Arizona Reconsultation Committee Meeting #4

ARIZONA RECONSULTATION COMMITTEE

November 30, 2021

Meeting Logistics Summary

- Roll Call
  - Members will unmute and acknowledge their attendance when their name is called.
- ARC Delegates
  - Use the WebEx “raise hand” feature to request to speak or ask questions.
  - Wait to be recognized before speaking to ensure clear communication and remain muted when not speaking.
- Livestream Attendees
  - Electronic public comment forms are available at cap-az.com/ARC for anyone wishing to submit a comment or question during the meeting.
  - All submissions will be addressed during the Call to the Public at the end of the meeting, unless relevant to a specific topic in the presentation.
- Modeling and Analysis Workgroup and ARC Information
  - Meeting materials have been posted on the ADWR and CAP ARC pages: cap-az.com/ARC or new.azwater.gov/ARC.

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ARC #4 - Meeting Agenda

- Welcome and Introductions
- Review of Colorado River Hydrology and Projections
- DCP Implementation and 1,030’ Consultation Update
- MAWG Update with Modeling Results
- Reconsultation Process Update
- Next Steps
- Call to the Public

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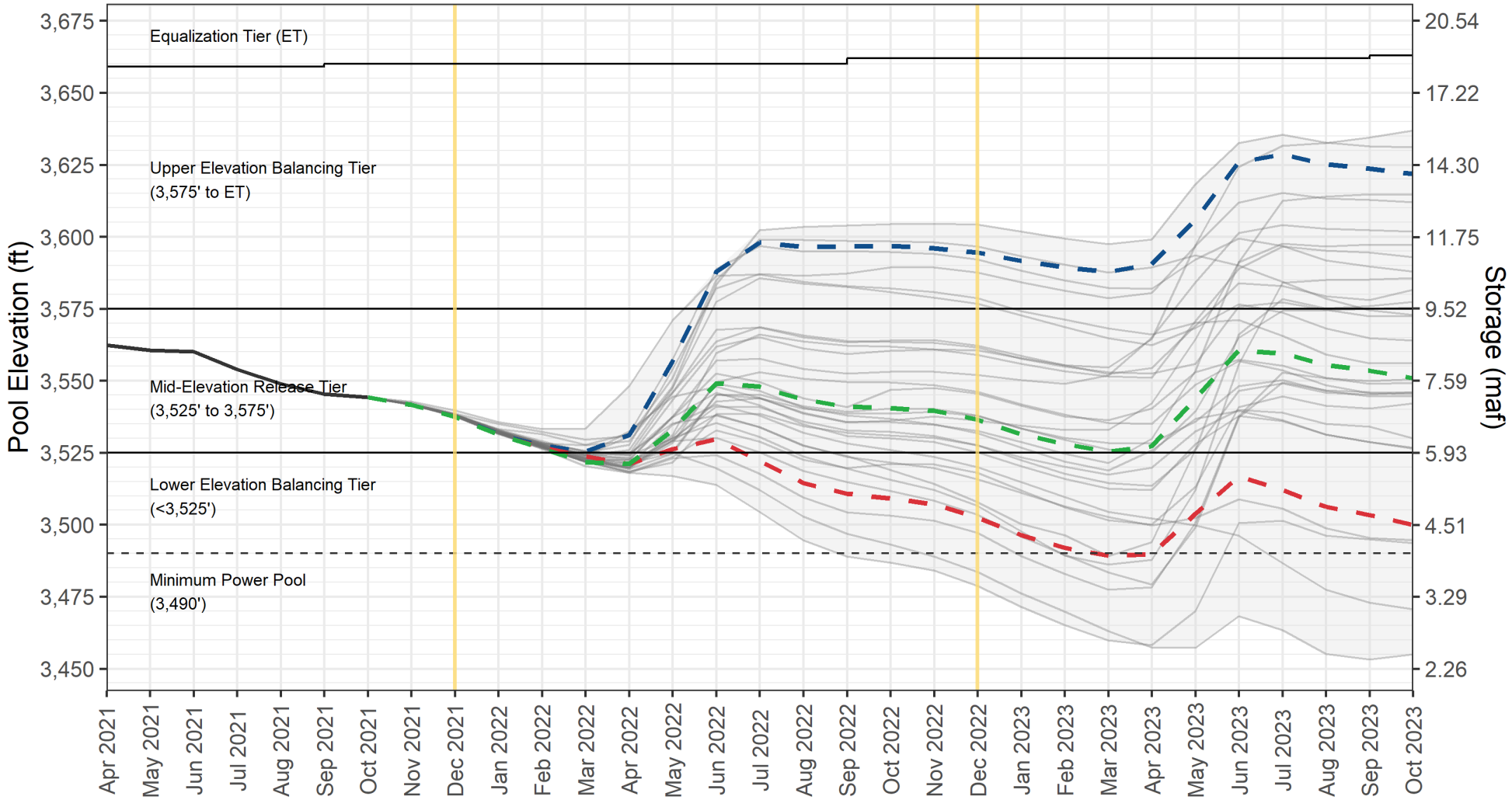
Lake Powell End-of-Month Elevations

CRMMS Projections from November 2021



Most Probable End of CY 2021 Projection:
3,537.49 feet (28% full)
Min/Max Probable Range:
3,537.45 to 3,537.45 feet

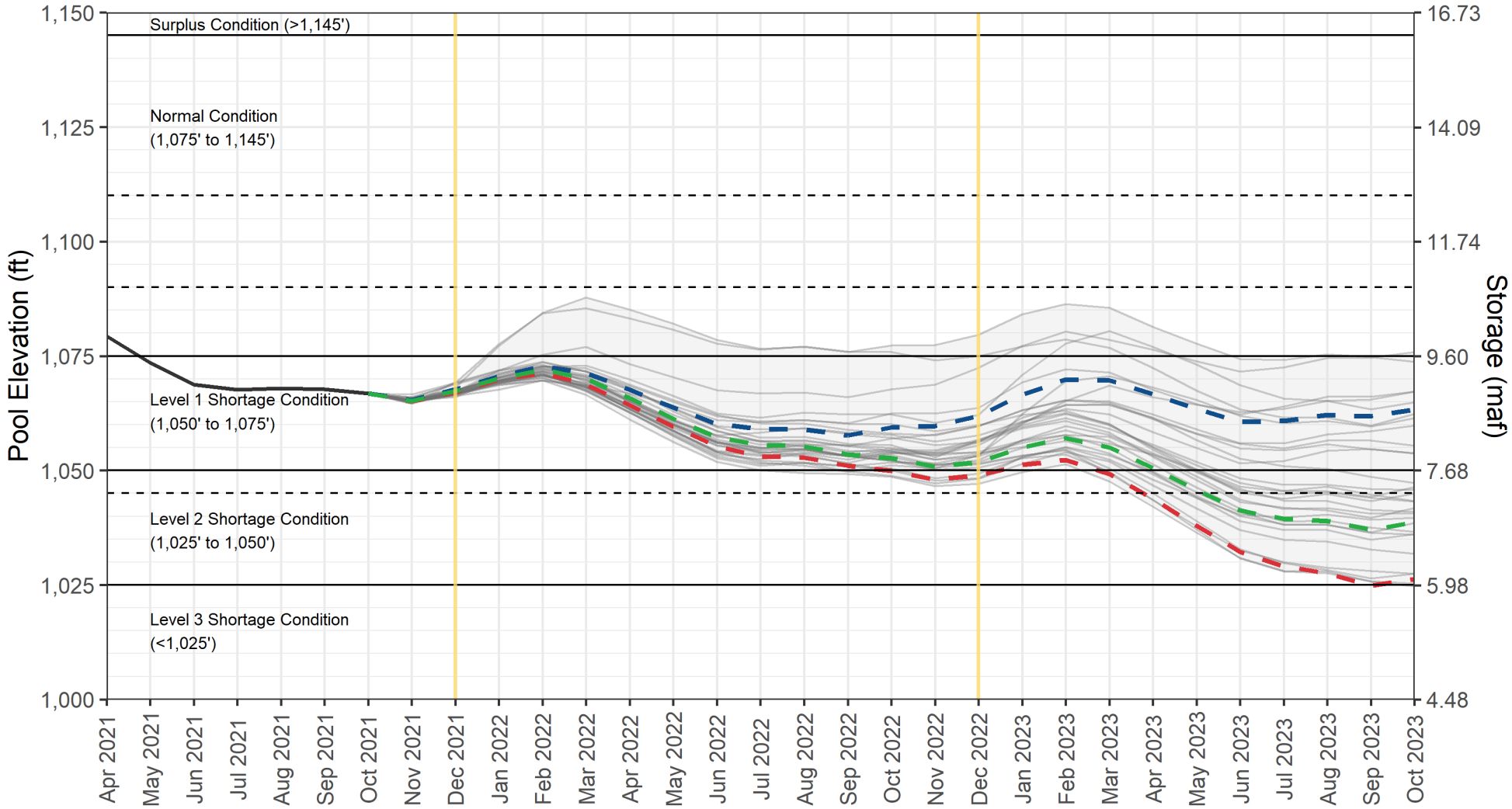
Most Probable End of CY 2022 Projection:
3,536.40 feet (27% full)
Min/Max Probable Range:
3,502.47 to 3,594.44 feet

- 24-Month Study DROA Minimum Probable
- 24-Month Study DROA Maximum Probable
- 24-Month Study Most Probable
- Historical
- CRMMS-ESP Projections (30 projections)
- CRMMS-ESP Projections Range

BUREAU OF RECLAMATION

Lake Mead End-of-Month Elevations

CRMMS Projections from November 2021



24-Month Study DROA Minimum Probable

24-Month Study DROA Maximum Probable

24-Month Study Most Probable

Historical

CRMMS-ESP Projections
(30 projections)

CRMMS-ESP Projections Range

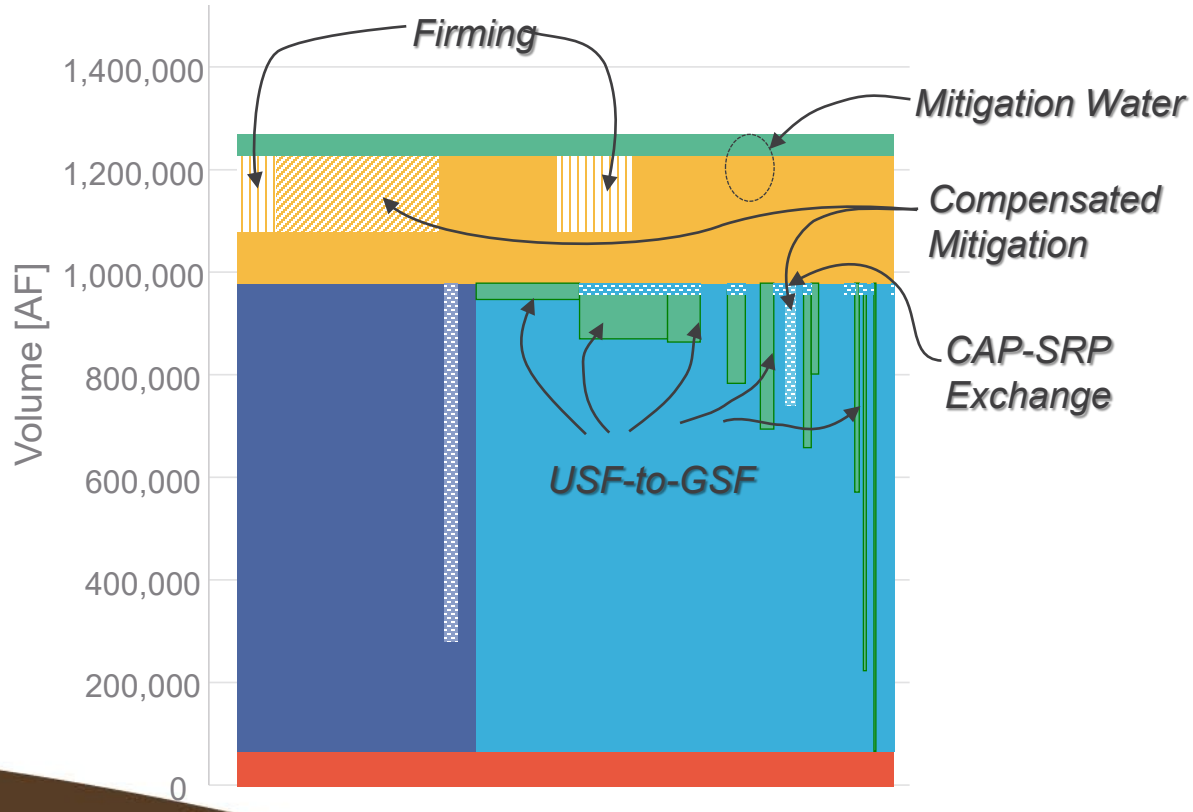
Most Probable End of CY 2021 Projection:
1,067.28 feet (34% full)
Min/Max Probable Range:
1,067.03 to 1,067.74 feet

Most Probable End of CY 2022 Projection:
1,051.76 feet (30% full)
Min/Max Probable Range:
1,048.89 to 1,061.95 feet

These projections do not include the additional conservation measures in the 500+ plan.

— BUREAU OF —
RECLAMATION

AZDCP Implementation – 2022 CAP Operations and Mitigation



Updated CAP "Mitigation Math"

- +30 KAF Lake Pleasant to pre-Mitigation supply
- Slightly higher than projected M&I orders
- Revised NIA methodology
  - Pre-Mitigation supply used to fill existing contractors first
  - Lower firming and Compensated Mitigation volumes
  - New NIA contractor orders filled with Mitigation Water
- Mitigation resources:
  - Firming: 18,515 AF *(USBR & AWBA)*
  - NIA Compensated Mitigation: 36,206 AF *(GRIC & Scottsdale)*
  - USF-to-GSF 45,500 AF *(-1 KAF HVID/Scottsdale)*
  - Lake Pleasant: 55,000 AF
  - SRP Exchange: 10,000 AF
  - CAWCD ICS: 59,497 AF

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1,030’ Consultation – Commitment to Additional Action

Exhibit 1 to the Lower Basin Drought Contingency Plan Agreement, Sec. V. B. 2, states in part:

- “…commitment to individual and collective action to avoid and protect against the potential for elevations in Lake Mead to decline to elevations **below 1,020’”**
- “…If any 24-Month Study for the minimum probable inflows projects that Lake Mead will be at or **below 1,030’** anytime within the succeeding two Years, the Secretary and Lower Division States shall consult and determine what additional measures will be taken” (emphasis added)
- August 2021 24-Month Study triggered this provision

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1,030’ Consultation - Lower Basin Discussions

- Lower Basin Parties have been meeting since August to develop a plan for additional voluntary commitments to conserve/contribute additional water to Lake Mead beyond those in DCP - from Arizona, California, Nevada and the U.S.
    - ADWR and CAP have been closely coordinating throughout

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Increasing Risk

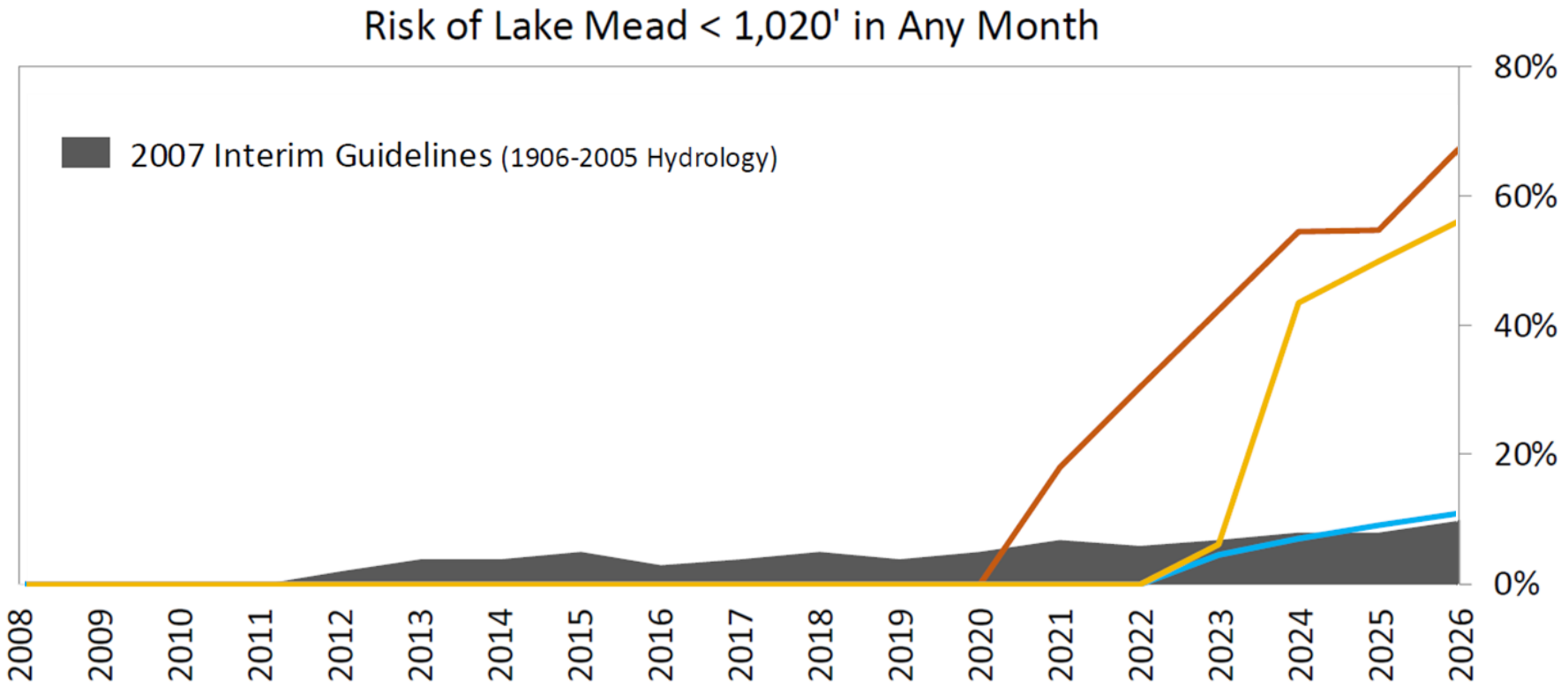

Chart adapted from USBR Stakeholder Webinar, November 5, 2021

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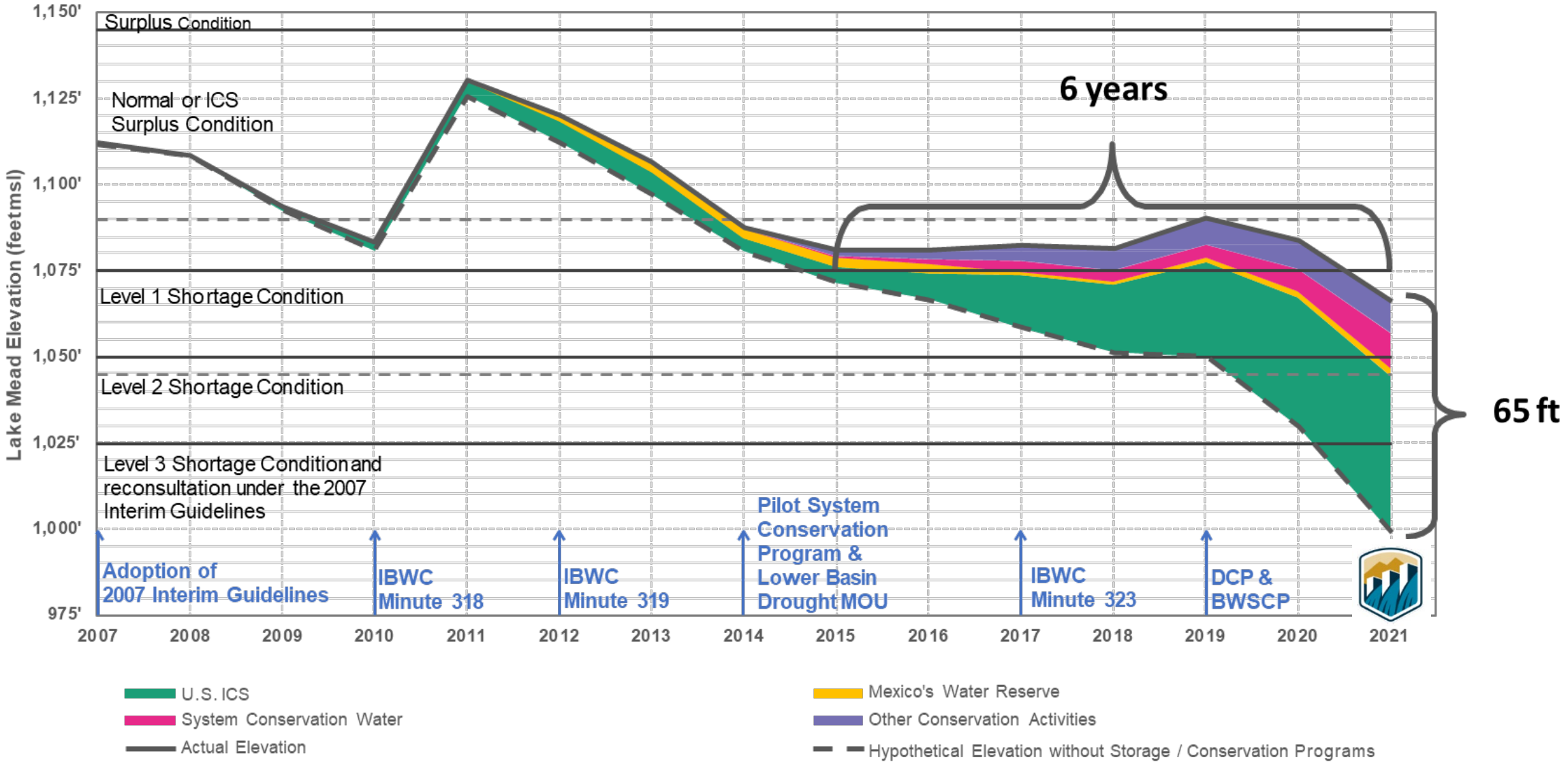
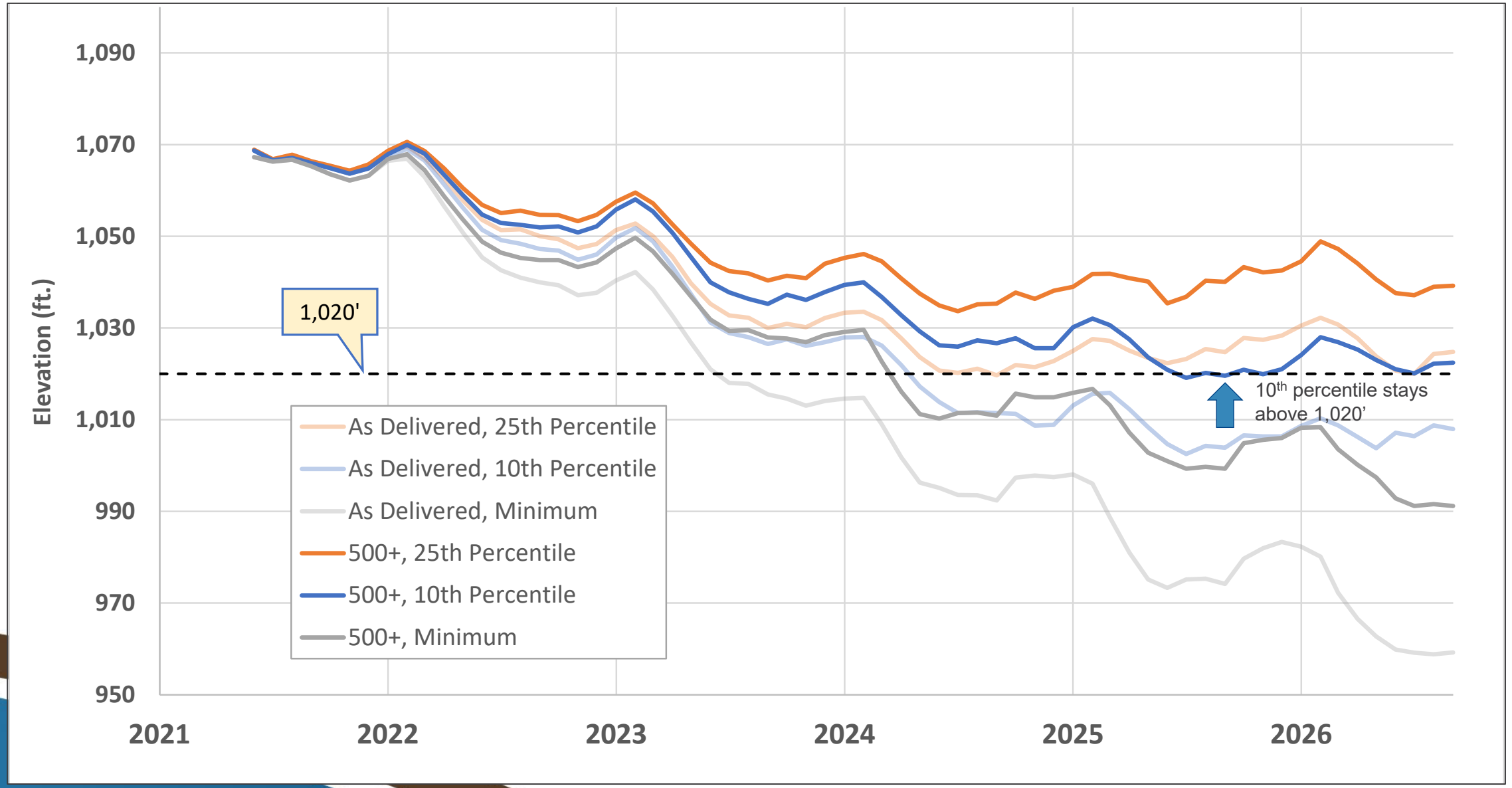
Lake Mead Storage and Conservation



Analysis of Additional 500 KAF Conservation



Lower Basin 500+ Plan

- Two-year plan, with expected ongoing activity through 2026
- Four types of voluntary activities
  - Additional ICS
  - Reduction in planned ICS releases
  - System Conservation
  - System Efficiency
- Funding commitments from AZ, CA, NV and the U.S.
- 2022 target volumes identified:
  - Arizona: ~223 KAF
  - California: ~215 KAF
  - Reclamation: ~62 KAF
- 2023 volumes under further development

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Arizona Contributions to 500+ Plan

- Arizona's target of ~223 KAF anticipates participation from both on-River and CAP water users
  - Includes both tribal and non-tribal participants
  - ~30 KAF on-River
  - ~193 KAF from CAP water users
- All contributions will directly benefit Lake Mead, through System Water or Storage, including reduced release of ICS
- CAP and ADWR are providing funding, and have established guiding principles for Arizona's contributions:
  - **Voluntary**
  - **Temporary**
  - **Compensated**

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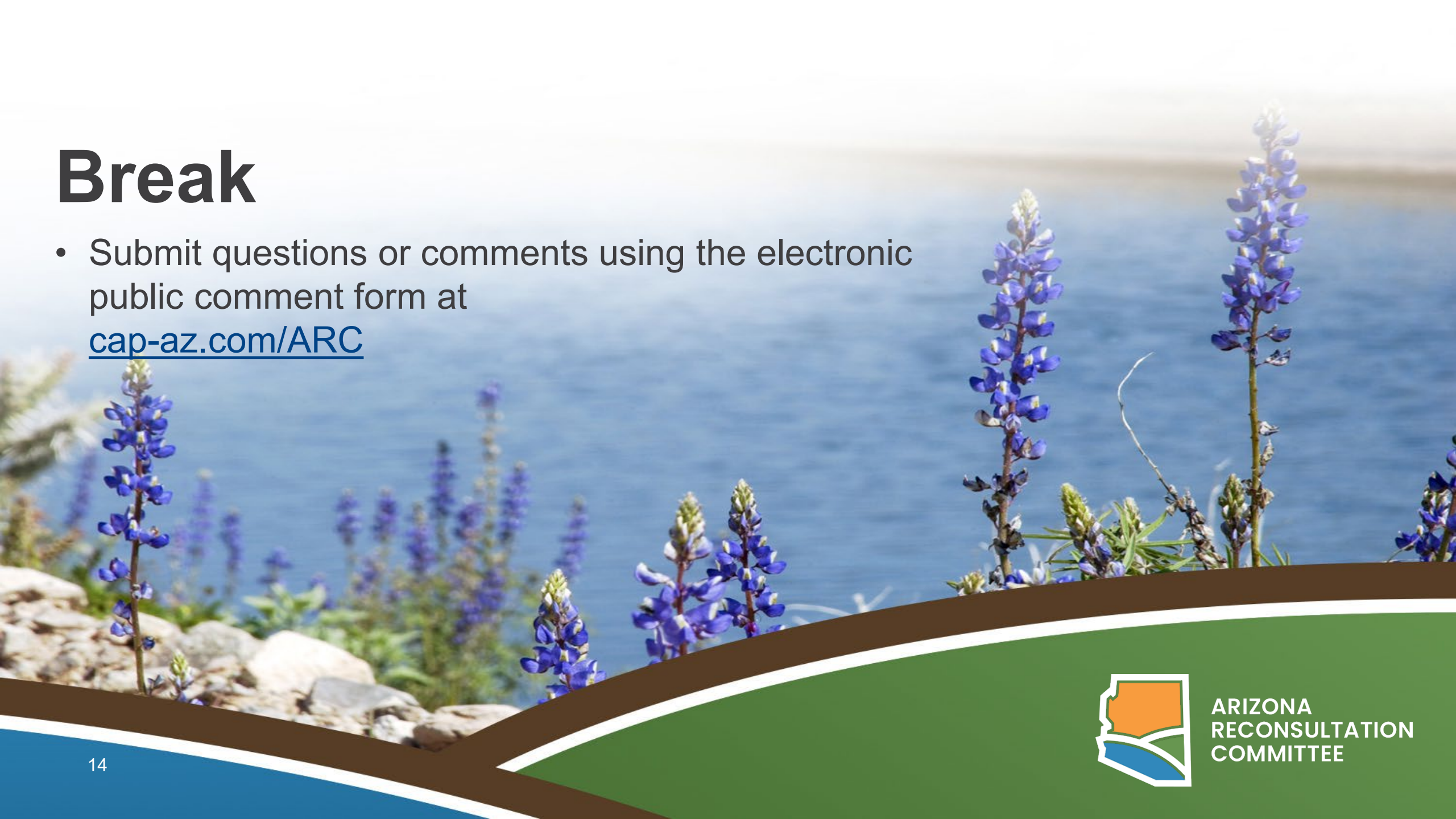
Break

- Submit questions or comments using the electronic public comment form at cap-az.com/ARC



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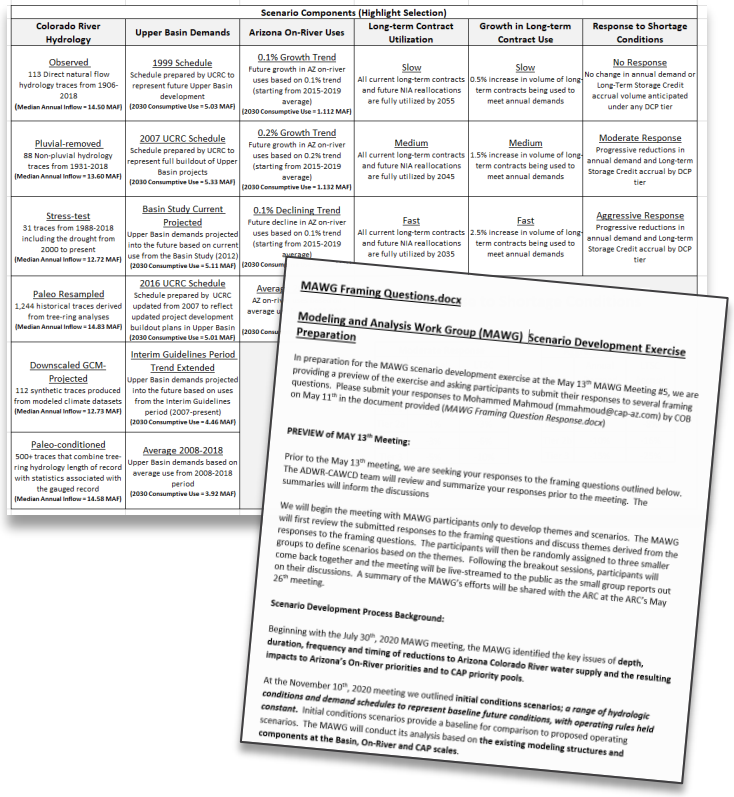
MAWG #5 Summary – Initial Conditions (IC) Scenario Development Exercise

- Pre-meeting scenario exploration and development exercise generated six “themes” to guide scenario development
- MAWG #5 conducted on May 13, 2021
- Members selected key components to generate six unique scenarios:
  - Hydrology
  - Upper Basin Demands
  - Arizona On-River Demands
  - CAP Utilization
- One MAWG scenario was refined at the ARC #3 Meeting
- Modeling conducted over 3 scales: Basin, AZ On-River and CAP



Scenario Components (Highlight Selection)

Colorado River Hydrology	Upper Basin Demands	Arizona On-River Uses	Long-term Contract Utilization	Growth in Long-term Contract Use	Response to Shortage Conditions
Observed 113 Direct natural flow hydrology traces from 1906-2018 (Median Annual Inflow = 14.50 MAF)	1999 Schedule Schedule prepared by UCRC to represent future Upper Basin development (2030 Consumptive Use = 5.03 MAF)	0.1% Growth Trend Future growth in AZ on-river uses based on 0.1% trend (starting from 2015-2019 average) (2030 Consumptive Use = 1.112 MAF)	Slow All current long-term contracts and future NIA reallocations are fully utilized by 2055	Slow 0.5% increase in volume of long-term contracts being used to meet annual demands	No Response No change in annual demand or Long-Term Storage Credit accrual volume anticipated under any DCP tier
Pluvial-removed 88 Non-pluvial hydrology traces from 1931-2018 (Median Annual Inflow = 13.60 MAF)	2007 UCRC Schedule Schedule prepared by UCRC to represent full buildout of Upper Basin projects (2030 Consumptive Use = 5.33 MAF)	0.2% Growth Trend Future growth in AZ on-river uses based on 0.2% trend (starting from 2015-2019 average) (2030 Consumptive Use = 1.132 MAF)	Medium All current long-term contracts and future NIA reallocations are fully utilized by 2045	Medium 1.5% increase in volume of long-term contracts being used to meet annual demands	Moderate Response Progressive reductions in annual demand and Long-term Storage Credit accrual by DCP tier
Stress-test 31 traces from 1988-2018 including the drought from 2000 to present (Median Annual Inflow = 12.72 MAF)	Basin Study Current Projected Upper Basin demands projected into the future based on current use from the Basin Study (2012) (2030 Consumptive Use = 5.11 MAF)	0.1% Declining Trend Future decline in AZ on-river uses based on 0.1% trend (starting from 2015-2019 average) (2030 Consum	Fast All current long-term contracts and future NIA reallocations are fully utilized by 2035	Fast 2.5% increase in volume of long-term contracts being used to meet annual demands	Aggressive Response Progressive reductions in annual demand and Long-term Storage Credit accrual by DCP tier
Paleo Resampled 1,244 historical traces derived from tree-ring analyses (Median Annual Inflow = 14.83 MAF)	2016 UCRC Schedule Schedule prepared by UCRC updated from 2007 to reflect updated project development buildout plans in Upper Basin (2030 Consumptive Use = 5.01 MAF)	Averag AZ on-riv average u (2030 Consu			
Downscaled GCM-Projected 112 synthetic traces produced from modeled climate datasets (Median Annual Inflow = 12.73 MAF)	Interim Guidelines Period Trend Extended Upper Basin demands projected into the future based on uses from the Interim Guidelines period (2007-present) (2030 Consumptive Use = 4.46 MAF)				
Paleo-conditioned 500+ traces that combine tree-ring hydrology length of record with statistics associated with the gauged record (Median Annual Inflow = 14.58 MAF)	Average 2008-2018 Upper Basin demands based on average use from 2008-2018 period (2030 Consumptive Use = 3.92 MAF)				

MAWG Framing Questions.docx

Modeling and Analysis Work Group (MAWG) Scenario Development Exercise Preparation

In preparation for the MAWG scenario development exercise at the May 13th MAWG Meeting #5, we are providing a preview of the exercise and asking participants to submit their responses to several framing questions. Please submit your responses to Mohammed Mahmoud (mmahmoud@cap-az.com) by COB on May 11th in the document provided (*MAWG Framing Question Response.docx*)

PREVIEW of MAY 13th Meeting:

Prior to the May 13th meeting, we are seeking your responses to the framing questions outlined below. The ADWR-CAWCD team will review and summarize your responses prior to the meeting. The summaries will inform the discussions

We will begin the meeting with MAWG participants only to develop themes and scenarios. The MAWG will first review the submitted responses to the framing questions and discuss themes derived from the responses to the framing questions. The participants will then be randomly assigned to three smaller groups to define scenarios based on the themes. Following the breakout sessions, participants will come back together and the meeting will be live-streamed to the public as the small group reports out on their discussions. A summary of the MAWG's efforts will be shared with the ARC at the ARC's May 26th meeting.

Scenario Development Process Background:

Beginning with the July 30th, 2020 MAWG meeting, the MAWG identified the key issues of **depth, duration, frequency and timing of reductions to Arizona Colorado River water supply and the resulting impacts to Arizona's On-River priorities and to CAP priority pools.**

At the November 10th, 2020 meeting we outlined **initial conditions scenarios; *a range of hydrologic conditions and demand schedules to represent baseline future conditions, with operating rules held constant.*** Initial conditions scenarios provide a baseline for comparison to proposed operating scenarios. The MAWG will conduct its analysis based on **the existing modeling structures and components at the Basin, On-River and CAP scales.**

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MAWG Initial Conditions (IC) Scenarios Overview

- Purpose of IC Scenarios
  - Provide frame of reference for comparison of future proposed operating rules (post – ’26)
  - Recognize additional scenarios are likely to be developed in the future
- IC Scenarios Summary
  - ADWR – CAWCD operated CRSS & JSAM, conducted QA/QC and verified results
  - Operated with 4 discreet CRSS hydrologies
  - Observed that hydrology is the principal driver of impacts to Arizona & CAP
  - Did not evaluate alternative Colorado River operating rules
- Reclamation is in the process of developing additional CRSS hydrologies for consideration in 2022

Key Modeling Assumptions

- CRSS “as delivered” April 2021 version
  - ‘07 Guidelines + DCP operating rules extended for the modeling period
  - As delivered ICS and conservation assumptions
- IC Scenarios 1 – 6 modify CRSS Equalization Line
  - EQ Line fixed at 3652’ post-2026 operations
- JSAM application of Arizona On-River demands per IC Scenarios 1 – 6 conditions
- JSAM CAP impacts limited to Tier 3 volumes when Mead < 1,025’

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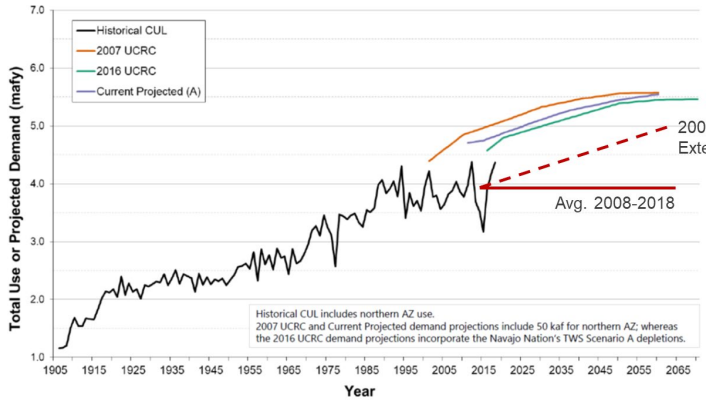
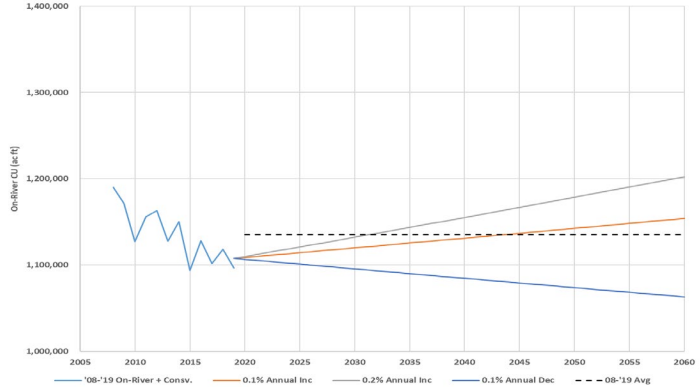
Initial Conditions Modeling Exercise

- **Purpose**: provide a frame of reference for comparison of future proposed operating rules (post – 2026)
- Initial condition scenarios were developed by MAWG participants at meeting #5 (May 13, 2021)
- Modeling conducted over 3 scales: Basin, AZ On-River and CAP, using CRSS and JSAM modeling tools

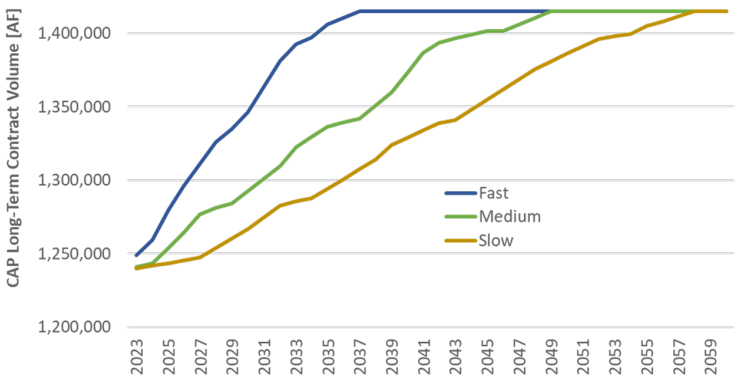
UB Demand



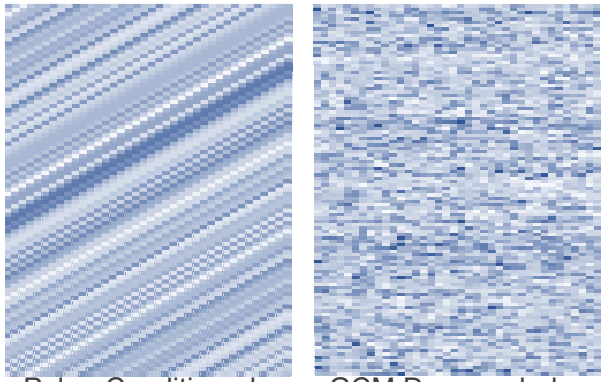
AZ On-River Demand



CAP Supply Utilization



CRSS Hydrology



Paleo-Conditioned GCM Downscaled

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MAWG Initial Conditions Scenarios Summary

Scenario	Hydrology	Upper Basin Demand	Arizona On-River Demand	CAP Utilization
IC #1	Stress Test	Guidelines Period UB Use Extended	0.1% Growth	Medium
IC #2	Paleo-Conditioned	2016 UCRC Upper Basin Growth	0.2% Growth	Medium
IC #3	Pluvial-Removed	Guidelines Period UB Use Extended	0.1% Growth	Medium
IC #4	Downscaled GCM	2016 UCRC Upper Basin Growth	0.2% Growth	Fast
IC #5	Pluvial-Removed	Upper Basin Guidelines Period Average	On-River Guideline Average	Medium
IC #6	Stress Test	2012 Basin Study Current Trends Growth	0.2% Growth	Fast

**All scenarios assume Lake Powell equalization line is capped at 3,652 ft starting in 2027*

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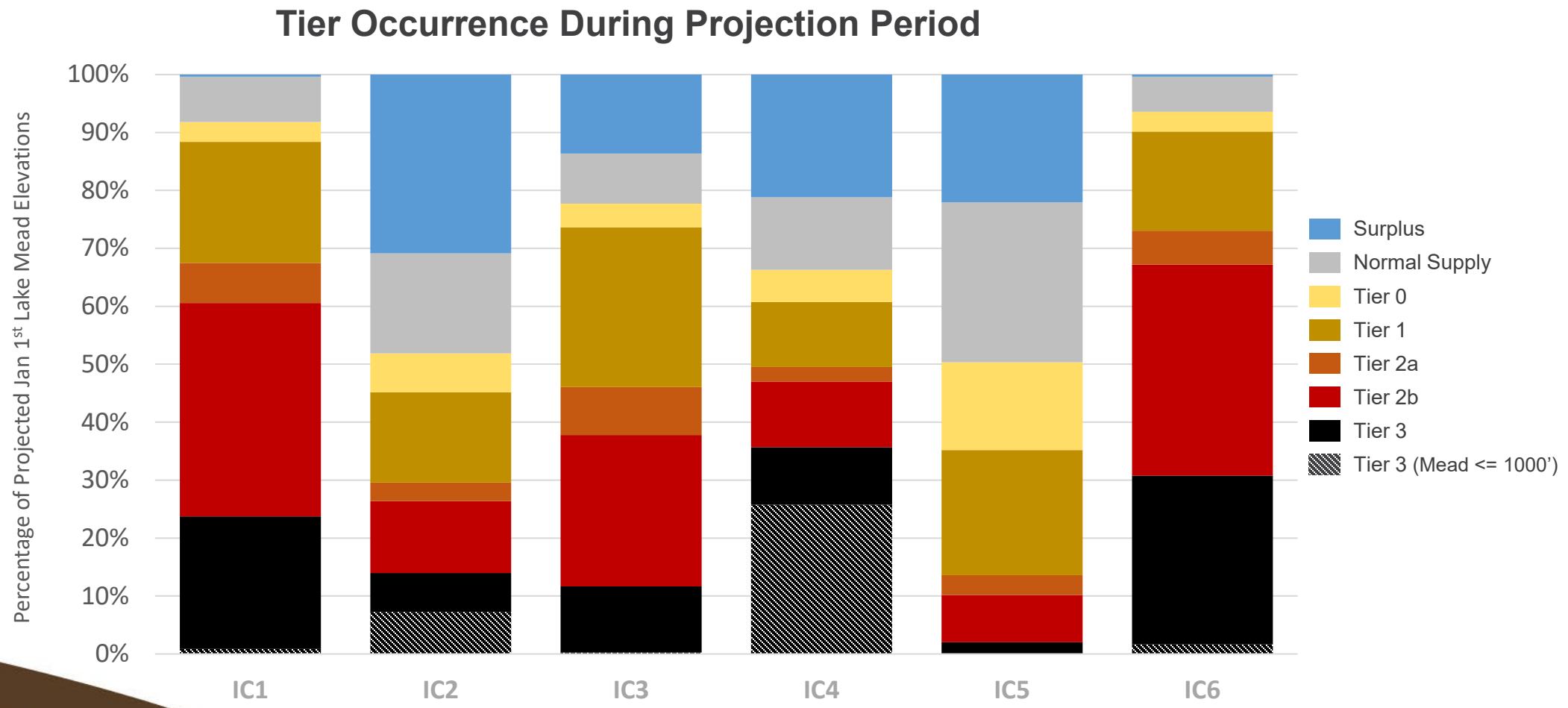
Tier Occurrence

Scenario	Hydrology	Upper Basin Demand	Arizona On-River Demand	CAP Utilization
IC #1	Stress Test	Guidelines Period UB Use Extended	0.1% Growth	Medium
IC #2	Paleo-Conditioned	2016 UCRC Upper Basin Growth	0.2% Growth	Medium
IC #3	Pluvial-Removed	Guidelines Period UB Use Extended	0.1% Growth	Medium
IC #4	Downscaled GCM	2016 UCRC Upper Basin Growth	0.2% Growth	Fast
IC #5	Pluvial-Removed	Upper Basin Guidelines Period Average	On-River Guideline Average	Medium
IC #6	Stress Test	2012 Basin Study Current Trends Growth	0.2% Growth	Fast



Duration at or Below Mead Elevation 1,025’

Scenario	1 yr	2 - 3 yrs	4 - 5 yrs	6 - 7 yrs	8 - 9 yrs	10+ yrs	Average Duration (yrs)
IC #1	48%	39%	12%	2%	0%	0%	2.0
IC #2	24%	25%	14%	10%	8%	19%	4.7
IC #3	49%	39%	11%	1%	0%	0%	1.9
IC #4	14%	18%	12%	9%	8%	39%	6.2
IC #5	68%	29%	3%	0%	0%	0%	1.4
IC #6	44%	40%	14%	3%	0%	0%	2.2

Scenario	Hydrology	Upper Basin Demand	Arizona On-River Demand	CAP Utilization
IC #1	Stress Test	Guidelines Period UB Use Extended	0.1% Growth	Medium
IC #2	Paleo-Conditioned	2016 UCRC Upper Basin Growth	0.2% Growth	Medium
IC #3	Pluvial-Removed	Guidelines Period UB Use Extended	0.1% Growth	Medium
IC #4	Downscaled GCM	2016 UCRC Upper Basin Growth	0.2% Growth	Fast
IC #5	Pluvial-Removed	Upper Basin Guidelines Period Average	On-River Guideline Average	Medium
IC #6	Stress Test	2012 Basin Study Current Trends Growth	0.2% Growth	Fast

MAWG Initial Conditions Scenario – Estimated Impact

Scenario	Hydrology	Upper Basin Demand	Arizona On-River Demand	CAP Utilization	Overall Ranking
IC #1	Stress Test	Guidelines Period UB Use Extended	0.1% Growth	Medium	3
IC #2	Paleo-Conditioned	2016 UCRC Upper Basin Growth	0.2% Growth	Medium	5
IC #3	Pluvial-Removed	Guidelines Period UB Use Extended	0.1% Growth	Medium	4
IC #4	Downscaled GCM	2016 UCRC Upper Basin Growth	0.2% Growth	Fast	2
IC #5	Pluvial-Removed	Upper Basin Guidelines Period Average	On-River Guideline Average	Medium	6
IC #6	Stress Test	2012 Basin Study Current Trends Growth	0.2% Growth	Fast	1

**All scenarios assume Lake Powell equalization line is capped at 3,652 ft starting in 2027*

Estimated Impact to Arizona / CAP

Lower — Higher

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MAWG Next Steps

- ADWR/CAWCD will continue to coordinate with Reclamation and others on additional CRSS hydrologies (early 2022)
- ADWR/CAWCD will conduct a sensitivity analysis regarding the influence of demands (Upper Basin, On-River and CAP) on Colorado River supplies
- Next MAWG meeting in late spring 2022

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Reclamation Technical Updates

- Reclamation assisting with QA/QC of Lower Basin modeling for the 1,030’ Consultation
- Establish modeling refinements and modifications
- Target April 1, 2022 to begin CRSS sensitivity analysis
- Coordinate with Basin States to address UB and LB priorities

ARC Next Steps

- Continue to share information with the ARC as it becomes pertinent to the Committee's purpose.
  - Since August, the focus has been on the 1,030' Consultation and the Reconsultation has been generally put on pause
  - The Basin States, in coordination with Reclamation, are developing a process to engage with Tribes and NGOs
  - We have heard Reclamation intends to begin its NEPA process in 2022

Call to the Public

- Submit questions or comments using the electronic public comment form at cap-az.com/ARC

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For continued information and updates, visit new.azwater.gov/ARC or cap-az.com/ARC

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