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COMMITTEE ON NATURAL RESOURCES
SUBCOMMITTEE ON WATER, OCEANS, AND WILDLIFE
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Chairman Huffman, Ranking Member Bentz, and members of the Subcommittee:

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 status and management of drought in the Colorado River Basin.

BACKGROUND

In 1980, Arizona took a major step forward in water management when it adopted the Groundwater Management Act, a groundbreaking set of laws to manage our finite groundwater supplies and incentivize conjunctive use of surface water and groundwater. The Act was a hard-fought compromise between agriculture, industry, mining interests and municipalities. The Act imposes stringent water management regulations in the areas of the state designated as Active Management Areas, or "AMAs." Within AMAs, municipal, industrial, and agricultural groundwater users are subject to mandatory water conservation requirements. 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 policy goal of the Act is to reduce reliance on finite groundwater supplies and preserve those supplies for use when drought has reduced the availability of surface water supplies. These aggressive water management actions have resulted in a reduction in Arizona's water use over the same time period that the State's population and economic output have increased. One example of the Act's success is that Arizona's dependence on groundwater has decreased from 53% in 1980 to 41% as of 2019.

Building Upon the Original Groundwater Management Act

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 for use at a later time. In 1994, the Legislature enacted the Underground Water Storage, Savings, and Replenishment Act, which further refined the underground storage 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 facilities 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 would otherwise pump groundwater for irrigation. The groundwater left in the ground by that farmer creates long-term storage credits that can be recovered later by the entity supplying the surface or reclaimed water supply to the farmer. This method for creating long-term storage credits leverages existing infrastructure: the canals, laterals and wells already 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 and that rising water levels do not damage existing structures extending below land surface.

The underground storage program serves multiple objectives by integrating sustainable water supply management and drought protection. Water users in Arizona have taken advantage of this program to store water underground to protect against reductions in surface water supplies due to drought. Long-term storage credits can be used to demonstrate renewable water supplies to meet the 100-year requirement for residential growth. 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 storage program when it created the Arizona Water Banking Authority in 1996. 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 4.3 million acre-feet for these purposes. The Water Banking Authority is also authorized to engage in interstate banking of Colorado River water with California and Nevada. To date, the Water Banking Authority has stored 601,000 acre-feet for Nevada. Arizona previously stored water for California, but California has since recovered that water.

Current Issues of Concern: **Drought and Climate Change**

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 local conditions "on the ground" in Arizona as well as drought impacts to water supplies.

The past two decades of on-going drought in the western United States, and in particular the Colorado River Basin, is challenging the seven Colorado River Basin States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming,

as well as the Republic of Mexico, to meet the needs of the 40 million people and millions of acres of farmland that rely on the River.

The volume of water in Lake Mead has been declining since the Lake was last full in 2000. The cause of the decline is over-allocation of the River and drought-induced reductions in the annual average flow of the River. More importantly, many scientists believe that it is climate change, not drought, that is the root cause of declining flows in the Colorado River system. To illustrate that point, we have seen several years in which runoff is significantly lower than snowpack. For example, in water year 2021, snowpack in the Colorado River Basin peaked at 89% of normal, while runoff was only 33% of normal. This phenomenon is likely the result of the hotter and drier conditions caused by climate change. This trend is one that water managers must take into account as we plan for the future of the Colorado River.

Natural flows in the Colorado River have decreased from the long-term average of 14.8 million acre-feet per year to an average of 13.3 million acre-feet per year over the last 30 years. Future flows of the Colorado River are predicted to be even less.

Actions and Creative tools to manage the Colorado River

Water managers in the Colorado River Basin have been cognizant of the risks to the water supplies provided by the River for decades and have taken numerous actions to address these risks. In 2007, the Secretary of the Interior adopted the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead, commonly referred to as "the Guidelines." The Guidelines require reductions in Colorado River water use by Nevada and Arizona triggered at specified elevations in Lake Mead. Those reductions were intended to slow projected declines in Lake Mead elevations and to reduce the probability of the Lake falling below critical elevations to single digits. The Guidelines also work to balance the contents of Lake Powell and Lake Mead, thus protecting key elevations in both reservoirs. New tools to incentivize conservation in Lake Mead were also developed in those Guidelines. One important tool is "Intentionally Created Surplus" or "ICS," which allows a water user to conserve water that has been historically used and effectively store it in Lake Mead for use at a later date. That tool has been very successful in bolstering water levels at Lake Mead.

After the Guidelines took effect, water managers representing the Basin States began working with the Department of the Interior and the International Boundary and Water Commission ("IBWC") to develop a framework for cooperative efforts between the United States and Mexico in managing the Colorado River. Recognizing the need to include the Basin States in binational discussions regarding the Colorado River, the IBWC adopted Minute No. 317 to the 1944 Mexican Water Treaty to allow for participation by the Basin States. In 2012, in coordination with the Department of the Interior and the Basin States, through the adoption of Minute No. 319 to the 1944 Mexican Water Treaty, Mexico signed on both to the benefits inherent in the Guidelines, such as conserving water for later use, and to voluntary reductions equitable to those mandated by the Guidelines.

In 2013, the Colorado River Basin States concluded that the Guidelines were not robust enough to protect Lake Mead and the Colorado River System. The States embarked on a process to identify and prescribe additional actions to protect the River. Those discussions culminated in the Secretary of the Interior adopting the Upper Basin and Lower Basin Drought Contingency Plans ("DCP") in May 2019.

The Lower Basin DCP requires additional contributions to Lake Mead by Nevada, Arizona and California at targeted elevations. Through Minute No. 323 to the 1944 Mexican Water Treaty, Mexico also agreed to participate in the actions contained in the Lower Basin DCP. The Guidelines and the DCP agreements are in place through 2026. Table 1 shows the volumes of reductions and contributions by participant at each elevation under the combined requirements of the Guidelines and the Lower Basin DCP.

Table 1. 2007 Interim Guidelines Shortage Reductions and Incremental DCP Contributions

Lake Mead Elevation	AZ 2007	AZ DCP	AZ TOTAL	NV 2007	NV DCP	NV TOTAL	CA 2007	CA DCP	CA TOTAL	BOR DCP	MX Min 323	MX BWSCP	MX Total	TOTAL
≤1090 >1075	0	192K	192K	0	8K	8K	0	0	0	100k	0	41k	41k	341k
≤1075>1050	320K	192K	512K	13K	8K	21K	0	0	0	100k	50k	30k	80k	713k
≤1050>1045	400K	192K	592K	17K	8K	25K	0	0	0	100k	70k	34k	104k	821k
≤1045>1040	400K	240K	640K	17K	10K	27K	0	200K	200K	100k	70k	76k	146k	1,113k
≤1040>1035	400K	240K	640K	17K	10K	27K	0	250K	250K	100k	70k	84k	154k	1,171k
≤1035>1030	400K	240K	640K	17K	10K	27K	0	300K	300K	100k	70k	92k	162k	1,229k
≤1030>1025	400K	240K	640K	17K	10K	27K	0	350K	350K	100k	70k	101k	171k	1,288k
≤1025	480K	240K	720K	20K	10K	30K	0	350K	350K	100k	125k	150k	275k	1,475k

Two other key components of the Lower Basin DCP are expanding ICS flexibility as an incentive to conserve water in Lake Mead and establishing an adaptive management provision if projections show a continued decline in the Lake Mead levels.

While the DCP was under negotiation, in light of the need for immediate action, water managers developed another mechanism to protect Lake Mead, beyond the creation of ICS. Water users can reduce their historical use and leave that water in Lake Mead as part of the contents of the River system. Unlike ICS, the conserved water is not recoverable by the entity that created it. That water is referred to as "system conservation." The Bureau of Reclamation has played a crucial role in agreements to compensate those who create system conservation by verifying the reduction in consumptive use.

Table 2 illustrates the efforts of water users in the Lower Basin States and Mexico to preserve the elevation of Lake Mead through ICS and system conservation. The Bureau of Reclamation has shown that since 2014, the collective conservation efforts in the Lower Basin have increased the elevation of Lake Mead by approximately 50 feet. When the Central Arizona Water Conservation District's ("CAWCD") voluntary forbearance of excess Central Arizona Project ("CAP") water and the additional contributions agreed to in the DCP are included, Arizona's contributions by themselves have increased the elevation of Lake Mead by approximately 23 feet, two-thirds of which was for overall system benefit and not for ICS.

Table 2. Water conservation in Lake Mead since 2014.

Arizona	**1.44 maf***
Intentionally Created Storage	498 kaf**
System Conservation	305 kaf
DCP Contributions	133[a] kaf
Other conservation activities	507[b] kaf
Lower Basin	**3.89 maf**
Lower Basin Intentionally Created Storage	2.72[c] maf
System Conservation	376 kaf
DCP Contributions	133[d] kaf
Other conservation activities	664[e] kaf
Lower Basin and Mexico	**4.05 maf**
Mexico's Water Reserve	157 kaf
Lower Basin Intentionally Created Storage	2.72[c] maf
System Conservation	376 kaf
DCP Contributions	133[d] kaf
Other conservation activities	664[e] kaf

*maf = million acre-feet

**kaf = thousand acre-feet

[a] As system water; remaining 2020 contribution of 49 kaf included in ICS balance.

[b] Includes voluntary contributions.

[c] Only includes conservation that has contributed to elevation gain in Lake Mead; total ICS accumulation through 2020 as reported in the 2020 Water Accounting Report is 2.84 maf.

[d] As system water; remaining 2020 contributions of 57 kaf included in ICS balance.

[e] Includes voluntary contributions and other unused water.

Impacts of Colorado River reductions to Arizona and mitigation efforts

In 2022, Tier 1 of the Guidelines will be in effect, requiring additional DCP reductions. Nevada will leave 21,000 acre-feet in Lake Mead; Mexico will leave 80,000 acre-feet in Lake Mead; and Arizona will leave 512,000 acre-feet in Lake Mead. These are significant reductions for our water users.

Arizona has a 2.8 million acre-foot per year apportionment of Lower Basin Colorado River water. When full supplies are available, about 1.5 to 1.6 million acre-feet of this water is used by Tribes, agriculture, cities, water companies and industries in central and southern Arizona through the CAP. The remainder of Arizona's apportionment is used by Tribes, agriculture, cities, water companies and industries along the mainstem of the Colorado River in western Arizona.

Pursuant to established priorities, virtually all the reductions to Arizona in 2022 will be applied to CAP supplies. Water deliveries to the Arizona Water Banking Authority for water banking (underground storage for future recovery), agricultural users, two tribal communities, 12 cities and towns, two private water companies, a community facilities district, the Central Arizona Groundwater Replenishment District and a handful of industrial users within the CAP system will be reduced.

To address these cuts, Arizona has a DCP implementation plan to partially mitigate the impacts. The reductions to tribal communities and municipal and industrial users will be fully mitigated with substitute water supplies or financial compensation. The reductions to agricultural users will be partially mitigated with substitute water supplies and money for infrastructure and efficiency improvements. Water banking will not be mitigated.

The Arizona DCP Implementation Plan is a monument to collaboration and creativity. Funding sources came from the State, CAWCD and non-governmental organizations. A DCP Steering Committee composed of bipartisan State legislative leaders and representatives of the State executive branch, tribes, water users, interest groups, agricultural districts, counties, and the Bureau of Reclamation hammered out the plan over an 8-month time frame. A package of state legislation was passed on January 31, 2019 to effectuate the implementation plan and to authorize the Director of the Arizona Department of Water Resources to sign the

Basin States' DCP Agreements. A total of 22 separate agreements were negotiated and executed to deliver the DCP and the Arizona Implementation Plan.

The Seven Basin States' DCP Agreements and the Arizona Implementation Plan continue 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. That philosophy includes partnering with the federal government, neighboring states and Mexico. At the same time, Arizona has always maintained an ethos of taking actions within the State to better manage its water supplies and to be prepared for and to address the impacts of drought-induced water supply reductions.

Flexibility in managing 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.

Additional Actions and Next Steps on the Colorado River

In August 2021, Bureau of Reclamation projections activated the Lower Basin DCP adaptive management provision, commonly referred to as the elevation 1030' consultation provision. This provision requires Arizona, California, Nevada and the Department of the Interior to "consult and determine what additional measures will be taken to protect against the potential for Lake Mead to decline below elevation 1,020 feet."[1] The three states have been meeting to discuss additional actions to meet that requirement and to identify and resolve the many issues that may attach to those actions. Additional actions could fall into two categories: (1) additional mandatory reductions in use, or (2) additional voluntary conservation of water in Lake Mead through ICS or system conservation.
At this time, the states are focusing on the latter category.

The 1030' consultation process allows the affected states and their water users to determine how best to manage Lake Mead and the Colorado River system. In the alternative, the Secretary of the Interior or a court could impose actions upon us.

[1] Lower Basin Drought Contingency Operations, Section V.B.2.

The latter is an outcome that potentially dictates winners and losers and is not the preferred path of Arizona.

The expiration of the Guidelines and the DCP in 2026 also points to the need to address the operating parameters after 2026. While those parameters are expected to be developed through an administrative process, including environmental compliance under the National Environmental Policy Act and concluding in a record of decision, the Basin States agreed in 2007 to consult on the post-2026 water management framework. The States have embarked on that path and reached out to tribal communities and Non-Governmental Organizations as part of that process earlier this year. That process will likely continue in parallel with the 1030' consultation. From Arizona's perspective, the near-term 1030' consultation is more pressing and a higher priority.

CREATING RESILIENCY TO DROUGHT

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 only nuclear power plant in the world to use reclaimed wastewater for cooling. Since 1973, the Palo Verde Nuclear Generating Station has held a contract for reclaimed water. Palo Verde currently contracts for 80,000 acre-feet per year and uses 72,000 acre-feet per year of treated municipal wastewater from the 91st Ave Wastewater Treatment Plant, which also serves five cities in the region. Palo Verde produces up to 4,200 megawatts of power and serves about four million people in four western states. Technological advances and improved management practices have increased water use efficiency by the cooling towers and substantially reduced water use since the startup of the plant in 1986.

Most of Arizona's municipal wastewater is reclaimed and put to beneficial uses, including indirect potable reuse, agricultural and landscape irrigation, riparian restoration and other environmental uses.

Augmenting Arizona Water Supplies

In 2021, the Arizona Legislature created a Drought Mitigation Fund and a board to administer it. The fund is designed to explore opportunities to augment Arizona's water supplies with new water from outside the State.

One potential project is being explored as part of the implementation of Minute No. 323 to the 1944 Mexico Water Treaty: binational desalination opportunities in the Sea of Cortez. Those discussions are on-going.

Through the Governor's Water Augmentation, Innovation and Conservation Council, in-state desalination opportunities, additional reuse of recycled water, enhanced artificial recharge and other opportunities are also being explored.

Maximizing the use of existing infrastructure

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 the February 2017 System Use Agreement between the CAWCD (the operator of the canal) and the Bureau of Reclamation. The System Use Agreement ensures that the legal framework governing the use of the canal is honored, while taking advantage of the flexibility to move water inherent in the canal's 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 both 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 enables 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 stored underground. When Phoenix needs the water, Tucson's CAP water will be delivered to Phoenix through the CAP canal, and Tucson will use its wells to recover Phoenix's 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.

Forest and Watershed Health

Unhealthy and overgrown forests on National Forest Service lands are fuel for large catastrophic wildfires that affect the health of the Salt River, Verde River and East Clear Creek watersheds in Arizona. Large-scale, high-severity wildfires make average precipitation events extremely destructive; accelerating flood flows and toxic runoff, eroding soils, depositing sediment into water storage reservoirs, and ultimately causing hundreds of millions of dollars in increased treatment costs and reduced water storage capacity. Reservoirs filling up with sediment and ash is a significant concern considering that the Greater Phoenix area is a desert environment that relies on long-term water storage to provide water to millions of people.

Re-establishing healthy forests, through forest restoration, is critical to maintaining and protecting the health of Arizona's water supply. Restoring Arizona forests to a more natural condition through thinning provides a multitude of benefits including:

- Protecting communities, property and lives from wildfires.
- Preventing large-scale, high-severity fires that emit air pollutants and carbon.
- Protecting sustainable and reliable water supplies, water infrastructure, long-term water storage, and preventing against degraded water quality.
- Increasing forest resiliency to natural wildfire, insects, disease, and the effects of climate change.
- Sequestering additional carbon.
- Protecting endangered and threatened species and their habitat.
- Protecting recreation, tourism, and economic opportunities.

On average, approximately 12,000-15,000 acres of thinning occurs every year. The goal is to thin to 50,000 acres per year over the next 20 years.
The State of Arizona has increased its efforts in forest restoration through the Healthy Forest Initiative and partnerships. There is a significant need to increase the pace and scale of restoration to protect Arizona's water supplies.

CONCLUSION

Arizona and the other western states face serious challenges as we grapple with drought and the anticipated hotter and drier future attendant to climate change. Meeting those challenges requires vigilance in monitoring the hydrologic conditions, watershed health and reservoir contents to create programs and implement actions that not only respond to those conditions but reduce the likelihood that more onerous water supply reductions will occur.

Arizona has a history of meeting challenges both on its own and in concert with other water users in the Colorado River Basin and Mexico. Arizona recognizes that it cannot be successful solely on its own, particularly given the challenges we face today. Collaboration with the Basin States and Mexico is the only realistic pathway to achieve success. Likewise, the water users, Tribes and other stakeholders throughout the Basin must be engaged and provide input into actions to protect the Colorado River System. Arizona has embraced that philosophy in the creation of the DCP, the 1030' consultation and post-2026 discussions.

Partnering with the Department of the Interior and the Bureau of Reclamation is also a crucial factor in managing the current conditions of the Colorado River and will be key in managing our future. Reclamation's data and modeling capabilities represent the best available science in providing a baseline for hydrologic conditions and projections to inform decision-making for future actions. Interior and Reclamation have other key resources that can deployed to enhance the sustainability of the Colorado River System.

Moving forward, transparency and inclusiveness are imperative. Arizona benefited by following those tenets in the creation of its DCP Implementation Plan that set the stage for approval of the Seven Basin States' DCP Agreements. Arizona is following those tenets as it continues its internal discussion and as it works with the Basin States, Mexico, the United States and stakeholders on the Colorado River.