



The Water Report™

Water Rights, Water Quality & Water Solutions in the West

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COLORADO RIVER BASIN DROUGHT CONTINGENCY PLAN

WE ARE WHERE WE THOUGHT WE'D BE:

THE PLAN IS ABOUT TO BE TESTED

AS THE COLORADO RIVER BASIN ENTERS A NEW ERA OF SHORTAGE

by John Habib, Snell & Wilmer (Phoenix, AZ)

Introduction

This article details drought conditions on the Colorado River and efforts to allocate its flow in times of shortage, especially in its Lower Basin. Specifically, this article focuses on the Drought Contingency Plan, a recently-adopted collaborative approach to shortage sharing in the Lower Basin.

Section I describes the Colorado River Basin and summarizes its existing legal regime. The article begins by explaining the adoption of the 2007 Shortage Sharing Guidelines that are set to expire on December 31, 2025. Next, we examine the factors that led to development of the Drought Contingency Plan and explains the Plan. The following section summarizes the current condition of the Colorado River, describes the Secretary of the Interior's 2020 review of the 2007 Shortage Sharing Guidelines, and analyzes the Drought Contingency Plan's efficacy through 2020. Finally, the article: examines the activities of the Lower Basin States since the adoption of the Drought Contingency Plan; looks to the future of the Drought Contingency Plan; and examines the Lower Basin States' current and contemplated activities leading up to the Secretary of the Interior's anticipated adoption of new shortage sharing guidelines in 2026.

Facts on the Ground

Forty million people across seven states rely on water from the Colorado River. The Colorado River's "Basin" is the area of land drained by the River and its tributaries. In 1922, seeking to cooperatively manage the River, the states of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming (the "Basin States") entered into the Colorado River Compact (Compact) with the consent of Congress. The Compact divided the Basin into the "Upper Basin," comprised of Colorado, New Mexico, Utah, and Wyoming, and the "Lower Basin," comprised of Arizona, California, and Nevada. The Compact then apportioned 7.5 million acre-feet of water (maf) per year from the River to each basin in perpetuity. The Mexican Water Treaty of 1944 allotted an additional 1.5 maf to Mexico in perpetuity. The 16.5 maf total was based on roughly 30 years of Colorado River streamflow data beginning in the early 1890s. Unfortunately, the 16.5 maf total was a serious overestimation of long-term average flows. Tree ring studies demonstrate that the early 20th century was one of the wettest periods of the last 800 years. The true natural flow of the River is currently estimated to be between 13.5 and 14.6 maf per year. As if that disparity weren't enough, the Basin also loses approximately 1.5 maf per year to evaporation and transpiration (water utilized by plants).

Colorado River Basin

Conjunctive Management

Lake Mead

Lake Powell

State's Allocations

"Structural Deficit"

Declines

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To manage the apportioned 16.5 maf, the Basin relies primarily on Lake Mead and Lake Powell as both storage facilities and measuring sticks for current water availability. The lakes are managed conjunctively to regulate the flow of the River and to deliver water to the Basin States. Brad Udall, water and climate researcher at Colorado State University, describes Lake Powell as the Upper Basin's "bank account" for meeting its delivery obligations to the Lower Basin. [Lexi Peery, *Lake Powell Reached Capacity 40 years Ago. But What do the Coming Decades Hold in Store?* (6/22/20), KUER Radio, www.kuer.org/post/lake-powell-reached-capacity-40-years-ago-what-do-coming-decades-hold-store#stream/0].

The Boulder Canyon Project Act, signed by President Coolidge in December 1928, authorized construction in Black Canyon of what would later be called Hoover Dam (completed in 1936). Hoover Dam created Lake Mead, which is the largest reservoir in the United States with a maximum capacity of 26.134 maf. On August 8, 2021, Lake Mead was 35% full. [Lower Colorado Water Supply Report, www.usbr.gov/lc/region/g4000/weekly.pdf (last visited Aug. 23, 2021)].

Despite the creation of Lake Mead, the Upper Basin had no way to ensure it could fulfill its delivery obligation to the Lower Basin while retaining enough water for its own use. To solve this issue, the United States Bureau of Reclamation (Reclamation or USBR) proposed Glen Canyon Dam, which was completed in 1966 and created Lake Powell. Lake Powell has a maximum capacity of 24.322 maf. Each year, the Upper Basin is expected to discharge 8.23 maf of water from Lake Powell to flow down to Lake Mead. However, the actual volume discharged varies based on the Secretary of the Interior's equalization criteria for Lake Mead and Lake Powell under the 2007 Shortage Sharing Guidelines. On August 8, 2021, Lake Powell was 32% full. *Id.*

By the terms of the Compact (and subsequent litigation), the allocation of the Lower Basin's 7.5 maf among the three states is: 4.4 maf to California, 2.8 maf to Arizona, and 300,000 acre-feet to Nevada. The 1948 Upper Colorado River Basin Compact apportionment of the Upper Basin's 7.5 maf is: 51.75% to Colorado; 23.00% to Utah; 14% to Wyoming; and 11.25% to New Mexico. This allocation-by-percentage allows for flexibility when flows of the Colorado River change. Together, the Lower Basin States and Mexico are allocated and authorized to divert a total of 9 maf of water from Lake Mead. This "structural deficit" — the 677,000 acre-foot difference between inflow and outflow — can cause a 12-foot drop in the water level of Lake Mead every year.

Development of the 2007 Shortage Sharing Guidelines

The River was over-appropriated at the outset of the Compact, but circumstances worsened with regional growth and climate change. Since 2000, River flow is down 20% due to what John Fleck, Director of Water Resources at the University of New Mexico, says should be called "aridification" rather than "drought." Peery, *supra* Note i. A 2004 study showed that a reduction in precipitation of as little as 1-6% could cause a decline in River flow of as much as 18%. Researchers estimate that the flow of the River will decline another 20% by 2050.

As the flow of the River diminished, demand for its water surged. In 2007, following more than a decade of dwindling River flows, the seven Basin States and Reclamation completed an agreement establishing criteria for shortage sharing (2007 Guidelines). The Secretary of the Interior was required to conduct a review of their efficacy by December 31, 2020. The 2007 Guidelines are set to expire by their own terms on December 31, 2026, and the Drought Contingency Plan expires on the same day.

Each year, in accordance with the 2007 Guidelines, the Secretary of the Interior determines the status of the River water supply for the Lower Basin and determines whether the River should be categorized as being in Shortage, Normal, or Surplus condition. Lake Mead is in Shortage when its elevation above sea level is at or below 1075 feet; Normal is between 1075 and 1145 feet; and Surplus is at or above 1145 feet. Lake Mead and Lake Powell's discharge volumes are adjusted in accordance with the water condition determination.

Lower Basin Forbearance Obligations Under 2007 Shortage Sharing Guidelines (in thousand acre-feet (kaf))			
Lake Mead Elevation	Arizona	Nevada	California
1050-1075	320	13	0
1025-1050	400	17	0
<1025	480	20	400

Lake Powell			Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹	Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹
3,700	Equalization Tier Equalize, avoid spills, or release 8.23 maf	24.3	1,220	Flood Control Surplus or Quantified Surplus Condition Deliver > 7.5 maf	25.9
3,636-3,666 (2008-2026)	Upper Elevation Balancing Tier³ Release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	15.5-19.3 (2008-2026)	1,200 (approx.) ²	Domestic Surplus or ICS Surplus Condition Deliver > 7.5 maf	22.9 (approx.) ²
3,575		9.5	1,145	Normal or ICS Surplus Condition Deliver ≥ 7.5 maf	15.9
	Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf		1,075	Shortage Condition Deliver 7.167 ⁴ maf	9.4
3,525		5.9	1,050	Shortage Condition Deliver 7.083 ⁵ maf	7.5
3,490	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf	4.0	1,025		5.8
3,370		0	1,000	Shortage Condition Deliver 7.0 ⁶ maf Further measures may be undertaken ⁷	4.3
			895		0

Diagram not to scale

¹ Acronym for million acre-feet;² This elevation is shown as approximate as it is determined each year by considering several factors including Lake Powell and Lake Mead storage, projected Upper Basin demands, and an assumed inflow; ³ Subject to April adjustments which may result in a release according to the Equalization Tier;⁴ Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada;⁵ Of which 2.40 maf is apportioned to Arizona, 4.4 maf to California, and 0.283 maf to Nevada;⁶ Of which 2.32 maf is apportioned to Arizona, 4.4 maf to California, and 0.280 maf to Nevada;⁷ Whenever Lake Mead is below elevation 1,025 feet, the Secretary shall consider whether hydrologic conditions together with anticipated deliveries to the Lower Division States and Mexico are likely to cause the elevation at Lake Mead to fall below 1,000 feet. Such consideration, in consultation with the Basin States, may result in the undertaking of further measures, consistent with applicable Federal law.Adapted from USBR website: www.usbr.gov/ColoradoRiverBasin/

Shortage Allocations

A shortage declaration is further subdivided within the 2007 Guidelines. First, when Lake Mead's surface elevation is between 1050 and 1075 feet above sea level, classified as "Light Shortage," California will receive 4.4 maf, Arizona 2.480 maf, and Nevada .287 maf. When Lake Mead's surface elevation is between 1025 and 1050 feet, "Heavy Shortage" guidelines dictate that California receives 4.4 maf, Arizona 2.4 maf, and Nevada .283 maf. Finally, when Lake Mead's elevation is below 1025, "Extreme Shortage" guidelines allot California 4 maf, Arizona 2.32 maf, and Nevada .28 maf. Minute 319, a 2012 amendment to the Mexican Water Treaty of 1944, requires Mexico to reduce its water consumption to 1.45 maf when Lake Mead is between 1050 and 1075 feet and 1.43 maf when Lake Mead is below 1050 feet.

In tandem with the 2007 Guidelines, Reclamation implemented intentionally-created surplus (ICS) programs to address growing water demands on the River. ICS programs allow Lower Basin States to store water in Lake Mead if they create an equal amount of water through conservation. For example, if Arizona developed a plan to conserve 5,000 acre-feet of water that would have otherwise been lost to evaporation, Arizona can leave those 5,000 acre-feet in Lake Mead as a credit for the future.

Colorado River Basin

Planning Need

In 2018, Reclamation projected the probability of a shortage declaration of some kind for 2020, 2021, and 2022. The probabilities were 52% in 2020, 64% in 2021, and 68% in 2022. After these results were published, Brenda Burman, then-Commissioner of Reclamation, said:

We need action and we need it now. We can't afford to wait for a crisis before we implement drought contingency plans. We all — states, tribes, water districts, non-governmental organizations — have an obligation and responsibility to work together to meet the needs of over 40 million people in the Colorado River basin states to put real — and effective — drought contingency plans in place before the end of this year.

USBR, *Another Dry Year in the Colorado River Basin Increases the Need for Additional State and Federal Actions* (5/9/18), www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=62170.

"Deadpool"

Development of the DCP

In early 2019, River managers projected that if dry conditions continued the managers eventually would be unable to deliver any water to users in Los Angeles, Phoenix, San Diego, and Tucson. Colloquially, this condition is called "deadpool." In light of the deadpool projection — and the earlier statement of Commissioner Burman — the Basin States developed the Drought Contingency Plan (DCP) to keep Lake Powell and Lake Mead from reaching critically low levels. The DCP became effective in May 2019 and will govern the River through 2026. Before the end of 2026, the Secretary of the Interior will publish new guidelines for long-term management of the Basin, replacing the 2007 guidelines. To develop the new 2026 guidelines, all seven Basin States must cooperate.

DCP Purposes

In the Upper Basin, the DCP is designed to: (a) protect critical elevations at Lake Powell and help ensure continued compliance with the 1922 Colorado River Compact; and (b) authorize storage of conserved water in the Upper Basin that could help establish the foundation for a Demand Management Program to be developed in the future.

In the Lower Basin, the DCP is designed to: (a) require Arizona, California, and Nevada to contribute additional water to Lake Mead storage at predetermined elevations; and (b) create greater flexibility to incentivize additional voluntary conservation of water to be stored in Lake Mead.

Because of the junior status of some Colorado River water users in Arizona, the terms of the DCP in the Lower Basin affect Arizona first and most significantly. Under the DCP, in addition to reductions imposed by the 2007 Guidelines, Arizona must contribute 192,000 acre-feet (AF) when Lake Mead is projected to be between 1090 and 1045 feet and 240,000 AF when Lake Mead is projected to be at or below 1045 feet. Similarly, the DCP requires Nevada to contribute an additional 8,000 AF when Lake Mead is projected to be between 1090 and 1045 feet and an additional 10,000 AF when Lake Mead is projected to be at or below 1045 feet. Finally, California must contribute 200,000 AF when Lake Mead is projected to be between 1045 and 1040 feet, 250,000 AF when Lake Mead is projected to be between 1040 and 1035 feet, 300,000 AF when Lake Mead is projected to be between 1035 and 1030 feet, and 350,000 AF when Lake Mead is projected to be at or below 1030 feet. The table below shows the *combined* forbearance obligations under *both* the DCP and the 2007 Guidelines.

Forbearance Obligations

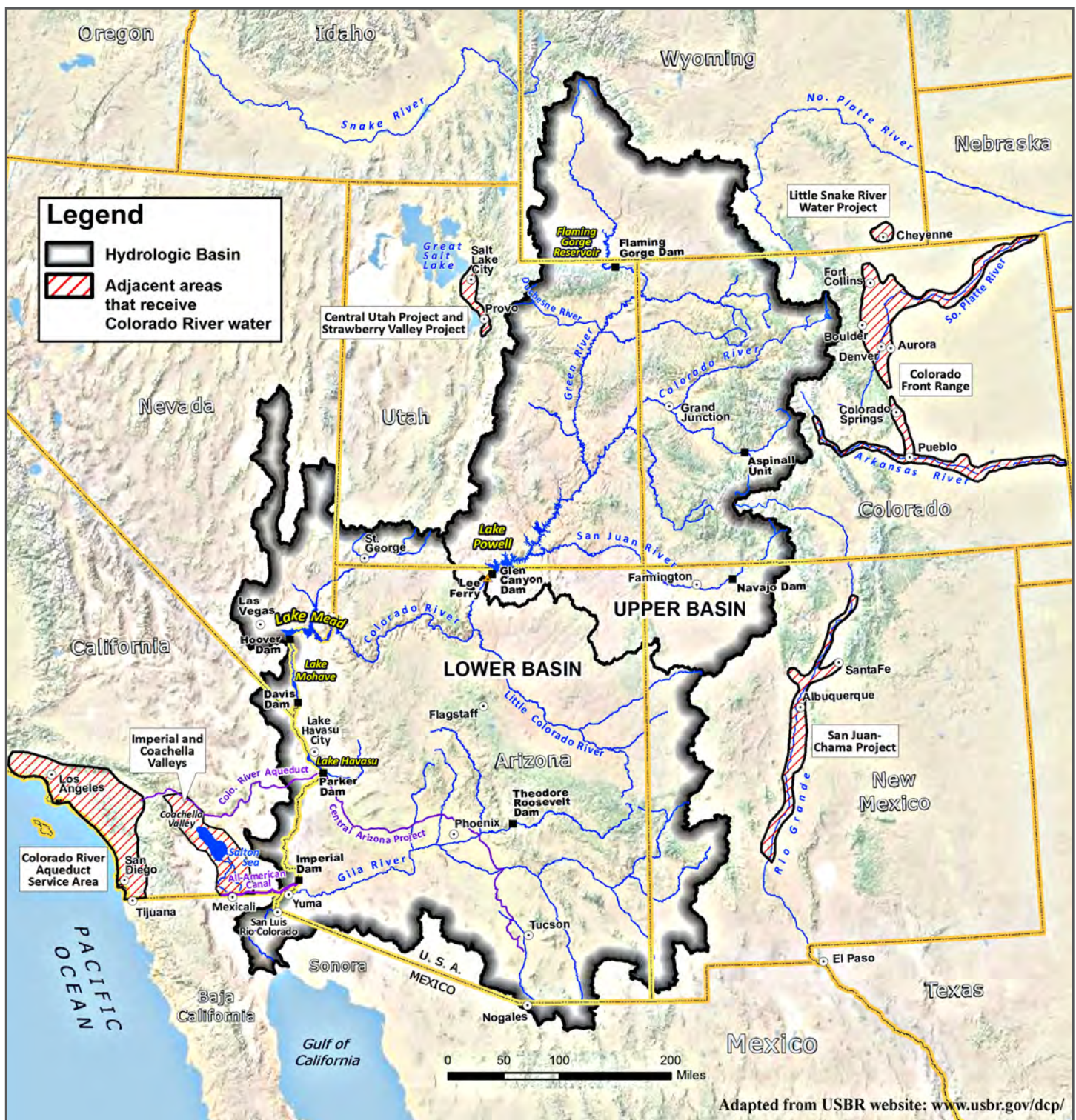
Combined Forbearance Obligations Under DCP & 2007 Guidelines (in kaf)			
Lake Mead Elevation	Arizona	Nevada	California
1075-1090 (Tier 0)	192	8	0
1050-1075 (Tier 1)	512	21	0
1045-1050 (Tier 2a)	592	25	0
1040-1045 (Tier 2b)	640	27	200
1035-1040 (Tier 2c)	640	27	250
1030-1035 (Tier 2d)	640	27	300
1025-1030 (Tier 2e)	640	27	350
<1025 (Tier 3)	720	30	750

Arizona: Most Impacts

Challenges

Despite significant efforts on all fronts — from state initiatives modifying existing agricultural infrastructure to municipal incentives for installing water-efficient landscaping, appliances, and plumbing — there are minefields to navigate in the Lower Basin. Dozens of proposals exist in the Upper Basin to withdraw more Colorado River water, which would further stress Lower Basin water supply. Further, some water currently being retained in Lake Mead is stored as a credit to be drawn upon in the future. Finally, the warming climate will evaporate more water out of the Basin as a whole.

The challenges faced by all Colorado River water users are serious: drought; over-allocation; growing water needs; and the prospect of a drier future.



Shortage Declaration

DCP Benefits

Current Conditions on the River and the Effect of the 2007 Guidelines and the DCP

On August 16, 2021, Reclamation declared a Tier 1 shortage for the 2022 water year. USBR, *Reclamation Announces 2022 Operating Conditions for Lake Powell and Lake Mead* (8/16/21), www.usbr.gov/newsroom/#!/news-release/3950.

Because of the DCP, the Basin is in a much better position than it would have been had the Basin relied only on the 2007 Guidelines. As discussed below, the DCP provides mechanisms that encourage Lower Basin States to take less than their entire allocation. These mechanisms will become increasingly important as drought becomes more frequent, more severe, and more protracted. Thus, the Basin will rely even more heavily on the DCP moving forward.

Colorado River Basin Tier 1 Shortage CAP Impacts Mitigation Nevada: Pre-Conservation 2007 Guidelines Benefits DCP: Binding System Consumption Reduced	Current Condition of the Colorado River Each month, Reclamation creates a projection of operation of the Colorado River Basin for the next 24 months. In August, October, January, and April, the Bureau forecasts minimum and maximum probable inflows of the River into Lake Powell and Lake Mead. In April 2021, Reclamation projected that the water level at Lake Mead would fall below 1075 feet by June 2021 and continue to fall into 2022. The study further projected that the water level in Lake Mead may even fall below 1050 — triggering a Tier 2 shortage — by November 2022. The August 2021 study measured Lake Mead at 1067.98 feet and projected November’s water level at 1064.50 feet. Because the August 24-month study found Lake Mead below 1075 feet, on August 16th Reclamation declared a Tier 1 shortage for Water Year 2022. Commenting on the shortage declaration, Deputy Commissioner of Reclamation Camille Touton said, “The announcement today is a recognition that the hydrology that we planned for years ago and hoped we’d never see is here.” Tier 1 shortage will require Arizona to reduce its water use by 512 kaf and Nevada to reduce its water use by 21 kaf. New York Times, <i>In a First, U.S. Declares Shortage on Colorado River, Forcing Water Cuts</i> (8/16/21), www.nytimes.com/2021/08/16/climate/colorado-river-water-cuts.html?referrer=masthead. The Tier 1 curtailment impacts in Arizona will fall primarily on Central Arizona Project (CAP) water users, but the impact will vary among the several categories of CAP contractors and subcontractors (CAP is described in greater detail below). The first parties to feel this effect will be anyone holding a CAP subcontract for “excess water.” These subcontractors will not have access to any CAP water during the Tier 1 shortage. However, because of Arizona’s previous aggressive efforts to conserve water — like voluntarily adhering to Tier 0 guidelines and large-scale storage of excess CAP water in aquifers during prior wet years — users entitled to Agricultural Pool water (the next lowest priority among CAP water users) may not see their allocation reduced to zero. Instead, Ag Pool contract holders may have their curtailment mitigated by a combination of: money for new wells; redirected CAP water from municipalities; and water stored as ICS in Lake Mead. Likewise, those holding an entitlement to “Non-Indian Agricultural Water” may see their curtailment mitigated by a combination of: future water credits; money; and water created by ICS in Lake Pleasant and Lake Mead. More senior CAP contractors and subcontractors, including those with rights to Indian Priority and Municipal and Industrial (M&I) Priority water, may not be directly affected by a Tier 1 shortage (Indian Priority and M&I Priority CAP water have co-equal priorities). In Nevada, John Entsminger, the general manager of the Southern Nevada Water Authority has noted that the his agency had pre-conserved the cuts it will see under the Tier 1 shortage, meaning that its users will likely not see the effect of the shortage declaration. The Secretary of the Interior’s Review of the 2007 Guidelines As part of the agreement establishing the 2007 Guidelines, the Secretary of the Interior was required to conduct a review of the 2007 Guidelines’ efficacy no later than December 31, 2020. On December 18, 2020, then-Secretary David Bernhardt released the results of the US Bureau of Land Management’s review of the 2007 Guidelines. Overall, Secretary Bernhardt concluded the 2007 Guidelines improved management of the Colorado River. Specifically, Secretary Bernhardt found the 2007 Guidelines provide water users in the Lower Basin better predictability of water deliveries, especially when Lake Mead is at a low water level, by providing mechanisms for storage and delivery of water. The 2007 Guidelines also provided a framework for developing the DCP and ICS across the Basin States and into Mexico. Additionally, the 2007 Guidelines established flexibility and legal, political, and operational stability to support conservation measures. Unfortunately, the 2007 Guidelines’ ability to protect the Basin from the effects of drought have become less certain over time. The Effect of the Drought Contingency Plan The Basin — without the DCP — had the potential to be catastrophic. The 2007 Guidelines alone were not enough to mitigate rapid decline in water levels across the Basin. Because of the DCP, the Basin States have a binding system for water allocation under the current Tier 1 shortage declaration. Voluntary contributions under the DCP also forestalled shortage declarations by the Secretary of the Interior. In the first year following adoption of the DCP, California consumed only 3.8 maf, Arizona 2.5 maf, and Nevada 233 kaf. While Lake Mead was declared “normal” for 2020, this status was achieved only because the Lower Basin States made extensive voluntary contributions to stabilizing Lake Mead. For example, Arizona’s contributions amounted to 308,293 AF in 2019 and 345,273 AF in 2020 — enough to raise the level of the Lake by eight feet. Those contributions were just enough. On the day Reclamation determined shortage status for the 2020 water year, Lake Mead measured 1090.4 feet — five inches from the mandatory forbearance required of Arizona and Nevada under a shortage declaration. The DCP also reduced tension in the Lower Basin, especially as the water levels at Lake Mead and Lake Powell fell, because it encouraged Arizona, Nevada, and California to reduce their water consumption before being required by the 2007 Guidelines. The DCP also brought water conservation issues further to the forefront, and enabled Arizona to voluntarily adhere to its obligations under a Tier 0 shortage even though an official shortage had not been declared.
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Looking Ahead

Colorado
River Basin

DCP Litigation

AZ Authority
& OperationReconsultation
ProcessGuiding
PrinciplesAnalysis
Workgroup

Arizona is undeniably at the forefront of the Lower Basin when it comes to planning for the new guidelines coming in 2026. Nevada has a relatively small share of the Lower Basin apportionment and has instituted policy measures at the local level, allowing it to consistently utilize less water than it is entitled to. After the 2007 Guidelines were adopted, California curtailed its water use to remain within its Compact allocation. All three states then cooperated in negotiating the DCP to provide further protection for the Lower Basin's critical water supply. Unfortunately, though, the status of the DCP in California is uncertain due to ongoing litigation. California's Imperial Irrigation District (IID) filed a lawsuit on April 16, 2019, alleging that MWD improperly agreed to the DCP without consulting IID or conducting environmental reviews of the DCP's impact on the Salton Sea (discussed below).

Arizona

Arizona's primary water regulatory authority is the Arizona Department of Water Resources (ADWR) and its director, appointed by Arizona's governor. Also playing a critical role in distribution and use of Arizona's Colorado River allocation is the Central Arizona Water Conservation District (CAWCD), headed by a board of directors elected by residents of the counties served by the CAP. CAWCD operates the Central Arizona Project (CAP), a massive canal system that delivers approximately 1.5 maf of Arizona's Colorado River allocation to central Arizona each year — serving 80% of the state's population.

Arizona water leaders, led by ADWR Director Tom Buschatzke and CAP General Manager Ted Cooke, formed the Arizona Reconsultation Committee (ARC) in Spring 2020. The ARC was formed in response to the Secretary of the Interior's review of the 2007 Guidelines, in anticipation of the Secretary's development of new guidelines to take effect in 2026, and to address continuing implementation of the DCP.

At its initial meeting on June 25, 2020, the ARC laid out its objectives:

1. Establish a process for continued engagement within Arizona throughout the Reconsultation process;
2. Provide a venue for developing and sharing stakeholder perspectives and values to guide Arizona's involvement in the Reconsultation process;
3. Identify risks and benefits to inform Arizona's input to the Reconsultation process; and
4. Continue the transparency that was established during the successful DCP Steering Committee effort.

Recording of the June 25, 2020 ARC Meeting, <https://cap-az.granicus.com/player/clip/422?>

The ARC anticipates that the Reconsultation process will operate in three tiers. The first tier will be similar to the creation of the 2007 Guidelines — led by the Secretary of the Interior and Reclamation and coupled with a process required under the National Environmental Policy Act. The second tier will involve all of the Basin States, with the goal of developing a Basin State alternative to the plan created by Reclamation and the Secretary of the Interior. Finally, the third tier will take place within Arizona to frame Arizona's position among the Basin States and Reclamation processes. The third tier will build support for and develop a framework to implement the new operating rules within Arizona, and facilitate broad representation including Arizona tribes and NGOs.

At its September 17, 2020 meeting the ARC laid out its guiding principles:

1. Respect the existing "Law of the River" framework including existing rights, contracts, and priorities;
2. Seek Basin-wide solutions with burdens shared across the Basin (not just Arizona);
3. Focus on long-term sustainability including addressing the structural deficit and recognizing that conservation and supply augmentation are part of the long-term solution;
4. Insist against marketing unused water;
5. Insist against marketing Arizona water out of state;
6. Collaborate with the 22 federally-recognized Arizona tribes who hold 27% of the land in Arizona and have rights to 46% of CAP water;
7. Collaborate with Mexico; and
8. Collaborate with Arizona legislative leaders.

Slideshow of Meeting, https://new.azwater.gov/sites/default/files/20200914_ARC_2.pdf.

The ARC also formed a Modeling and Analysis Workgroup (MAWG) on September 17, 2020. The group focuses on answering technical questions posed by the ARC and providing fact-based analysis of risks, vulnerabilities, and impacts to Arizona's overall Colorado River supply. *Id.* On November 10, 2020, the ARC, through the MAWG, projected that by 2100 precipitation will decline across nearly the entire Basin, streamflow will decline mildly in the Upper Basin and severely in the Lower Basin, and the Basin will experience a rise in temperature of 2 degrees Celsius (3.6 degrees Fahrenheit).

The ARC convened a meeting on April 29, 2021 following Reclamation's release of its April 2021 24-month study. The leading issue was the condition of Lake Mead and the "strong likelihood" of a Tier 1 shortage declaration in the Lower Basin. At the meeting, Director Buschatzke stated: "This is a day we knew would come...[but it has come] later than [it] otherwise would have" because of the DCP and 2007 Guidelines. Likewise, Mr. Cooke noted that without the DCP, it is likely the Lower Basin would already be in Tier 2 of the 2007 Guidelines. Recording of the April 29, 2021 ARC Meeting, www.youtube.com/watch?v=eNsOOLRp3AP&ab_channel=azwater.

The shortage declaration is now in effect.

Colorado River Basin

Nevada Conservation

Residential Use Reduction

Conservation Adoptions

Salton Sea Concerns

Salinity Issue

DCP Lawsuit

DCP Issues & Response

Nevada

Nevada's primary water regulatory authority is the Nevada Division of Water Resources. The Southern Nevada Water Authority (SNWA) manages Nevada's Colorado River allocation. Nevada has not yet formalized a process to represent its interests during the Secretary of the Interior's development of new shortage sharing guidelines for 2026. That said, Nevada has done well with water conservation.

Anticipating the Secretary's review of the 2007 Guidelines, Nevada initiated conservation efforts well before the DCP was enacted. Bronson Mack, outreach manager for the SNWA, shared in May 2019 that "[Nevada's] water use has been around 245,000 acre-feet, ... so we're already below [the maximum reductions for Nevada under the combined 2007 Guidelines and the DCP]." Steve Wolford & Gerald Ramalho, *Nevada, Six Other States Sign Drought Contingency Agreement* (5/20/19), <https://news3lv.com/news/local/nevada-six-other-states-sign-drought-contingency-agreement>.

For example, Nevada put a program in place in 2002 that by 2019 had reduced overall residential water use by 52%, despite adding 730,000 new residents. Accordingly, Nevada was in a good position when the Secretary of the Interior released its review of the 2007 Guidelines. Nevada will likely remain in a good position for the guidelines coming in 2026, as well.

In late 2019, SNWA created the Integrated Resource Planning Advisory Committee (IRPAC) to evaluate and develop recommendations on issues critical to the SNWA. IRPAC made several recommendations related to water resources and water conservation that were adopted by the SNWA. Adopted IRPAC recommendations include:

- Requiring out-of-valley development to return wastewater to Lake Mead
- Reducing nonfunctional turf acreage by 50% by 2035
- Implementing smart controller technology to automate landscape watering compliance
- Implementing advanced metering infrastructure
- Making investments that will maintain or improve water loss rates among water purveyors

California

California's primary water regulatory authority is the California Department of Water Resources. The Metropolitan Water District of Southern California (MWD) operates the Colorado River Aqueduct that supplies much of the Colorado River water used in Southern California. California has not yet formalized a process to represent its interests before the Secretary of the Interior during the creation of the new shortage sharing guidelines for 2026. The State has been preoccupied with internal conflict regarding the DCP.

Of particular concern is the Salton Sea. The Sea, formed by the Colorado River's breach of irrigation canals in 1905, is the largest body of water in California. The federal government designates the Salton Sea as a "repository for agricultural drainage." USBR, *An Effort to Determine the Feasibility of Preserving, Maintaining, and Enhancing the Value of the Salton Sea and to Document the Environmental Implications of the Action Alternative* (June 1998), www.usbr.gov/lc/region/saltsea/sswp.html. Without the Sea, the Imperial and Coachella Valleys would be too water-logged and/or saline for agriculture. The Sea has no natural outflow. Every year, roughly 1.3 maf of water is lost to evaporation in the Salton Sea.

Four million tons of salts are carried into the Salton Sea each year by Colorado River tailwater and agricultural drainage. Agricultural and geological salts are left behind when the water evaporates, gradually raising the salinity of the Sea. Like a giant gold pan, the lakebed collects the salts that fall out of solution.

The Imperial Irrigation District (IID) is the largest user of Colorado River water in the Basin. IID discharges close to 1.3 maf of agricultural drainage and tailwater to the Sea each year. As water evaporates and the surface area of the Sea shrinks, the salts can become wind-borne, threatening the air quality and safety of much of Southern California. Additionally, many birds and fish dependent on the Sea would be jeopardized during the evaporation process as the salinity of the Sea increased. If IID's annual discharge of water to the Sea is reduced due to California's DCP commitments, the Sea may continue to shrink, further increasing salinity and exposing more of the salts to future wind-borne spread. Chris Iovenko, *Toxic Dust from a Dying California Lake*, *The Atlantic*, Nov. 9, 2015 (available at: www.theatlantic.com/science/archive/2015/11/the-airborne-toxic-lake-event/414888/).

On July 8, 2020, IID filed a brief in support of its April 16, 2019 petition seeking a writ of mandate to vacate MWD's approval of the DCP. *Imperial Irrigation District v. Metropolitan Water District of Southern California*, Case No. 19STCP01376 (L.A. Cty. Sup. Ct., July 8, 2020) (Brief available at: www.iid.com/home/showdocument?id=18610; Petition available at: www.iid.com/home/showdocument?id=17725).

The petition and brief were filed in the Los Angeles County Superior Court. IID alleged that MWD went beyond the scope of its authority when it agreed to the final DCP without performing environmental surveys in accordance with the California Environmental Quality Act (CEQA), and further that MWD improperly excluded IID from the decision. MWD filed a response to IID's brief on September 25, 2020, arguing that the court lacked jurisdiction, that IID failed to exhaust administrative remedies before bringing the lawsuit, and that MWD's approval of the DCP is exempt from environmental surveys under CEQA.

On March 8, 2021, the Court denied IID's petition for writ of mandate because IID failed to exhaust administrative remedies before bringing suit. *Id.* IID filed a notice of appeal with the court on March 12, 2021. *Id.* The suit has massive implications. If IID is successful and MWD is compelled to back out of the DCP, the DCP and the Lower Basin could be severely affected.

Colorado River Basin

John Habib is an Associate in the Natural Resources Group at Snell & Wilmer, LLP. He has not yet been admitted to the State Bar of Arizona. He received his B.S. in Agricultural and Environmental Plant Science from Cal Poly, San Luis Obispo and his J.D. from Arizona State University. Prior to law school, he worked as a pest control advisor and certified crop adviser on the central coast of California.

Federal Priorities

The Biden Administration and Secretary of the Interior Haaland will undoubtedly have different priorities than the Trump Administration, but it is too early to tell what effect those priorities might have on the Colorado River. It is likely that the Administration will ensure that the dozens of federally recognized Indian tribes, who hold 20% of senior water rights in the River, are consulted during development of the 2026 Guidelines.

If the Basin's efforts to address shortages do not work, there is also the possibility of Supreme Court intervention under its original jurisdiction over suits between states and/or with the Tribes. Like the Biden Administration, it is too early to tell what impact the Court may have on the River.

Conclusion

The future is uncertain for the Colorado River Basin, but we are where we thought we would be. The River was over-appropriated at the outset, and the warming climate, expanding uses, and growing population have exacerbated the structural imbalance between supply and demand. The 2007 Shortage Sharing Guidelines forestalled a shortage on the River. Beneath the shadow of an increasingly-likely shortage declaration by the Secretary of the Interior, however, the Basin States agreed to the Drought Contingency Plan, buying yet more time and establishing a stronger framework for shortage-sharing. Now, facing a shortage declaration on the River, the Basin States are preparing for the Secretary of the Interior's development of new Guidelines for 2026. The Secretary, the Basin States, the Tribes, and the many stakeholders in the Basin will need to continue — and build on — their efforts to face these growing challenges in the years ahead.

FOR ADDITIONAL INFORMATION:

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Reclamation - Colorado River Basin webpage: <https://www.usbr.gov/ColoradoRiverBasin/>

Editors' Addendum: Reclamation Colorado River Basin Shortage Declaration

On August 16, Reclamation released the Colorado River Basin August 2021 24-Month Study. The August study projections are used to set annual operations for Lake Powell and Lake Mead in 2022. Releases are determined by anticipated reservoir elevations.

The Upper Basin experienced an exceptionally dry spring in 2021, with April to July runoff into Lake Powell totaling just 26% of average despite near-average snowfall last winter. The projected water year 2021 unregulated inflow into Lake Powell — the amount that would have flowed to Lake Mead without the benefit of storage behind Glen Canyon Dam — is approximately 32% of average. Total Colorado River system storage today is 40% of capacity, down from 49% at this time last year.

Downstream releases from Glen Canyon Dam and Hoover Dam will be reduced in 2022 due to declining reservoir levels. In the Lower Basin the reductions represent the first "shortage" declaration — demonstrating the severity of the drought and low reservoir conditions.

Plans that have been developed over the past two decades lay out detailed operational rules for these critical Colorado River reservoirs:

- Based on projections in the study, Lake Powell will operate in the Mid-Elevation Release Tier in water year 2022 (10/1/21 through 9/30/22), and Lake Mead will operate in its first-ever Level 1 Shortage Condition in calendar year 2022 (1/1/22 through 12/31/22).
- Lake Powell Mid-Elevation Release Tier: The study projects Lake Powell's January 1, 2022, elevation to be 3,535.40 feet — about 165 feet below full and about 45 feet above minimum power pool. Based on this projection, Lake Powell will operate in the Mid-Elevation Release Tier in water year 2022. Under this tier, Lake Powell will release 7.48 million acre-feet (AF) in water year 2022 without the potential for a mid-year adjustment in April 2022.
- Lake Mead Level 1 Shortage Condition: The study projects Lake Mead's January 1, 2022, elevation to be 1,065.85 feet — about nine feet below the Lower Basin shortage determination trigger of 1,075 feet and about 24 feet below the drought contingency plan trigger of 1,090 feet. Based on this projection, Lake Mead will operate in a Level 1 Shortage Condition for the first time ever. The required shortage reductions and water savings contributions under the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations of Lake Powell and Lake Mead, 2019 Lower Basin Drought Contingency Plan and Minute 323 to the 1944 Water Treaty with Mexico are: Arizona: 512,000 AF, which is approximately 18% of the state's annual apportionment; Nevada: 21,000 AF, which is 7% of the state's annual apportionment; and Mexico: 80,000 AF, which is approximately 5% of the country's annual allotment.

In July 2021, drought operations to protect Lake Powell were implemented under the Upper Basin Drought Response Operations Agreement which project releasing up to an additional 181,000-acre feet of water from upstream initial units of the Colorado River Storage Project to Lake Powell.

For info: Patti Aaron, Reclamation, 702/ 726-1921 or paaron@usbr.gov; August 24-Month Study at: www.usbr.gov/uc/water/crsp/studies/24Month_08.pdf

Rio Grande Project

Historical Irrigation

Mexican Damage Claims

Equitable Distribution

Mexico's Allocation

Delivery Deviations

RIO GRANDE PROJECT

THE BINATIONAL CONVENTION OF 1906 AND THE RIO GRANDE PROJECT

by Jerry Melendez, US Bureau of Reclamation (El Paso, TX)
and

Delbert Humberson & Samantha Stiffler, International Boundary and Water Commission (El Paso, TX)

Introduction

At the time of the first Spanish explorations in 1536, the Rio Grande Project area (*see* Figure 1) was irrigated in a limited way by the area tribes and pueblos who were growing corn, beans, and grapes by diversions from the Rio Grande. Settlement of the area by the Spaniards beginning in 1659 caused a gradual increase in irrigation to an estimated total of 30,000 to 40,000 acres by 1880. During this period, diversions from the river furnished an ample supply, but by 1890 summer shortages on both sides of the international border increased in intensity to the extent that the Mexican government claimed damages against the United States.

Throughout recorded history there have been chronic shortages of water in the Rio Grande Basin above Fort Quitman, Texas. These shortages have led to multiple lawsuits and court actions as a result of severe competition for available water.

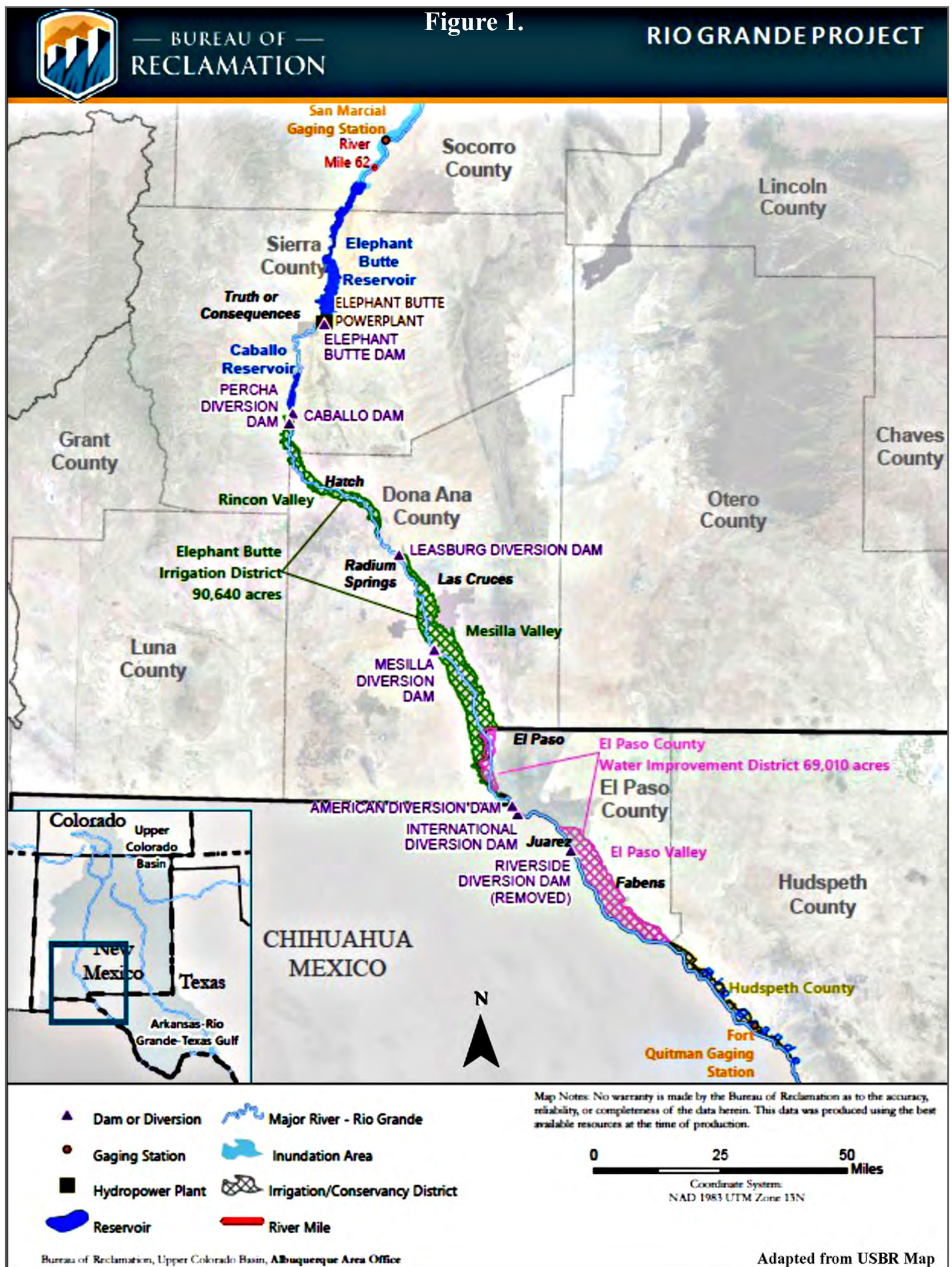
Binational Convention of 1906

The origins of the Binational Convention of 1906 are rooted in claims by Mexico that Rio Grande diversions in the United States upstream of Ciudad Juárez, Chihuahua, Mexico exhausted flow and caused damages to Mexico. These claims, coupled with extreme drought in the Southwest that caused dry conditions throughout a considerable portion of New Mexico, led to plans to provide a more reliable water supply for irrigation. These plans led to the decision to construct a main storage reservoir and a secondary reservoir to catch surplus flood waters. Once initial negotiations between the countries were completed, the Binational Convention of 1906 for the equitable distribution of water of the Rio Grande, was signed on May 21, 1906 (the Convention can be found at www.ibwc.gov/Files/1906Conv.pdf). The International Boundary and Water Commission (IBWC), which is a binational Commission that oversees boundary and water treaties between the United States and Mexico, oversees the Convention and ensures that its agreements are heeded.

Article I of the Convention states that once the storage dam and a water distribution system were completed, the United States will deliver to Mexico a total of 60,000 acre-feet (AF) of water annually in the bed of the Rio Grande at the headworks of the Acequia Madre, which is the canal diverting Rio Grande water into Mexico at Ciudad Juárez. Article II further elaborates that the 60,000 AF will be provided during the months of February through November (*see* Table 1). It should be noted that while the treaty mandates a delivery schedule, deviations to this schedule have been authorized since the 1940s via exchange of diplomatic notes initiated by Mexico's Secretariat of Foreign Relations. In its response, the US Department of State has authorized the US Commissioner to deviate from the treaty schedule. While initially this deviation was seen as benefiting Mexico, in recent decades, it has been seen as beneficial to both countries to maintain the flexibility to keep water in the reservoir until it is needed by farmers. Once the United States authorizes deviations from the treaty schedule, the schedule modification requests from Mexico are channeled from Mexico's National Water Commission (CONAGUA) through the Mexican Section of IBWC (MXIBWC) to the United States Section of IBWC (USIBWC). USIBWC then coordinates the schedule change with the US Bureau of Reclamation (Reclamation).

Table 1. Irrigation Schedule in Article II of the Binational Convention of 1906

	Acre feet per month	Corresponding cubic feet of water
January	0	0
February	1,090	47,480,400
March	5,460	237,837,000
April	12,000	522,720,000
May	12,000	522,720,000
June	12,000	522,720,000
July	8,180	356,320,800
August	4,370	190,357,200
September	3,270	142,441,200
October	1,090	47,480,400
November	540	23,522,400
December	0	0
	60,000 Acre Feet	



Rio Grande Project
Drought Stipulation
No Cost Obligation
Claims Waiver
Elephant Butte Dam
Allocations to Mexico
Project Irrigation

A point of interest in Article II is the stipulation that the amount of water delivered to Mexico shall be diminished in the same proportion as water delivered to lands in the United States in the event of extraordinary drought or serious accident to the irrigation system. The treaty does not specify what constitutes extraordinary drought, instead basin and reservoir conditions are evaluated every year by Reclamation and the United States Section of IBWC. This evaluation includes near-monthly consultation and information-sharing with the Mexican Section of the Commission and officials from the irrigation district in the Juarez Valley. American Dam, which is located on the International Boundary approximately two miles upstream of the Acequia Madre, regulates deliveries to Mexico. Since its first full year of operation in 1939, Mexico’s annual allocation has been reduced 34 times (*see* Figure 2).

Article III of the Convention states that there is no cost to Mexico for the delivery of its water. The United States pays the whole cost of storage, conveyance, and measurement of the water and assumes no obligation beyond delivering the water in the bed of the river above the head of the Acequia Madre. Mexico is not charged monetary costs nor water losses incurred while water is in storage or transit.

Article IV of the Convention states that Mexico waives any claim to waters of the Rio Grande for any purpose between the head of the Acequia Madre and Fort Quitman, Texas; it also states that all claims by Mexico against the United States for damages due to diversion of Rio Grande waters by US citizens are fully settled or waived, existing or otherwise. Article V goes on to say that this agreement does not set a precedent, and that both parties (United States and Mexico) understand that the Convention only applies to the international portion of the Rio Grande from the head of the Mexican Canal to Fort Quitman, Texas.

Although signed in 1906, the delivery obligations listed in Article I could only go into effect once the proposed storage dam and water distribution system set forth in Article 1 were constructed. This dam is known today as Elephant Butte Dam. With the addition of Caballo Reservoir and Dam, several diversion dams, and other irrigation works, the entire storage/delivery system is known as the Rio Grande Project.

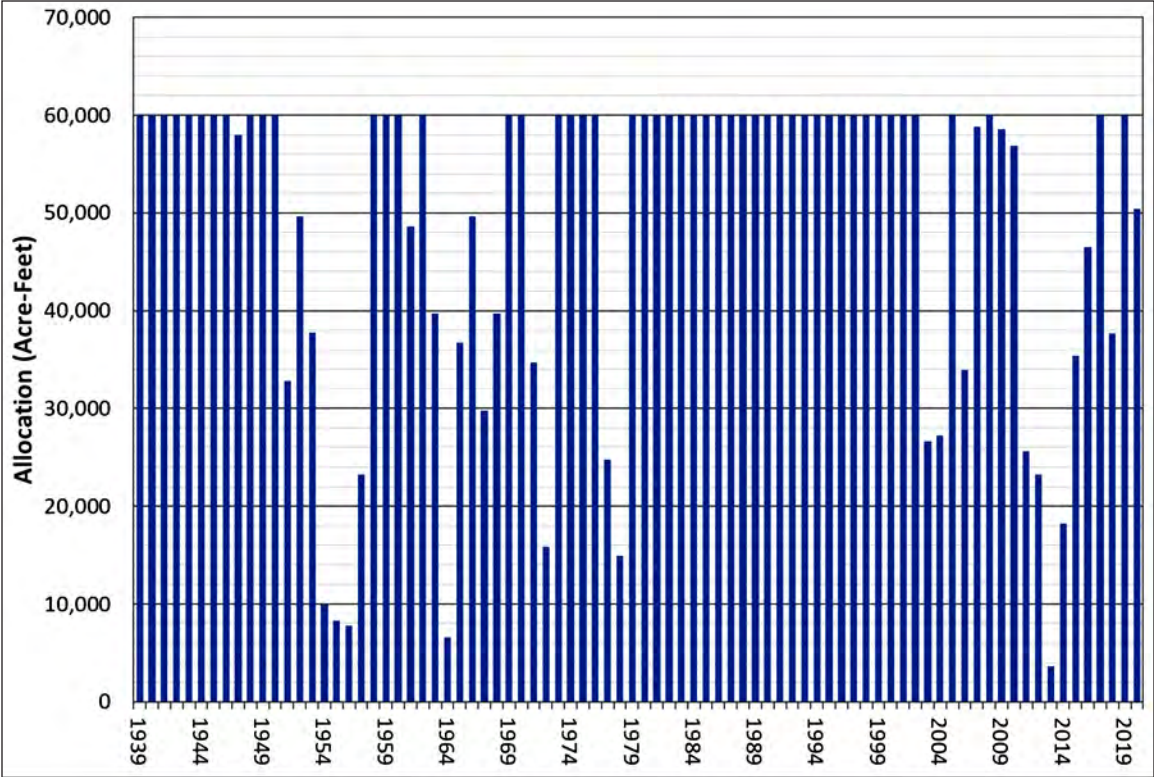


Figure 2. Historical Allocations to Mexico, 1939-2021

The Rio Grande Project

The Rio Grande Project (Project) provides full irrigation water for about 178,000 acres in southern New Mexico and far west Texas, and approximately 25,000 acres in Chihuahua, Mexico. The Project’s water supply is largely driven by snowmelt from Rio Grande headwaters in northern New Mexico and southern Colorado, although local runoff also provides some supply. Project farmlands lie in a long narrow strip neighboring the river and extend for nearly 130 miles from Caballo Reservoir to the Hudspeth County line in Texas. There are three main valleys: Rincon, Mesilla, and El Paso/Juarez, all divided by narrow mountain ranges. Among the crops grown in the Rio Grande Project area, cotton is the most prominent, along with chile peppers, onions, alfalfa, and pecans.

Rio Grande Project Dam Design Sedimentation Caballo Reservoir Purposes Distribution System Operations & Maintenance Water for Mexico Governing Documents	Elephant Butte Dam, located in South Central New Mexico near the towns of Truth or Consequences and Elephant Butte, is a concrete gravity structure 301 feet high and 1,674 feet wide. This dam was authorized by the Secretary of Interior on December 2, 1905 after the passage of the Reclamation Act of 1902, which facilitated the construction of irrigation projects to reclaim arid lands in the western United States. Construction started in 1911 and the first storage and release for irrigation occurred in 1915, while the dam was completed in 1916. It was the largest reservoir in the world at that time. Elephant Butte Reservoir was designed for 2,634,800 AF (AF) of capacity, but it is now reduced to 2,010,900 AF. Since 1915, the reservoir is estimated to have lost 623,900 AF of storage capacity (24%) due to sedimentation. With the construction of upstream reservoirs such as Cochiti, El Vado, and Abiquiu Reservoirs in the 1950s and 1960s, the sediment inflows have been greatly reduced. Elephant Butte Dam has a powerplant consisting of three generating units that can produce 24 Megawatts, however, releases for power generation are governed by irrigation releases. Caballo Reservoir is located approximately 20 miles downstream from Elephant Butte Dam. It was built in 1938 with partial funding from the State Department as a flood control and power regulating reservoir. Caballo's capacity is 324,509 AF, with 100,000 AF reserved for flood control. Water is released from Caballo Reservoir solely to meet agricultural and municipal demand. Typically, there are no storage requirements in the two reservoirs for wildlife preservation and recreation, which is different from upstream reservoirs where water operators work together to match irrigation demand with providing habitat for the endangered Rio Grande Silvery Minnow in central New Mexico. However, for the 2021 irrigation season, Reclamation instituted minimum pools of 10,000 AF in Elephant Butte and 12,000 AF in Caballo to provide for the safety of employees, protect the facilities and infrastructure, and in consideration of multiple Rio Grande Project purposes, including avoiding fish kills, and other necessities. These minimum pools were established due to early 2021 irrigation season projections of possible record low storage levels caused by ongoing drought. The water distribution system starts at Elephant Butte and ends at the El Paso/Hudspeth County line. It is a fairly closed system designed to minimize water exiting the system. The Project consists of five diversion dams: Percha Dam, Leasburg Dam, Mesilla Dam, American Dam, and International Dam (<i>see</i> Figure 1). In addition to the diversion dams, the system also includes 141 miles of main canals, 462 miles of laterals, and 457 miles of drains. A system of canal drains was built in the early 1920s to drain water-logged fields and salts from farmlands. Through a Warren Act Contract, the Project delivers irrigation wastewater to the Hudspeth County Conservation & Reclamation District No. 1 (Hudspeth County), which consists of 18,300 authorized irrigated acres. At the Project's inception, the diversion dams — except for American and International Dams — and the canal system within the United States were managed by Reclamation. In the early 1980s, Reclamation transferred the operations and maintenance of the Project to two local irrigation districts, Elephant Butte Irrigation District (EBID) in New Mexico and El Paso County Water Improvement District Number One (EP1) in Texas. This transfer occurred under the Reclamation transfer of works programs; Reclamation, however, still maintains ownership, operation, and control of the two dams and reservoirs, and ownership of the major diversion dams upstream of American Dam. On the Rio Grande near the international boundary, two of the five diversion dams are operated by USBWC to regulate irrigation deliveries to the United States and Mexico. American Dam began operating on June 2, 1938 and diverts water into the American Canal for use in the United States. The remaining flow is passed downstream towards International Dam, which was constructed in its current form in 1940 and diverts water for Mexico into the Acequia Madre. Once water is delivered to the Acequia Madre, CONAGUA manages the deliveries to farms in Mexico. Project Operations There are three main governing documents that determine the distribution of water in the Rio Grande Project: 1) the Binational Convention of 1906 (discussed above); 2) the Rio Grande Compact of 1938 (Compact) that determines the distribution of waters between the states of Colorado, New Mexico, and Texas above Ft. Quitman. Under the Compact, the delivery obligation by New Mexico to Texas is met with releases from Elephant Butte Dam, rather than at the state line, since Reclamation acquired the water rights in this area prior to New Mexico statehood (<i>see</i> Figure 3). The Rio Grande Compact can be found at: www.usbr.gov/uc/albuq/water/RioGrande/pdf/Rio_Grande_Compact.pdf; and 3) the Rio Grande Project Operating Agreement of 2008 (OA) between Reclamation, EBID, and EP1 (Hudspeth County is not part of the Rio Grande Compact, nor is it part of the Operating Agreement).
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Rio Grande Project

Allocations

Irrigation Districts

Binational Meetings

Water allocations to Project users are based on an analysis of available Project supply in accordance with the governing documents above. Today, these allocations are made by a committee consisting of a member from EBID, EP1, and Reclamation. With the inclusion of Mexico's 60,000 AF under the 1906 Treaty, a full release for the Project under the Compact is 790,000 AF. In years of reduced release due to extraordinary drought, the United States and Mexico proportionally shared the burden of the irrigation reductions in accordance with Article II of the Binational Convention of 1906.

Initially, Reclamation managed the delivery from Caballo Dam to individual farms in the United States. In the 1980s, operation of the system was transferred to United States irrigation districts. After the transfer, Reclamation was only responsible for delivering water to the diversion points where it was then distributed to United States lands by EBID and EP1. Since Reclamation no longer managed deliveries to individual farms, a new method was needed to allocate water to Mexico during extraordinary drought that ensured compliance with Article II of the Binational Convention of 1906 and to settle possible disputes between the districts. This method was drafted during a wet period in the 1980s and 1990s (*see* Figure 4), and, consequently, was not actually implemented until the drought of the 2000s.

As described, surface water in the Rio Grande Project falls under the jurisdiction of several agreements and layers of government: local irrigation districts in the United States (EBID and EP1) and multiple federal agencies (Reclamation, IBWC, CONAGUA). To successfully coordinate irrigation deliveries

to three states in two countries, these agencies must work together effectively. Monthly binational meetings are held with all stakeholders to discuss current allocations, releases, and operational updates. These meetings are also critical for coordinating projects during the irrigation off-season, which could include: structural maintenance; channel dredging; levee improvement; and complete canal redesigns. Data relating to discharge measurements and computed deliveries to Mexico are also readily shared with all stakeholders.

Streamflow forecasts are also discussed in these meetings to help water managers plan water use scenarios. The Natural Resources Conservation Service (NRCS) forecasts streamflow based on snowpack in the headwaters of the Rio Grande, and these forecasts are used to drive river operation simulations in the Upper Rio Grande Water Operations Model (URGWOM). URGWOM is a RiverWare model that includes a complex array of interactions, including: delivery obligations; water transfers; baseflows for environmental purposes; and groundwater pumping.

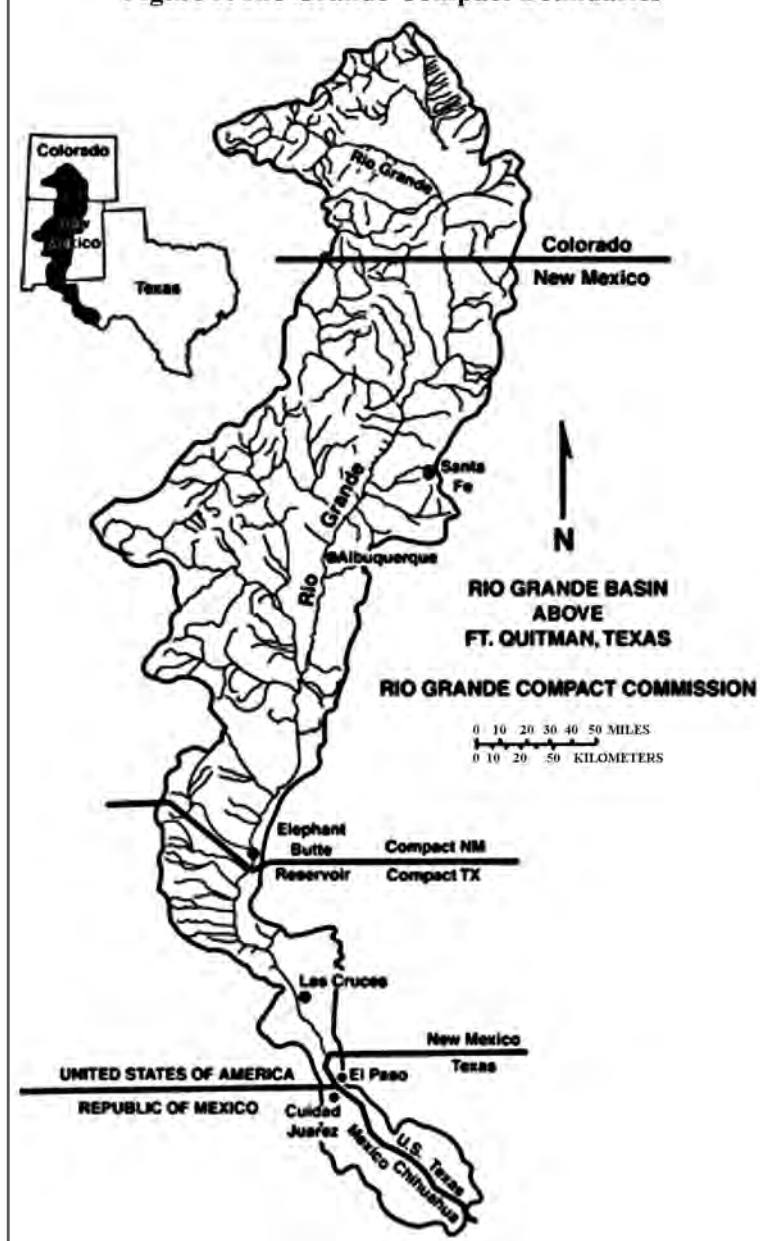
Drought

Since about 2002, the Rio Grande Project has been in a multiyear drought. A recent study found that the period from 2000 to 2018 was the driest 19-year span in the southwestern United States and northwestern Mexico since the late 1500s and the second-driest period since the year 800 (*see*: <https://science.sciencemag.org/content/368/6488/314>).

By the end of the 2020 irrigation season in October, Project storage was at 109,913 AF, or 5% of capacity. A La Niña climate outlook, which typically results in less snowpack for the Rio Grande headwaters in southern Colorado and northern New Mexico, was forecast for the winter of 2020-2021. This has major implications for the Project since snowmelt runoff provides the bulk of the Project's water supply. Soon after, rumors about a possible zero release for 2021 were spreading.

Usable storage in the Project is defined under the Compact as "all water, exclusive of New Mexico and Colorado credit water, which is in Elephant Butte and Caballo reservoirs." At the beginning of 2021, usable storage was 156,140 AF, or about 7% of capacity. Even

Figure 3. Rio Grande Compact Boundaries



Rio Grande Project

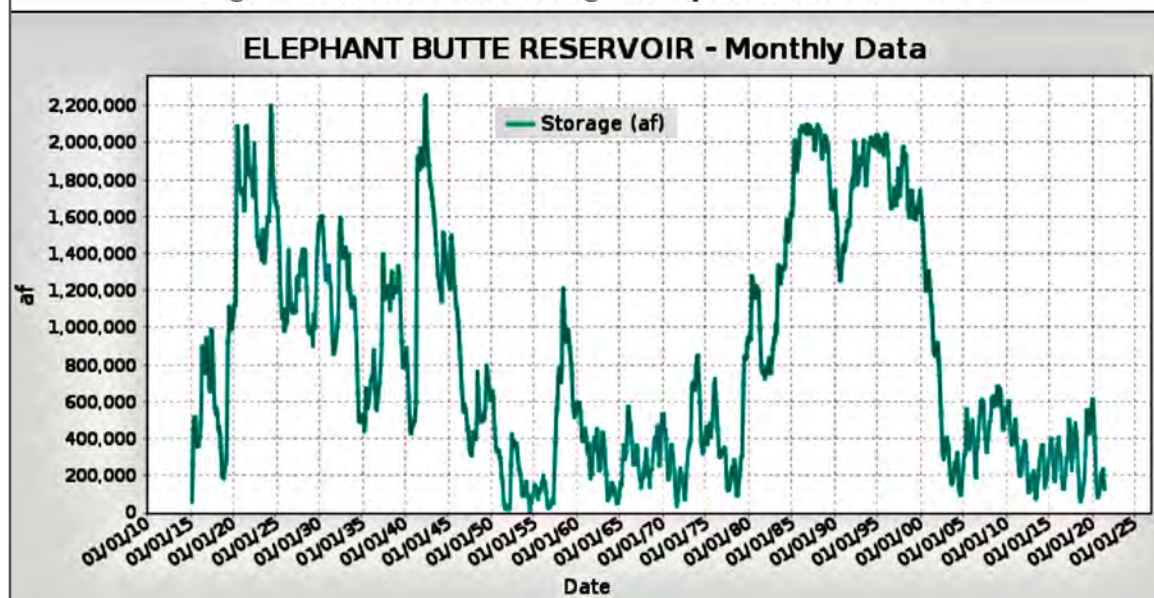
Flow Forecast

Minimum Reservoir Pools

2021 Allocation

2021 Season Storage

Figure 4. Historic Water Storage at Elephant Butte Reservoir



though snowpack in the Rio Grande headwaters was near the 1981 - 2010 median, the March 1 NRCS March - July inflow forecast for Elephant Butte Reservoir, as measured at the San Marcial gaging station, was only 177,000 AF or 34% of the 1981 - 2010 average of 510,000 AF. The lower inflow forecast was due to low soil moisture conditions that resulted from lack of precipitation in the 2020 monsoon season. The URGWOM model also predicted 175,000 AF of inflow into Elephant Butte Reservoir.

The minimum reservoir pools instituted by Reclamation in 2021, including a buffer against estimated evaporation, totaled 24,000 AF. This reduced useable project storage available for release, and thus reduced the water available for allocation. As a result of the low storage and low allocation, irrigation districts in both the United States and Mexico delayed irrigation until late May. EBID ceased irrigating at the end of June, whereas EP1 and CONAGUA ceased irrigating in August. Under a full project release, the irrigation season typically starts in March and finishes in October. To put the 2021 allocation in perspective, the final 2021 allocation to Mexico was 12,129 AF (20% of a full 60,000 AF allocation). The lowest allocation to Mexico on record is 3,665 AF (6% of a full allocation), which occurred in 2013 and coincided with the lowest Project release of approximately 166,000 AF.

Conclusion: 2021 and 2022

In March 2021, URGWOM forecast Elephant Butte at 10,000 AF and Caballo at 12,000 AF of storage by the end of the 2021 irrigation season. However, recent heavy rain in the Project area slashed irrigation demand and provided higher than average summer inflows into Elephant Butte Reservoir. It is now estimated that the season will end with around 80,000 AF of storage at Elephant Butte, and 20,000 AF at Caballo. While this is still worse than storage at the end of the 2020 irrigation season, it is better than what was initially predicted, using conservative monsoon inputs. Given the current La Niña conditions forecast for lower-than-average snowpack and warmer temperatures this winter, water managers may have to struggle with hard decisions in a possible low water year in 2022.

FOR ADDITIONAL INFORMATION:

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Delbert Humberson and **Samantha Stiffler** are Hydrologists at the United States Section of the International Boundary and Water Commission (USIBWC). They maintain discharge records, account for water delivered to Mexico under the Binational Convention of 1906, and account for water delivered to the United States under the 1944 Water Treaty.

Jerry Melendez is a Civil Engineer at the United States Bureau of Reclamation. He coordinates with local, state, and federal entities including USIBWC, as well as other stakeholders to help manage the Rio Grande system from Colorado to Western Texas, especially in the Rio Grande Project area. He assists in verifying the water accounting for the Project related to the 1906 Treaty, Rio Grande Compact of 1938, and the Project Operating Agreement of 2008. Also, he keeps an eye on new technologies related to water measurements, projects, and federal grant funding.

Forest Fires & Water

Watersheds: Natural Infrastructure

Agriculture to Urban Use Shift

Reclamation Dam

WATER QUALITY & WILDFIRES

MAINTAINING HEALTHY WATERSHEDS & SUSTAINABLE WATER SUPPLIES

by Bruce Hallin and Elvy Barton, SRP (Phoenix, AZ)

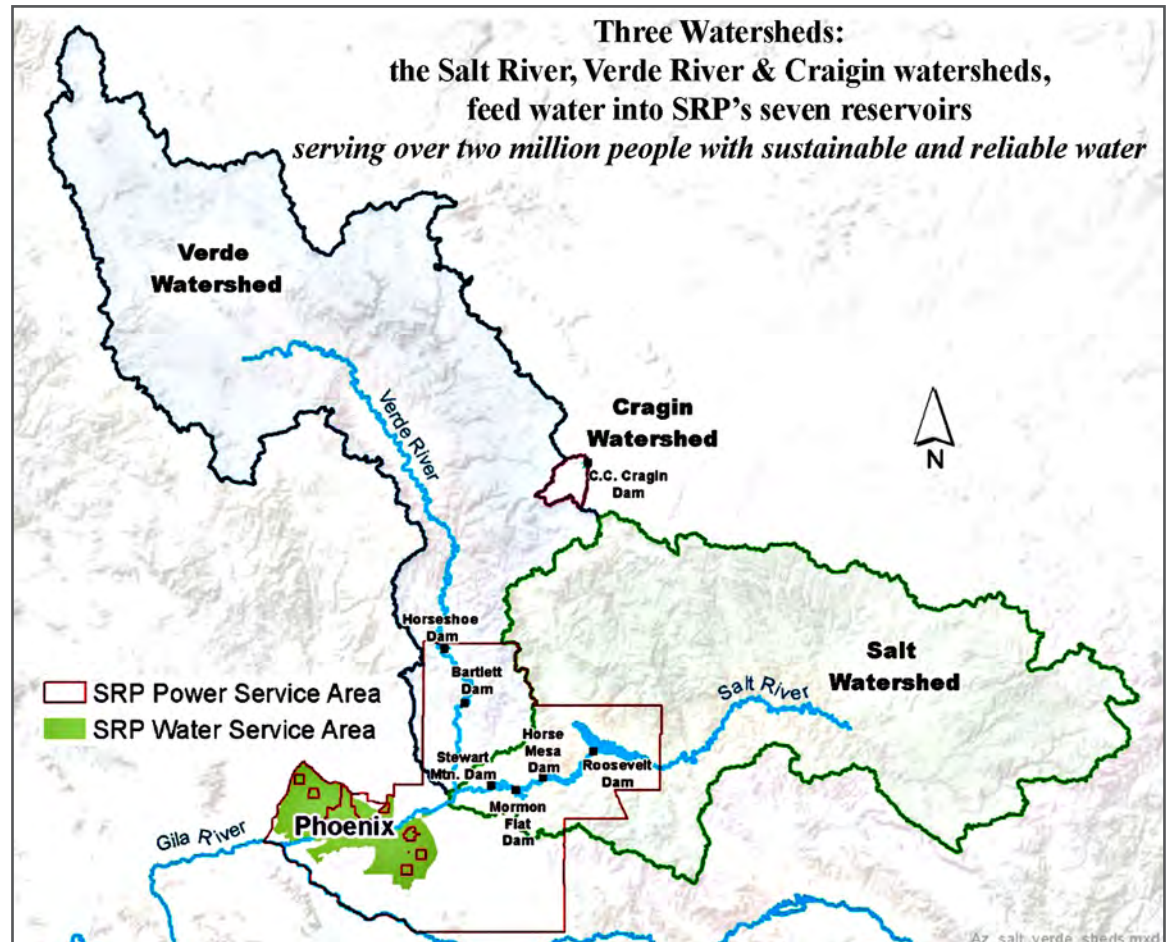
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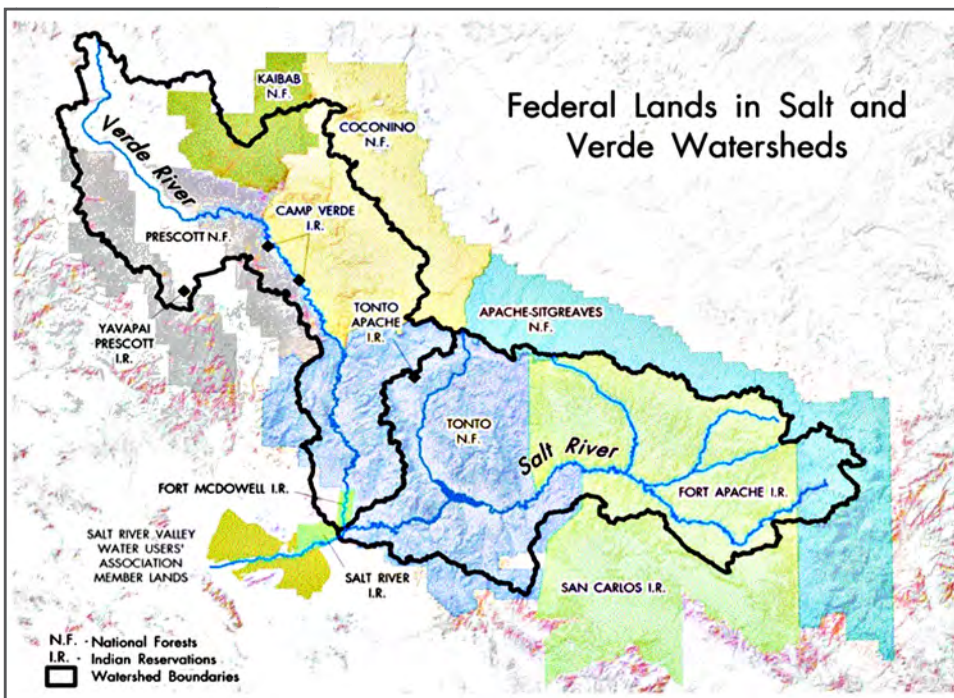
HISTORY OF THE SALT RIVER PROJECT

For the Salt River Project (SRP), delivering water throughout the Greater Phoenix area, including the nation's fifth-largest city, is a core mission. To do that, we must look beyond the physical infrastructure that stores and delivers water. We must also consider the 8.3 million acres of natural infrastructure where the water first collects. Three watersheds — the Salt River, Verde River and East Clear Creek watersheds — feed water into SRP's seven reservoirs that serve over two million people with sustainable and reliable water. One of the greatest threats to these watersheds, and the Greater Phoenix area's water supply, is unhealthy and overgrown forests. SRP is tackling this threat by acting today.

SRP is composed of the Salt River Valley Water Users' Association (Association) and the Salt River Project Agricultural Improvement and Power District (District). Under contract with the federal government, the Association, a private corporation, and the District, a political subdivision of the State of Arizona, provide water to approximately 250,000 acres of land in the Greater Phoenix area. Over the past century, most of these lands have been converted from agricultural to urban uses and now comprise the core of the Phoenix area.

The Association was organized in 1903 by landowners in the Salt River Valley to contract with the federal government for the building of Theodore Roosevelt Dam, located some 80 miles northeast of Phoenix. SRP was the first multipurpose project approved under the Reclamation Act of 1902. In exchange for pledging their land as collateral for the federal loans to construct Roosevelt Dam, which loans have long since been fully repaid, landowners in the Salt River Valley received the right to water stored behind the dam.





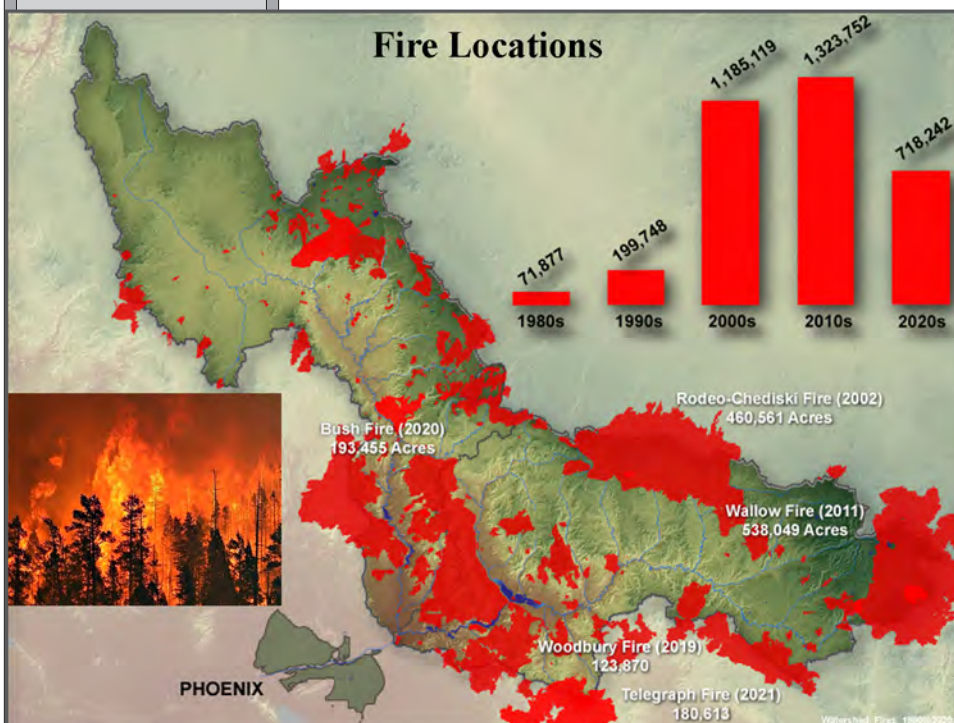
SRP now operates six dams and reservoirs on the Salt and Verde Rivers in the Gila River Basin, one dam and reservoir on East Clear Creek in the Little Colorado River Basin, 1,300 miles of canals, laterals, ditches and pipelines, groundwater wells, and numerous electrical generating, transmission, and distribution facilities. The seven SRP reservoirs impound surface water runoff, which is delivered via SRP canals, laterals, and pipelines to municipal, industrial, and agricultural water users.

Since the end of the nineteenth century, farmers and residents of the Salt River Valley have been integrally involved and interested in the management of the Salt and Verde watersheds. Although the Valley's involvement with the forested land has changed over the decades, the interest has remained constant due to the watersheds' vital role in producing water for the Greater Phoenix area.

Water Supply

National Forests

In 1891 and 1897, the US Congress passed legislation enabling the federal government to set aside forests to help preserve the nation's water supply for future generations. In 1897, the Arizona Territorial Legislature wrote to Congress and stated, "The forests on these water-sheds [Salt and Verde]...are in great danger of being entirely removed by settlers and large lumber companies to the great detriment of our water supply." Over the next decade, National Forests were created primarily to protect the watershed above Theodore Roosevelt Dam and to protect the watershed along the Verde River. In 1901, the Arizona Republican touted the designations by saying: "Protection [provided] to the magnificent forest and the conservation of the waters that feed the Verde and Salt Rivers. The value of this action to the people of the Salt River valley cannot be overestimated." Today, 59% of the 13,000-square-mile watershed that feeds into SRP's reservoirs lies within national forests as part of a plan to provide reliable water supplies for the Greater Phoenix area. The hydrologic values of a reliable water supply associated with healthy forests were recognized by the federal government during the early part of the 20th century and was the underlying reason most forest lands were set aside in Arizona. (SRP, 2021)



Wildfires & Watersheds

THE GROWING PROBLEM

The century-long exclusion of frequent, low-intensity wildfires has led to striking and rapid changes in Arizona's forested ecosystems. Arizona's forests are overstocked with small trees, both live and dead, which increases susceptibility to insect and disease epidemics, drought conditions, and increased risk for catastrophic wildfire. To make matters worse, Arizona is in the midst of the worst drought on record. The forests are dry and are one unintended spark away from devastating impacts. Today, deteriorating forest health and catastrophic wildfires are impacting the hydrologic characteristics of watersheds. Runoff and water yield, peak flows and low flows, erosion and sedimentation, water temperature and water chemistry are all negatively impacted by unnatural forest conditions and severe wildfires.

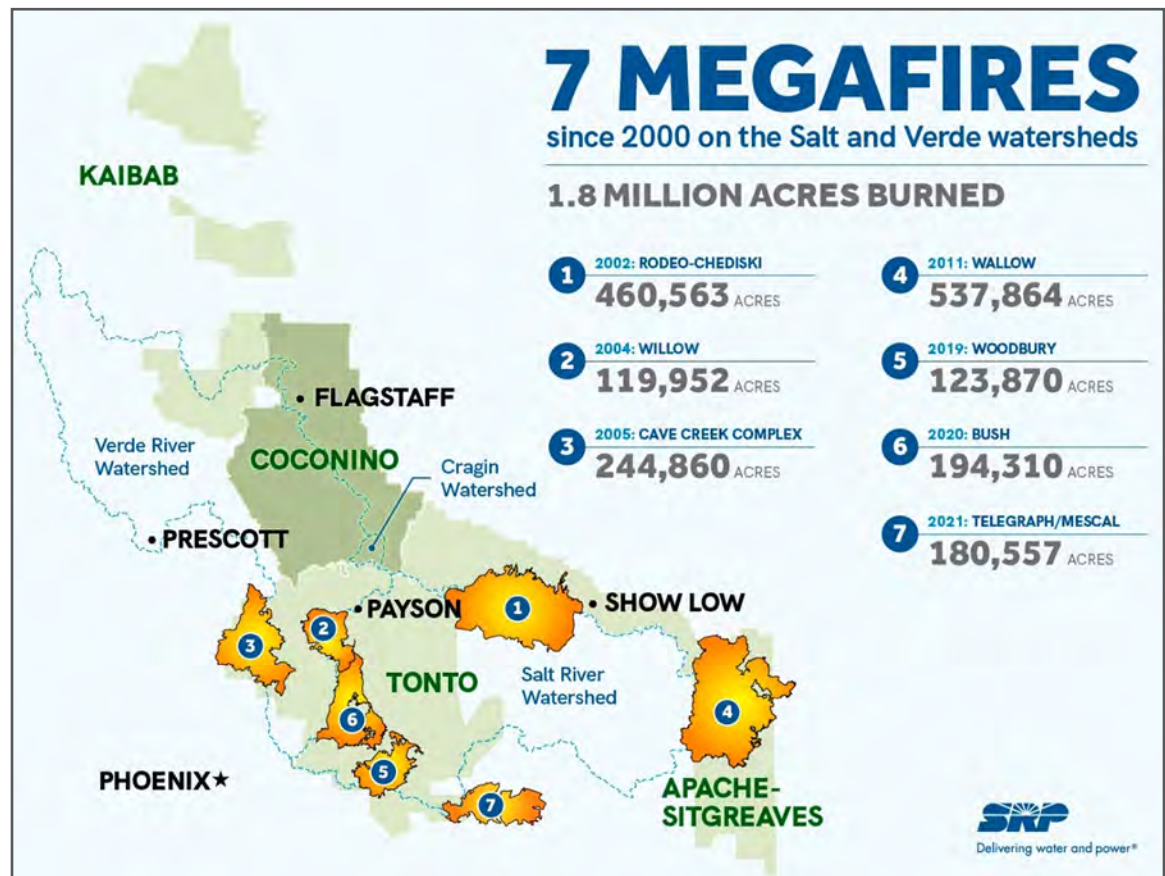
Forest Fires & Water

Megafires Impacts

Resiliency

Forest Restoration

Flooding & Erosion



Over the past two decades, Arizona has experienced eight mega-fires (wildfires that burn more than 100,000 acres), seven of which were in the Salt and Verde River watersheds. These wildfires not only devastate natural ecosystems, but they also degrade water quality and impact the resiliency of the water supply. Large-scale, high-intensity wildfires can sear the soils, preventing new vegetation growth and preventing water from soaking into the ground. When precipitation hits these burned areas, the water gushes downstream picking up loads of sediment, ash, and debris that fill up rivers and reservoirs.

Filling up the reservoirs with sediment and ash is a huge 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 SRP's water supply.



The pictures above are in a sequence of about 100 yards from left to right visually displaying the benefits of forest restoration. The forest has been thinned in the left photo; the middle photo includes a Forest Service road and shows the transition area of the fire from the treated area to the untreated area and the devastating impact of crown fire shown in the photo on the right.

The Value of Healthy Forests and Watersheds: Case Studies on the Costs of Wildfire

The American Planning Association undertook a case study on the Hayman wildfire in Colorado to look at post-wildfire flooding erosion. The case study concluded that ensuing post-wildfire precipitation events create erosion on wildfire-impacted watersheds that causes increases in sediment yield of over 1,400 times pre-fire conditions. (American Planning Association, n.d.). In addition to increased erosion and its impact on sediment concentrations in surface waters, wildfires can result in an increase in nutrient

Forest Fires & Water

Nutrient Overload

(i.e., nitrogen and phosphorus) loading to water bodies. This can result in an increase in algal growth and reduction in dissolved oxygen leading to fish kill. Runoff from wildfires contains heightened levels of nitrates, phosphates, heavy metals, total organics, and turbidity. (CWPP EA, 2018). For example, the 2002 Rodeo-Chediski fire produced significant post-wildfire increases in calcium, magnesium, potassium, sulfate, phosphorus, and nitrogen. “The increased calcium and sulfur concentrations were about half of the US Environmental Protection Agency’s (EPA’s) drinking water quality standards, but the values for magnesium, potassium phosphorus, and nitrogen rose to 2 times, 5 times, 390 times, and 22 times, respectively, above EPA drinking water quality standards.” In addition, there were significant increases in lead, iron, copper, and arsenic levels post Rodeo-Chediski fire. “The values [were] very high and dangerous, constituting of about 460%, 3000%, 300%, and 6850% of the U.S. EPA drinking water standards for lead, iron, copper, and arsenic, respectively.” Finally, “conductivity and turbidity levels increased by 422% and 1,020,000% above the U.S. EPA standards, respectively.” (Teclé, A. and Neary, D., 2015).

Erosion Prone Area

Another example is the Sunflower Fire that burned more than 18,000 acres south of Payson, Arizona in the summer of 2012. This small wildfire occurred just above Sycamore Creek, a tributary to the Verde River. The high-severity wildfire removed vegetation that had helped stabilize the steep slopes in the upper portion of the watershed, leaving the land prone to erosion and flooding. Heavy rain events on the Sunflower burn scar created large flows of ash and sediment, which washed down Sycamore Creek and into the Verde River, creating a situation where the first flush of water from the event was untreatable at the Val Vista water treatment plant, the largest treatment plant on the SRP water system. The water was bypassed and diverted into the normally dry Salt Riverbed.

Drinking Water Challenges

Drinking water providers must ensure that water delivered to customers for potable uses meets safe drinking water standards. Decreased surface water quality and spikes in sediment load following extreme wildfire events makes it challenging and costly to treat water. In several cases, water treatment facilities in the Greater Phoenix area have been upgraded by adding carbon and other filtration methods to ensure the facilities can handle the increased levels of organics and sediment. The upgrades to water treatment facilities have come at a cost of hundreds of millions of dollars.

Community Impacts

Wildfires not only impact water quality but also have significant flooding impacts in surrounding communities. For example, the 2012 Schultz wildfire located just outside Flagstaff, Arizona consumed approximately 15,000 acres of forested land. This high-intensity wildfire caused extensive damage to wildlife habitat, property, and infrastructure. Unprecedented flash flooding following the wildfire added further damage to property, and resulted in the death of one person. The ongoing threat of intensified flash flooding remains today. Northern Arizona University’s (NAU) Alliance Bank Business Outreach Center was commissioned by NAU’s Ecological Research Institute to conduct a full cost accounting on the wildfire’s impact. The study found that the quantifiable cost impacts of wildfire suppression, and post-wildfire and flood mitigation to be over \$59 million. However, when considering the full costs associated with items such as flood insurance premiums, evacuation costs, loss of property value, loss of wildlife habitat, and loss of life, the full cost impact of the wildfire balloons to the \$133-147 million range. (NAU ERI, 2013).



**Water Samples from the SRP Water System
following the Sunflower fire**

Forest Fires & Water

Mitigation Costs

Finally, we turn to the C.C. Cragin Reservoir located in northern Arizona near the crest of the Mogollon Rim. This reservoir is the primary water supply for communities in northern Gila County including the Town of Payson. In 2018, the Electric Power Research Institute conducted a case study on the Cragin Watershed, concluding that should a catastrophic wildfire consume the watershed, the costs of wildfire mitigation, infrastructure repair and replacement would cost SRP, the US Bureau of Reclamation, the Town of Payson, and other stakeholders over \$293 million. (EPRI, 2018). According to the Federal Emergency Management Agency (FEMA) Benefit-Cost Tool Analysis, mitigation related to post-wildfire could cost \$5,250 per acre for soil stabilization, flood diversion, and reforestation. In total, full mitigation costs associated with a wildfire across all 64,000 acres of the Cragin watershed area would be in the range of \$336 million. (FEMA, 2016).

These are just a few real life and modeled examples of the threats that Arizonans are facing today. The threat of wildfires impacting communities and water supplies is growing. We must move quickly to restore our national forest lands to address these serious risks.

Arizona's Four Forest Restoration Initiative

"There are risks and costs to a program of action, but they are far less than the long-range risks and costs of comfortable inaction." – President John F. Kennedy

Arizona's Four Forest Restoration Initiative (4FRI) is a Collaborative Forest Landscape Restoration Program (established under section 4003(a) of Title IV of the Omnibus Public Land Management Act of 2009) designed to restore over two million acres across four national forests: Apache-Sitgreaves, Coconino, Kaibab, and Tonto National Forest. The 4FRI area encompasses a significant expanse of the Salt and Verde Rivers and East Clear Creek watersheds. The objective of 4FRI is to restore the national forest lands and to re-build a forest industry that will have the capability to process and mechanically harvest trees across 4FRI over a 20-year period. It is the largest forest restoration collaborative project in the nation and includes over 30 stakeholder organizations. One of 4FRI's successes stems from its ability to conduct large-scale National Environmental Policy Act (NEPA) environmental assessments. Today, there are over 500,000 acres across 4FRI that have approved NEPA environmental impact statements or environmental assessments and are ready to be thinned. Next year, an additional 900,000 acres will make it across the NEPA finish line and will be available for thinning. This is a significant accomplishment that the stakeholder organizations have been able to tackle. Unfortunately, developing sustainable markets and attracting well-capitalized industry that has the capability to thin the forests and process the low-value trees across the 4FRI landscape has been a challenge for the US Forest Service. (US Forest Service, 2021).

Experience has shown that most of the thinning projects across 4FRI require some level of subsidy from the US Forest Service (Forest Service) or contributing partners due to the low-value harvested trees, high cost of transportation, and the limited existing forest industry. In addition, the forest industry that does exist is primarily located in eastern Arizona, with little industry capacity in the western part of 4FRI. Harvested trees on the westside of 4FRI must be transported to the eastside to be processed into wood products. This means long haul distances and time, which increases the overall costs of implementing thinning treatments and requires additional subsidies.

Over time, the lack of considerable progress on forest thinning has resulted in stakeholders, like SRP, becoming actively involved in working with existing industry, and attracting new industry that can successfully employ long-term forest thinning contracts.

Restoration Program

NEPA Assessments

Forestry Market Needs

Market Development



Untreated Overgrown Forest



Treated & Thinned Forest

Forest Fires & Water Forest Management Wildfire Threat Barriers to Success Tax Credit Thinning Project Large-Scale RFP Customer Donations Biomass Plant Carbon Benefits	Moving Forward – SRPs Role in Forest Restoration <i>“Our playbook is broken.” – Forest Service Chief Vicki Christiansen</i> The 4FRI collaborative is a billion-dollar project that is taxing the Forest Service’s resources. Increased stakeholder involvement, oversight, and ingenuity is now required to develop a successful forest products industry and forest management program. In the short-term, such a program would increase the pace and scale of restoration. In the long-term, the program should ensure proactive management of the forests that mimics more natural conditions and will support reintroduction of low-intensity fire as a natural forest management tool. Through ten years of 4FRI the Forest Service has struggled to meet forest thinning goals and objectives, in particular the primary goal of accelerating treatments to 50,000 acres per year. The rate of thinning since project inception has averaged less than 15,000 acres per year. SRP’s mission and obligation in operating a large-scale water system includes a duty to provide sustainable, reliable, and safe water to over two million customers. Wildfire poses a significant threat to that duty. Arizona and SRP cannot afford to lose the watersheds or water supplies that originates from these forests. Forest health is a priority and working with the Forest Service to accomplish the goals of 4FRI is a priority for SRP. Consequently, SRP has taken a leadership role in identifying and pursuing opportunities that will accelerate restorative work across the watersheds. Identifying and Designing Policies that Remove Barriers to Success SRP strongly advocated for the passage in the 2018 Omnibus Bill of a provision that extended stewardship contracting terms with the Forest Service from 10 years to 20 years. The 20-year term provides industry with more surety in recovering capital investment and the ability to withstand wood product market fluctuations. In addition, SRP helped resolve issues associated with “Fire Borrowing,” which effectively ensures that the Forest Service’s restoration budgets are protected and not used to fund growing wildfire suppression costs. Finally, SRP worked with Congress to include \$250 million for the Forest Service to implement 20-years stewardship contracts in the 2021 Infrastructure Investment and Jobs Act recently passed by the Senate. Bolstering Forest Product Industry’s Capacity PARTNERING TO MODERNIZE FOREST SERVICE BUSINESS PRACTICES & PROCESSES SRP led the adoption of a tax credit that was passed by the Arizona Legislature and signed by the Governor this year that attracts new forest industry to Arizona and incentivizes existing industry to process more trees into wood products — in turn restoring more forests every year. In addition, SRP partnered with The Nature Conservancy on a thinning project that will serve as a “proof of concept” to utilize innovative technologies and to develop and modernize Forest Service processes and practices to create restoration activity efficiency and cost savings. Finally, in 2018 SRP in collaboration with the Forest Service, US Bureau of Reclamation, Arizona Department of Forestry and Fire Management, and Arizona Commerce Authority worked together to develop the first 20-year stewardship request for proposal (RFP). This RFP offered up to 520,000 acres of forest thinning over the next 20 years. This partnership was the first time the Forest Service utilized partners to develop a large-scale RFP. This was an innovative partnership that allowed to the partners to learn from each other’s perspectives and build long-term relationships. On the Ground Investments in Thinning Projects In 2020, SRP launched a customer-led initiative that allows SRP customers to contribute to forest thinning projects by making monthly donations on their power bill. SRP provides a customer contribution match of up to \$200,000 per year. SRP is pursuing implementation, with our partners, on four thinning projects to thin over 3,300 acres this next year. We have brought together a diverse array of partners that include the Arizona Department of Forestry and Fire Management, Town of Payson, US Bureau of Reclamation, Forest Service, National Wild Turkey Federation, Arizona Game and Fish Department and many others. Finally, SRP has a power purchase agreement for half of the capacity produced at the NovoPower biomass plant that is fueled by low-value forest biomass. Our power purchase agreement supports forest thinning efforts across Arizona and rural jobs in Snowflake, Arizona. Developing Carbon and Water Ecosystem Benefit Metrics: ADDED INCENTIVES FOR INVESTMENT IN FOREST RESTORATION PROJECTS The carbon benefits stemming from forest thinning projects are two-fold. The first set of carbon benefits come from high-severity wildfire avoidance. Restoration projects protect forests from high-severity, large-scale wildfires that result in unsequestered releases of carbon. The second set of carbon benefits result from the removal of small trees to allow larger, more mature trees to thrive. Improving the overall health of the forest and restoring natural fire regimes enables the forests to stably store more carbon per acre. The National Forest Foundation in partnership with SRP developed a case study to look at the carbon benefits of forest thinning in the East Clear Creek watershed. The case study concluded that the above-ground carbon benefits averaged about 25.9 tons per restored acre over 40 years.
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Forest Fires & Water

Water Benefits Metric

Aggressive Goals

Collaboration Required

In collaboration with Arizona State University, SRP is developing a first ever water balance model and metric that looks at the ecosystem water benefits associated with forest thinning projects. These water benefits will be in the form of acre-feet that remain within the ecosystem and are not lost to evapotranspiration. Water remaining in the system will benefit springs, stream flow, aquifer recharge or wetlands. This model and metric will provide a greater understanding of how forest thinning will benefit the hydrologic cycle. Together, these ecosystem benefit metrics will be used to attract financial investment in forest thinning projects across the Salt and Verde River and East Clear Creek watersheds.

Establishing Aggressive Goals with Measurable Metrics Focusing on Acres Restored

SRP has adopted a sustainability goal as a commitment to forest restoration and protecting its watersheds across the 4FRI landscape — to support the thinning of 50,000 acres per year or a total of 500,000 acres thinned by the year 2035. This goal demonstrates SRP's long-term commitment and action to help restore national forest lands.

Conclusion

The Salt River Project's rich history and duty to provide sustainable, reliable, and safe water to millions of customers are what drives our organization to be a leader in forest restoration. SRP is creating new pathways to partner with stakeholders because the serious wildfire problem requires all stakeholders, private and public, to work together. SRP is also working closely with industry partners and elected officials to ensure that policies and procedures are helping industry be successful. Finally, SRP is dedicating resources to on-the-ground projects and creating science and technology driven metrics to quickly reduce wildfire risks and accelerate forest restoration treatments. The communities and customers we serve are of the utmost importance and SRP is taking significant actions to ensure we can continue to deliver on our mission. We also know that we cannot do this alone. We invite others to partner and collaborate with us.

Together, we can tackle the wildfire challenges ahead.

FOR ADDITIONAL INFORMATION:

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Salt River Project forests webpage at: www.srpnet.com/forests

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Bruce Hallin has over 30 years of experience in the water resource and power utility industries, with the last twenty-five years at the Salt River Project. He has worked in the fields of water resource development and management, water resource planning, water rights, energy corporate planning and strategy, land rights management and acquisitions, contract development and negotiations, and forest health. He currently serves as the Director of Water Supply at SRP. He serves on multiple water related local and regional water resource committees, boards, and business groups. Prior to SRP, he was a partner in a water resource consulting business and worked for the Arizona Department of Water Resources. He has a Bachelor's in Urban Studies/Geography from Arizona State University.

Elvy Barton is a natural resources and environmental policy expert with over 15 years of experience in this field. Elvy is currently a Forest Health Management Principal at Salt River Project. In this role, she leads SRP's forest restoration partnerships, projects, and policy efforts. Before working at SRP, Elvy was a Senior Policy Advisor at the Arizona Legislature for 10 years where she focused on water, natural resources, and environmental policy. Elvy also is an associate professor at Northern Arizona University where she teaches public sector communications. She has a Master's in Public Administration and is currently pursuing an Executive Master's in Sustainability Leadership from Arizona State University.

WATER BRIEFS

IBWC COMMISSIONER US
NEW COMMISSIONER ANNOUNCED

The International Boundary and Water Commission operates and maintains: flood control levees; international storage reservoirs; diversion dams; wastewater treatment plants; and boundary monuments at various locations on the US-Mexico border. In addition to its Headquarters in El Paso, Texas, the US Section has offices at San Diego, CA; Nogales and Yuma, AZ; Las Cruces, NM; El Paso/American Dam, Ft. Hancock, Presidio, Del Rio/Amistad Dam, Laredo, Falcon Heights/Falcon Dam, and Mercedes in Texas; and Washington, DC.

On August 20, President Biden announced his intent to appoint Maria-Elena Giner to be the US Commissioner of IBWC. The daughter of an immigrant, she will be the first Latina nominated as Commissioner of the IBWC. Ms. Giner has over 25 years of experience serving the residents of the US-Mexico border region on water issues. The United States and Mexican governments appointed her in 2010 as the General Manager for the Border Environment Cooperation Commission (BECC). Much of her work at BECC focused on modernizing the institution by expanding its municipal infrastructure programs and updating its organizational tools to meet the dynamic needs of the region while balancing the interests of the federal administrations. During her tenure, she focused on a progressive agenda that addressed binational cooperation on water, energy, and climate change.

Dr. Giner is well regarded with state agencies and local communities in California, Arizona, New Mexico, Texas, and the six Mexican border states. With the support of staff, she led the development and financing of \$9 billion in environmental infrastructure, benefiting about 100 communities and over 10 million residents. In addition, she has published extensively on water policy and transboundary bilateral cooperation. Her education includes a Bachelor of Science in Civil Engineering from Loyola Marymount University, a Master of Business Administration from the University of Texas in El Paso, and a Ph.D. in Public Policy from the University of Texas at Austin. Dr. Giner is also a registered professional engineer in the State of Texas.

For info: www.ibwc.gov

WOTUS DEFINITION US
NAVIGABLE WATERS DECISION

As widely reported, on August 30th the US District Court for the District of Arizona vacated and remanded the “Navigable Waters Protection Rule” (NWPR) for reconsideration to the US Environmental Protection Agency and Army Corps of Engineers. The NWPR had established a new definition of the phrase “waters of the United States” (WOTUS) in the Clean Water Act. *Pasqua Yaqui Tribe, et al. v. EPA, et al.*, Case No. CV-20-00266-TUC-RM (8/30/21). The case was brought on behalf of six American Indian tribes: Plaintiffs Pascua Yaqui Tribe, Quinault Indian Nation, Fond du Lac Band of Lake, Superior Chippewa, Menominee Indian Tribe of Wisconsin, Tohono O’odham Nation, and Bad River Band of Lake Superior Chippewa.

Following the August 30th decision vacating the Trump Administration WOTUS definition, EPA and the Army Corps of Engineers announced on September 3 they have halted implementation of the 2020 NWPR and will instead interpret the “waters of the United States” definition as “consistent with the pre-2015 regulatory regime until further notice.”

The district court recognized the severity of the impacts of the 2020 NWPR rule and its effects on the extent of jurisdiction under the Clean Water Act. “The concerns identified by Plaintiffs and the Agency Defendants are not mere procedural errors or problems that could be remedied through further explanation. *See Pollinator Stewardship Council*, 806 F. 3d at 532. Rather, they involve fundamental, substantive flaws that cannot be cured without revising or replacing the NWPR’s definition of ‘waters of the United States.’” *Order* at 9. The court paid particular attention to the impact of the former NWPR on ephemeral waters: “In New Mexico and Arizona, nearly every one of over 1,500 streams assessed under the NWPR were found to be non-jurisdictional — a significant shift from the status of streams under both the Clean Water Rule and the pre-2015 regulatory regime.” *Id.*

For info: *Order* available at: https://earthjustice.org/sites/default/files/files/order_remand_and_vacate.pdf

ANTI-SPECULATION LAW CO
WORK GROUP REPORT

The Anti-Speculation Work Group arose out of passage of Colorado Senate Bill 20-048, signed by Governor Polis on March 11, 2021. The Work Group was composed of 22 water policy experts, including people affiliated with the agricultural community, environmental and recreational interests, and municipal water providers, as well as attorneys with a variety of backgrounds in water law. SB20-048 required the Executive Director of the Colorado Department of Natural Resources to convene the Work Group to explore ways to strengthen current anti-speculation law and to report to the water resources review committee by August 15, 2021. The Work Group is co-chaired by Kevin Rein, State Engineer, and Scott Steinbrecher, Assistant Deputy Attorney General.

On August 13, 2021, the Colorado Department of Natural Resources delivered the Work Group’s Anti-Speculation Law Report to the members of the Water Resources Review Committee. “Due in part to the drawbacks that the Work Group identified for each of the brainstormed concepts...the Work Group does not recommend any of the concepts for implementation.” *Report* at 8. The Work Group did not reach “consensus that any concept should be a recommended change in law.” *Report* at 62.

“This report defines Traditional Water Speculation as seeking to appropriate, change, or continue a water right without a specific plan and intent to put the water right to its claimed beneficial use, or without a vested interest in the facilities or place to be served by the water. Without plan and intent to place the water to beneficial use, the party intends to either profit from future sale of the water right or to hoard the water right for some unidentified future use.”

“This report defines Investment Water Speculation as the appropriation or purchase of water rights followed by the use of those water rights, where the appropriator or purchaser’s primary purpose is profiting from increased value of the water in a subsequent transaction such as sale, lease, or payment for non-diversion. The profit is derived solely from forces of supply and demand, and not from any added value. *Report* at 30 (emphasis added).

WATER BRIEFS

Nineteen concepts were presented in the *Report*. Each of the eight “select group of concepts for the Committee’s consideration” presented in Section 6 of the *Report* “meets the criteria that the Work Group understands were intended by the General Assembly in SB 20-048: (1) it is a change in law and (2) it has the potential to effectively reduce Investment Water Speculation on a large scale, rather than just in certain limited situations.” *Report* at 8.

The eight concepts selected are:

- Prohibit or penalize compensated non-diversion
- Fund and/or create a right of first refusal for the purchase of water rights for long-term irrigation use for public benefit
- Eliminate or reduce the agricultural tax benefit for lands from which water is removed
- Unless irrigated land is going to be changed to a new land use, require water to be tied to the land
- Create a statewide process to identify and prohibit Investment Water Speculation
- Encourage local governments to police Investment Water Speculation through their 1041 powers
- Tax the profit derived from sale or lease of water rights previously purchased for Investment Water Speculation purposes
- Establish maximum rate of water right price increase and impose higher taxes when the rate is exceeded

The *Report* provides a wide range of information on anti-speculation in water law that is of immense value for water professionals throughout the West. **For info:** The 66-page *Report* is available at: <https://dnr.colorado.gov/anti-speculation-law-work-group>

MISSOURI BASIN WEST HEADWATERS RESILIENCY STUDY

On August 26, the Bureau of Reclamation released the *Missouri River Headwaters Basin Study* that provides options to meet the increased water demand during a change in the timing of the snowmelt runoff in the Missouri River Basin above Fort Peck Reservoir. The Basin covers about 50,000 square miles and is the primary water source for 320,000 people and about 1.1 million acres of irrigated lands. The combined watersheds of the Basin have an annual average outflow of about 6.7 million acre-feet.

Area stakeholders face challenges similar to those in other watersheds in the western US where finite water supplies serve increasing demands. The greatest demand in the study area is for irrigation, comprising about 87% of the total consumptive water demand. Reservoir evaporation accounts for about 12% and all other uses about 1% (Montana Department of Natural Resources and Conservation 2014). The study identified key challenges, including:

- Increasing annual water supply compared to recent history
- Earlier peak snowpack will lead to an earlier snowmelt-driven runoff
- Changing runoff may lead to more flooding during the winter and spring seasons and water supply shortages later in the irrigation season
- Increasing water demand due to a warming climate, expanded irrigation, and population growth.
- Decreasing summer rain,, increasing the reliance on reservoir storage.

The study partners developed and evaluated potential strategies to meet the challenges within the basin including:

- Providing water for future uses through water from Canyon Ferry Reservoir and Lake Elwell
- Providing water for future municipal, domestic, and industrial uses in the Gallatin Valley
- Increasing irrigation efficiencies
- Releasing ecological flows from Canyon Ferry Reservoir and Lake Elwell
- Changing water management strategies in the Sun River Basin
- Creating new off-stream storage in the Lower Musselshell River Basin
- Developing water management strategy for increased drought resilience

Reclamation partnered with the Montana Department of Natural Resources and Conservation to develop this basin study. In addition, the US Geological Survey, Northern Rocky Mountain Science Center and Montana State University – Bozeman participated in the development of this basin study. Numerous water districts participated in the basin study’s development, and the study team communicated with the Blackfeet Tribe Water Resources Director .

For info: Full *Study* available at: www.usbr.gov/newsroom/#/news-release/3966 Peter Soeth, Reclamation, 303/ 445-3615 or pssoeth@usbr.gov

LAND & WATER

ID

CONSERVATION PLAN

The City of Boise, Idaho (Boise) has joined in an effort called “America the Beautiful” with leading conservation organizations, National Geographic, the Biden-Harris administration, and other government agencies in a global effort to support our environment. The goal is to conserve at least 30% of land and water all over the world by 2030. It’s an ambitious undertaking, but one that will help protect clean drinking water sources, combat the negative impacts of climate change, protect endangered species and more.

According to Boise’s America the Beautiful webpage, “Now is the time to act to create real and lasting change. By creating a set of 30x30 goals unique to Boise, we can directly protect native habitat in our open spaces, manage park properties to promote pollinators, increase the city’s tree canopy and promote healthy soils — all while protecting the Boise River for generations to come.”

Boise set out its goals and how it will reach its “30x30 goals”:

1. Manage 30% of open space and native habitat areas by 2030 using science-based land management actions to build resistant, resilient ecosystems in the Boise Foothills and along the Boise River. Plan: Plant native species and support habitat restoration work (example: Hulls Gulch Reserve restoration project; *see* www.cityofboise.org/departments/parks-and-recreation/parks/hulls-gulch-reserve/)
2. Increase actively managed native habitat areas in improved park sites by 30% across Boise by 2030. Plan: Plant pollinator gardens and teach residents about their benefits (example: Mariposa Park)
3. Raise a total of \$30 million by 2030 to protect more open space and clean water resources and enhance community restoration projects. Raise additional \$10 million to protect property in the Boise Foothills for generations to come (example: Boise Foothills levies that have already raised \$20 million toward this goal)
4. Grow engagement opportunities by 30% to provide meaningful experiences for community members. Plan: Department Volunteer Opportunities (examples: Adopt Greenbelt, Adopt Habitat, Weed Warriors, Pollinator Posse, Habitat

WATER BRIEFS

Restoration, Ridge to Rivers, Citizen Science)

5. Plant more trees and increase tree canopy cover in Boise to 30% through the City of Trees Challenge.

For info: Open Space Matters: City of Boise Reserves Management Plan at: www.cityofboise.org/media/4990/osm_compiled_reserve-plan_final.pdf

STORMWATER RECYCLING CA SUPPLY PROJECT

The Metropolitan Water District of Southern California (MWD) is helping advance two local supply projects that will further diversify and strengthen the region's water reliability, under two agreements approved recently by MWD's board of directors. The board approved an agreement with the Municipal Water District of Orange County and the Santa Margarita Water District to provide funding for a recycled water project. It also approved an agreement with the Inland Empire Utilities Agencies to help fund a stormwater capture project as part of a Metropolitan pilot program that helps measure the potential benefits of such projects for the region.

Metropolitan will invest up to \$1.5 million over the next 25 years for water produced by the Santa Margarita Water District's proposed Los Flores Recycled Water Expansion Project, which is expected to begin producing up to 209 acre-feet of recycled water per year for irrigation purposes beginning in 2022. The project consists of building about 12,000 feet of new recycled water distribution pipelines and repurposing a surplus sewer lift station to serve as a recycled water booster pump station.

The funding comes from Metropolitan's Local Resources Program (LRP), which was created in 1982 to provide financial incentives to local and member agencies to develop local supply projects, such as water recycling, groundwater recovery, and seawater desalination. Since its inception, Metropolitan has supported the production of nearly 4.1 million acre-feet of recycled water and recovered groundwater. In 2019-20, Metropolitan incentivized member agencies to produce about 128,000 acre-feet of local supplies.

Metropolitan doesn't currently offer LRP incentives for stormwater capture, due to the need to better understand how much water such projects actually yield for use. "We need more information,

which is why we created a Stormwater for Recharge Pilot Program," said Water Resources Management Group Manager Brad Coffey. "By helping to fund these projects, we're able to gather the data we need to better understand the potential benefits stormwater capture projects can deliver to Southern California."

Metropolitan's agreement with Inland Empire Utilities Agency invests up to \$990,000 into construction and monitoring of the agency's Montclair Basins Improvement Project. The investment will fund constructing upgrades to the existing Montclair Basin, perform groundwater modeling, and provide for a minimum of three years of stormwater recharge monitoring and reporting. The project is the third agreement to be approved under MWD's Stormwater for Recharge Pilot Program, which was approved by the board in 2019. Metropolitan has received an additional three applications, which are currently being reviewed by staff.

For info: Rebecca Kimitch, MWD, 202/821-5253 or kimitch@mwdeho.com

GROUNDWATER QUALITY TX CONTAMINATION REPORT

The Texas Commission on Environmental Quality (TCEQ) recently published its annual report on the quality of groundwater in Texas, which lists all current groundwater-contamination cases in the state and their enforcement status. *Joint Groundwater Monitoring and Contamination Report 2020, SFR-056/20 (August 2021)*. Texas Water Code, Section 26.406 requires the annual report to describe the current status of groundwater monitoring activities conducted or required by each agency at regulated facilities or associated with regulated activities. The report is required to contain a description of each case of groundwater contamination documented during the previous calendar year. Also included is a description of each case of contamination documented during previous periods for which voluntary clean up action was incomplete at the time the preceding report was issued. The report is required to indicate the status of enforcement action for each listed case.

The report is divided into five sections. The section titled Groundwater Protection Program Descriptions provides a narrative, program-specific overview for each

contributing agency or organization. The section titled Groundwater Contamination Case Description Tables contains a tabular listing of individual contamination cases, which were documented for the calendar year. For more information, see the User's Guide section in this report.

For info: Report 2020 available at: www.tceq.texas.gov/publications/sfr/056

PFAS TESTING US DRAFT EPA TEST METHOD

The US Environmental Protection Agency (EPA), in collaboration with the US Department of Defense (DoD) has published a draft of the first EPA-validated laboratory analytical method to test for per- and polyfluoroalkyl substances (PFAS) in eight different environmental media.

A partnership between EPA and the DoD's Strategic Environmental Research and Development Program has produced draft Method 1633, a single-laboratory validated method to test for 40 PFAS compounds in wastewater, surface water, groundwater, soil, biosolids, sediment, landfill leachate, and fish tissue. Until now, regulated entities and environmental laboratories relied upon modified EPA methods or in-house laboratory standard operating procedures to analyze PFAS in these settings. With the support of the agency's Council on PFAS, EPA and DoD will continue to collaborate to complete a multi-laboratory validation study of the method in 2022.

This draft method can be used in various applications, including National Pollutant Discharge Elimination System (NPDES) permits. The method will support NPDES implementation by providing a consistent PFAS method that has been tested in a wide variety of wastewaters and contains all the required quality control procedures for a Clean Water Act (CWA) method. While the method is not nationally required for CWA compliance monitoring until EPA has promulgated it through rulemaking, it is recommended now for use in individual permits.

EPA publishes laboratory analytical methods (test procedures) that are used by industries, municipalities, researchers, regulatory authorities and other stakeholders to analyze the chemical, physical, and biological components of wastewater and other environmental samples. EPA regularly publishes methods for CWA compliance

WATER BRIEFS

monitoring on its CWA Methods website. Doing so does not impose any national requirements to use the method. Only after EPA promulgates a CWA analytical method through rulemaking (at 40 CFR Part 136) does it become nationally required for use in NPDES permit applications and permits.

The work EPA is doing to provide new laboratory analytical methods reflects the work that the EPA Council on PFAS is undertaking to support federal, state, local, and Tribal efforts to protect all communities from the harmful impacts of PFAS contamination.

For info: EPA's CWA Analytical Methods website: <https://www.epa.gov/cwa-methods/>

STOCKWATER LIMITS CA SHASTA/SCOTT EMERGENCY RULE

On August 30, 2021, a drought emergency regulation for the Scott River and Shasta River watersheds went into effect that, among other things, provides the State Water Resources Control Board (State Water Board) with curtailment authority to protect minimum instream flows, establishes minimum health and safety and livestock watering provisions, and limits diversions for livestock during the September through January period. A link to the notice explaining the regulation's provisions related to livestock watering and informing diverters of the need to immediately reduce their surface water livestock diversions to the reasonable quantities established by the emergency regulation appears on the Scott River and Shasta River Watersheds Drought Response webpage: www.waterboards.ca.gov/drought/scott_shasta_rivers/

For info: Scott River and Shasta River Drought Response at: ScottShastaDrought@waterboards.ca.gov

WATER RESILIENCE US ACCOUNTING FRAMEWORK

A new report from the Pacific Institute presents a framework for achieving water system resilience. The *Water Resilience Accounting Framework* provides a method to develop common measurable goals and outcomes for stakeholder resilience planning. The framework has four key steps: visualizing the system; developing a resilience strategy; testing

the resilience strategy; and evaluating.

For info: https://pacinst.org/publication/water_resilience_accounting_framework/

NUTRIENT POLLUTION US NEW EPA CRITERIA

EPA has released three new resources to assist the agency's state, territorial and authorized Tribal partners to address adverse effects of nutrient pollution, including freshwater harmful algal blooms (HAB). The three resources include: the agency's *Final Recommended Nutrient Criteria for Lakes and Reservoirs*; a web-based tool with information and tracking of HABs; and a Technical Support Document to aid implementation of certain HABs criteria.

As the first update to EPA's nutrient criteria in 20 years, the new recommendations represent a significant advancement in the scientific understanding of the impacts of nitrogen and phosphorus in our waters. The new recommendations are based on statistical stressor-response relationships developed from data collected in approximately 1,800 lakes nationwide and incorporated into national models.

States, territories, and authorized Tribes can consider adopting the recommended criteria into their water quality standards but are not compelled to revise existing EPA-approved criteria or total maximum daily load (TMDL) targets.

The new ArcGIS StoryMap that will allow the public to learn about and track reported cyanobacterial HABs (cyanoHABs) in freshwaters across the country. CyanoHABs can harm ecosystems and contaminate freshwaters with toxins that can lead to serious human health impacts. There is scientific consensus that the incidence of cyanoHABs has increased in the nation's freshwater systems in recent years, in part due to climate change. EPA's Tracking CyanoHABs story map creates a single online resource for information about cyanoHAB events across the US.

To help states, territories and authorized Tribes protect swimmers from two cyanobacterial toxins (cyanotoxins) produced by cyanoHABs, EPA has also published the *Final Technical Support Document: Implementing the 2019 Recommended Recreational Water Quality Criteria or*

Swimming Advisories for Microcystins and Cylindrospermopsin. This document explains how states, territories, and authorized Tribes may adopt EPA's 2019 recommended criteria for the two cyanotoxins into their water quality standards or use the criteria in swimming advisory programs. The document also addresses implementation of the 2019 criteria recommendations through other Clean Water Act programs including identifying and listing of impaired waters, and TMDL development.
For info: EPA Nutrient Policy webpage: www.epa.gov/nutrient-policy-data

PUMPING & NITRATES CA OVER-PUMPING CONSEQUENCES

Intensive pumping of aquifers during drought can speed up deterioration of groundwater quality, according to a new study by the US Geological Survey (USGS). Previous groundwater research has been focused on the risk of wells being overdrawn and running dry during drought; this study provides a major advancement to understanding the related consequences to water quality caused by over-pumping.

Researchers examined 30 years of data from Central Valley public water system wells to find nitrate concentrations increased on a regional scale where water levels dropped rapidly during drought. Nitrate, and other co-occurring contaminants, are present in shallow groundwater throughout the Central Valley due in large part to decades of agricultural land use. USGS scientists found that increased pumping from wells during drought can pull shallow, contaminated groundwater down to depths commonly tapped for public drinking-water supply.

This study is part of a cooperative effort between the USGS and California's Water Resources Control Board Groundwater Ambient Monitoring and Assessment Program (GAMA). Many more GAMA Program articles and publications can be found on the program publications website, including studies that monitor Central Valley arsenic concentrations and assess groundwater quality trends.
For info: Full Study at: <https://doi.org/10.1029/2021GL094398>; GAMA website: www.waterboards.ca.gov/gama/

September 16 WEB
Pollution Prevention Waste Management Virtual Workshop, Presented by Texas Commission on Environmental Quality, US EPA & the University of Texas Arlington. For info: TCEQ, 512/ 239-0010, P2@tceq.texas.gov or www.P2workshop.com

September 16 WEB
The Water and Tribes Initiative: A Conversation with Anne Castle, Former Assistant Secretary for Water and Science, US Department of the Interior. Stanford's Water in the West Program Event; Noon-1pm PDT. For info: <https://woods.stanford.edu/events/upcoming-events>

September 16-17 WEB
Tribal Consultations Conference, Interactive Broadcast Live. For info: Law Seminars International, 206/ 567-4490, registrar@lawseminars.com or www.lawseminars.com

September 19-21 CA
2021 WaterReuse California Annual Conference, Los Angeles. JW Marriott. For info: <https://wateruse.org/sections/wateruse-california/meetings-events/>

September 21 WEB
PFAS Sample Collection: State of the Science Webinar, One Hour Taped Webinar with Taryn MaKnight (See TWR #195). For info: <https://go.pardot.com/l/679373/2021-09-07/slyyt>

September 21 CO
RiverBank 2021 Anniversary Bash, Denver. Denver Botanic Gardens. Fundraising Event for Colorado Water Trust. For info: www.coloradowatertrust.org

September 22-25 RI
Association of Water Technologies Annual Convention & Exposition, Providence. Rhode Island Convention Center. Water Treatment Professionals & Industry Partners. For info: www.awt.org/annual-convention-2021/

September 24 PA/WEB
Wild & Scenic Film Festival - 13th Annual, West Chester. Hybrid Format; Brandywine Red Clay Alliance's Myrick Conservation Center Amphitheatre. Benefit for Stroud Water Research Center, The Land Conservancy for Southern Chester County & Brandywine Red Clay Alliance. For info: <https://stroudcenter.org/event/film-festival/>

September 27-29 TX
Water for Texas 2021 Conference: Clear Vision for the Future, Austin, AT&T Hotel & Conference Center. Hoping to Gather in Person. Hosted by the Texas Water Development Board. For info: <https://waterfortexas.twdb.texas.gov/2021/>

September 28-29 MT/WEB
21st Annual Montana Water Law Conference - Live Webcast & In-Person, Helena. Great Northern Hotel. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

September 30 WEB
All In: Fight for Safe, Healthy Food; Clean Public Water; A Livable Climate Conference, Virtual Conference & Benefit: 12:30 - 5:00 pm Pacific Time. Presented by Food & Water Watch. For info: www.foodandwaterwatch.org/specialevent/?j=1202731&sfmc_sub=679099686&l=35&mid=100001791

September 30-Oct. 1 MT/WEB
6th Annual Buying and Selling Ranches in Montana Seminar, Helena. Delta Hotels Helena Colonial - Live Webcast & In-Person. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

October 4-5 WEB
Endangered Species Act, Wetlands, and Stormwater Regulatory Compliance for Energy & Utilities Conference, RE: Benefits of Planning, Factors Driving Capital Expenditures, & Funding Sources. For info: www.euci.com/events/

October 5-6 WEB
World Water-Tech North America Summit, Online Networking, Panel Discussions, Workshops, & Roundtable Debates. For info: <https://worldwatertechnorthamerica.com>

October 5-7 CO
2021 Sustaining Colorado Watersheds Conference: Together Like Never Before, Avon. Westin Riverfront Resort & WEB. Hybrid Format Event. For info: <https://www.watereducationcolorado.org/>

October 6-7 WEB
2021 AWRA-WA State Conference (Virtual Event), Transboundary Water Resources Management & Water Marketing Trends, Presented by the American Water Resources Association - Washington Section. For info: www.waawra.org/event-4406410

October 6-8 UT
2021 Annual Conference American Water Works Association Intermountain Section, Midway. Zermatt Resort. For info: www.ims-awwa.org/page/Conferences

October 6-7 NV
13th Annual WaterSMART Innovations Conference and Exposition, Las Vegas. South Point Hotel & Conference Center. Showcasing New Water-Efficiency Technology, Interdisciplinary Relationships; and Innovative Water Efficiency. For info: <https://www.watersmartinnovations.com>

October 12-14 PA
Interstate Council on Water Policy's 62nd Annual Meeting, Philadelphia. Wyndham Historic District Hotel. In-Person Fall Annual Meeting: Field Trip on Tuesday; Informative Panels on Wednesday & Annual ICWP Membership Meeting and 1/2 day of panels on Thursday; Remote Option Available. For info: Sue Lowry, ICWP, 307/ 630-5804 or www.icwp.org

October 13 WEB
Oregon Water Rights and Regulations Seminar, Presented by HalfMoon Education. For info: www.halfmoonseminars.org

October 13-14 WEB
Long Term Capital & Financial Planning for Municipal/Public Water and Wastewater Utilities Conference, RE: Benefits of Planning, Factors Driving Capital Expenditures, & Funding Sources. For info: www.euci.com/events/

October 14 WEB
2021 Environmental & Natural Resources Law: Year in Review CLE, Virtual Event. Presented by the Environmental & Natural Resources Section of the Oregon BAR - Co-Sponsored by the Oregon State BAR. For info: Caylin Barter, 530/ 205-5107 or cbarter@wildsalmoncenter.org

October 14-15 WEB
Environmental Justice in Oregon Conference, Interactive Broadcast Live. For info: Law Seminars International, 206/ 567-4490, registrar@lawseminars.com or www.lawseminars.com

October 16-20 IL
WEFTEC 2021: 94th Annual Technical Exhibition & Conference, Chicago. McCormick Place. Water Environment Federation's Annual All Water Sectors Event. For info: www.weftec.org/about/about-weftec/

October 19 DC/WEB
2021 Environmental Achievement Award Annual Award Ceremony: Carol Browner, Washington. Omni Shoreham Hotel. In-Person & Live Webcast. For info: www.eli.org/award-dinner

October 19 WEB
Streamflow Restoration Competitive Grants - Applicant Workshop, Online Webinar: 1:30 pm Pacific Time. Presented by Department of Ecology. For info: <https://ecology.wa.gov/Events/WR/SFR-Grants-2022/October-Webinar>

October 20-22 GA
Clean Currents 2021 Tradeshow & Conference, Atlanta. Georgia World Congress Center. National Hydropower Association Waterpower Event. For info: <https://cleancurrents.org>

October 21 TX
7th Annual Water, Texas Film Festival, Austin. Austin Film Society Cinema. Event by the Texas Water Foundation. For info: brittany@texaswater.org or www.watertexasfilms.org/

October 26-27 WEB
Recovery & Resilience: Achieving Sustainable Stormwater Management - CASQA 2021 Virtual Conference, Presented by the California Stormwater Quality Association. For info: www.casqa.org/events/annual-conference

October 27 WEB
Streamflow Restoration Competitive Grants - Applicant Workshop, Presented by Department of Ecology: 10am Pacific Time. For info: <https://ecology.wa.gov/Events/WR/SFR-Grants-2022/Grants-October-27>

October 28 WEB
10th Annual Gulf Coast Water Conservation Symposium, Virtual Event: 9 am - 3 pm Central Time. Presented by HARC (Houston Advanced Research Center). For info: <https://harcresearch.org> > Events

November 1-2 MI
Project Management for Water & Wastewater Utilities Course, Linden. Linden Water Treatment Plant. Presented by EUCI. For info: EUCI, 303/ 770-8800 or www.euci.com/

November 3-4 WA/WEB
Washington Water Code Seminar, Seattle. Washington Athletic Club, 1325 6th Avenue. In-Person & Live Webcast of Presentation. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

November 3-4 CA
The Annual US Water Treatment USA Conference, San Diego. San Diego Marriott Mission Valley. Presented by LMN Group. For info: Daniel Craig, LMN Group, 312/ 544-0063, daniel.craig@lmnassets.com or www.lmnpower.com

November 4 WEB
Streamflow Restoration Competitive Grants - Applicant Workshop, Presented by Department of Ecology: 10 am Pacific Time. For info: <https://ecology.wa.gov/Events/WR/SFR-Grants-2022/November-Webinar>

November 4-5 NM
Water Law Institute, Santa Fe. The Eldorado Hotel & Spa. Presented by Rocky Mountain Mineral Law Foundation. For info: www.rmmlf.org/programs

November 4-5 OR/WEB
30th Annual Oregon Water Law Conference - Live Webcast & In-Person, Portland. TBA. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

November 4-5 WEB
Groundwater Sustainability Implementation in California Conference, Interactive Broadcast Live. For info: Law Seminars International, 206/ 567-4490, registrar@lawseminars.com or www.lawseminars.com

November 4-6 UT
42nd Annual Agricultural Law Educational Symposium, Salt Lake City. Little America Hotel. Presented by the American Agricultural Law Association. For info: www.aglaw-assn.org/2021-annual-educational-symposium/



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November 6 **OR/WEB**

19th Annual Celebration of Rivers, Portland. Left Bank Annex & Virtual Event. Fundraising Event for WaterWatch of Oregon: In-Person Cocktail Reception. For info: bit.ly/19thgathering

November 6-10 **WA**

American Water Resources Association National Conference, Renton. Hyatt Regency Lake Washington. Pre-Conference Workshops & Field Trips on Nov. 6th; Presented by the Washington Section of AWRA. For info: Rabia Ahmed (rahmed@greeneconomics.com) or www.waawra.org

November 7-10 **WA**

Water Quality Technology Conference, Tacoma. Greater Tacoma Convention Center. A Practical Forum for Water Technology Professionals to Exchange Latest Research & Information. For info: www.awwa.org/Events-Education/Water-Quality-Technology

November 8-9 **WEB**

Fundamentals of Cost of Service and Rate Design for Water Utilities Webinar. Real World Examples Based on Accepted Ratemaking Principles. For info: www.euci.com/events/

November 15-16 **SC**

Fall Strategic Leadership Meeting, Charleston. Francis Marion Hotel. Presented by National Assoc. of Clean Water Agencies. For info: www.nacwa.org/conferences-events/event-at-a-glance/2021/11/15/nacwa-endorsed-events/fall-strategic-leadership-meeting

November 16 **OR**

Wild & Scenic Film Festival, Eugene. Benefit for the Upper Willamette Stewardship Network. For info: www.longtom.org/upperwillamette/

November 17-18 **WEB**

One River, Ethics Matter 2021 Conference - Virtual Event. Focus on Treaty Renewal, Restoring Salmon & the River, Youth and Climate Change. Facilitated by the Ethics & Treaty Project; Co-hosted by the Okanagan Nation Alliance and the University of British Columbia Okanagan Campus. For info: https://ubc.zoom.us/joining/register/u5wvc-isrzwEtQ7iyEZ1fGBtjY8BzzNWZfo

November 17-18 **KS**

10th Annual Governor's Conference on the Future of Water in Kansas, Manhattan. Hilton Garden Inn. Latest Policy & Research: Kansas Water Vision/Plan Implementation. For info: https://kwo.ks.gov/news-events/calendar

November 17-19 **SC**

National Clean Water Law & Enforcement Seminar, Charleston. Francis Marion Hotel. National Assoc. of Clean Water Agencies event. For info: www.nacwa.org/conferences-events/event-at-a-glance/2021/11/17/nacwa-events/national-clean-water-law-enforcement-seminar

2021 AWRA Washington Annual State Conference

October 6-7, 2021 (Virtual Webinar)

Transboundary Water Management And Water Market Trends



**American
Water
Resources
Association**
Washington Section



Libby Dam and Lake Koocanusa



Hite Marina, Lake Powell



Steelhead (Columbia River)

Lake Mead 2021
Photos by Tom Ring and Jason McCormick

Details and Registration at: www.waawra.org