

## Colorado River Basin Water Supply and Demand Study

In December 2012, the Bureau of Reclamation and agencies representing the seven Colorado River Basin States completed the Colorado River Basin Water Supply and Demand Study (Study). Conducted with participation and input from a broad range of stakeholders throughout the Basin, the purpose of the Study was to define future imbalances in water supply and demand in the Basin through the year 2060, and to develop and analyze options and strategies to resolve those imbalances.

*The Colorado River and its tributaries provide water to nearly 40 million people for municipal use, supply water to irrigate nearly 5.5 million acres of land, and is the lifeblood for at least 22 federally recognized tribes, 7 National Wildlife Refuges, 4 National Recreation Areas, and 11 National Parks.*

Authorized by the 2009 SECURE Water Act, the Study analyzed future water supply and demand scenarios based on factors such as projected changes in climate and varying levels of growth in communities, agriculture and business in the seven Basin States of Arizona, California, Colorado, New Mexico, Nevada, Utah, and Wyoming.

The Colorado River Basin is one of the most critical sources of water in the western United States and Mexico. It is widely known that the Colorado River, based on inflows observed over the last century, is over-allocated and supply and demand imbalances are likely to be exacerbated in the future.

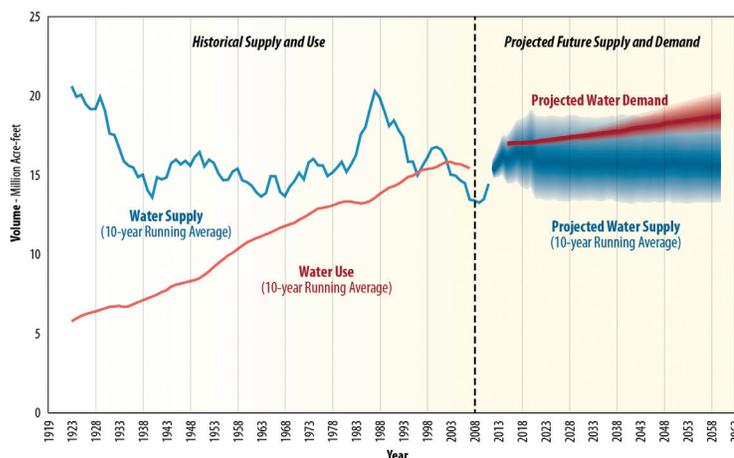
Reclamation considered the needs of Basin resources that are dependent upon a healthy river system, including water for municipal, industrial, and agricultural use; hydroelectric power generation; recreation; fish and wildlife and their habitats; water quality including salinity; flow and water-dependent ecological systems; and flood control, all under a range of conditions that could occur over the next 50 years.



### Study Approach and Projected Range of Water Supply and Demand Imbalances

The amount of water available and changes in the demand for water throughout the Basin over the next 50 years are highly uncertain and dependent upon a number of factors. The potential impacts of future climate variability and climate change further contribute to these uncertainties. A scenario planning process was used to guide the development of scenarios that provide a broad range of future water supply and demand projections, resulting in four scenarios related to future water supply

### Historical Supply and Use and Projected Future Colorado River Basin Water Supply and Demand



and six scenarios related to future water demand. The range of the projected future water supply and demand in the Basin, as determined through the scenario process, is shown above. Without additional future water management actions, a wide range of future imbalances is plausible primarily due to the uncertainty in future water supply. Comparing the median of water supply projections against the median of the water demand projections (medians are indicated by the darker shading), the long-term projected imbalance in future supply and demand is about 3.2 million acre-feet by 2060. The imbalance, however, can be much greater (or less) under any one of the multiple plausible future supply and demand scenarios.

*The Study confirmed that the Colorado River Basin faces a range of potential future imbalances between supply and demand. Addressing such imbalances will require diligent planning and cannot be resolved through any single approach or option.*

## Opportunities to Resolve Supply and Demand Imbalance

To identify a broad range of potential options to resolve water supply and demand imbalances, input from Study participants, interested stakeholders, and the general public was solicited for consideration in the Study. Over 150 options were received and were organized into 4 groups: 1) those that increase Basin water supply, 2) those that reduce Basin water demand, 3) those that focus on modifying operations, and 4) those that focus primarily on Basin governance and mechanisms to implement options. Despite the submission of several options that may ultimately be considered too costly or technically infeasible, the Study explored a wide range of options with the goal of ensuring that all viable options were considered.

Recognizing no single option will be sufficient to resolve future projected supply and demand imbalances, groups of options, called portfolios, were developed to reflect different adaptive strategies. Each of the portfolios consisted of a unique combination of options that were considered to address Basin resource needs that may exist under future combinations of supply and demand.

Commonalities amongst the portfolios included large agricultural and municipal and industrial conservation, and most portfolios included reuse

options. Differences among portfolios were apparent in terms of cost and performance when focusing on future conditions that are particularly stressing to the Basin. The total annual cost, in 2012 dollars for implementing the portfolios ranges from approximately \$3.6 billion to 5.8 billion in year 2060 when considering the more severe futures projected by climate models.

## Next Steps

The Study's portfolio exploration demonstrated that implementation of a broad range of options can reduce Basin resource vulnerability and improve the system's resiliency to dry hydrologic conditions while meeting increasing demands in the Basin and adjacent areas receiving Colorado River water.

The Study indicates that targeted investments in water conservation, reuse, and augmentation projects can improve the reliability and sustainability of the Colorado River system to meet current and future water needs.

Ultimately, the Study is a call to action. There are several areas where next steps should be taken:

- Uncertainties related to water conservation, reuse, water banking, and weather modification concepts must be resolved in order to adequately implement these options.
- Costs, permitting issues, and energy availability issues relating to large-capacity augmentation projects need to be improved through feasibility-level studies
- Opportunities to advance and improve the resolution of future climate projections should be pursued.
- A study of issues related to tribal water use will be conducted by Reclamation and the Ten Tribes Partnership.

As projects, policies, and programs are developed, consideration should be given to those that provide a wide-range of benefits to water users and healthy rivers for all users.

A process began in May 2013 to move forward with the first phase of these steps that build on findings for critical next investigations described in the Study. This process includes stakeholders throughout the Basin and will build on the collaborative approach demonstrated in the Study.

**For additional information on the Study, including the final Study reports, visit us online at:**  
<http://www.usbr.gov/lc/region/programs/crbstudy.html>