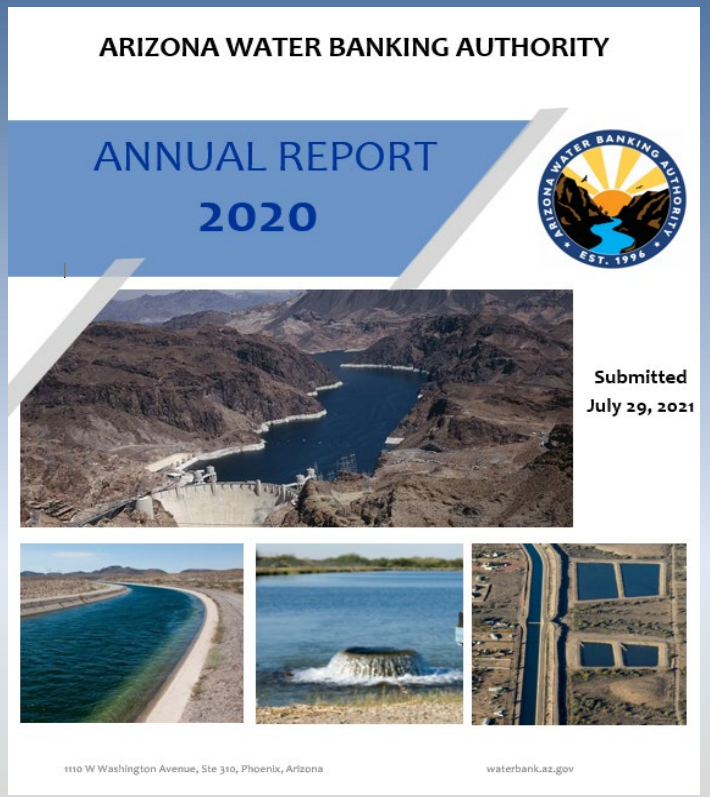
Agenda Item No. 7

2020 AWBA Annual Report



AWBA Quarterly Meeting
July 29, 2021

Virginia O'Connell, Director
Simone Kjolsrud, Technical Administrator

2020 Plan of Operation

- No Initial Water Storage Deliveries
- Amended Plan – Total Delivered 59,543 AF
  - Phoenix AMA – 35,843 AF
  - Pinal AMA – 12,000 AF
  - Tucson AMA – 11,700 AF
- LTSC purchases 27,080 AF
  - Phoenix AMA – 13,100 AF
  - Tucson AMA – 6,157 AF
- GRIC ICS Firming Credits - 6,390 AF
  - Phoenix AMA – 4,023 AF
  - Pinal AMA – 2,367 AF

2020 Plan of Operation Expenditures

Funding Source	Phoenix AMA	Pinal AMA	Tucson AMA	Total
	($ Million)			
Water Storage Tax	**$10.96**	**$2.12**	**$5.53**	**$18.62**
Withdrawal Fees	**$1.10**	**$0.65**	**$0.62**	**$2.38**
Total	**$12.07**	**$2.77**	**$6.16**	**$21.00**

*Totals may not sum due to rounding

Progress Toward AWBA Firming Objectives through 2020

Objective	Funding Source	Credits Accrued (AF)	Estimated Firming Volumes through 2120 (AF) [1]	
M&I Firming			UB 15% Reduction	UB "As-is"
Phoenix AMA	Maricopa 4¢	1,565,592	1,885,000 – 2,985,000	
Pinal AMA	Pinal 4¢	233,797	293,000 – 463,000	
Tucson AMA	Pima 4¢	507,934	1,040,000 – 1,647,000	
On-River M&I Firming	General Fund	403,830	221,000 – 359,000	
Tribal Firming [2]			717,000 – 907,000	
Gila River Indian Community	Withdrawal Fees	168,974	456,000 – 577,000	
Groundwater Mgmt				
Phoenix AMA	Withdrawal Fees	251,411		
Pinal AMA	Withdrawal Fees	417,670		
Tucson AMA	Withdrawal Fees	107,148		

[1] Based on hydrologic modeling results identified in Appendix C of the 2020 Annual Report

[2] Estimated firming volumes through 2107

Questions?

Ten-Year Plan
(2022-2031)

- Planning tool
- Firming projections & estimates ICUA volume/timing
- Firming implementation – Operational timeline triggers for tribal firming/M&I firming
- Supports policy development

Assumptions

- No Excess CAP water available 2022-2031
- No general fund appropriations
- Continued legislative transfers of withdrawal fees
- LTSC purchases based on CAP Excess Water rates
- If water becomes available, AWBA will store based on established priorities

Credit Development

- **Indian Firming**
  - **ICS Firming Credits (21,220 AF)**
- **CAP M&I Firming**
  - **Based on current agreements**
    - Maricopa Water Storage Tax (19,700 AF)
    - Pima Water Storage Tax (24,130 AF)
- **Tucson AMA withdrawal fee (~1,000 AF/year)**

AWBA Credits by Objective - through 2031

Location and Objective	Funding Source	Estimated Credits Accrued through 2031 (AF)[1]	Estimated Firming Volumes through 2120 (AF)[7]	
			"UB 15% Reduction"	"UB As-Is"
CAP M&I Firming				
Phoenix AMA	Water Storage Tax collected by County	1,591,792	1,885,000 – 2,985,000	
Pinal AMA		233,797	293,000 – 463,000	
Tucson AMA		621,634	1,040,000 – 1,647,000	
On-River M&I Firming[2]	General Fund	403,830	221,000 – 359,000	
Tribal Settlement Obligations:				
Gila River Indian Community		194,390[3]	456,000 – 577,000	
up to 15 KAF/year	General Fund	*0*		
	Withdrawal Fees	*194,390*		
Future Settlements[4] -		0		
up to 8.7 KAF/year	General Fund	0	261,000 – 330,000	
	Withdrawal Fees	0		
Federal Assistance (SAWRSA) -				
$3 million provided in LTSCs	General Fund	28,481		
	Tucson W/Fees	5,621		
Groundwater Management[5]				
Phoenix AMA	Withdrawal Fees collected by AMA	251,411		
Pinal AMA		417,670		
Tucson AMA		121,845		
Other:	Agreement with Nevada			
Shortage Reparations ($8M)		109,489		
Pinal Redirect Credits[6]	N/A	14,125		

Credit Distribution

- Modeling scenarios, shortage probability and firming volumes
  - Colorado River Simulation System (CRSS)
  - Joint Recovery Model (JRM)
- AWBA baseline scenario
  - Full Hydrology
  - 2016 UCRC Schedule for Upper Basin demands
  - Full utilization of CAP contracts by 2037

April 2021 – Full Hydrology

Shortage Probabilities for Lake Mead and AWBA Estimated Firming (2022 - 2031)

Full Hydrology[1]		← Reclamation's Five-Year Table[2]				← Projections Extended by AWBA[2] →					
Operational Tier[2]/Shortage Probability[2]	**KAF**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Surplus Condition (≥ 1,145)		0%	0%	1%	4%	7%	12%	16%	20%	22%	24%
Normal Year or ICS Surplus (<1145 and		3%	6%	17%	19%	22%	20%	18%	15%	13%	10%
Normal (<1145 and >1090)		0%	0%	5%	8%	14%	14%	16%	12%	11%	9%
Tier Zero (≤1090 and >1075)	192	3%	5%	11%	10%	8%	6%	2%	3%	2%	1%
Shortage Condition (Mead ≤1075)		97%	94%	82%	77%	72%	68%	66%	66%	65%	66%
Tier 1 DCP Contribution (≥1050 and ≤1075)	512	**97%**	**81%**	37%	**34%**	28%	25%	24%	22%	24%	27%
Tier 2 DCP Contribution (≥1025 and <1050)		0%	13%	**44%**	32%	**32%**	**30%**	**28%**	**30%**	**29%**	**27%**
Tier 2a (>1045 and <1050)	592	0%	11%	9%	6%	7%	6%	5%	8%	6%	6%
Tier 2b (≥1025 and ≤1045)	640	0%	2%	35%	27%	25%	24%	23%	22%	24%	20%
Tier 3 DCP Contribution (<1025)	720	0%	0%	1%	11%	12%	13%	14%	14%	12%	12%

Total AWBA Firming[3] (af)		**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**Total**
Tier 1 DCP Contribution (≥1050 and ≤1075)		9,402	12,624	12,881	13,664	13,898	14,326	14,550	14,774	15,285	15,614	
Tier 2 DCP Contribution (≥1025 and <1050)												
Tier 2a (>1045 and <1050)		14,252	18,154	18,412	18,677	18,750	20,232	23,206	26,179	29,154	32,129	
Tier 2b (≥1025 and ≤1045)		36,424	43,008	45,984	48,959	51,936	54,913	57,892	60,871	63,851	66,832	
Tier 3 DCP Contribution (<1025)		89,602	95,848	98,832	101,817	104,802	107,788	110,776	113,763	116,752	119,741	
Total AWBA Firming[3] (af)		**9,402**	**12,624**	**45,984**	**13,664**	**51,936**	**54,913**	**57,892**	**60,871**	**63,851**	**66,832**	**437,969**

[1] Hydrologic assumptions from Reclamation's April 2021 CRMMS/CRSS Full Hydrology (DNF 1906-2019).

[2] Shortage probabilities from Reclamation's projections of future Colorado River system conditions, April 2021 CRMMS/CRSS Full Hydrology (DNF 1906-2019). Reclamation's projections run through 2025. The 2007 Interim Guidelines expire in 2026. The AWBA extended Reclamation's projections (based on current operating conditions) through 2031. These projections do not represent the full range of future possibilities that could occur with different modeling assumptions.

[3] Estimated AWBA firming volumes derived from the Joint Recovery Model, developed by ADWR, AWBA and CAWCD: May 2021. These estimated firming volumes do not represent the full range of future possibilities that could occur with different modeling assumptions.

April 2021 – Full Hydrology

Full Hydrology[1]

Tribal CAP NIA Firming[3] (af)	KAF	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Tier 1 DCP Contribution (≥1050 and ≤1075)	512	9,402	12,624	12,881	13,664	13,898	14,326	14,550	14,774	15,285	15,614	
Tier 2 DCP Contribution (≥1025 and <1050)												
Tier 2a (>1045 and <1050)	592	14,252	18,154	18,412	18,677	18,750	18,703	18,608	18,515	18,422	18,331	
Tier 2b (≥1025 and ≤1045)	640	14,441	17,958	17,865	17,774	17,683	17,594	17,505	17,417	17,330	17,244	
Tier 3 DCP Contribution (<1025)	720	13,053	16,232	16,148	16,066	15,984	15,903	15,822	15,743	15,664	15,587	
Total NIA Indian Firming[3] (af)		**9,402**	**12,624**	**17,865**	**13,664**	**17,683**	**17,594**	**17,505**	**17,417**	**17,330**	**17,244**	**158,328**

CAP M&I Firming[3] (af)		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Tier 1 DCP Contribution (≥1050 and ≤1075)		0	0	0	0	0	0	0	0	0	0	
Tier 2 DCP Contribution (≥1025 and <1050)												
Tier 2a (>1045 and <1050)		0	0	0	0	0	1,530	4,598	7,665	10,732	13,799	
Tier 2b (≥1025 and ≤1045)		21,983	25,050	28,118	31,185	34,252	37,319	40,387	43,454	46,521	49,588	
Tier 3 DCP Contribution (<1025)		76,549	79,616	82,684	85,751	88,818	91,885	94,953	98,020	101,087	104,154	
Total CAP M&I Firming[3] (af)		**0**	**0**	**28,118**	**0**	**34,252**	**37,319**	**40,387**	**43,454**	**46,521**	**49,588**	**279,641**

[1] Hydrologic assumptions from Reclamation's April 2021 CRMMS/CRSS Full Hydrology (DNF 1906-2019).

[3] Estimated AWBA firming volumes derived from the Joint Recovery Model, developed by ADWR, AWBA and CAWCD: May 2021. These estimated firming volumes do not represent the full range of future possibilities that could occur with different modeling assumptions.

April 2021 – Stress Test Hydrology

Shortage Probabilities for Lake Mead and AWBA Estimated Firming (2022 - 2031)

Stress Test Hydrology[1]		← Reclamation's Five-Year Table[2] →				← Projections Extended by AWBA[2] →					
Operational Tier[2]/Shortage Probability[2]		**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Surplus Condition (≥ 1,145)		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Normal Year or ICS Surplus (<1145 and		3%	8%	9%	6%	14%	16%	16%	15%	15%	10%
Normal (<1145 and >1090)		0%	0%	0%	3%	9%	9%	12%	13%	10%	10%
Tier Zero (≤1090 and >1075)	192 kaf	3%	7%	9%	3%	5%	7%	4%	2%	5%	0%
Shortage Condition (Mead ≤1075)		97%	92%	91%	94%	86%	84%	84%	85%	85%	90%
Tier 1 DCP Contribution (≥1050 and ≤1075)	512 kaf	**97%**	**71%**	31%	33%	21%	15%	16%	17%	17%	23%
Tier 2 DCP Contribution (≥1025 and <1050)		0%	21%	**60%**	**36%**	**37%**	**37%**	30%	31%	**38%**	**40%**
Tier 2a (>1045 and <1050)	592 kaf	0%	17%	6%	7%	6%	7%	4%	4%	4%	6%
Tier 2b (≥1025 and ≤1045)	640 kaf	0%	4%	54%	29%	31%	30%	26%	27%	34%	34%
Tier 3 DCP Contribution (<1025)	720 kaf	0%	0%	0%	25%	28%	32%	**38%**	**37%**	30%	27%

Total AWBA Firming[3] (af)		**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**Total**
Tier 1 DCP Contribution (≥1050 and ≤1075)	512 kaf	9,402	12,624	12,881	13,664	13,898	14,326	14,550	14,774	15,285	15,614	137,019
Tier 2 DCP Contribution (≥1025 and <1050)												
Tier 2a (>1045 and <1050)	592 kaf	14,252	18,154	18,412	18,677	18,750	20,232	23,206	26,179	29,154	32,129	219,146
Tier 2b (≥1025 and ≤1045)	640 kaf	36,424	43,008	45,984	48,959	51,936	54,913	57,892	60,871	63,851	66,832	530,670
Tier 3 DCP Contribution (<1025)	720 kaf	89,602	95,848	98,832	101,817	104,802	107,788	110,776	113,763	116,752	119,741	1,059,721
Total AWBA Firming[3] (af)		**9,402**	**12,624**	**45,984**	**48,959**	**51,936**	**54,913**	**110,776**	**113,763**	**63,851**	**66,832**	**579,039**

[1] Hydrologic assumptions from Reclamation's April 2021 CRMMS/CRSS Stress Test Hydrology (DNF 1988-2019).

[2] Shortage probabilities from Reclamation's projections of future Colorado River system conditions, April 2021 CRMMS/CRSS Stress Test Hydrology (DNF 1906-2019). Reclamation's projections run through 2025. The 2007 Interim Guidelines expire in 2026. The AWBA extended Reclamation's projections (based on current operating conditions) through 2031. These projections do not represent the full range of future possibilities that could occur with different modeling assumptions.

[3] Estimated AWBA firming volumes derived from the Joint Recovery Model, developed by ADWR, AWBA and CAWCD: May 2021. These estimated firming volumes do not represent the full range of future possibilities that could occur with different modeling assumptions.

April 2021 – Stress Test Hydrology

Stress Test Hydrology[1]

CAP NIA Indian Firming[3] (af)		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Tier 1 DCP Contribution (≥1050 and ≤1075)	512 kaf	9,402	12,624	12,881	13,664	13,898	14,326	14,550	14,774	15,285	15,614	137,019
Tier 2 DCP Contribution (≥1025 and <1050)												
Tier 2a (>1045 and <1050)	592 kaf	14,252	18,154	18,412	18,677	18,750	18,703	18,608	18,515	18,422	18,331	180,825
Tier 2b (≥1025 and ≤1045)	640 kaf	14,441	17,958	17,865	17,774	17,683	17,594	17,505	17,417	17,330	17,244	172,810
Tier 3 DCP Contribution (<1025)	720 kaf	13,053	16,232	16,148	16,066	15,984	15,903	15,822	15,743	15,664	15,587	156,202
Total NIA Indian Firming[3] (af)		**9,402**	**12,624**	**17,865**	**17,774**	**17,683**	**17,594**	**15,822**	**15,743**	**17,330**	**17,244**	**159,081**

CAP M&I Priority Firming[3] (af)		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Tier 1 DCP Contribution (≥1050 and ≤1075)	512 kaf	-	-	-	-	-	-	-	-	-	-	-
Tier 2 DCP Contribution (≥1025 and <1050)												
Tier 2a (>1045 and <1050)	592 kaf	-	-	-	-	-	1,530	4,598	7,665	10,732	13,799	38,322
Tier 2b (≥1025 and ≤1045)	640 kaf	21,983	25,050	28,118	31,185	34,252	37,319	40,387	43,454	46,521	49,588	357,860
Tier 3 DCP Contribution (<1025)	720 kaf	76,549	79,616	82,684	85,751	88,818	91,885	94,953	98,020	101,087	104,154	903,519
Total CAP M&I Priority Firming[3] (af)		**-**	**-**	**28,118**	**31,185**	**34,252**	**37,319**	**94,953**	**98,020**	**46,521**	**49,588**	**419,958**

[1] Hydrologic assumptions from Reclamation's April 2021 CRMMS/CRSS Stress Test Hydrology (DNF 1988-2019).

[3] Estimated AWBA firming volumes derived from the Joint Recovery Model, developed by ADWR, AWBA and CAWCD: May 2021. These estimated firming volumes do not represent the full range of future possibilities that could occur with different modeling assumptions.

April 2021 vs. June 2021
Lake Mead Probabilistic Projections

Full Hydrology[1]		← Reclamation's Five-Year Table →				← Projections Extended by AWBA[2] →					
Operational Tier	24-Month Study	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Tier 1 (≥1050 and ≤1075)	Apr-21	97%	81%	37%	34%	28%	25%	24%	22%	24%	27%
	Jun-21	100%	74%	31%	23%	20%	20%	17%	17%	20%	22%
Tier 2 (≥1025 and <1050)	Apr-21	0%	13%	44%	32%	32%	30%	28%	30%	29%	27%
	Jun-21	0%	23%	54%	39%	38%	34%	32%	37%	33%	30%
Tier 3 (<1025)	Apr-21	0%	0%	1%	11%	12%	13%	14%	14%	12%	12%
	Jun-21	0%	0%	3%	20%	18%	19%	19%	14%	13%	15%

Stress Test Hydrology[1]		← Reclamation's Five-Year Table →				← Projections Extended by AWBA[2] →					
Operational Tier	24-Month Study	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Tier 1 (≥1050 and ≤1075)	Apr-21	97%	71%	31%	33%	21%	15%	16%	17%	17%	23%
	Jun-21	100%	60%	30%	28%	20%	16%	11%	14%	13%	17%
Tier 2 (≥1025 and <1050)	Apr-21	0%	21%	60%	36%	37%	37%	30%	31%	38%	40%
	Jun-21	0%	34%	65%	32%	37%	30%	30%	31%	42%	39%
Tier 3 (<1025)	Apr-21	0%	0%	0%	25%	28%	32%	38%	37%	30%	27%
	Jun-21	0%	0%	2%	38%	35%	46%	46%	42%	32%	34%

[1] Compares Lake Mead probabilistic projections from Reclamation's April and June 2021 Full Hydrology and Stress Test Hydrology.

[2] Shortage probabilities from Reclamation's projections of future Colorado River system conditions, April and June 2021 projections. The AWBA extended Reclamation's five-year probability table (based on current operating conditions) through 2031. These projections do not represent the full range of future possibilities that could occur with different modeling assumptions.

Cumulative Ten-Year AWBA Firming Volumes (June 2021 Lake Mead Projections)

Full Hydrology[1]

Total AWBA Firming[3] (af)		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Tier 1 DCP Contribution (≥1050 and ≤1075)		9,402	12,624	12,881	13,664	13,898	14,326	14,550	14,774	15,285	15,614	
Tier 2 DCP Contribution (≥1025 and <1050)												
Tier 2a (>1045 and <1050)		14,252	18,154	18,412	18,677	18,750	20,232	23,206	26,179	29,154	32,129	
Tier 2b (≥1025 and ≤1045)		36,424	43,008	45,984	48,959	51,936	54,913	57,892	60,871	63,851	66,832	
Tier 3 DCP Contribution (<1025)		89,602	95,848	98,832	101,817	104,802	107,788	110,776	113,763	116,752	119,741	
Total AWBA Firming[3] (af)		**9,402**	**12,624**	**45,984**	**48,959**	**51,936**	**54,913**	**57,892**	**60,871**	**63,851**	**66,832**	**473,264**

Stress Test Hydrology[1]

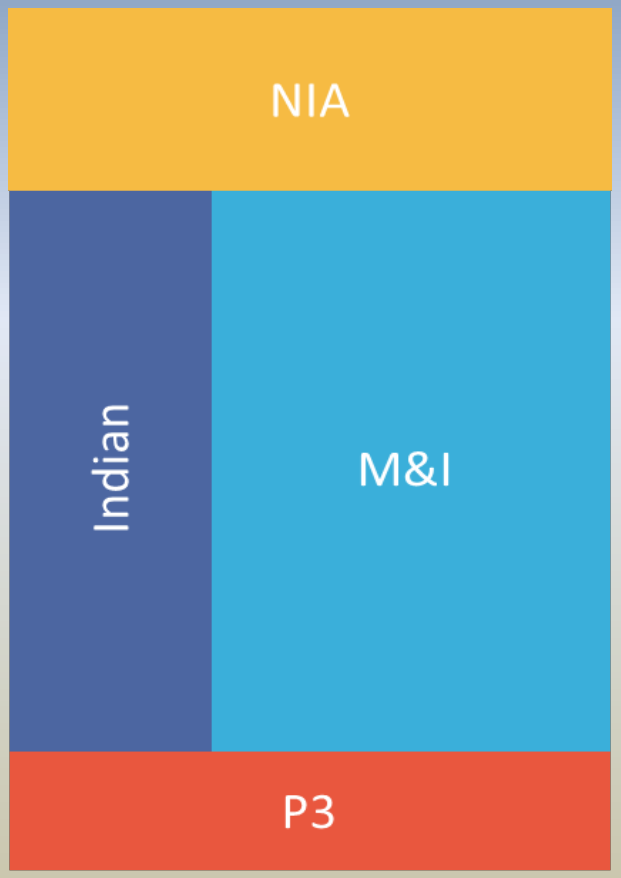
Total AWBA Firming[3] (af)		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Tier 1 DCP Contribution (≥1050 and ≤1075)	512 kaf	9,402	12,624	12,881	13,664	13,898	14,326	14,550	14,774	15,285	15,614	137,019
Tier 2 DCP Contribution (≥1025 and <1050)												
Tier 2a (>1045 and <1050)	592 kaf	14,252	18,154	18,412	18,677	18,750	20,232	23,206	26,179	29,154	32,129	219,146
Tier 2b (≥1025 and ≤1045)	640 kaf	36,424	43,008	45,984	48,959	51,936	54,913	57,892	60,871	63,851	66,832	530,670
Tier 3 DCP Contribution (<1025)	720 kaf	89,602	95,848	98,832	101,817	104,802	107,788	110,776	113,763	116,752	119,741	1,059,721
Total AWBA Firming[3] (af)		**9,402**	**12,624**	**45,984**	**101,817**	**51,936**	**107,788**	**110,776**	**113,763**	**63,851**	**66,832**	**684,772**

[1] Hydrologic assumptions from Reclamation's June 2021 CRMMS/CRSS Full Hydrology (DNF 1906-2019) and Stress Test Hydrology (DNF 1988-2019).

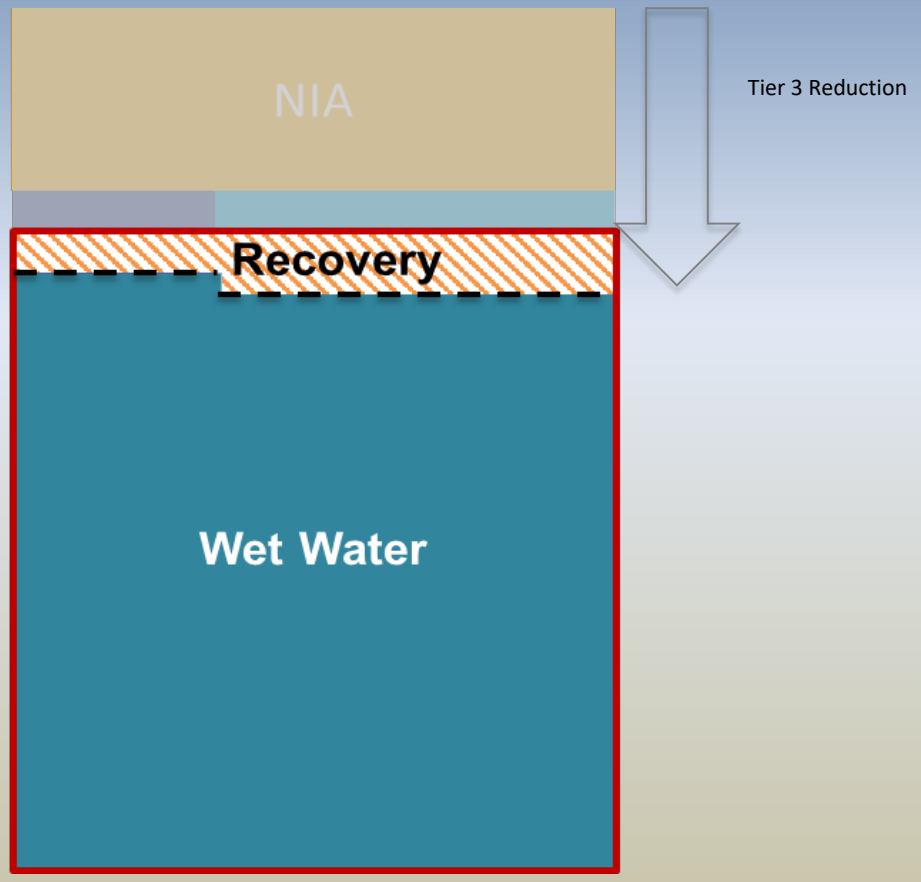
[3] Estimated AWBA firming volumes derived from the Joint Recovery Model, developed by ADWR, AWBA and CAWCD: May 2021. These estimated firming volumes do not represent the full range of future possibilities that could occur with different modeling assumptions.

M&I Recovery Capacity Analysis

A. Subcontractor "X" - CAP supplies in a normal year (non-shortage year)



B. Subcontractor "X" – Reduction to CAP supplies in Tier 3 shortage



Direct Use Demands
(includes annual storage and recovery)

- - - Assuming a Tier 3 Shortage in 2026

Estimated M&I Recovery Capacity Needed

	M&I Firming - Recovery Capacity Needed by Tier (AF)									
Operational Tier	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Tier 1	-	-	-	-	-	-	-	-	-	-
Tier 2a	-	-	-	-	-	-	1,339	1,685	3,370	3,370
Tier 2b	3,698	4,345	4,869	6,388	8,050	9,713	11,190	11,986	12,804	13,614
Tier 3	19,980	21,741	23,504	25,267	27,032	28,321	29,220	30,893	33,881	37,095

	M&I Firming – Tier 3 Recovery Capacity Needed (AF)									
	2022	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Phoenix AMA										
Independent Recovery	12,032	12,972	13,913	14,852	15,792	16,494	16,999	18,258	20,834	23,414
CAP Recovery	6,088	6,838	7,591	8,346	9,102	9,622	9,947	10,270	10,591	11,134
Pinal AMA Independent Recovery	1,531	1,589	1,646	1,703	1,760	1,816	1,872	1,927	1,981	2,035
Tucson AMA Independent Recovery	328	341	353	366	378	390	402	438	475	511
Total	**19,980**	**21,740**	**23,503**	**25,267**	**27,032**	**28,322**	**29,220**	**30,893**	**33,881**	**37,094**

[1] Estimated recovery well capacity needs incorporate feedback from impacted M&I subcontractors

Conclusion

- Tier 1, 2022 – 9,402 AF firming requirement for the Community
- Increasing likelihood of Tier 2/Tier 3 in 2024-2031, with firming requirements for Tribal contracts and CAP M&I subcontracts
- Reclamation's June 2021 five-year probabilistic projections for Lake Mead indicate a 44% probability of a Tier 2b Shortage in 2024, resulting in M&I Firming
- Preparation of M&I firming agreements for those who elect independent recovery of AWBA LTSCs

Questions?

AWBA Quarterly Meeting
waterbank.az.gov

Presented by
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