

Overview of the Hot “and Dry” Button Issues

Environmental Professionals of Arizona Conference



Clint Chandler

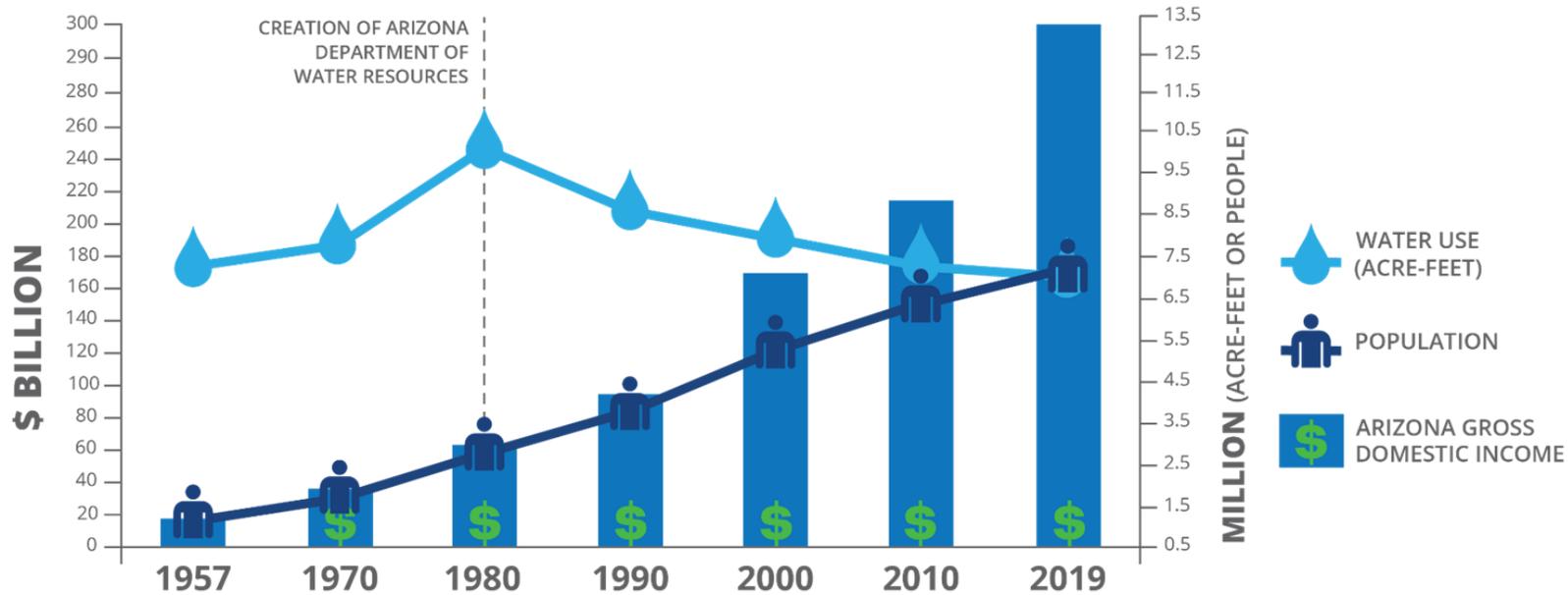
Deputy Director

Arizona Department of Water Resources

February 27, 2024

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)



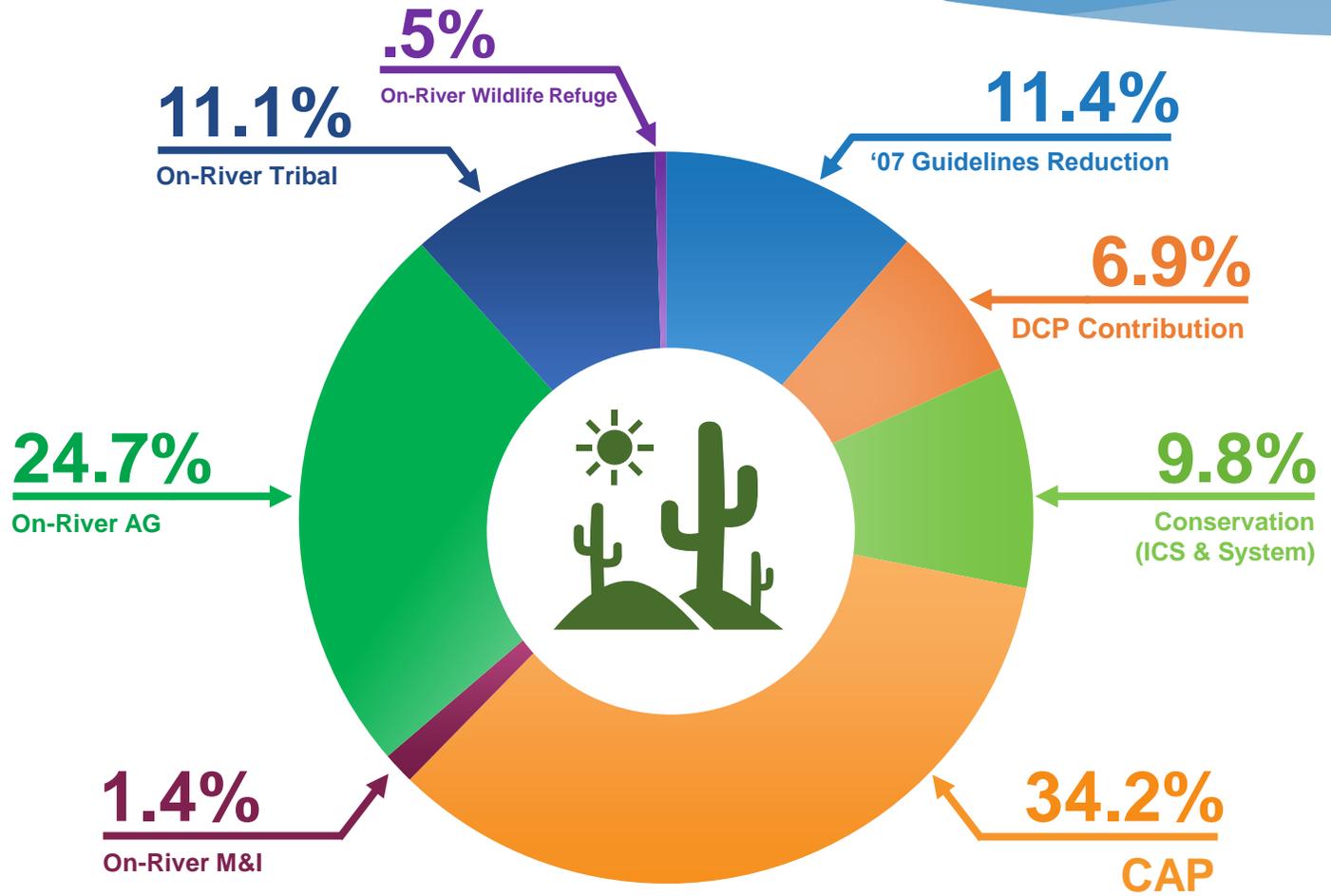
Arizona Water Use By Sector (2019)



ADWR's Critical Functions

- Colorado River Management
- Technical assistance to the Court for General Stream Adjudications
- Administration of the Assured and Adequate Water Supply Program
- Statewide Regional Planning
- Dam Safety and Coordination of Flood Mitigation
- Administration of Recharge and Recovery Program
- Collection and Assessment of Hydrologic Data
- Administration of Groundwater Rights and Surface Water Rights
- Representation of the State of Arizona in Indian Water Rights Settlements

Arizona's Colorado River Use (2022)



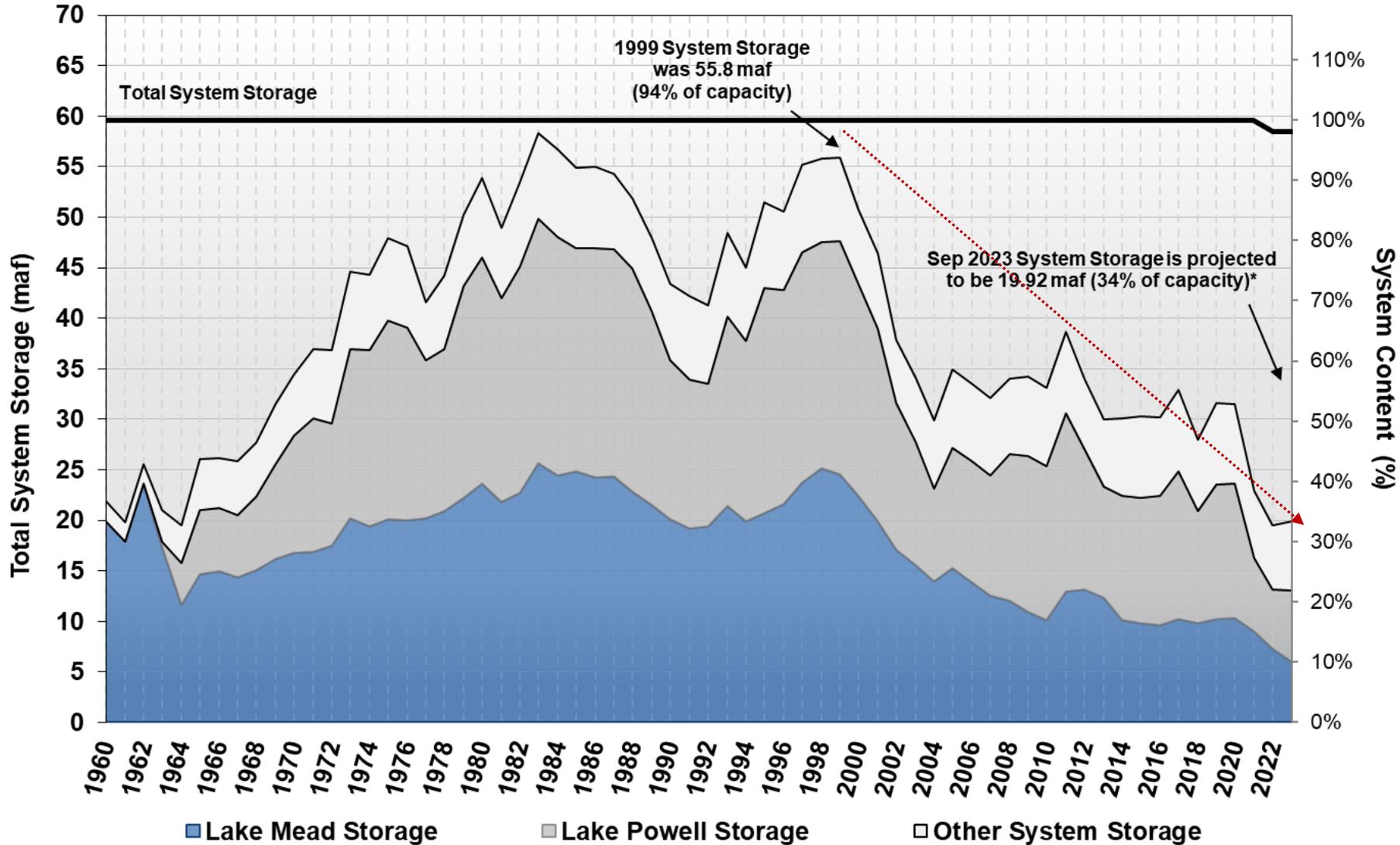
Colorado River Management

- A.R.S. § 45-107 – The Director of ADWR represents the State of Arizona in policy negotiations of Colorado River Operations and administration of entitlements.
- A.R.S. § 45-106 – Requires Legislative approval in certain situations when a sovereign right or claim of the State is part of an agreement between Colorado River States.
- “Law of the River” serves as a constitution for governing the management of Colorado River Resources.
- Colorado River water is vital to the economies of southwestern U.S and Mexico.
- Hydroelectric plants on the River generate approximately 4,200 megawatt-hours of electricity.
- Supplies water to 40 million people
- Irrigates ~5 million acres of farmland



End of Water Year Colorado River Basin Total System Storage

Water Years 1960 - 2023*



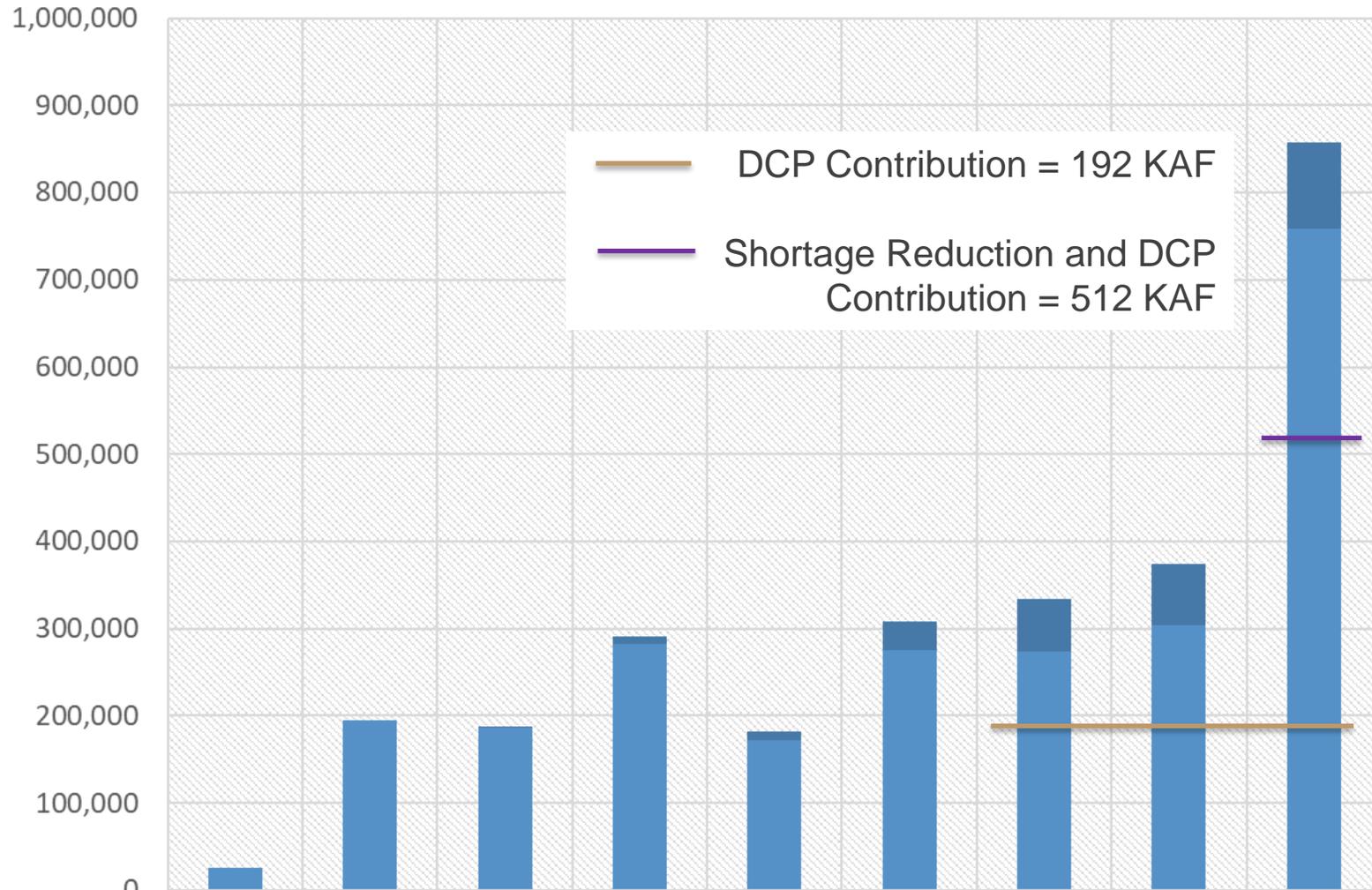
Snowpack vs. Runoff (% of average)		
	Snowpack	Runoff
2020	105%	61%
2021	86%	37%
2022	90%	63%
2023	161%	140%

*Storage value for the end of WY 2023 is based on the January 2023 24-Month Study projection.

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.

Arizona Water Conserved in Lake Mead



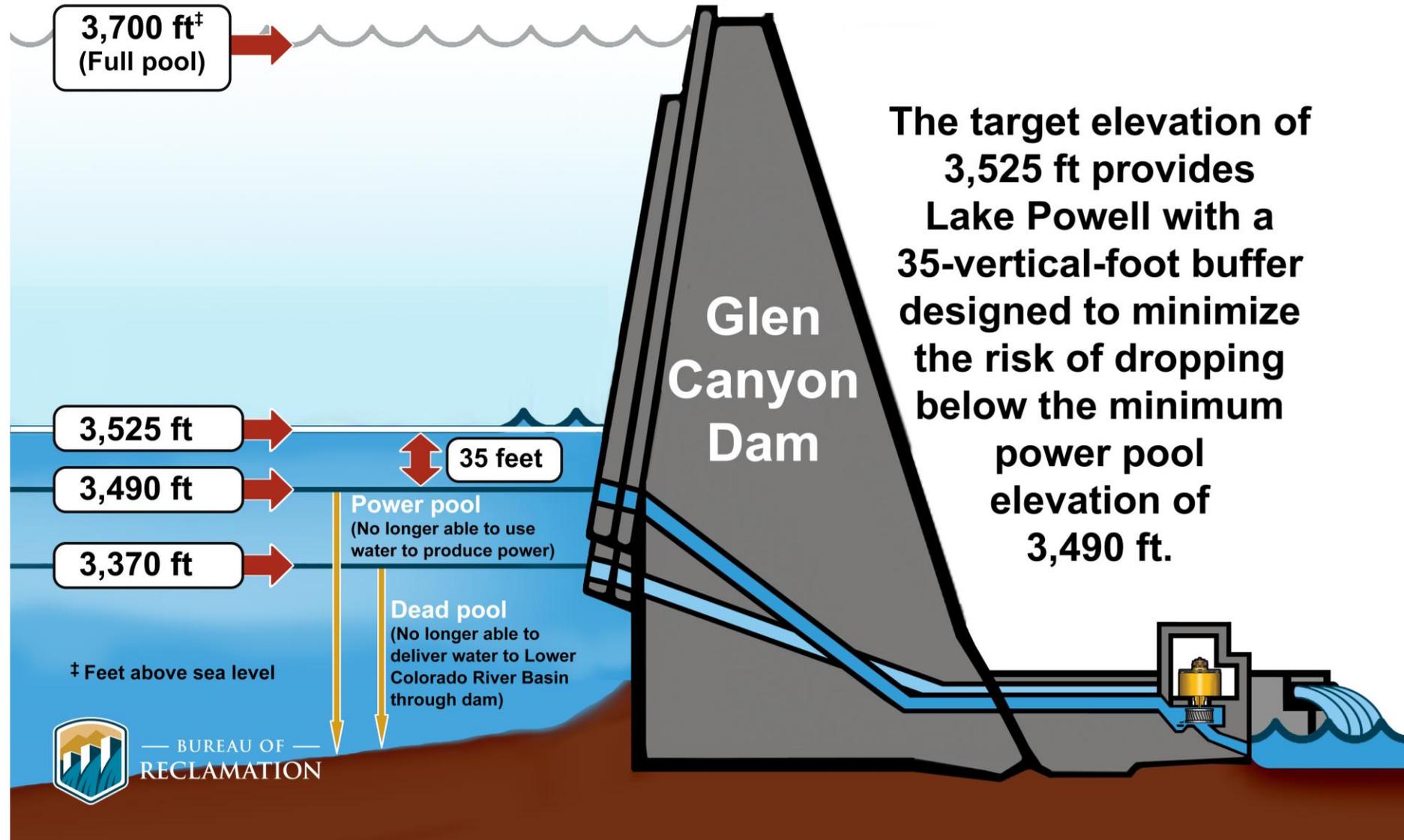
■ AZ On River			1,137	8,612	9,401	33,385	60,222	70,792	98,321
■ CAP	25,117	195,103	186,030	281,885	171,839	274,908	273,608	303,472	758,844

Arizona Colorado River Water Conserved in Lake Mead

Includes

- 2007 Guidelines
- DCP Contributions
- ICS Creation
- Voluntary System Conservation Programs

Lake Powell – Key Elevations



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	<i>Lower Basin States + Mexico</i>	AZ	NV	CA	Mexico	AZ Total	NV Total	CA Total	<i>Lower Basin States Total</i>	<i>Mexico Total</i>	<i>Lower Basin States + Mexico</i>	
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 →	1,045 - 1,040	400	17	70	487	240	10	200	76	640	27	200	867	146	1,013
Tier 2c →	1,040 - 1,035	400	17	70	487	240	10	250	84	640	27	250	917	154	1,071
Tier 2d →	1,035 - 1,030	400	17	70	487	240	10	300	92	640	27	300	967	162	1,129
Tier 2e →	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

Inflation Reduction Act

- Reclamation has established the new Lower Colorado Conservation and Efficiency Program to increase system conservation and efficiency opportunities.
- Three components of the lower Colorado Conservation and Efficiency program
 - 1a: System conservation agreement with Reclamation at a set price of \$330/af (1 yr term), \$365/af(2 yr term) & \$400/af (3 yr term)
 - 1b: Conservation plan proposals resulting in reduction of consumptive use, including price/af, economic justification, proposed conservation and other information
 - 2: Proposals for long-term system efficiency improvements

Supplemental EIS Purpose

- DOI recognizes that operational strategies must be revisited due to critically low reservoir elevations, and potential for worsening drought which threatens critical infrastructure and public health and safety
- Potential impacts of low runoff conditions in 2022 and 2023 pose unacceptable risks to operations of Glen Canyon and Hoover Dams
- Development of modified operating guidelines will inform operations in 2023-24; and may also inform potential operations in 2025-26
- Scoping comments were due by December 20, 2022

Draft SEIS Alternatives

- The Draft SEIS was published in the Federal Register on April 14, 2023, and includes two Action Alternatives in addition to a required No-Action Alternative
- **Alternative 1 – “by priority”**
 - Reductions pursuant to ‘07 Guidelines and DCP, plus additional cuts by an interpretation of priority under the Law of the River
- **Alternative 2 – “pro rata”**
 - Uniform percent reductions applied to all users based on 2021 consumptive use, plus reductions pursuant to ‘07 Guidelines and DCP
 - Includes a potential 500 kaf of DROA release from the Upper Basin

Lower Basin Consensus Proposal

- On May 22, 2023, the Lower Colorado River Basin States announced a consensus proposal to conserve at least an additional 3 million acre-feet of Colorado River Water in the Lower Basin by the end of calendar year 2026 with at least 1.5 MAF of that total being conserved by the end of calendar year 2024.
- They requested that the proposal be fully analyzed as an action alternative in the Bureau of Reclamation's Near-Term Colorado River Operations Draft Supplemental Environmental Impact Statement published in April.
- Stabilization of the system through 2026.
- Litigation avoidance
- The Federal Register Notice only temporarily withdrew the Draft SEIS. The Notice of Intent is still valid.

Arizona parties contributing water in the interim period



Progress towards the Lower Basin Proposal

- Arizona parties have committed to voluntarily conserving approximately 356 kaf in 2023
 - Totalling more than 1 million acre-feet through the interim period
- California parties are in the process of executing final conservation agreements
 - Many have been conserving water since the Lower Basin Proposal was announced – even without an executed agreement with the United States

Post-2026 Activity: Lower Basin: Primary Objectives

- Improve the sustainability of the River over a broad but plausible range of future conditions
- Increase the predictability of reductions
- Address the structural deficit by sharing reductions among the lower basin states and Mexico
- Share the risks and benefits of the system equitably within and between the basins

Post-2026 Activity:

Lower Basin Objective: Increase Predictability

- Base reductions in the Lower Basin on combined system contents, rather than individual elevations
- Take consistent reductions over a broad range of storage contents
- Eliminate reliance on forecast data

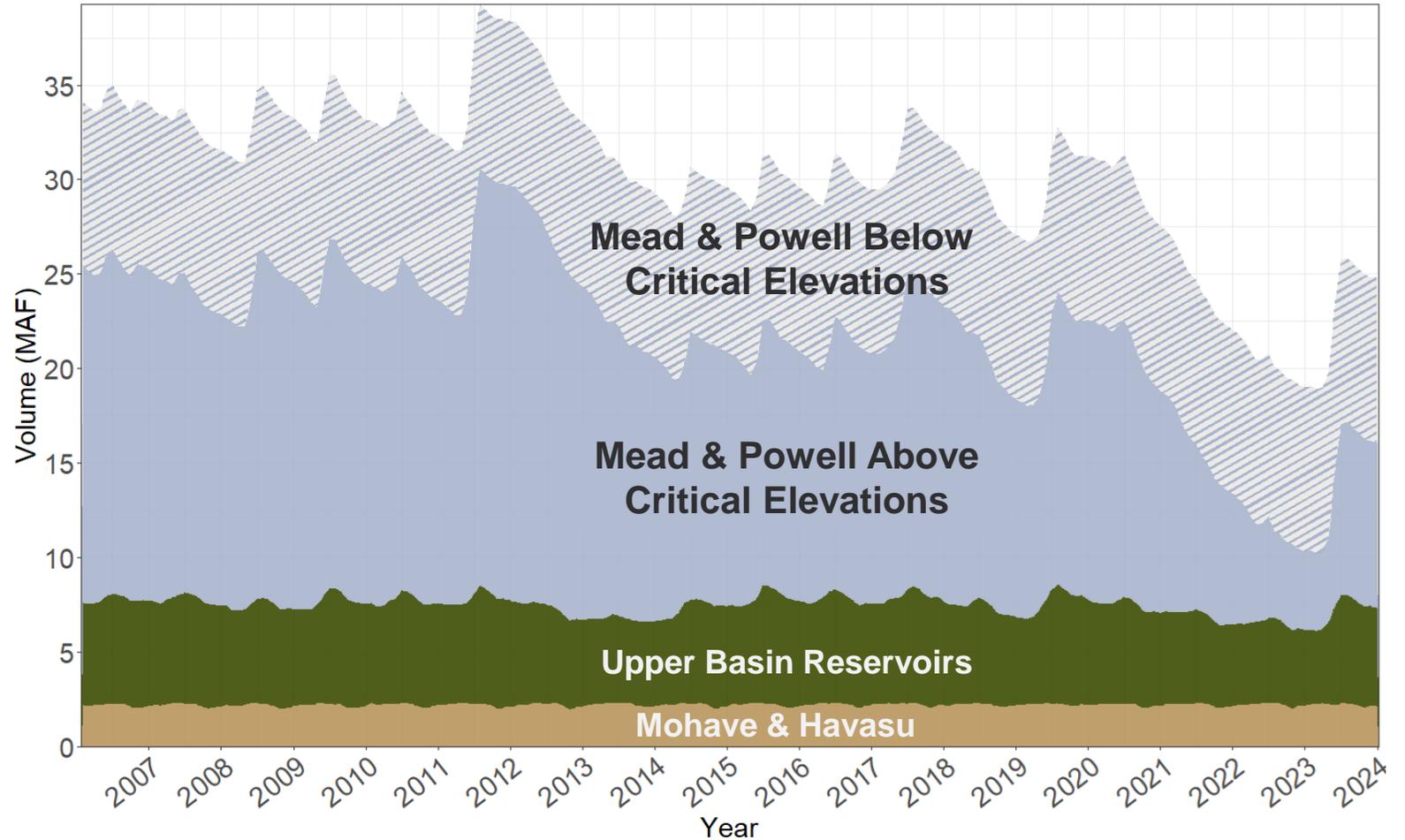
Post-2026 Activity:

Lower Basin Objective: Share Risks and Benefits

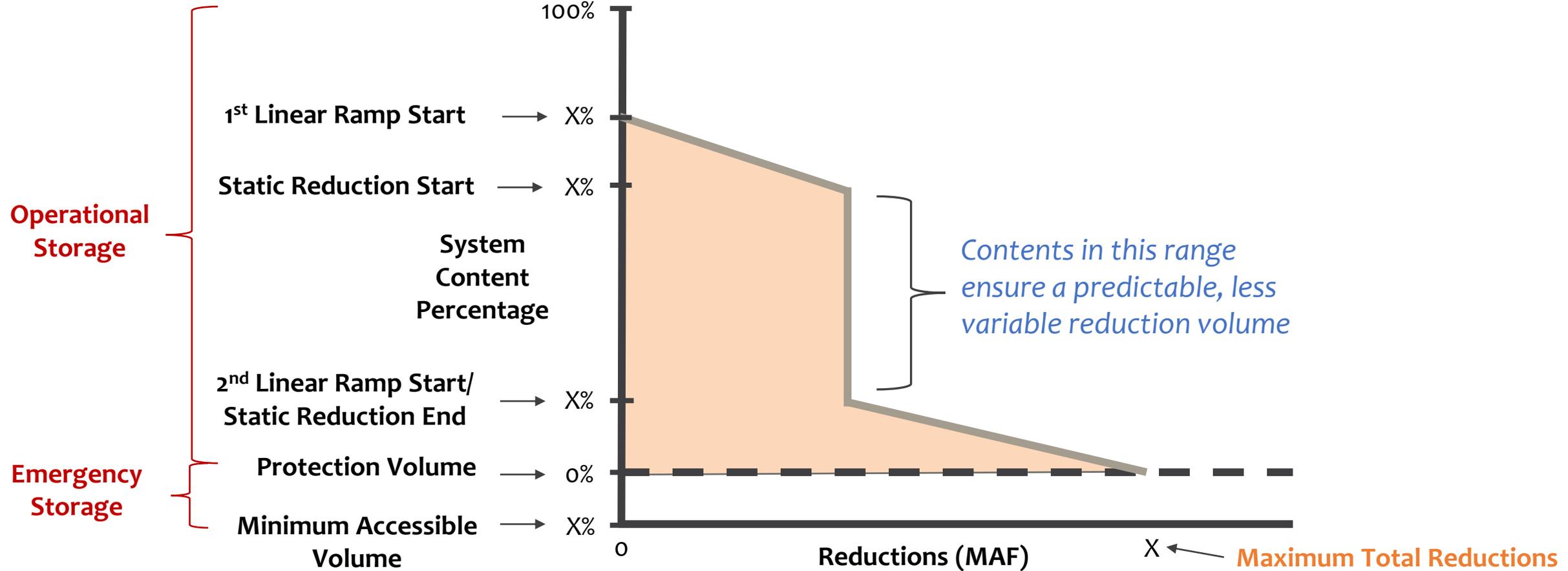
- Recognize the value of infrastructure protection, including Glen Canyon Dam
- Develop rules for releases from Lake Powell that equitably share the risks and benefits to the upper and lower basins
- All water users in UB and LB states participate in reductions

System Contents

- Looking at current system contents rather than forecasts for inflow and predicted elevations provides a more accurate assessment of the system



Reductions Approach using System Contents



Goals of the System Contents Approach

- Address the structural deficit
- Reduce reliance on forecasts for water supply determinations
- Reduction determinations are no longer directly connected to reservoir elevation in Lake Mead
- Provide consistency and predictability for water users
- Provide a framework for equitable sharing of risk between basins

Next Steps

COMPLETED

Public Scoping Period – opportunity for public to provide input on scope of EIS and Purpose and Need for Proposed Action

JUNE – AUGUST 2023

Development of EIS Operational Alternatives by Reclamation, partners, and stakeholders

FALL 2023 – SPRING 2024

Publication of Draft EIS with public comment period to follow

DECEMBER 2024

JUNE 2023

Reclamation publishes NOI to Prepare EIS - initiates NEPA Process - Begins public Scoping Period

COMPLETED

AUGUST – SEPTEMBER 2023

Reclamation develops Scoping Summary Report with anticipated Purpose & Need

COMPLETED

SPRING – FALL 2024

Reclamation prepares Draft EIS

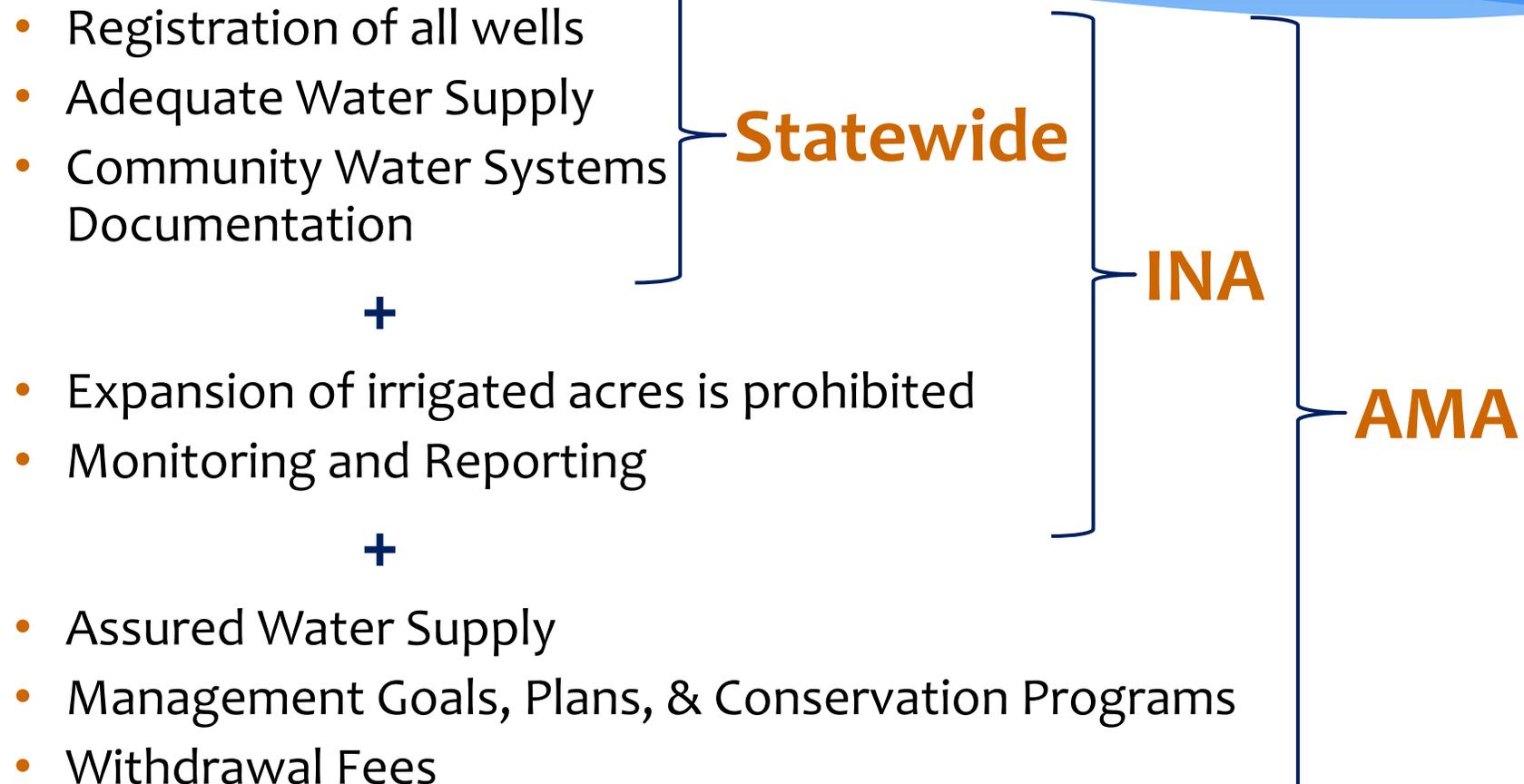
2025 – 2026

Publication of Final EIS and Record of Decision issued

◆ Key NEPA Process milestones – Opportunities for Tribal, State, Partner, Stakeholder, and Public engagement
Post-2026 Colorado River Operations Public Scoping



Regulatory Structure



Groundwater Management – Active Management Areas

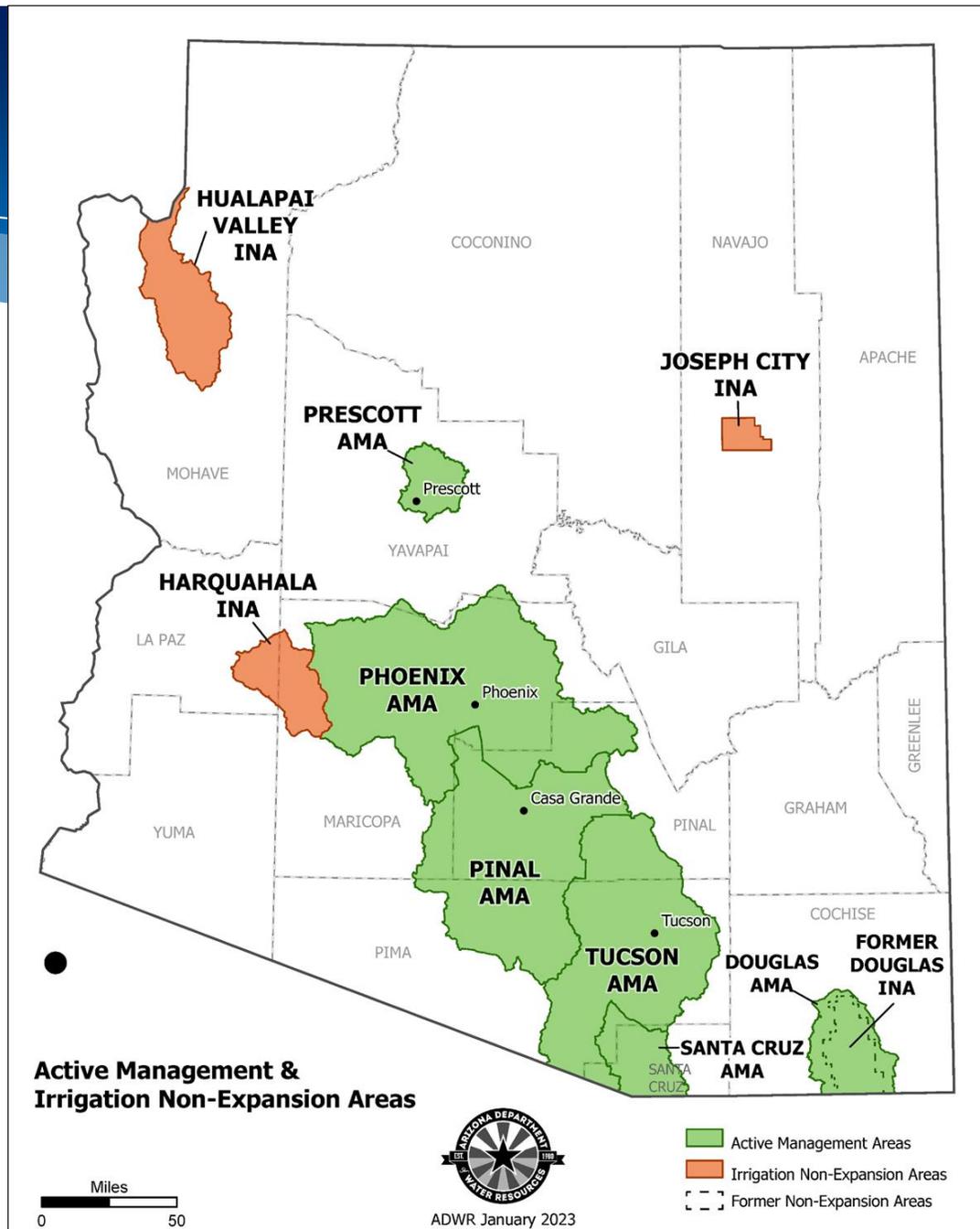
Statewide Provisions

Active Management Areas (AMAs)

- Phoenix
- Pinal
- Prescott
- Tucson
- Santa Cruz
- Douglas (est. December 1, 2022)

Irrigation Non-Expansion Areas (INAs)

- Harquahala
- Joseph City
- Hualapai Valley (est. December 19, 2022)



Assured & Adequate Water Supply Programs

Assured Water Supply Program

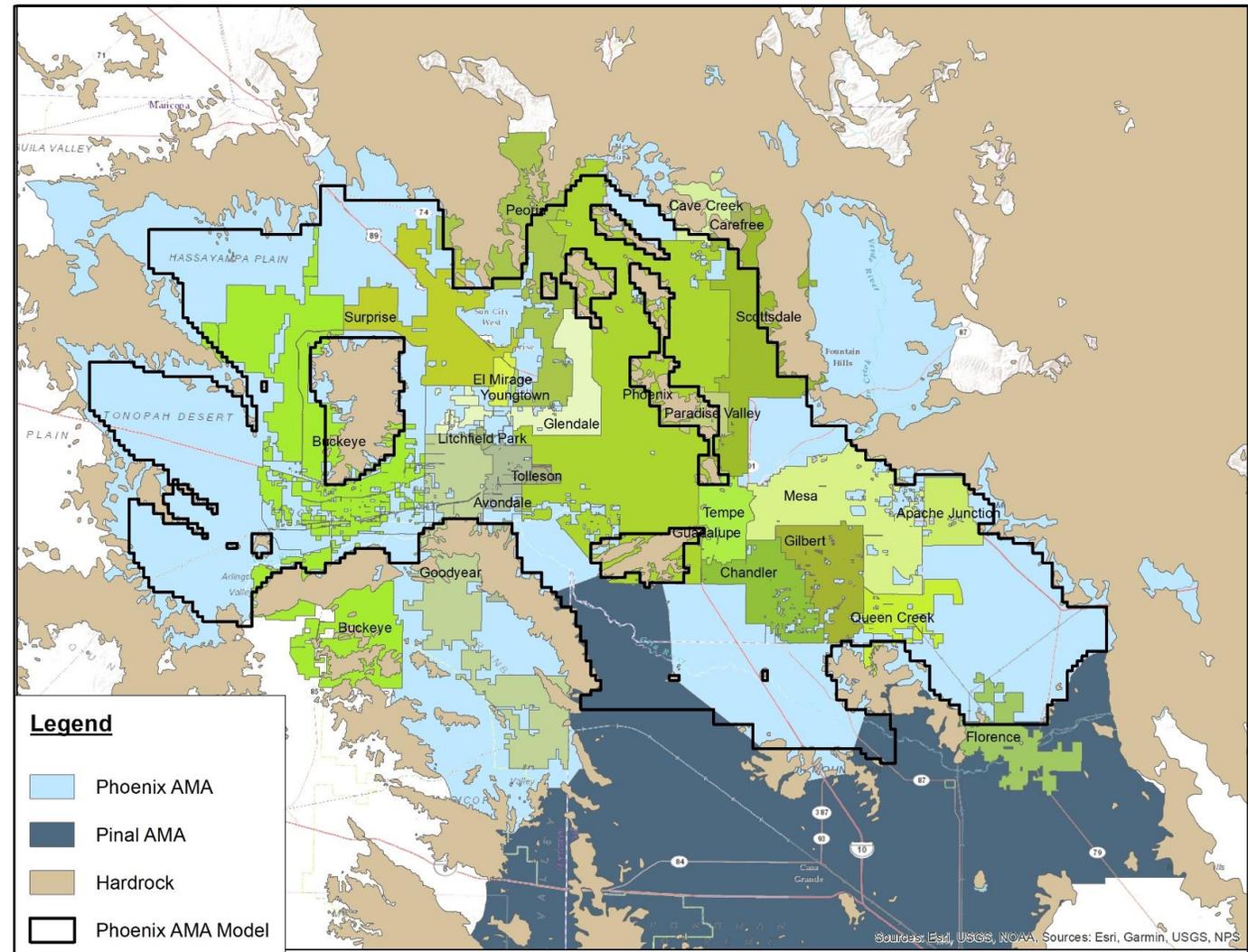
- Operates within the five AMAs.
- Before recording plats or selling parcels within an AMA, developers must demonstrate all the following criteria:
 - **Physical availability for 100 years**
 - Continuous availability for 100 years
 - Legal availability for 100 years
 - Water quality
 - Financial capability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

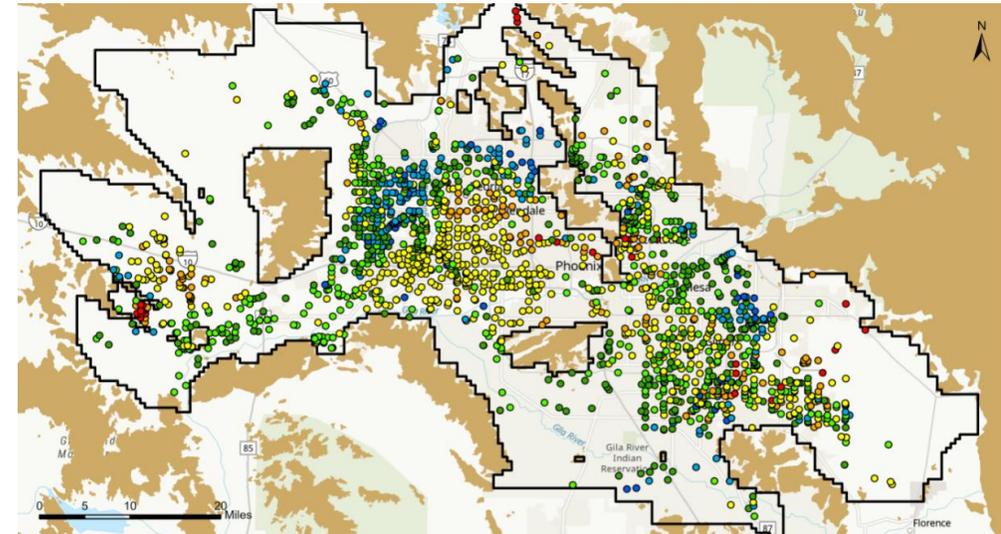
Phoenix Groundwater Model

- 1990s ADWR created a MODFLOW model of the Salt River Valley (ESRV and WSRV)
- Most recently updated in 2009
- Brown and Caldwell 2006 Lower Hassayampa model
- 2023 release of Phoenix AMA model, which combines the SRV with the Lower Hassayampa
- Projection period includes standard Assured Water Supply (AWS) assumptions



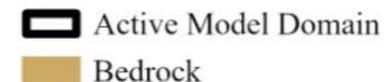
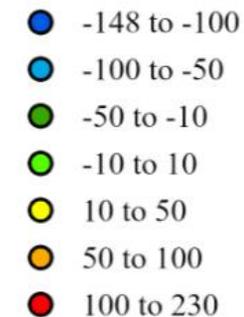
Phoenix AMA Model Calibration

- Calibration period of pre-1900 to 2021 (122 years)
- Multiple types of calibration targets
 - 40,577 WLEs from wells
 - 325 aquifer tests
 - Streamflow from 5 gaging stations
 - Baseflow from historical observations
- Peer-reviewed
- Industry standard robust calibration
- Consistent with conceptual model
- Best-available science for use with the AWS program



Distribution of Head Residuals
in Layer 2

Average Head Residual (Layer 2)
(feet)



Key Takeaways

- AWS Program is working as intended
 - We have time to make water management decisions
 - This is an inflection point
- Existing homes built pursuant to the AWS program have secure water supplies
- Significant volumes of groundwater and other water supplies are available for continued growth
- Water providers in the Phoenix AMA have diverse water supplies and are not solely reliant on groundwater
- People are not running out of water

Governor's Water Policy Council

- On January 9, 2023, Governor Katie Hobbs issued an Executive Order to establish the Governor's Water Policy Council.
- The Council is tasked to provide proposals for consideration by December 2023.
- Per the Governor's Executive Order, the Director of the Arizona Department of Water Resources (ADWR) serves as the Chair of the Council.
 - ADWR provides staffing and technical support to the Council.
- The Council replaces and will build upon the work of the Governor's Water Augmentation, Innovation, and Conservation Council (GWAICC).
 - Link to Previous Councils (GWAICC & GWAC): <https://www.azwater.gov/gwaicc>

Governor's Water Policy Council Committees

- Based on the Council's focus areas and objectives, two committees were formed:
 - Assured Water Supply (AWS)
 - Rural Groundwater Management
- Committee members are Council members or their designated representatives.
- Committees may form technical subcommittees as necessary to accomplish tasks.
- Council and Committee meetings are open to the public, but participation is limited to members.
 - Meeting recordings and meeting materials are posted to the Council webpages.
- A committee does not require unanimity to move something forward.
- Alternative viewpoints are captured and are made part of the materials.

Council Membership

The Directors of the following agencies:

- Arizona Department of Water Resources
- Arizona Department of Environmental Quality
- Arizona Department of Forestry & Fire Management
- Arizona State Land Department
- Arizona Commerce Authority

Additional representatives chosen by the Governor from the following:

- State Legislature
- Governor's Office
- Salt River Project
- Central Arizona Project
- Local government leaders
- Arizona Municipal Water Users Association
- Kyl Center for Water Policy, ASU
- Water Resources Research Center, UA
- College of Environment, Forestry, and Natural Sciences, NAU
- Two Tribal communities within the current AMAs
- One Tribal community outside the current AMAs
- Navajo Nation
- Sustainable agriculture/ranching industry
- Development community
- Non-governmental conservation organizations
- Private water companies

Assured Water Supply Committee

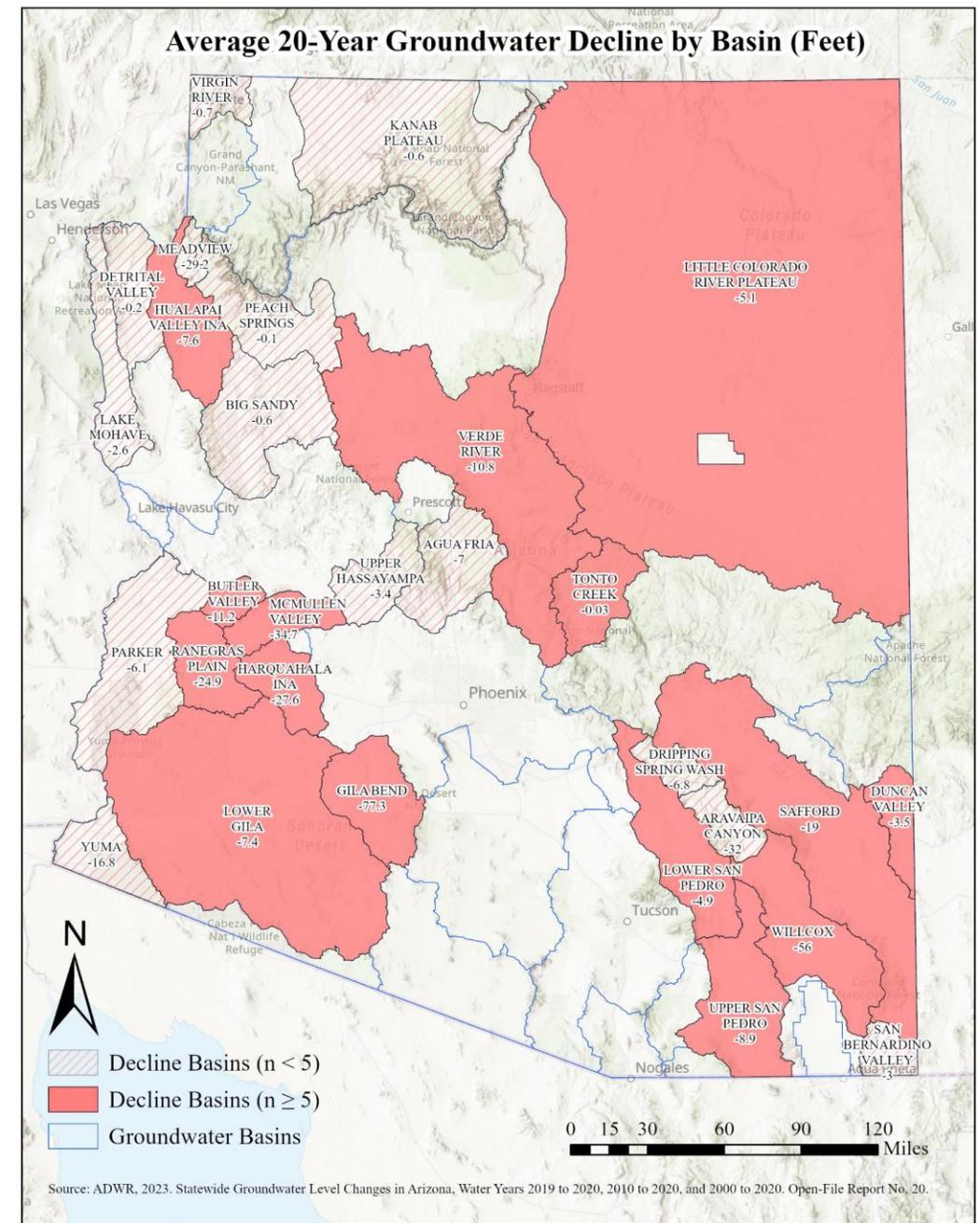
Objective: Review and make recommendations for changes to Assured Water Supply policies – legislatively, administratively, or by executive action – to address the challenges revealed by Assured Water Supply modeling projections.

Deliverables: Policy recommendations that meet the objective and principles, and that maintain consumer protections.

Focus: Development of high-priority, well-constructed proposals, keeping the timeline in mind.

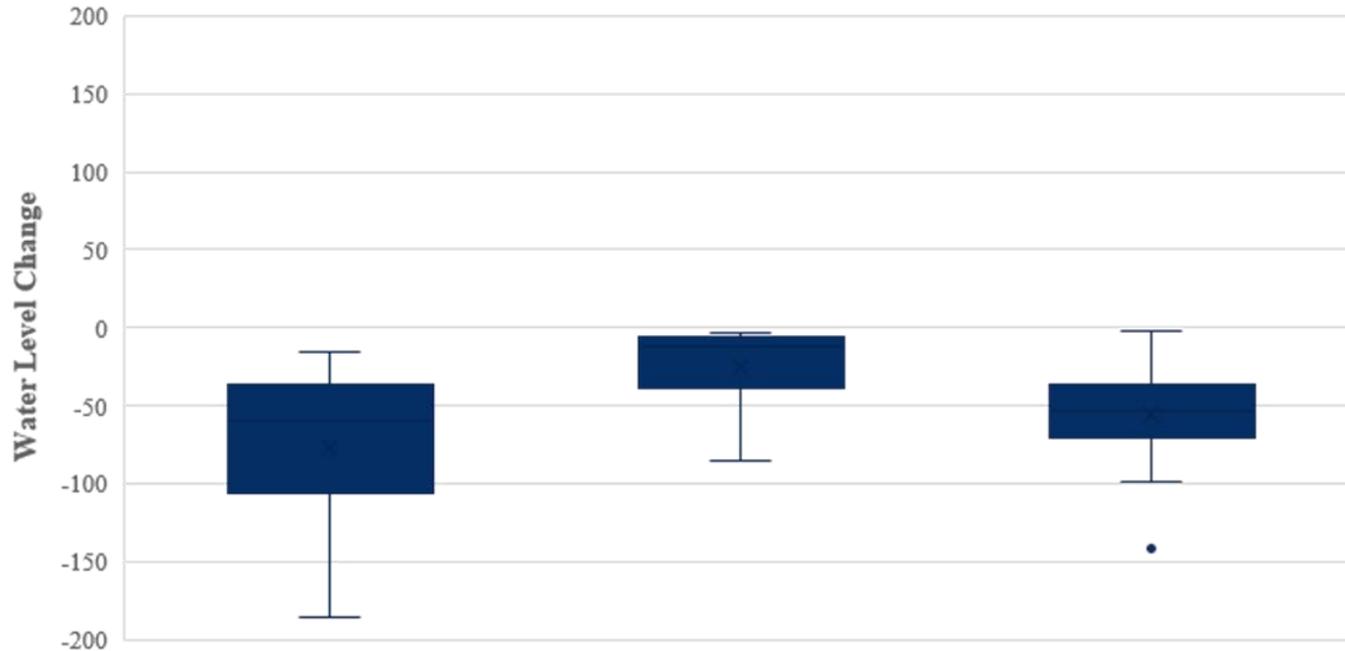
The Current State of Rural Groundwater

- Outside the AMAs and INAs, there is limited regulatory framework for managing groundwater.
- No requirements for metering and reporting groundwater use outside AMAs and INAs.
- Many communities are facing aquifer depletion with limited access to renewable supplies and no tools to manage the groundwater declines.
- There are increasing calls for a framework that will assist rural communities to manage their groundwater resources.



Priority (Severe Decline) Basins

Priority (Severe Decline) Basins

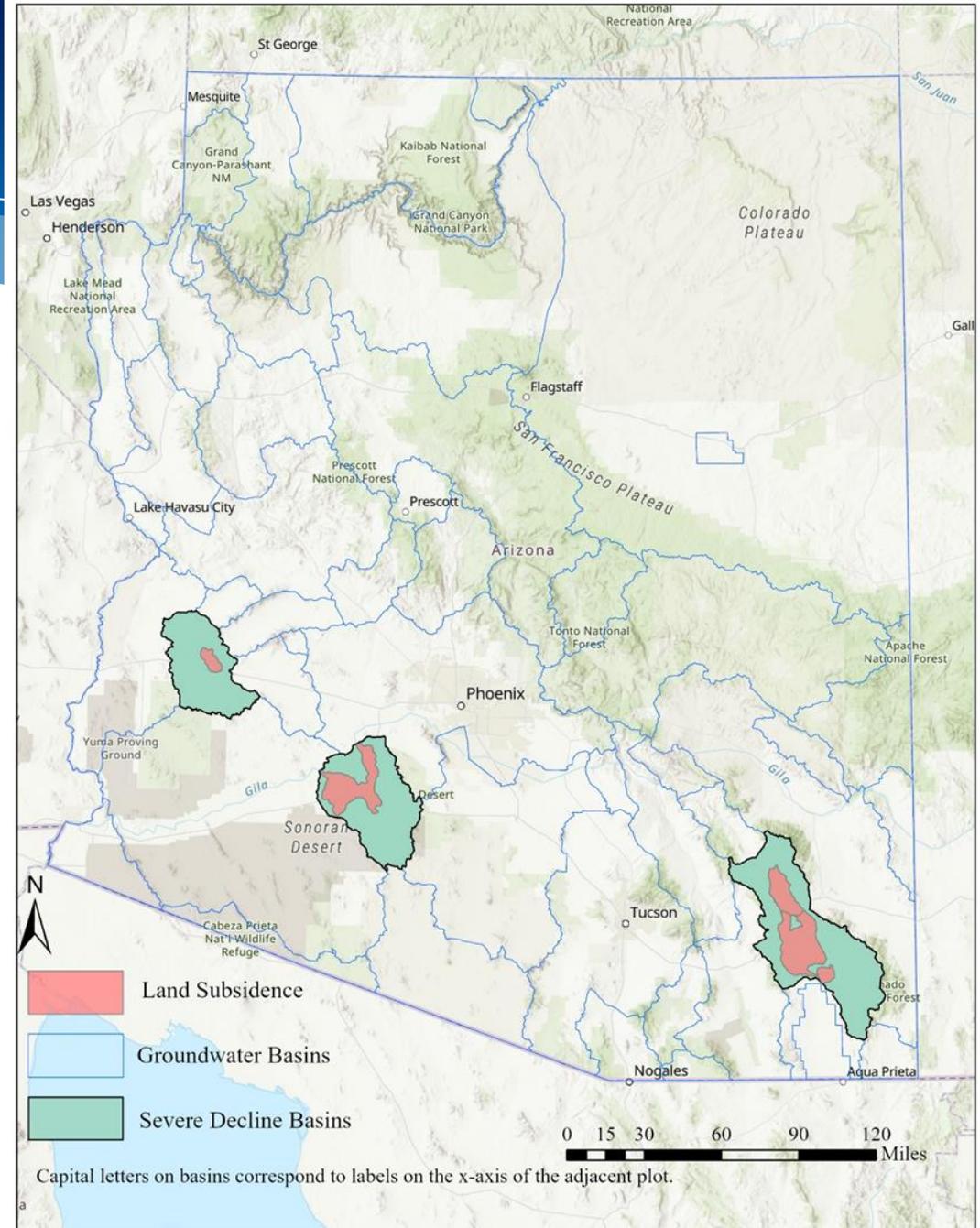


(A) Gila Bend Basin †

(B) Ranegras Plain Basin †

(C) Willcox Basin †

† Basin with subsidence



Rural Groundwater Committee

Objective: Develop policy, legislative, or other actionable recommendations for the Governor that provide a groundwater management framework that assists rural communities to manage local groundwater resources, protect water users, and sustainably manage aquifers.

- These recommendations will assist rural communities outside the state's Active Management Areas (AMAs) and Irrigation Non-Expansion Areas (INAs) in managing local groundwater resources and mitigating further aquifer depletion.
- These recommendations should be broad enough to address the specific groundwater basin management needs and tailored to the basin's unique characteristics.

Council Recommendations to Gov. Hobbs

On November 29, 2023, the Governor’s Water Policy Council submitted recommendations to Governor Hobbs that would add to the sustainability of Arizona water supplies now and in the future.

- Alternative Path to Designation
- Build to Rent
- “Wildcat” Development
- “Rural Groundwater Management Area” Framework
- Rural Groundwater Measuring & Reporting

Council Recommendations – Assured Water Supply

The Governor’s Water Policy Council sent the following recommendations to the Governor:

1. ADAWS - Draft new rules that will provide water providers a means to obtain a Designation of Assured Water Supply in AMAs, creating a pathway for water providers to grow incrementally on alternative supplies while reducing groundwater mining.
2. “Wildcat” Development - Through legislative action, close statutory loopholes associated with “wildcat” subdivisions, ensuring residents of these subdivisions are brought under the protections of the Assured Water Supply Program.
3. Build to Rent - Through legislative action, close statutory loopholes that allow the avoidance of Assured Water Supply Program requirements when constructing build-to-rent housing projects, ensuring residential lease communities are brought under the protections of the Assured Water Supply Program.

Council Recommendations – Rural Groundwater Management

The Governor’s Water Policy Council sent the following recommendations to the Governor:

1. Rural Groundwater Management Areas - A foundational framework for creating Rural Groundwater Management Areas to fulfill the need for groundwater management programs in at-risk groundwater basins in rural Arizona, providing an opportunity for rural communities and water users to benefit from groundwater management and protection.
2. Measuring and Reporting - A non-regulatory program for ADWR to bolster the measuring and reporting of groundwater water use and monitoring of groundwater conditions throughout the state.

Recommendations – Next Steps

ADAWS

- *Rulemaking*
- ADWR drafting rules, to be shared soon
- ADWR to host informal stakeholder meetings, followed by rulemaking process

“Wildcat” Development

- *Legislation*
- ADWR working with legislators to pass legislation to meet Council recommendations

Built to Rent Development

- *Legislation*
- ADWR working with legislators to pass legislation to meet Council recommendations

Rural Groundwater Management Areas

- *Legislation*
- Governor’s Office working with legislators to introduce and pass legislation to establish RGMAs, following the outlined framework from the Council

Measuring and Reporting

- *Administrative*
- ADWR to begin investigating areas of data needs in the state and options to collect additional data in those locations

Questions?

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