CAP
CENTRAL ARIZONA PROJECT

The Use of Models by the Central Arizona Project to Support Water Supply Planning in an Uncertain Future

Nolie Templeton, Ph.D., P.E.
Water Resources Analyst

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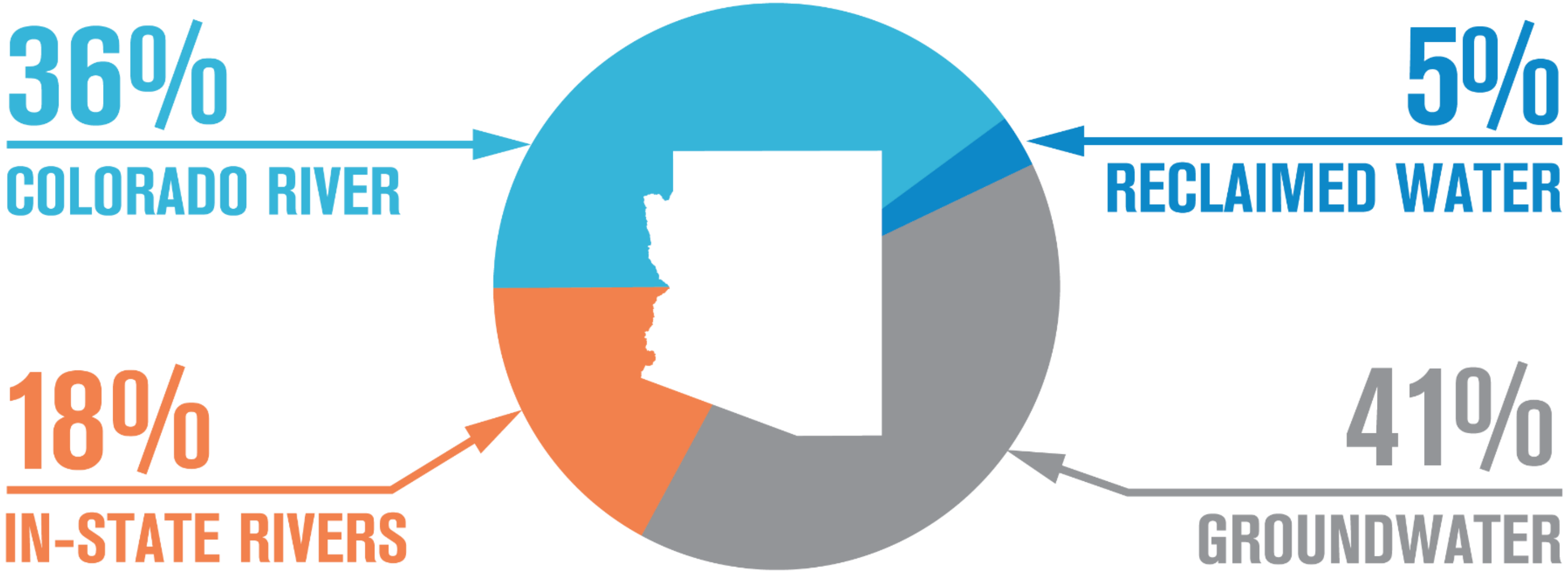
ARIZONA'S WATER SUPPLY



SOURCE: ADWR, **2020**

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Central Arizona Project

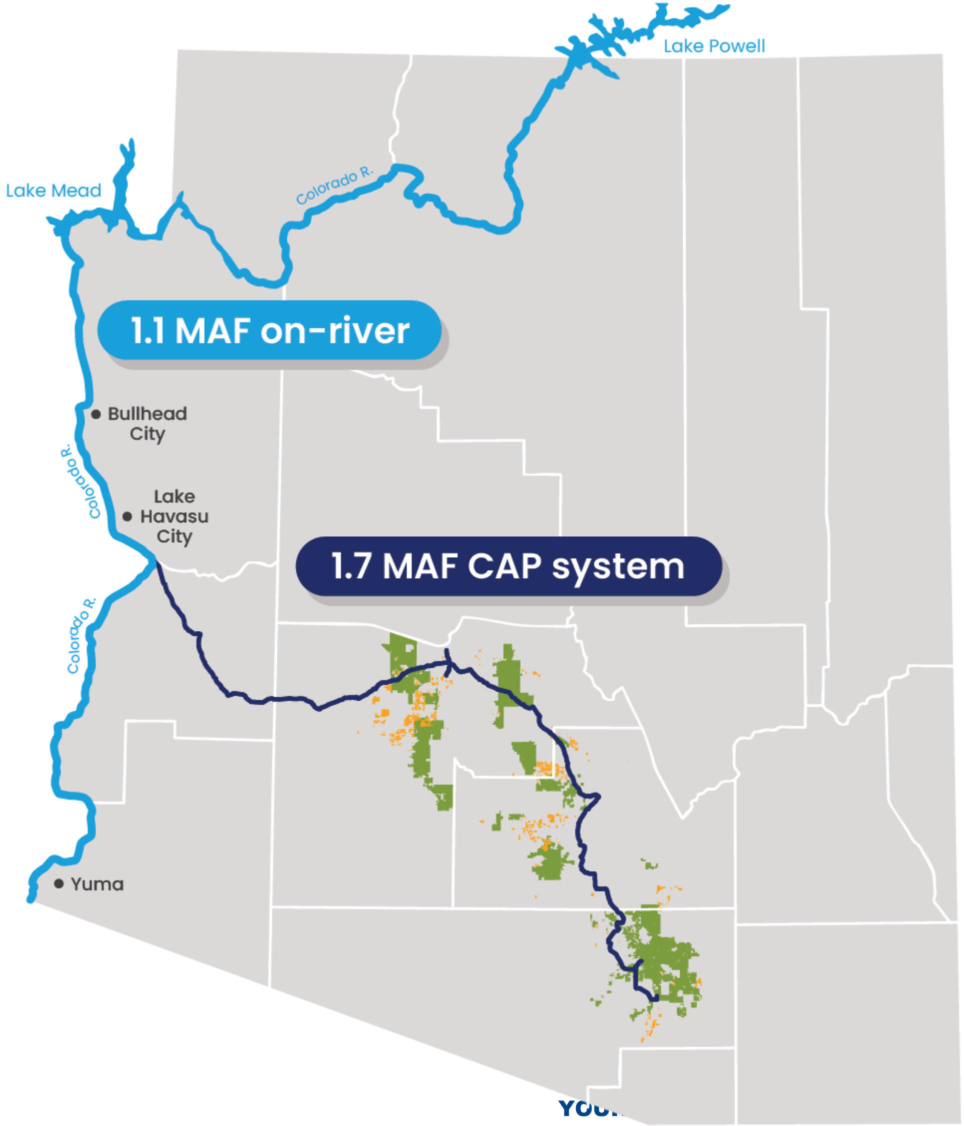
336-mile aqueduct stretches from Lake Havasu to Tucson

Deliveries began in 1985

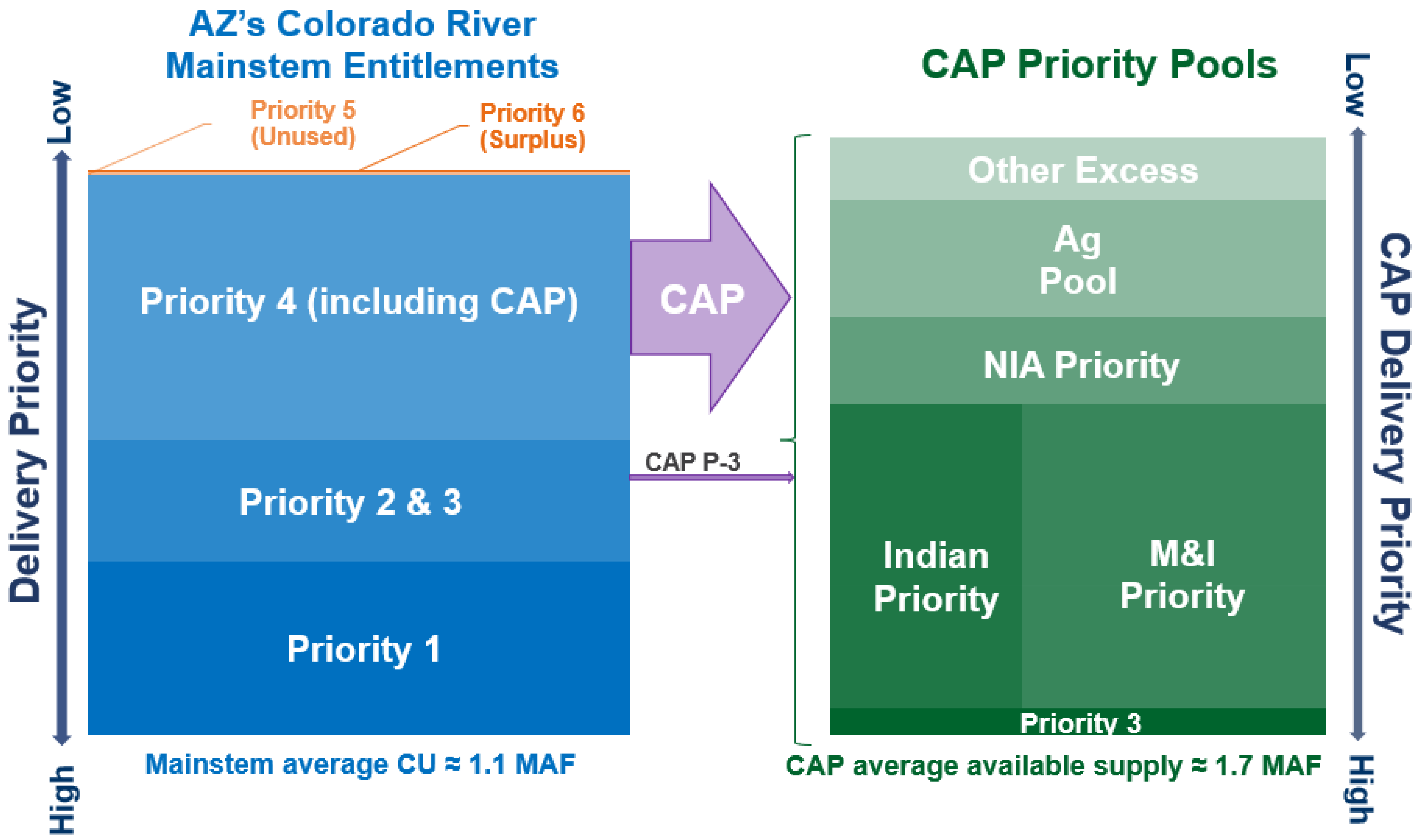
Serves region where 80% of the state's population resides; 6 million people and 12 tribes

Supply allocated 46% to tribes and 54% municipal

Arizona's 2.8 MAF allocation



CAP Priority Pools



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Modeling Tools

- **Colorado River (interstate)**
  - 24-Month Study/Colorado River Mid-term Modeling System (CRMMS): Lower Basin shortages and Coordinated Operations of Lake Powell and Lake Mead
  - Colorado River Simulation System (CRSS): Long-term planning studies, operational criteria development and risk analysis
- **Arizona (intrastate)**
  - On-River Models: Estimates demands and available supplies to Arizona On-River Colorado River users and salinity
  - CAP Joint Shortage Analysis Model: Model to evaluate the impact of variations in CAP supply to CAP users

Current, Near-Term & Long-Term Water Supply Planning Processes

PLANNING EFFORT	CURRENT OPERATIONS (24-Month Study)	NEAR-TERM COLORADO RIVER OPERATIONS (Supplemental Environmental Impact Statement)	LONG-TERM COLORADO RIVER OPERATIONS (POST-2026)
DURATION	2024-2025	2024-2026	2026 AND BEYOND
OPERATIONS	• 2024 - Tier 1 shortage • 2025 - Tier 1 shortage	• ROD identified Lower Basin Proposal as preferred alternative • 3 MAF of voluntary conservation in Lake Mead through 2026	• Ongoing Process • Lower Basin States have submitted an alternative for analysis
MODELING TOOL	24-Month Study	Colorado River Mid-term Modeling System (CRMMS)	Colorado River Simulation System (CRSS)

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

Total Volumes (kaf)

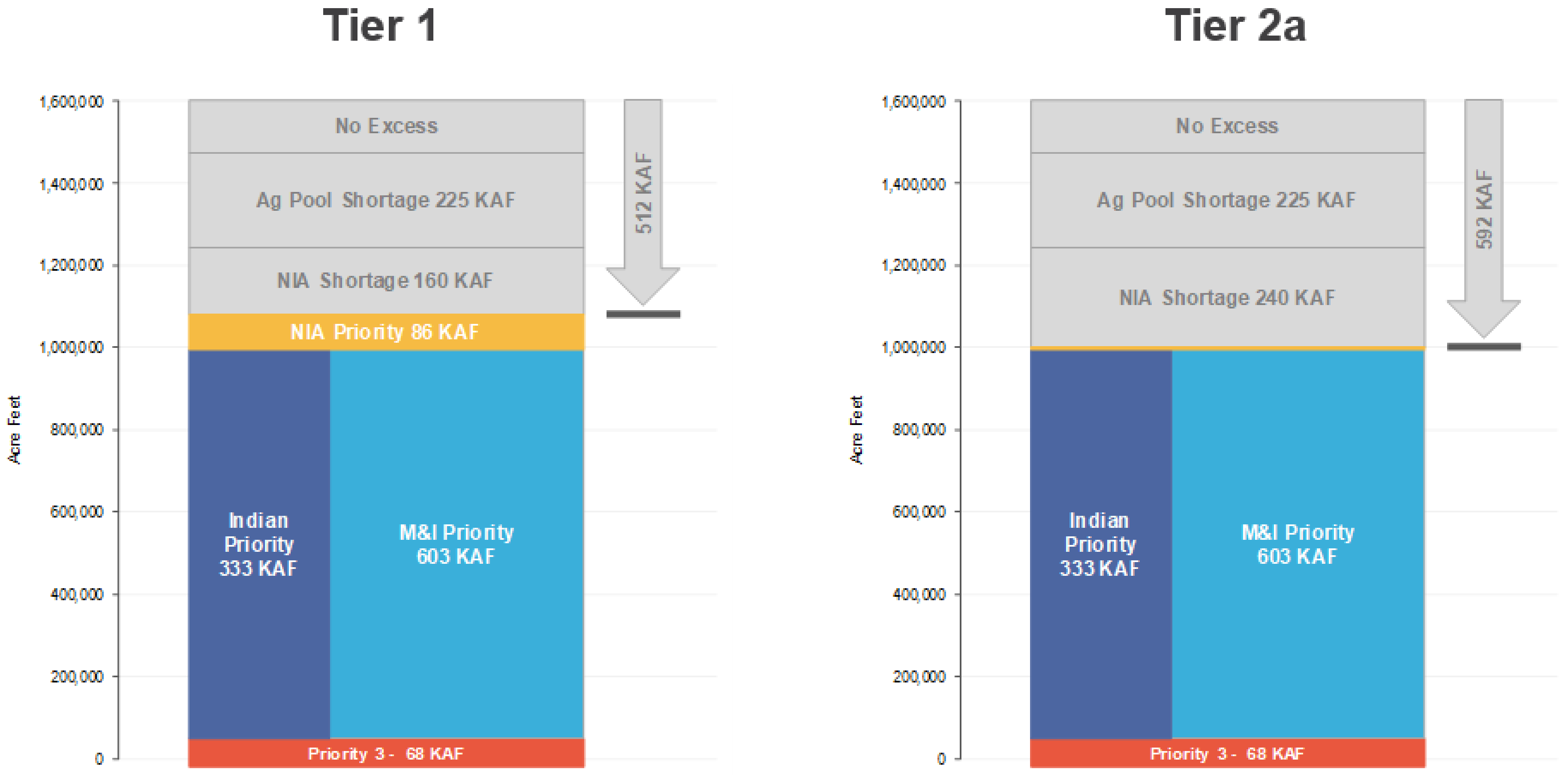
	Lake Mead Elevation (feet msl)	2007 Interim Guidelines Shortages		Minute 323 Delivery Reductions	Total Combined Reductions	DCP Water Savings Contributions			Binational Water Scarcity Contingency Plan Savings	Combined Volumes by Country *US: (2007 Interim Guidelines Shortages + DCP Contributions) Mexico: (Minute 323 Delivery Reductions + Binational Water Scarcity Contingency Plan Savings)*					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 2025 Reductions+ Contributions	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***

CAP Shortage Impacts

Lower

Priority

Higher



For illustration only. Based on 2023 orders.

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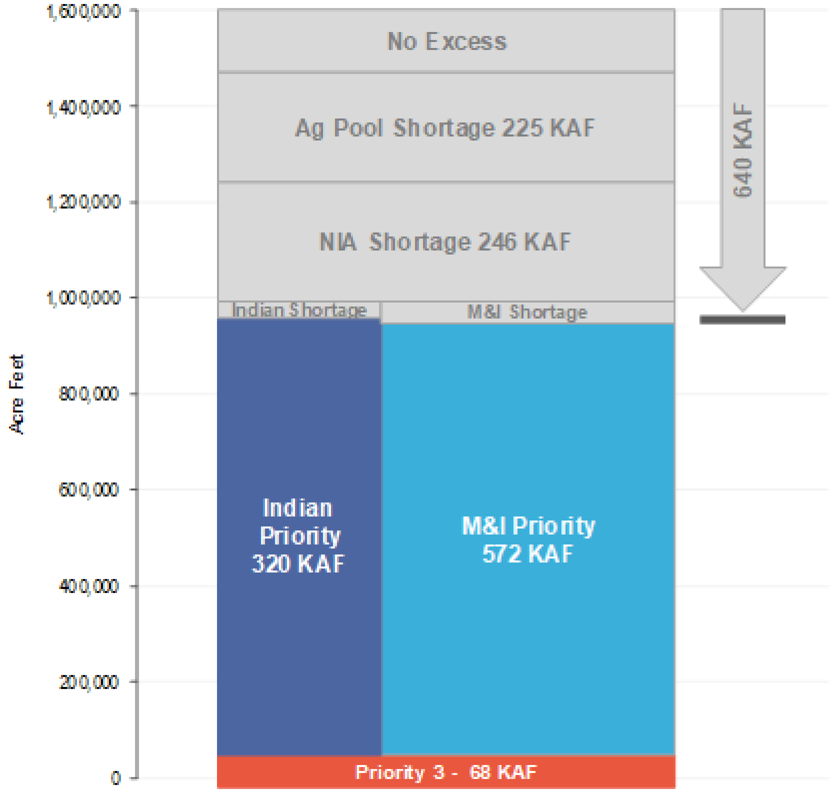
CAP Shortage Impacts

Lower

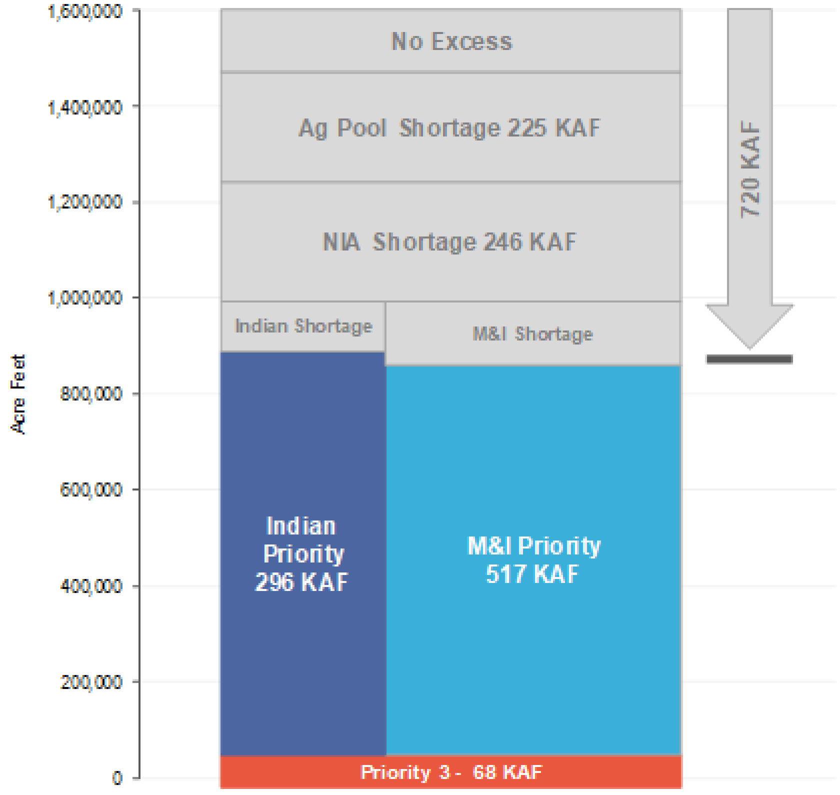
Priority

Higher

Tier 2b-e



Tier 3



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Post-2026: Proposed Schedule

JUNE 2023
Reclamation publishes NOI to Prepare EIS - initiates NEPA Process - Begins public Scoping Period
COMPLETED

COMPLETED
JUNE – AUGUST 2023
Public Scoping Period – opportunity for public to provide input on scope of EIS and Purpose and Need for Proposed Action

FALL 2023
Reclamation develops Scoping Summary Report with anticipated Purpose & Need
COMPLETED

FALL 2023 – SPRING 2024
Development of EIS Operational Alternatives by Reclamation, partners, and stakeholders

SPRING – FALL 2024
Reclamation prepares Draft EIS

DECEMBER 2024
Publication of Draft EIS with public comment period to follow

2025 – 2026
Publication of Final EIS and Record of Decision issued

2007 Interim Guidelines & Paradigm Shifts

Operational decisions based on forecasts →

Paradigm Shift
Rely on measured conditions, incorporating hydrology that has happened, rather than what could happen

Single reservoir contents determining reductions →

Paradigm Shift
Base operations and reduction determinations on a **system contents approach**, which is a more holistic indicator of system health and allows for proactive instead of reactive responses to risk

Use of tiers for operations and shortage determinations →

Paradigm Shift
Base reduction determinations on a **continuous function**, instead of categorized tiers

Insufficient reduction volumes →

Paradigm Shift
Take proactive reductions before the system is at higher risk and take larger basin-wide reductions if needed to avert crisis

Lower Basin Alternative: Goals

- Address the structural deficit in the Lower Basin
- Share the risks and benefits of the system within and between the basins
- Improved predictability of reductions
- Improve water supply predictability over a broad but plausible range of future conditions

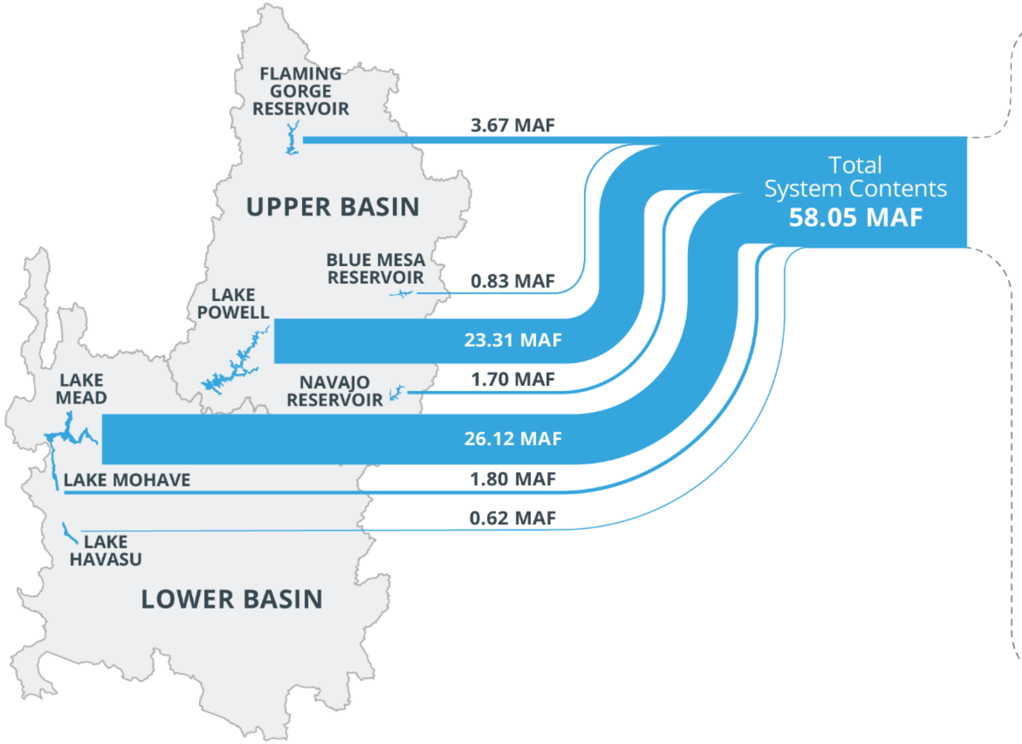
Alternative Components and Design: Reductions

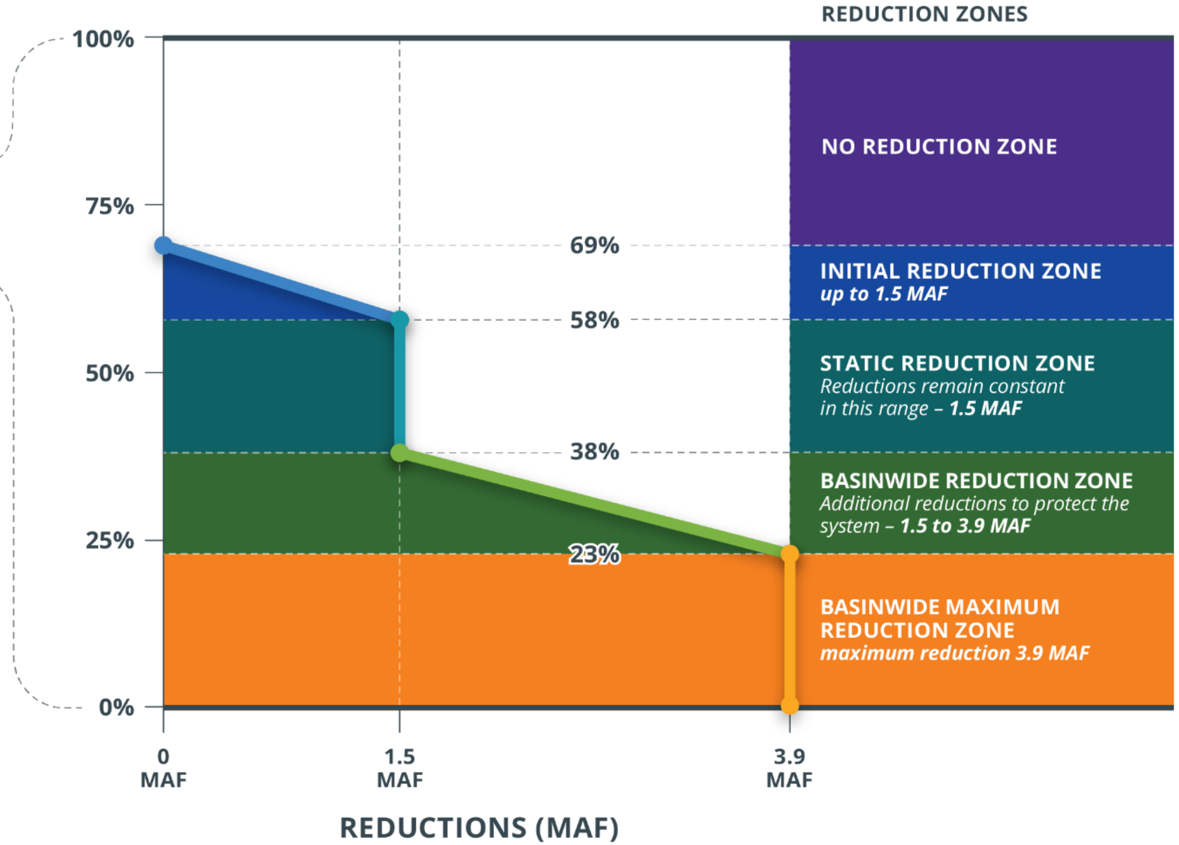
MAXIMUM SYSTEM CONTENTS

System contents are based on the volume in each reservoir that is available for release, in millions of acre-feet (MAF)

REDUCTION DETERMINATION

Reductions are based on the available system contents, based on the function below





Reduction Sharing among Basin States and Mexico

	Total Reduction Volumes	Upper Basin	Arizona	California	Nevada	Mexico*
Initial Reduction Zone	Up to 300 KAF	0	80% (Up to 240 KAF)	0	3.33% (Up to 10 KAF)	16.67% (Up to 50 KAF)
	300 KAF – 1.5 MAF	0	43.33% (240 KAF – 760 KAF)	36.67% (0 KAF – 440 KAF)	3.33% (10 KAF – 50 KAF)	16.67% (50 KAF – 250 KAF)
Static Reduction Zone	1.5 MAF	0	760 KAF	440 KAF	50 KAF	250 KAF
Basin-wide Reduction Zone	1.5 – 3.9 MAF	**Shared among Upper Division states, Lower Division States and Mexico**				
Basin-wide Maximum Reduction Zone	3.9 MAF					

Reductions to Mexico will be determined in a separate binational process

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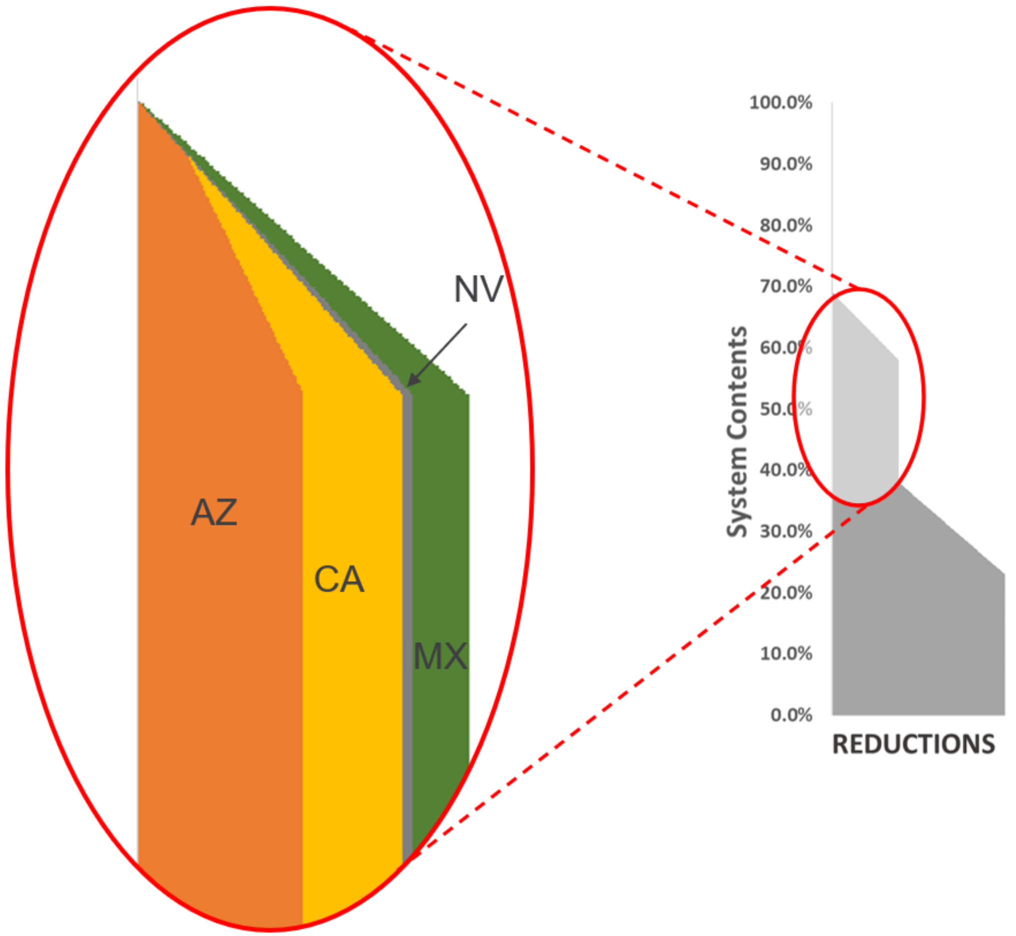
Reduction Sharing among Basin States and Mexico



- Reductions proposed under the LDS would reduce AZ's delivery to 2.04 MAF, CA's to 3.96 MAF, and NV to 250 KAF
- Reduction curve inflection points were developed under a rigorous, iterative analysis in CRSS to provide for the sustainable management of the Colorado River system and its resources under a wide range of potential future system conditions due to a changing climate

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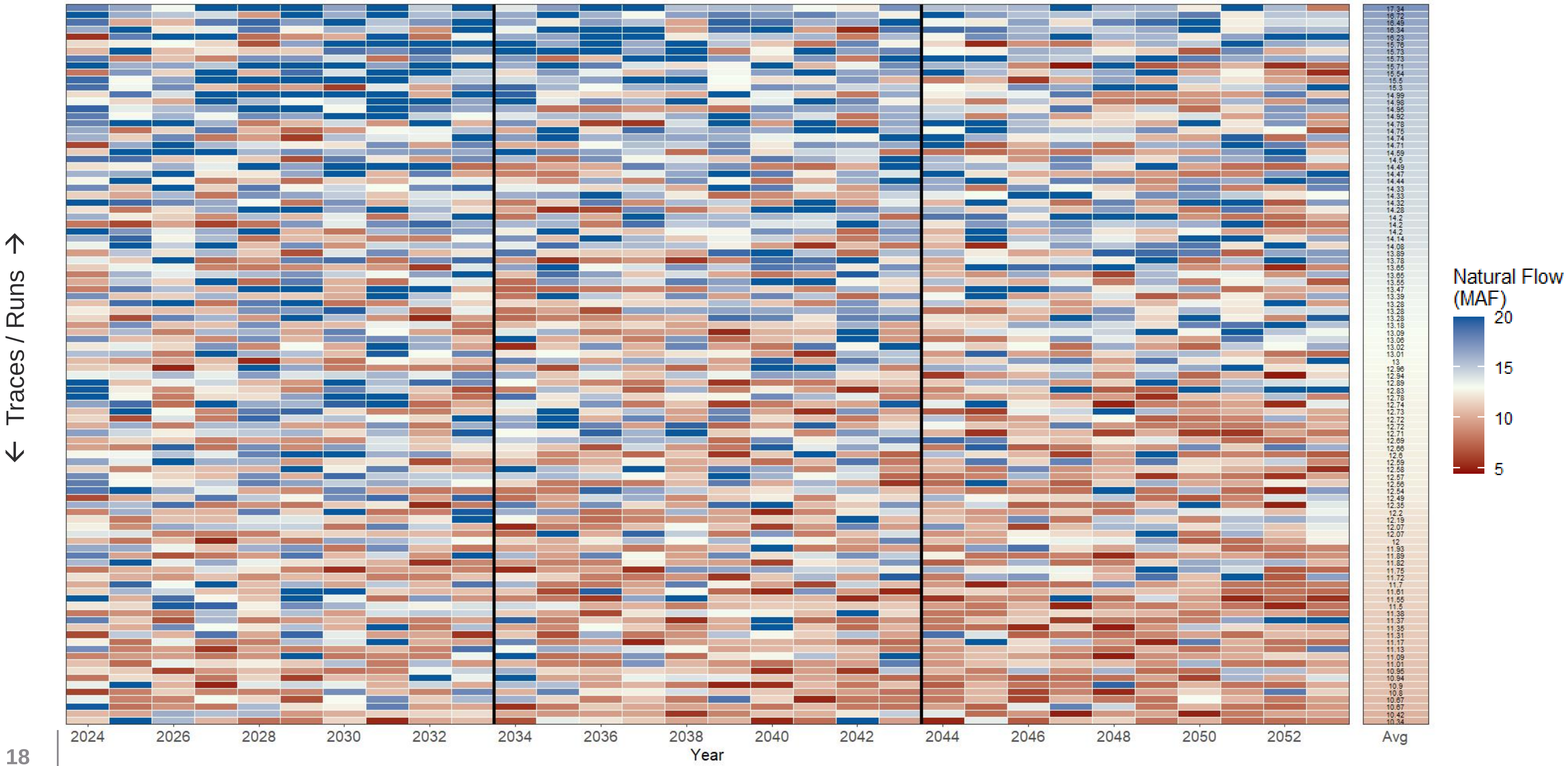
Analysis of Reductions

- CRSS simulations over a 30-year period

- Hydrology input is BOR-selected 400 traces of potential future conditions in the Colorado River Basin

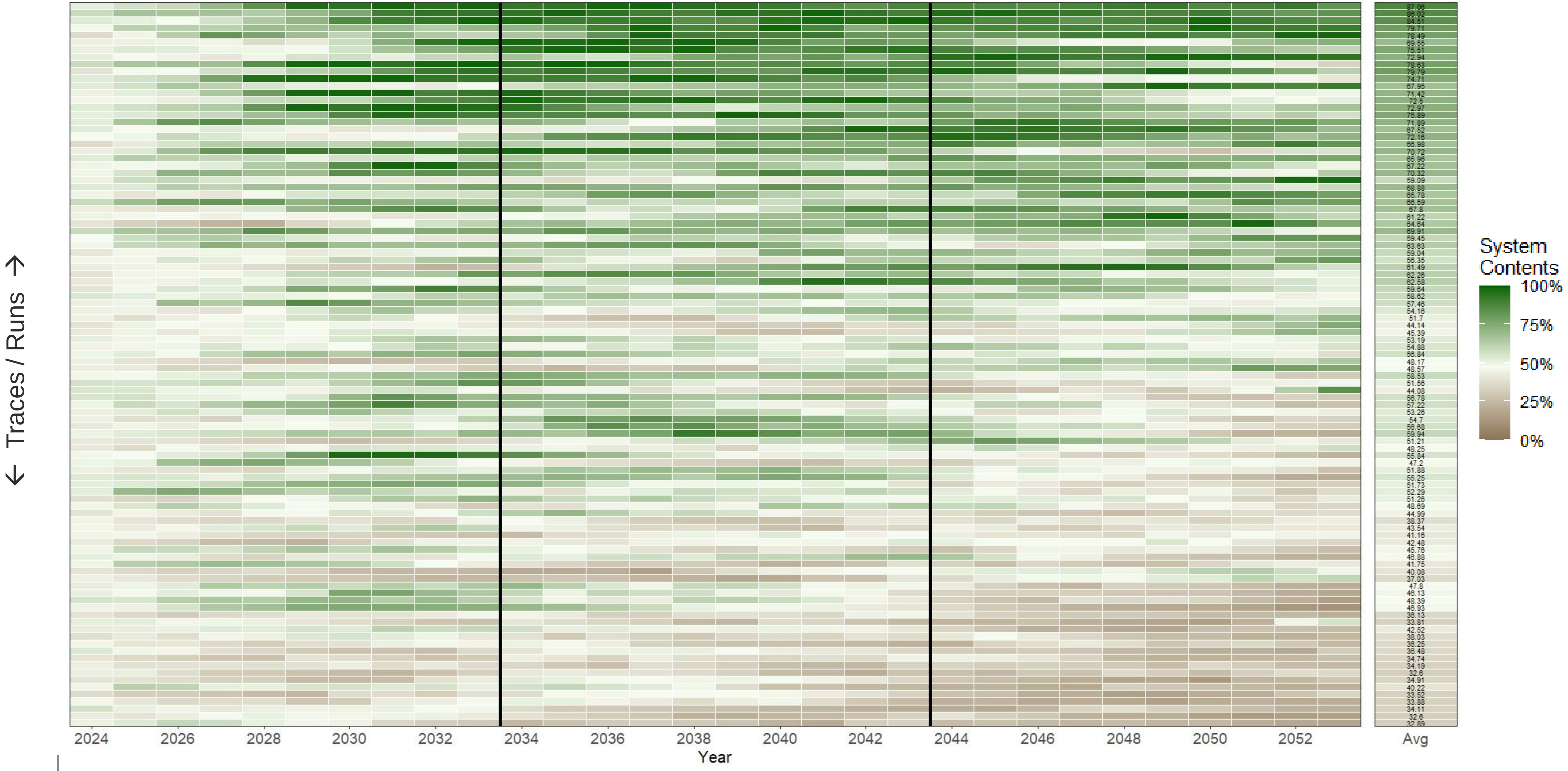
- Additional analysis and visualization helps with understanding variability within each hydrology, including extended, subsequent dry periods and interactions between hydrology, system contents, and subsequently reductions
    - Frequency, magnitude, and duration

Input Hydrology* (Traces sorted by Average Natural Flow)



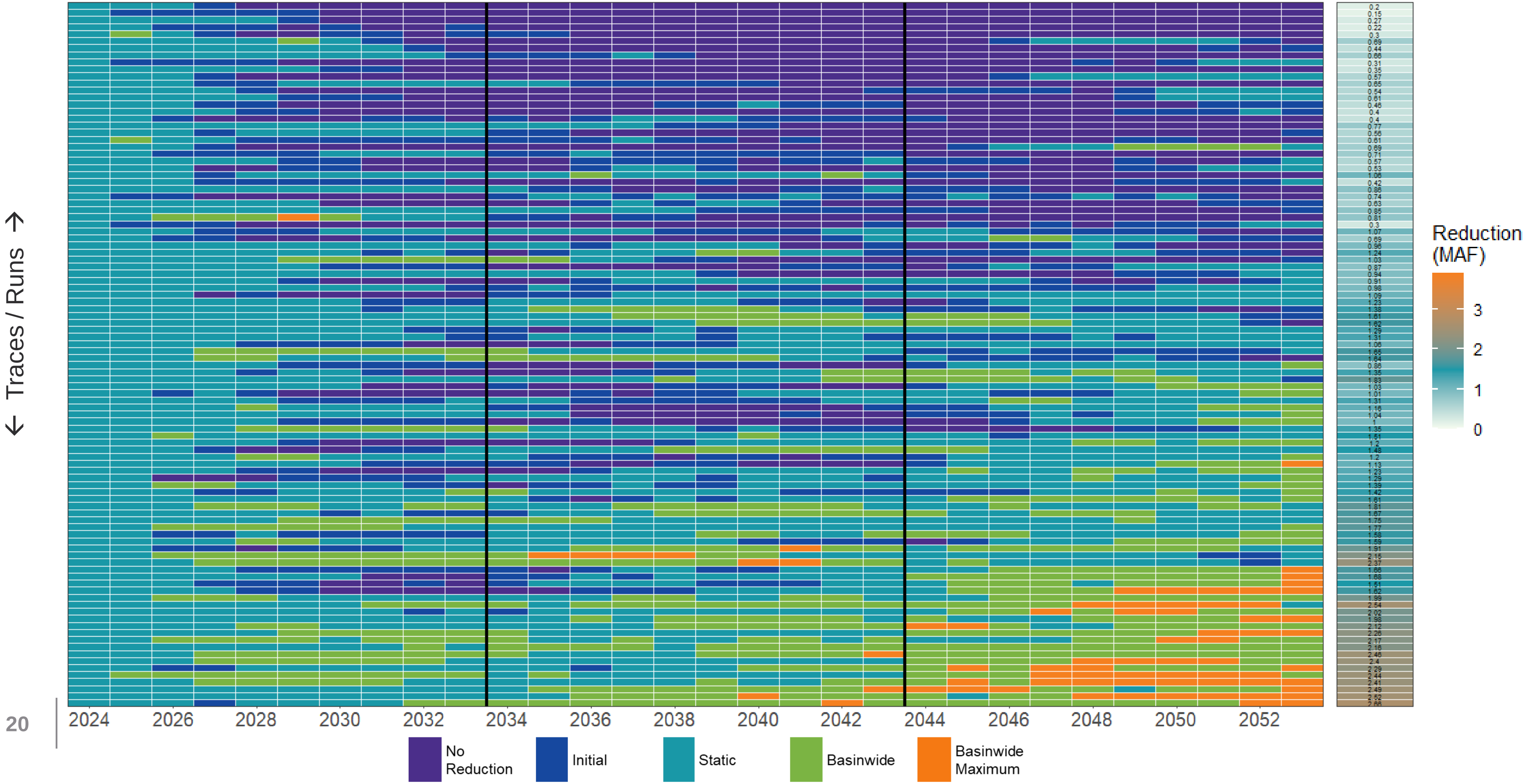
* Post-Pluvial NPC Temperature-Adjusted

Total System Contents (Traces sorted by Avg Natural Flow)



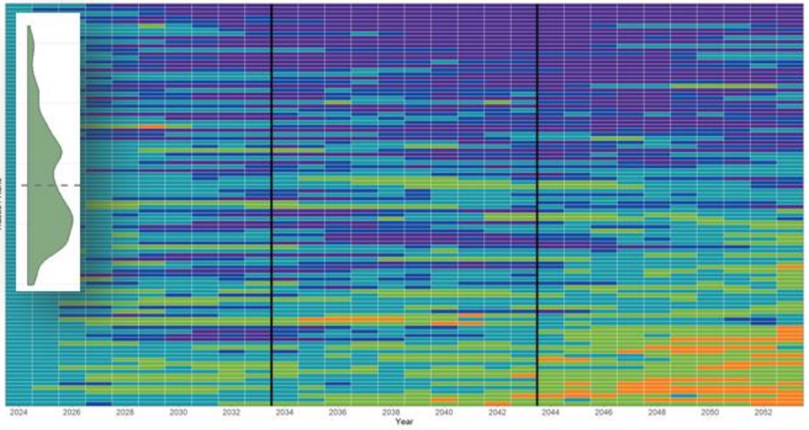
Lower Basin Reduction Zones

(Traces sorted by Average Natural Flow)

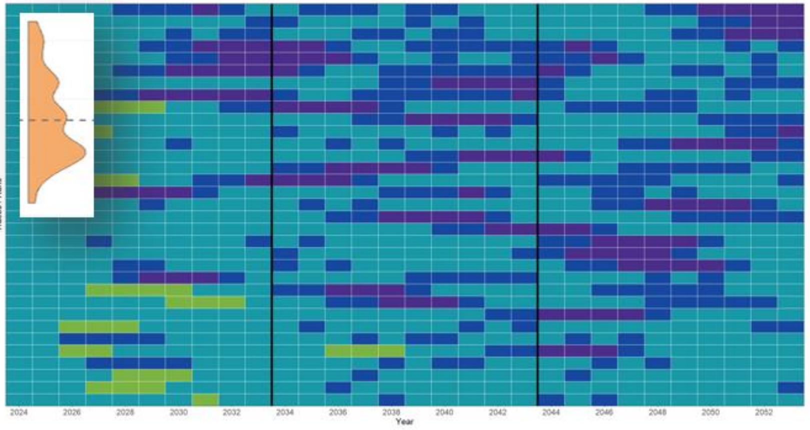


Reduction Zone Maps by Hydrology

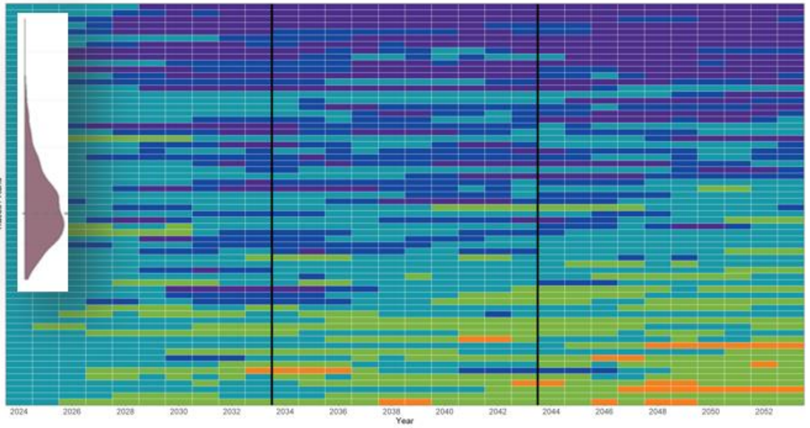
Post-Pluvial NPC Temperature-Adjusted



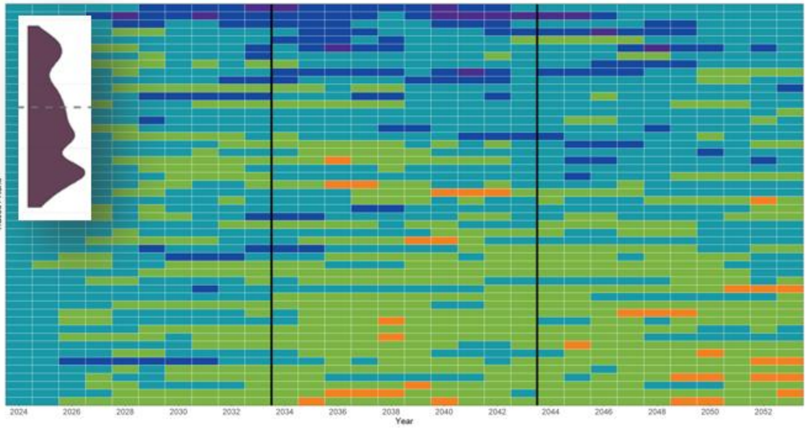
Stress Test



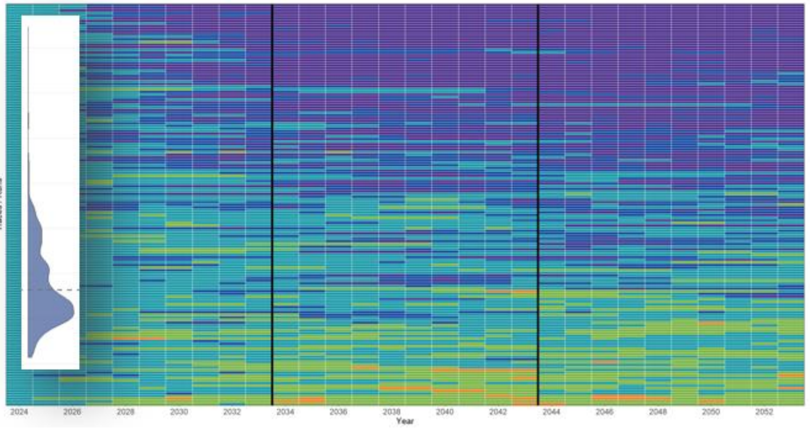
CMIP5 LOCA KNN



Paleo Drought Resampled Subsample



CMIP3 BCSD NPC Subsample



No Reduction
Initial
Static
Basinwide
Basinwide Maximum

Thank you!

For additional information and updates, visit: www.cap-az.com

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