Testimony of Peter Nelson, Chairman
Colorado River Board of California

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 Peter Nelson, and I am the Chairman of the Colorado River Board of California (Board). The Board is the California state agency established in 1937 by the Legislature and is charged with safeguarding and protecting the rights and interests of the State, its agencies, and citizens in the water and hydropower resources of the seven-state Colorado River System. The Board is comprised of ten-members, including representatives from the Coachella Valley Water District, Imperial Irrigation District, Los Angeles Department of Water and Power, The Metropolitan Water District of Southern California, Palo Verde Irrigation District, San Diego County Water Authority, representatives from the California Departments of Fish and Wildlife and Water Resources, and two at-large public members. In my role as Chairman of the Board, I serve as California's Colorado River Commissioner in discussions with my counterparts in the other six Colorado River Basin States and representatives of the federal government. Thank you for providing me with the opportunity to provide this testimony regarding the impacts and challenges of the ongoing drought in the Colorado River Basin to the Subcommittee.

## THE CHALLENGES OF THE "MILLENNIUM DROUGHT"

The Colorado River Basin is experiencing its worst drought in over 100 years of record-keeping, and one of the worst droughts in the past 1,200 years. The period from 2000 through 2021, characterized as the "Millennium Drought", is projected to be the driest 22-year period on record with an average annual natural flow at Lee Ferry of 12.4 million acre-feet (MAF), which is 84% of the long-term average of 14.7 MAF based on the historical period 1906-2021.

Provisional indications are that Water-Year (WY) 2021 resulted in a winter snowpack of about 89% of average but yielded a runoff and inflow into Lake Powell of about 30% of average. This disparity between snowpack and runoff is directly attributed to hotter than normal temperatures in the Basin and extremely dry soil moisture conditions. Currently, the observed unregulated inflow into Lake Powell was 3.52 MAF, or about 33% of average (10.8 MAF over the period 1981-2010). WY-2021 will end up being the third driest year on record (WY-2002 was the driest, followed by 1977). Finally, Water Years 2020 and 2021 are the driest two consecutive years in the historical record (1906-2020).

As of October 7, 2021, Lake Powell has just under 7.3 MAF in storage, or about 30% of capacity. Lake Mead storage is just over 9.0 MAF, or just under 34% of capacity at an elevation of about 1,068 feet. Total System reservoir storage is about 23 MAF (38% of capacity) but has lost nearly 6.5 MAF since this same time last year.

The U.S. Bureau of Reclamation's (Reclamation) August 2021 24-Month Study Report projections for Basinwide water supply conditions was released on August 16th and was used to define operations at both Lakes Powell and Mead for development of the 2022 Annual Operating Plan (AOP) for the Colorado River Reservoir System. Based upon the August 2021 24-Month Study Report, and pursuant to the tier determination criteria in the 2007 Interim Guidelines, it is projected that the annual release from Lake Powell through Glen Canyon Dam in WY-2022 will be reduced to 7.48 MAF (only the second time since 2007 that there will have been a 7.48 MAF release from GCD), and the current projection is that the annual release in WY-2023 could be as low as 7.0 MAF.

The calendar year (CY) 2022 Lake Mead operations are projected to be conducted under a "Level 1 shortage condition", as the August 2021 projection is that Lake Mead will be below elevation 1,075 feet on January 1, 2022. This will be the first time that a formal "shortage condition" has been declared by the Secretary of the Interior; and pursuant to the 2007 Interim Guidelines, 2017 U.S./MX Minute 323, and the 2019 Drought Contingency Plan (DCP), this first-tier shortage condition results in a combined total 0.613 MAF of reductions to Arizona, Nevada, and Mexico during CY-2022. Due to its senior water rights, California does not take any reductions under the Interim Guidelines and does not begin to make DCP contributions to Lake Mead storage until Mead reaches or goes below elevation 1,045 feet.

The August 2021 24-Month Study Report also contains a "minimum probable" (10th percentile) projection that Lake Mead's elevation could reach or decline below elevation 1,030 feet in July 2023. Pursuant to Section V.B.2. of Exhibit 1 to the 2019 Lower Basin DCP, this projection requires a consultation among the Lower Basin States and the Secretary of the Interior to determine if "additional measures" are warranted to bolster storage in Lake Mead and protect the reservoir from reaching or declining below 1,020 feet a critical elevation for water supply (i.e., about 5.5 MAF of live capacity). The Lower Basin States have initiated a technical analysis and evaluation process to identify potential measures that could be developed and implemented to protect Mead elevation 1,020 feet.

Over the past several decades, the Basin has experienced a noticeable shift to hotter, drier conditions, which are straining an already overallocated system. For instance, when comparing 2011-2020 to 1971-1980: (1) precipitation decreased by 0.3%; (2) temperature increased by 2.4 degrees F (1.3 degrees C); (3) natural flow decreased by 8.5%, or 1.2 MAFY; (4) run-off efficiency decreased by 8.4%; and (5) Lower Basin intervening side-inflows decreased by 21.7%, from an average of 0.914 MAFY to 0.716 MAFY. While direct causality of increasing temperatures and reduced water supply in the Basin may not always be clear, the implications of the available climate-change science and data can no longer be ignored.

Within the State of California, WY-2021 has ended up being the second-driest year (1977 being the driest) and follows WY-2020 which was the fifth-driest year on record. The dry conditions in California resulted in a drawdown of reservoir storage to 60% of average at the end of WY-2021. Allocations to California's State Water Project (SWP) contractors in 2020 were 20% of Table A allocations; and declined to 5% in 2021; and the Department of Water Resources has indicated that the initial allocation will be 0% for 2022 and will not increase until sufficient precipitation falls in the Northern Sierra Nevada. Finally, as of mid-summer 2021, 50 of California's 58 counties were under a drought emergency proclamation and following the Governor's call to reduce statewide water use by 15%, MWD issued a water supply alert urging its service area to meet the Governor's water reduction target.

As this Subcommittee is aware, the wildfires of 2020 were catastrophic for California. Over 4.2 million acres were burned in the worst year ever. The impacts on watersheds in California will likely be felt for years to come. The 2021 summer/fall wildfire season in California is shaping up to be nearly as severe. For the first time in the state's history, two large fires have burned from the west side of the Sierras to the east side. As bad as the recent impacts of the drought have been in the Colorado River Basin, they have been equally bad in California.

Finally, in July 2021, the U.S. Department of Commerce's National Oceanographic and Atmospheric Administration (NOAA) Climate Prediction Center reported a "La Nina Watch". The tropical Pacific Ocean is currently in a neutral climate state, but NOAA experts see the potential for La Nina conditions to emerge this fall and winter, with a 70-80% chance of La Nina conditions from November 2021 through January 2022. La Nina conditions across southern California tend to be drier than average, but exhibit a less clear signal for northern California.

COLLABORATIVE PROBLEM SOLVING AND WATER CONSERVATION

California was one of the first states in the Basin to begin extensively developing the use of Colorado River water supplies in the 1870s in the Palo Verde Valley, and by 1920 there were nearly 500,000 acres being cultivated in the Imperial Valley. California was the primary advocate for the federal development of the Lower Colorado River system to provide reservoir storage for flood control and water supply reliability purposes and for a canal that would convey water to the Imperial Valley. These needs were met by the Congress with the passage of the 1928 Boulder Canyon Project Act (45 Stat. 1057) which authorized the construction of what became known as Hoover Dam, Lake Mead, and the Imperial Dam and All-American Canal.

By the late-1980s and into the early-2000s, California's lawful use of mainstream Colorado River water supplies was averaging about 5.2 million acre-feet per year (MAFY). Beginning in early-1990s, California's Colorado River water users began taking meaningful steps to reduce its annual demands to its basic mainstream apportionment of 4.4 MAFY and diversify the available water supply portfolio pursuant to "California's Colorado River Water Use Plan" developed by the Colorado River Board and its member agencies. These activities resulted in the 2003 Quantification Settlement Agreement (QSA), the Nation's largest ag-to-urban water

conservation and transfer program, and initiated mitigation efforts for impacts to the Salton Sea.

With the 2003 QSA in place, the Imperial Irrigation District (IID) typically conserves about 0.500 MAFY and has cumulatively conserved about 6.2 MAF since 2003. The Coachella Valley Water District (CVWD) has banked over 4.0 MAF in its groundwater basins since the 1970s. The San Diego County Water Authority has invested heavily in the conserved water transfer agreement with IID, the cornerstone of the QSA, as well as the lining of the All-American and Coachella Canals and made other investments that have increased storage and expanded local supplies including the nation's largest desalination plant and $1.5 billion Emergency & Carryover Storage Project. The Metropolitan Water District of Southern California (MWD) has developed over 6.0 MAF of storage capacity since the 1980s, a 15-fold increase in storage capacity. Two-thirds of this storage is outside of MWD's service area, and contained in the Colorado River Basin, Central Valley, and with other State Water Project (SWP) contractors. MWD also maintains a long-term cooperative water conservation program with the Palo Verde Irrigation District. As of January 1, 2020, MWD had 3.5 MAF stored (some on behalf of IID and Nevada), its largest amount to date.

The 2001 Interim Surplus Guidelines were intended to help California ratchet down its average annual mainstream water use from 5.2 MAFY to its basic apportionment of 4.4 MAFY, but the onset of the Millennium Drought in 2000 essentially resulted in an immediate cutback to California's basic mainstream apportionment of 4.4 MAFY.

Following the implementation of the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (2007 interim guidelines), over the period 2008-2020, California has created and stored approximately 2.0 MAF of "Intentionally Created Surplus" (ICS) supplies in Lake Mead. Collective efforts between the Lower Basin States and Mexico have resulted in about 4.0 MAF of conserved water supplies (equivalent to about 51 feet of elevation) being retained in Lake Mead.

California utilized the LB DCP's provisions for increased storage opportunities and MWD and IID stored approximately 0.340 MAF total in Lake Mead in 2020. By the end of CY-2021, California is projected to have nearly 1.3 MAF of ICS stored in Lake Mead (equivalent to about 14 feet of elevation in Mead). This could not have occurred without the additional ICS exhibits approved in the Lower Basin DCP and California's aggressive use of its collaborative water conservation programs among its Colorado River water users.

For CY-2021, with the 5% State Water Project 2021 Allocation, MWD projected a water supply/demand gap of just under 0.650 MAF. Water supplies to meet the shortfall were withdrawn from MWD's dry-year storage reserves and the purchase of "north of Delta" water transfers. Initially, MWD had planned to meet some of that supply gap from water stored in Lake Mead, but as its service area demands dropped it altered operations so that California will not withdraw and stored water from Lake Mead this year.

California Governor Newsom's Administration has prioritized water management as crucial to the State's economic, ecological, and social well-being. In July 2019, the Newsom Administration finalized a Water Resilience Portfolio that charts state actions to equip California to cope with more extreme droughts and floods and rising temperatures while addressing declining fish populations, overreliance on groundwater supplies, and a lack of safe drinking water in many communities, as well as other challenges. The actions of the Resilience Portfolio are intended to maintain and diversify water supplies, protect, and enhance natural systems, build connections within and across watersheds, and bolster preparedness for natural disasters. Water resilience is also prioritized in the State's budget, and over the next three years the budget will invest nearly $5 billion in projects, personnel, and local financial assistance to help the State's diverse regions safeguard clean, reliable water supplies even in the face of average warmer temperatures that can exacerbate drought and flooding.

Collaboration and cooperation have been the primary tools utilized by the Basin states—especially the Lower Basin states—and Mexico over the past two decades, beginning with the interim surplus guidelines in 2001, followed by the Lower Colorado River Multi-Species Conservation Program in 2005, the 2007 interim shortage guidelines, and a series of important binational agreements between the U.S. and Mexico, culminating in Mexico's Binational Water Scarcity Contingency Plan in Minute No. 323 executed in 2017. This Mexican contingency plan was intended to be both comparable and complimentary to the domestic DCP agreements executed by the Upper and Lower Basin states in 2019.

Under the authorizations provided by the federal SECURE Water Act of 2009 (P.L. 111-11), Reclamation, the seven Basin states, and numerous stakeholders across the Basin participated in the development of the Colorado River Basin Study report which was finalized in 2012. This important science-based report evaluated various scenarios associated with water uses and water supply conditions in the Basin through 2060. The report identified a range of water supply/demand imbalances going forward; and defined a "vulnerable condition" as the long-term average annual natural flow at Lee Ferry of 13.8 MAFY, and an 8-year period of flows less than 11.2 MAFY. In a related vein, Reclamation initiated a similar study effort focusing on the long-term Colorado River water resource needs among Native American Tribes in the Basin. The 2018 Basinwide Tribal Water Study report identified between 2.8-3.4 MAFY of quantified/unquantified consumptive use and diversion water rights among the 29 federally-recognized Native American Tribes in the Basin. Finally, hydrologic and water supply information provided in both the 2012 Colorado River Basin Study and 2018 Tribal Water Study Reports was supplemented with significant climate-change related scientific data and analyses in the 2020 Colorado River Basin "State-of-the-Science" report.

In the context of Colorado River management, the value of adaptive management cannot be overstated. With the initiation of the Millennium Drought in the early 2000s, the surplus guidelines morphed into the 2007 interim shortage guidelines which, along with and additional conservation actions implemented by the Lower Basin States, stabilized the reservoir system at about 50% of capacity for more than a decade. However, new information available from climate scientists demonstrated that future droughts could be more severe than was previously

understood, resulting in an increased risk of reaching critical reservation elevations. This new information resulted in the Basin states, Reclamation, and Mexico initiating efforts that resulted in both the 2017 binational Lake Mead protection plan with Mexico in Minute No. 323 and the 2019 Basin States DCPs both of which were intended to further protect critical elevations in both Lakes Powell and Mead while continuing to meet the water supply needs in the states and in Mexico. The back-to-back poor hydrologic conditions of 2020 and 2021 demonstrated that increased risk and have significantly reduced levels in both Lakes Powell and Mead resulting in implementation of further DCP actions and evaluation of potential additional measures to protect critical elevations in both reservoirs.

FEDERAL SUPPORT NEEDED TO HELP ADDRESS HISTORICALLY LOW RESERVOIR SYSTEM STORAGE CONDITIONS

California believes that going forward it will be imperative to continue to closely coordinate and collaborate with not only the other six Basin states, water users in the Basin, Mexico, but most importantly with the federal agencies with management authorities and responsibilities in the Colorado River Basin. As the next set of long-term operational guidelines are developed for implementation beginning in 2026 (post-2026 guidelines), the following are some of the challenges that must be addressed:

1. Continued Incentivization of Water Conservation, System Augmentation, and Water Supply Storage Opportunities—There must be an emphasis on continuing to incentivize the conservation and storage of water supplies in both the Upper and Lower Basins and Mexico. The federal/non-federal partnership should continue to diligently identify realistic and feasible System augmentation opportunities (e.g., weather modification and desalination, etc.), both within the United States and in collaboration with Mexico. Under decreasing water supply conditions, the Lower Basin states and Mexico will require increased water supply management flexibility, and operational and water supply reliability and certainty.

2. Colorado River Water Quality Improvement Enhancements—With the continued decline of water supply storage in the reservoir system and reduced flows in the mainstream and tributaries, it will become critically important to ensure the long-term viability of the water quality improvements provided by the Colorado River Basin Salinity Control Program authorized in the 1974 Colorado River Basin Salinity Control Act (P.L. 93-320, as amended), including developing a long-term solution associated with the Paradox Valley Salinity Control Unit. Going forward, it will also be important to address aspects of Title I of the Act in the context of maintaining adequate water quality associated with the annual delivery of Colorado River water to Mexico pursuant to the 1944 U.S./Mexico Water Treaty. The collaborative and cooperative partnership with Mexico regarding conservation, storage, salinity management, and management of environmental resources will be important to these efforts.

3. Native American Tribal Collaboration and Partnership Opportunities—The 2018 Basinwide Tribal Water Study identified between 2.8-3.4 MAFY of consumptive use and/or diversion rights collectively among the Tribes in the Basin, and a need for reliable safe drinking water supplies on some reservations highlights the need for close coordination and collaboration among the U.S., Tribes, and the Basin states. The Arizona DCP process provides a potential template for identifying opportunities, value, and benefits for Tribal participation in water conservation and storage programs and should be an important element as the seven States begin development of the post-2026 guidelines framework.

4. Maintenance of Colorado River Basin Environmental Compliance Programs—Given the severity of the Millennium Drought and System operational complexities, meeting new environmental compliance obligations associated with the post-2026 guidelines may prove challenging and may require additional analysis and evaluation pursuant to the National Environmental Policy Act, as well as permits under the Endangered Species Act. The Basin States will be seeking to collaborate with the various federal agencies in evaluating the need for bolstering existing environmental compliance programs like the Glen Canyon Dam Adaptive Management Program, Salton Sea management, and the Lower Colorado River Multi-Species Conservation Program.

5. Partnership & Collaboration in Large-Scale, Longer-Term Efforts—With more than 20+ years of managing the Colorado River System under severe and sustained drought conditions, it has become abundantly clear that collaboration and cooperation among the seven Basin states, water users, scientists, non-governmental organizations, Native American Tribes, Mexico, and agencies of the U.S. federal government will be necessary if we are to successfully meet long-term water supply needs for 40 million residents and over five million acres of irrigated agriculture. California believes that it will be very important for the federal government to commit not only fiscal resources but to also direct the inter-departmental and inter-agency coordination that will be needed to begin to address the increasing impacts of climate change in the Basin, as well as the rest of the Nation. This federal/non-federal partnership must be swiftly developed and dedicated to landscape-level forest and rangeland management and watershed rehabilitation which can provide benefits leading to improved water supply conditions and improved environmental conditions for species and habitats.

6. Utilization of Adaptive Management—To the extent possible, the post-2026 guidelines must address significant variability and uncertainty in basinwide water supply and hydrologic conditions going forward (i.e., both extremely dry and wet periods). It is anticipated that the identification and consideration of inflection points for critical resources (i.e., “sign-posting”) that can trigger adaptive decision-making and management will be important.

7. Collection, Management, and Utilization of “Best Available Science”—It will be important to evaluate updated water use data, new scientific data, new research, utilize

hindcasting, review actual operating experiences (e.g., Reclamation's final 7.D. Review Report, etc.), and continue to improve precipitation and water supply forecasting techniques. Fully consider future climate projections and identify potential future hydrologies in evaluating potential alternative management/operational strategies.

CONCLUSIONS

California, its sister-states in the Colorado River Basin, and the Republic of Mexico, continue to face significant challenges in addressing the impacts of the Millennium Drought and the increasing effects of warming brought on by climate change. This will require stepped-up coordination and cooperation among the water users and all relevant state and federal agencies in the context of monitoring, forecasting, planning, decision-making and adaptive management, and implementation of operations, programs, and activities that can provide the states and water users with some measure of certainty and reliability associated with meeting critical water supply needs.

California has a long history of meeting challenges associated with management of the state's water resources portfolio; and since the mid-1990s in the Colorado River Basin, this has been accomplished through collaborative and innovative partnerships within and among its Colorado River water users as well among the other six Basin states and Mexico. Continuing this collaborative partnership among stakeholders across the Basin and in conjunction with the federal agencies will become increasingly more important as the Basin's water supply conditions are further impacted by the Millennium Drought and the inherent uncertainties associated with climate change.

In closing, California believes that the Congress, this Administration, as well as future administrations will be essential in providing not only direction and fiscal resources in support of drought mitigation relief and water conservation programs, but also in committing the significant agency expertise that resides with the departments of the Interior, Agriculture, and Commerce, as well as the U.S. Environmental Protection Agency to working closely with the seven Basin States. Going forward, California remains committed to its continued collaboration and cooperation with all of the Basin's water users, tribes, federal agencies, and Mexico in meeting the challenges and immediate needs during the ongoing drought as well as working together to identify and implement science-based sustainable water resources management activities and programs and develop an adaptable operational paradigm for the post-2026 Colorado River System guidelines.

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