STATEMENT OF KATHLEEN FERRIS, EXECUTIVE DIRECTOR
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COLORADO RIVER BASIN WATER SUPPLY AND DEMAND STUDY
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Chairman Schatz and members of the Subcommittee, I am Kathleen Ferris, Executive Director of the Arizona Municipal Water Users Association (AMWUA). Thank you for the opportunity to testify before the Subcommittee on the Colorado River Basin Water Supply and Demand Study (Basin Study).

AMWUA is a non-profit association of municipal water providers in the Phoenix metropolitan area. Our members are the Cities of Avondale, Chandler, Glendale, Goodyear, Mesa, Peoria, Phoenix, Scottsdale and Tempe, and the Town of Gilbert. Collectively, the AMWUA members provide water to over 3.2 million people, more than fifty percent of Arizona's population. Since 1969, AMWUA has advocated for responsible water stewardship that supports economic prosperity and safeguards Arizona's water supplies for future generations.

I am also one of the Chairs of the Municipal and Industrial Conservation and Reuse Workgroup (M&I Workgroup). This Workgroup, comprised of conservation professionals from the Basin states, Reclamation, and representatives of NGOs, was formed as part of the next steps of the Basin Study.

For the past 36 years, I have devoted my professional career to developing and implementing sound water management policies in Arizona. I was one of the drafters of Arizona's Groundwater Management Act, served as the Director of the Arizona Department of Water

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Resources, and was legal counsel to AMWUA for 24 years before assuming the position of Executive Director. With that background, I would like to share my views on conservation and reuse as water management tools and their role in solving future imbalances of Colorado River water. I will also discuss the duties of the M&I Workgroup.

Conservation and Reuse in the Study Area—The Arizona Example

For more than thirty years, conservation and reuse of water have been a way of life in central Arizona. In 1980, Arizona enacted the Groundwater Management Act[1] to "provide a framework for the comprehensive management and regulation of the withdrawal, transportation, use, conservation and conveyance of rights to use groundwater."[2] Prior to 1980, Arizonans had been mining groundwater supplies without regulation to keep up with continually expanding uses. Groundwater mining led to land subsidence, water quality degradation, and costly lawsuits among water users. Finally, after two and a half years of work by a special commission and intense negotiations chaired by Governor Bruce Babbitt, Arizona passed this comprehensive law that is unique in the United States in its far-reaching approach to water management. Hailed in 1986 by the Ford Foundation and the Harvard School of Government as one of the ten most innovative programs in state and local government, Arizona's Groundwater Management Act continues to be one of the nation's most visionary laws for the use and protection of water resources.

The Groundwater Management Act applies to Arizona's most heavily populated areas. These are known as Active Management Areas or AMAs,[3] and encompass approximately 83 percent of the state's population and 57 percent of its water use. Within AMAs, the Act quantifies rights to use groundwater,[4] prohibits new agricultural irrigation,[5] permits new wells to be drilled only

[1] A.R.S. Title 45, Chapter 2
[2] A.R.S. § 45-401.B
[3] A.R.S. Title 45, Chapter 2, Article 2
[4] A.R.S. Title 45, Chapter 2, Article 5
[5] A.R.S. § 45-452

in conformance with well-impact standards,[6] and prohibits the development of new residential subdivisions without a proven 100-year assured water supply.[7]

The Act also requires the Arizona Department of Water Resources to develop progressive 10-year management plans for each AMA, designed to achieve a management goal for that AMA.[8] The management goal for the Phoenix, Tucson and Prescott AMAs is safe-yield.[9] Safe-yield is a long-term balance between the amount of groundwater withdrawn in the AMA and the amount of natural and artificial recharge in the AMA.[10] The management plans must contain conservation requirements for all water users in the AMAs.[11] Because these plans provide the blueprint for conservation in most of Arizona, it is important to understand how they are developed and the strategies that have been employed to increase water efficiency in the AMAs.

The management plans are developed using technical advisory committees and multiple levels of public input. In each successive ten-year period, the preparation of the plans provides the opportunity to analyze the effectiveness of water management efforts. Adjustments in strategies and conservation requirements are made, and additional reasonable reductions in water use are specified. In each management period, the Department of Water Resources has included incentives for the efficient use of renewable supplies, provided technical and financial assistance, and revised programs based on new technologies and practices.

Since the First Management Plan was adopted in 1984, the approach to municipal conservation has been refined, evolving in sophistication and flexibility in each subsequent management period, in response to the growing understanding of the complexities of water management issues. In the First Management Plan, one program was applied to all providers. It quickly

[6] A.R.S. § 45-598
[7] A.R.S. § 45-576
[8] A.R.S. § 45-563
[9] A.R.S. § 45-562
[10] A.R.S. § 45-561
[11] A.R.S. §§ 45-564 through 45.568.02

became apparent, however, that the unique characteristics and growth patterns within a provider's service area greatly influence that provider's ability to reduce per capita use.

Today, there are two primary conservation programs for large municipal providers (those serving 250 acre-feet of water or more annually): the base Total Gallons Per Capita per Day (Total GPCD) Program and the Non-Per Capita Conservation Program (NPCCP). In addition to these programs, each provider must limit water system losses to less than 10 percent and meter all service connections, and is subject to mandatory reporting requirements.

Under the Total GPCD Program, a large municipal provider must limit the annual per capita water use within its service area to a specified total GPCD requirement calculated individually for that provider. Total GPCD includes residential, industrial, commercial, and other uses supplied water by the municipal provider. The actual amount of water withdrawn, diverted, or received by the municipal provider in the calendar year determines compliance. Some deliveries of treated wastewater by the municipal provider are excluded from the calculation to encourage the use of reclaimed water.

The alternative Non-Per Capita Conservation Program requires implementation of specific residential and non-residential conservation measures for interior and exterior water use and a water conservation public education program. Conservation measures selected by the provider must be designed to result in water use efficiency equivalent to that assumed in the provider's total GPCD requirement. The NPCCP is a performance-based program with compliance determined by effective implementation of stipulated conservation measures and required water use reductions.

Under municipal conservation programs, facilities and industries that receive municipal water, including landscaped public rights-of-way, turf-related properties and other non-residential customers, also have specific conservation requirements. These requirements include

limitations on allowable acreage with turf, limitations on water-intensive landscaping for hotels, annual water allotments for turf, and low water use landscaping in rights-of-ways.

The AMWUA members have responded to the challenges of conserving water. Each member has a dedicated water conservation office and expert staff to assist its community. In addition to limiting water system losses to less than 10 percent, repairing and replacing service meters, and setting rate structures that encourage conservation, the members collectively implement 305 best management practices, including:

- Water-waste and irrigation ordinances
- Residential audits
- High water use notification and assistance
- Rebates for converting from turf to water-efficient landscaping
- Training for landscape professionals
- Water use plan requirements for commercial, industrial, and institutional facilities
- Retrofit programs for low-income residents
- Plumbing codes
- Restrictions on water features
- Extensive outreach and education

These individual efforts have paid great dividends, but AMWUA has also seen the benefit of collaborative regional conservation programs and was the forerunner in those efforts, launching the Regional Water Conservation Program in 1982. Through this program we share conservation information, messaging, training and education. We count our citizens as partners by supplying knowledge that encourages individuals to make real changes that foster stewardship of our resources. Because we pool resources and identify common needs, our efforts have greater visibility, reach, consistency and impact.

Recognizing that between 50 and 70 percent of residential water use in central Arizona occurs outdoors, the Regional Water Conservation Program has focused extensively on developing educational brochures to inspire and assist homeowners to design, install and maintain low-water-use landscapes. We have distributed more than 4 million of these brochures and developed award-winning, interactive websites, helping to popularize the shift to water-efficient landscapes across our region.

Research showed that our customers didn't want to be told to conserve—they wanted to learn how to conserve—so our members also developed the multi-media campaign *Water—Use It Wisely*. We have devoted more than thirteen years to this campaign, increasing public consciousness and empowering individuals to conserve, and over 400 public and private entities across our country have followed Arizona's lead. Today, *Water—Use It Wisely* is the largest water conservation awareness campaign in North America.

Since passage of the Groundwater Management Act, the AMWUA cities have also become leaders in the reuse of wastewater, reclaiming 100 percent of the wastewater produced by their citizens and putting it to beneficial uses such as energy production, turf irrigation, agriculture, environmental restoration, and recharge.[12] The uses of this wastewater are many and varied, but one striking example shows the long-lasting and innovative nature of our reuse efforts.

In 1973, AMWUA negotiated an agreement with Arizona Public Service Company to provide reclaimed wastewater to the Palo Verde Nuclear Generating Station (Palo Verde) for cooling purposes.[13] Located approximately 50 miles west of Phoenix, Palo Verde is the largest nuclear generating station in the western hemisphere, producing 4.0 gwh of energy, and supplying power to the grid for the entire southwestern United States. It is the only nuclear plant not

[12] In Arizona, reclaimed wastewater is not groundwater or surface water and the entity that treats the wastewater is free to contract for its disposition. Arizona Public Service Co. v. Long, 773 P2d 988 (1989)
[13] The Agreement was renegotiated in 2010.

located on a large body of fresh water for cooling purposes, and the only nuclear plant in the world to use recycled wastewater for cooling. The 91st Avenue Wastewater Treatment Plant, operated by the City of Phoenix for Phoenix, Glendale, Mesa, Scottsdale and Tempe, provides up to 80,000 acre-feet of reclaimed wastewater annually to Palo Verde through a dedicated pipeline. The plant itself uses water efficiently, recycling it 25 times for cooling purposes. Unlike other nuclear plants, Palo Verde maintains "zero discharge," with no liquid waste discharged to rivers, streams or oceans.

The AMWUA members also work with commercial and industrial facilities to create opportunities to recycle process water and advance efficiency and sustainability. Through an innovative partnership, the City of Chandler and Intel built and operate a facility that uses state of the art technology to treat industrial process water from Intel's semiconductor manufacturing plants to bring it up to drinking water standards. The water is then recharged back into the ground, providing a renewable water supply for the City. Since the beginning of operations, the Chandler Reverse Osmosis Facility has pumped over five billion gallons of recycled water back into the ground, enough water to supply 45,000 households. Intel also uses recycled water in its cooling towers and reclaimed wastewater from a nearby Chandler reclamation facility to irrigate landscaping. This partnership has allowed industrial growth to occur in the City, creating thousands of high-paying jobs, increasing City tax revenues, and boosting the area's economy, while maintaining a healthy water supply.

Water management innovations in Arizona did not end with passage of the Groundwater Management Act. Since 1980, Arizona has enacted progressive laws prohibiting the use of drinking water in man-made development lakes,[14] requiring water conservation plumbing, [15] and encouraging the underground storage of excess water supplies for use in times of drought.[16]

[14] A.R.S. Title 45, Chapter 1, Article 3
[15] A.R.S. Title 45, Chapter 1, Article 12
[16] A.R.S. Title 45, Chapter 3.1

The impacts of these laws on water use in Arizona have been substantial. Demand for water is flattening, despite the dramatic growth of the region. While the population of the AMWUA cities increased by 157 percent between 1980 and 2010, water use increased by only 87 percent. Individual municipal records are equally impressive. The City of Phoenix is the sixth largest city in the country with more than 1.4 million residents. Between 1980 and 2010, the City's population increased by 83 percent, yet the City's total per capita demand decreased by 35 percent and its total water production increased by only 18 percent.

Conservation and reuse efforts outside of the AMAs tell a similar story. Cities in other parts of Arizona have also implemented programs and measures to promote water efficiency, including limits on landscape watering and expansion of turf, tiered rate structures, rebates for low flow appliances, and prohibitions on the use potable water for golf course irrigation. The numbers are dramatic. Statewide, Arizona's population has increased by 470 percent since 1957, but total water use is virtually the same today as it was more than a half century ago.

Water is not just about supporting the population, it drives the economy. In Arizona, we have found that we can have water efficiency and a healthy economy. The attached info-graphic shows that our domestic income continued to increase even as water use became more and more efficient.

In Arizona, codes, ordinances, pricing, and incentives have led new development to build in efficiency on the front end. Efficient fixtures continue to improve interior water use. Desert-adapted landscaping has gained in popularity. Smart irrigation technology is becoming more common. Clearly, Arizonans embrace conservation and reuse to stretch all of our water supplies to ensure sustainable growth and economic prosperity. We are eager to share our successes with the other Basin states.

Conservation and Reuse in the Basin Study

Conservation and reuse are essential to our Colorado River basin economies, but while further implementation of evolving technologies and proven practices can continue to help maximize the use of our existing water supplies, it is doubtful that the projected Colorado River imbalances can be satisfied through conservation and reuse alone.

To estimate the future demand for Colorado River water, Reclamation developed six water demand scenarios. These scenarios include current projected demand, demand based on slow growth or rapid growth, and demand based on enhanced environmental uses. The amount of M&I conservation included in each demand scenario varies, from 478,000 acre-feet for the current projected demand scenario to 1,114,000 acre-feet for the enhanced environment scenario.[17] Reclamation then examined the potential for additional conservation (over and above the amounts estimated in the demand scenarios) by considering three levels of increased conservation "based on assumed levels of reductions and adoption rates" of progressively ambitious best management practices (BMPs).[18] Using this approach, the Study estimates that additional conservation could reduce Colorado River demands by as much as another 1 million acre-feet by 2060.[19] This robust savings figure should be evaluated in light of the following considerations noted in the Basin Study:

- The assumed levels of reductions and adoption rates for best management practices were derived from Colorado and California approaches and applied to the total Study Area demand to result in a Basin-wide estimate of potential savings. "The assumptions were derived for purposes of the Study and do not necessarily reflect realistic or achievable local conservation goals."[20]

[17] Colorado River Basin Water Supply and Demand Study, Appendix F9-10, Table F9-4
[18] Id., Appendix F9-6
[19] Id., Appendix F9-11, Table F9-5
[20] Id., Appendix F9-6

- Many of the BMPs considered in the levels of increased conservation "have already been enacted throughout the Study Area."[21]

- "The potential M&I conservation measures are assumed to apply to the overall Study Area, but significant differences in potential water savings exist between geographies based on the current level of conservation adoption, commercial and industrial base, and climate."[22]

These considerations clearly indicate that the 1 million acre-foot figure should not be relied upon too heavily.

Additionally, the Basin Study makes a distinction between conservation savings for "in-Basin" locations, and conservation savings for "out-of-Basin" locations, such as Southern California and Denver.[23] The Study states:

> In many of the major urban areas receiving Colorado River water, the overall water supply provided to communities consists of a significant portion of other supplies (other surface supplies, groundwater supplies, reuse, etc.) in addition to Colorado River water. In most of these out-of-Basin areas, the supplies are commingled in the water supply and distribution systems before delivery to the consumer. Because conservation measures are end-use water demand reductions, the water savings result in a net demand reduction. In these areas, the net M&I demand

[21] Id., Appendix F9-3
[22] Id., Appendix F9-8
[23] While most of Arizona is located within the Colorado River Basin, municipal uses of Colorado River supplied by the Central Arizona Project are more similar to uses in out-of-Basin areas, since central Arizona is located more than 300 miles from the River. Municipal and industrial uses of Central Arizona Project water were treated like out-of-Basin uses for purposes of this Study.

> reductions may not result in the same amount of demand reduction for Colorado River water. This is the result of the distributed nature of conservation efforts and the inability of conservation to target one type of supply in regions that have diverse water supply portfolios. . . . Water conservation will reduce the overall demand on these supplies collectively, but is not likely to result in a one-for-one reduction in Colorado River demand.

As the next steps of the Study move forward, it will be important to gain a better understanding of how much Colorado River water can, or cannot, be saved by conservation in out-of-Basin urban areas.

The Basin Study also estimates that greater municipal wastewater reuse could potentially reduce Colorado River demands by 930,000 acre-feet by 2060.[24] The Study points out that, "Given the complexity of regional and local water management decisions, it was simply assumed that increased development of reuse reduces water demands proportionally to the magnitude of supply from Colorado River and non-Colorado River sources."[25] This assumption and the role of reuse in reducing demands on the River warrant greater exploration.

From my experience with water conservation and reuse in Arizona, I offer the following perspectives. While GPCD rates can be useful in tracking water use trends over time within a service area, such absolute metrics should not be used to judge relative water use efficiencies among different water providers. These metrics cannot take into account geographical differences, such as climate, and differences in development patterns, lot sizes, cultural and socio-economic conditions, and industrial and commercial uses within a provider's service area,

[24] Id., Appendix F6-3
[25] Id., Appendix F6-2

all of which significantly impact water use. There is no industry standard for how per capita use is calculated. A further complicating factor is that providers meter, categorize, and track customer accounts and end uses in dramatically different ways. There is no apples-to-apples approach that is used by all providers. In short, a provider's progress is best measured in light of the history and future potential within its specific service area.

Efficient water use must also consider the need for viable economic development. Efficiency must allow for uses of water that provide high-paying jobs, increase a city's tax base, provide goods and services to the nation, and improve overall standards of living.

Conservation and reuse are necessary, desirable, and effective water management tools, but they must be supplemented with other measures. In central Arizona, we have found that a comprehensive approach is necessary. Even as we conserve and reuse, we must also augment our supplies and employ other strategies, such as underground storage of water, to ensure that our water supplies are secure, reliable and sustainable. The same can be said for Colorado River water. We must conserve and reuse Colorado River supplies, but we must be mindful of the limitations of these tools. We must explore all of our options, including augmentation, to ensure a balanced and sustainable approach to this complex issue.

Duties of the M&I Workgroup

The M&I Workgroup consists of representatives of all of the Basin states, Reclamation, and several Non-Government Organizations. Carolyn Schaffer, of the Metropolitan Water District in Southern California, and Marc Waage, of Denver Water, serve with me as chairs. We have developed a proposed scope of work for the first phase of the Workgroup's activities. We intend to quantify conservation and reuse savings to date within the Study Area by gathering and examining more detailed data from existing reports, studies, planning documents and other information sources. We will also document successful conservation and reuse programs

that have been implemented in the Study Area and assess the potential to expand these programs to other parts of the Study Area. Ultimately, we will analyze the potential for additional conservation and reuse to help reduce Colorado River water demands.

This is a big undertaking in a short period of time, but we are committed to completing our task. For Arizona, addressing potential Colorado River imbalances is of the utmost importance. For the AMWUA members, it is critical. The Central Arizona Project (CAP), along with Nevada and some Arizona municipal providers on the River, share the lowest priority to Colorado River water in the Lower Basin. In times of shortages, we take the first hit. My members hold contracts to almost 300,000 acre-feet of CAP water, nearly half of the CAP M&I supply. As municipal water providers, we know the necessity of reducing vulnerabilities so that we may continue to provide reliable supplies to our citizens, businesses and industries. We recognize the need to balance competing interests and the value of a healthy River system. We understand the importance of dealing with Colorado River imbalances, just as we have long understood the urgency of managing all of our water resources efficiently.

Arizona and AMWUA appreciate Reclamation's leadership on this crucial issue and look forward to working with Reclamation and the other Basin states to find comprehensive and lasting solutions.

Thank you for your interest in this important issue.