

**Testimony of Thomas Buschatzke**  
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**COMMITTEE ON ENERGY AND NATURAL RESOURCES**  
**SUBCOMMITTEE ON WATER AND POWER**  
**United States Senate**  
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**Chairman Flake, Ranking Member King and members of the Subcommittee:**

**I. Introduction**

My name is Tom Buschatzke and I am the Director of the Arizona Department of Water Resources. Thank you for providing me an opportunity to present testimony on behalf of the State of Arizona as the subcommittee examines the issues of increasing water supplies for drought preparedness through infrastructure, management, and innovation.

Arizona has a long-standing philosophy regarding drought preparedness and water management: continuously develop and improve the legal framework, policy prescriptions, institutions and infrastructure needed to create certainty so that reliable and secure water resources are the pillar upon which the State builds its economy, grows its population, and maintains a superior quality of life for its citizens. While Arizona has a history of partnering with the federal government and its neighboring states, it has always maintained an ethos of first taking actions within the State to better manage its water supplies and to be prepared for drought.

Flexibility to manage water supplies and adaptation to drought conditions are part of Arizona's history and will continue to be a key management strategy now and in the future.

## **II. Background**

The State of Arizona and its water users have a long history of developing water supplies and the necessary infrastructure to deploy those supplies to maximize their benefit to the citizens and businesses in our State. Sound management of those supplies has been a primary focus in our State and the arid nature of Arizona is a constant reminder of the value of every drop of water available to us. Arizona is fortunate to have a diverse portfolio of water supplies. Arizona currently uses about seven million Acre-feet of water per year statewide which comes from the following sources: the Colorado River-41%; groundwater-40%; in state rivers-16%; and reclaimed water reuse-3%.

Arizona has a long history of collaboration and innovation in managing its water supplies. Private development of water resources was the paradigm in Arizona's territorial days. As we moved toward statehood in 1912, the Reclamation Act of 1902 offered new opportunities to increase water supplies and to build infrastructure to create more reliability for our existing supplies. Some of those success stories include the Salt River Project, the Gila Project, the San Carlos Project, the Mojave Valley Irrigation District, the Wellton-Mohawk Irrigation and Drainage District, the Yuma County Water Users' Association, the Yuma Mesa Irrigation District, the North Gila Valley Irrigation and Drainage District, the Yuma Auxiliary Project-Unit B, and the Central Arizona Project.

Arizona took a major step forward regarding its legal and policy framework for managing water supplies in 1980. Arizona adopted the Groundwater Management Act, a groundbreaking set of laws that managed our finite groundwater supplies and incentivized conjunctive use of surface water and groundwater. The Act was a hard-fought compromise between agriculture, industry, mining interest and municipalities. The Act imposes stringent water management regulations in the areas of the state designated as Active Management Areas, or "AMAs." Within AMAs, mandatory water conservation

requirements are established for municipal, industrial, and agricultural water users. Agricultural acreage is capped, with no new agricultural land allowed to be put into production after 1980. Turf acreage is limited on new golf courses and so is the amount of water they can use. New housing developments are required to show that they have a 100-year renewable water supply before they can be built. Outside of AMAs, community water systems, i.e., municipal providers, are required to have conservation and drought management plans in place and agricultural acreage is capped in areas designated as Irrigation Non-Expansion Areas.

The overarching goal of the Act is to preserve finite groundwater supplies for use when drought has reduced surface water supplies. These aggressive water management actions reduced Arizona's water use over time while the State's population and economic output have increased. One result is that Arizona's dependence on groundwater has decreased from 53% in 1980 to 40% today.

### **III. Arizona's Drought Vulnerability**

Arizona has been under an emergency drought declaration since 1999. The Governor of Arizona makes that declaration annually pursuant to a recommendation from the Governor's Drought Interagency Coordinating Group. The declaration relates to conditions "on the ground" in Arizona as well as drought impacts to water supplies.

The west-wide drought presents some unique challenges for all Colorado River users and the State of Arizona. The Colorado River watershed is entering its 17<sup>th</sup> year of below average runoff due to drought. Arizona stands to lose 320,000 Acre-feet of its 2.8 Million Acre-feet Colorado River allocation when a Tier 1 shortage is triggered by order of the Secretary of the Interior pursuant to the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations of Lake Mead. Under the Interim Guidelines a projection of the elevation of Lake Mead is made in mid-August for the first day of the next calendar

year. If that projection shows Lake Mead falling below elevation 1,075 feet then a Tier 1 shortage is put into place starting on January 1 of that year. Today, Lake Mead is at elevation 1,079<sup>1</sup> feet. The probability of a shortage declaration in the Lower Basin of the Colorado River had been steadily increasing over the past few years. While there has been some modest improvement in the shortage probabilities there is still an unacceptable risk of shortage. The probability of a shortage in calendar year 2019 is 31% and that increases to 32%<sup>2</sup> for 2020. It is important to note that a Tier 1 shortage triggers reductions for Arizona, Nevada and the Republic of Mexico but not for California. Arizona shoulders the brunt of the shortage among the three states and Mexico, about 84% of the total. This is one of the driving forces requiring the State to look within its borders to create drought mitigation programs.

Deeper shortages will occur if Lake Mead's elevation continues to decline. Between elevation 1,050 feet and 1,025 feet a Tier 2 shortage results in Arizona suffering a reduction of 400,000 Acre-feet and at elevation 1,025 feet Arizona loses 480,000 Acre-feet, a Tier 3 shortage. The probabilities of Tier 2 and 3 occurring have also been increasing as the drought continues. If Lake Mead's elevation continues to drop and falls below elevation 1,025 feet, the volume of shortage to Arizona is unknown at this time. This uncertainty further galvanizes Arizona's efforts to aggressively take actions to have drought mitigation activities in place.

Low reservoir conditions in the Colorado River system impact not only water users, but directly impact the production of hydroelectric power from major dams on the River. Hoover Dam's generating capacity during the current drought has decreased from a maximum of 2,074 Megawatts to 1,602 Megawatts, a 23% decrease. On average, a one foot drop in the

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<sup>1</sup> Based on USBR Lower Colorado River Region's weekly Colorado River water supply report for July 24, 2017.

<sup>2</sup> Based on USBR Lower Colorado River Region's Colorado River April 2017 24 MTOM/CRSS Study and resulting projections of Lake Mead elevations.

elevation of Lake Mead decreases the generation capacity by about 5 Megawatts. Glen Canyon Dam hydropower production is eliminated if Lake Powell falls below elevation 3,490 feet, and United States Bureau of Reclamation has indicated that impacts to power production could occur at elevation 3,525 feet.

The drought also causes other impacts indirectly related to reduced precipitation. The health of the watersheds of the Colorado, Salt, Verde and Gila Rivers is an increasingly important issue in the region. A number of national forests in Arizona were created primarily for watershed protection and are indicative of the fact that forest health and water supply are closely connected. The drought has exacerbated issues associated with poor forest management including fuels and timber management so that the risk to our forests from catastrophic wildfires is increasing.

#### **IV. Innovation and Continuous Improvement**

##### **Reuse of Reclaimed Water**

Arizona's history also includes a strong commitment to recycling and reuse of reclaimed water. Arizona was reusing substantial volumes of reclaimed water long before reuse became a common practice. The poster child for reuse in Arizona is the Palo Verde Nuclear Generating Station in the Phoenix metropolitan area. The Nuclear Generating Station contracts for 80,000 Acre-feet per year and uses 72,000 Acre-feet per year of treated municipal wastewater from the 91<sup>st</sup> Ave Wastewater Treatment Plant which serves five cities in the region. The 2010 agreement is for a 40-year term and replaces an earlier agreement from 1973. Palo Verde produces up to 4,200 megawatts of power and serves about 4 million people in four western states. Technological advances and improved management practices have increased efficiency in the use of the water by the cooling towers and has substantially reduced water use since the startup of the plant in 1986.

## **Improving the Groundwater Code**

The 1980 Groundwater Management Act has been improved over time as new programs and tools were identified. In 1986, the Arizona Legislature established the Underground Water Storage and Recovery program to allow persons with surplus supplies of water to store that water underground and recover it at a later time for the storer's use. In 1994, the Legislature enacted the Underground Water Storage, Savings, and Replenishment Act (UWS), which further defined the recharge program. Water quality protections are part of this program.

There are several mechanisms used to accomplish the storage requirements and certify the creation of "long-term storage credits" that can be accessed in the future. One way to earn long-term storage credits is to put Colorado River water or reclaimed water into basins constructed for the purpose of allowing the water to infiltrate into the underlying aquifer. Long-term storage credits can also be earned by supplying a substitute surface or reclaimed water supply to a farmer who is pumping groundwater. The groundwater left in the ground by that farmer creates long-term storage credits. This method for creating long-term storage credits leverages existing infrastructure: the canals, laterals and wells being used by the farmer.

Another commonly used method to create long-term storage credits is to utilize existing dry streambeds. Water is delivered into those streambeds and infiltrates into the groundwater aquifer. Infiltration rates can be enhanced by the construction of basins or berms. A less frequently used fourth mechanism is to put surface water or effluent directly into the aquifer through injection wells.

Protections are in place to ensure that the addition of water to the aquifer through this program does not harm the aquifer's water quality. Protections also ensure that existing structures extending below land surface are not damaged by rising water levels.

The Underground Water Storage and Recovery program serves multiple objectives and integrates sustainable water supply management and drought protection. Water users in Arizona have taken advantage of this program to create volumes of water to protect against reductions in surface water supplies due to drought. Long-term storage credits can be used to meet the 100-year requirement for residential growth to demonstrate that it is using renewable water supplies. Long-term storage credits are fungible and can be sold from one water user to another, thus creating a market mechanism to help manage water supplies in Arizona.

The State recognized the value of the Underground Water Storage and Recovery Program and in 1996 created the Arizona Water Banking Authority. This state agency is charged with storing water underground to backfill shortages of Colorado River water for municipal, industrial and tribal entities that have their water delivered to them through the Central Arizona Project and for certain municipal and industrial Colorado River water users who have contracts directly with the Secretary of the Interior. To date the Water Banking Authority has stored about 4.1 Million Acre-feet for these purposes. The Water Banking Authority's powers also include the ability to engage in interstate banking of Colorado River water with California or Nevada. To date the AWBA has stored 601,000 Acre-feet for Nevada. Water was stored in Arizona for California but that has all been recovered by California.

### **Proactive Measures to Protect Lake Mead and the Colorado River System**

Arizona recognizes that the risks to its Colorado River supplies associated with the on-going drought and the over-allocation of water supplies for the Lower Basin States of Arizona, California and Nevada are great. It has conscientiously pursued a strategy to create resiliency to respond to drought impacts through its internal activities, policies, and legal framework. But we recognize that more needs to be done.

Collaboration is another key strategy that Arizona is pursuing to deal with the Colorado River. Actions taken in concert with the federal government through the Department of the Interior and the Bureau of Reclamation, California, Nevada, Utah, Wyoming, Colorado and New Mexico are critical to a successful outcome. Likewise, including the Republic of Mexico as a valuable partner in managing the Colorado River system is a key tactic.

The 2007 Interim Guidelines set the stage for conjunctively operating Lake Powell and Lake Mead and set the shortage triggers and volumes for Arizona and Nevada in the Lower Basin. Signed on November 20, 2012, Minute 319 of the 1944 Mexican Water Treaty brought Mexico into the fold so that they would take shortage reductions at the same elevations in Lake Mead and in the same proportions as Nevada and Arizona through the term of Minute 319, which expires at the end of 2017. The total shortage volumes were intended to reduce the risks of Lake Mead falling to levels where draconian shortage levels could be imposed. It has become evident that the total existing shortage volumes attendant to the 2007 Guidelines and Minute 319 do not sufficiently reduce the probabilities that Lake Mead could fall to draconian levels. That revelation led to a realization by Arizona and the Basin States that additional actions to achieve the original goal of the 2007 Guidelines, reducing the probabilities of Lake Mead falling to unhealthy levels, were needed.

### **The Drought Contingency Plan - A Work in Progress**

Arizona, Nevada and California along with the Bureau of Reclamation are negotiating a “Drought Contingency Plan” (“DCP”) to add to the protections created in the 2007 Guidelines. While that Plan has not yet been finalized, it is nearing completion. Under the DCP, California would for the first time agree to take reductions to help protect critical Lake Mead elevations. The DCP incentivizes the conservation and storage of Colorado River water in Lake Mead by improving existing management

tools. Those tools are system conservation and Intentionally Created Surplus, methods to bolster the contents of Lake Mead through conservation. Those conservation volumes increase the water surface elevation at Lake Mead and work to delay or avoid shortage reductions for Arizona, Nevada and Mexico. The Plan creates greater flexibility to store water in Lake Mead and to take it out when needed to incentivize more storage in the Lake. That increased flexibility creates benefits for California Colorado River water users and is a key factor in their ability to agree to take reductions at lower levels in Lake Mead, because they could offset those reductions by tolling their conserved water account in Lake Mead. Arizona and Nevada could also take advantage of that flexibility for their additional DCP reductions as well.

Arizona believes that the best way to cement the commitments of the parties to the DCP and to create the certainty that the DCP will deliver its intended benefits, including increasing the flexibility to store and recover conserved water from Lake Mead, while protecting the interests of all water users throughout the Colorado River Basin including the States, is to obtain Congressional authorization directing the Secretary of the Interior to execute the agreement and operate the system pursuant to the terms of the agreement.

The DCP is an example of the evolution of the interaction between the Basin States and their ability to find creative ways to take advantage of existing infrastructure, Lake Mead, and tools to better manage the Colorado River system while honoring the rights to Colorado River water that each state enjoys and the certainty those rights create for each state.

## **Mexico as a Valued Partner**

The benefits to the water users in the United States attendant to Minute 319 to the 1944 Mexican Water Treaty include shortage reductions for Mexico, an ability for Mexico to conserve water in Lake Mead that helps to prop up the elevations of the Lake to avoid shortage triggers, and for a portion of conserved Mexican water to be transferred to US water users that provide funding for those conservation projects. The formal approval of that Minute between Mexico and the United States in November 2012 created certainty that the expected outcomes in the Minute would be achieved, including investments in conservation by US water users.

Negotiations on a successor to Minute 319 have been on-going since May 2015. The essential elements of Minute 319 are being repeated in a proposed successor, Minute 323. The Basin States, including Arizona, have been a part of the negotiations with the Mexican delegation along with the Department of the Interior, the State Department and the International Boundary and Water Commission. Corollary agreements that allow all the elements of the Minute to be implemented need formal approval by the Basin States and some water users in those states. Those corollary agreements create certainty. Direct participation by the States in the binational meetings has been critical to the successful negotiation of Minute 323. Arizona is fully supportive of Minute 323 and legislation authorizing me to sign the corollary agreements was signed into law by Arizona Governor Doug Ducey on March 2, 2017. We hope to see approval of Minute 323 and the corollary domestic agreements in early fall 2017.

Minute 323 also contains provisions in parity to those contained in the draft DCP. When the DCP is finalized and becomes effective those parallel provisions in Minute 323 would kick in. Those provisions are known as the “binational scarcity plan” in Minute 323. Mexico is clearly demonstrating its commitment to forging a strong partnership with the

United States and the Basin States in the protection of the Colorado River system.

Many of the features of Minutes 319 and 323 are tied to operations of Lake Mead and rely on elements of the 2007 Interim Guidelines. Those Guidelines were subject to NEPA and other environmental compliance. Approval of Minute 319 and the anticipated approval of Minute 323 rely on the NEPA compliance in place for the 2007 Guidelines. Knowing that NEPA coverage for Minute 323 already exists was one component of Arizona's willingness to negotiate and support Minute 323.

Minutes 319 and 323 are also indicative of the collaborative nature of Colorado River management, innovative thinking and Arizona's commitment to taking the necessary actions to protect its Colorado River entitlement.

### **Settlement of Tribal Water Rights Claims**

Arizona has 22 federally recognized Indian Tribes and 13 have had their water rights determined, in whole or in part, either by litigation or by settlement. Arizona's policy is to pursue settlement of tribal water rights claims rather than to litigate them. The tenet for these settlements is the certainty achieved for the tribal entities, non-tribal entities and the United States, as trustee for the Tribes. A negotiated settlement allows non-tribal entities to better manage the impacts of water rights awarded to Tribes. In addition to avoiding costly litigation, settlement allows for compromise and trade-offs that benefit the tribal, non-tribal and federal parties to the settlements. Tribes receive certainty for their future needs but also often receive funding for infrastructure so that their water supplies can actually be put to use for the benefit of their communities. Creating a mechanism for turning a "paper water right" into wet water, is in one of the key elements of settlements.

Another major benefit of settlements in Arizona is that Tribes have received a right to market their water supplies while protecting the permanent nature of their water right. Arizona Tribes have leased water to neighboring cities, a key tool for achieving an equitable settlement package. Additionally, Tribes may create long-term storage credits under Arizona's Underground Water Storage and Recovery program for their own benefit but also to market the credits for use off-reservation. Marketing of tribal water rights also leverages existing infrastructure. Existing canals, water delivery systems and wells are being used to transport and deliver tribal water that is being marketed.

Arizona Tribes including the Gila River Indian Community, the Fort McDowell Yavapai Nation, the Tohono O'odham Nation and the Colorado River Indian Tribes have participated in programs to conserve water in Lake Mead thus helping Arizona deal with the drought impacts on the Colorado River.

The flexibilities and opportunities created by settlements of tribal water rights have served Arizona's water management goals well. Arizona will continue to seek settlement for the 11 Tribes in Arizona with outstanding water rights claims.

## **V. Development and Deployment of Arizona's Water Resources**

### **The Central Arizona Project Canal**

Arizona is leveraging existing infrastructure to develop and deploy additional water resources. The Central Arizona Project Canal runs from the Colorado River through central Arizona and into southern Arizona in the Tucson area, a total of about 336 miles. The canal is used to deliver approximately 1.5 million acre-feet of water from the Colorado River each year. There is capacity in the canal to move other types of water as well. For example, certain groundwater aquifers outside of central Arizona have been statutorily designated to allow transfer of the groundwater to central Arizona. The CAP canal can be used to transport

that water pursuant to a February 2017 agreement between the operator of the canal, the Central Arizona Water Conservation District, and the Bureau of Reclamation. That agreement is known as the “system use agreement” and it sets out the rules for ensuring that the legal framework governing the use of the canal is honored while taking advantage of the flexibility to move water inherent in the canals design and operation.

The system use agreement also allows the canal to be used for the transportation of long-term storage credits, i.e., water stored underground. That water will be recovered to backfill Colorado River shortage reductions for non-tribal and tribal entities. The canal can also be used to effectuate the marketing of long-term storage credits.

The system use agreement also compliments new water management tools. The Cities of Tucson and Phoenix entered into a landmark exchange agreement in 2014. Phoenix is sending some of its Colorado River water through the CAP canal to Tucson where it is being stored underground. When Phoenix needs the water, Tucson’s CAP water will be delivered to Phoenix and Tucson will use its well to recover Phoenix’ stored water. That exchange leverages the use of the CAP canal and Tucson’s wells creating cost savings, flexibility and drought resiliency for both cities.

Completion of that agreement was a major accomplishment for Arizona.

### **Roosevelt Dam**

An opportunity exists to generate additional water for use in Arizona at Modified Roosevelt Dam, a facility owned by the Bureau of Reclamation and operated by a local entity, the Salt River Project. The dam was originally completed in 1911. Modifications to the dam completed in 1996 added 556,000 Acre-feet of dedicated flood control space, along with new water conservation space and safety of dams space (1,223,000

Acre-feet). A Water Control Manual governs the operation of the flood control space behind the dam. Flood control operations are exceedingly safe and conservative. The safety of dams storage space above the flood control space provides protection for the Probable Maximum Flood.

There is an opportunity to use the flood control space for “temporary storage” when the conservation storage space fills and water remains in the flood control space at the end of the runoff season, typically in April. The water conserved as temporary storage can then be put to beneficial use prior to the next storm season in late fall or early winter. Preliminary modelling by the Salt River Project estimates that an average of about 70,000 Acre-feet per year might be generated under this concept. The model also projects that the yield is highly variable, ranging between zero and 300,000 acre-feet in a year. In fact, water would have been available in 2005, 2008 and 2010 if temporary storage in the flood control space had been an option.

The median yield of the Salt River Project system between 1981-2010 was 680,000 Acre-feet. Adding an average of 70,000 Acre-feet per year, a 10 percent increase, would be a significant addition to the water supplies delivered by the Salt River Project.

In 2008 Salt River Project representatives and local municipal water providers who receive water from the Salt River Project reached out to the Army Corps of Engineers to discuss this concept. Many hurdles were identified and the effort was set aside for future consideration. Streamlining the process for creating temporary storage at Modified Roosevelt Dam can help to make this opportunity come to fruition.

## **VI. Conclusion**

Arizona has created a robust water management structure to maximize its resources and to create and control its own destiny to the maximum extent possible. It has created innovative programs, robust partnerships,

water marketing tools, and leveraged existing infrastructure. It continues to successfully look within the State for solutions to water supply and drought management issues. Collaborative efforts with the United States, other western states and their water users and Mexico have also been key to the success of the State in managing its water supplies and creating resiliency against drought on the Colorado River.

Continuing and building upon those collaborative efforts are an absolute necessity. Minimizing federal oversight, streamlining, and reducing regulations and permitting processes and recognizing that states are the best entities for managing their water resources will allow Arizona to move forward, to innovate and to continuously improve its water management laws, policies and institutions and create a resilient water future for generations to come.