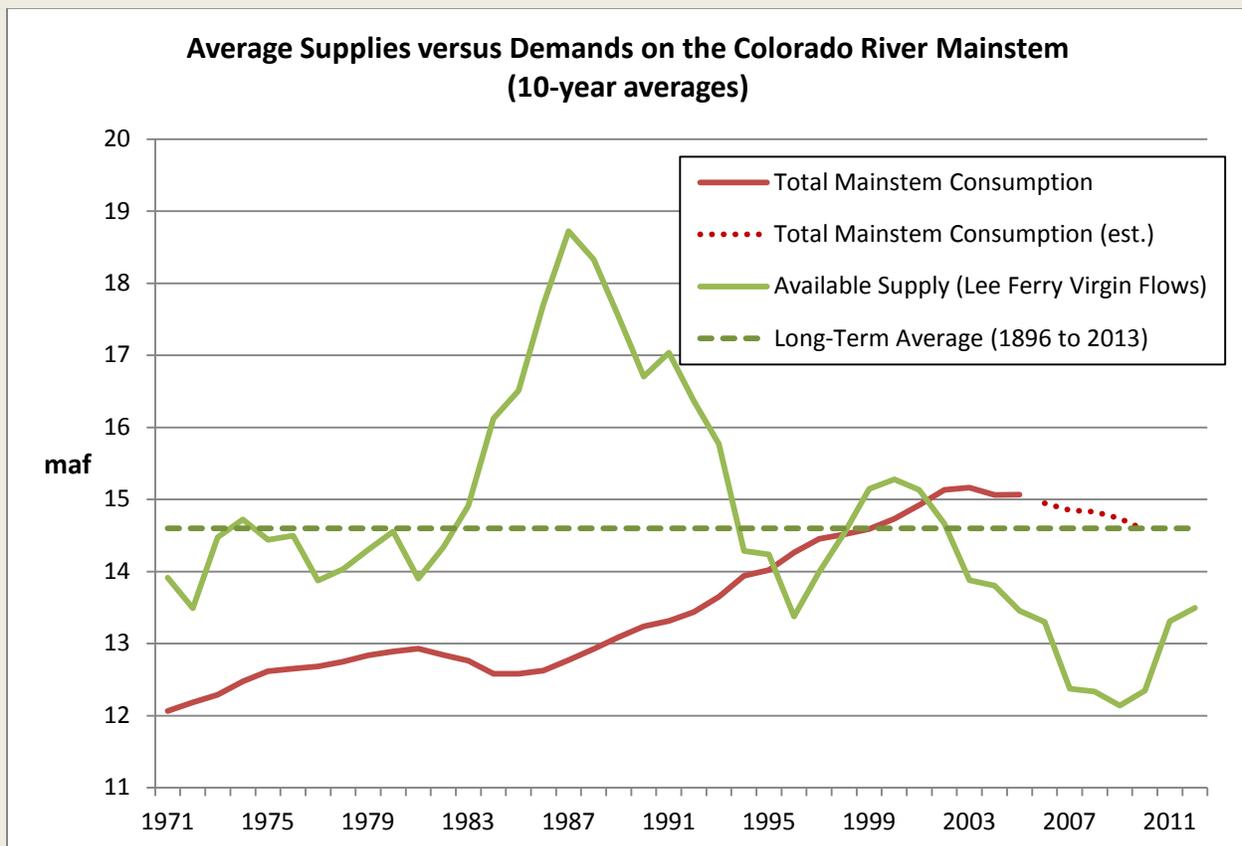
² The CRRG is a "self-directed group of 10 veteran Colorado River scholars assembled to provide a non-partisan, academic voice on matters pertaining to science, law and policy on the Colorado River, helping all those with a stake in the river identify, justify and implement actions consistent with long-term sustainable management."

THE WATER BUDGET: OUT OF THE FRYING PAN

No image better conveys the troubling hydrologic reality of the Colorado than the “bathtub rings” that now encircle Lakes Powell and Mead. Well over 100 feet high in Lake Mead, the rings provide an inescapable visual reminder the reservoirs of the Colorado are in a sharp decline threatening all the values associated with full reservoirs, including water supply reliability, hydropower generation, and recreational opportunities. From 1999 to 2004, these two reservoirs—the largest in the United States—lost half of their water, an amount enough to sustain present-day Las Vegas for over 80 years. Conditions improved somewhat due to a very wet 2011, but the reservoirs have not refilled and curtailments to water users remain a growing likelihood.

Why are the massive reservoirs throughout the Colorado River basin so empty? A reservoir is a bank, no different than a savings account to which you make deposits (inflows) and withdrawals (outflows). Throughout most of the 20th century, inflows into the storage banks of Powell and Mead consistently exceeded outflows. However, demands have grown over time, and by the turn of the 21st century, had caught up with supplies (see figure below). When the latest drought hit, the result was predictable: we lost much of our savings. And it’s not just the reservoirs. Greater losses have been measured for our aquifers than the reservoirs. The combined forces of growth and drought have busted the water budget.

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Our prospects for improved streamflows in the future do not look good. Hopefully the current drought ends soon, but a recovery to the “normal” of the 20th century seems unlikely. In fact, the latest synthesis of the climate science indicates flows could decline 5 to 35 percent by midcentury. To put that in perspective: the drought conditions we have experienced since 2000 could, in fact, become the new normal, and the baseline from which future drought events would more frequently occur. These are projections, not facts, but this is the best science, and the region has already warmed 2°F in just the last 3 decades.

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Fortunately, the demand side of the water budget equation is something that can be managed. So what is the plan? According the *Basin Study*—the detailed review of conditions and projections compiled by the federal government and basin states in 2012—the plan is to *increase* consumption by 2060 in every basin state. Figures vary widely by scenario. The *minimum* increases identified in study scenarios are: Arizona (4 percent), California (4 percent), Colorado (6 percent), Nevada (63 percent), New Mexico (13 percent), Utah (10 percent), and Wyoming (13 percent). In almost every case, the high growth scenarios are at least double these figures. Additionally, consumption is expected to increase among the basin’s many tribes, using water that has been reserved in law if not in physical reality. Depending on the scenario, total increases by states and tribes are expected to total 1.2 to 3.4 million acre-feet per year, or about 8 to 23 percent more than current levels. Still other evidence of an expected growth in consumption is found in the pending claims (permits and conditional rights) found in state water rights databases. Some of these totals are absurd—70 million acre-feet in Colorado, 4.3 million acre-feet in Utah—and cannot be construed to represent anyone’s honest appraisal of expected future action. But the larger message is clear: additional depletions from the Colorado are in the plans of many water user groups.

How is this growth in consumption possible? In short, it’s not, and those water managers that look at the numbers through a basin-wide lens know this. But decisions about which projects to build or not build are rarely evaluated through this lens, and the decision-makers tend to be individuals representing cities and other small pockets of the basin who assert that one more little project won’t make much of a difference. And except for the really big projects, they are usually right; it’s the cumulative impact that is of concern. Those in the upstream states—Colorado, Wyoming, Utah and New Mexico—are also often correct when asserting, typically with the impassioned backing of state leaders, that they have legal rights to more consumption. But this doesn’t change the math and it doesn’t repair the water budget. If everyone takes what they believe is deserved and promised, then everyone losses out on the economic, social and environmental benefits that make the river precious.

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Some cling to the idea of offsetting new consumption by bringing in new supplies. We don’t share that enthusiasm. While supply augmentation is viable in some limited contexts (e.g., desalination to drought-proof an urban center), significant system-wide augmentation cannot occur quickly and is likely to never make sense from an economic, environmental, or political perspective, and focusing on this goal is counterproductive to implementing better solutions. The good news is that there are many better ways to solve the problems we face.

THE PATH FORWARD

Our review of the Colorado River’s broken water budget has been sobering. Despite the complexities associated with the legal issues, system operations, water accounting nuances, information shortages, uncertain climate and demographic projections, and so on, two simple truths have emerged. First, there is plenty of evidence to suggest that the current water budget is unsustainable; it clearly is unsustainable given ongoing drought conditions. The buffers that have historically protected water users from fluctuating inflows have largely been eroded. Second, to pursue new depletions in this environment is exceedingly risky.

When you find yourself in a hole, the first thing you should do is stop digging.
--- *The First Rule of Holes*

As the search for solutions intensifies, we will look with skepticism to all proposals that call for taking more water from the river; simultaneously, we will support ongoing efforts to promote conservation throughout the basin, both in the municipal and agricultural sectors. One of the great (but largely ignored) regional success stories is that many large and rapidly-growing western cities use no more water today than they did a quarter-century ago. Efforts to ratchet such efforts up to a basin-wide scale are emerging, as evidenced by the new Colorado River System Conservation Program and the ongoing work of the municipal and agricultural conservation work groups formed as the “next steps” to the *Basin Study*. And provisional data suggest a recent dip in basin-wide consumption. These are reasons for optimism. But it all means nothing if we ignore the problem of new consumption.

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In future reports of the CRRG, we will explore other elements of the path forward. In general, we will advocate for those options that are flexible and iterative, use science and economics, and that feature a sound collaborative structure that allows constant reassessment and adjustment over time. We see great potential in a greater use of markets and incentives, believing that the historic failure to manage water with respect to sound economic principles is not merely a problem to lament, but is an opportunity to exploit. And we contend that everyone who has received benefits from the river has a

responsibility to support solutions through conservation, funding and other suitable mechanisms. No water user should assume their depletions—either current or projected—are not part of the problem, and none should expect a “free pass” in the search for lasting solutions.