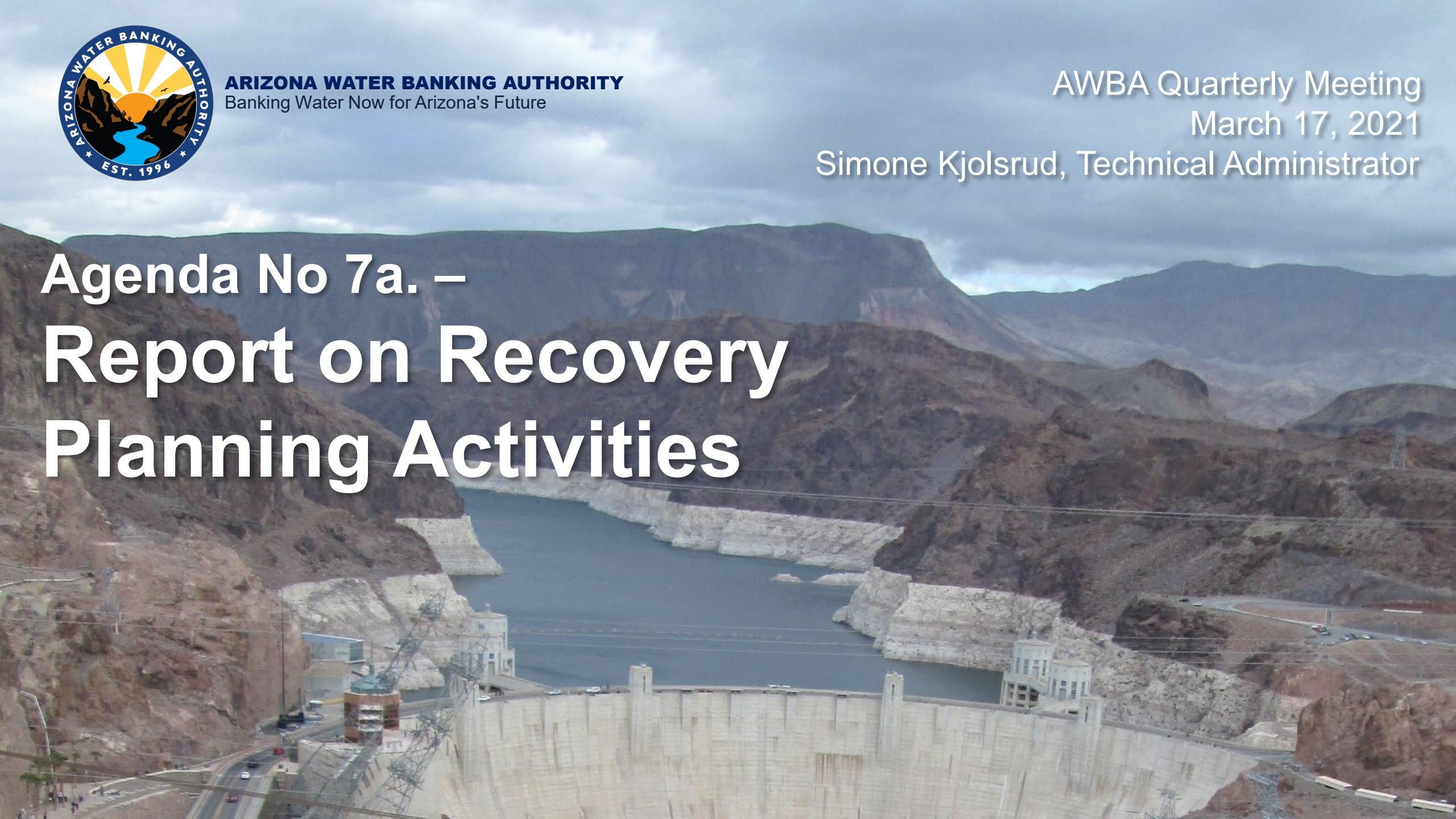


ARIZONA WATER BANKING AUTHORITY
Banking Water Now for Arizona's Future

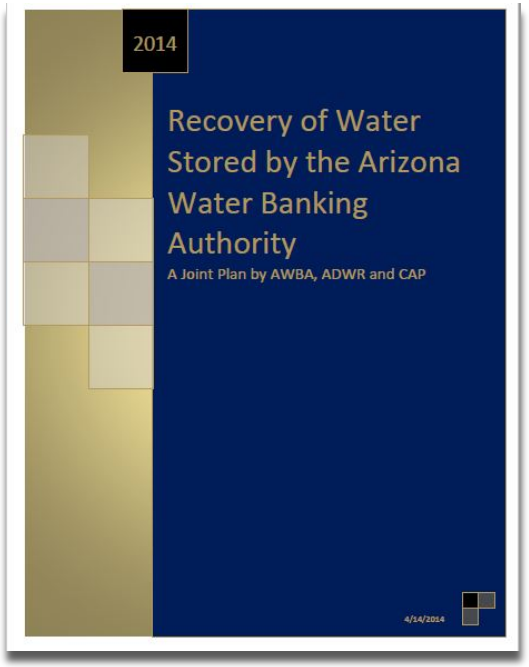
AWBA Quarterly Meeting
March 17, 2021
Simone Kjolsrud, Technical Administrator

Agenda No 7a. – Report on Recovery Planning Activities

Recovery Planning

- The 2021 Update to the 2014 Joint Recovery Plan represents an important milestone in recovery planning.

- The 2021 Update expands on concepts in the Joint Recovery Plan and includes updates since 2014.



2021 Update includes:

- Updated modeling based on DCP reductions
- Estimated recovery capacity required for firming CAP M&I subcontractors
- Recovery implementation timelines and triggers

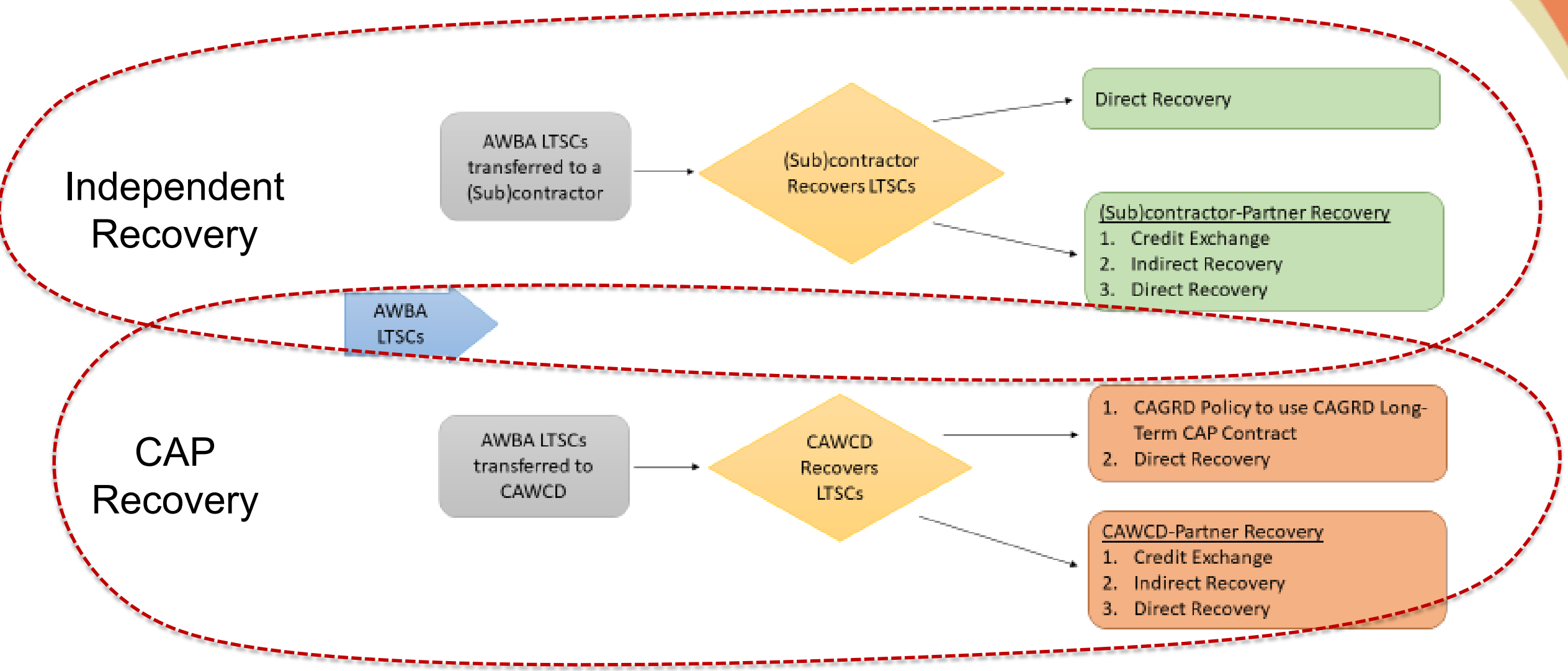
http://new.azwater.gov/rpag

Recovery Methods

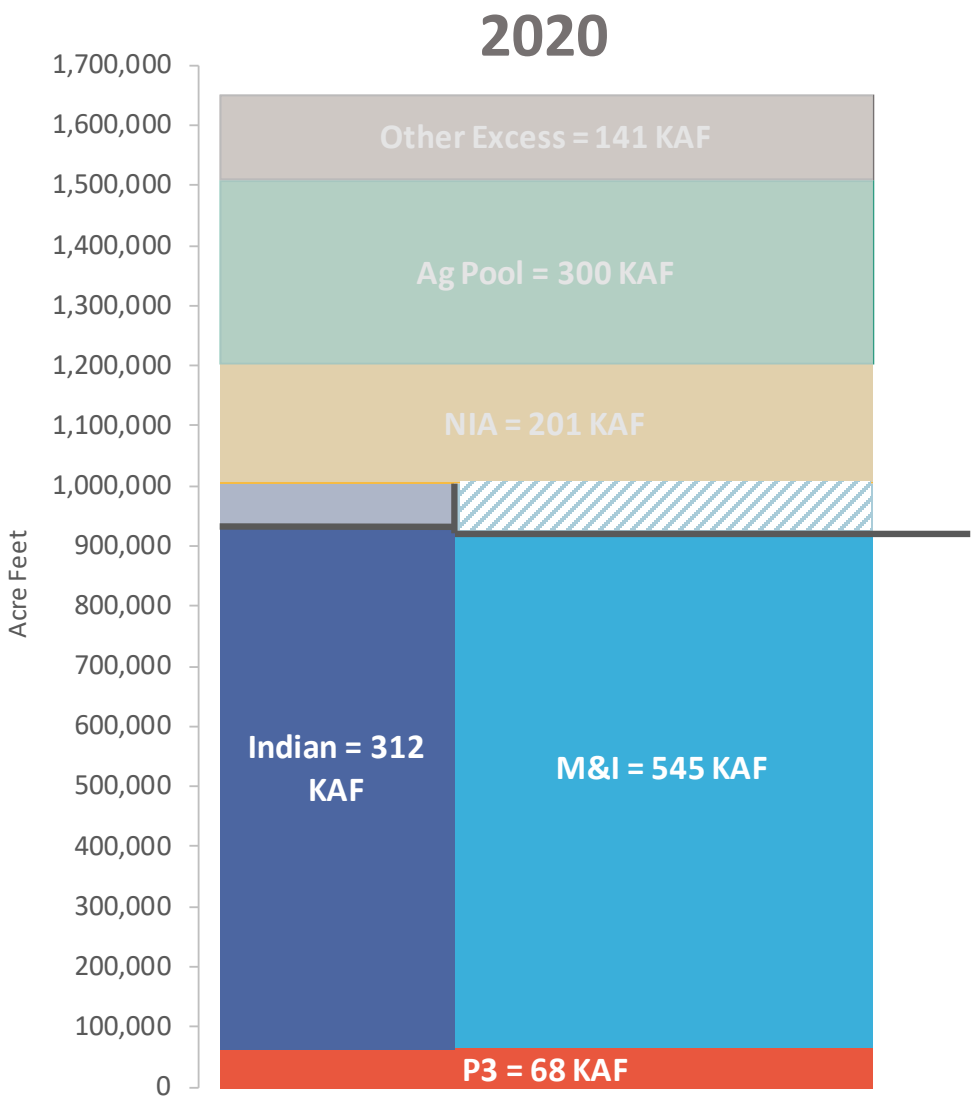
- Recovery Methods
  - Direct Recovery- CAP pumps water from storage and delivers via the CAP canal
  - Indirect Recovery – AWBA credits are assigned to (sub)contractor and (sub)contractor recovers
  - Credit Exchange

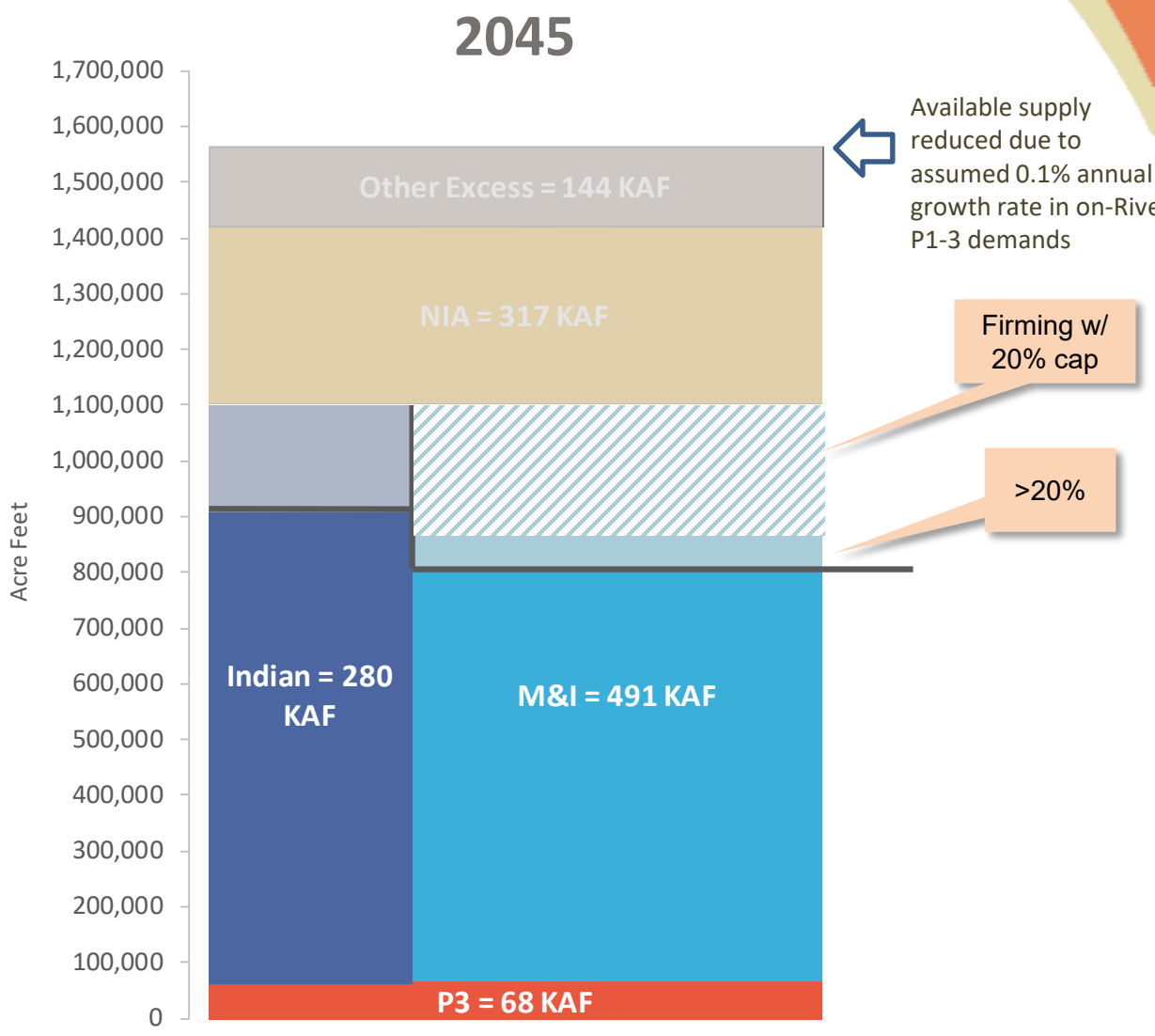
- CAP System Use Agreement
  - Defined “firming water”
  - Independent Recovery
  - Defined Exchanges including AWBA recovered LTSC’s exchanged for CAP water

CAP M&I Subcontractor Recovery Methods

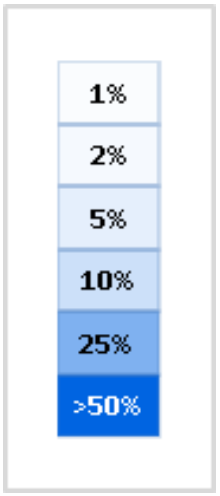


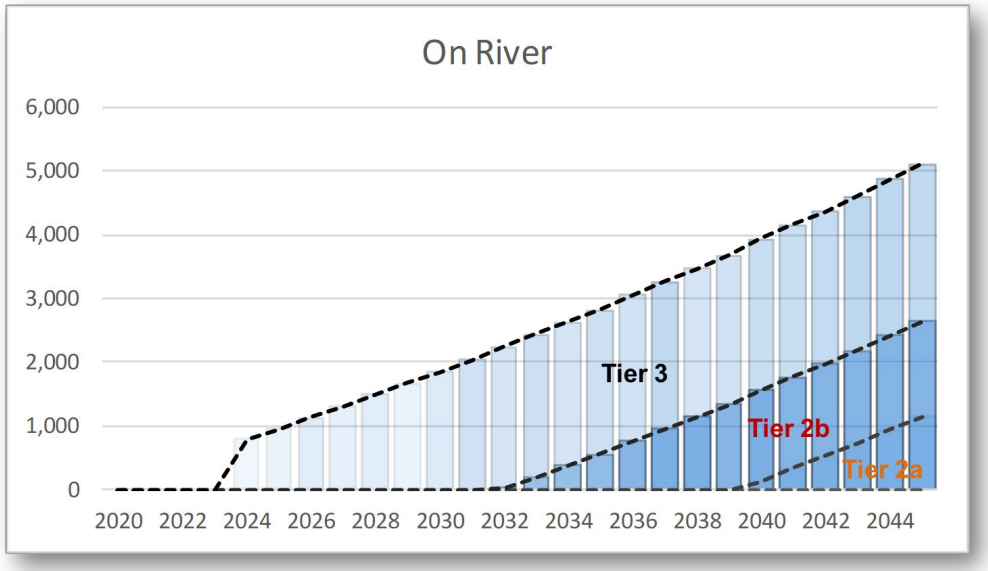
Current vs Projected Demand – **Tier 3** (720,000 AF)

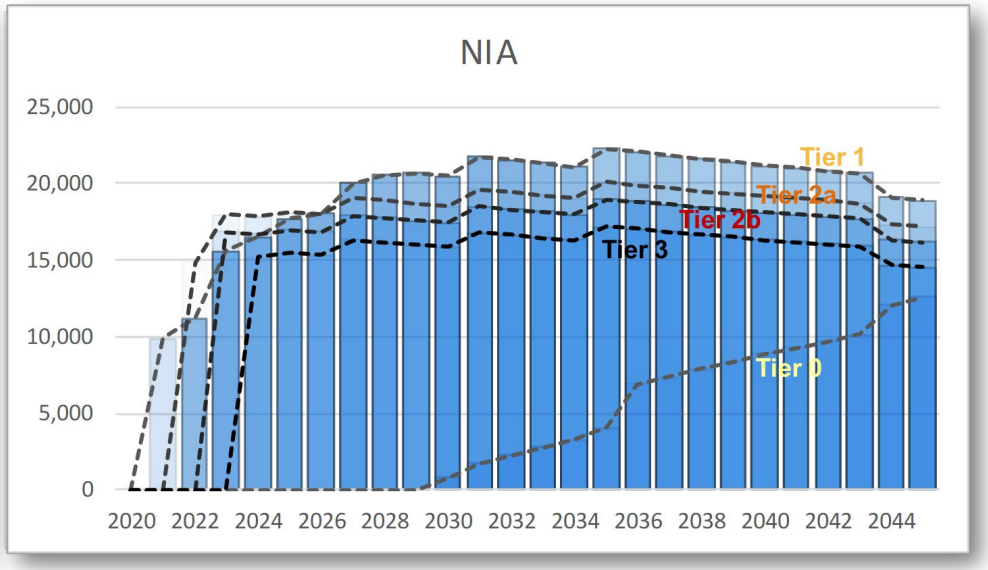


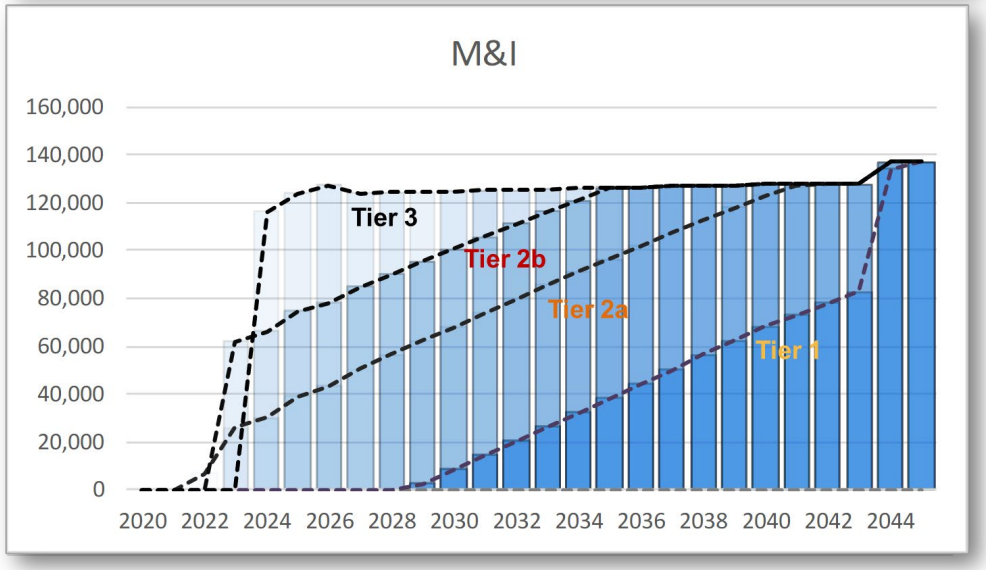


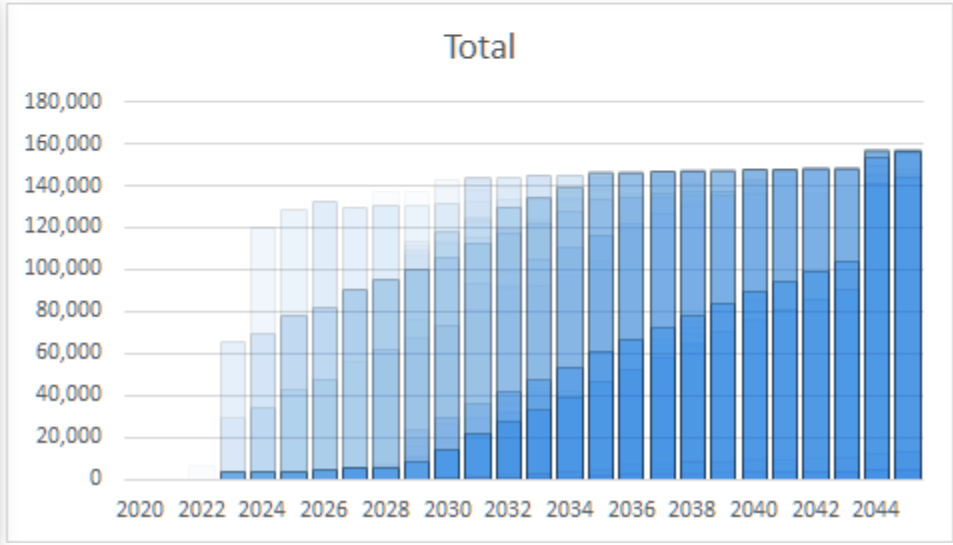
Firming Volumes: All Traces



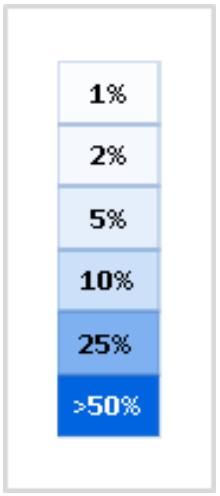


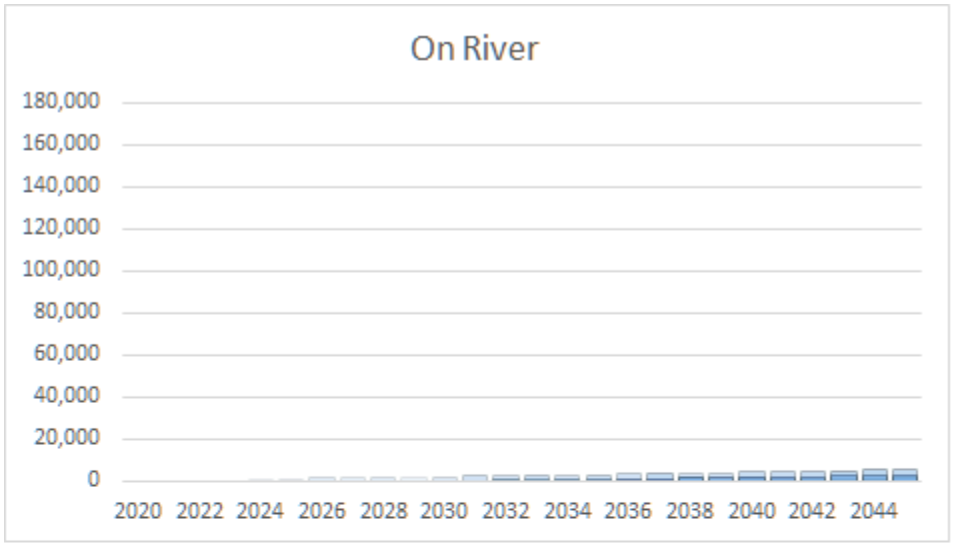


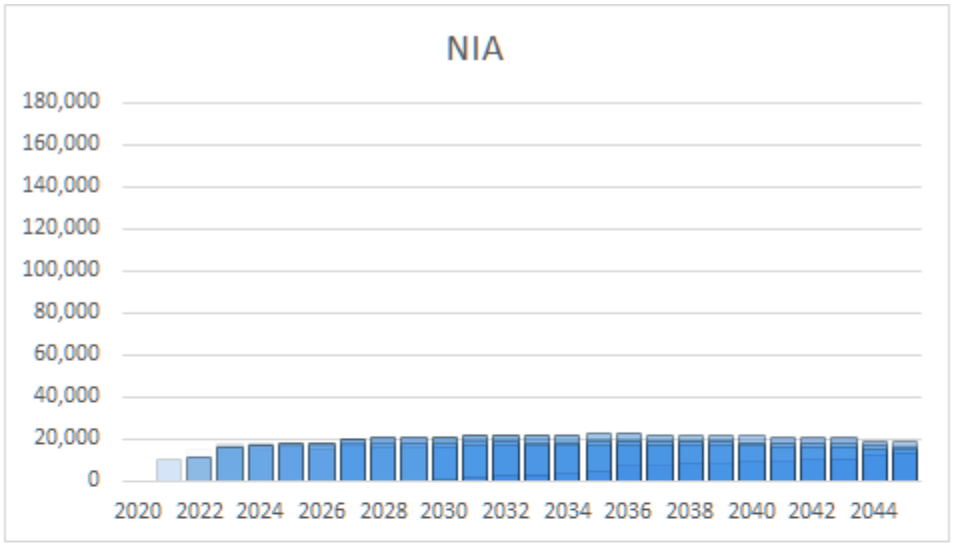


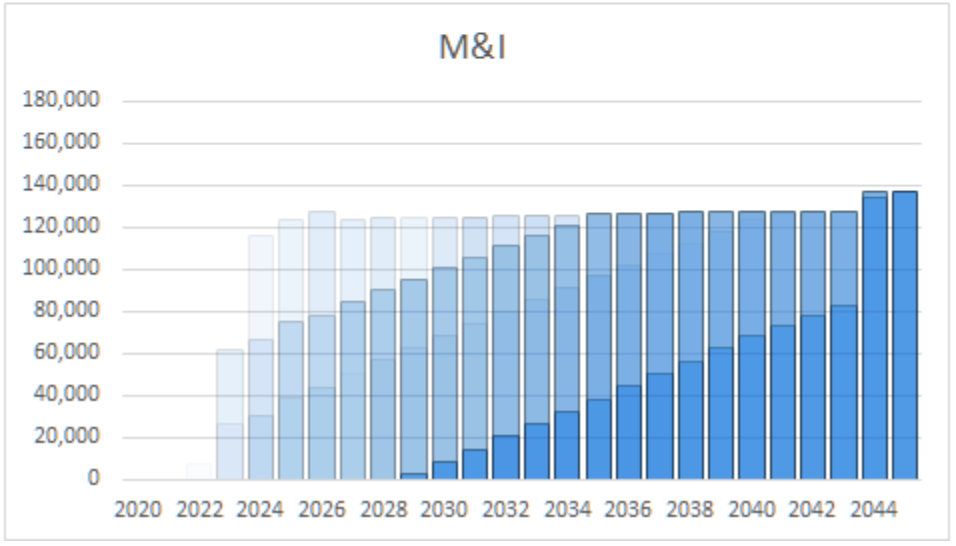


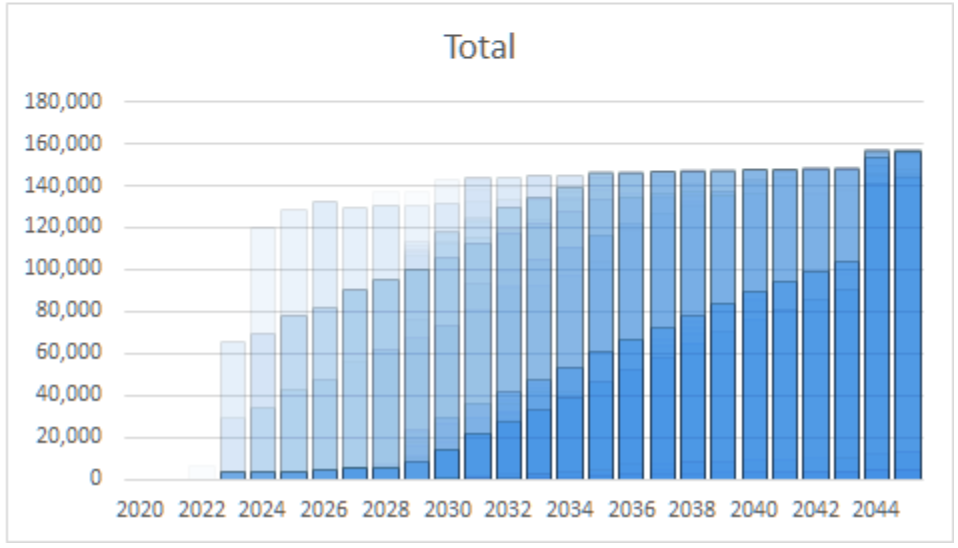
Firming Volumes: All Traces, Same Scale



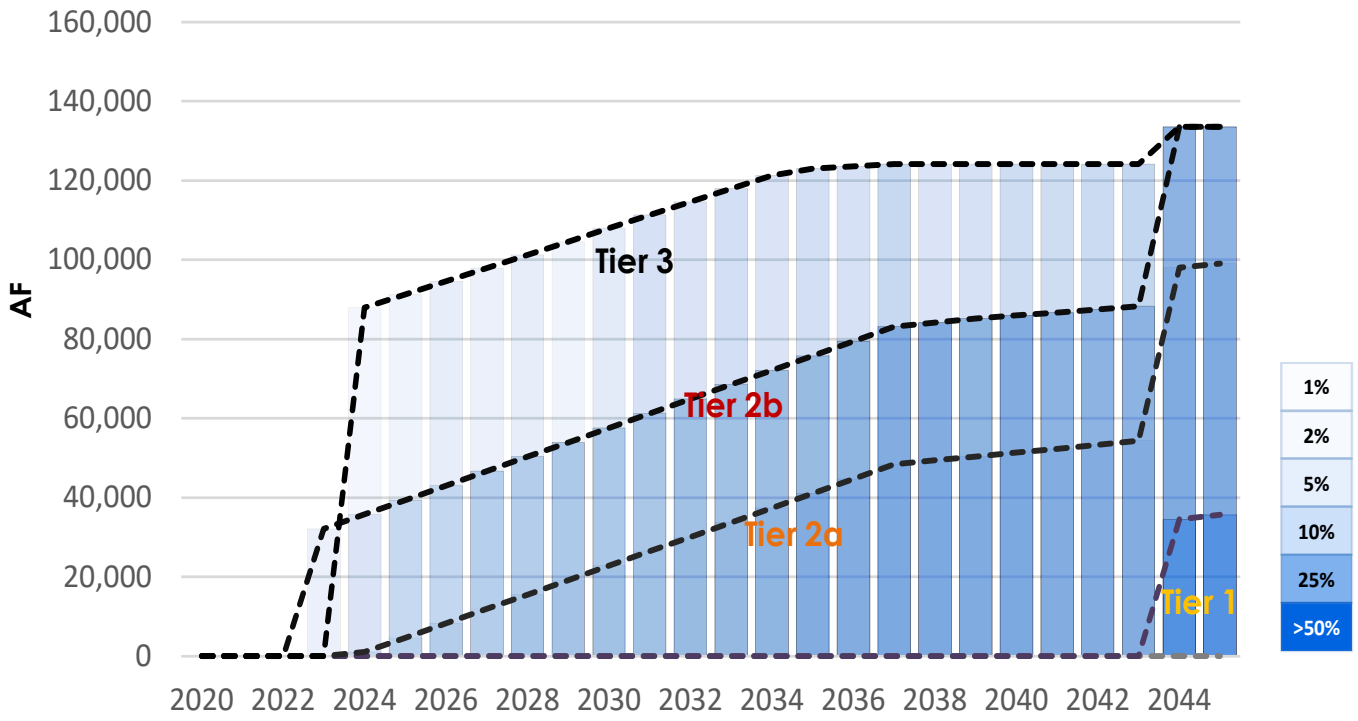








CAP M&I Modeling Results

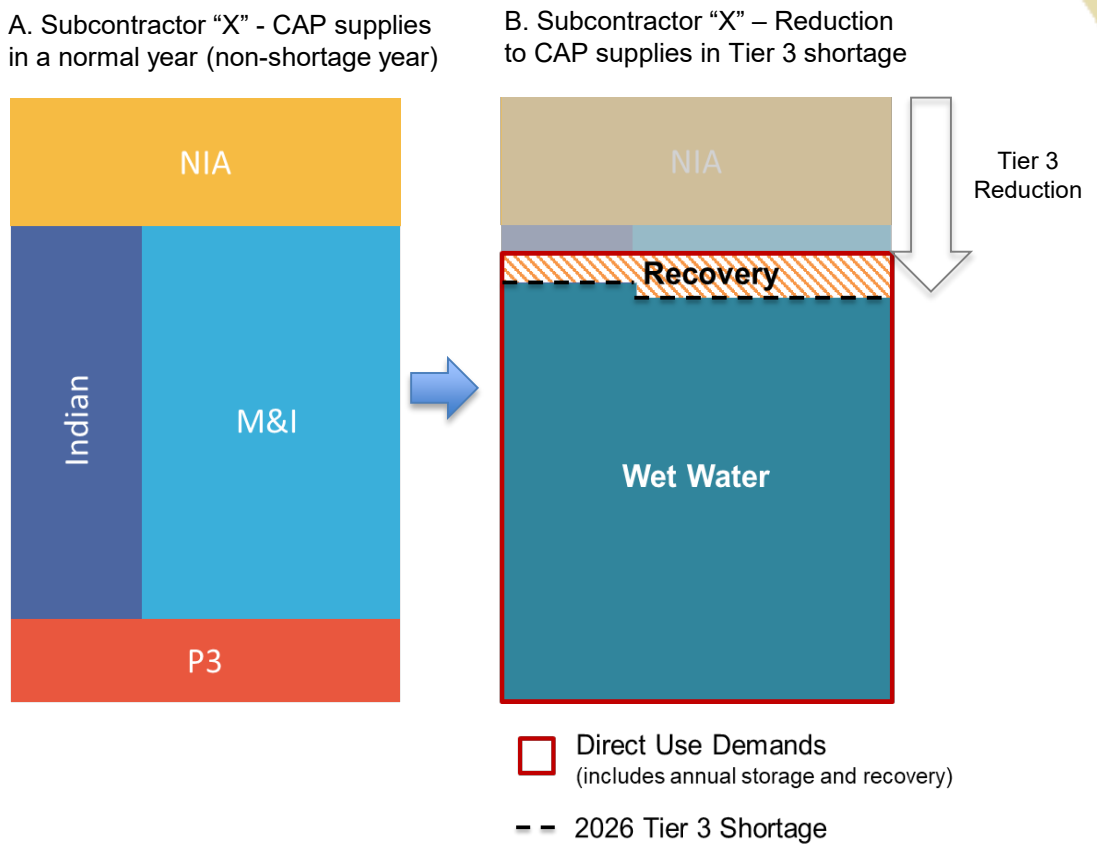


Projected Maximum Annual Firming Volume

Tier	Near (2021-2026)	Mid (2027-2035)	Long (2036-2045)
0	0	0	0
1	0	0	35,700
2a	8,300	41,100	99,100
2b	43,000	75,800	133,600
3	94,600	123,000	133,600

CAP M&I Recovery Capacity Analysis

- Analysis to estimate recovery well capacity, based on Tier 3 reduction of 720 KAF
- Focused on a subcontractor's CAP supplies used to meet direct use demands (treatment plant + ASR)
- Worked collaboratively with impacted subcontractors to refine analysis assumptions



CAP M&I Recovery Capacity Required (Tier 3)

Tier 3 Reduction - M&I Impacts (AFY)	2026[6]	2035[6]	2043[6]	2045[6]
AWBA M&I Recovery Capacity Needed[4]	**27,000**	**51,100**	**71,000**	**68,000**
Capacity Met by CAP	11,500	15,100	18,800	21,700
Capacity Met by Independent Recovery[5]	15,500	36,000	52,200	46,300

- Annual recovery capacity for CAP M&I firming* (final year of each planning period)
- M&I subcontractors estimated independent recovery
- Firming volumes adjust after 2044, approximately 47 KAF of NIA priority converts to M&I Priority

Table 12. Estimated AWBA M&I Recovery Capacity Required under a Tier 3 reduction[1]

Tier 3 Reduction – M&I Impacts (AFY)	2026[6]	2035[6]	2043[6]	2045[6]
Total CAP Supplies Used by M&I Subcontractors[2]	**859,900**	**878,300**	**878,300**	**878,300**
T3 Reduction to CAP Supplies Used by M&I Subcontractors	**207,800**	**239,300**	**252,300**	**254,600**
Reduction to LTSC Accrual	158,700	155,000	135,700	137,900
Reduction to Direct Uses[3]	49,100	84,300	116,700	116,700
~~*Reduction to M&I Priority Direct Uses*~~	~~29,108~~	~~54,980~~	~~79,860~~	~~90,108~~
AWBA M&I Recovery Capacity Needed[4]	**27,000**	**51,100**	**71,000**	**68,000**
Capacity Met by CAP	11,500	15,100	18,800	21,700
~~Capacity Met by Independent Recovery[5]~~	~~15,500~~	~~36,000~~	~~52,200~~	~~46,300~~

[1] Includes Phoenix, Pinal and Tucson AMAs. All values in acre-feet per year (AFY).
[2] Total CAP supplies used by M&I subcontractors during a non-shortage year, all CAP priority pools.
[3] Direct use includes CAP supplies not used to accrue LTSCs (e.g. water sent to treatment plants and ASR)
[4] Recovery capacity past 2026 is capped at 20% of the total M&I priority pool, excluding the San Carlos Apache Tribe's M&I priority supply of 18,145 acre-feet.
[5] Estimates based on feedback provided by subcontractors. Numbers may not sum due to rounding.
[6] Reflects the final year of each planning period, with 2043 and 2045 separated to show before and after the 47,303 AF of NIA priority supply converts to M&I priority in 2044.

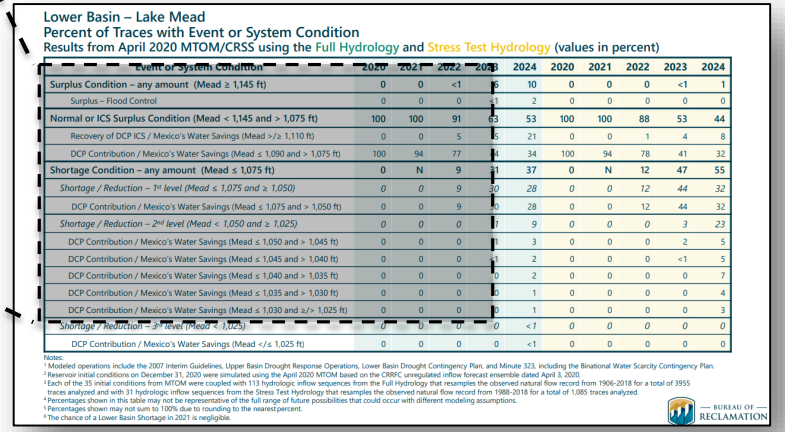
*Phoenix, Pinal, Tucson AMAs

Implementation Timing & Triggers

- Implementation begins three years prior to a potential shortage year

Event or System Condition	2020	2021	2022	2023
Surplus Condition – any amount (Mead ≥ 1,145 ft)	0	0	<1	6
Surplus – Flood Control	0	0	0	<1
Normal or ICS Surplus Condition (Mead < 1,145 and > 1,075 ft)	100	100	91	63
Recovery of DCP ICS / Mexico's Water Savings (Mead >/≥ 1,110 ft)	0	0	5	15
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,090 and > 1,075 ft)	100	94	77	44
Shortage Condition – any amount (Mead ≤ 1,075 ft)	0	N	9	31
Shortage / Reduction – 1st level (Mead ≤ 1,075 and ≥ 1,050)	*0*	*0*	*9*	*30*
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,075 and > 1,050 ft)	0	0	9	30
Shortage / Reduction – 2nd level (Mead < 1,050 and ≥ 1,025)	*0*	*0*	*0*	*1*
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,050 and > 1,045 ft)	0	0	0	1
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,045 and > 1,040 ft)	0	0	0	<1
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,040 and > 1,035 ft)	0	0	0	0
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,035 and > 1,030 ft)	0	0	0	0
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,030 and ≥/> 1,025 ft)	0	0	0	0
Shortage / Reduction – 3rd level (Mead < 1,025)	*0*	*0*	*0*	*0*

Bureau of Reclamation Five-Year Table



Lower Basin – Lake Mead
Percent of Traces with Event or System Condition
Results from April 2020 MTOM/CRSS using the Full Hydrology and Stress Test Hydrology (values in percent)

Event or System Condition	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
Surplus Condition – any amount (Mead ≥ 1,145 ft)	0	0	<1	6	10	0	0	0	<1	1
Surplus – Flood Control	0	0	0	<1	2	0	0	0	0	0
Normal or ICS Surplus Condition (Mead < 1,145 and > 1,075 ft)	100	100	91	63	53	100	100	88	53	44
Recovery of DCP ICS / Mexico's Water Savings (Mead >/≥ 1,110 ft)	0	0	5	15	21	0	0	1	4	8
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,090 and > 1,075 ft)	100	94	77	44	34	100	94	78	41	32
Shortage Condition – any amount (Mead ≤ 1,075 ft)	0	N	9	31	37	0	N	12	47	55
Shortage / Reduction – 1st level (Mead ≤ 1,075 and ≥ 1,050)	*0*	*0*	*9*	*30*	*28*	*0*	*0*	*12*	*44*	*32*
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,075 and > 1,050 ft)	0	0	9	30	28	0	0	12	44	32
Shortage / Reduction – 2nd level (Mead < 1,050 and ≥ 1,025)	*0*	*0*	*0*	*1*	*9*	*0*	*0*	*0*	*3*	*23*
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,050 and > 1,045 ft)	0	0	0	1	3	0	0	0	2	5
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,045 and > 1,040 ft)	0	0	0	<1	2	0	0	0	<1	5
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,040 and > 1,035 ft)	0	0	0	0	2	0	0	0	0	7
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,035 and > 1,030 ft)	0	0	0	0	1	0	0	0	0	4
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,030 and ≥/> 1,025 ft)	0	0	0	0	1	0	0	0	0	3
Shortage / Reduction – 3rd level (Mead < 1,025)	*0*	*0*	*0*	*0*	*<1*	*0*	*0*	*0*	*0*	*0*
DCP Contribution / Mexico's Water Savings (Mead </≤ 1,025 ft)	0	0	0	0	<1	0	0	0	0	0

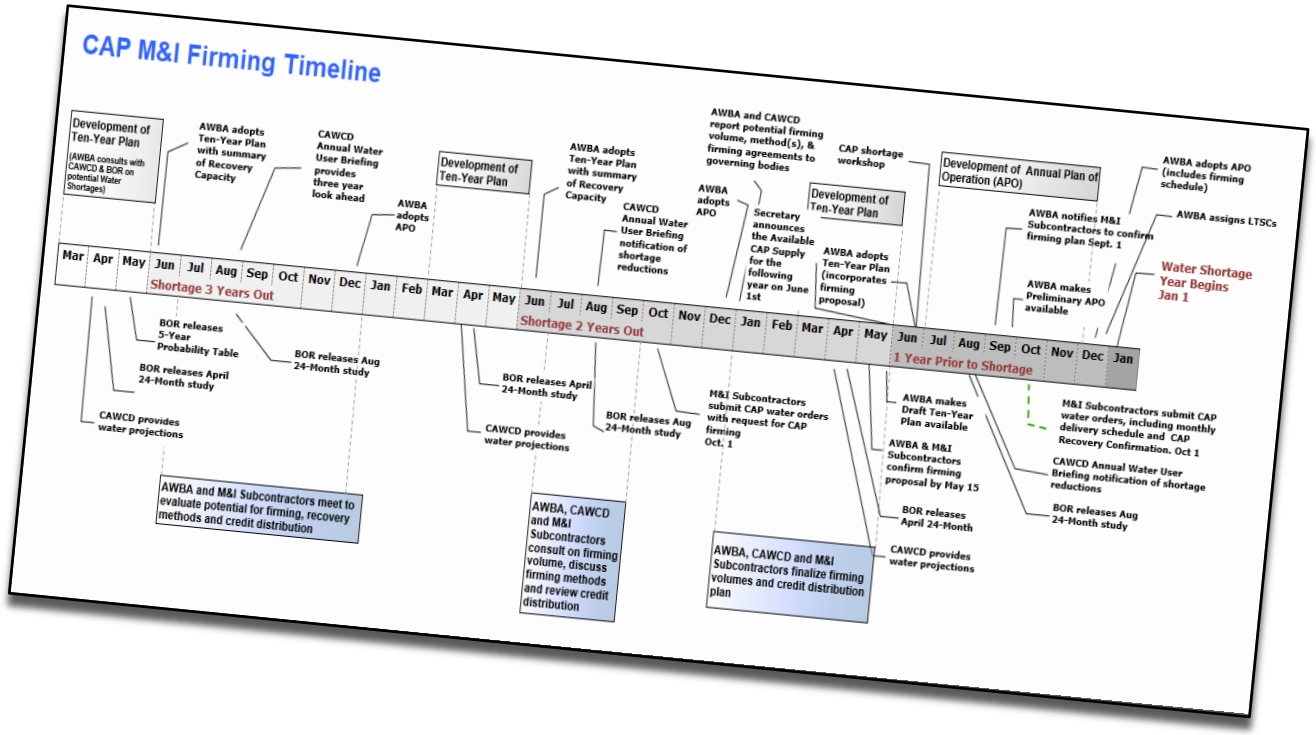
Notes:
[1] Modeled operations include the 2007 Interim Guidelines, Upper Basin Drought Response Operations, Lower Basin Drought Contingency Plan, and Minute 323, including the Binational Water Scarcity Contingency Plan.
[2] Reservoir initial conditions on December 31, 2020 were simulated using the April 2020 MTOM based on the CRRFC unregulated inflow forecast ensemble dated April 3, 2020.
[3] Each of the 35 initial conditions from MTOM were coupled with 113 hydrologic inflow sequences from the Full Hydrology that resamples the observed natural flow record from 1906-2018 for a total of 3955 traces analyzed and with 31 hydrologic inflow sequences from the Stress Test Hydrology that resamples the observed natural flow record from 1988-2018 for a total of 1,085 traces analyzed.
[4] Percentages shown in this table may not be representative of the full range of future possibilities that could occur with different modeling assumptions.
[5] Percentages shown may not sum to 100% due to rounding to the nearest percent.
[6] The chance of a Lower Basin Shortage in 2021 is negligible.

BUREAU OF RECLAMATION

- Proposed triggers for M&I firming
  - Trigger 1: The April 5-year table
    > 15% probability of shortage in third year
  - Trigger 2: April 24-Month Study
    The "Min Probable" forecasts a shortage in second year
  - Trigger 3: April 24-Month Study
    The "Most Probable" forecasts a shortage in following year

Operational Timeline & M&I Firming Timeline

Year	Month	Task
Before (Preparation)	April	- USBR provides likely water availability (i.e., Normal, Surplus or Shortage) o Trigger 1: April 5-year table > 15% probability of M&I shortage in third year o Trigger 2: April 24-Month Study, "Min Probable" forecast with M&I shortage in second year o Trigger 3: April 24-Month Study, "Most Probable" forecast with M&I shortage in following year
	May	- SNWA provides preliminary request for ICUA for the upcoming year and an estimate for the two succeeding years - AWBA and CAP M&I subcontractors confirm the firming proposal by May 15th if shortage is forecasted in the following year
	June	- AWBA adopts Ten-Year Plan with a summary of projected recovery capacity required, including projections for CAP Recovery and Independent Recovery
	July – Sept	- AWBA consults with CAP M&I subcontractors on firming volumes, firming methods and credit distribution plan. If shortage is forecasted in the following year, AWBA provides final notification of firming plan by Sept. 1st
	August	- 24 Month Study, USBR indicates water availability (i.e., Normal, Surplus or Shortage) - CAP holds annual customer workshop advising customers of expected CAP water availability for the next year
	September	- SNWA makes final request to the Secretary for the release of the ICUA - AWBA Preliminary Annual Plan of Operation (APO), which includes preliminary Recovery Schedule, is presented to the AWBA Commission
	October	- CAP M&I subcontractors submit water orders for the upcoming year, includes an estimate of requested AWBA firming volumes for the two succeeding years - Deadline for MCWA to notify CAP its intent to exchange LTSCs
	November	- AWBA presents its preliminary APO to the GUACs - CAP and AWBA collaborate on any adjustments to Recovery Schedule
	December	- Final Draft APO is presented to the AWBA Commission for adoption - Deadline for MCWA to transfer credits to CAP prior to Exchange Year - USBR official determination of water availability for next year in their Annual Operating Plan (AOP) signed in December
During (Recovery)	During Year	- CAP works with recovery partners to monitor and ensure compliance with contractual responsibilities
	Quarterly	- CAP sends AWBA any substantive changes to the Recovery Schedule - AWBA incorporates the changes in their quarterly reports
	December	- CAP sends AWBA a recovery report with accounting of credit utilization
	By End of Year	- AWBA credits must be transferred to recovery partner (or 3rd party partner)
After (Reporting)	March	- Deadline for CAP and recovery partners to submit annual reports to ADWR
	June	- Reconciliation of annual reporting, if necessary
	June	- Final accounting of credits recovered in previous year in AWBA's Annual Report



Recovery Cost Considerations

- Beneficiaries of AWBA firming are responsible for recovery costs
- Independent Recovery of AWBA credits
  - CAP M&I subcontractors who elect for independent recovery of AWBA credits are responsible for all recovery costs
- CAP Recovery of AWBA credits
  - CAP recovery partnership agreements each have unique costs and terms
  - CAP has established a recovery reserve supporting recovery work that will also factor into the total recovery costs
  - For planning purposes, CAP anticipates recovery costs will be comparable to CAP delivery rates

Section 8: Future Activities & Commitments

- ADWR, AWBA and CAP will monitor factors influencing Colorado River Supply
- Proposed Colorado River operating guidelines (post 2026) will require updated modeling to determine the impact to the frequency and magnitude of shortage reductions and the impact on the AWBA's firming responsibilities.
- CAP will continue to seek recovery partner agreements and perform technical studies for future project feasibility
- AWBA, CAP and SNWA will continue ongoing discussions to plan for Nevada’s request for ICUA
- AWBA will continue to monitor credit balances and credit utilization rate
- Importance of continued collaboration with the RPAG

Release of the 2021 Update

- April 2021 - Incorporate final comments, minor technical corrections and final formatting
- May 2021 – Final version released for public comment
  - Email announcement
  - Coordinated blog posts (ADWR and CAP)
- Next RPAG meeting early May

Discussion/Questions?