

Navigating the New Normal on the Colorado River from the Lens of Southern Arizona

Southern Arizona Water Users Association Annual Forum



Clint Chandler

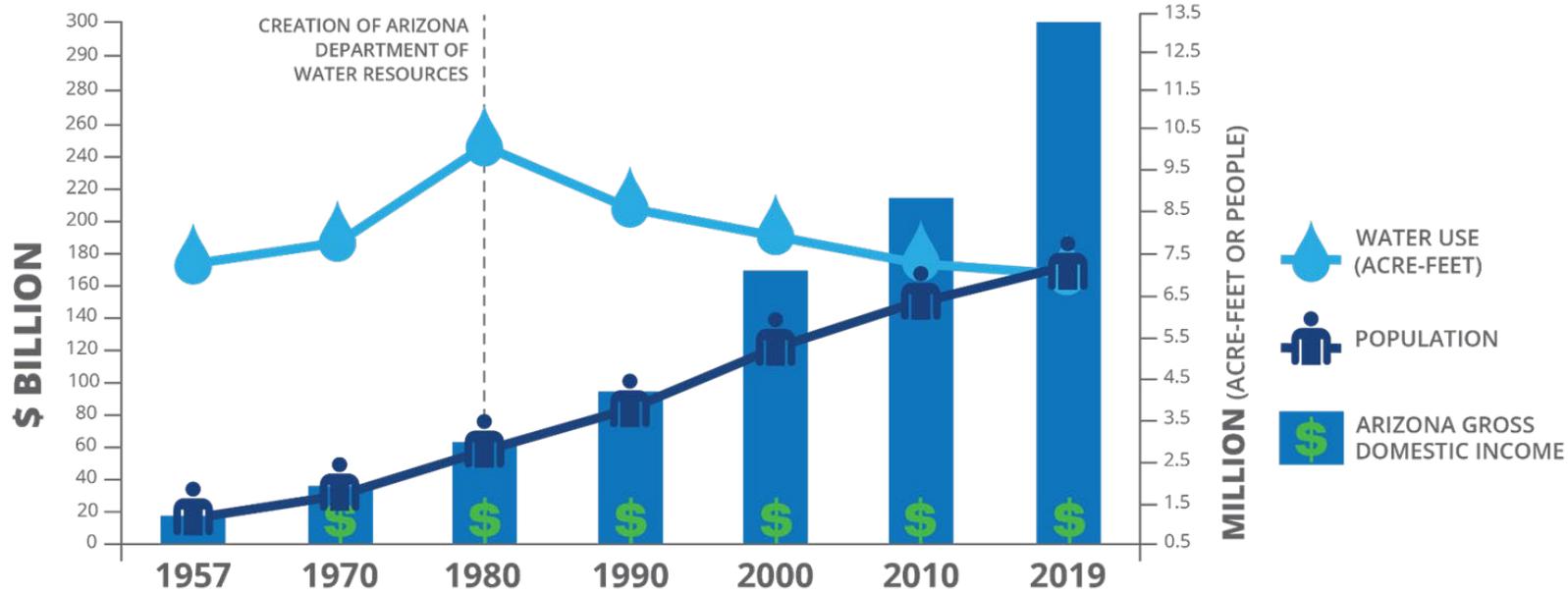
Deputy Director

Arizona Department of Water Resources

September 29, 2022

ARIZONA'S WATER MANAGEMENT SUCCESS

ARIZONA WATER USE, POPULATION AND ECONOMIC GROWTH (1957 - 2019)



TOTAL WATER USE (IN MILLIONS ACRE/FEET)

1957 7.1 MAF
 2019 6.9 MAF

-3% CHANGE FROM 1957-2019

POPULATION (IN MILLIONS)

1957 1.1
 2019 7.2

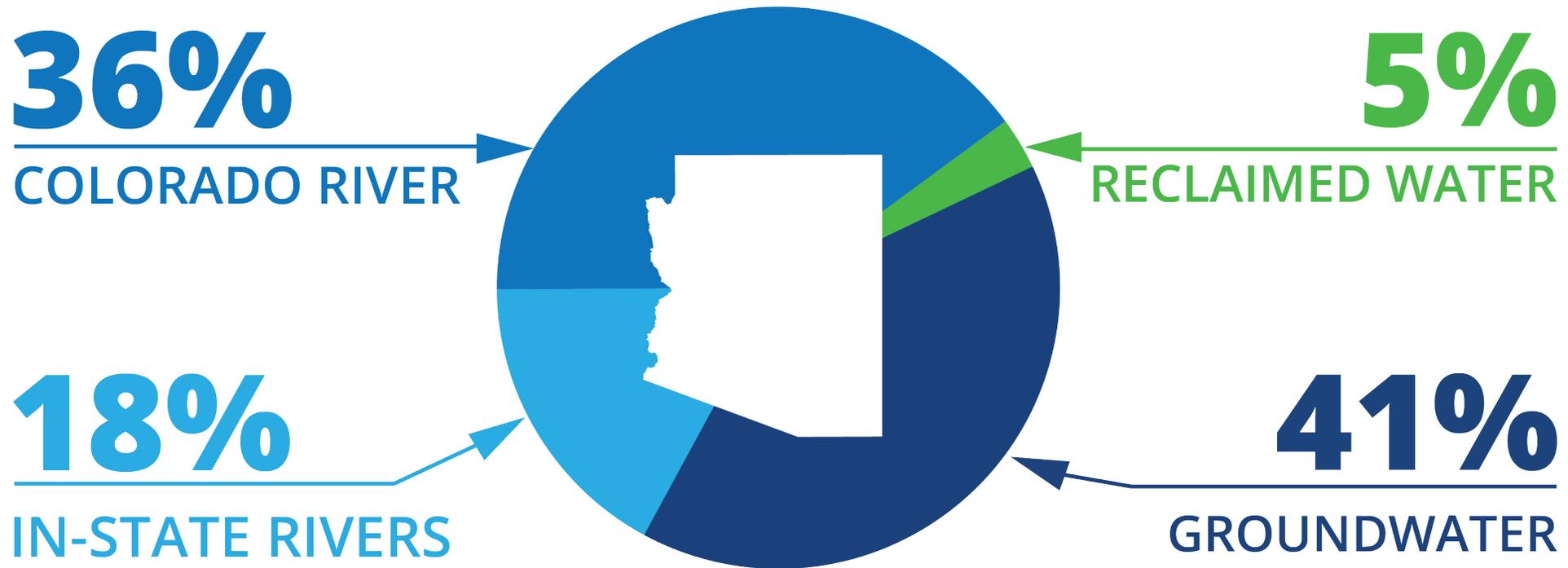
555% CHANGE FROM 1957-2019

GROSS DOMESTIC INCOME (IN BILLIONS)

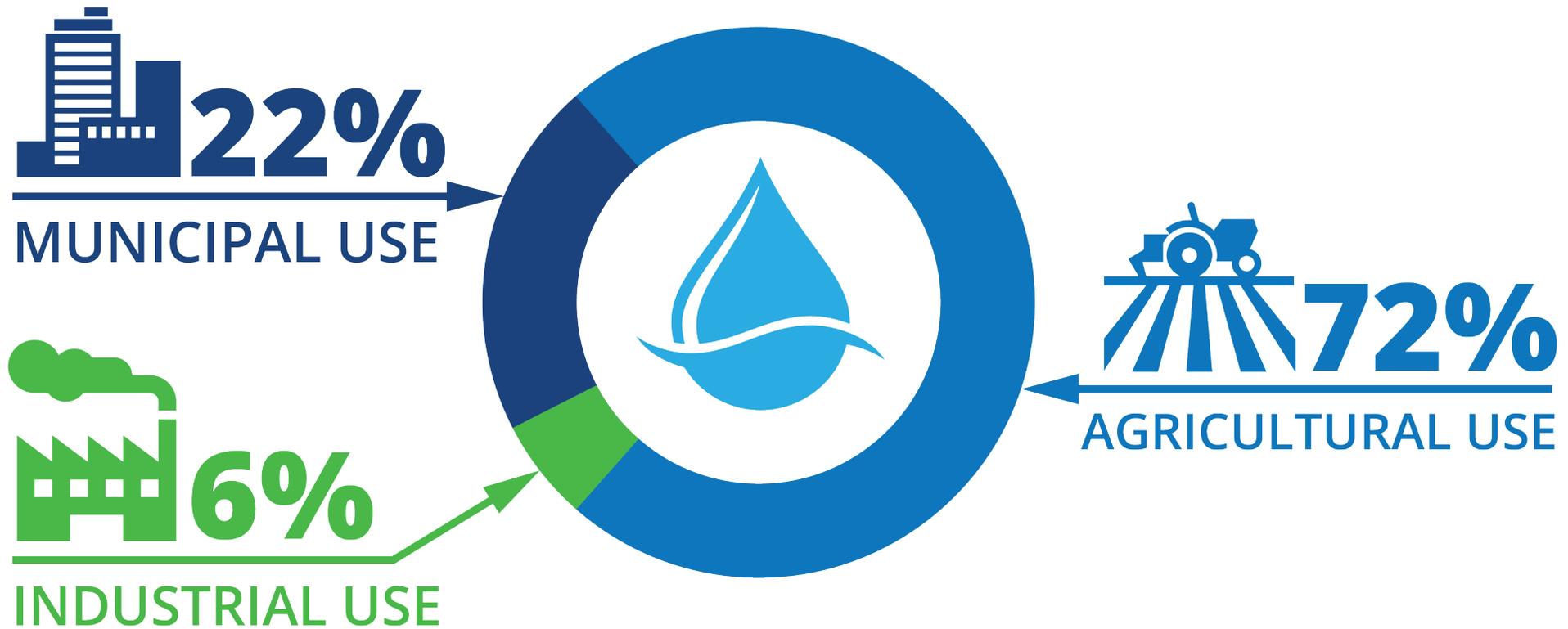
1957 \$ 13.4
 2019 \$ 299.8

2,137% CHANGE FROM 1957-2019

Arizona Water Use By Source (2019)

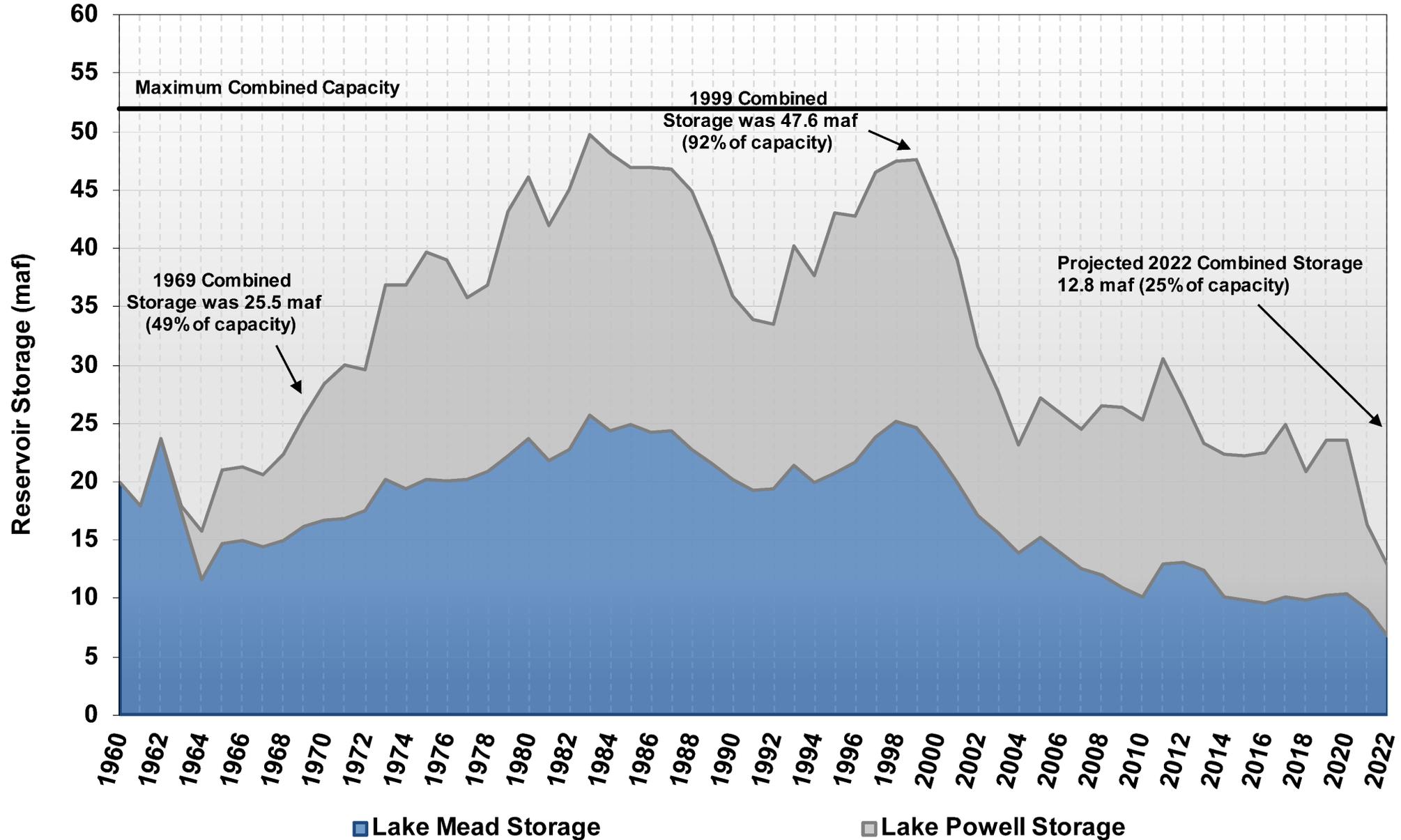


Arizona Water Use By Sector (2019)



Lake Powell and Lake Mead End of Water Year Storage

Water Years 1960 through 2022



Lower Basin – Lake Mead

Percent of Traces with Event or System Condition

Results from May 2022 CRMMS-ESP (values in percent)

Event or System Condition	2022	2023	2024	2025	2026
Surplus Condition – any amount (Mead \geq 1,145 ft)	0	0	0	0	0
Surplus – Flood Control	0	0	0	0	0
Normal or ICS Surplus Condition (Mead $<$ 1,145 and $>$ 1,075 ft)	0	0	7	0	13
Recovery of DCP ICS / Mexico's Water Savings (Mead $>/\geq$ 1,110 ft)	0	0	0	0	0
DCP Contribution / Mexico's Water Savings (Mead \leq 1,090 and $>$ 1,075 ft)	0	0	7	0	10
Shortage Condition – any amount (Mead \leq 1,075 ft)	100	100	93	100	87
<i>Shortage / Reduction – 1st level (Mead \leq 1,075 and \geq 1,050)</i>	100	37	17	30	23
DCP Contribution / Mexico's Water Savings (Mead \leq 1,075 and $>$ 1,050 ft)	100	37	17	30	23
<i>Shortage / Reduction – 2nd level (Mead $<$ 1,050 and \geq 1,025)</i>	0	63	60	37	20
DCP Contribution / Mexico's Water Savings (Mead \leq 1,050 and $>$ 1,045 ft)	0	60	7	3	7
DCP Contribution / Mexico's Water Savings (Mead \leq 1,045 and $>$ 1,040 ft)	0	3	10	3	0
DCP Contribution / Mexico's Water Savings (Mead \leq 1,040 and $>$ 1,035 ft)	0	0	13	10	10
DCP Contribution / Mexico's Water Savings (Mead \leq 1,035 and $>$ 1,030 ft)	0	0	10	7	0
DCP Contribution / Mexico's Water Savings (Mead \leq 1,030 and $\geq/>$ 1,025 ft)	0	0	20	13	3
<i>Shortage / Reduction – 3rd level (Mead $<$ 1,025)</i>	0	0	17	33	43
DCP Contribution / Mexico's Water Savings (Mead $</\leq$ 1,025 ft)	0	0	17	33	43

Notes:

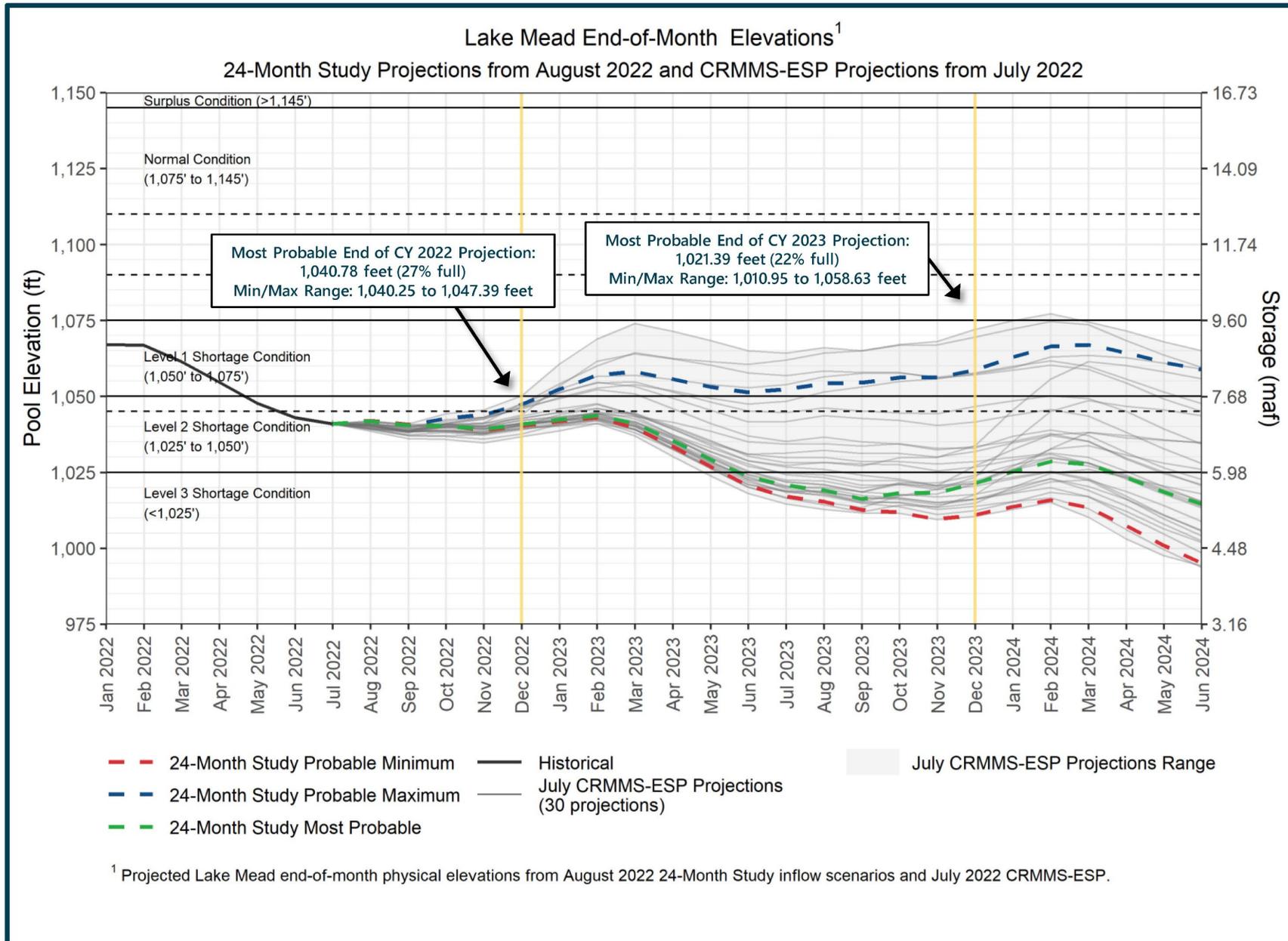
¹ Modeled operations include the 2007 Interim Guidelines, Upper Basin Drought Response Operations, Lower Basin Drought Contingency Plan, Minute 323, including the Binational Water Scarcity Contingency Plan, 2022 Drought Response Operations Plan, and 2022 Glen Canyon Dam operational adjustment.

² The projected operating tiers are computed "as if" the 480 kaf reduced release from Glen Canyon Dam in water year 2022 was delivered to Lake Mead.

³ Reservoir conditions for 2022-2026 were simulated using the May 2022 CRMMS in ensemble mode using the CBRFC unregulated inflow forecast ensemble (CRMMS-ESP) dated May 4, 2022 (May 17, 2022 for Navajo modified unregulated inflow).

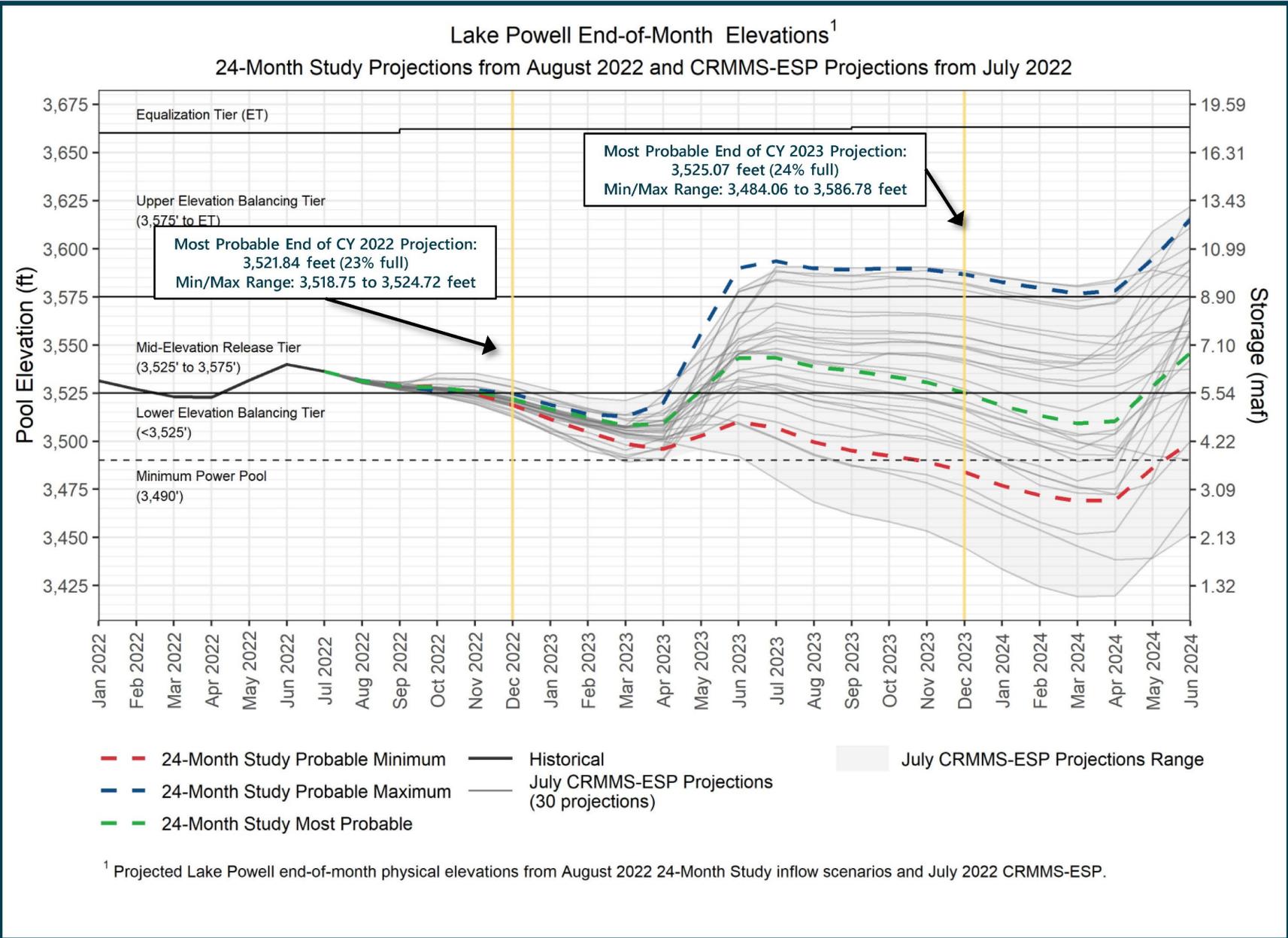
⁴ Percentages shown in this table may not be representative of the full range of future possibilities that could occur with different modeling assumptions.

⁵ Percentages shown may not sum to 100% due to rounding to the nearest percent.



The chart above displays projected “physical” elevations for Lake Mead. Based on August 2022 24-Month Study modeling, Lake Mead’s operating condition for calendar year 2023 is the Level 2 Shortage Condition within the 1,045 – 1,050 elevation band.

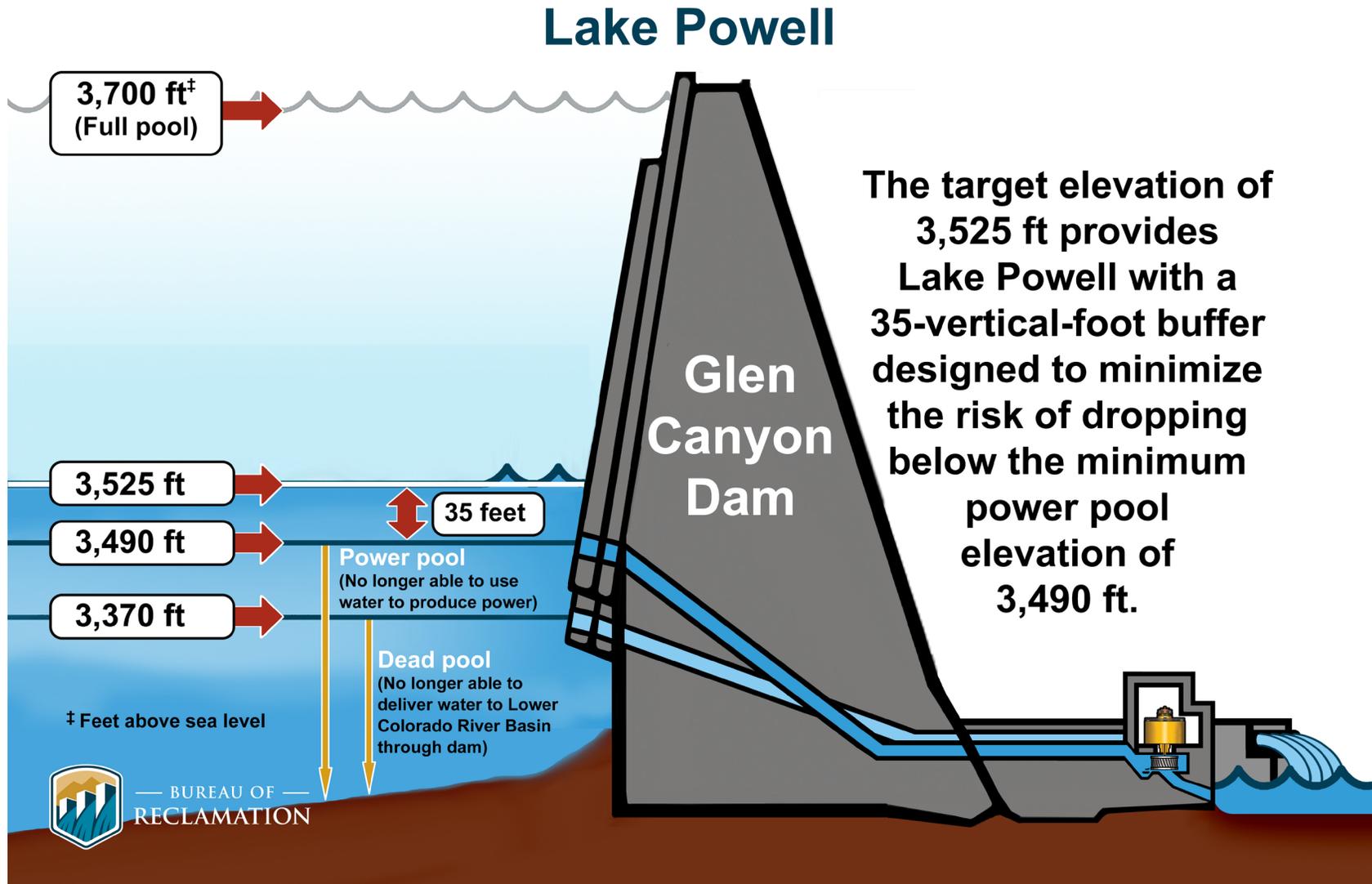




The chart above displays projected “physical” elevations for Lake Powell. Based on August 2022 24-Month Study modeling, Lake Powell’s elevation is projected to be less than 3,525 feet and the operating tier for water year 2023 is the Lower Elevation Balancing Tier.



Lake Powell – Key Elevations



Comparison of February 2022 CRMMS-ESP and January 2022 CRSS Projections

Chance of Lake Powell Reaching Critical Reservoir Elevations

	Run	WY 2022*	WY 2023	WY 2024	WY 2025	WY 2026
Lake Powell less than 3,525 feet	January 2022	87%	42%	39%	36%	37%
	February 2022	90%	77%	50%	50%	37%
	Difference	3%	35%	11%	14%	0%
Lake Powell less than 3,490 feet (minimum power pool)	January 2022	N	8%	20%	23%	26%
	February 2022	N	23%	27%	27%	23%
	Difference	-	15%	7%	4%	-3%
Lake Powell less than 3,375 feet (dead pool = 3,370 feet)	January 2022	0%	0%	0%	0%	0%
	February 2022	0%	0%	0%	0%	0%
	Difference	0%	0%	0%	0%	0%

All results computed as the chance of falling below the threshold in any month of the water year.

* There is a negligible chance that Lake Powell will fall below 3,490 in WY 2022.



Actions Announced to Support Colorado River System in 2023

On Tuesday, August 16, 2022, Camille Touton, Commissioner of the Bureau of Reclamation, announced that Lake Mead will operate in its first-ever Tier 2a Shortage Condition in 2023. Tier 2a reductions include:

- Arizona: 592,000 acre-feet, which is approximately 21% of the state's annual apportionment
- Nevada: 25,000 acre-feet, which is 8% of the state's annual apportionment
- Mexico: 104,000 acre-feet, which is approximately 7% of the country's annual allotment
- There is no required water savings contribution for California in 2023 under this operating condition.

Basin States Commit to Continue Working

- The Basin States were unable to meet the mid-August deadline set by Commissioner Touton to voluntarily identify 2-4 MAF conservation.
- The Basin States will continue to meet with the U.S. to address the challenges on the Colorado River System.
- All water users have a stake in the outcome and all need to contribute to the solution.
- The Basin States are discussing ways that additional reductions can be implemented.

*Source: "Interior Department Announces Actions to Protect Colorado River System, Sets 2023 Operating Conditions for Lake Powell and Lake Mead." U.S. *Bureau of Reclamation*, August 16, 2022, <https://www.usbr.gov/newsroom/news-release/4294>. Press Release.

Actions Announced by the Department of Interior on September 22nd

- Moving forward with administrative actions needed to authorize a reduction of Glen Canyon Dam releases below seven million acre-feet per year, if needed, to protect critical infrastructure at Glen Canyon Dam.
- Preparing to manage elevations in Lake Powell by implementing emergency drought operations.
- Preparing to take action to make additional reductions in 2023, as needed, through an administrative process to evaluate and adjust triggering elevations and/or increase reduction volumes identified in the 2007 Interim Guidelines Record of Decision.
- Accelerating ongoing maintenance actions and studies of the bypass tubes at Glen Canyon Dam to analyze the feasibility of possible modifications to increase water delivery capacity during low reservoir levels.
- Ensuring that water use determinations for the Lower Basin satisfy appropriate beneficial use standards during this time of historically low reservoirs, including taking into consideration fundamental human health and safety requirements.
- Assessing how to account for and allocate system losses due to evaporation, seepage, and other losses.

Runoff Efficiency a Major Factor in Colorado River Stability

- Even with 2 MAF of added volume, Lake Powell and Lake Mead combined storage at 3525 and 1020 is vulnerable to a Powell inflow equal to or less than 69% of the 1991-2020 avg inflow.
- If runoff efficiency is similar to that of 2021 (43%), then it would take 160% of average precipitation to create that amount of inflow (69% of average).
- Runoff efficiency is different every year; it's difficult to relate a percent of average precipitation to a runoff volume.

Drought Contingency Plan

Lower Basin Drought Contingency Plan

- ADWR & CAWCD jointly hosted 9 public Steering Committee meetings to discuss & recommend how to adopt and implement the LBDCP in a way that is acceptable to Arizona water users
- **January 31, 2019** – Arizona Legislature passed & Gov. Ducey signed SB 1227
 - The legislation authorized ADWR Director to sign the Interstate DCP Agreements on behalf of Arizona

Colorado River Drought Contingency Plan

- **March 27 & 28, 2019** – Reclamation & Colorado River Basin representatives testified at U.S. subcommittee hearings at the Senate (subcommittee chaired by AZ Sen. McSally) & the House (subcommittee chaired by Rep. Huffman; full committee chaired by AZ Rep. Grijalva)
- **April 8, 2019** – Bill passed after announced by Sen. McSally & Rep. Grijalva
- **April 16, 2019** – Signed by President Trump
- **May 20, 2019** – Signed & finalized by Lower Basin States, Reclamation & Interior



THE ARIZONA REPUBLIC

SUNDAY, DECEMBER 29, 2019

azcentral.com

PART OF THE USA NETWORK

OPINION

The Arizona Republic's 2019 Arizonans of the Year

"The Lower Basin Drought Contingency Plan is nothing short of historic."

"DCP is monumental because it proves that people with wildly different viewpoints can learn to work together and accomplish things that matter."

"It's why Tom Buschatzke, director of the Arizona Department of Water Resources, and Ted Cooke, general manager of Central Arizona Project, are The Arizona Republic's 2019 Arizonans of the Year."

Editorial board, Arizona Republic

Viewpoints/ Page: D3

HAM(M)ER TIME!

OPINION

Glenn Hamer's 2019 Ham(m)er Awards

Glenn Hamer December 31, 2019 11 min read Add comment

Bipartisan Accomplishment of the Decade Award

The Drought Contingency Plan.

What a way to close out the 21st century's second decade. Start with the work of Gov. Ducey, Central Arizona Project's Ted Cooke and Arizona Department of Water Resources honcho Tom Buschatzke, who grinded out a deal on a water stewardship plan that earned near unanimous approval in the state Legislature. Ensuring the health of Lake Mead and the Colorado River requires adult leadership, which is what Senate President Karen Fann, House Speaker Rusty Bowers, House Minority Leader Charlene Fernandez, and state Sen. Lisa Otondo delivered. When the baton was passed to Capitol Hill, Sen. Martha McSally and House Natural Resources Committee Chairman Raúl Grijalva grabbed it and got the Drought Contingency Plan through Congress.



2007 Interim Guidelines, Minute 323, Lower Basin Drought Contingency Plan, and Binational Water Scarcity Contingency Plan

Total Volumes (kaf)

Lake Mead Elevation (feet msl)	2007 Interim Guidelines Shortages		Minute 323 Delivery Reductions	Total Combined Reductions	DCP Water Savings Contributions			Binational Water Scarcity Contingency Plan Savings	Combined Volumes by Country <i>US: (2007 Interim Guidelines Shortages + DCP Contributions)</i> <i>Mexico: (Minute 323 Delivery Reductions + Binational Water Scarcity Contingency Plan Savings)</i>					Total Combined Volumes
	AZ	NV	Mexico	Lower Basin States + Mexico	AZ	NV	CA	Mexico	AZ Total	NV Total	CA Total	Lower Basin States Total	Mexico Total	Lower Basin States + Mexico
1,090 - 1,075	0	0	0	0	192	8	0	41	192	8	0	200	41	241
Tier 1 → 1,075 - 1050	320	13	50	383	192	8	0	30	512	21	0	533	80	613
Tier 2a → 1,050 - 1,045	400	17	70	487	192	8	0	34	592	25	0	617	104	721
Tier 2b { B 1,045 - 1,040	400	17	70	487	240	10	200	76	640	27	200	867	146	1,013
C 1,040 - 1,035	400	17	70	487	240	10	250	84	640	27	250	917	154	1,071
D 1,035 - 1,030	400	17	70	487	240	10	300	92	640	27	300	967	162	1,129
E 1,030 - 1,025	400	17	70	487	240	10	350	101	640	27	350	1,017	171	1,188
Tier 3 → <1,025	480	20	125	625	240	10	350	150	720	30	350	1,100	275	1,375

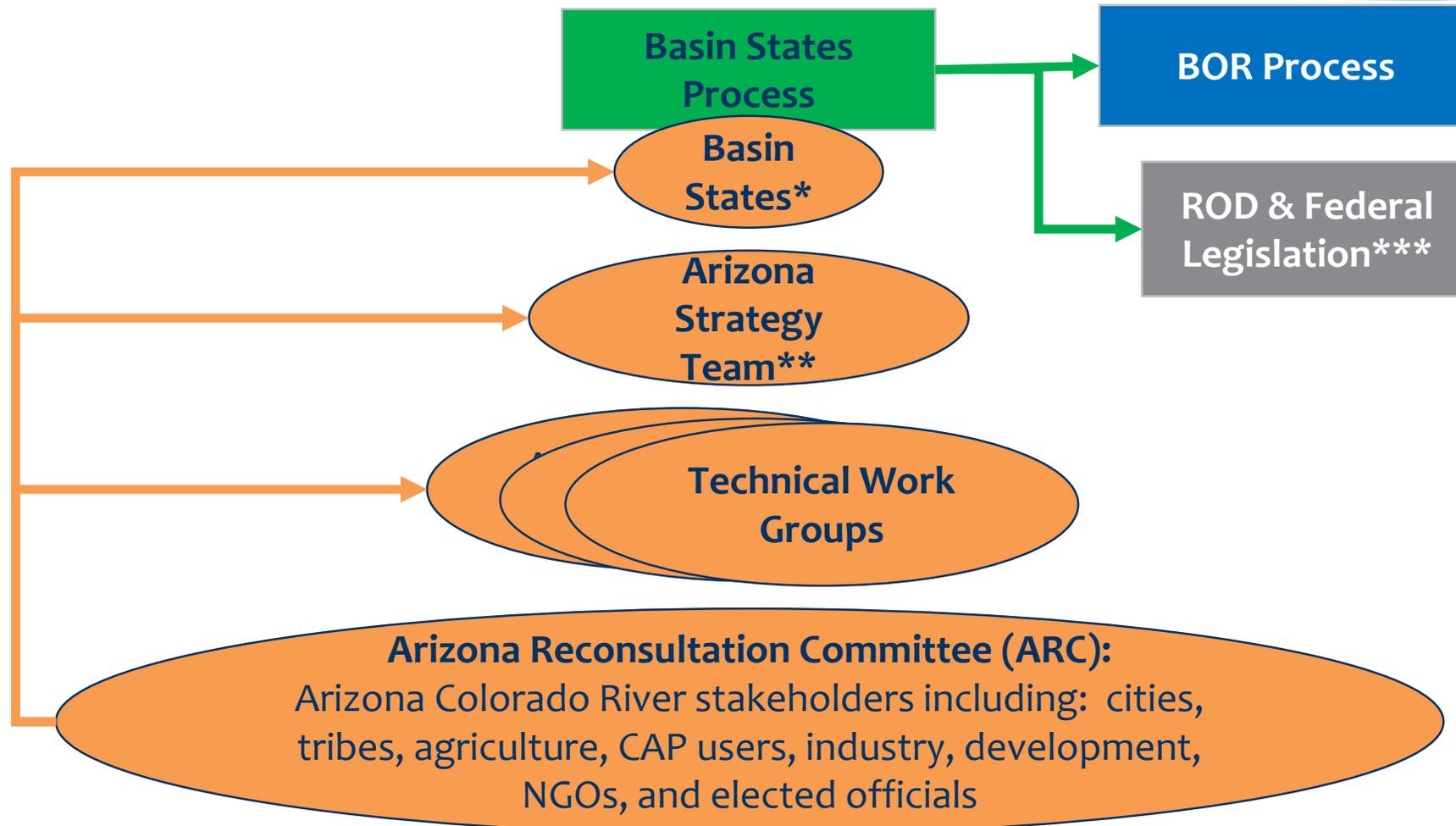
The Secretary of the Interior will take affirmative actions to implement programs designed to create or conserve 100,000 acre-ft per annum or more of Colorado River System water to contribute to conservation of water supplies in Lake Mead and other Colorado River reservoirs in the lower basin. All actions taken by the United States shall be subject to applicable law, including availability of appropriations.



August 2021 Lower Basin Drought Contingency Plan Consultation

- The Bureau's projections in its August 2021 24-month study concluded Lake Mead would descend below 1,030 feet in July 2023.
- That projection triggered Section V.B.2 of the Lower Basin Drought Contingency Operations, which requires the Lower Basin States to consult, along with Interior, on taking additional measures prior to Lake Mead falling below elevation 1,020 feet.
- On December 15, 2021, the Lower Basin States, together with the Interior, announced the 500+ Plan, which aimed to add 500,000 acre-feet of additional water to Lake Mead in both 2022 and 2023 through projects and programs to conserve water across the Lower Colorado River Basin.

Arizona Reconsultation Process

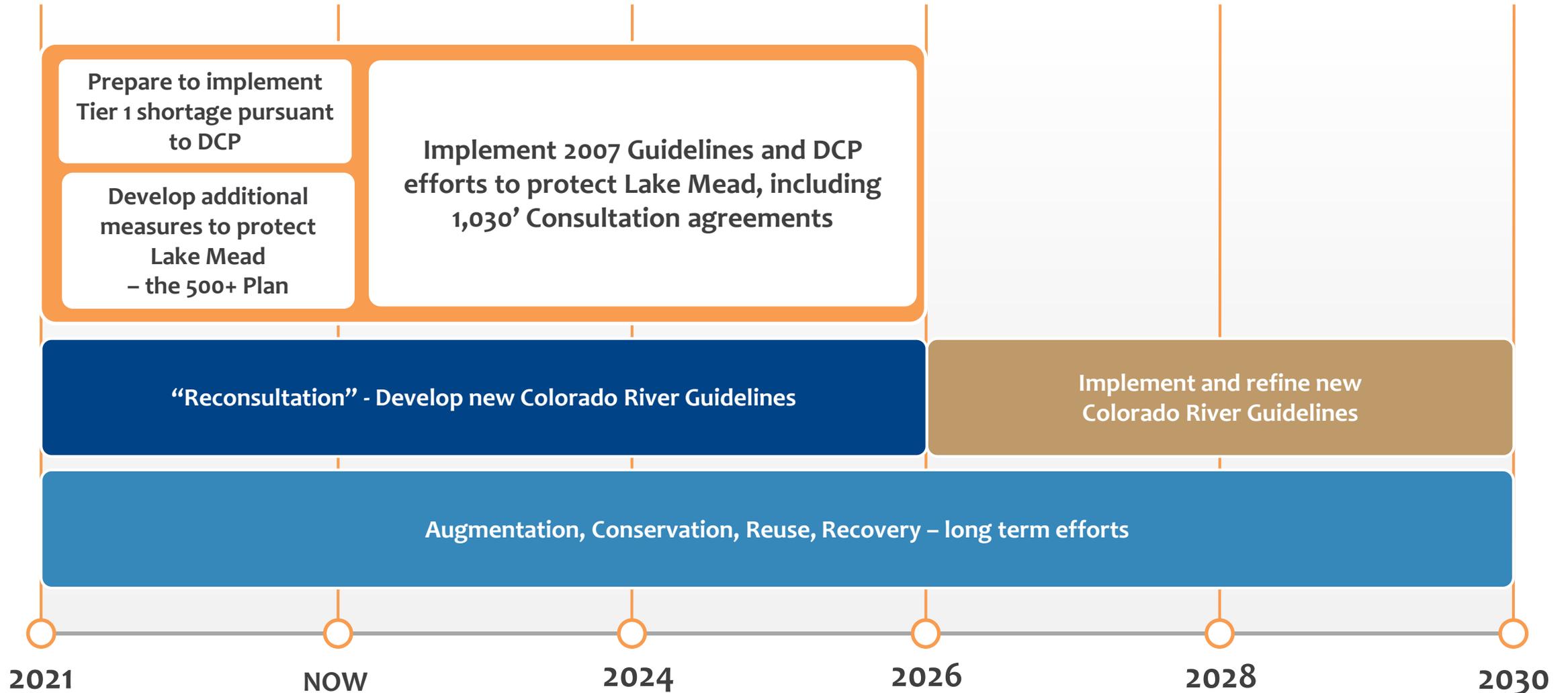


*By invitation to support the co-Chairs

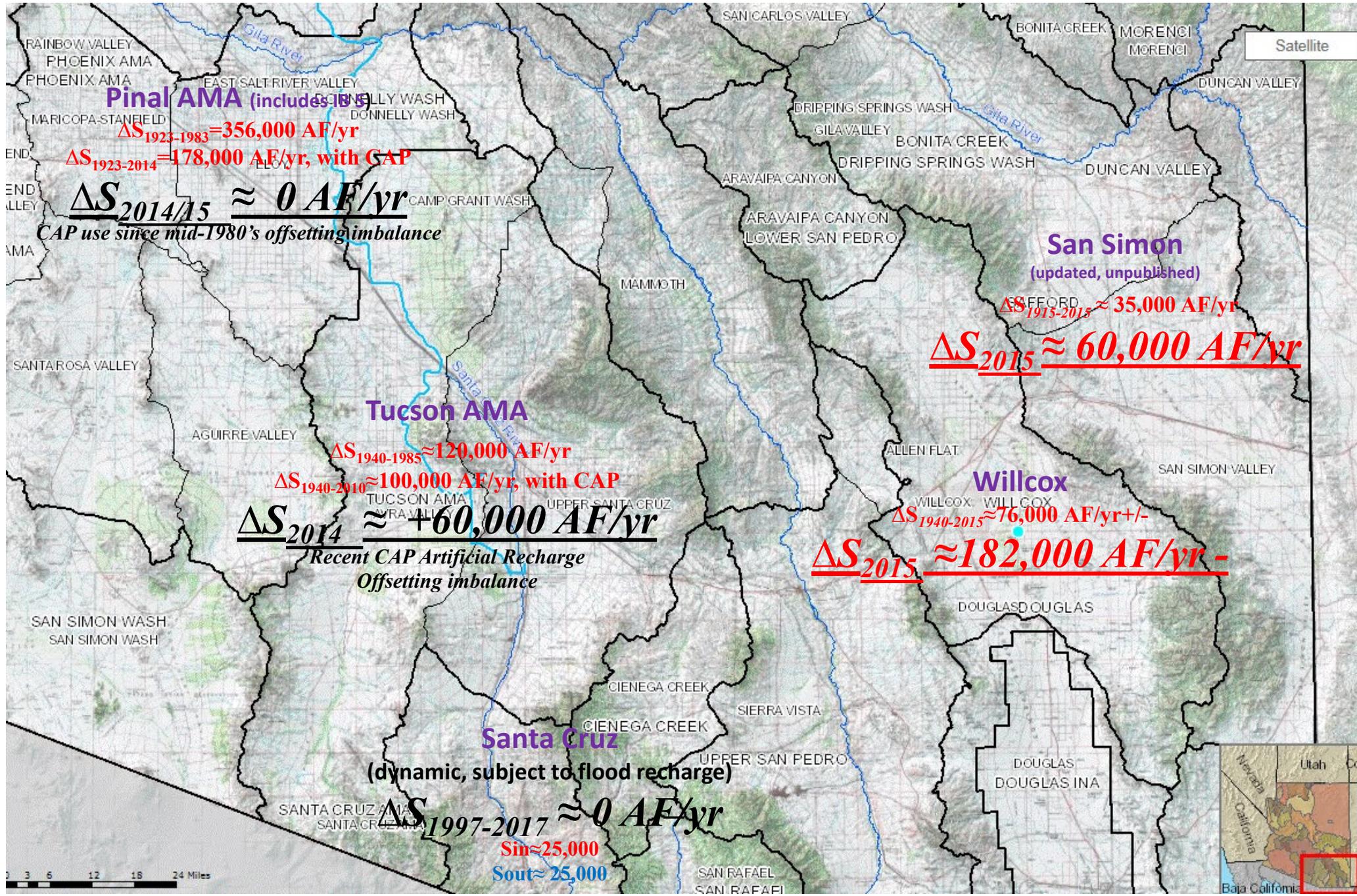
**Requires confidentiality agreement for legal advice and negotiating strategies

***Federal legislation if necessary

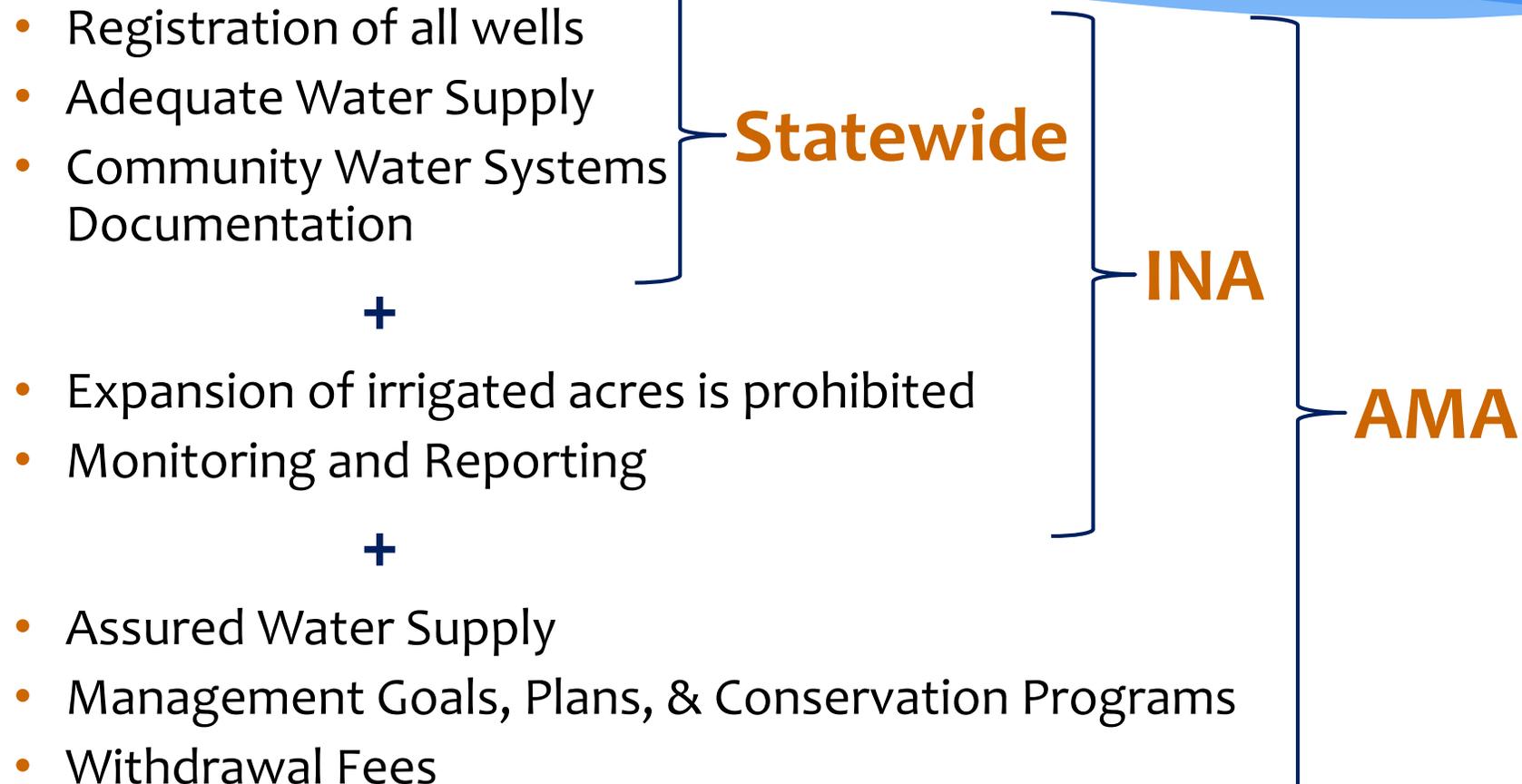
Building A Resilient Colorado River System



DRAFT Transient Annualized ΔS Rates, ADWR Models



Regulatory Structure



Groundwater Management - Active Management Areas

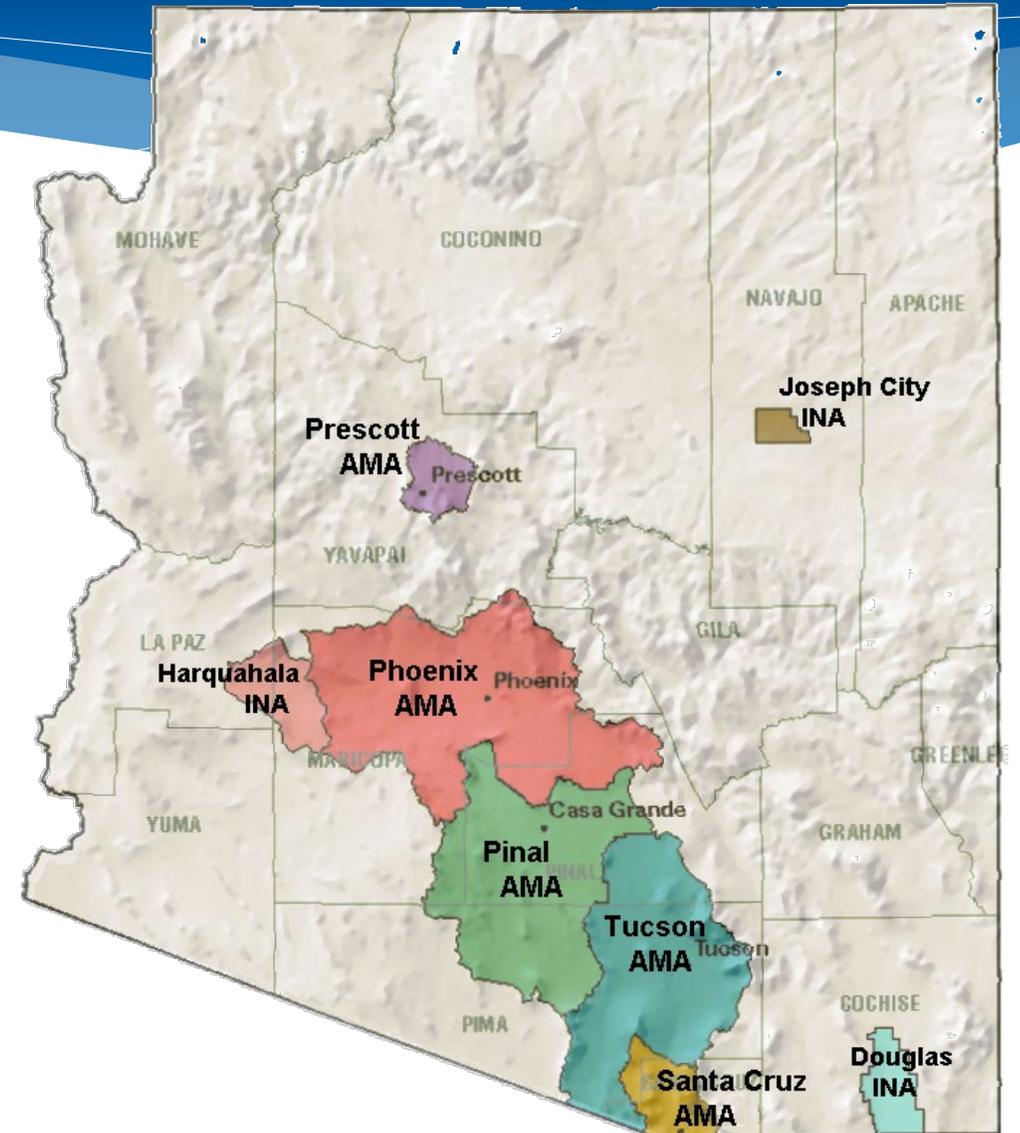
Statewide Provisions

Active Management Areas (AMAs)

- Phoenix
- Pinal
- Prescott
- Tucson
- Santa Cruz

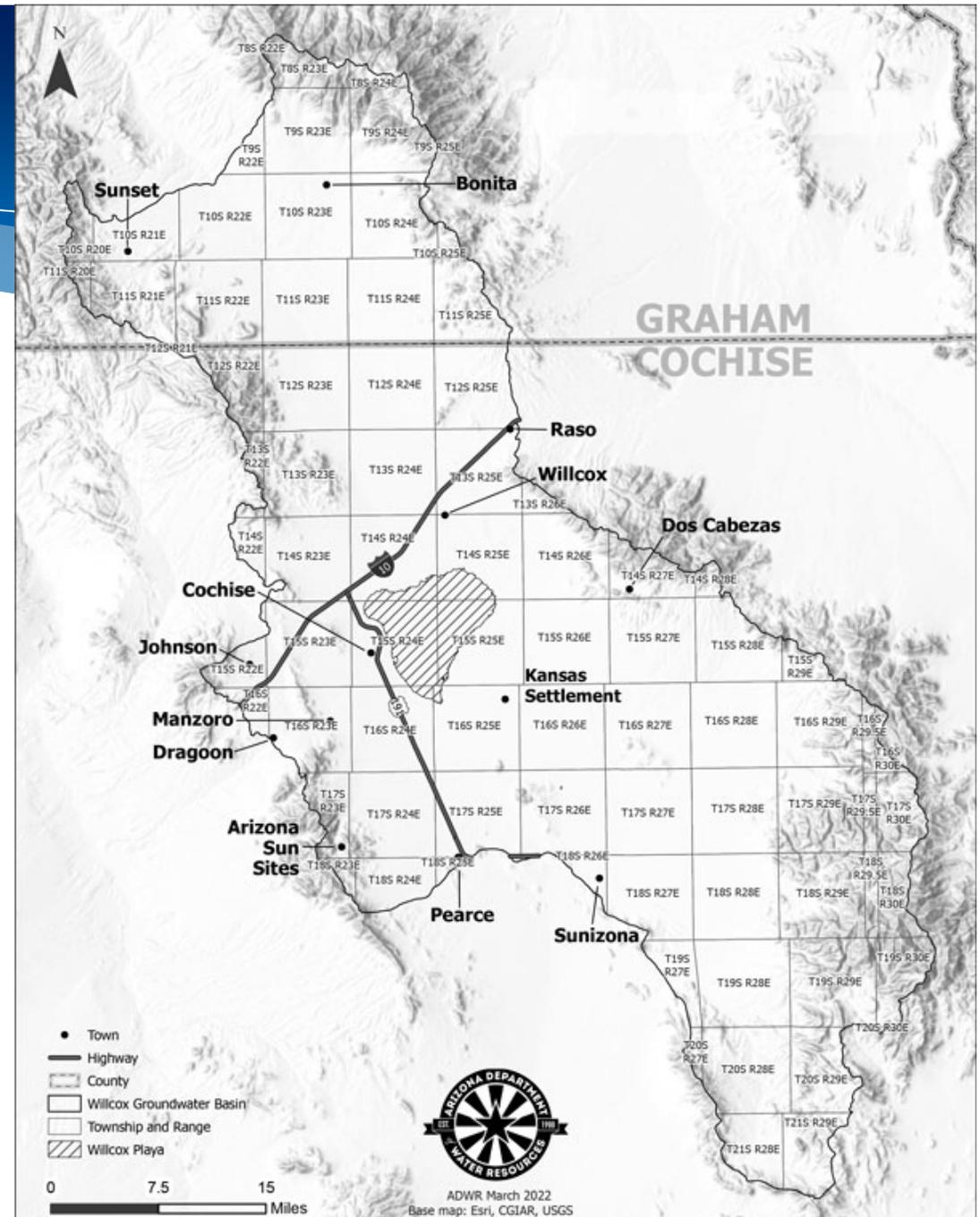
Irrigation Non-Expansion Areas (INAs)

- Harquahala
- Douglas
- Joseph City



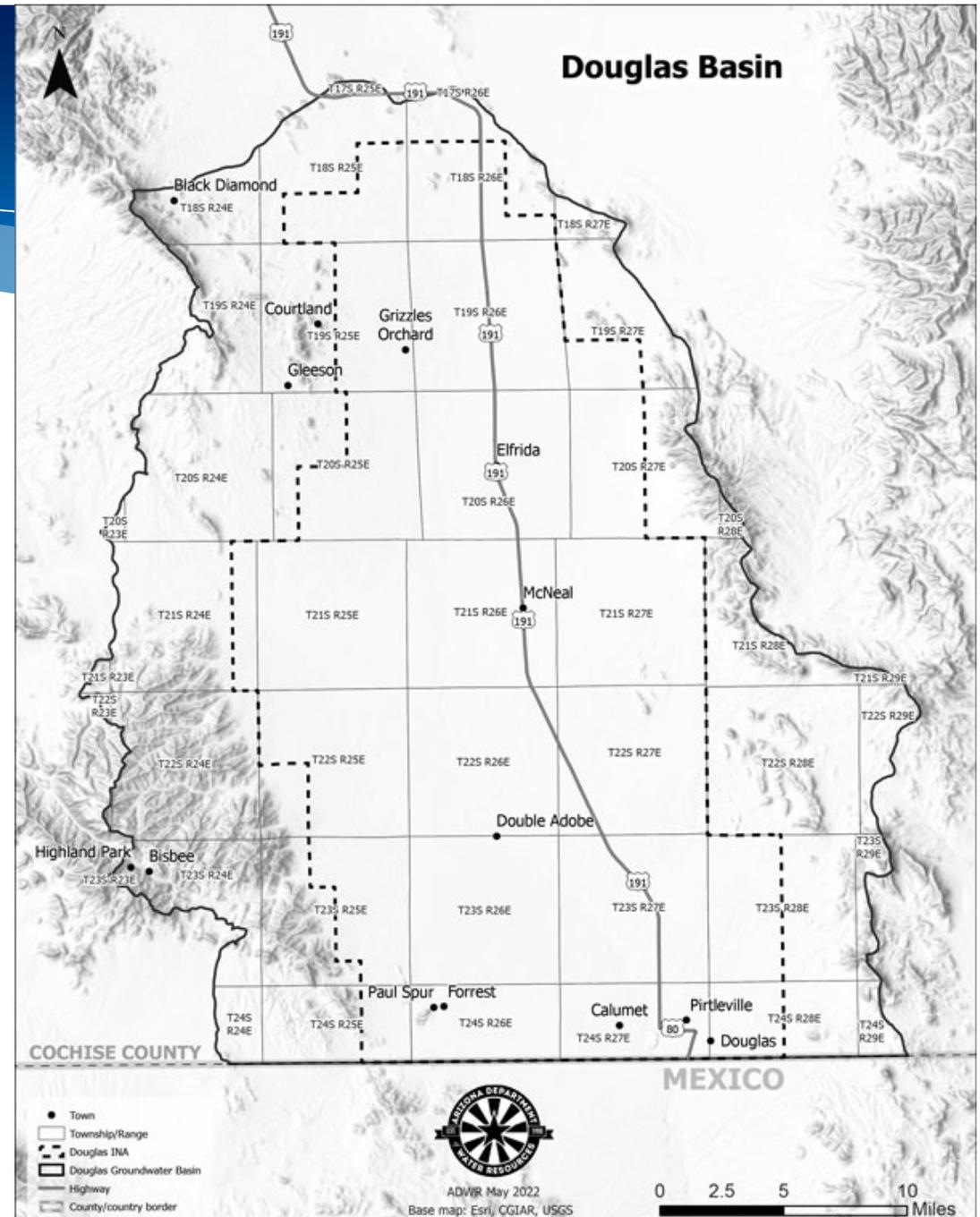
Election called on proposed AMA for the Willcox Basin

- On August 30, 2022, in response to a petition that was filed by residents pursuant to A.R.S. § 45-415, the Board of Supervisors of Cochise County called for an election, to be held on November 8, 2022, on whether to designate the Douglas Groundwater Basin as an active management area (“AMA”).
- On August 16, 2022, ADWR held an informational meeting on the subject with stakeholders in Willcox.
- For more information visit: <https://new.azwater.gov/ama/faqs-willcox-ama>



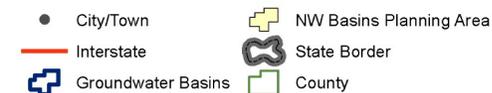
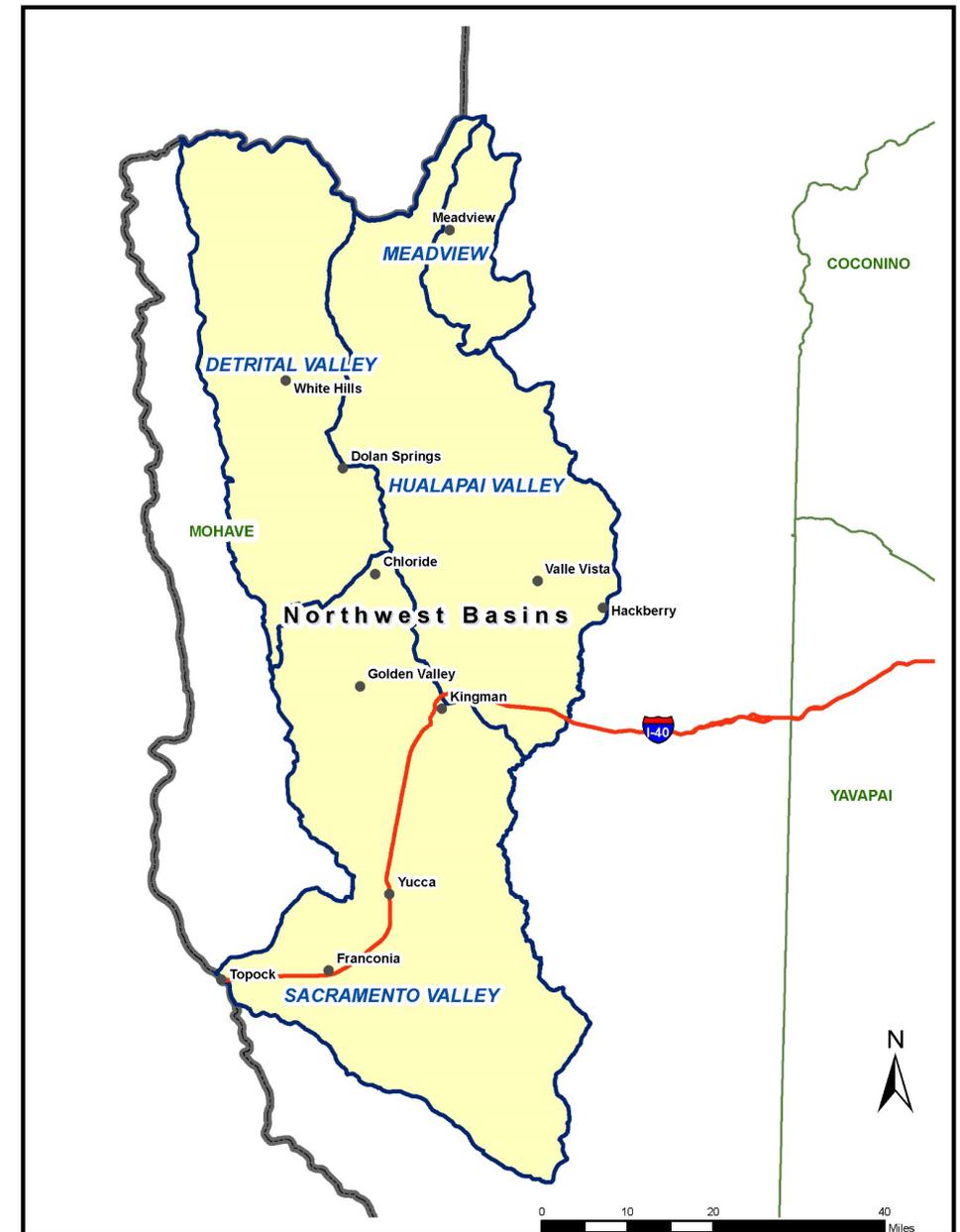
Election called on proposed AMA for the Douglas Basin

- On August 30, 2022, in response to a petition that was filed by residents pursuant to A.R.S. § 45-415, the Board of Supervisors of Cochise County called for an election, to be held on November 8, 2022, on whether to designate the Douglas Groundwater Basin as an active management area (“AMA”).
- On August 16, 2022, ADWR held an informational meeting on the subject with stakeholders in Willcox.
- For more information visit: <https://new.azwater.gov/ama/faqs-douglas-ama>



Request to Designate a subsequent INA for the Hualapai Valley Groundwater Basin

- A written request from the Mohave County Board of Supervisors was received by ADWR on June 23, 2022.
- On September 20, 2022, ADWR will host a public meeting in Kingman to present information and receive public comments on whether ADWR should initiate procedures to designate the Hualapai Valley Groundwater Basin as a subsequent Irrigation Non-Expansion Area.



**Northwest Basins
Groundwater Basins**



Assured & Adequate Water Supply Programs

Assured Water Supply Program

- Operates within the five AMAs.
- Before recording plats or selling parcels within an AMA, developers must demonstrate all the following criteria:
 - **Physical availability for 100 years**
 - Continuous availability for 100 years
 - Legal availability for 100 years
 - Water quality
 - Financial capability
 - Consistency with Management Goal
 - Consistency with Management Plan

Adequate Water Supply Program

- Operates outside of the AMAs.
- Five criteria must be demonstrated to obtain an Adequate Water Supply determination:
 - Physical availability for 100 years
 - Continuous availability for 100 years
 - Legal availability for 100 years
 - Water quality
 - Financial capability

Groundwater Supply in Pinal County

- In 2019, a Pinal Stakeholder Group, chaired by Pinal County Supervisor Stephen Miller was formed to examine potential solutions to the Assured Water Supply groundwater physical availability issue within Pinal County.
- ADWR provided technical support and input when requested.
- On June 28, 2021, Deputy Director Chandler related to the task force members that in the judgment of Director Buschatzke, “the days of utilizing native groundwater for development in Pinal are over, it’s done.”
- As a result, ADWR will not approve new assured water supply applications seeking to utilize groundwater within the Pinal model domain. The solutions include non-groundwater importation and direct delivery.
- Those desiring to develop within the Pinal model domain will need to bring their own non-groundwater supplies.

Questions?

Clint Chandler
Deputy Director

Phone: 602.771.3974

Email: cchandler@azwater.gov

Website: new.azwater.gov www.azwater.gov

Twitter: [@azwater](https://twitter.com/azwater)

