

ARIZONA WATER BANKING AUTHORITY

ANNUAL REPORT 2021



**Submitted
July 1, 2022**



Arizona Water Banking Authority

Annual Report

2021

Honorable Douglas A. Ducey
Governor of Arizona

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Thomas Buschatzke
Chair

Mark Clark
Vice-chair

Alexandra Arboleda
Secretary

Eric Braun
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Representative Gail Griffin

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July 1, 2022

The Honorable Douglas A. Ducey
Governor, State of Arizona 1700
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Thomas Buschatzke, Chair
Mark Clark, Vice Chair
Alexandra Arboleda, Secretary
Eric Braun
Joseph Olsen

EX OFFICIO MEMBERS
Honorable Karen Fann
Honorable Gail Griffin

Dear Governor Ducey:

Enclosed is the Annual Report of the Arizona Water Banking Authority (AWBA). The Annual Report details the AWBA's activities for calendar year 2021 and the progress made on achieving its goals and obligations including commitments made in support of Arizona's plan for implementing the Lower Basin Drought Contingency Plan (LBDCP). The report also includes a Ten-Year Plan that examines the AWBA's ability to meet its statutory responsibilities over the next decade.

A primary objective of the AWBA is to store excess CAP water underground in central and southern Arizona and to make that water available to municipal and industrial Colorado River water users and certain Arizona Indian Tribes during times of shortage (i.e. firming). In 2021, there was no excess CAP water available to the AWBA for storage as these supplies were used to assist in meeting Arizona's requirement to contribute 192,000 acre-feet to Lake Mead under a Tier Zero condition. To continue to make progress on its firming goals and objectives, the AWBA purchased 7,863 acre-feet of long-term storage credits (LTSCs) and 4,196 acre-feet of Intentionally Created Surplus (ICS) credits under its agreement with the Gila River Indian Community, a component of Arizona's DCP Implementation Plan. Additionally, the AWBA worked cooperatively with ADWR, CAWCD, and stakeholders on plans to distribute and recover AWBA credits to meet its future firming responsibilities. These efforts resulted in the release of an updated recovery plan that provides greater planning clarity and detailed implementation steps. With a Tier 1 shortage declared in the Lower Basin in 2022 and the likelihood of deeper shortages in the coming years, the AWBA is fully prepared to meet its firming responsibilities. The AWBA has accrued over 3.76 million acre-feet of LTSCs that can be tapped for this purpose.

I am pleased to submit this report detailing the accomplishments of the AWBA. I am confident the AWBA will navigate through these uncertain times and fully embrace its role in Arizona's water future.

Sincerely,

Thomas Buschatzke
Chair

Enclosure: As stated

cc: The Honorable Karen Fann, President of the Arizona Senate
The Honorable Gail Griffin, Arizona House of Representatives

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ACRONYMS AND ABBREVIATIONS

ADWR	Arizona Department of Water Resources
AMA	Active Management Area
APO	Annual Plan of Operation
AWBA	Arizona Water Banking Authority
AWB Fund	Arizona Water Banking Fund
AWSA	Arizona Water Settlements Act of 2004
CAGR D	Central Arizona Groundwater Replenishment District
CAP	Central Arizona Project
CAWCD	Central Arizona Water Conservation District
CRMMS-ESP	Colorado River Mid-term Modeling System in Ensemble Mode
Community	Gila River Indian Community
DCP	Drought Contingency Plan
GSF	Groundwater Savings Facility
ICS	Intentionally Created Surplus
ICUA	Intentionally Created Unused Apportionment
IGA	Intergovernmental Agreement
Implementation Plan	Arizona's Implementation Plan for the LBDCP
JSAM	Joint Shortage Analysis Model
LBDCP	Lower Basin Drought Contingency Plan
LTSCs	Long-term storage credits
MAF	Million acre-feet
M&I	Municipal and Industrial
MCWA	Mohave County Water Authority
Nation	Tohono O'odham Nation
NIA	Non-Indian Agricultural
Reclamation	U.S. Bureau of Reclamation
RPAG	Recovery Planning Advisory Group
SNWA	Southern Nevada Water Authority
USF	Underground Storage Facility
WMAT	White Mountain Apache Tribe

1 SUMMARY

The operation of the Arizona Water Banking Authority (AWBA) continues to evolve. In its initial phase, the AWBA primarily stored excess Central Arizona Project (CAP) water to create long-term storage credits (LTSCs) to mitigate the effects of future Colorado River shortages on municipal and industrial (M&I) water users, provide groundwater management benefits, assist the State in the settlement of Indian water rights claims, and assist both California and Nevada through interstate banking arrangements. In time, what began as opportunities to beneficially utilize the State's full entitlement of Colorado River water grew in certain cases into obligations the AWBA must fulfill. With reductions in excess CAP water supplies and increased probability of Colorado River shortages, the AWBA is transitioning to its next phase, focusing on making its LTSCs available to mitigate potential shortages.

The AWBA had no excess CAP water supplies available for storage in 2021. As a result, the AWBA continued to make progress on its firming goals and obligations through other means. The AWBA purchased 7,863 acre-feet of LTSCs including 6,500 acre-feet in the Phoenix AMA and 1,363 acre-feet in the Tucson AMA. Cumulatively, the AWBA has accrued or acquired 4.37 million acre-feet (MAF) of LTSCs. Of this amount, 3.76 MAF are for Arizona uses and 0.61 MAF are interstate credits stored on behalf of the State of Nevada. Additionally, the AWBA purchased 4,196 acre-feet of intentionally created surplus (ICS) firming credits pursuant to its 2019 agreement with the Gila River Indian Community (Community).

An update to the 2014 Joint Recovery Plan was released in May 2021. The update was developed cooperatively with staff from the Arizona Department of Water Resources (ADWR) and Central Arizona Water Conservation District (CAWCD) in consultation with a Recovery Planning Advisory Group (RPAG) that was convened in 2018 for this purpose. The update provides greater planning clarity and includes implementation steps that involve direct participation by CAP M&I subcontractors in determining how AWBA firming needs are accomplished during shortages. Its release was an important and necessary milestone, given the rapid changes in Colorado River conditions.

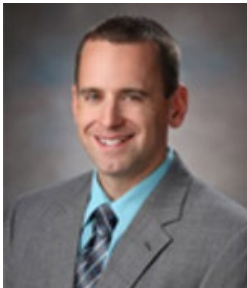
While Tier 1 shortage reductions in 2022 limited the AWBA's firming responsibilities to the Community, shortage reductions are expected to result in the need to firm supplies for CAP M&I subcontractors as early as next year with increasing levels of shortage through 2026. The Bureau of Reclamation's (Reclamation) Colorado River water supply projections for May 2022 (CRMMS-ESP) indicate a Tier 2a shortage is most likely to be declared in the Lower Basin in 2023 (60% probability) and that a Tier 2b shortage could be in effect in 2024 (53% probability) and in 2025. For the first time, projections show that a Tier 3 shortage could occur by 2026 (43% probability). As a result, the AWBA could have a cumulative firming requirement of approximately 271,000 acre-feet over the next four years. However, it is important to note that these estimates are based on current hydrologic modeling analyses. The Colorado River system is facing unprecedented conditions causing rapid declines in both Lake Powell and Lake Mead. It is possible that additional near-term measures may be taken that affect operations and supply availability to Arizona and the Lower Basin overall. The AWBA Commission and staff will adapt accordingly as necessary.

2 AWBA COMMISSION MEMBERS – CALENDAR YEAR 2021

Thomas Buschatzke – Chair
As Director of Arizona Department of Water Resources



Joseph Olsen, P.E.
A person knowledgeable in water resource management



Eric Braun
Representing CAP M&I subcontractors



Alexandra Arboleda - Secretary
Representing CAWCD, designated by CAWCD Board President Terry Goddard



Mark Clark – Vice-Chair
Representing mainstream Colorado River contractors



Ex-officio Members



Senate President Karen Fann



Representative Gail Griffin

3 2021 ACTIVITIES

The AWBA started calendar year (CY) 2021 with the appointment of two new Commission members and one returning member. Eric Braun was appointed as the representative for CAP M&I subcontractors, replacing Commissioner Kathryn Sorensen who retired in October 2020. Joseph Olsen was appointed as someone knowledgeable in water resource management, replacing Commissioner Ray Jones who also served as Vice-Chair. Commissioner Mark Clark was re-appointed as the representative for mainstream Colorado River contractors. The AWBA also held elections for officers. Commissioner Mark Clark was elected to serve as Vice-Chair and Commissioner Alexandra Arboleda was elected to serve as Secretary.

The AWBA held its quarterly meetings on March 17, July 29, September 15, and December 1.

3.1 TRANSITIONING FROM WATER STORAGE TO SATISFYING SHORTAGE RESPONSIBILITIES

AWBA activities in 2021 concentrated largely on the steps necessary for meeting its firming responsibilities as the likelihood of a Colorado River shortage advanced throughout the year. These planning efforts were realized in August with the first-ever Tier 1 shortage declaration by the Secretary of the Interior (Secretary) for CY 2022. As a result, Arizona's Colorado River entitlement is reduced by 512,000 acre-feet. This volume includes 320,000 acre-feet in reductions under the 2007 operating guidelines¹ and 192,000 acre-feet in additional contributions to Lake Mead under the Lower Basin Drought Contingency Plan (LBDCP). While these reductions do not impact CAP M&I Priority subcontractors or on-River M&I contractors, they affect CAP non-Indian agricultural (NIA) Priority water supplies. As a result, the AWBA has its first-ever Tribal firming obligation in 2022. The Tier 1 shortage reductions also triggered the need to provide additional mitigation resources under Arizona's Implementation Plan for the LBDCP (Implementation Plan).

3.1.1 Agency Coordination

AWBA staff participated in various workshops and stakeholder group meetings during the year to plan and prepare for a Tier 1 shortage in 2022. These included coordinated efforts with ADWR, CAWCD and Reclamation to inform stakeholders of the impacts of shortage reductions. Discussions included CAP water supply availability, impacts to reallocated CAP NIA Priority water supplies, AWBA firming responsibilities, and how mitigation resources identified under the Implementation Plan would be utilized.

3.1.2 Tribal Firming Obligations

The AWBA is the State's agent for meeting the State's requirements under the Arizona Water Settlements Act of 2004 (AWSA), which became effective and fully enforceable in December 2007. The AWSA required that the Secretary develop a Tribal Firming Program to ensure that CAP NIA Priority water supplies made available to Tribes under the AWSA are firming for a 100-year period (through 2107) to the equivalent of CAP M&I supplies. The AWBA has an obligation under the Tribal Firming Program to firm up to 15,000 acre-feet per year

¹ Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead.

for the Community and up to 8,724 acre-feet per year for future settlements. Although certain future settlements have been identified, these settlements are either not yet enforceable, or have not been enacted by Congress. These include settlements for the White Mountain Apache Tribe and Hualapai Tribe, respectively. Therefore, the AWBA's Tribal firming obligation in 2022 is limited to the Community.

The AWBA and the Community executed an Intergovernmental Agreement (IGA) for firming June 16, 2015 (2015 IGA). The 2015 IGA identifies several firming methods that may be used to satisfy a firming obligation during a shortage year. The AWBA entered into subsequent agreements to implement or add agreed-upon firming methods including an IGA in 2016 for the development of Firming Credits² and an IGA in 2019 for the development of ICS Firming Credits (2019 IGA).³

Based on CAWCD's final accounting of 2022 water orders, the AWBA's firming volume is 6,429 acre-feet. To satisfy this firming obligation, the AWBA and the Community elected to extinguish an equal volume of Firming Credits (see **Table 10**).

3.1.3 Agreement to Exchange Long-Term Storage Credits⁴

In addition to meeting its Tribal firming obligations, the AWBA also plays an important role in facilitating wet water mitigation under the Implementation Plan. The AWBA entered into an agreement to exchange LTSCs with Phoenix and Tucson AMA CAP M&I Priority subcontractors that agreed to store water at groundwater savings facilities (GSFs) in the Pinal Active Management Area (AMA) during Tier 1 and Tier 2a shortages between 2020 and 2022. Under the agreement, the AWBA will exchange its LTSCs accrued in the Phoenix and Tucson AMAs for an equal volume of LTSCs accrued by the storing entities in the Pinal AMA. This allows storing entities the ability to recover and use the water in the AMA where they are located.

The AWBA agreed to exchange up to 43,225 acre-feet of LTSCs per year (from 45,500 acre-feet of storage less 5 percent cut to the aquifer) for the three-year period. However, since 2020 and 2021 were non-shortage years, the exchange will only apply to water stored in 2022. Legislation authorizing the AWBA to exchange its water management LTSCs for this purpose expires Dec. 31, 2026. Therefore, all exchanges must be completed by this date.

² Agreement between the AWBA and the Community for the Development of Firming Credits effective June 30, 2016 through December 31, 2018. Firming credits developed under the agreement remain available until utilized to meet a firming obligation.

³ Intergovernmental Agreement between the AWBA and the Gila River Indian Community for the Development of ICS Firming Credits executed May 20, 2019.

⁴ *Lower Basin Drought Contingency Plan ("LBDCP") Implementation Plan: Agreement to Exchange Long-Term Storage Credits between AWBA and the City of Avondale; City of Chandler; City of Goodyear; City of Peoria; City of Phoenix; City of Scottsdale; City of Tucson; Freeport Minerals Corporation; and EPCOR Water Arizona Inc.*

3.2 RECOVERY PLANNING

Recovery Planning activities in 2021 continued to focus on a collaborative effort among the AWBA, CAWCD, ADWR, and the RPAG to update the 2014 Joint Recovery Plan⁵ and improve planning level certainty as the potential for Colorado River shortages approaches. The updated recovery plan⁶ was subsequently released in May 2021 (2021 Recovery Update). It serves as a companion document to the 2014 Joint Recovery Plan and includes updated hydrologic modeling as well as an analysis of the AWBA's firming responsibilities. It also incorporates key recovery concepts developed through the RPAG and summarizes the procedural steps for recovery implementation.

As the designated recovery agent for the AWBA, CAWCD is responsible for the recovery of water stored by the AWBA, both for intrastate firming and interstate banking with Nevada. During RPAG discussions, many CAP M&I subcontractors indicated a preference for utilizing their own infrastructure, or that of a partner, to recover AWBA LTSCs for firming, particularly in the near-term. This concept, referred to as Independent Recovery, resulted in a statutory amendment to allow for the distribution of AWBA LTSCs directly to subcontractors for this purpose.⁷ It also stipulates that any LTSCs assigned to a subcontractor by the AWBA cannot be sold; and that the subcontractor is responsible for all recovery costs as well as fees assessed by ADWR for the assignment of the LTSCs. Subcontractors that choose to do Independent Recovery will need to enter into a firming agreement with the AWBA. Work on the agreement was initiated in 2021.

The 2021 Recovery Update also includes a new timeline to provide clarity on recovery implementation for CAP M&I firming. It provides a three-year planning horizon for recovery implementation activities, with action triggers tied to Reclamation's April Five-Year Probability Table and April 24-Month Study projections. The timeline is intended to ensure shortage readiness by highlighting critical decision points and deadlines. Although Reclamation's 2021 April projections did not specifically indicate a shortage affecting CAP M&I subcontractors within three years, the August 24-Month Study did, resulting in the need to begin recovery planning consultations. The triggers are described in detail under the Ten-Year Plan section of this report.

3.3 ADOPTION OF 2022 PLAN OF OPERATION

The AWBA 2022 Annual Plan of Operation (APO) was adopted on Dec. 1, 2021. With no excess CAP water supplies available to the AWBA, the 2022 APO focuses on LTSC purchases and developing ICS firming credits to make progress on its CAP M&I and Tribal firming goals. The 2022 APO provides for the development of an estimated 30,140 acre-feet of credits at a total estimated cost of \$8.26 million.

Credit acquisitions are anticipated to occur in the Phoenix and Tucson AMAs. Potential LTSC purchases total 27,160 acre-feet and are estimated to cost \$7.4 million. The CAWCD has reserved \$7 million in funds under its 2021/2022 Water Storage Tax Resolution for the purchase of LTSCs for CAP M&I Firming accounted for by county as follows: \$4 million in Maricopa County funds and \$3 million in Pima County funds. Total available funds also include an estimated \$396,000 in withdrawal fees collected in the Tucson AMA. Additionally, the

⁵ Recovery of Water Stored by the Arizona Water Banking Authority: A Joint Plan by AWBA, ADWR and CAP, dated April 14, 2014 (2014 Joint Recovery Plan).

⁶ 2021 Update: Recovery of Water Stored by the Arizona Water Banking Authority: A Joint Plan by AWBA, ADWR and CAP, dated 5/6/2021.

⁷ A.R.S § 45-2457(B)(7) as amended by SB 1147.

AWBA anticipates developing 2,980 acre-feet of ICS Firming credits for approximately \$866,400 using withdrawal fee revenues collected in the Phoenix AMA.

As previously indicated, the Colorado River will operate under a Tier 1 shortage condition in 2022. While this reduction will not impact supplies for CAP M&I subcontractors or on-river M&I contractors, the reductions will result in a Tribal firming requirement of 6,429 acre-feet. The AWBA's APO identifies the use of Firming Credits for this purpose.

4 REVENUES AND EXPENDITURES

A.R.S § 45-2425 mandates the various sources of monies for the Arizona Water Banking (AWB) Fund. The AWB Fund is administered by the AWBA. In 2021, the AWBA obtained its funding from the following sources:

1. Fees for groundwater pumping, known as withdrawal fees, are collected within the Phoenix, Pinal and Tucson AMAs and charged for water banking purposes at \$2.50 per acre-foot in the Phoenix and Tucson AMAs and up to \$2.50 per acre-foot in the Pinal AMA. Withdrawal fees can be used by the AWBA for water-management purposes, which includes Tribal firming and CAP M&I firming. LTSCs accrued with these funds must be used to benefit the AMA in which the monies were collected.

The Arizona Legislature authorized the use of approximately \$1.4 million in the AWB Fund to support both ADWR (\$1.2 million) and the Arizona Navigable Stream Adjudication Commission (\$200,000) for fiscal year 2021. Any unused monies are subsequently redistributed to the AWBA. Additionally, as a component of the Drought Contingency Plan (DCP), fees levied in the Pinal AMA during calendar years 2020 through 2026 will not be made available to the AWBA but will be used instead to support groundwater infrastructure and irrigation efficiency projects in the Pinal AMA.⁸

2. As in previous years, the CAWCD Board resolved to retain the water storage taxes levied and collected for the 2019-2020 tax year and to use the funds for meeting operating, maintenance (O&M) and replacement and/or repayment costs of the CAP, which includes water storage by the AWBA. The CAWCD Board also reserved \$10 million in water storage tax revenues to support AWBA purchases of LTSCs for CAP M&I Priority firming. The AWBA utilized \$1.87 million for this purpose leaving approximately \$8.13 million available for potential purchases in subsequent years. LTSCs accrued using water storage tax funds must be used to benefit the county in which the funds were collected.
3. The AWBA did not receive a general fund appropriation in 2021.

Table 1 shows the monies the AWBA collected, monies made available by CAWCD and the monies expended in 2021 by source of funds. **Table 2** shows the total monies received, expended and remaining through December 2021 by source of funds. Remaining funds are committed to activities identified in the APO adopted for the current year. Details of the AWBA's expenditures for acquiring firming water resources are described in Section 5.

⁸ A.R.S. § 45-611(C)(3), A.R.S. § 45-611(C)(5), § 45-613(D) and § 45-615.01

Table 1. Monies Collected, Made Available, and Expended in 2021 by Source of Funds

Source of Funds	Carryover	Collected/Made Available	Expended
General Fund	\$0	\$0	\$0
State Tribal FIRMING Appropriation	\$0	\$0	\$0
Interstate Water Banking¹	\$23,847	\$384	\$0
Water Storage Tax			
Maricopa County	\$0	\$1,562,795	\$1,562,795
Pinal County	\$0	\$0	\$0
Pima County	\$0	\$440,186	\$303,690
Subtotal	\$0	\$2,002,981	\$1,866,485
Groundwater Withdrawal Fees²			
Phoenix AMA	\$231,724	\$971,303	\$976,642
Pinal AMA	\$162,568	\$65,348	\$209,371
Tucson AMA	\$62,890	\$199,811	\$0
Subtotal	\$457,183	\$1,236,462	\$1,186,013
TOTAL³	\$481,030	\$3,239,827	\$3,052,497

¹ Includes \$269 in interest for 2021 and Lehman Brothers bankruptcy distribution of \$115.

² Funds collected includes \$122,081 in legislative allocations unused by ADWR in FY 2021.

³ Totals may not sum due to rounding.

Table 2. Cumulative Monies Collected, Made Available, Expended and Remaining Available through 2021

Source of Funds	Collected/Made Available	Expended	Remaining ¹
General Fund	\$11,100,865	\$11,100,865	\$0
State Tribal FIRMING Appropriation	\$2,578,389	\$2,578,389	\$0
In-Lieu Fund - MCWA Pre-payments	\$5,123,480	\$5,123,480	\$0
Interstate Water Banking-NV²	\$112,409,161	\$112,384,930	\$24,231
Shortage Reparations – NV	\$8,001,948	\$8,001,948	\$0
Water Storage Tax³			
Maricopa County	\$143,979,321	\$143,979,321	\$0
Pinal County	\$16,585,741	\$16,585,741	\$0
Pima County	\$65,263,223	\$65,126,727	\$136,496
Subtotal	\$225,691,789	\$225,691,789	\$0
Groundwater Withdrawal Fees			
Phoenix AMA	\$35,428,845	\$35,202,460	\$226,386
Pinal AMA	\$26,078,949	\$26,060,404	\$18,546
Tucson AMA	\$11,037,593	\$10,774,892	\$262,701
Subtotal	\$72,545,387	\$72,037,755	\$507,632
TOTAL⁴	\$437,587,515	\$436,919,156	\$668,359

¹ Remaining funds include monies committed for the 2022 AOP. Pima County Water Storage Tax funds reflect unspent monies deposited to the AWB Fund for LTSC purchases.

² Pursuant to the Third Amended Agreement, remaining funds are non-reconcilable for interstate purposes. They include accrued interest and recovered Lehman Brothers bankruptcy monies and are subject to legislative authorization prior to use by the AWBA.

³ Monies collected by CAWCD made available to AWBA through direct deposit into the AWB Fund or as an expenditure by CAWCD to offset AWBA delivery and storage costs as part of CAP O&M costs.

⁴ Totals may not sum due to rounding.

5 CREDIT DEVELOPMENT

The AWBA's APO for 2021 did not include storage of excess CAP water as these supplies were conserved in Lake Mead to assist in meeting Arizona's requirement to contribute 192,000 AF to Lake Mead under a Tier Zero condition. As a result, the AWBA relied on other options to develop credits including the acquisition of LTSCs through purchase agreements and payment of ICS developed in Lake Mead as part of the LBDCP.

5.1 LONG-TERM STORAGE CREDIT PURCHASES

The AWBA purchased LTSCs in the Phoenix and Tucson AMAs totaling 7,863 acre-feet at a cost of \$1.87 million. This amount is significantly less than the target volume of 42,020 acre-feet identified in the AWBA's 2021 APO. While fewer LTSCs were purchased in 2021, unspent funds, including water storage tax funds reserved for this purpose, remain available for AWBA LTSC purchases in subsequent years.

5.1.1 Purchases Pursuant to A.R.S. § 45-841.01

The Tohono O'odham Nation (Nation) must offer the AWBA 10 percent of any LTSCs deemed accruable from water stored at the Mission Mine Complex before ADWR can issue a final volume of LTSCs to the Nation.⁹ The price for each LTSC is equal to the AWBA's per acre-foot cost to deliver and store water at a state demonstration project located within 10 miles of the Nation's storage (i.e. Pima Mine Road Recharge Project) at the time of sale. These LTSCs may be used by the AWBA for M&I firming or for water management purposes. However, there is a restriction that they cannot be recovered within five miles of the exterior boundary of the reservation. In 2021, the Nation offered 1,363 acre-feet of LTSCs for \$303,690. The LTSCs were purchased for CAP M&I firming purposes using Pima County water storage tax funds.

5.1.2 Other LTSC Purchases

The AWBA also purchased 6,500 acre-feet of LTSCs in the Phoenix AMA from the City of Peoria. The LTSCs were purchased for CAP M&I firming purposes using \$1.56 million in Maricopa County water storage tax funds. Although the AWBA has entered into several purchase and sale agreements, other partners opted not to sell LTSCs to the AWBA in 2021.

The AWBA's cumulative LTSC purchases and expenditures are identified in *APPENDIX A*.

5.1.3 Accounting of LTSCs

The AWBA has a statutory requirement to account for all LTSCs accrued by the funding sources used to develop the credits. The number and location of LTSCs for 2021, which were limited to purchase acquisitions,

⁹ A.R.S. § 45-841.01(F)(3),

are identified in **Table 3**. Cumulative LTSCs accrued or acquired by the AWBA through December 2021 are identified in **Table 4**.

Table 3. Number and Location of LTSCs Acquired in 2021 (AF)

Funding Source	Phoenix AMA	Pinal AMA	Tucson AMA	Total
Water Storage Tax	6,500	-	1,363	7,863
Withdrawal Fees	-	-	-	-
General Fund	-	-	-	-
Intrastate TOTAL	6,500	-	1,363	7,863
Interstate - Nevada	-	-	-	-
TOTAL	6,500	-	1,363	7,863

Table 4. Cumulative LTSCs Accrued or Acquired through December 2021 (AF)

Funding Source	Phoenix AMA	Pinal AMA	Tucson AMA	Total
Water Storage Tax ¹	1,572,095	234,791	509,298	2,316,184
Withdrawal Fees	339,724	434,793	112,769	887,286
General Fund ²	42,316	306,968	54,546	403,830
Other Intrastate:				
Tribal Firming Appropriation	-	-	28,481	28,481
Shortage Reparation	20,642	60,507	28,340	109,489
GSF Operator Full Cost Share	-	14,125	-	14,125
Intrastate TOTAL	1,974,777	1,051,184	733,434	3,759,395
Interstate - Nevada	60,021	440,241 ³	113,584	613,846
TOTAL⁴	2,034,798	1,491,425	847,018	4,373,241

¹ Includes restoration of 957.43 AF of LTSCs previously withheld from storage occurring in 2020: 3.09 AF in the Phoenix AMA and 954.34 AF in the Pinal AMA.

² Includes 256,174 AF of LTSCs reserved for MCWA in the Pinal AMA pursuant to firming agreements dated February 4, 2005 and December 8, 2010.

³ Includes 50,000 AF of LTSCs transferred from CAWCD pursuant to Amended Agreement for Interstate Water Banking.

⁴ Totals may not sum due to rounding.

5.2 ICS FIRING CREDITS

As part of Arizona’s Implementation Plan, the AWBA entered into an IGA with the Community to purchase 50,000 acre-feet of firming ICS created by the Community.¹⁰ Due to a one-time ten percent reduction for system and evaporation losses, the 50,000 acre-feet of firming ICS resulted in 45,000 acre-feet of ICS credits, referred to as ICS Firming Credits under the IGA. These credits will be used to satisfy AWBA firming obligations to the Community after 2026. The AWBA has paid incrementally for the creation of firming ICS, which started at a rate of \$240 per acre-foot in 2019. The rate schedule has an annual escalator of three percent.

In 2021, the AWBA purchased 4,662 acre-feet of Firming ICS for \$1,186,013, which resulted in 4,196 acre-feet of ICS Firming Credits after losses. Withdrawal fees were used to purchase the Firming ICS, which included \$976,642 collected in the Phoenix AMA and \$209,371 collected in the Pinal AMA¹¹. **Table 5** identifies purchases of firming ICS since 2019 and the resulting ICS Firming Credits.

Table 5. Cumulative ICS Firming Credits Accrued

Year	Cost/AF	Firming ICS Purchased (AF)	Total Cost/AF	ICS Firming Credits Accrued (AF)
2019	\$240.00	14,660	\$3,518,400	13,194
2020	\$247.20	7,100	\$1,755,120	6,390
2021	\$254.40	4,662	\$1,186,013	4,196
Total		26,422	\$6,459,533	23,780

5.3 AGREEMENTS AND REPORTS

In 2021, the AWBA renewed its water storage agreements with its GSF partners for an additional ten years. Although the AWBA does not anticipate having supplies available for storage in the near-term, the execution of these agreements will ensure that the AWBA is prepared in the event conditions change and water becomes available.

The AWBA also released an updated Storage Facility Inventory Report (Inventory). The purpose of the Inventory is to determine if sufficient storage facilities exist to meet the water storage needs of the AWBA for the following ten years.¹² Additionally, storage facilities used for interstate storage must be identified in the Inventory before they can be used for this purpose.¹³ The Inventory must be updated at least every five years. The AWBA maintains water storage permits at 18 facilities located within the Phoenix, Pinal, and Tucson AMAs,

¹⁰ IGA between the AWBA and the GRIC for the Development of ICS Firming Credits executed May 20, 2019 (2019 IGA).

¹¹ Pinal AMA revenues collected in connection with groundwater use fees levied prior to 2020.

¹² A.R.S. § 45-2452.

¹³ Storage and Interstate Release Agreement among the United States of America, acting through the Secretary of the Interior, the Arizona Water Banking Authority, the Southern Nevada Water Authority and the Colorado River Commission of Nevada executed December 18, 2002.

that have a total storage capacity of 954,398 acre-feet. While the AWBA shares this storage capacity with other water storers, if water supplies become available, there should be ample storage capacity available to meet AWBA storage needs.

Lastly, the AWBA entered into a memorandum of understanding (MOU) with ADWR and CAWCD aimed at investigating supply augmentation opportunities through a Regional Recycled Water Program (RRWP) being developed by the Metropolitan Water District of Southern California (Metropolitan).¹⁴ Metropolitan has been developing the RRWP in partnership with the Los Angeles County Sanitation Districts. The project involves advanced treatment of reclaimed water that would be discharged to Metropolitan's distribution system, replacing other imported supplies, including Colorado River water. By replacing Colorado River supplies with the RRWP supplies, it creates an opportunity to augment Arizona's Colorado River supplies through an interstate exchange agreement. The project is intended to be developed in phases, with an estimated yield of approximately 170,000 AF per year at completion. The goal is to complete phase one by 2025, with the project fully developed in the early 2030s.

Two additional agreements were needed to implement the proposal, 1) an agreement among Metropolitan, ADWR and CAWCD to contribute funds for phase 1 of the RRWP,¹⁵ which allows for those funds to be credited toward a future development agreement, and 2) a joint funding agreement within Arizona between ADWR and CAWCD describing how funds will be made available to Metropolitan.¹⁶ Water storage tax funds are being used by CAWCD for this purpose (up to \$6 million). The expenditure of these funds is consistent with the goal to benefit long-term contracts because it will provide future supplies for CAP M&I firming by the AWBA. The funds are fully refundable if any party decides not to participate in the development of the water resource and exchange. By participating in the program, the parties agree to work cooperatively on the development of a framework for how interstate water is exchanged and delivered to Arizona. This is important because it will also provide a structural basis for implementing other similar projects or opportunities that might come up in the future. The Southern Nevada Water Authority (SNWA) also entered into an agreement with Metropolitan to participate in the RRWP.

¹⁴ Memorandum of Understanding (MOU) between ADWR, AWBA and CAWCD Regarding Investigation of Augmentation Opportunities Through a Regional Recycled Water Program, December 2021

¹⁵ Agreement to Contribute Funds for Environmental Planning Phase Services Related to the RRWP between Metropolitan, ADWR and CAWCD, December 2021.

¹⁶ Joint Funding Agreement between ADWR and CAWCD, December 2021.

6 CREDIT DISTRIBUTION OR EXTINGUISHMENT

The LTSCs developed by the AWBA, including credits developed through non-storage means, are intended to be used for five purposes:

- Firming CAP M&I priority subcontracts;
- Firming post-1968 Colorado River domestic use contracts;
- Firming the State’s obligation under the AWSA, including LTSCs accrued specifically for the State’s obligation to the United States;
- Assisting in fulfilling the water management objectives set forth in Chapter 2 of Title 45, Arizona Revised Statutes; and
- Interstate water banking purposes pursuant to agreements with Nevada.

LTSCs accrued by the AWBA for firming purposes may be distributed or extinguished under the following circumstances: if a shortage is declared on the Colorado River system and demand exceeds supply, if there is a water shortage as defined under the AWSA, or if there is an operational disruption of the CAP. Since there were no shortages or unplanned CAP outages in 2021, the AWBA did not distribute or extinguish LTSCs for these purposes. Additionally, no LTSCs were distributed or extinguished in 2020 for water-management purposes or the development of intentionally created unused apportionment (ICUA) for interstate banking purposes.

While LTSCs were not distributed in 2021, the need for the AWBA to firm supplies for the following year were confirmed in Reclamation’s [Annual Operating Plan for Colorado River Reservoirs 2022](#), published December 8, 2021. As a result, the AWBA’s firming obligation was incorporated into its APO for 2022 and is also identified in **Table 6** below.

Table 6 identifies the volume of credits accrued or acquired by the AWBA through 2021, the estimated credits used to meet AWBA objectives in 2022 and the balance of credits remaining, not including credits that may be acquired in 2022.

Table 6. AWBA Credits Available, Use of Credits in 2022 and Estimated Credits Remaining

Objective and Location	Credits Available ¹	Estimated Credits Used in 2022	Estimated Credits Remaining
	Acre-feet		
CAP M&I Firming (4-cent tax)			
Phoenix AMA	1,572,095	0	1,572,095
Pinal AMA	234,791	0	234,791
Tucson AMA	509,298	0	509,298
On-River M&I Firming (gen. fund)	403,830	0	403,830
Tribal Settlement Obligations:²			
Community - 15,000 AFY	173,170	6,429	166,741
LTSCs	105,390	0	105,390
Firming Credits	44,000	6,429	37,571
ICS Firming Credits	23,780	0	23,780
WMAT - 3,750 AFY	0	0	0
Hualapai - 557.5 AFY	0	0	0
Future Settlements - 4416.5 AFY	0	0	0
Federal Assistance (SAWRSA)	34,102	0	34,102
Groundwater Mgmt.³ (W/Fees)			
Phoenix AMA	251,411	0	251,411
Pinal AMA	417,706	0	417,670
Tucson AMA	107,148	0	107,148
Shortage Reparations⁴	109,489	0	109,489
Phoenix AMA	20,642	0	20,642
Pinal AMA	60,507	0	60,507
Tucson AMA	28,340	0	28,340
Pinal Redirect Credits⁵	14,125	0	14,125
Interstate - SNWA	613,846	0	613,846
Phoenix AMA	60,021	0	60,021
Pinal AMA	440,241	0	440,241
Tucson AMA	113,584	0	113,584

¹ Credits accrued or acquired through 2021.² White Mountain Apache Tribe (WMAT) Water Rights Quantification Act enforceability date is April 30, 2023; Hualapai settlement subject to congressional approval.³ Withdrawal Fee LTSCs may be used for CAP M&I firming and/or Tribal settlement obligations if needed.⁴ LTSCs accrued pursuant to Arizona-Nevada Shortage-Sharing Agreement executed in 2007.⁵ Credits accrued from water provided to Pinal AMA GSFs at full cost to the GSF operators.

7 Ten-Year Plan

Pursuant to A.R.S. §45-2426(B)(6), the AWBA is required to prepare a Ten-Year Plan that describes any water banking services and interstate water banking it intends to undertake during the ten-year period in addition to storing Colorado River water for its three main purposes: (1) protecting Arizona’s M&I water users against future water shortages on the Colorado River and disruptions of operation of the CAP, (2) fulfilling Arizona’s water-management objectives as set forth in the Groundwater Code and (3) making water available to implement the settlement of water rights claims by Tribal communities within the state. The Ten-Year Plan must also provide an analysis of the AWBA’s ability to complete those activities. The Ten-Year Plan is prepared only for planning purposes and is updated annually based on current information.¹⁷

This Ten-Year Plan analyzes potential activity for the planning period 2023 through 2032 to the extent possible and will be utilized in the development of the 2023 APO. Indeed, while the Ten-Year Plan is an essential tool for providing advance notice of potential near-term firming obligations or commitments, limited data (2023-2026) regarding Reclamation’s projected Lower Basin supply conditions prevent the AWBA from showing shortage probabilities for the remainder of the planning period (2027-2032). Information concerning the remaining years will be updated once the data becomes available. Estimated recovery capacity for M&I subcontractors, however, is shown for the ten-year period, for every operational Tier.

The AWBA is not expected to have excess CAP water available under this Ten-Year Plan and will therefore continue to explore alternative resources for firming purposes. However, the AWBA’s ability to enter into these types of agreements cannot be known in advance. Therefore, this Ten-Year Plan does not assume a certain volume of supplies that could potentially be acquired during this time period. Any supply acquisitions during this period will be incorporated into future Ten-Year Plans.

With shortage conditions anticipated in the coming years, this Ten-Year Plan focuses instead on AWBA credit distribution including credits distributed for firming purposes, or the creation of ICUA associated with interstate water banking. Based on Reclamation’s May 2022 CRMMS-ESP probabilistic projections, the AWBA may have a cumulative firming requirement of approximately 271,000 acre-feet until 2026. The estimated cumulative Tribal firming requirement is approximately 61,000 acre-feet and the estimated cumulative M&I firming requirement is approximately 209,000 acre-feet for the 2023-2026 period. However, it should be noted that extraordinary conditions on the Colorado River are resulting in rapid reservoir depletions. Potential decisions to address these issues could result in operations that affect water supplies available to the Lower Basin. The AWBA’s firming analyses will be updated accordingly as new information becomes available.

The Ten-Year Plan is comprised of two primary components, credit development and credit distribution. AWBA credits will be distributed for firming purposes or the creation of ICUA associated with interstate water banking.

7.1 CREDIT DEVELOPMENT

The ability to develop LTSCs is dependent on the availability of water, storage capacity and funding. When planning to store water, the AWBA must consider the availability of each as they are interdependent. The

¹⁷ AWBA APOs and Annual Reports for past years can be accessed on the AWBA website.

availability of one, or lack thereof, will ultimately affect the significance of the other in developing the Ten-Year Plan. Similarly, when purchasing LTSCs or other water supplies is it also dependent on the availability of supplies and funding with consideration also given to location and market rates.

7.1.1 Water Availability

Due to anticipated future hydrologic conditions, the AWBA is not expected to have excess CAP water available during the next ten years. Consequently, this Ten-Year Plan does not include water storage estimates. While the AWBA could store CAP water that is turned back during the year, the availability of this water cannot be known in advance and is therefore not a consideration in the Ten-Year Plan. Likewise, the AWBA could store water on behalf of others using supplies made available by those entities, such as Nevada’s unused Colorado River entitlement. However, since that storage would not impact the use of excess CAP supplies, it is also not a consideration in this Ten-Year Plan. If water does become available, the AWBA should have sufficient funding and storage capacity available to store the water.

7.1.2 Storage Capacity

Based on recharge permit volumes and discussions with AWBA storage partners, the AWBA could have a cumulative volume of 154,500 acre-feet per year of storage capacity available at GSFs and 139,000 acre-feet per year of capacity available at Underground Storage Facilities (USFs) (see *APPENDIX B*). Actual storage capacity volumes available to the AWBA in any given year will depend on storage by other entities. If excess CAP water becomes available to the AWBA, or CAP water is turned back during a year, the AWBA should have sufficient storage capacity available.

7.1.3 Funding

As indicated previously in Section 4, funding for water storage that benefits Arizona (intrastate storage) comes from three sources: water storage taxes (i.e., 4-cent water storage tax), groundwater withdrawal fees and general fund appropriations. The availability of revenues from each source varies annually. Additionally, there are restrictions on how each funding source can be used. Funding for interstate banking is received at the time of storage.

Water Storage Taxes

This Ten-Year Plan assumes CAWCD will continue to retain the water storage tax revenues collected for repayment or O&M of the project, but continue to offset AWBA water delivery and storage costs as part of O&M if water becomes available, and deposit funds into the AWB Fund for LTSC purchases. In accordance with the IGA between the AWBA, ADWR and CAWCD,¹⁸ the AWBA must request funds from CAWCD annually for all planned LTSC purchases for the following year. The AWBA did not request water storage tax funds for calendar year 2023 since the AWBA will likely have unspent funds available from 2022, as well as \$8.13 million in carryover funds from 2021. If necessary, additional funds could be requested during the year.

¹⁸ Intergovernmental Agreement among ADWR, AWBA, and CAWCD, executed January 3, 2019.

CAWCD has the authority to levy the water storage tax through 2035. The tax may be levied at a rate of up to 4-cent per \$100 of assessed property value through tax year 2029 and up to 3-cent for the remainder of the term. LTSCs accrued with these funds are used to firm CAP M&I supplies during shortages.

Groundwater Withdrawal Fees

This Plan assumes an estimated \$2.4 million in withdrawal fees is collected annually with \$2 million collected in the Phoenix AMA and \$390,000 collected in the Tucson AMA.¹⁹ As previously noted, withdrawal fees will not be levied for AWBA purposes in the Pinal AMA through 2026. The AWBA can utilize withdrawal fees to further the water management objectives of the AMAs, including firming for CAP M&I subcontracts and implementing Tribal water rights settlements when legislative appropriations are not available. When distributed or extinguished, these credits can only be used for the benefit of the AMA in which the monies were collected.

General Fund Appropriations

Pursuant to A.R.S. § 45-2423.B.10, the AWBA can submit a request for a General Fund appropriation each year. While the AWBA may request General Fund appropriations during this planning period, receipt of an appropriation cannot be assured. Absent future General Fund appropriations, any credit development for Tribal firming would require the use of groundwater withdrawal fees.

Funding for Interstate Storage

Pursuant to the Third Amended and Restated Agreement for Interstate Water Banking among the AWBA, Southern Nevada Water Authority (SNWA) and the Colorado River Commission of Nevada (Third Amended Agreement), the AWBA will collect all charges for administrative services and for delivery and storage of water. Costs for interstate banking will be incorporated into the APO.

7.1.4 Credit Purchases

Through 2022, the AWBA will have accrued or acquired an estimated 4.45 MAF of credits. **Table 7** below identifies all available credits by firming responsibilities and objectives, including LTSCs and non-storage firming credits developed pursuant to the AWBA's agreements with the Community.

¹⁹ Withdrawal fee revenues vary from year to year. The assumptions used in this Ten-Year Plan are based on the average revenues over the last three years (2019 through 2021).

Table 7. AWBA Credits Available through 2022 (AF)¹

Objective	Phoenix AMA	Pinal AMA	Tucson AMA	Total
M&I Firming	1,582,489	234,791	512,227	2,329,507
On-River Firming	42,316	306,968	54,546	403,830
Tribal Firming ²	143,908	25,373	34,102	203,383
Water Management	251,411	417,706	107,148	776,266
Shortage Reparation	20,642	60,507	28,340	109,489
Other	-	14,125	-	14,125
Interstate	60,021	440,241	113,584	613,846
Total	2,100,787	1,499,711	849,947	4,450,445

¹ Credit accrual for 2022 is estimated based on anticipated ICS firming credits and LTSC purchases.

² Includes use of 6,429 acre-feet to satisfy a firming obligation to the Community in 2022. Credits available for Tribal firming in Tucson are LTSCs that will be used to assist the Secretary for federal firming obligations to the Nation.

While the AWBA has a significant amount of firming credits, hydrologic modeling has shown the AWBA will likely need significantly more water to firm supplies during shortages. Since excess CAP supplies are not anticipated to be available during the next ten years, this Ten-Year Plan assumes the AWBA will continue to develop credits through alternative means. The AWBA has funding available for this purpose in the near-term. However, due the uncertainties related to the availability of LTSCs, competitive interests, and future market prices, the amount of LTSCs that can be purchased during the planning period cannot be known in advance. The decision to purchase LTSCs will continue to be determined annually as part of the AWBA's APO.

In addition to purchasing LTSCs, the AWBA will continue to fund the development of the remaining 18,239 acre-feet of the 45,000 total acre-feet of ICS firming credits identified under its agreement with the Community. Assuming the AWBA has \$2 million in withdrawal fees available each year from the Phoenix AMA, all ICS firming credits will be purchased by 2026.

7.2 CREDIT DISTRIBUTION OR EXTINGUISHMENT

The Ten-Year Plan is an important tool for providing advance notice of potential near-term firming obligations and developing future policies. Water Bank firming occurs when Colorado River water supplies are insufficient to meet demand for CAP users and on-River fourth priority users, for which the AWBA has firming responsibilities. Factors affecting AWBA firming obligations include Colorado River system hydrologic conditions, the supply available to Arizona and Colorado River demands within Arizona. The AWBA estimates firming volumes based on Reclamation's 5-Year Probabilistic Projections. Previously, Reclamation generated the 5-Year Probabilistic Projections using the Colorado River Simulation System, which produced model results beyond the 5-year period. The AWBA typically extends these projections to encompass the AWBA's full ten-year planning period. However, in February 2022, Reclamation switched to generating 5-Year Probabilistic Projections using the Colorado River Mid-term Modeling System in Ensemble Mode (CRMMS-ESP), which does not provide results beyond the 5-year period and thus the forecast projections could not be extended through 2032. Firming projections are determined based on an analysis of supply and demand using the Joint Shortage Analysis Model (JSAM): a model developed jointly by CAWCD and ADWR to estimate Colorado River demands

within Arizona’s priority system and evaluate the timing, frequency and magnitude of shortages that may result in AWBA firming.

7.2.1 Timing, Magnitude and Likelihood of Firming

As identified in **Table 8**, the May 2022 forecast developed based on CRMMS-ESP projected a Tier 2 shortage as the most likely operating condition in 2023, 2024, and 2025, and a Tier 3 shortage as the most likely operating condition in 2026.

Table 8. Projected Lower Basin Supply Conditions

Operational Tier	Tier Reductions (AF)	Reclamation’s Five-Year Table - Shortage Probability ¹			
		2023	2024	2025	2026
Surplus Condition (≥1,145)		0%	0%	0%	0%
Normal Year (<1145 and >1075)		0%	7%	0%	13%
Normal (<1145 and >1090)		0%	0%	0%	0%
Tier Zero (≤1090 and >1075)	192,000	0%	7%	0%	10%
Any Shortage (Mead ≤1075)		100%	93%	100%	87%
Tier 1 Shortage (≥1050 and ≤1075)	512,000	37%	17%	30%	23%
Tier 2 Shortage (≥1025 and <1050)		63%	60%	37%	20%
Tier 2a (>1045 and <1050)	592,000	60%	7%	3%	7%
Tier 2b (≥1025 and ≤1045)	640,000	3%	53%	33%	13%
Tier 3 Shortage (<1025)	720,000	0%	17%	33%	43%

¹ Hydrologic assumptions from Reclamation’s May 2022 CRMMS-ESP. Shortage probabilities from Reclamation’s projections of future Colorado River system conditions, May 2022 CRMMS-ESP. Reclamation’s projections run through 2026. The 2007 Interim Guidelines expire in 2026. These projections do not represent the full range of future possibilities that could occur with different modeling assumptions.

Reclamation’s May 2022 most probable projection is used to determine the most likely operating tier each year and the LBDCP model is used to estimate the corresponding AWBA firming volume that year (as highlighted in **Table 8**). For planning purposes, Tier 2a operating conditions are anticipated in 2023 with Tier 2b shortage reductions beginning in 2024. The likelihood of a Tier 2b or Tier 3 operating condition is equal in 2025, but the probability of a Tier 3 shortage (33%) is less than a probability of a Tier 2 (37%) shortage. As a result, operations under a Tier 2b are selected for 2025. Nevertheless, a Tier 3 shortage is anticipated in 2026.

As identified in **Table 9**, total firming requirements for Tribal contractors (CAP NIA priority supplies) would be 61,468 or 59,810 acre-feet for the 2023-2026 period (depending on whether a Tier 2b or Tier 3 shortage occurs in 2025, respectively). Likewise, total firming requirements for CAP M&I subcontractors (M&I Priority supplies) would be 209,491 or 264,057 acre-feet (depending on whether a Tier 2b or Tier 3 shortage occurs in 2025, respectively). On-River M&I contractors would not be affected during this time period.

Table 9. Estimated AWBA Firming Volumes through 2026

Reclamation's Five-Year Table - Shortage Probability ¹				
Operational Tier	2023	2024	2025	2026
Tier 1 Shortage	37%	17%	30%	23%
Tier 2 Shortage	63%	60%	37%	20%
Tier 2a	60%	7%	3%	7%
Tier 2b	3%	53%	33%	13%
Tier 3 Shortage	0%	17%	33%	43%

Tribal Firming ²				
Operational Tier	2023	2024	2025	2026
Tier 1 Shortage	9,463	10,034	12,827	13,230
Tier 2a	14,898	14,712	18,336	18,208
Tier 2b	14,014	13,840	17,248	17,128
Tier 3 Shortage	12,667	12,510	15,591	15,482
Most Probable Firming Volumes	14,898	13,840	17,248	15,482

M&I Firming ²				
Operational Tier	2023	2024	2025	2026
Tier 1 Shortage	0	0	0	0
Tier 2a	4,148	11,806	13,639	17,965
Tier 2b	39,937	47,595	49,428	53,754
Tier 3 Shortage	94,503	102,161	103,994	108,320
Most Probable Firming Volumes	4,148	47,595	49,428	108,320

On-River Firming ²				
Operational Tier	2023	2024	2025	2026
Tier 1 Shortage	0	0	0	0
Tier 2a	0	0	0	0
Tier 2b	0	0	0	0
Tier 3 Shortage	0	0	0	0
Most Probable Firming Volumes	0	0	0	0

Total AWBA Firming ²				
Operational Tier	2023	2024	2025	2026
Tier 2 Shortage				
Tier 2a	19,045	26,518	31,974	36,173
Tier 2b	53,952	61,435	66,677	70,883
Tier 3 Shortage	107,171	114,671	119,585	123,802
Most Probable Firming Volumes	19,045	61,435	66,677	123,802
Cumulative Volumes	270,959			

¹ Shortage probabilities are from Reclamation's May 2022 CRMMS-ESP Projections. Reclamation's projections run from 2022 through 2026.

² Estimated AWBA firming volumes derived from the Joint Shortage Analysis Model, developed by ADWR, AWBA and CAWCD, updated in May 2022. These estimated firming volumes do not represent the full range of future possibilities that could occur with different modeling assumptions.

7.2.2 Tribal Firming for the Gila River Indian Community

Under the 2004 AWSA, the AWBA, as agent for the State, is obligated to firm up to 15,000 acre-feet per year (through 2107) of CAP NIA Priority water for the Community when supplies are insufficient to meet demand. The AWBA and the Community entered into an IGA on June 16, 2015 to establish an annual process to ensure the State’s obligations to the Community are satisfied when shortages occur. The IGA outlines the steps that must be taken by each party to develop a firming plan prior to a shortage year. In 2022, the AWBA utilized Firming Credits, as identified in Exhibit B to the IGA to satisfy a firming obligation of 6,429 acre-feet. The parties agreed to utilize the same firming method in 2023. **Table 10** below identifies the estimated firming volume for calendar year 2023. This volume will be amended to reflect actual 2023 water orders as needed. It is anticipated that the remaining Firming Credits will be utilized before LTSCs accrued on-Reservation are used to satisfy AWBA firming obligations through 2026.

Table 10. Firming Proposal for the Gila River Indian Community for Shortage Year 2023 – Tier 2a

Year	Firming Credits Developed			Firming Credits Used in 2023 (AF)		Remaining Balance (AF)
	Firming Credits Developed (AF)	Cost/AF	Total Cost	Through CY 2022 ¹	CY 2023 ²	
2015	16,000	\$157.00	\$2,512,000	6,429	9,571	0
2016	12,000	\$161.00	\$1,932,000	0	5,327	6,673
2017	7,000	\$164.00	\$1,148,000	0	0	7,000
2018	9,000	\$160.00	\$1,440,000	0	0	9,000
Total	44,000		\$7,032,000	6,429	14,898	22,673

¹ Based on CAWCD’s final accounting of 2022 water orders

² Estimates for 2023 CAP water availability provided by CAWCD, assuming full water orders for NIA contracts issued in 2022.

7.2.3 M&I Firming and Recovery Capacity Required

As discussed in the 2021 Joint Update, the AWBA will initiate firming discussions with CAP M&I subcontractors based on a three-year planning horizon. Recovery implementation triggers for M&I firming are tied to Reclamation’s April Five-Year Probability Table and April 24-Month Study²⁰. The first trigger occurs when the April 5-year table shows a greater than 15% probability of a shortage impacting the M&I Priority pool in the third year. The second trigger occurs when the April 24-Month Study forecasts a shortage impacting the M&I Priority pool in the second year based on the “Min Probable” forecast. The third trigger occurs when the April 24-Month Study forecasts a shortage impacting the M&I Priority pool in the following year based on the “Most Probable” forecast. In addition to these annual triggers to initiate progressive levels of coordination, the M&I firming timeline in the 2021 Joint Update highlights critical decision points, deadlines to finalize firming agreements, and the timing of rate notifications for CAP recovery. While the triggers and planning timeline are linear in nature, actual hydrologic conditions could change the need to either accelerate or maintain the planning process. For example, Reclamation’s 2021 April projections did not specifically indicate a shortage

²⁰ In 2022, Reclamation released its Five-Year Probability Table in May instead of April. As for the 24-Month Study, it will be used when available.

affecting CAP M&I subcontractors within three years. However, with drier conditions and reductions in inflows during the year, this trigger was met in August with a 25% chance of a Tier 2b shortage, resulting in the need to begin recovery planning consultations. With Reclamation’s April 24-Month study for 2022 continuing to indicate CAP M&I shortages for 2023, the planning process will continue with development of subcontractor firming proposals. The August 24-Month study results for 2022 will be key in determining how quickly the firming proposals will need to be implemented.

The AWBA is responsible for the distribution of credits for firming purposes, consistent with its statutory and contractual responsibilities. However, the AWBA is not authorized to recover stored water and must rely on CAP or other recovery partners. Many CAP M&I subcontractors have indicated a preference for Independent Recovery of AWBA LTSCs using their own infrastructure (with no direct reliance on CAP recovery). This allows for operational flexibility and maximizes the use of existing infrastructure. An amendment to A.R.S. § 45-2457, adopted in the spring of 2021, authorizes the AWBA to distribute LTSCs directly to CAP M&I subcontractors. This amendment allows M&I subcontractors to enter into a firming agreement with the AWBA and request a direct transfer of AWBA LTSCs for firming purposes.

To estimate the portion of AWBA firming volumes that might require recovery well capacity, it is necessary to evaluate how shortage reductions impact individual M&I subcontractors’ annual direct uses. In some cases, the reductions to M&I Priority supplies will only impact the ability of a subcontractor to accrue LTSCs for future use, but in other cases reductions will impact a subcontractor’s annual direct uses. Shortage impacts to CAP M&I Priority water scheduled for delivery to a treatment plant (or used for annual storage and recovery) is relevant for recovery planning, because these direct use impacts affect the annual volume of recovery capacity required for M&I firming. Understanding the timing of these impacts is particularly important because it requires the use of recovery wells that must be available in the year that the shortage reductions occur. **Table 11** identifies the estimated volume of recovery capacity that may be needed for M&I firming each year and **Table 12** identifies the estimated volume of recovery capacity needed in each AMA during a Tier 3 reduction.

Table 11. Estimated Recovery Capacity Needed by Shortage Tier

Operational Tier	M&I Firming - Recovery Capacity Needed ¹ (AF)									
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Tier 1	0	0	0	0	0	0	0	0	0	0
Tier 2a	755	2,075	2,462	3,317	4,436	6,745	9,055	11,651	12,382	13,022
Tier 2b	6,376	8,420	10,047	12,377	14,716	16,997	19,515	22,213	23,060	24,048
Tier 3	21,602	24,608	26,195	28,982	31,759	34,414	36,550	37,731	38,546	38,905

¹ Estimated recovery well capacity incorporates March 2022 feedback from impacted M&I subcontractors

Table 12. Estimated Recovery Capacity Needed by AMA in Tier 3

	M&I Firming - Tier 3 Recovery Capacity Needed (AF)									
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Phoenix AMA										
Independent Recovery	4,074	4,478	4,650	4,917	5,183	5,446	5,705	5,790	5,790	5,790
CAP Recovery	15,312	17,718	19,059	21,454	23,843	26,112	27,871	28,806	29,515	29,777
Pinal AMA										
Independent Recovery	1,705	1,834	1,875	1,953	2,029	2,104	2,177	2,177	2,177	2,177
Tucson AMA										
Independent Recovery	511	578	611	658	705	752	798	958	1,064	1,161
Total	21,602	24,608	26,195	28,982	31,759	34,414	36,550	37,731	38,546	38,905

¹ Estimated recovery well capacity incorporates March 2022 feedback from impacted M&I subcontractors

As the AWBA’s designated recovery agent, CAWCD has secured several recovery partnership agreements and continues to explore additional partnerships to increase the volume of recovery capacity available. Within the Phoenix AMA, CAP recovery capacity will likely be made available through the “CAP Board Policy Allowing the Use of the Central Arizona Groundwater Replenishment District Long-Term Contract to Satisfy the Arizona Water Banking Authority’s Firming or Interstate Obligations.” During this ten-year period, CAP may be able to create sufficient recovery capacity through the Central Arizona Groundwater Replenishment District (CAGR) policy and/or credit exchange partnerships. However, if additional recovery capacity is needed, direct recovery might be necessary. Direct recovery would require the development of wells and conveyance systems and would increase recovery costs.

In the Phoenix AMA, where most CAWCD recovery is anticipated, there are recovery partnership agreements in place with Roosevelt Water Conservation District (RWCD), New Magma Irrigation and Drainage District (NMIDD), and Queen Creek Irrigation District (QCID), for up to 10,000 acre-feet, 5,000 acre-feet and 2,250 acre-feet of annual recovery capacity, respectively. In the Pinal AMA, CAWCD has recovery partnership agreements in place with Central Arizona Irrigation and Drainage District (CAIDD) and Maricopa-Stanfield Irrigation and Drainage District (MSIDD) for up to 5,250 acre-feet and 5,000 acre-feet of annual recovery capacity respectively. The recovery agreements with NMIDD, QCID, CAIDD, and MSIDD collectively satisfy the \$5 million commitment made by the CAWCD Board to support groundwater infrastructure development as part of Arizona's DCP implementation. **Table 12** identifies the volume, terms and conditions of all existing CAP recovery partnership agreements.

CAWCD has also entered into two agreements specifically intended to secure capacity for the recovery of the AWBA’s interstate credits.²¹ These agreements will be used to develop ICUA when SNWA makes a request. In the Pinal AMA, the agreement with Arizona Water Company, for up to 2,500 acre-feet of annual recovery capacity, will likely be utilized for interstate recovery beginning in 2025. However, this agreement can also be used for other AWBA recovery needs during a year when interstate recovery is not requested. In the Tucson AMA, CAWCD has entered into an agreement with Tucson Water for the recovery of the AWBA’s interstate LTSCs. The agreement with Tucson Water, for up to 10,000 acre-feet of annual recovery capacity (not to exceed 65,000 acre-feet total) can only be used for interstate recovery on behalf of SNWA. **Table 13** below

²¹ SNWA is responsible for paying the recovery costs to develop ICUA and has therefore, under separate agreements, provided CAWCD \$1 million for advancement to both AWC and the City of Tucson for this purpose.

identifies the volume, terms and conditions of CAP’s recovery agreements for both intrastate and interstate recovery.

Table 13. CAP’s Available Recovery Capacity by AMA

Partner	Volume (AF)	Term	Conditions
Phoenix AMA TOTAL	23,676		
CAGRD	6,426	Undefined	
New Magma IDD	5,000	2024-2051	
Queen Creek ID	2,250	2024-2049	
RWCD	10,000	2008-2022	
Pinal AMA TOTAL	12,750		
Arizona Water Company	2,500	2025-2050	Priority to interstate recovery
Central Arizona IDD	5,250	2027-2051	
Maricopa-Stanfield IDD	5,000	2027-2051	
Tucson AMA TOTAL	10,000		
Tucson Water	10,000	2020-2050	Interstate recovery only
Grand TOTAL	46,426		

7.2.4 Agreement to Exchange LTSCs

In 2019, as a component of Arizona’s Implementation Plan for the LBDCP, the AWBA agreed to exchange LTSCs with Arizona parties who agreed to store a portion of their CAP water at GSFs in the Pinal AMA.²² Under the agreement, the AWBA will exchange up to 43,225 acre-feet of LTSCs per year (from 45,500 acre-feet of storage less 5 percent cut to the aquifer) under Tier 1 or Tier 2a shortage conditions occurring from 2020 through 2022. While there were no shortages in 2020 and 2021, a Tier 1 shortage was triggered in 2022. Therefore, the AWBA will exchange its LTSCs for an equal volume of LTSCs accrued by participants for this purpose. This exchange allows these entities storing in the Pinal AMA the ability to recover and use the water in the AMA where they are located. LTSC exchanges are anticipated to occur in 2023. All exchanges must be completed by December 31, 2026.

7.2.5 Interstate Storage and Requests for Intentionally Created Unused Apportionment

Pursuant to the interstate storage Third Amended Agreement, there is no obligation to accrue a specified volume of LTSCs on behalf of SNWA. Rather, storage is determined annually through mutual agreement and paid for by SNWA in a year storage occurs. LTSCs accrued under previous interstate water banking agreements with SNWA total 601,041 acre-feet and are held in a separate interstate subaccount for SNWA. In 2018, the

²² Lower Basin Drought Contingency Plan (“LBDCP”) Implementation Plan: Agreement to Exchange Long-Term Storage Credits between AWBA and the City of Avondale; City of Chandler; City of Goodyear; City of Peoria; City of Phoenix; City of Scottsdale; City of Tucson; Freeport Minerals Corporation; and EPCOR Water Arizona Inc

AWBA stored 13,500 acre-feet of Nevada’s unused Colorado River allocation, which resulted in 12,805 acre-feet of LTSCs, bringing the total volume of LTSCs in SNWA’s subaccount to 613,846 acre-feet. Since decisions to store water for Nevada are made as part of the AWBA’s APO, assumptions for interstate storage are not included in this Ten-Year Plan. Presently, interstate storage is not contemplated for the AWBA’s 2022 APO.

The Third Amended Agreement also authorizes Nevada to request development of ICUA, as follows: in the initial year, an amount not exceeding 20,000 acre-feet; the second year, an amount not exceeding 30,000 acre-feet and in all subsequent years, an amount not exceeding 40,000 acre-feet. However, if sufficient recovery capacity exists, SNWA may request the development of additional ICUA to replace reductions in supply during Colorado River shortages up to its annual entitlement of 300,000 acre-feet. This Ten-Year Plan assumes that SNWA will request 2,500 acre-feet per year of ICUA development beginning in 2025.²³ There are currently recovery agreements on behalf of SNWA for the development of ICUA that provide up to 12,500 acre-feet per year of recovery capacity.²⁴ Credits accrued prior to the Third Amended Agreement must be recovered by December 31, 2063. Credits accrued after, such as those accrued in 2018, must be recovered within 50 years of the date of storage with the oldest credits recovered first. The agreement terminates when all credits (i.e. existing and future) have been recovered.

7.2.6 Estimated Use of AWBA Credits

As illustrated in **Table 14** below, the AWBA anticipates utilizing an estimated 61,468 acre-feet of credits to satisfy potential firming obligations for Tribal entities through 2026, roughly 36 percent of the credits available at the beginning of 2023. This includes 54,922 acre-feet for the Community and 6,546 acre-feet for the White Mountain Apache Tribe (WMAT) if the Water Rights Quantification Act become enforceable in 2025.²⁵ Although, the AWBA has not designated LTSCs for satisfying other Tribal settlements including the WMAT, groundwater management LTSCs (withdrawal fee LTSCs) could be used for this purpose if necessary. Since entities in the Phoenix AMA plan to lease CAP NIA Priority supplies made available to the WMAT, Phoenix AMA withdrawal fees would likely be used to firm these supplies.

The AWBA also anticipates distributing 209,491 acre-feet of LTSCs for CAP M&I firming purposes based on the firming volumes identified in **Table 9**. However, given the potential for a Tier 3 shortage occurring in 2025, the AWBA may need to distribute an additional 54,566 acre-feet of LTSCs for a total of 264,057. As a result, the AWBA could be distributing through 2026 an estimated 9 to 11 percent of its water storage tax LTSCs available at the beginning of 2023 (**Table 14**). Shortages are not anticipated to effect on-River M&I users. Therefore, LTSCs are not distributed for this purpose.

²³ This assumption is based on communication with SNWA June 2022.

²⁴ This includes an agreement with Arizona Water Co. providing recovery capacity for up to 2,500 acre-feet per year and an agreement with Tucson Water providing recovery capacity for up to 10,000 acre-feet per year. SNWA has also prepaid CAWCD for the recovery of 50,000 acre-feet of LTSCs that were accrued in the Pinal AMA and transferred to the AWBA under the original interstate water banking agreement.

²⁵ Legislation to extend the WMAT enforceability date two years to April 30, 2025, was introduced to Congress November 4, 2021.

Table 14. Uses of AWBA Credits Through 2026

Location and Objective	Credits Available in 2023 (AF)	Estimated Credits Used/Exchanged through 2026 (AF)	Estimated Credits Remaining End of 2026 (AF)
CAP M&I Firming¹	2,329,507	209,491	2,120,016
Phoenix AMA	1,582,489	123,600	1,458,889
Pinal AMA	234,791	67,037	167,754
Tucson AMA	512,227	18,854	493,373
On-River M&I Firming	403,830	0	403,830
Tribal Settlement Obligations:²			
Community - 15,000 AFY	169,281	54,922	114,359
LTSCs	105,390	17,351	88,039
Firming Credits	37,571	37,571	0
ICS Firming Credits	26,320	0	26,320
WMAT - 3,750 AFY	6,546	6,546	0
Hualapai - 557.5 AFY	0	0	0
Future Settlements - 4416.5 AFY	0	0	0
Federal Assistance (SAWRSA)³			
\$3 million provided in LTSCs	34,102	0	34,102
Groundwater Management⁴	769,719	0	769,719
Phoenix AMA	244,865	(38,475)	206,390
Pinal AMA	417,706	43,225	460,931
Tucson AMA	107,148	(4,750)	102,398
Shortage Reparations	109,489	0	109,489
Phoenix AMA	20,642	0	20,642
Pinal AMA	60,507	0	60,507
Tucson AMA	28,340	0	28,340
Pinal Redirect Credits	14,125	0	14,125
Interstate - SNWA	613,846	5,000	608,846
Phoenix AMA	60,021	0	60,021
Pinal AMA	440,241	5,000	435,241
Tucson AMA	113,584	0	113,584

¹ Assumes Tier 2b shortage reductions in 2025.² White Mountain Apache Tribe (WMAT) Water Rights Quantification Act enforceability date is currently April 30, 2023; Hualapai settlement subject to congressional approval. WMAT firming LTSCs were deducted from Groundwater Management LTSCs for the Phoenix AMA.³ Credits could be requested by Reclamation during this time period.⁴ Reflects maximum volume of credits that could be exchanged pursuant to LTSC exchange agreement under the Implementation Plan.

8 CONCLUSION

The Ten-Year Plan is intended to serve as a guide to assist the AWBA in the development of its APO, in which the AWBA is required to plan its activities for the following calendar year. The Ten-Year Plan is reviewed and updated annually and may change significantly depending on hydrologic conditions and the goals set by the AWBA. Based on a range of modeling scenarios, the AWBA anticipates that the Lower Basin will operate under Tier 2 or Tier 3 conditions for most of the planning period.

Based on current shortage projections, the AWBA is anticipating using 9 percent of its LTSCs for CAP M&I firming over the next four years. The AWBA will have about 2.3 million LTSCs at the beginning of 2023 for M&I firming purposes. Based on shortage probabilities and demand estimates during this time, the AWBA anticipates distributing 209,491 LTSCs (**Table 14**) by 2026, leaving 2,120,126 acre-feet of LTSCs remaining for subsequent years.

Likewise, the AWBA is anticipating using 32 percent of the credits it has for firming the Community over the next four years. The AWBA will have 169,281 acre-feet of credits at the beginning of 2023. Projections indicate the AWBA will need to firm 54,922 acre-feet for the Community through 2026, leaving 114,359 acre-feet of credits currently dedicated for this purpose for future years (**Table 14**). Additionally, the AWBA may need to begin using groundwater management LTSCs to meet its other Tribal firming obligations. The AWBA anticipates using LTSCs from the Phoenix AMA to firm WMAT lessees beginning in 2025.

The AWBA will continue to work collaboratively with CAWCD and stakeholders to ensure it is well prepared to meet its firming responsibilities under these conditions.

APPENDICES

APPENDIX A

Annual and Cumulative Long-Term Storage Credit Purchases¹

Funding Source	2021		Cumulative	
	Funds Expended	Credits Accrued ² (AF)	Funds Expended	Credits Accrued (AF)
Ad Valorem Tax				
Phoenix AMA	\$1,562,795	6,500	\$24,218,197	100,762
Pinal AMA	\$ 0	-	\$0	-
Tucson AMA	\$303,690	1,363.45	\$10,293,626	45,797
Withdrawal Fees				
Phoenix AMA	\$ 0	-	\$834,876	3,600
Pinal AMA	-	-	\$0	-
Tucson AMA	\$ 0	-	\$1,100,403	5,123
Shortage Reparations				
Phoenix AMA	\$0	-	\$0	-
Pinal AMA	\$0	-	\$0	-
Tucson AMA	\$0	-	\$579,842	3,665
Total	\$1,866,485	7,863	\$37,026,945	158,946

¹ Information on AWBA annual and cumulative LTSCs accrued from water storage at individual facilities can be found on the AWBA's website, waterbank.az.gov

² LTSC purchases in 2021 include 6,500 acre-feet from the City of Peoria and 1,363.45 acre-feet from the Nation in the Tucson AMA.

APPENDIX B

STORAGE FACILITIES AVAILABLE TO THE AWBA (as used in the Ten-Year Plan)					
Name of Facility	Facility Permit Expiration	Facility Permitted Capacity (AF)	Capacity Available to AWBA ¹ (AF)	Year Water Last Stored	Volume of Water Last Stored ² (AF)
PHOENIX – GSF					
New Magma Irrigation & Drainage District	Jan-23	80,000	3,000	2020	953
Queen Creek Irrigation District	Pending	22,000	2,500	2020	35
Tonopah Irrigation District	Sep-22	15,000	2,000	2020	400
Subtotal for Phoenix AMA - GSF		117,000	7,500		
PHOENIX – USF					
Agua Fria Recharge Project	Dec-40	24,000	8,000	2018	4,637
Granite Reef Underground Storage Project	Mar-32	93,000	15,000	2016	10,120
Hieroglyphic Mountains Recharge Project	Pending	35,000	8,000	2018	7,011
Superstition Mountains Recharge Project	Jan-28	25,000	8,000	2018	8,687
Tonopah Desert Recharge Project	Sep-25	150,000	80,000	2020	34,455
Subtotal for Phoenix AMA - USF		333,000	119,000		
PINAL – GSF					
Central Arizona Irrigation & Drainage District	Oct-23	110,000	60,000	2020	4,500
Hohokam Irrigation & Drainage District	Pending	82,000	20,000	2020	3,000
Maricopa-Stanfield Irrigation & Drainage District	Sep-25	168,114	60,000	2020	4,500
Subtotal for Pinal AMA - GSF		360,114	140,000		
TUCSON – GSF					
BKW Farms	Mar-26	14,324	1,000	2016	1,000
Cortaro-Marana Irrigation District	Oct-24	20,000	4,000	2018	2,500
Kai-Farms – Red Rock	Feb-26	11,401	2,000	2018	1,334
Subtotal for Tucson AMA - GSF		45,725	7,000		
TUCSON – USF					
Avra Valley Recharge Project	Jan-39	11,000	0	2020	2,000
Lower Santa Cruz Recharge Project	Jan-36	50,000	10,000	2018	6,666
Pima Mine Road Recharge Project	Feb-41	23,500	5,000	2018	1,300
SAVSARP	Jan-28	60,000	5,000	2020	5,400
Subtotal for Tucson AMA - USF		144,500	20,000		
ALL AMAs - GSF		522,839	154,500		
ALL AMAs - USF		477,500	139,000		

¹ This does not reflect the actual “permitted” volume for these facilities; instead for the purposes of this plan, staff relied on average historical storage volumes and potential for future storage and in some cases constraints provided by the facility operator.

² Storage volumes reflect the combined effect of water, funding, and storage capacity availability.