

**Testimony of Thomas Buschatzke
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**COMMITTEE ON ENERGY AND NATURAL RESOURCES
SUBCOMMITTEE ON WATER AND POWER
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Chairman Lee, Ranking Member Hirono 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 regarding S. 2902, the Western Water Supply and Planning Enhancement Act. The on-going drought in the western United States demonstrates the need for Congressional action that will allow states to: (1) better plan and manage their existing water resources in a manner that creates greater certainty for water users; (2) leverage existing infrastructure to generate more water supplies; (3) manage watersheds to increase their yield; and (4) protect those watersheds from being degraded by catastrophic fire. If enacted S. 2902 will provide new tools to help achieve those four goals.

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 for our State; 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. Our State currently uses about seven million Acre-feet of water per year statewide which comes from the following sources: the Colorado River-40 percent; Groundwater-40 percent; in state rivers-17 percent; and reclaimed water reuse- 3 percent.

Arizona has a long history of collaboration and innovation in managing our water supplies. We have participated in interstate and international agreements to protect our Colorado River water supplies, extending from the Colorado River Compact of 1922 to recent agreements with Mexico through Minute 319. Arizona has created institutions over many decades that provide certainty for our water users. Some of those success stories include the Salt River Project, the Gila Project, 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, the Central Arizona Project, the 1980 Groundwater Management Act, the Underground Storage and Recovery Act and the Arizona Water Banking Authority. Arizona and its water users have taken proactive measures and made hard choices over many decades to ensure a high quality of life for our

citizens and a vibrant economy and will continue to do so in the face of the on-going drought in the West.

Despite the actions and choices made by Arizona, uncertainty remains and the vulnerability of our water supplies to drought is a matter of constant attention among water providers, water users and water managers around the state. 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.

In keeping with the long-standing practice of Arizonans stepping up to work together to address challenges to water sustainability, the provisions of S. 2902 that I discuss in my testimony reflect a consensus list of Arizona's federal water priorities. They are the result of comprehensive in-state discussions among a broad group of water users. That process proceeded from a meeting on April 1, 2015 between Governor Ducey, Senator McCain and Senator Flake to discuss the direction that the State would take with its federal delegation on water issues.

Challenges Imposed by the On-Going Drought

Arizona continues to experience drought and 100 percent of the State falls within "Abnormally Dry" to "Severe Drought" conditions. The Salt and Verde River watersheds are in the sixth consecutive year of drought, which has reduced the surface water supplies utilized in the Phoenix metropolitan area by municipal water providers and agriculture. That has resulted in an increase in groundwater pumping to backfill the reduction in those surface water supplies. The Salt and Verde River watersheds are also at increased risk to wildfires, as is the Gila River watershed, the other main source of Arizona's in-state river supplies. Allocations of surface water from the Gila River have also been reduced as a result of the drought. To address drought conditions and the impact on our water supplies and water users, the Governor's Drought Interagency Coordinating Group has recommended that a Drought Declaration be adopted by Governor Ducey. That Declaration will allow aid to flow to farmers and ranchers from the United States Department of Agriculture for loss of production and it also raises public awareness regarding drought conditions affecting the State.

The West-wide drought presents some unique challenges for all Colorado River users and the State of Arizona. The Colorado River watershed is in the 16th 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 Secretarial order pursuant to the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and The Coordinated Operations for Lake Powell and 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 were to show Lake Mead falling below elevation 1,075 feet, a Tier 1 Shortage is then put into place starting on January 1 of that year. Today, Lake Mead is at

elevation 1,075.19¹ feet. The probability of a shortage declaration in the Lower Basin of the Colorado River has been steadily increasing during the past few years. The probability of a shortage in calendar year 2017 is 10 percent and that increases to 56 percent² for 2017. 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 burden of the shortage among the three states and Mexico, about 84 percent of the total.

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 creates a difficult task for Arizona: how to plan for a shortage that is unquantified but will undoubtedly be greater than 480,000 Acre-feet. As Lake Mead approaches elevation 1,000 feet, the near-term limit for diversions by Las Vegas, or continues to decline to dead pool at elevation 895 feet, draconian shortages are likely to occur. Reductions in water supply are not the only impacts associated with declining levels at Lake Mead. As Lake Mead elevations decline, the hydropower generating capacity is reduced at Hoover Dam. Hydropower generation at Hoover Dam serves electrical customers in California, Arizona, and Nevada with enough energy to serve 1.3 million people each year. Hoover Dam currently generates about 3,700,000 megawatt hours of electricity each year. The following table illustrates the magnitude of reduction at Hoover Dam:

Lake Mead Elevation	Hoover Dam Capacity ³	Percentage Reduction
1,212 (Jan. 2000 – start of drought)	~ 2,074 MW	
1,076 (July 2015 elevation)	~ 1,551 MW	25%
1,050	~ 1,371 MW	33%
1,000	~ 1,046 MW	50%

³ USBR information August 2013. USBR reports that projected generation capacity is uncertain below elevation 1050 due to unknown impacts of vibration and cavitation on performance at low reservoir elevations.

If a shortage were declared, Hoover Dam could lose as much as 21% of hydropower production from 2015 production levels – a loss equivalent to the electricity needs of 280,000 people. The following table illustrates those reductions:

Lake Mead Elevation	Hoover Dam Generation	Percent Reduction
Current (2015)	3,700,000 MWH	-
1,075 (1st Level Shortage)	3,445,000 MWH	6%
1,050 (2nd Level Shortage)	3,193,000 MWH	13%
1,025 (3rd Level Shortage)	2,915,000 MWH	21%

¹ Based on USBR Lower Colorado River Region's daily reservoir conditions for May 12, 2016.

² Based on USBR Lower Colorado River Region's Colorado River April 2016 24 Month Study and resulting projections of Lake Mead elevations.

³ USBR information August 2013. USBR reports that projected generation capacity is uncertain below elevation 1050 due to unknown impacts of vibration and cavitation on performance at low reservoir elevations.

Impacts on power generation will also occur as Lake Powell's elevations decline. 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.

DISCUSSION OF S. 2902

SECTION 101

This Section directs re-evaluation of flood control operations at US Army Corps of Engineers or US Bureau of Reclamation dams to enhance water storage. In Arizona, an opportunity exists 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 were completed in 1996 and 556,000 acre-feet of dedicated flood control space was added 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, moreover, 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 flood control space has been an option.

The median yield of the Salt River Project system between 1981-2010 is 680,000 Acre-feet and 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. Section 101 provides clarity and potentially streamlines the process to creating temporary storage at Modified Roosevelt Dam and the State of Arizona supports the concept.

SECTION 103

This Section requires the National Academy of Sciences conduct a study on the efficiency of controlling tamarisk to increase water supplies and improve riparian habitats and for the Bureau of Reclamation to create a feasible plan that builds upon the 2012 Colorado River Basin Supply and Demand Study to implement tamarisk control. The Colorado River Basin Water Supply and Demand Study contained the following statement: "Estimates of water savings by removal of tamarisk and replacement by other species range from zero and up to 1.5 are-feet (af) per acre (Nagler et al., 2009). A reasonable estimate

for planning purposes is 0.54 af per acre (Tamarisk Coalition, 2009).” The Basin Study also made clear that additional information is necessary to understand the water savings potential of removing non-native vegetation such as tamarisk from the Colorado River watershed in a cost-effective and environmentally responsible manner.

In the Lower Basin more than 600,000 Acre-feet of water is lost annually due to evaporation, transmission losses and consumption by non-native vegetation.

Cost effective methods to control tamarisk that create additional flow in the Colorado River system can help to alleviate those losses, reduce impacts of the drought, and can add resiliency to the system. That outcome is consistent with the goals of the State of Arizona and I support these provisions.

SECTION 104

This Section amends Title II of the Energy and Water Development and Related Agencies Appropriations Act, 2015 (division D of Public Law 113-235) by replacing section 206 (43 U. S.C. 620 note; 128 Stat. 2312). It effectively provides authority for the Secretary of the Interior to fund or participate in projects to conserve water for the benefit of the Colorado River system. It also authorizes an appropriation of \$10 million each fiscal year 2017 through 2027.

The provisions of this Section build upon the collaborative efforts of the Colorado River Basin States and the Department of the Interior to proactively manage the Colorado River system to improve its health. A major advancement occurred with the approval of the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and The Coordinated Operations for Lake Powell and Lake Mead. That agreement created flexibility for water users in Arizona, Nevada and California to create “Intentionally Created Surplus” by conserving water in one year, storing it in Lake Mead and recovering it for use in a future year. Carefully crafted conditions were attached to this program. One result of this new flexibility was that critical Lake Mead elevations could be protected through the conservation of this water in the Lake. The Basin States continued to seek ways to protect reservoir levels and the health of the Colorado River system.

In July 2014 a pilot system conservation program was created by the Bureau of Reclamation, the Central Arizona Water Conservation District (aka the Central Arizona Project), the Metropolitan Water District of Southern California, the Southern Nevada Water Authority and Denver Water. This program is funded by those partners. In the Lower Basin the program looked to conserve water to benefit Lake Mead and in the Upper Basin to benefit Lake Powell. Unlike Intentionally Created Surplus, this conserved water was dedicated to the system and is not available for future recovery. It was another step forward in management of the River.

That program was followed in December 2014 by the Memorandum of Understanding (MOU) among the United States of America, through the Department of the Interior, Bureau of Reclamation, the

Central Arizona Water Conservation District, the Metropolitan Water District of Southern California, the Southern Nevada Water Authority, the Arizona Department of Water Resources, the Colorado River Board of California, and the Colorado River Commission of Nevada for Pilot Drought Response Actions. That MOU was a best efforts agreement that collectively targets a volume of 740,000 Acre-feet to be stored in Lake Mead to protect critical elevations in the Lake. Both Intentionally Created Surplus and system conservation water are accounted to the target.

The creation of system conservation water is a critical component of efforts to protect Lake Mead elevations because Arizona, Nevada and California and their water users all benefit from this system water. In 2014 and 2015 Arizona created about 120,000 Acre-feet of system conservation water. By the end of 2016 we project that approximately an additional 45,000 Acre-feet will be created. The total system conservation water that Arizona expects to be created in 2014-2016 is 165,000 Acre-feet. This is a significant contribution to Lake Mead that benefits Nevada and California as well as Arizona. Additionally, system water can have benefits to the Upper Basin by reducing the probability that low lake levels in Lake Mead will lead to increased Lake Powell balancing releases. Intentionally Created Surplus is also a valuable tool in protecting Lake Mead but that water is intended to be released from the Lake unlike system water.

Absolute certainty that this system water will stay in Lake Mead is a necessity for Arizona to continue its efforts to create these protection volumes. Arizona has the ability to use water solely for the benefit of Arizona. Its robust water banking program can store all of this water in aquifers within Arizona for future use in the State. Recovery of that stored water is a key strategy for minimizing the impacts to Arizona when a shortage is declared by the Secretary of the Interior in the Lower Basin and Arizona and Nevada have their Colorado River allocations reduced. The decision to store conserved water in Lake Mead rather than in aquifers in Arizona relies on some assurances that the conserved water ultimately will go to its intended purpose.

While Arizona appreciates that the Secretary of the Interior has chosen not to release any of the system water created to date, the State of Arizona supports the provisions in Sec. 104 inserting language at Sec. 206 (a) (2), Division D, PL 113-235 to achieve the outcome of absolute certainty that system water will remain as system water to the benefit of the Basin States.

Section 104 of S. 2902 provides incentive for all water users in the Lower Basin to continue to incrementally add to system conservation measures with the knowledge that the conserved water will provide the benefit that was intended.

Sections 111-114

These Sections apply a streamlined permitting process to forest and wildland restoration activities in critical water supply watersheds. The conditions of the national forest system lands, and certain other wildland areas, in the State are presently near a crisis stage, a circumstance that demands the utmost sense of urgency and meaningful and measurable action. The health of our watersheds is one of the biggest environmental challenges for Arizona in the 21st Century. Drought conditions in the West only magnify the challenges. The largest contiguous ponderosa pine forest in North America, an area encompassing approximately four million acres, extends from the Grand Canyon National Park to the Gila National Forest of western New Mexico. This stand, and the other forested and wildland areas in Arizona, supply water to Arizona communities and provide recreational opportunities for our citizens.

The status of vast portions of these forests is distressingly poor due to several factors. The implementation of certain forest management methods, spanning decades, and including well-intentioned yet restrictive administrative and regulatory constraints, have been counterproductive. Among other things, the practices have resulted in over-stocked and even-aged stands of trees. These dense thickets of low value younger trees, combined with ineffective or injurious fire management schemes, have yielded the conditions for catastrophic landscape scale wildfires, endangering people, flora, fauna, and watersheds.

Unhealthy forests and resulting catastrophic wildfires affect the short and long term management, sustainability, and quality of Arizona's water supply. In Arizona and throughout the west, reservoir storage is a critical component of water supply and drought management. Catastrophic wildfires, unlike the low intensity fires seen in healthy forests, cause burn areas that devastate the landscape and produce increased loads of sediment, ash and debris causing reservoirs to fill up faster and reduce the life and storage capacity of reservoirs. In addition, the loss of trees and groundcover can also affect the timing and behavior of runoff, impacting the predictability and management of water supplies. Heavily forested and steep walled watersheds have characteristics that amplify the impact of sedimentation due to wildfire.

In addition, the water quality impact of catastrophic fire and post-fire flooding has both short and long-term impacts, reaching throughout the watershed, and extending far beyond the immediate impact area of the fire and the surrounding communities. The ash and sediment picked up by runoff after a major fire severely impact the taste and purity of drinking water supplies causing an increase in turbidity, and nutrient and organics loads that must be removed during treatment. Runoff events following fires have also resulted in significant changes in the levels of nitrates, sulfates, and chlorides in runoff. Over the longer term, the increased volume of sediment deposited behind reservoirs due to changes in runoff patterns and soil destabilization can impact the taste and odor as dissolved organics increase in the water. In many cases treatment facilities in Arizona have been upgraded by adding carbon filtration to handle the increased levels of organics and sediment at a cost of hundreds of millions of dollars.

In-pre-settlement conditions estimates show that there were less than 50 trees per acre and today those estimates have risen to over 1000 trees per acre. In the Salt and Verde River watersheds the number of acres impacted by fire has steadily increased from 85,000 acres in the 1980s, to 227,000

acres in the 1990s and to almost 2 million acres in the 2000s. According to the Arizona State Forestry and others, approximately 1.8 million acres of timber have burned since 2002.

These data are indicative of the enormity of the need to take immediate action to reduce the risk of fire in our forests and wildlands. Expediting the permit processes that are needed to restore these areas to a healthy condition is critical. I am encouraged by the expansion, enabled by Sections 111-114 of this bill, of categorical exclusion authority along with the “action/no action” evaluation for certain activities. The incorporation of the categorical exclusion provision in the 2014 Farm Bill, though somewhat limited, was a positive earlier step. S. 2902 would significantly increase the scope of this authorization and could result in accelerated forest restoration activities which would assist in the protection of critical watersheds.

In summary, the State of Arizona supports Sections 101, 103, and 111-114 of S. 2902. Collectively those provisions further the efforts of the State to manage their existing water resources in a manner that creates greater certainty for water users, leverages existing infrastructure in our State to generate more water supplies, creates healthy watersheds to increase their water supply yield and protects watersheds from being degraded by catastrophic fire.