

ARIZONA'S FUTURE WATER SUPPLY & DEMANDS

The current challenge facing Arizona is that, although the State has an existing solid water management foundation, water demands driven by future economic development are anticipated to outstrip existing supplies. Water resources planning efforts are instrumental in the identification and evaluation of these challenges. Arizona has been actively evaluating future water supply and demand conditions for decades.

Every ten years, consistent with State statute, ADWR evaluates water supply and demand conditions in each of the State's AMAs – primarily to evaluate the ability to achieve the management goals identified by the Legislature for each AMA under the GMA. Management Plans have been developed in 1985, 1990 and 2000. In 2009 and 2010, in anticipation of the next Management Plan, ADWR developed a demand and supply assessment for each of the five AMAs to: (1) evaluate the AMAs current status and ability to achieve the management goals and (2) to frame the discussions for alternative management strategies needed to meet and maintain those goals. Additionally, ADWR also produced the *Arizona Water Atlas* in 2010 to provide water-related information on a local, regional and statewide level to frame and support water planning and development efforts. The development of the Atlas also has spurred the development of a statewide water resources data repository housed at ADWR, which is continuously updated as water use information is reported and collected. These are on-going efforts that are either aimed at specific regions of the State or provide past and present water use information.

Since 1980, Arizona has also developed, or partnered in, comprehensive and prospective statewide (see Appendix III) and multi-state planning efforts. More recently, the Water Resources Development Commission (WRDC) was an Arizona-only effort aimed at projected future statewide water demands and available water supplies for the next 25, 50 and 100 years. *The Colorado River Basin Water Supply and Demand Study* (Bain Study) was developed by Reclamation in cooperation with the seven Basin States (Arizona, California, Colorado, New Mexico, Nevada, Utah and Wyoming) to define current and future imbalances in water supply and demand in the Colorado River Basin and the adjacent areas that receive water from the Colorado River, through 2060. The findings of these large-scale prospective efforts are discussed below.

Colorado River Basin Water Supply and Demand Study

Although the Basin Study was completed after the WRDC, it will be discussed first since it only addresses a certain portion of Arizona's total water supply and only examines those areas where that supply is currently being utilized. However, some assumptions were also analyzed for the utilization of this supply to meet future growth in other areas of Arizona in excess of its 2.8 MAF entitlement to address expanded growth within Arizona, though this does not mean Arizona is seeking an increase in its entitlement.

The Colorado River system spans seven western states. It serves the municipal uses of nearly 40 million people and supplies water to irrigate nearly 5.5 million acres of land. The Colorado River is also an important resource for wildlife and recreation, and hydroelectric generation from water stored at dam sites along the Colorado River totals about 12 billion kilowatt-hours per year. The power is shared among several western states³³. The Colorado River also flows into Mexico where it is a vital resource

³³ <http://www.waterencyclopedia.com/Ce-Cr/Colorado-River-Basin.html>

for agricultural and municipal water users. Reservoirs have been developed on the River to store almost four years of the natural flow of the River (60 MAF) and, while the West has been in the grips of the worst 14-year drought in the last century, the needs of these users have been fully met by this system. With the continued uncertainty of the magnitude and duration of the drought gripping the Colorado River Basin, and the need to meet the increasing demands that are anticipated in the Western States, Reclamation, in cooperation with the seven Basin States, conducted a study to determine the current and future imbalances in the Basin through 2060. The study area included the Colorado River Basin and adjacent areas dependent on this resource (see *Figure 7 - Colorado River Basin Study Area*)³⁴. The Basin Study was released in December of 2012.

This extensive study estimated that population within the study area is projected to increase from about 40 million people in 2015 to between 49.4 million and 76.5 million people by under the slow growth and a rapid growth scenario, respectively. As a result of this increased population, and factoring in Mexico's 1.5 MAF 1944 Treaty allotment and losses due to evaporation and system operations, projected demands in the Basin may range between 18.1 MAF (slow growth scenario) and 20.4 MAF (rapid growth scenario) by 2060. Over the past 10 years, the Colorado River's yield has averaged about 15.3 MAF annually. Comparing the median water demand projections to the median water supply projections, the long-term projected Basin-wide imbalance is estimated to be 3.2 MAF by 2060. However, the actual imbalance may be much larger, or could be slightly smaller, depending on the availability of water and actual growth in the region.



Figure 7. Colorado River Basin Study Area (Reclamation, 2012)

³⁴ Source: US Bureau of Reclamation

The Basin Study process incorporated a broad range of input from the Study participants, interested stakeholders and the general public to identify possible options to address the supply and demand imbalances. These options were not extensively evaluated during the study due to time and resource constraints, however, over 150 options were submitted and were organized into four groupings:

- 1) Increase Supply – Options that increase Basin water supply;
- 2) Reduce Demand - Options that reduce Basin water demand;
- 3) Modify Operations – Options that focus on modifying how the River is operated; and
- 4) Governance and Implementation – Options that mainly focus on Basin governance and mechanisms to facilitate optional implementation.

The specific options were identified in the Basin Study, setting the framework for the next step discussions currently underway between the Basin States attempting to address these future imbalances³⁵. This Strategic Vision will be a tool that will help guide ADWR in our deliberations in these discussions.

Water Resources Development Commission

Recognizing that water is essential to Arizona's prosperity, the Legislature passed House Bill 2661 in 2010 establishing the WRDC. The WRDC was tasked with assessing Arizona's water demands and available supplies to meet those demands for the next 25, 50 and 100 years. Seventeen Commission members, representing various Arizona industries and water users from a regional and geographic cross-section of the state, were selected for their knowledge about various water resources and water management issues in Arizona. Additionally, nine ex officio members representing state and federal agencies and the Governor's office participated on the Commission.

The findings of the WRDC were based on the combined work of many individuals in developing forecasted water demands for municipal, industrial, agricultural and tribal uses and current and projected water supplies to meet those demands. Additionally, the WRDC prepared an inventory of Arizona's water-dependent natural resources, providing future planning efforts valuable information on the State's water supplies and the environmental resources they support. Work was also done on identifying possible mechanisms to finance the development of additional water supplies and the associated infrastructure needed to deliver those supplies.

The WRDC found that Arizona has grown from a population of 2.7 million people with an economy of approximately \$30 billion in 1980 to nearly 6.6 million people with an economy of \$260 billion by 2009. Estimates for population growth in Arizona were developed for 2035, 2060 and 2110. The population estimates for these years are 10.5, 13.3 and 18.3 million people, respectively. Annual water demand is expected to grow from current levels of 6.9 MAF to between 8.2 and 8.6 MAF in 2035; between 8.6 and 9.1 MAF in 2060 and between 9.9 and 10.5 million acre-feet in 2110.

The WRDC also analyzed the availability of currently developed supplies. Baseline water supplies were catalogued within each groundwater basin in the State. These supply sources included: existing developed groundwater resources; in-state surface water diversions; existing developed reclaimed

³⁵ Colorado River Basin Supply and Demand Study – Executive Summary, December 2012 – Table 2: Summary of Representative Options Including Cost, Timing, Potential Yield, and Inclusion in Portfolios, p. 13

water supplies; mainstem Colorado River water; and CAP water. The total water supply that is currently developed or readily available to meet existing demands is approximately 7.7 MAF. Additional groundwater and reclaimed water supplies are also available to meet future demands. However, the availability of these water supplies may be constrained to specific water right holders, specific places of use within the State and, in the case of in-state surface water, Colorado River water and CAP water, subject to possible shortages due to drought.