



# **Annual Water Users Meeting**

## **August 24, 2022: 9 – 11am**

**YOUR WATER. YOUR FUTURE.**

# AGENDA

1. Welcome
2. Basin States Discussions and Reclamation Plan for 2023 Protection Volumes
3. 2023 Colorado River Update – August 24-month Study
4. Outlook for the 2023 CAP Delivery Supply
5. 2023 CAP Shortage Impacts and Mitigation
6. 2023 Protection Volume Within the CAP Service Area

— **BREAK** —

7. 2023 CAP Energy Outlook
8. Water Quality/Biology Report and Plans
9. 2023 Capital Improvement Program Update
10. 2023 Maintenance Operations
11. Discussion
12. Closing



Send Your Question To:  
[\*\*questions@cap-az.com\*\*](mailto:questions@cap-az.com)



# Basin States Discussions Update

Patrick Dent,  
Assistant General Manager, Water Policy  
August 24, 2022

**YOUR WATER. YOUR FUTURE.**

# Basin States Discussion Update

- The Basin States have not yet developed a consensus approach to implementing the Protection Volumes the Commissioner identified in June 2022 (2-4 MAF/year above Tier Reductions).
- While Reclamation set a deadline of the August 24-month study to develop a plan or implement actions prescribed by the Secretary, no direct water reductions beyond those identified in the 2007 Interim Guidelines, DCP and Minute 323 were specified last week.
- Reclamation did announce they will continue to
  - Explore their Authorities to implement Protection Volumes
  - Engage with the Basin States to identify voluntary actions in 2023
  - Initiate conversations with Mexico

# Basin States Discussion Update

- Discussions among the Basin States and the United States have only led to a framework relying entirely on short-term voluntary contributions for 2023, that fall far short of the water volumes needed to protect the system.
- Arizona asserted that it is unacceptable to continue to carry a disproportionate burden of the Protection Volume Reduction reductions for the benefit of others who have not contributed.
- Achieving volumes at this magnitude will take significant contributions by all water users in the Colorado River Basin.
- Arizona is committed to work towards a comprehensive plan that assures protection of the system through equitable contributions from all water users.

# 8/16 Reclamation Announcements for Upper Basin

- Take administrative actions needed to authorize a reduction of Glen Canyon Dam releases below 7 MAF if needed to protect critical infrastructure at Glen Canyon Dam
- Accelerate ongoing maintenance actions and studies to determine and enhance projected reliability
- Support technical studies to ascertain if physical modifications can be made to Glen Canyon Dam
- Continue work to implement additional substantial releases from Upper Basin reservoirs
- Invest in system conservation and voluntary agreements
- Consider other operational actions to establish flexibility in Upper Basin Operations

# 8/16 Reclamation Announcements for Lower Basin

- Take administrative actions to further define reservoir operations and Lake Mead including shortage operations below 1025 feet
- Prioritize and prepare for additional administrative initiatives that would ensure maximum efficient and beneficial use of urban and agricultural water, and address evaporation, seepage and other system losses in the Lower Basin
- Support technical studies to ascertain if physical modifications can be made to Hoover Dam to allow water to be released below Deadpool elevations
- Invest in system conservation and voluntary agreements
- Consider other operational actions to establish flexibility in Lower Basin Operations at Reclamation facilities

# 2023 Colorado River Operations

- Lake Powell will operate in the Lower elevation balancing tier in 2023
- Lake Mead will operate in its first-ever Tier 2 a shortage condition in 2023.
- 2023 Lower Colorado River water supply determination is a Tier 2(a)
- Arizona DCP mitigation agreement will be in effect (NIA Pool to 75%)
- 500+ Plan will continue



# Colorado River Water Supply Report August 2022

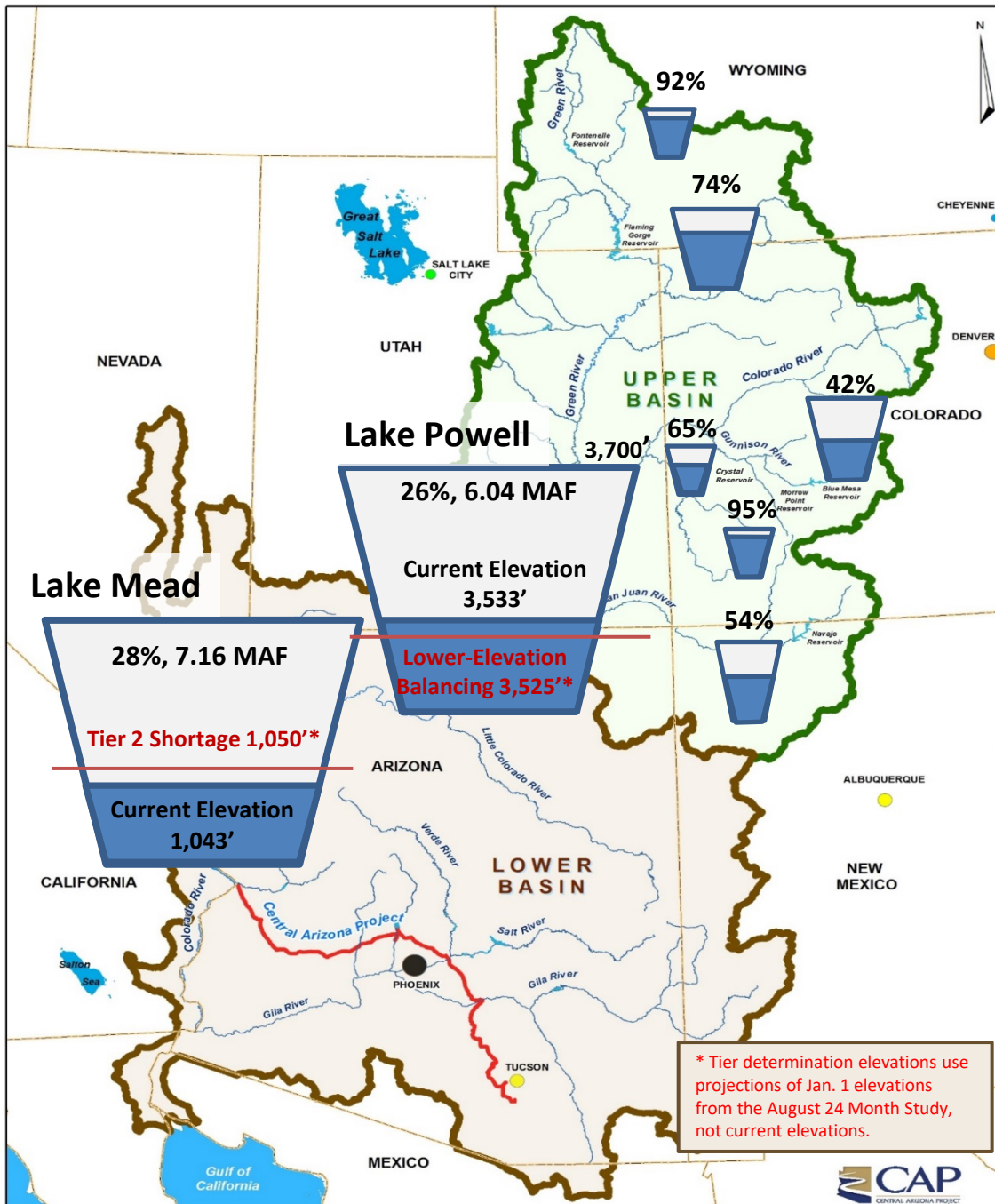
Vineetha Kartha  
*Colorado River Programs Manager*

# Colorado River Water Supply Report

System Contents: 17.67 MAF

As of August 18, 2022

Last Year System Contents: 21.43 MAF



Reservoir Capacities (MAF)

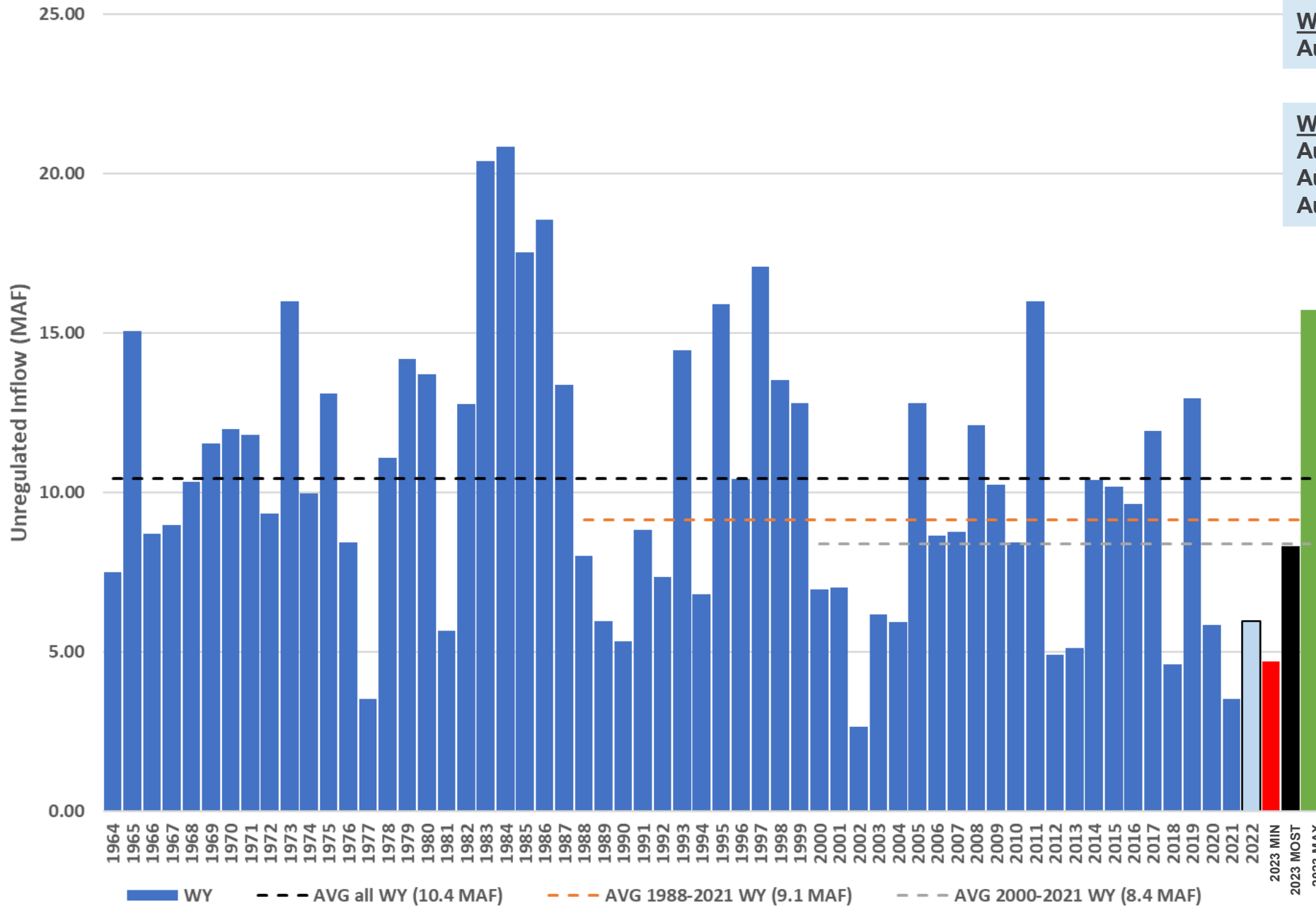
Reservoir	Current	Change*	Maximum
Lake Mead	7.16	+0.13	25.90
Lake Powell**	6.04	-0.20	23.31
Flaming Gorge Reservoir	2.76	-0.03	3.75
Fontenelle Reservoir	0.32	-0.01	0.34
Navajo Reservoir	0.91	+0.01	1.70
Blue Mesa Reservoir	0.35	-0.02	0.83
Morrow Point Reservoir	0.11	0.00	0.12
Crystal Reservoir	0.02	0.00	0.03

\* With respect to previous month's report



YOUR WATER. YOUR FUTURE.

# Unregulated Inflow to Lake Powell by Water Year (1964-2021)



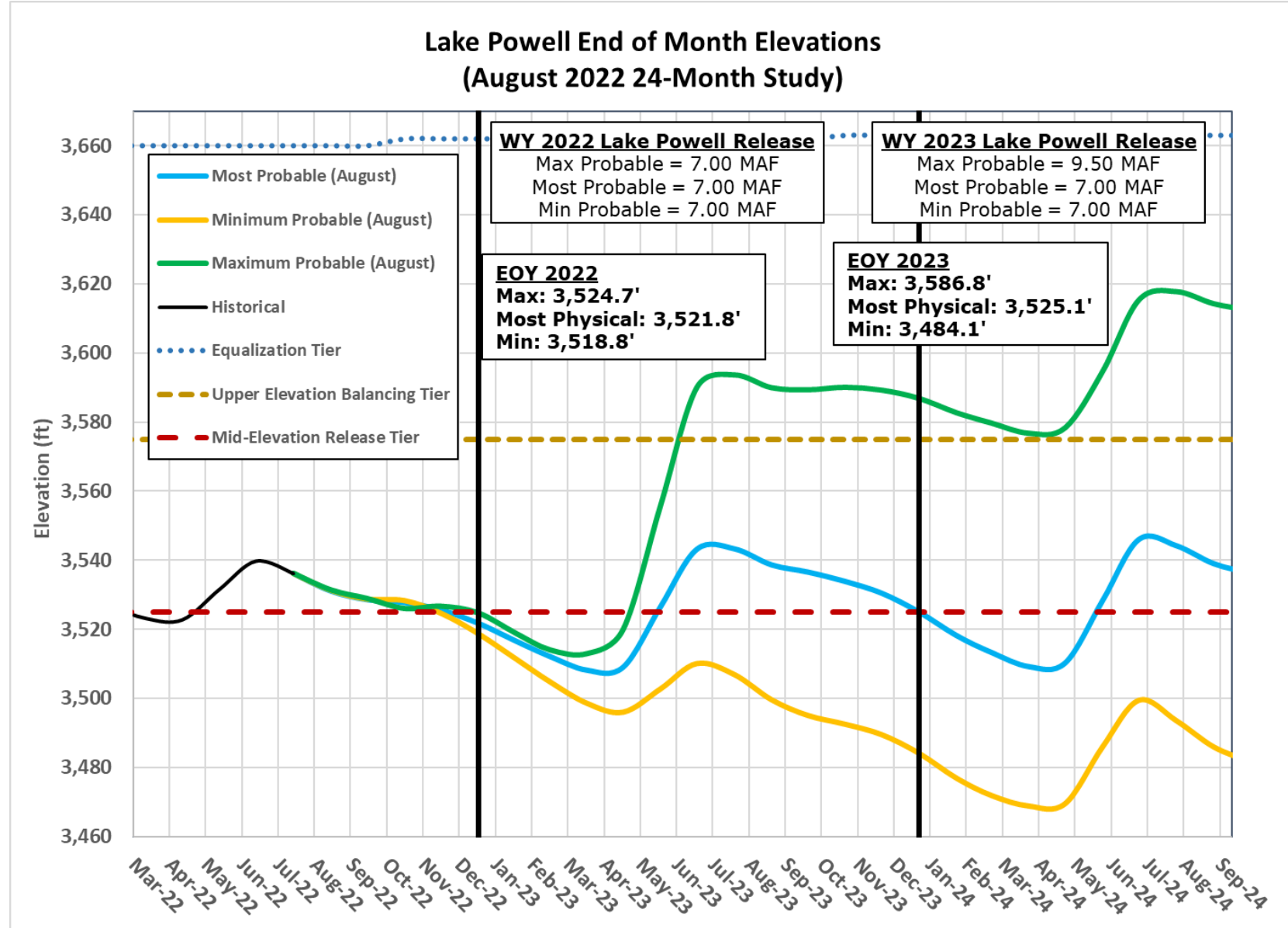
**Water Year 2022 Forecast**  
 Aug Most Prob = 5.96 MAF (62%)

**Water Year 2023 Forecast**  
 Aug Min Prob = 4.7 MAF (49%)  
 Aug Most Prob = 8.30 MAF (87%)  
 Aug Max Prob = 15.70 MAF (157%)



# Lake Powell August 2022 24-Month Study

- Results determine 2023 reservoir operations
- Lake Powell deliveries
  - 2022 – 7.0 MAF includes DROA
  - 2023 – 7.0 MAF with balancing releases considered in April 2023



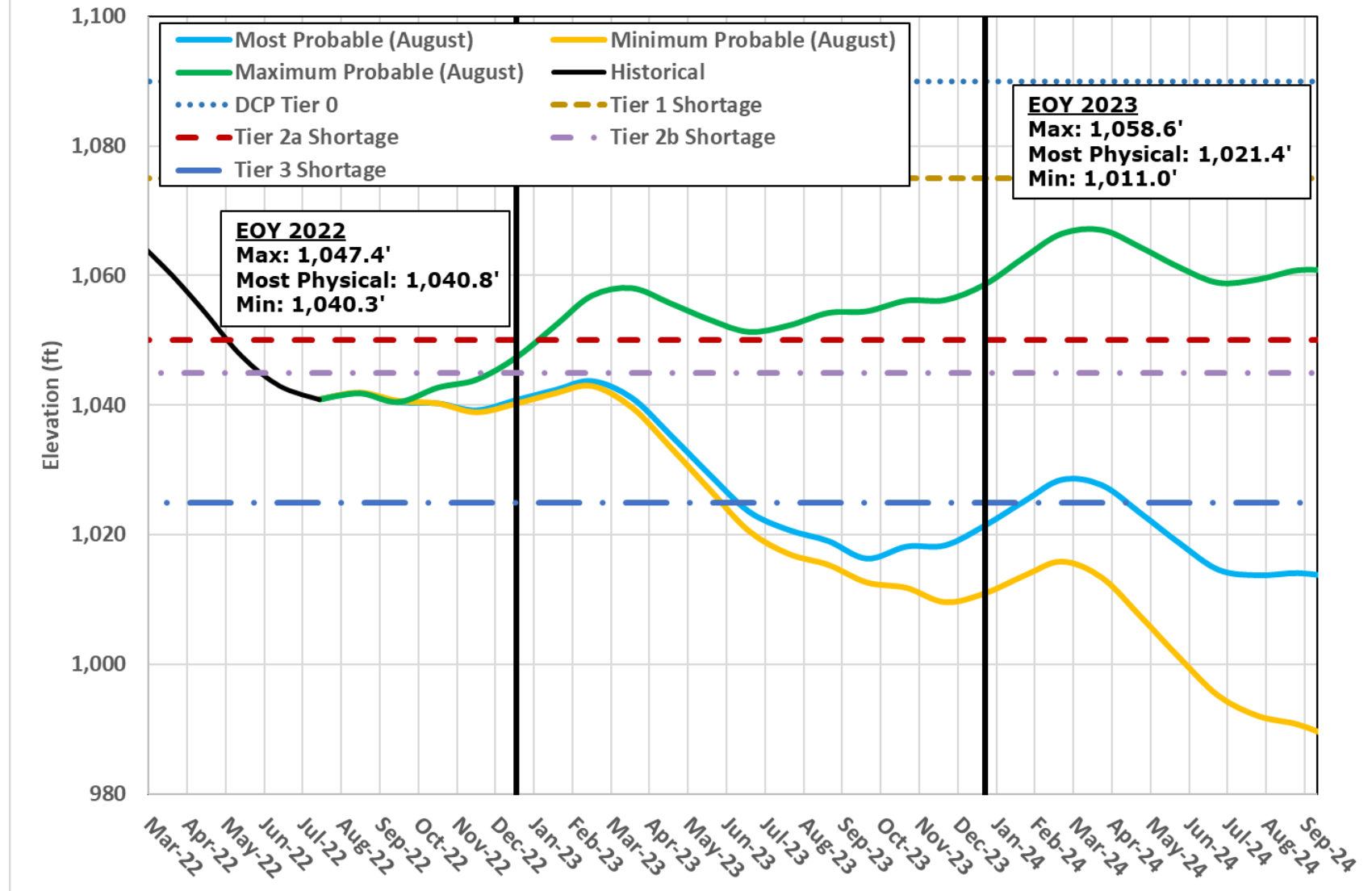
# WY 2023 Lake Powell Operations

- Glen Canyon Dam annual release set to 7.00 maf
- In April 2023 – Reclamation will evaluate hydrologic conditions to determine if balancing releases may be appropriate under the conditions established in the 2007 Interim Guidelines
- Balancing releases will be limited with a minimum of 7.00 maf to protect Lake Powell from declining below 3,525 feet at the end of Dec 2023
- Balancing releases will take into account operational neutrality of 480 kaf retained in Powell
- Modeling approach for WY 2023 will apply to 2024

# Lake Mead August 2022 24-Month Study

- Lake Mead will operate in Tier 2a Shortage condition in 2023 based on 'effective' elevation 1,047.6'
- Arizona will reduce its Colorado River water use by 592 KAF

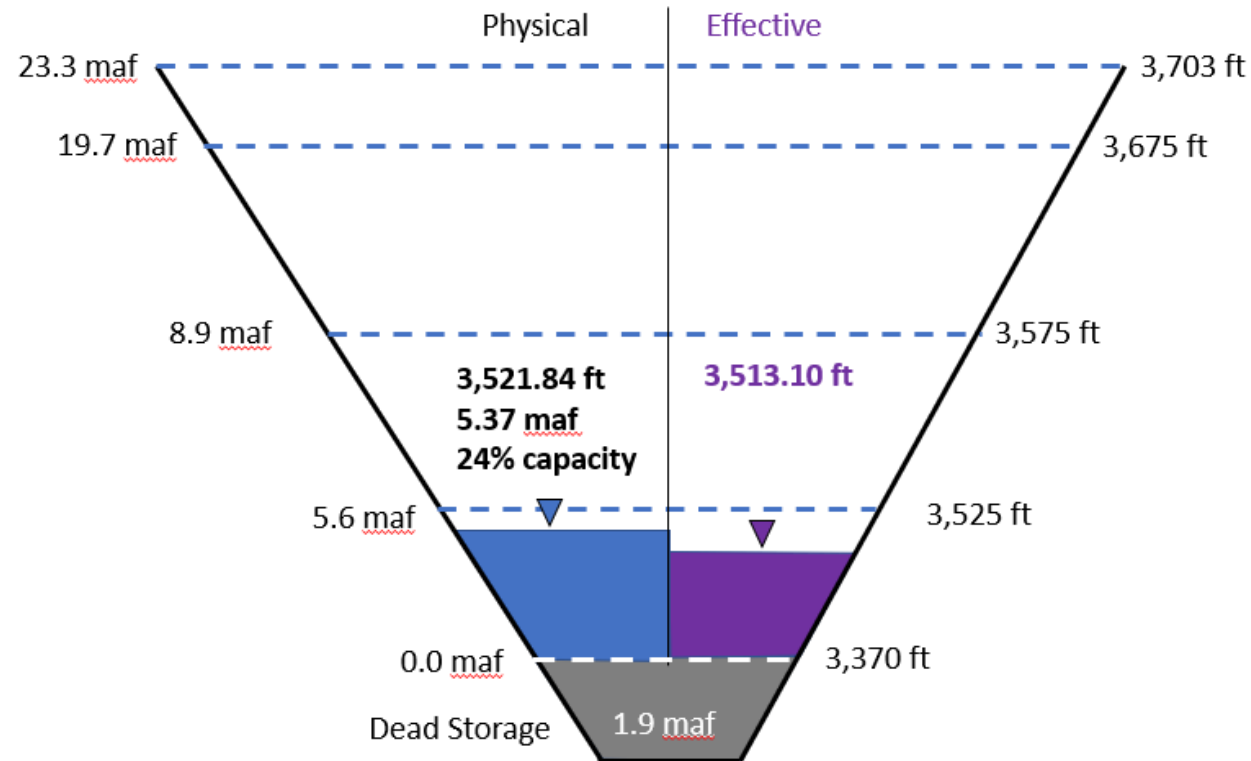
Lake Mead End of Month Elevations  
(August 2022 24-Month Study)



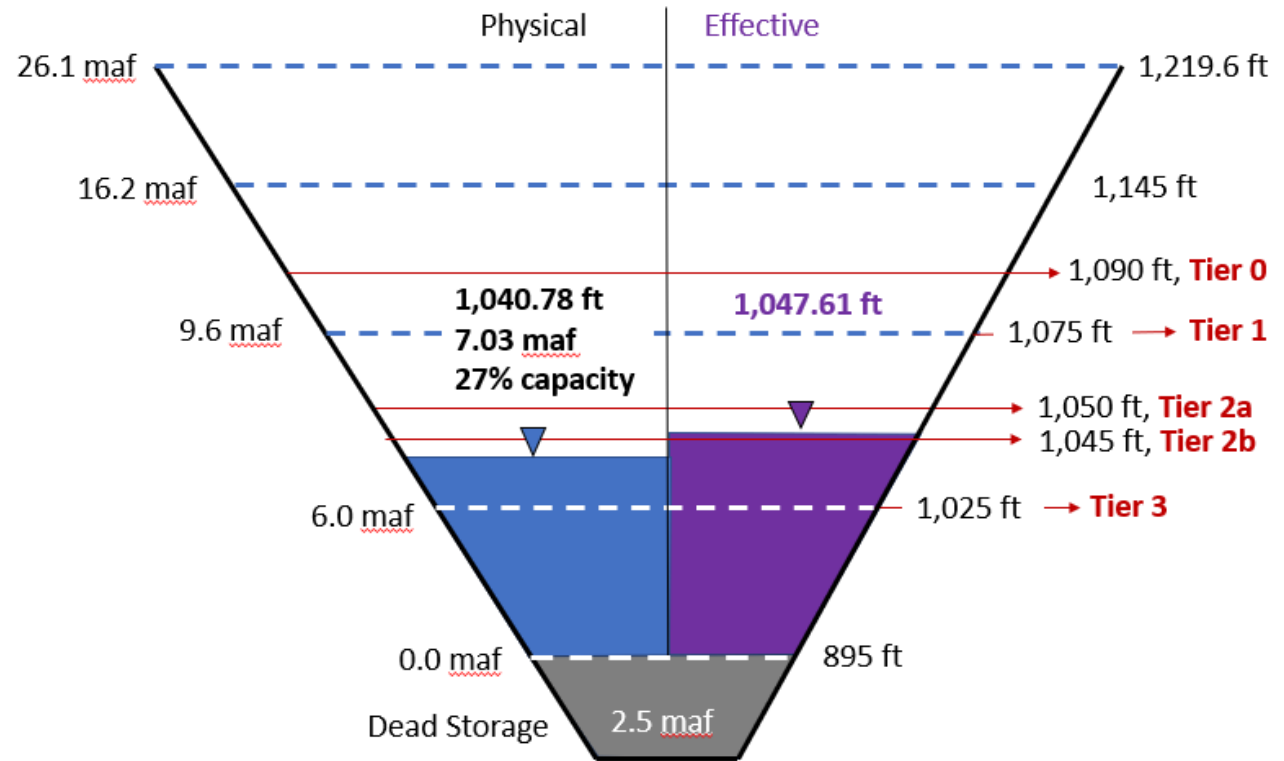
# End of Calendar Year 2022 Projections

## August 2022 24-Month Study Most Probable Inflow Scenario

### Lake Powell



### Lake Mead



# 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
Tier zero → 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
2023 Reductions+ Contributions → 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

← 2023 Reductions+ Contributions

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.





Arizona Lake Mead Contribution Volumes DCP Implementation & Related Actions		ICS <sup>1</sup>	2019 <sup>2</sup> (ac-ft)	2020 <sup>3</sup> Tier 0 (ac-ft)	2021 Tier 0 (ac-ft)	2022 <sup>4,5</sup> Tier 1 (ac-ft)
Arizona LBDCP (Tier 0 and 1: 192k ac-ft)	CAWCD EC ICS Creation	EC ICS	24,283	44,310 <sup>6</sup>		
	CAWCD Compensated Conservation	EC ICS		3,124 <sup>6,7</sup>		
	CAWCD DCP ICS Creation	DCP ICS			48,296	103,165
	CAWCD Reductions <sup>8</sup>		119,942	133,174	155,096	88,835
	<b>LBDCP Total</b>		<b>144,225</b>	<b>180,608</b>	<b>203,392</b>	<b>192,000</b>
CAWCD Voluntary Conservation	CAWCD EC ICS Creation	EC ICS			6,147	
	CAWCD Sub-Contractor Conservation					35,506
	<b>CAWCD Total</b>				<b>209,539</b>	<b>227,506</b>
Arizona DCP Mitigation Offset (400k ac-ft total)	GRIC - Reclamation	EC ICS	100,000			
	GRIC - AWBA	EC ICS	17,000	33,000		
	GRIC	EC ICS		50,000	40,000	
	CRIT System Conservation			50,000	50,000	50,000
	<b>Offset Total</b>		<b>117,000</b>	<b>133,000</b>	<b>90,000</b>	<b>50,000</b>
Reclamation DCP	FMYN System Conservation			10,000	13,933	13,933
	MVIDD System Conservation			6,137	6,925	
	GRIC System Conservation				40,000	50,937
	CRIT System Conservation				4,685	4,685
	242 Wellfield Expansion				8,813	25,000
	<b>Reclamation Total</b>		<b>0</b>	<b>16,137</b>	<b>74,356</b>	<b>94,555</b>
Additional Arizona ICS and System Conservation Creation	CRIT	EC ICS	6,274	3,736		
	GRIC <sup>9</sup>	EC ICS				78,565
	MVIDD System Conservation					9,592
	YMIDD System Conservation					8,544
	<b>Additional ICS Total</b>		<b>6,274</b>	<b>3,736</b>	<b>0</b>	<b>96,701</b>
Pilot System Conservation Program (PSCP)	Bullhead City		306	349	369	500
	CRIT		26,805			
	FMYN		13,683			
	<b>PSCP Total</b>		<b>40,794</b>	<b>349</b>	<b>369</b>	<b>500</b>
<b>Total Arizona Lake Mead Contributions</b>			<b>308,293</b>	<b>333,830</b>	<b>374,264</b>	<b>469,262</b>

Notes:

1. ICS Volumes reflect creation volumes contributed to Lake Mead and do not reflect account balances after losses and assessments.

2. 2019 reflects proactive actions prior to DCP execution and full implementation in 2020.

3. 2020 reflects the first full year of DCP implementation of Lake Mead contributions and related actions.

4. Values reflect estimated volumes, subject to final accounting.

5. Includes pending and projected projects and subject to creation and accumulation limits.

6. Actual Jan. 1 Lake Mead elevation was above 1,090'; therefore this ICS will remain as EC ICS (LBOps III.E.3).

7. 3,500 AF was conserved per the agreement between CAWCD and MDWID; per history of use provisions in ICS Exhibit R, 3,124 AF counts as ICS creation.

8. Volume will vary based on available Colorado River water, on-river use forecast, and CAP operations.

9. GRIC to fully utilize the Arizona ICS Accumulation Capacity in 2022.



YOUR WATER. YOUR FUTURE.

# Additional Water Modeled Under 500 Plus Plan (as modeled in the August 2022 Most Probable 24-Month Study)

Conservation Activity (volumes in AF)	2021	2022 (Projected)	2023 (Projected)
CAP ICS delivery offset	6,147	19,604	-18,400
GRIC System Conservation	40,000	50,937	0
GRIC ICS creation	0	78,565	0
CRIT System Conservation (in lieu of ICS)	4,685	4,685	0
CAWCD System Conservation	0	35,506	0
YMIDD System Conservation	0	8,544	13,670
MVIDD System Conservation	0	9,592	9,592
MWD ICS delivery offset and/or creation	58,134	-4,578	-161,978
PVID System Conservation	12,305	50,800	58,000
SNWA ICS creation	12,832	15,000	15,000
<b>Annual Total (Non-Shortage/DCP)</b>	<b>134,103</b>	<b>268,655</b>	<b>-84,116</b>
<b>Cumulative Total</b>	<b>134,103</b>	<b>402,758</b>	<b>318,642</b>

- 2022 and 2023 volumes reflect executed agreements and/or current operational projections and are subject to change.
- Additional conservation activities are being considered. After new agreements are finalized and executed, these additional activities will be included in Reclamation's operational modeling.





# Outlook for the 2023 CAP Delivery Supply

Don Crandall, P.E.  
*Water Control Manager*

**YOUR WATER. YOUR FUTURE.**

# CAP Annual Operating Plan Timeline

CAP Rate Letter Schedule Request	Jun 30, 2021
August 24 Month Study	Aug, 16 2022
<b>Annual Water Users Briefing</b>	<b>Aug 24, 2022</b>
Water Delivery Requests	Oct 1, 2022
Final Water Schedules	Nov 15, 2022

# CAP Delivery Supply Outlook Current Assumptions

2023 Tier 2a Shortage Condition

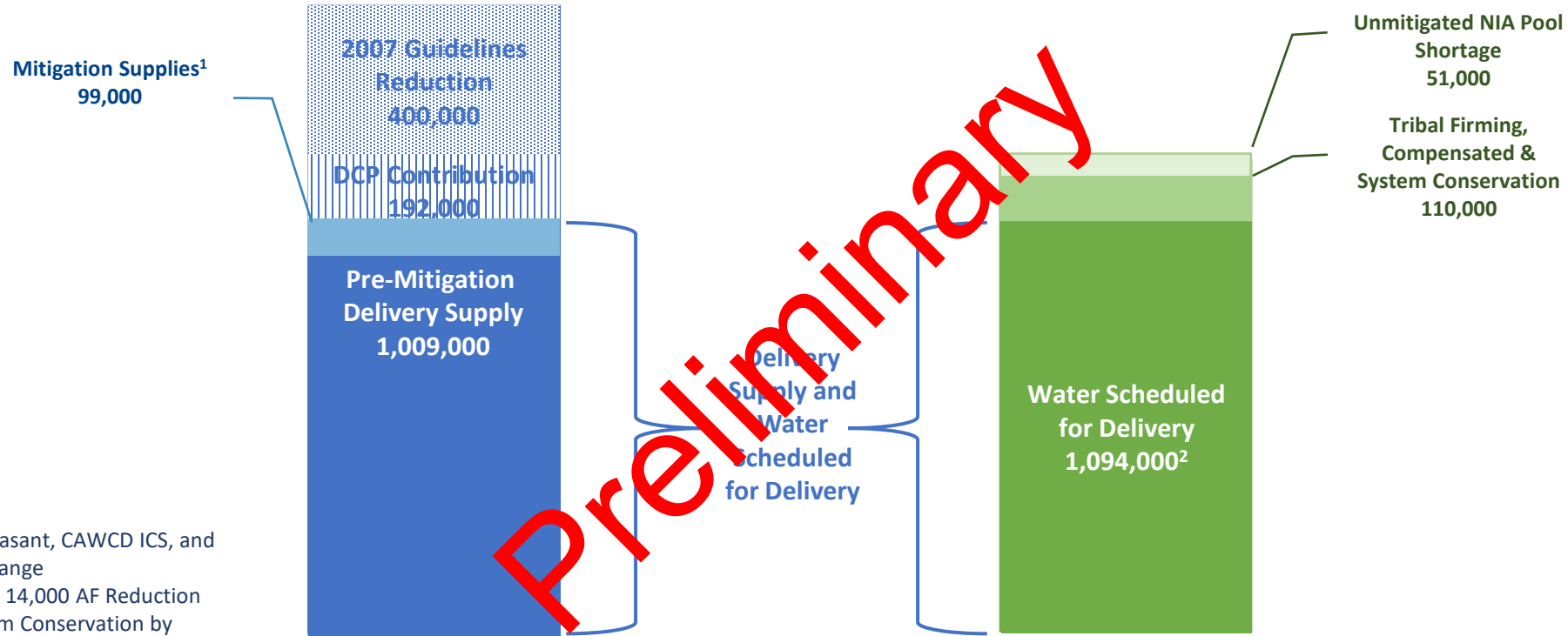
1,676,000 AF Colorado River Supply Normal Year (TBD)

“Available CAP Supply” determination by Reclamation

Mitigation per DCP Agreements

10,000 AF SRP DCP Exchange

# Outlook for the 2023 CAP Delivery Supply

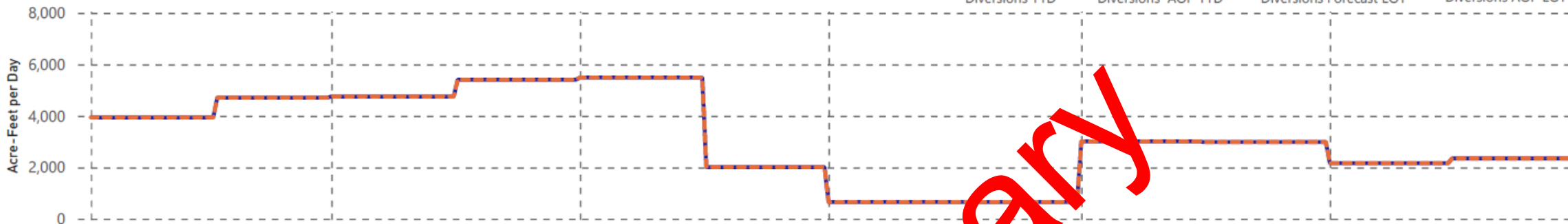


Preliminary

<sup>1</sup>Lake Pleasant, CAWCD ICS, and SRP Exchange  
<sup>2</sup>Includes 14,000 AF Reduction for System Conservation by FMYN

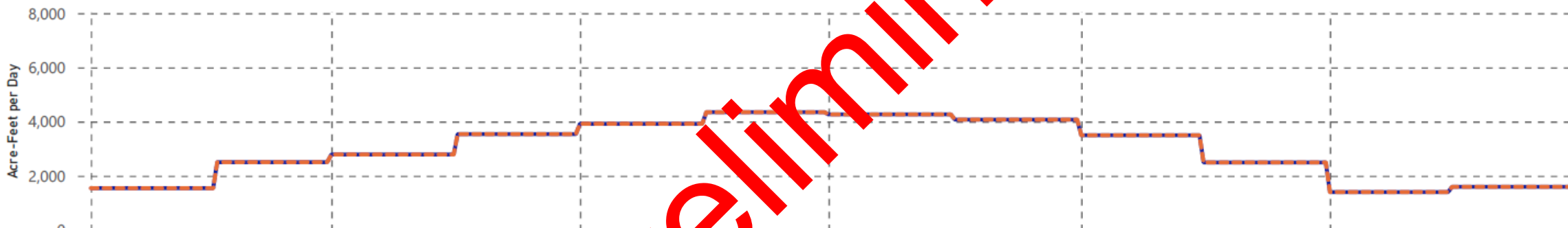
### CAP DIVERSIONS

Actual Diversion AOP Diversion Forecast Diversion



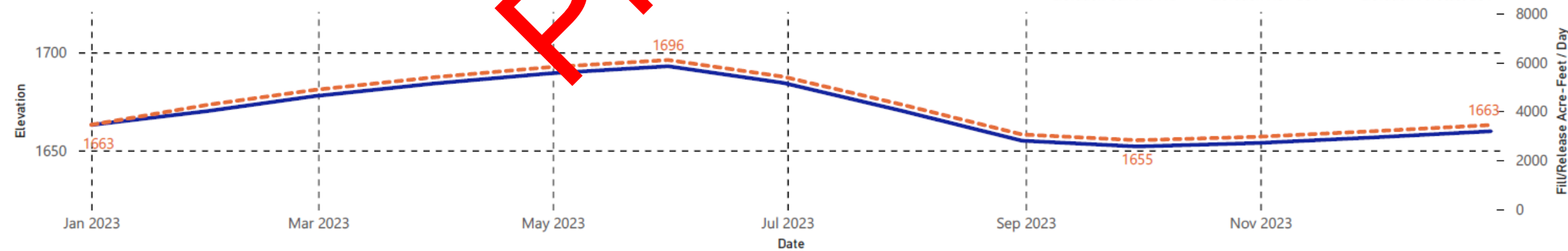
### CAP DELIVERIES

Actual Deliveries AOP Deliveries Forecast Deliveries



### LAKE PLEASANT OPERATIONS

Planned Elevation Forecast Elevation Actual Elevation WAD Fill WAD Release



Preliminary

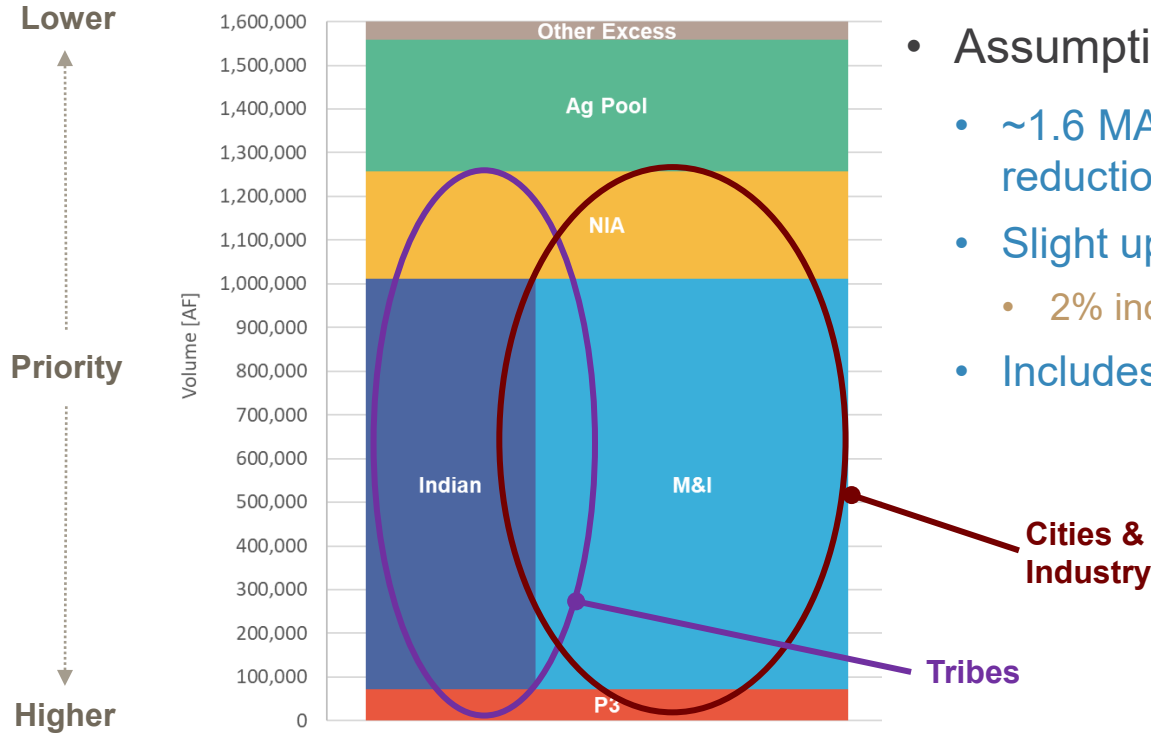


**KNOW YOUR WATER**

**Questions?**



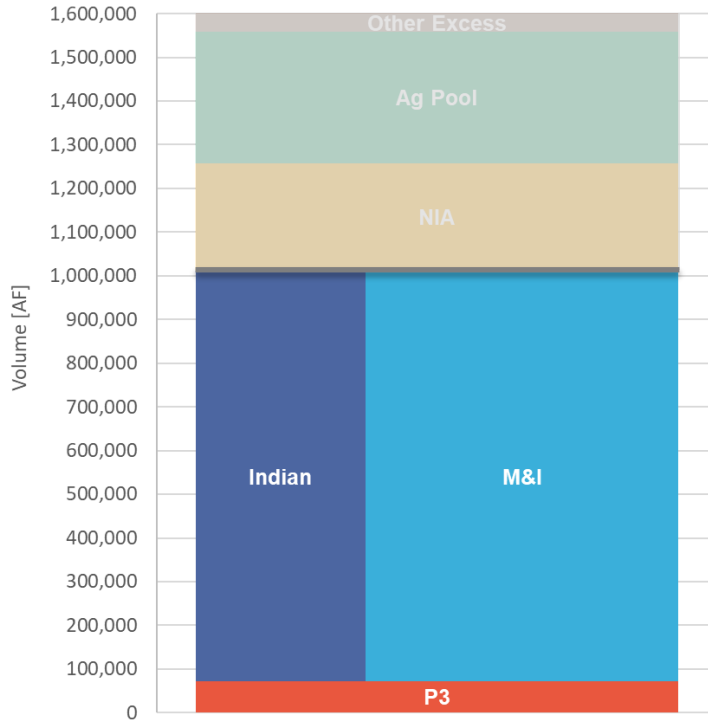
# CAP Priorities – Full Supply



- Assumptions for 2023:

- ~1.6 MAF of delivery supply prior to reductions (2007 guidelines and LBDCP)
- Slight uptick in orders compared to 2022
  - 2% increase in M&I orders
- Includes NIA Reallocation parties

# 2023 Pre-Mitigation Shortage Impact



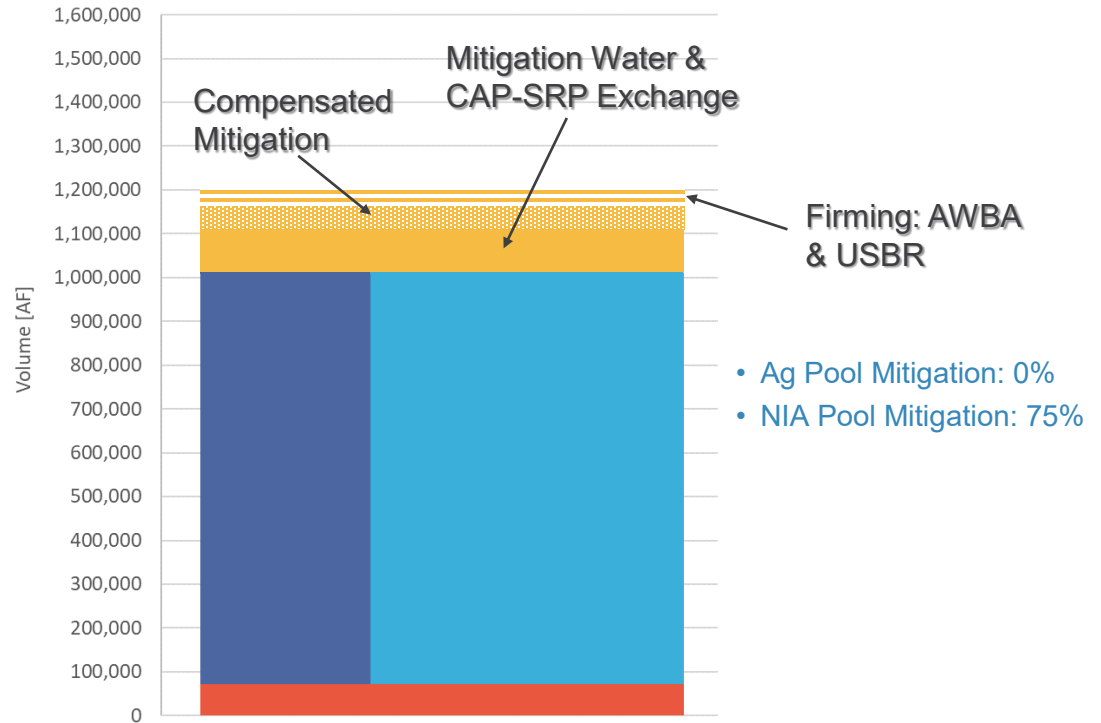
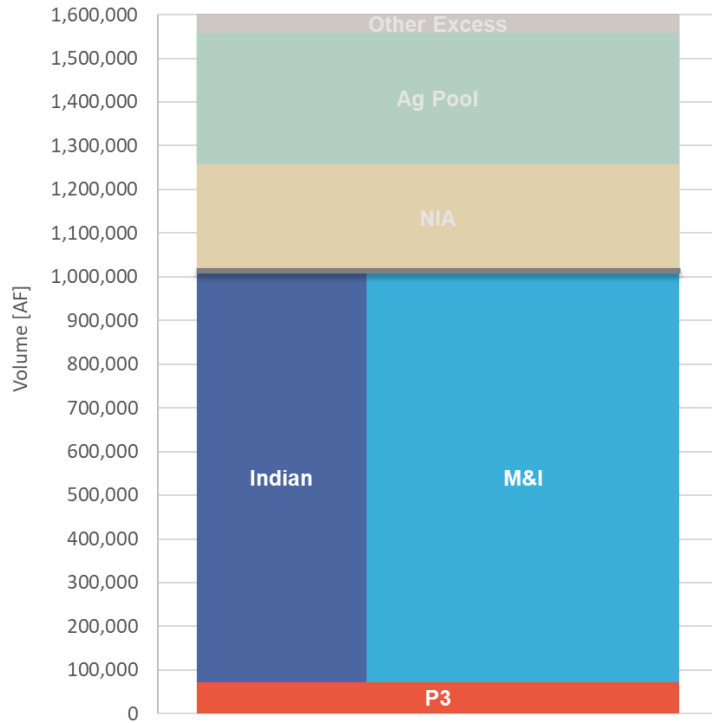
- Current projections indicate the likelihood of Tier 2a in 2023
  - 1050' <= Mead Elevation > 1045'
- Tier 2a shortage volume = 592 KAF
  - 400 KAF per 2007 Guidelines
  - 192 KAF per LBDCP
    - +80 KAF compared to 2022 (Tier 1)
- Pre-mitigation pool level impacts:
  - 100% reduction to Ag Pool
  - 100% reduction to NIA Pool
  - No reduction to Indian and M&I Pools

# AZDCP Mitigation Commitments - 2023

	2020	2021	2022	2023	2024	2025	2026	
Ag Pool Parties	105 KAF - Tier 1 70 KAF - Tiers 2a/2b	105 KAF - Tier 1 70 KAF - Tiers 2a/2b	105 KAF - Tier 1 70 KAF - Tiers 2a/2b GW 16.5K	No CAP Wet Water Mitigation				
				Groundwater Infrastructure Program 70 KAF / Yr				
NIA Contractors & Subcontractors	100% Tiers 1/2a/2b	100% Tiers 1/2a/2b		75%* - Tiers 1/2a 50%* - Tier 2b			No Mitigation 2026 or Tier 3	

**Mitigation Resources:** Credits, Wet Water and Money

# 2023 – Tier 2a Shortage w/ Mitigation





# 2023 CAP Energy Outlook

**Brian Young, *Manager, Power Programs***  
*August 24, 2022*

YOUR WATER. YOUR FUTURE.

# 2023 Market Energy Prices Escalating

- Natural Gas Prices Skyrocket:
  - >\$7.5/MMBtu in 2023 (~ triple 2020 prices)
  - Ukraine Invasion and U.S> LNG Exports
- Off-Peak Energy Prices, Largely Follow Natural Gas:
  - 2023 Forward Off-Peak >\$75/MWh;
  - About Triple 2020 prices



# 2023 CAP Energy Costs Increasing

*Projected 2023 CAP Energy Cost = \$43/MWh  
vs. \$30/MWh in 2022*

## CAP ENERGY COSTS INFLUENCED BY:

*Diversions and Deliveries (Tier 2a)\**

*Natural Gas Prices*

*Off-Peak Electrical Prices*

*\* CAP energy costs decrease with reduced diversions*

# Risk Analysis: 2023 CAP Energy Rate

- Acquired >55% of Estimated Energy Needed for 2023 Tier 2a Diversions
  - Remaining Energy Needed:
    - 60% in Duck-Curve Hours: Duck curve pricing has been more stable – low risk of cost escalation
    - 40% in Off-Peak Hours: Purchased mostly day-ahead at lower than current forward prices
      - May make more forward off-peak purchases if prices drop – some risk of cost escalation
    - No energy needed in peak price hours
- **Bottom Line: *Remaining risk of higher 2023 CAP energy costs appears relatively small, with the potential for lower diversions and/or reduction in natural gas prices to result in lower than projected energy costs.***





# KNOW YOUR WATER

Questions?

[byoung@cap-az.com](mailto:byoung@cap-az.com)



# Water Quality and Biology Update

Scott Bryan, Senior Biologist

Phillip Pagels, Water Transmission Supervisor

August 24, 2022

**YOUR WATER. YOUR FUTURE.**

# CAP's Expanded Water Quality Program



Water Quality Database



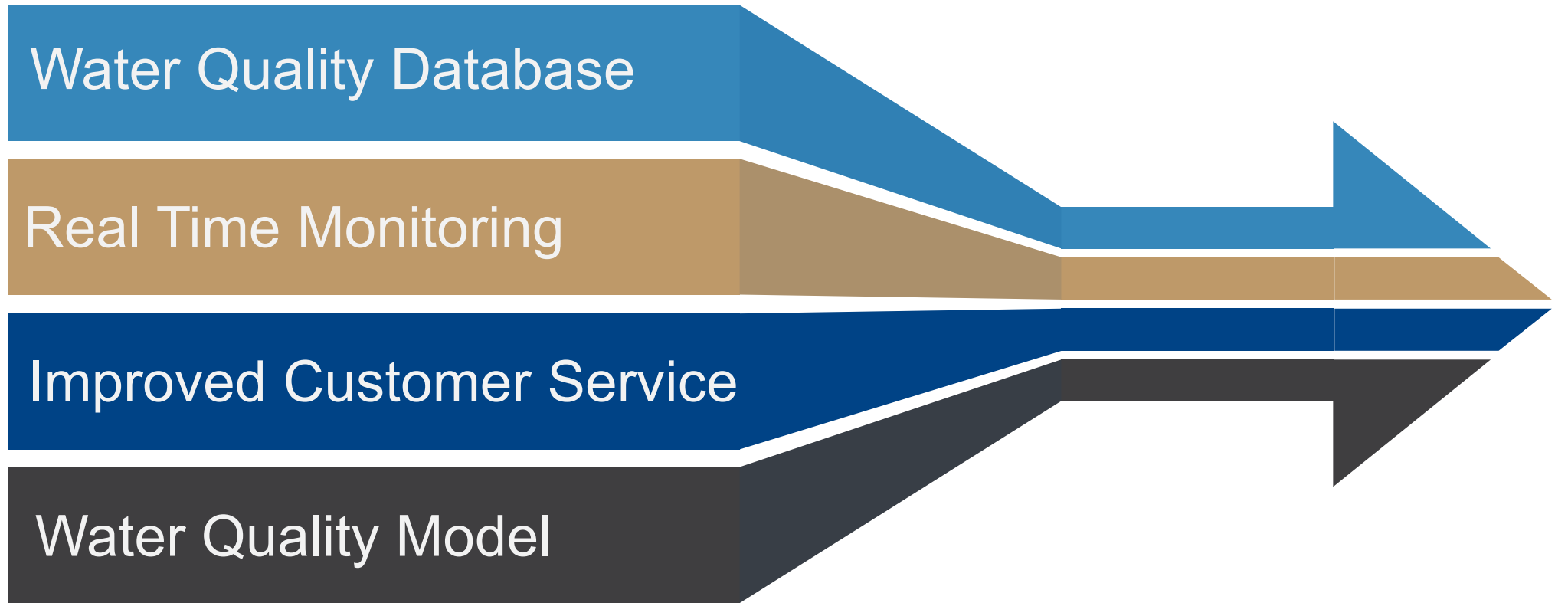
Real Time Monitoring



Improved Customer Service

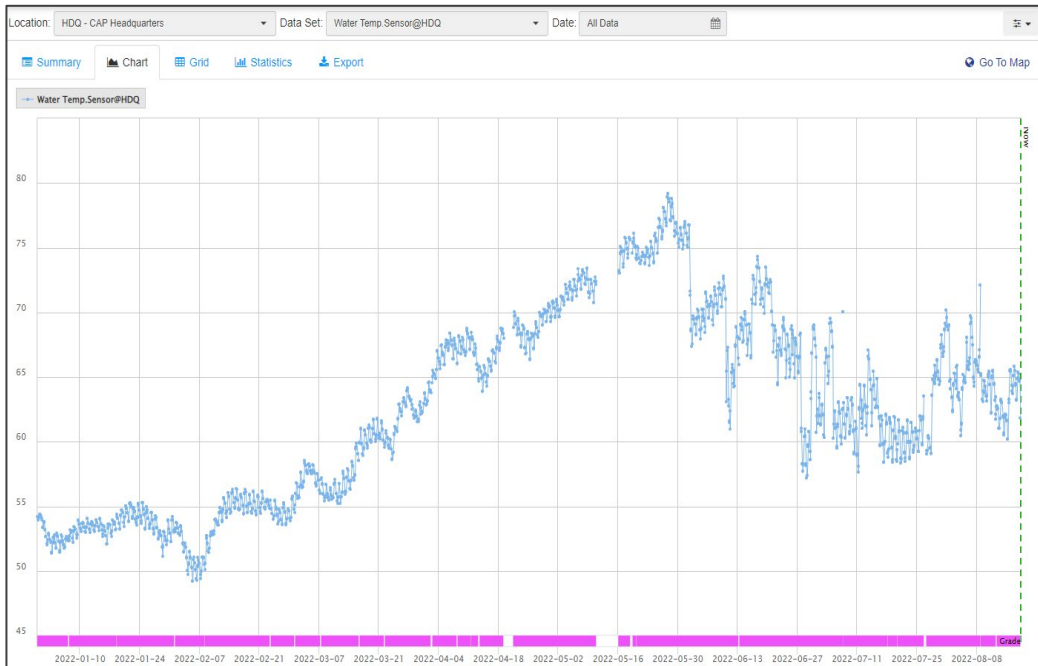


Water Quality Model





aquaportal.cap-az.com



### AQUAPORTAL

Welcome to the CAP AquaPortal!

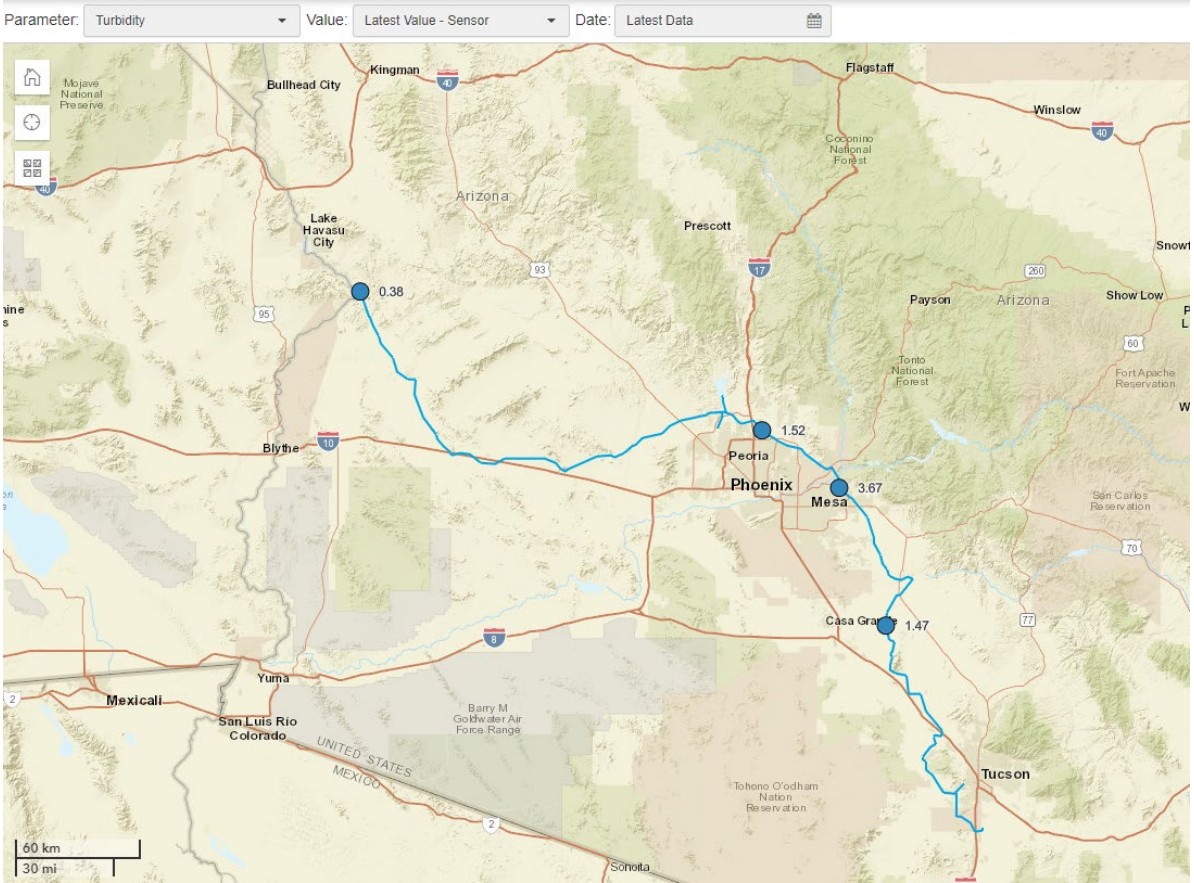
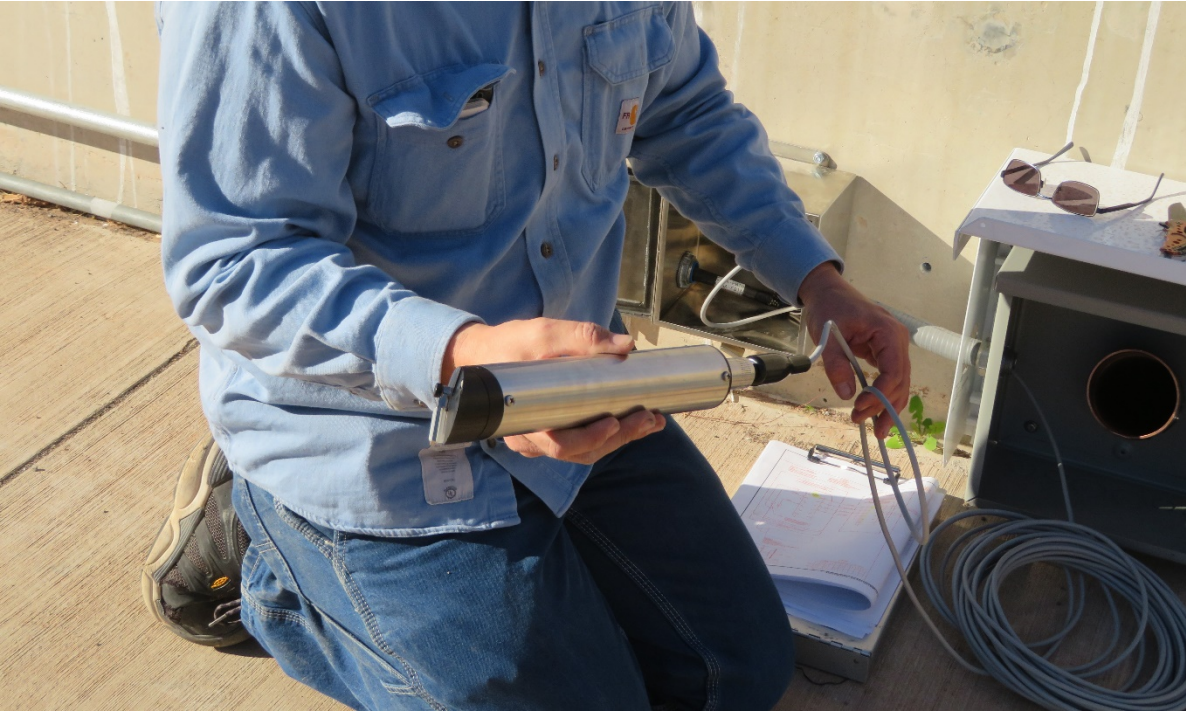
AquaPortal provides users with access to up-to-date water quality data and operational information from the CAP system and our source water. The customized water quality portal allows users to learn more about CAP's water quality program through informational dashboards, view near real-time data from continuous monitoring stations, explore system-wide data on the map, and view annual reports.

Descriptions of the menu items on the left panel are provided below, as well as a general description of our water quality monitoring program. To help you get around AquaPortal, a User Guide is available by clicking on the [User Guide](#) on the top right corner of this website, and then selecting "User Guide". A description of CAP's Quality Assurance and Data Grading procedures can be found by clicking on the [Getting Started Guide](#). Approved users can sign-in to unlock even more data and statistics, create custom charts, export data, and much more. Click on this [link](#) to request login credentials for additional access. Upon approval (1-3 business days), you will receive detailed login instructions.

Please feel free to [email](#) the CAP Water Transmission team if you have questions or comments.



# Turbidity Sensors



# Algae and Cymbella (Rock Snot)



May/June 2022 (LHQ)



July 2022 (WAD Canal)



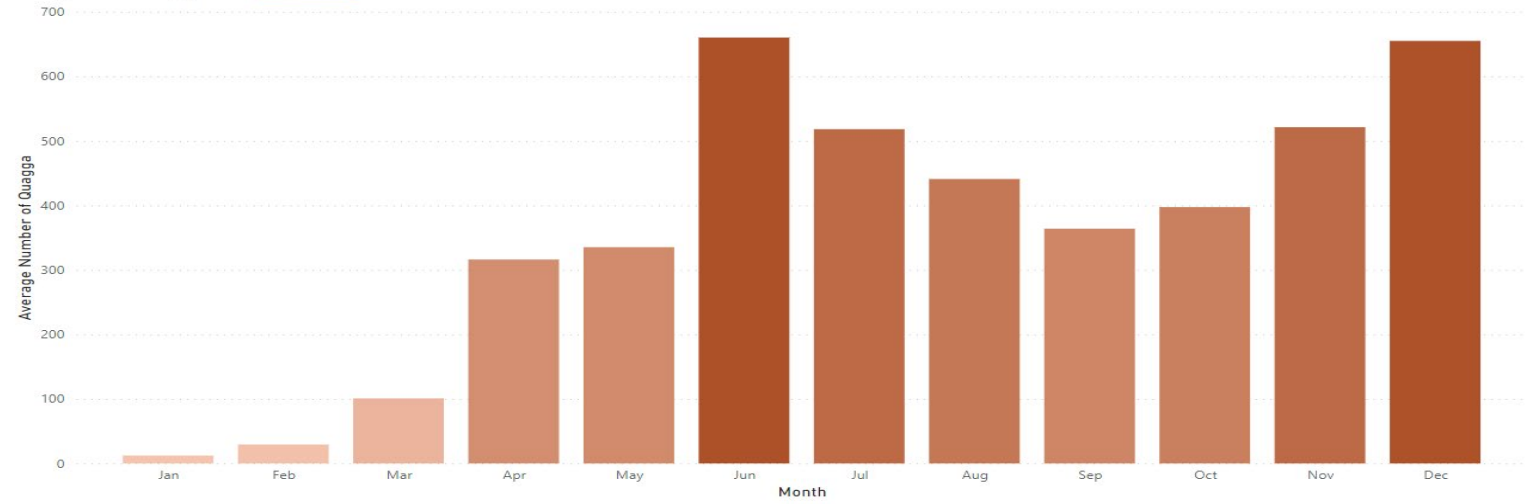
August 2022 (WAD Canal)

# Quagga Mussels



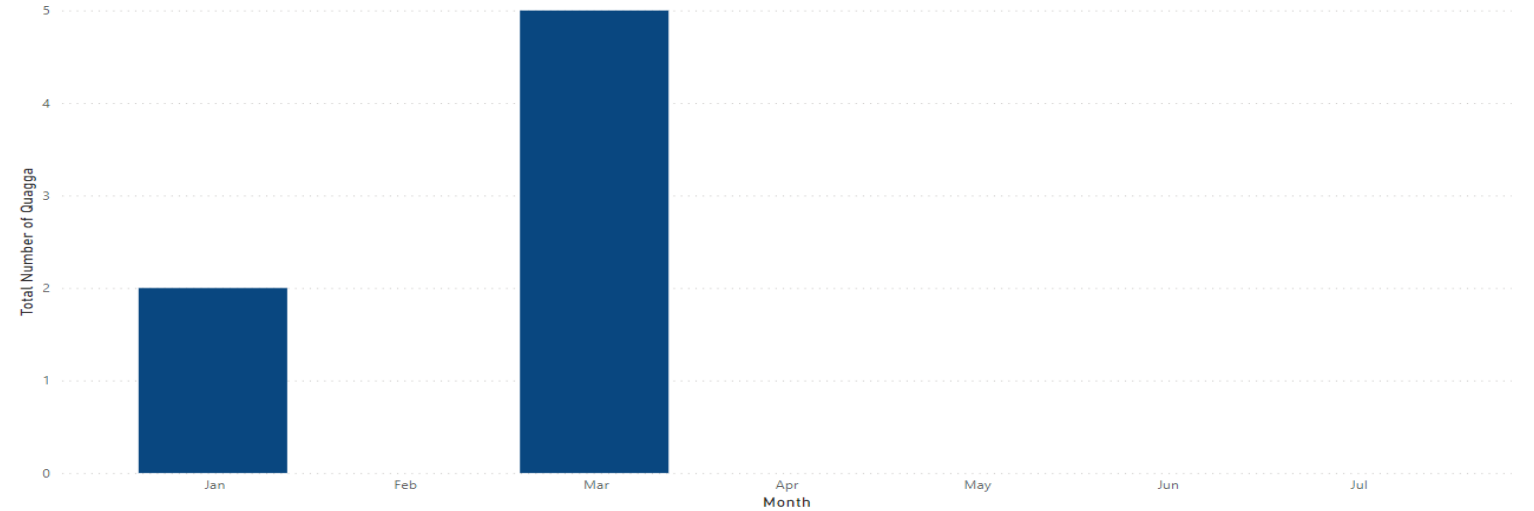
Average Quagga by Month

Average of Total Quagga 12.30 660.33



Total Quagga by Month

Year ● 2022

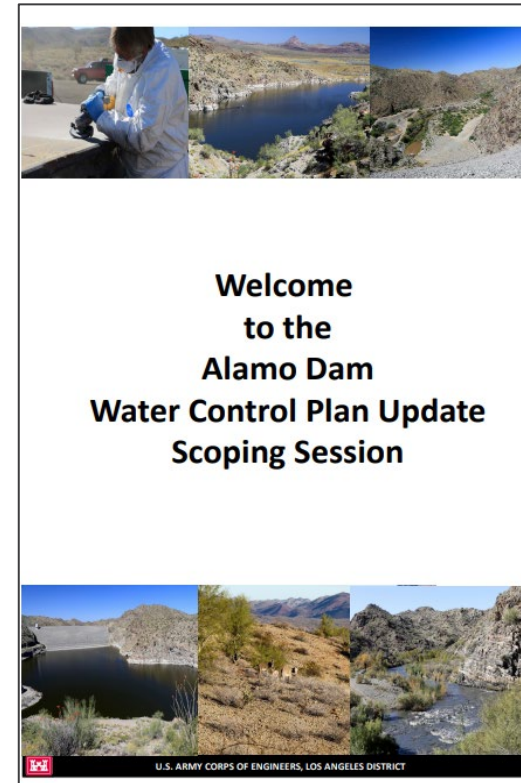


# Alamo Lake Releases

2022/2023 PLANNED RELEASES



WATER CONTROL PLAN



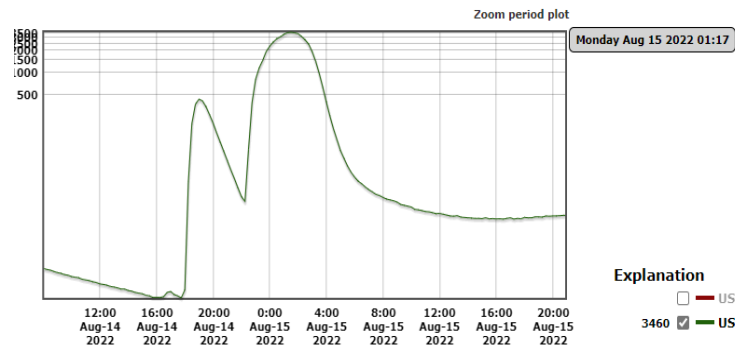


# August 15, 2022

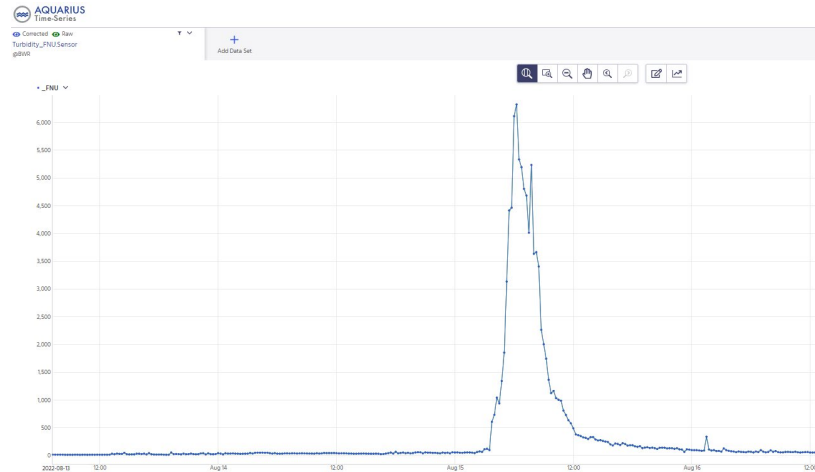


## USGS Gauging Station (Bill Williams)

USGS 09426000 BILL WILLIAMS RIVER BELOW ALAMO DAM, AZ  
 USGS 09426620 BILL WILLIAMS RIVER NEAR PARKER, AZ



## USGS Turbidity Meter (Bill Williams)



## CAP Turbidity Meter (MWP)





**KNOW YOUR WATER**

**Questions?**

**[sbryan@cap-az.com](mailto:sbryan@cap-az.com)**



**YOUR WATER. YOUR FUTURE.**

# **Engineering Capital Projects**

Ryan Johnson, Engineering Services Manager  
Annual Water User Briefing  
August 24, 2022

# 2023 CIP Budget – Project Budgets

## CAP Biennial Budget

## 2022 CAWCD Board Strategic Plan

### CAPITAL BUDGET SUMMARY

(Thousands)

	2019 Actual	2020 Actual	2021 Projection	2022 Budget	2023 Budget
Salaries and related costs	\$ 3,310	\$ 3,366	\$ 3,371	\$ 4,012	\$ 3,472
Equipment, buildings, and structures	16,543	20,484	20,690	26,782	32,361
Other expenses					
Outside services	2,464	5,419	4,131	2,792	2,151
Materials, supplies & other expenses	437	273	371	179	192
Capitalized interest	-	-	-	-	-
Overhead expenses	3,342	3,490	3,504	4,352	3,767
Subtotal other expenses	6,243	9,182	8,006	7,323	6,110
Total capital	\$ 26,096	\$ 33,032	\$ 32,067	\$ 38,117	\$ 41,943



### KRA: Project Reliability

Providing reliable and cost-effective operations, maintenance, and replacement of CAP infrastructure and technology assets

**21 Engineering  
Construction Projects  
\$33,852**

# Prioritizing & Executing Capital Projects

- Strategies Implemented:
  - Decisions Based on Asset Criticality & Condition
  - Balance Resources and Outage Constraints – Timing and Cost
  - Risk Register – Communication & Collaboration Tool

CONDITION ASSESSMENTS

Motors

PLEASE USE CTRL+CLICK TO NAVIGATE TO CORRESPONDING GIS LOCATION.

Plant	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10
MWP	C	A	B	B	B	A				
BSH	A	A	A	A	A	B	A	C	A	A
LHQ	A	A	B	A	A	B	A	A	A	
HSY	A	A	A	A	A	A	B	A	A	
WAD	A	A	B	A	A	B	B	A		
SGL	C	C	C	B	B	C	C	B	C	C
BRD	A	B	B	B	A	B	A	A		
PIC	B	B	A	A	A	A				

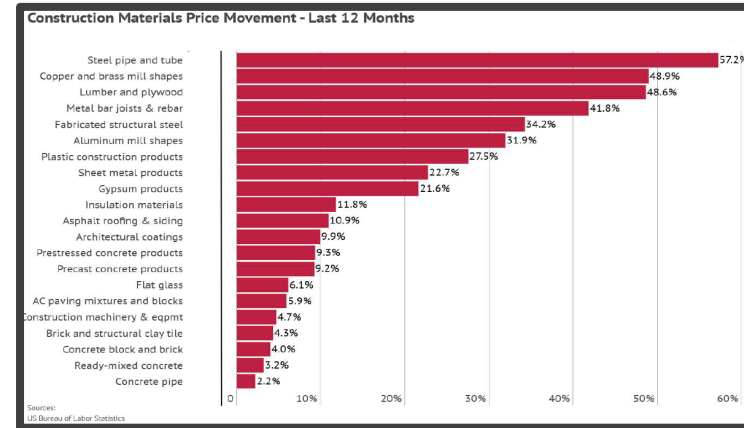
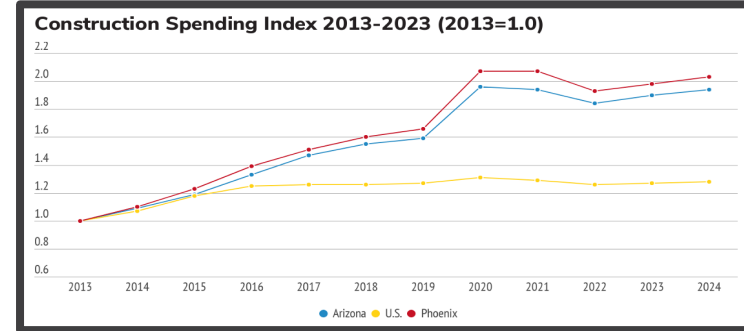
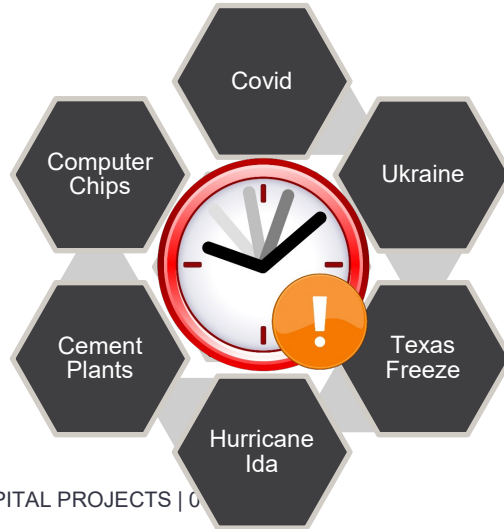
CAP Risk Register  
CENTRAL ARIZONA PROJECT

ID	Type	Status	RPN	PPN	Impact Score	Location	Description	Phase	Planned Budget Year	Est. Labor Hours	Est Non Labor Costs	Equipment	Parent WO	Work Mgmt MRC
465	Project Request	RPA	9	1	6 - Critical	SGL	Discharge Pipe and Manifold Retire (LT)	Planning	2023	0	\$1,500,000	SGLDISCHLT	781274	545
366	Project Request	RPA	9	5	6 - Critical	SGL	Discharge Pipe and Manifold Retire (LT)	Planning	2024	0	\$2,500,000	SGLDISCHLT		545
365	Project Request	U	9	4	6 - Critical	WAD	RT - Discharge Manifold, Pipes, Tunnels, and Bypass Pipes Retire	Forecast	2024	0	\$4,556,538	WADDISCHRT		545
	Project Request	U	9	5	6 - Critical	WAD	LT - Discharge Manifold, Pipes, Tunnels, and Bypass Pipes Retire	Forecast	2026	3,000	\$4,556,538	WADDISCHLT		545
	Project Request	U	9	3	6 - Critical	LHQ	LHQ Right Discharge Manifold Retire	Forecast	2026	3,500	\$1,500,000	LHQDISCHRT		545
	Project Request	AM	9	9	4 - Severe	Multi	EM Relay Replacement	Approved	2019	25,000	\$8,000,000	PP	659233	545
826	Project Request	AM	9	8	6 - Critical	WAD	PLC-5 Replacement	Approved	2021	12,500	\$5,500,000	PP		545
319	Project Request	AM	9	5	4 - Severe	MWP	MWP Cooling Water Treatment System	Approved	2020	3,500	\$1,400,000	PP	728928	545
113	Project Request	RPA	9	9	4 - Severe	TWP SAN, SND & BLK	Replace TWP/SAN/SND/BLK Unit Motor Exciter Rotating Packages	Planning	2022	8,000	\$8,000,000	PP	749644	545
93	Project Request	CAN	9	5	4 - Severe	Waddell PIG	Waddell High Voltage Non Segregated Phase Bus Evaluation	Rejected/Cancelled	2022	4,000	\$3,000,000	WADHVDKW1A	745837	545
38	Project Request	RPA	9	4	6 - Critical	Bose Hills Pumping Plant	BSH Retire Discharge Manifold - Right	Planning	2024	1,000	\$1,000,000	BSHDISCH		545
14	Project Request	RPA	9	4	6 - Critical	Mark Wilmer Pumping Plant	Retire Mark Wilmer Suction Tube Liners and Stilling Well	Planning	2023	2,000	\$3,600,000	WAPINLET	728718	545
10040	Project Request	RPA	8	NULL	2 - Serious	Multiple	Flowmeter Replacements - Multiple Locations Along the CAP Canal	Planning	2022	0	\$400,000	AFSTO	785596	545
969	Project Request	U	8	6	6 - Critical	WAD	Unit Breaker Replacement (U2, U3, U6, U7)	Forecast	2028	4,500	\$4,400,000	PP		545
968	Project Request	U	8	6	6 - Critical	HSY	Unit Breaker Replacement (U4, U5, U6, U7)	Forecast	2026	4,500	\$4,400,000	PP		545
354	Project Request	AM	8	9	4 - Severe	Multi	Condition Based Monitoring Project	Approved	2019	40,000	\$11,000,000	PP	626402	545

# Ongoing Construction Market Conditions

Some Challenges we are Facing:

- Growing Construction Market in Phoenix
- Changes in Input Costs
- Supply Chain Issues
- Labor Supply



# What is CAP Doing?



- Adapting expectations
- Building partnerships and reducing contractor risk
- Alternative delivery methods & early procurement
  - Generators
  - Backup battery power supplies
  - Cement for Pool 34
  - Elevator control processor chips
  - Fire feeder valves & hydrants
  - Check valves



CONSTRUCTION



# “Top 10” Construction Projects in 2023

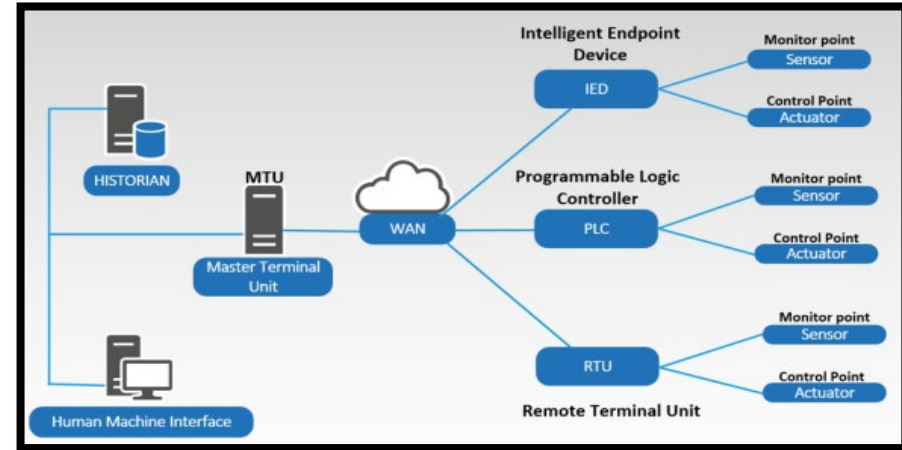
## Headquarters HVAC Replacement

2023 Budget: \$4.9 Million (HDQ)



## SCADA Replacement

2023 Budget: \$4.6 Million (System-Wide)





# “Top 10” Construction Projects in 2023

## Fire Protection Upgrade – Phase 2

2023 Budget: \$4.5 Million (SAN, TWP, SXV, BRW)



## Elevator System Replacements – Phase 2

2023 Budget: \$2.8 Million (MWP, BSH, HSY, WAD, RED, BRW, SXV)



# “Top 10” Construction Projects in 2023

## Mark Wilmer Fire Protection Upgrade

2023 Budget: \$2.7 Million (MWP)

## Backup Power System Replacement

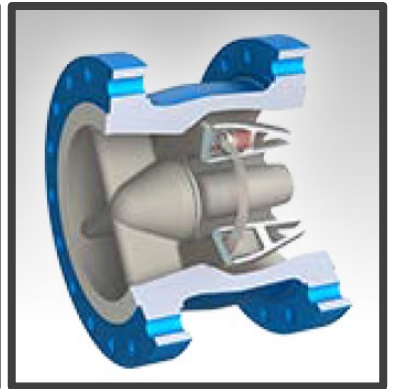
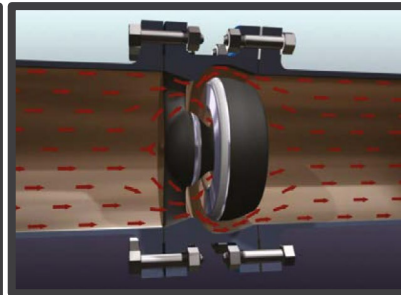
2023 Budget: \$2.2 Million (Checks, TO's, Microwaves)



# “Top 10” Construction Projects in 2023

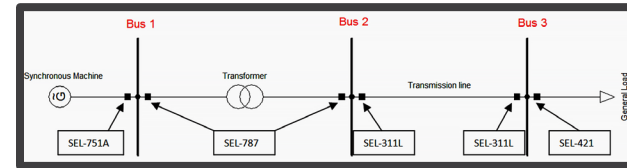
## Check Valve Replacement

2023 Budget: \$1.7 Million (BLK, SNY)



## Electro-Mechanical Relay Replace – Phase 2

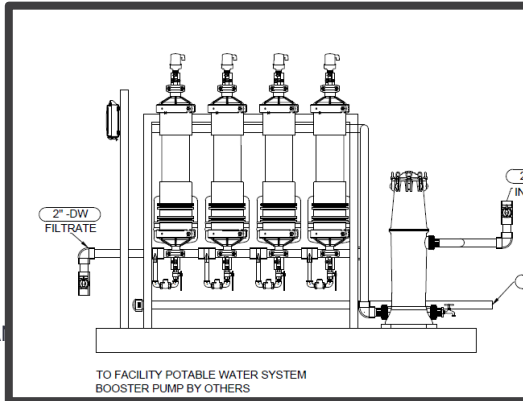
2023 Budget: \$1.6 Million (TWP, SAN, BRW, SXV, SNY, BLK, WAD)



# “Top 10” Construction Projects in 2023

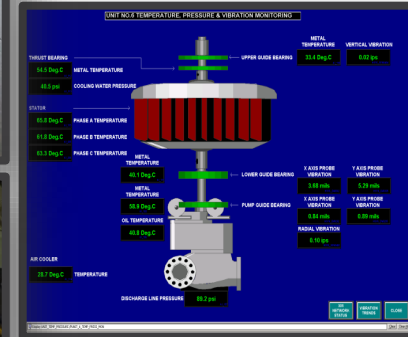
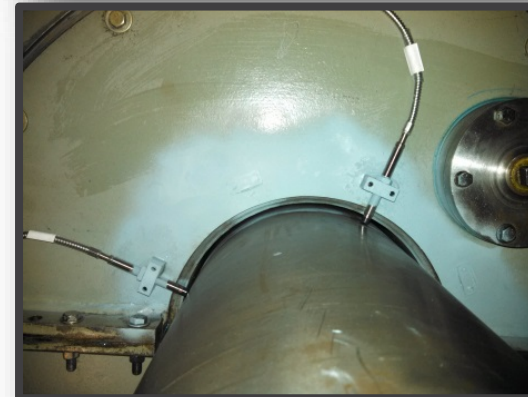
## Potable Water Treatment System Replace

2023 Budget: \$1.1 Million ( MWP, BSH, LHQ, HSY, BRD, PIC, RED)



## Condition Based Monitoring Project

2023 Budget: \$1.0 Million (TWP, SAN, BRW, SXV, WAD)





# KNOW YOUR WATER

Thank You

Ryan Johnson

[rjohnson@cap-az.com](mailto:rjohnson@cap-az.com)



# Maintenance Update

Robert Hitchcock

Maintenance Control Manager

Annual Water User Meeting

August 24, 2022

**YOUR WATER. YOUR FUTURE.**

# Maintenance Control

## TASK BURNDOWN

The following chart included Salt Gila tasks which are scheduled to continue into January.

### Maintenance Planning

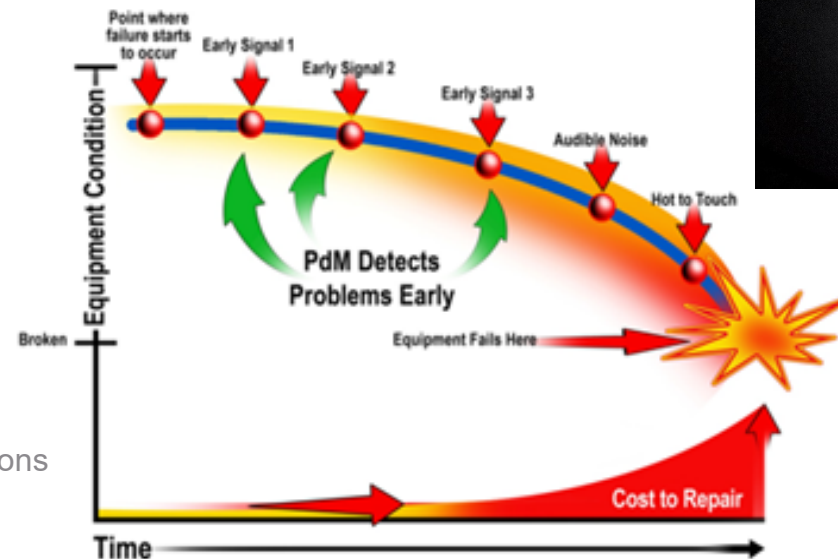
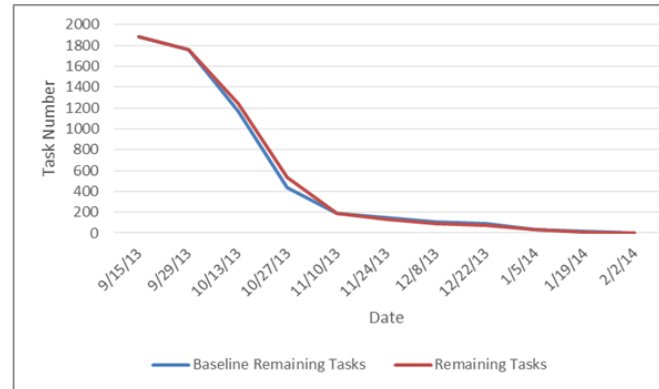
- **12 Maintenance Planners & 2 Sr. Schedulers/Outage Coordinators**
- **Long-Rang to Near-Term Planning**

### Maintenance Engineering

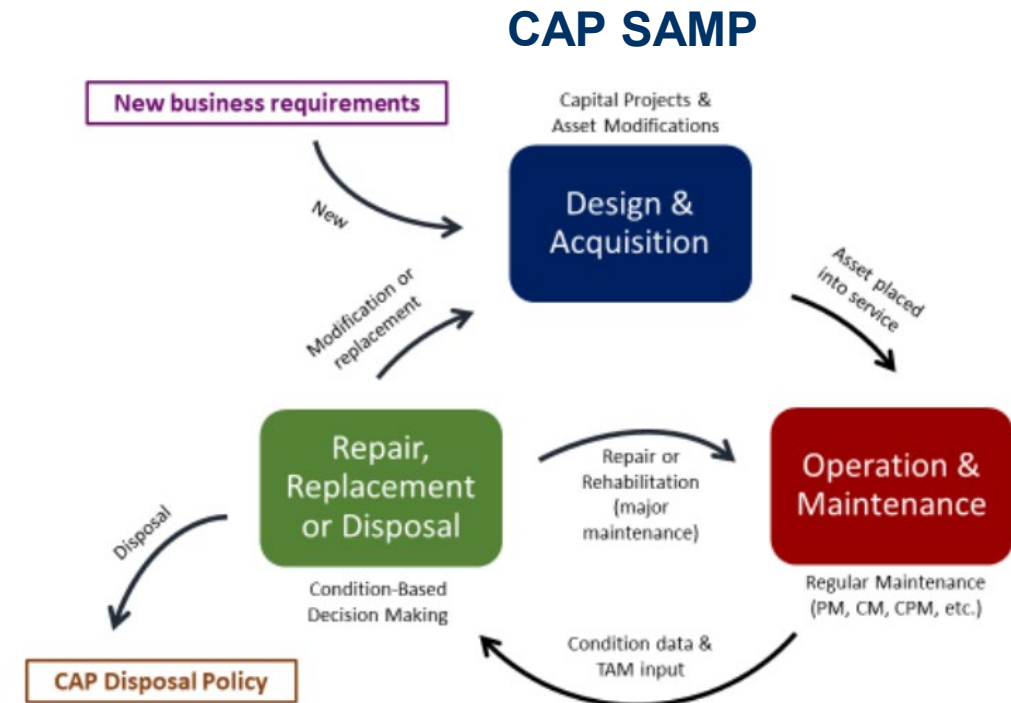
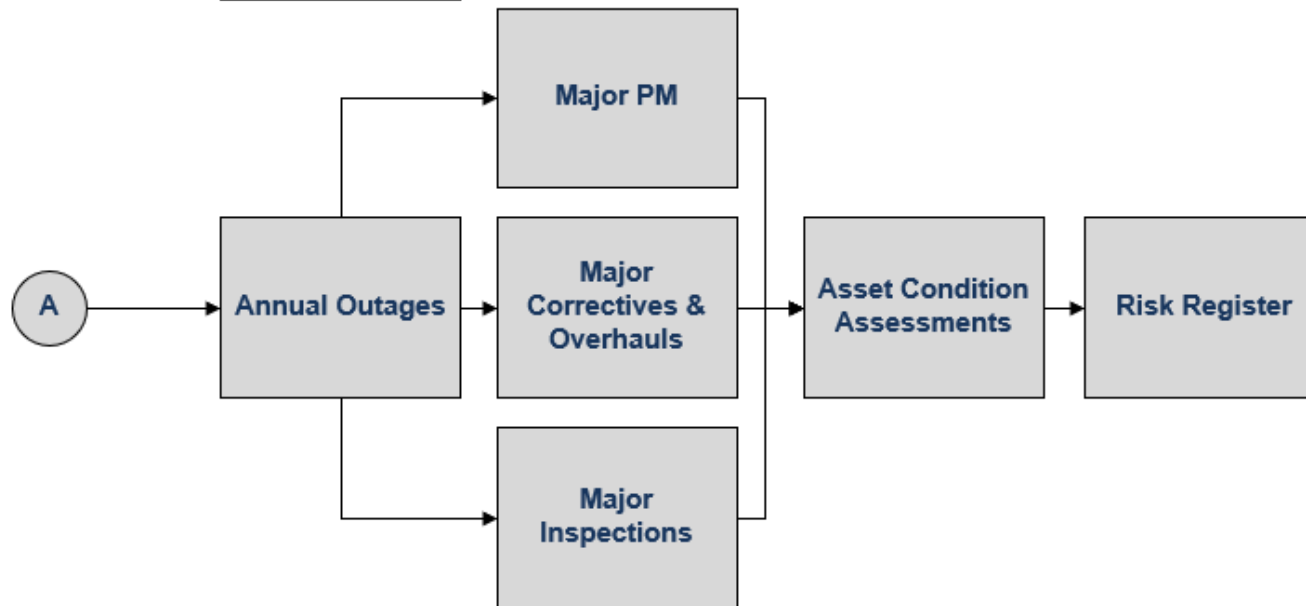
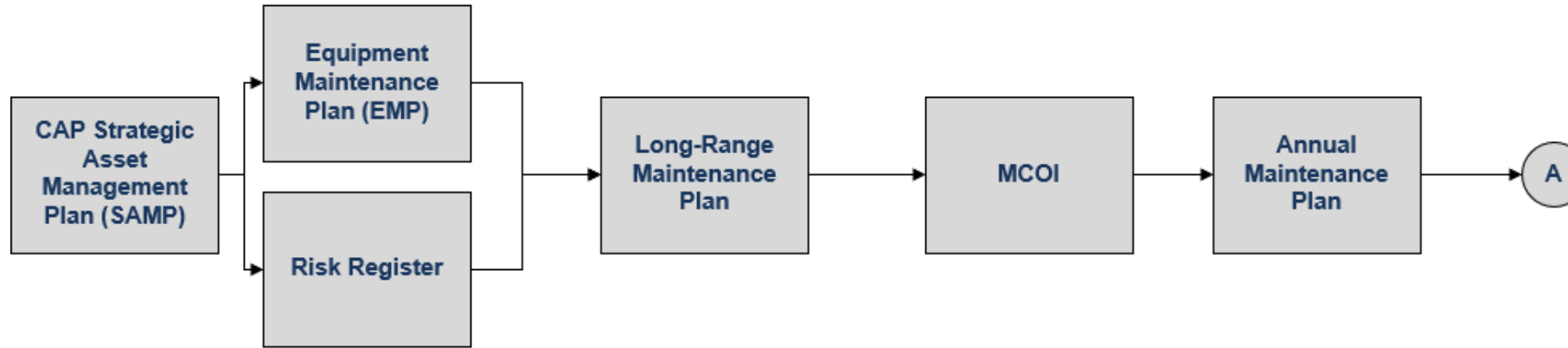
- **Degreed Engineers and ME Technicians**
- **Focused on minimizing downtime, troubleshooting, and return to service**

### Reliability Engineering

- **Degreed Engineers (Civil, Mechanical, Electrical & Controls)**
- **Focused on condition assessments, data trends, extending MTBF, & asset life-cycle planning**



# Long-Range Planning at CAP





# 2022 Annual Maintenance Outages



## WEST OUTAGE

**June 13<sup>th</sup> – Aug. 31<sup>st</sup>**

- Mark Wilmer Pumping Plant (MWP)
- Bouse Hills Pumping Plant (BSH)
- Little Harquahala Pumping Plant (LHQ)
- Hassayampa Pumping Plant (HSY)



## WADDELL OUTAGE

**Sept. 12<sup>th</sup> – Oct. 22<sup>nd</sup>**

- Waddell Pumping / Generating Plant (WAD)



## SOUTH OUTAGE

**Oct. 17<sup>th</sup> – Nov. 22<sup>nd</sup>**

- Sandario Pumping Plant (SAN)
- Brawley Pumping Plant (BRW)
- San Xavier Pumping Plant (SXV)
- Snyder Hills Pumping Plant (SNH)
- Black Mountain Pumping Plant (BLK)
- Salt Gila Pumping Plant (SGL)
- Brady Pumping Plant (BRD)
- Picacho Pumping Plant (PIC)
- Red Rock Plant (RED)
- Twin Peaks Pumping Plant (TWP)

# West Outage 2022 – Major Activities

## Maintenance Projects

LHQ Unit 7 Overhaul

MWP Unit 5/6 Pump Cavitation Repair

MWP Unit 5 6-Year PMs

MWP Aquatic Weed Treatment

BSH Unit 5 5-Year PMs

BSH Right Discharge Manifold & Pipeline 5-Year PM

HSY Switchyard 5-Year PMs

HSY Unit 6/7 5-Year PMs

LHQ Unit 10 5-Year PMs

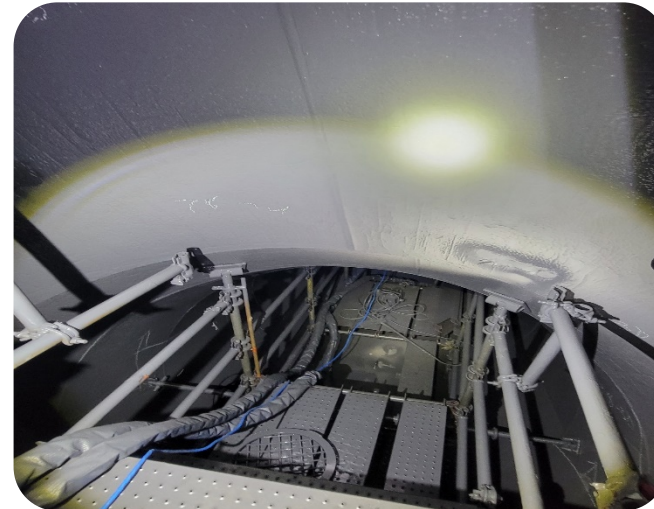
## Capital Projects

BSH Unit 1-5 West Plant Discharge Valve Installation Project

MWP Right Suction Tube & BSH Right Manifold Reline

HSY West Plant Exciter Replacement Project

MWP/BSH Suction Tube Reline Project



# Waddell Outage – Major Activities

## Maintenance Projects

- Left Fixed-Cone Valve Cylinder Replacement
- Left Tower Wheel Gate Broken Guide Repair
- Unit 1/2 Discharge Valve Seal Replacements
- Unit 3 Mechanical Seal Leak
- Non-segregated Bus 1 W4A 5-Year PM
- UZ1A Section A 5-Year PM

## Capital Projects

WAD PLC-5 Replacement Project



# South Outage 2022 – Major Activities

## Maintenance Projects

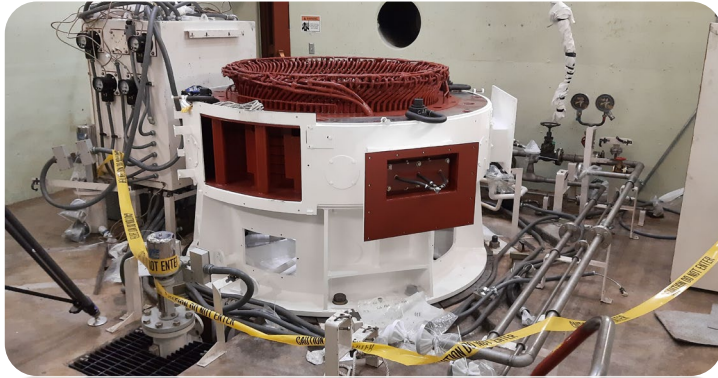
SGL Unit 4 Overhaul	SAN Discharge Manifold Line 5 Year
SGL Station Service Bus Megger Inspection/Testing 6Yrs PM	PIC U1-5 Discharge Valve Internal 5 Year PM
TWP Pool Twin Peaks Santa Cruz Siphon 15 Year PM Inspection	BLK U4 Motor Oil Leak
Santa Cruz Siphon 15 Year PM	PIC/SAN/BLK Discharge Manifold and Pipeline Inspection
Black Mountain Pipeline 8 Year EM Inspection	
SAN Circuit Breaker 10 Year PM	

## Capital Projects

South Plants Motor Exciter (TWP)  
EM Relay Project (BRW/SXV)  
Pool 34 Canal Lining Replacement  
SND Pipeline Discharge Valve Inspection  
RED Elevator Replacement Project



# 2022 Completed/ In-Progress Overhauls



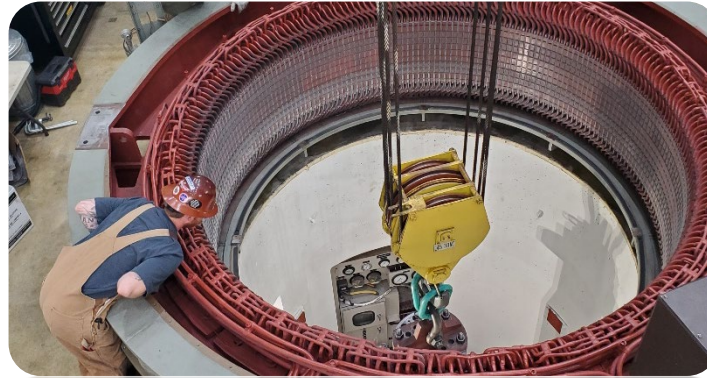
## SGL UNIT 2 - COMPLETE

Started - September 2021

Completed – February 2022

Pump Overhaul

Motor Reconditioning



## LHQ UNIT 7 – IN PROGRESS

Started June 2022

Scheduled to Complete October 2022

Pump Overhaul

Motor Cleaning and Testing



## SXV UNIT 1 – IN PROGRESS

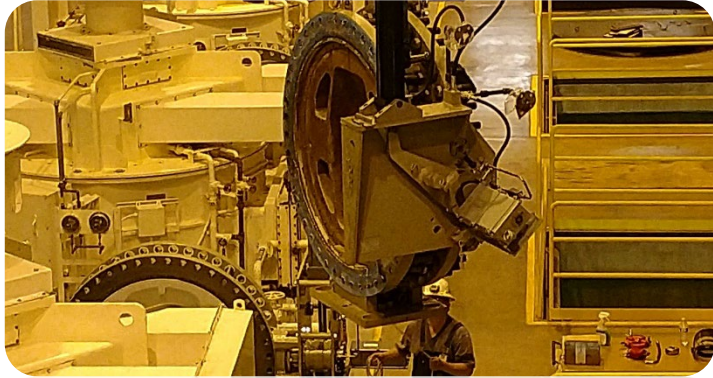
Started March 2022

Scheduled to Complete Sept. 2022

Pump Overhaul - Impeller/Shaft repair

Motor reconditioning

# 2022 Completed/ In-Progress Overhauls



## BLK UNIT 2 – IN PROGRESS

Started - December 2021

Scheduled to Complete – December 2022

Pump Casing Major Repair – External Contract

Motor Reconditioning



## SGL UNIT 4 - PLANNED

Scheduled Start – September 2022

Scheduled End – March 2023

Pump overhaul

Motor Reconditioning



## CHECK 11 RADIAL GATE REPLACEMENT

Started – January 2022

Complete – February 2022

Degraded Coatings

Initiating Corrosion and Metal Loss

# 2023 – Major PM Activities From EMP

## Pump/Motor Unit 5 Year PM's – (21 total)

- MWP (2)
- BSH (2)
- LHQ (2)
- HSY (2)
- WAD (2)
- SGL (2)
- PIC (1)
- RED (2)
- SAN (3)
- SXV (2)
- SND (1)
- BLK (1)

## HV Transformer 5 Year PM's – (14 Total)

- MWP (1)
- BSH (1)
- HSY (1)
- WAD (2)
- SGL (1)
- TWP (2)
- SAN (2)
- SXV (2)
- BLK (2)

## HV BUS 5 Year PM's – (5 Total)

- BSH (1)
- HSY (2)
- SGL (1)

## Station Service XFMR & Switchgear 5 Yr. PM

- PIC – RED - BRW

## Discharge Manifold & Pipeline 5 Yr. PM

- HSY – SGL – SAN - RED

## Tucson Reach 6 Pipeline EM Insp.– 8 Yr.

## Turnout Gates 5 Yr. PM's

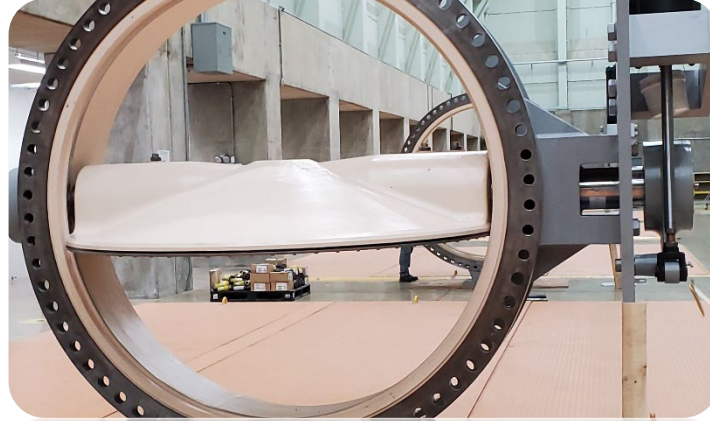
- 14 gates at 8 sites

# 2023 Major Work - Snapshot



COOLING WTR STRAINER REPL.  
WAD Units 3 & 4

- Replacing 2 per year



DISCHARGE VALVE REPL.

- HSY Units 1-5
- BSH Units 1-5
- SAN Unit 5
- BRW Unit 4



OVERHAULS

- HSY Unit 4- Wear ring degradation
- SXV Unit 4 – Casing Cover / Shaft Corrosion
- RED Unit 3 –Corrosion/ Metal loss in casing
- WAD Unit 4 – Wear ring degradation
- Check 14 Radial Gate Refurbishment



# Pump Condition Assessments

Suction Tube Coatings	3	Poor - Significant coating loss combined with corrosion and / or metal loss present (G2 / G3).
	2	Fair - Moderate coating loss and / or pitting. Metal loss and / or corrosion minor (G1/G2).
	1	Good - Minimal coating loss and / or pitting. Metal loss and / or corrosion insignificant (G1).

MAINTelligence - DMSI\_CAP\_PROD

## CAP Pump Condition Assessment

File Edit View Manager Work Purchase Process Se



ROBERT HITCHCOCK, JR.

8/11/2022 6:59:23 AM

Pumps

Plant	P01	P02
MWP	B	B
BSH	B	B
LHQ	B	B
HSY	B	C
WAD	B	A
SGL	A	A
BRD	A	B

- Casing Cover (Exterior)
- Shaft
- Shaft Sleeve
- Stuffing Box Bore
- 39488 HistVib Pump
- 39489
- BSHU01PR
- BSHU02

**LHQU02PUMP**

A (<=16) - Exceptional - Like new. Continue normal monitoring.

B (17-49) - Good - Some wear, stable. Cont. normal monitoring

C (50-82) - Fair - Worn, assess restoration & monitoring freq.

D (>=83) - Poor - Approaching end of life, budget for restoration.

**Asset Condition Grade** B

Manufacturer	Mitsubishi
Model	Main Unit
Flow	130
Overhaul Date	2004-09-15
OV or Major PM	2015-06-15

Diagnosis		Status	Parameter Score
<b>Justification</b>			
Rule Set	AH-PUMP-TYPE1	Asset Health Pump Type 1 Rule Set	
<b>Casing Diffuser Vane Condition</b>			
Moderate coating loss and/or pitting. Metal loss and/or corrosion minor (G1/G2).		Caution	3
<b>Casing Cover Interior Condition</b>			
Minimal coating loss and/or pitting. Metal loss and/or corrosion Insignificant (G1).		Caution	3
<b>Shaft Sleeve Condition</b>			
Minor grooving/wear present (<1/32" Depth), controlled leakage.		Caution	5
<b>Stuffing Box Bore Condition</b>			
Minor corrosion/metal loss present (<1/32" Depth), controlled leakage.		Caution	4
<b>Vibration Condition</b>			
Overall magnitudes for PGBX, PGBY and PGBR 20 - 40% of Trip Settings		Normal	5
<b>Condition Score</b>			20

Symptom	Parameter	Value	Limit	Status
Vibration Main Unit Pump	Pump Guide Bearing (PGBX)	2.200	0.000	Normal
Vibration Main Unit Pump	Pump Guide Bearing (PGBY)	2.300	0.000	Normal

Symptom	Parameter	Status
Minimal coating loss and/or pitting. Metal loss	Suction Tube	Caution
Moderate coating loss and/or pitting. Metal loss	Casing Diffuser Vanes	Caution
Minimal coating loss and/or pitting. Metal loss	Casing Cover (Interior)	Caution
Minor grooving / wear present (<1/32" Depth), co	Shaft Sleeve	Caution
Minor corrosion / metal loss present (<1/32" Dep	Stuffing Box Bore	Caution

P07	P08	P09	P10
B	B	B	B
B	B	B	A
B	B	B	B
B	B		
B	A	B	B
B	B		

Maintenance and Operations - Submit Questions to [Questions@cap-az.com](mailto:Questions@cap-az.com)

**YOUR WATER. YOUR FUTURE.**

# Asset Health Statistics

Note: All asset scores have individual multipliers so that they are normalized to the same scoring scale

**A (<=16) - Exceptional - Like new. Continue normal monitoring.**

**B (17-49) - Good - Some wear, stable. Cont. normal monitoring**

**C (50-82) - Fair - Worn, assess restoration & monitoring freq.**

**D (>=83) - Poor - Approaching end of life, budget for restoration.**

Asset Health Statistics	Total Count	A	B	C	D	N/A
Pumps	109	38	68	3	0	0
Motors	109	47	35	24	3	0
Discharge Valves	109	78	30	1	0	0
Transformers	42	31	11	0	0	0
Radial Gates	91	12	67	12	0	0
Turnouts	51	22	24	0	0	5
<b>Total</b>	<b>511</b>	<b>44.6%</b>	<b>46.0%</b>	<b>7.8%</b>	<b>0.6%</b>	<b>1.0%</b>

**Thank You – Questions?  
Questions@Cap-az.com**