

Final Draft

# ARIZONA WATER BANKING AUTHORITY

ANNUAL REPORT  
2017



Submitted

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# Arizona Water Banking Authority

## Annual Report 2017

Honorable Douglas A. Ducey  
Governor of Arizona

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## Acronyms and Abbreviations

ADWR	Arizona Department of Water Resources
Agreement to Firm	Agreement to Firm Future Supplies executed February 4, 2005 between the Arizona Water Banking Authority and the Mohave County Water Authority
Amended Agreement to Firm	Amended Agreement to Firm Future Supplies executed March 17, 2010.
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
CAGR D	Central Arizona Groundwater Replenishment District
CAP	Central Arizona Project
CAWCD	Central Arizona Water Conservation District
Credits	Long-term storage credits
CRSS	Colorado River Simulation System Model
Decree	Consolidated Decree of the U.S. Supreme Court in <i>Arizona v. California</i>
GRIC	Gila River Indian Community
GRIIDD	Gila River Indian Irrigation and Drainage District
GSF	Groundwater Savings Facility
ICUA	Intentionally Created Unused Apportionment
IRPG	Interagency Recovery Planning Group
IGA	Intergovernmental Agreement
M&I	Municipal and Industrial
MAF	Million Acre-feet
MCWA	Mohave County Water Authority
NIA	Non-Indian Agricultural
PSCP	Pilot System Conservation Program
Plan	Ten-Year Plan
Quantification Agreement	White Mountain Apache Tribe Water Rights Quantification Agreement
Reclamation	U.S. Bureau of Reclamation
RPAG	Recovery Planning Advisory Group
SNWA	Southern Nevada Water Authority
USF	Underground Storage Facility

## Summary

The role of the Arizona Water banking Authority (AWBA) has changed considerably since it was first established in 1996. The primary objective of the AWBA was to store excess Central Arizona Project (CAP) water 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.

Since inception, the AWBA has accrued over 4.2 million acre-feet (MAF) of long-term storage credits (credits) toward achieving its various goals. Of this amount, 3.6 MAF are for Arizona uses and include 91,646 acre-feet of existing credits purchased from others. The remaining 0.6 MAF are interstate credits stored on behalf of the State of Nevada. While this has been a major accomplishment, the AWBA has not yet met all its goals and will be challenged to do so in the years ahead, since future projections indicate there will be no excess CAP water supplies available for AWBA storage.

In 2017, the AWBA stored 17,630 acre-feet of excess CAP water within the Phoenix, Pinal, and Tucson Active Management Areas (AMAs), the lowest amount in AWBA history. The AWBA also developed 7,000 acre-feet of firming credits with the Gila River Indian Community through reimbursement of the Community's full-priced water costs as described in the AWBA's intergovernmental agreement (IGA) with the Community executed in June 2016. The agreement has a three-year term and is an extension of the letter agreement executed in 2015. To date, the AWBA has accrued a total of 35,000 acre-feet of firming credits on Community lands.

AWBA, Arizona Department of Water Resources (ADWR) and Central Arizona Water Conservation District (CAWCD) staff continue to work cooperatively on the future steps outlined in the Joint Recovery Plan, executed in 2014, to ensure the recovery and delivery of AWBA firming supplies can be implemented when needed. These activities include updates to hydrologic modeling analyses, recovery feasibility studies, cost estimates and the development of agreements for recovery partnerships. In 2017, the AWBA, CAWCD, Arizona Water Company, and Nevada entered into a series of agreements that facilitate the future recovery of interstate credits in the Pinal AMA. CAWCD and the Bureau of Reclamation also executed a CAP system use agreement. This agreement is of key importance as it describes how the system can be used to deliver AWBA supplies during times of shortage. AWBA staff has also initiated firming discussions with Maricopa County cities that intend to lease water pursuant to White Mountain Apache Tribe Water Rights Quantification Agreement once it becomes enforceable.

Long-term Colorado River water supply projections indicate a moderate to high probability that a shortage could be declared in the Lower Basin beginning in 2020 (>50%). The probability of a shortage increases and remains high (>64%) for the duration of the AWBA's ten-year planning period, with increased potential for deeper shortages over time. Projections also show that the AWBA may have its first firming requirement beginning in 2024 (>25%), but these firming volumes are manageable ranging from an estimated 375 acre-feet to 6,870 acre-feet per year and would only affect the AWBA's obligation to firm supplies allocated to Indian Tribes under the Arizona Water Settlements Act. The AWBA has credits in place for this purpose. It is important to note that these probabilities are based on long-term modeling projections and do not include future conservation efforts in Lake Mead. A shortage declaration is currently determined by the Bureau of Reclamation's August 24-Month Study, which is intended to capture the impacts of planned conservation efforts.

## Annual Report Requirements

Arizona Revised Statutes § 45-2426 mandates that the AWBA file an annual report with the Governor, President of the Senate, and Speaker of the House of Representatives on or before July 1 of each year for the previous calendar year. The report is required to be a full and complete account of the AWBA's transactions and proceedings and must include the following:

1. An accounting of all monies expended from the banking fund.
2. An accounting of all monies in the banking fund remaining available to the AWBA.
3. The amount of water stored by the AWBA.
4. The number of long-term storage credits distributed or extinguished by the AWBA.
5. The purposes for which long-term storage credits were distributed or extinguished by the AWBA.
6. A description of the water banking services and interstate water banking to be undertaken by the AWBA during the following ten-year period and a projection of the capacity of the AWBA during that period to undertake those activities in addition to storing Colorado River water brought into the State through the CAP for all the following purposes:
  - a. Protecting this State's municipal and industrial (M&I) water users against future water shortages on the Colorado River and disruptions of operation of the CAP.
  - b. Fulfilling the water management objectives of the State.
  - c. Making water available to implement the settlement of water rights claims by Indian communities within Arizona.
7. Any other matter determined by the authority to be relevant to the policy and purposes of the AWBA.





## 2017 Activities

The AWBA continued its quarterly meeting schedule in 2017 with meetings on March 15, June 28, September 20, and November 30. There were no special meetings held.

### AWBA 2017 Water Deliveries

The AWBA Plan of Operation (Plan) for 2017 identified 17,630 acre-feet of water available for delivery under CAWCD's Access to Excess policy adopted in 2014. No additional water was made available to the AWBA during the year. The volume of water delivered to each storage facility is described in Appendix A and totaled 4,130 acre-feet for the Phoenix AMA, 11,400 acre-feet for the Pinal AMA, and 2,100 acre-feet for the Tucson AMA. The Plan did not include an interstate water banking component.

Based on the Decree accounting data, total consumptive use of Colorado River water by Arizona in 2017 was 2.51 million acre-feet (MAF) and accounted for approximately 1.09 MAF of direct uses along the Colorado River and 1.42 MAF in CAP diversions (Calendar Year 2017 U.S. Bureau of Reclamation, Lower Colorado River Operations, Colorado River Accounting and Water Use Report Arizona, California, Nevada, dated May 2018). Efforts to mitigate declining water elevations in Lake Mead continued in 2017 with Arizona conserving an estimated 290,497 acre-feet of water in Lake Mead. This amount includes 18,692 acre-feet conserved under the Pilot System Conservation Program (PSCP), 80,000 acre-feet of conservation by the Gila River Indian Community, and 191,805 acre-feet in unused apportionment, including 41,763 acre-feet conserved under the Ag Forbearance 3 Program. Nevada and California also contributed with Nevada conserving 56,575 acre-feet of unused apportionment and California conserving 298 acre-feet under the PSCP. California also created 373,031 acre-feet of intentionally created surplus for future use.

### Long-term Storage Credit Purchases

#### *Purchases Pursuant to A.R.S. § 45-841.01*

Before a final volume of credits can be issued to the Tohono O'odham Nation (Nation) by ADWR, the Nation must offer the AWBA 10 percent of any credits deemed accruable from water stored at the Mission Mine Complex. The price for each credit 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 credits 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 2017, the AWBA was offered, and subsequently purchased 1,525 acre-feet of credits, accrued during 2014 and 2015, for \$303,435 using withdrawal fees collected in the Tucson AMA. To date, the AWBA has purchased 5,424 acre-feet of credits for a total cost of \$905,975.

#### *Other Credit Purchases*

The AWBA's governing statutes were amended in 2014 to allow the AWBA to purchase long-term storage credits in addition to credit purchases already allowed under A.R.S. § 45-841.01. Credits may be purchased after all available excess CAP water supplies have been scheduled for storage for the year. In

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2017, the AWBA purchased 71,652 acre-feet of credits for CAP M&I firming: 59,082 acre-feet located in the Phoenix AMA and 12,570 acre-feet located in the Tucson AMA. Expenditures totaled just over \$17.35 million and included just over \$14.5 million in Maricopa County water storage tax funds and \$2.85 million in Pima County water storage tax funds (See Appendix B). The AWBA 2017 Plan did not include credit purchases for the Pinal AMA since all available funds were used to purchase and store excess CAP water.

### **Indian Firming Program**

Colorado River modeling projections have shown that non-Indian agricultural (NIA) Priority CAP water would be the first supplies the AWBA would need to firm. To prepare, the AWBA has focused on accomplishing the steps necessary to ensure the state's Indian firming obligations will be met when the need arises. Significant progress continues to be made in this area. Staff also kept apprised of the status of other ongoing settlement discussions, particularly the need to firm water supplies that may result from those settlements.

#### *Gila River Indian Community (GRIC)*

Under the Arizona Water Settlements Act (AWSA), the AWBA, as agent for the State, has a 100-year requirement (until 2108) to firm up to 15,000 acre-feet per year of NIA Priority CAP water for the GRIC when supplies are insufficient to meet demand. The *Agreement between the Secretary and the State of Arizona for the Firming of CAP Indian Water*, executed on November 15, 2007, defines the AWBA's firming responsibilities, but also includes a provision that allows the AWBA to enter into a separate agreement with the Community to carry out its firming obligation. An intergovernmental agreement (IGA) for firming was subsequently executed on June 16, 2015. The IGA uses the AWBA Ten-Year Plan as the basis for evaluating potential future shortages and outlines the steps that must be taken by each party as the potential for shortage approaches. By offering alternative firming options, the IGA provides flexibility in how a firming obligation can be satisfied during a shortage year.

Concurrent with the execution of the IGA, the AWBA and the GRIC executed a separate letter agreement to implement one of the firming options identified under the IGA. The firming option allows for the reimbursement of CAP water delivered to the Community for which the Community paid full cost. In turn, the AWBA receives "firming credits" for each acre-foot of water delivered. The process for using this firming method was consequently formalized in a three-year agreement.<sup>1</sup> In 2017, the AWBA accrued 7,000 acre-feet of firming credits for a cumulative volume of 35,000 acre-feet (See Appendix B). These firming credits have been registered to a firming account held by the AWBA and may be debited in the future to reduce the state's firming obligation on an acre-foot per acre-foot basis.

#### *Southside Replenishment Bank*

In addition to firming requirements, the AWSA required that the AWBA deliver 15,000 acre-feet of water to the GRIC to establish the Southside Replenishment Bank. The Replenishment Bank can be used to satisfy a replenishment obligation that may be incurred from excess groundwater pumping in the Southside Protection Zones, an area adjacent to the southern portion of the GRIC reservation. This

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<sup>1</sup> *Agreement between the Arizona Water Banking Authority and the Gila River Indian Community for the Development of Firming Credits*, executed June 30, 2016, expires December 31, 2018.

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obligation was fully satisfied in 2015. Cumulative expenditures for meeting this obligation totaled \$2,339,000.

### *Southside Replenishment Obligations*

By memorandum dated September 15, 2017, the AWBA was informed by ADWR that there were no replenishment obligations for the 2016 reporting year. A replenishment obligation for the 2017 reporting year is likewise not anticipated, but that information will not be available until October of 2018 and will be reported in the 2018 Annual Report.

### *White Mountain Apache Tribe*

The Claims Resolution Act of 2010, which includes the White Mountain Apache Tribe Water Rights Quantification Agreement (Quantification Agreement), was signed by President Barack Obama on December 8, 2010. The Quantification Agreement requires that the AWBA firm up to 3,750 acre-feet per year of NIA Priority CAP water until 2108. This obligation is part of the 8,724 acre-feet per year firming requirement identified for future settlements under the AWSA. The White Mountain Apache Tribe (WMAT) intends to lease the water made available under the agreement, thus the AWBA's firming responsibilities will be to the lessees.<sup>2</sup> In 2017, AWBA staff initiated individual meetings with the lessees to discuss potential firming opportunities relative to their operational needs. Based on initial discussions, flexibility will be a key consideration in any agreements that are ultimately developed. These meetings are expected to continue in 2018 followed by joint discussions on potential firming agreements. The objective of the AWBA is to be fully prepared to meet a firming obligation once the Quantification Agreement becomes enforceable. The enforceability date of the Quantification Agreement is April 30, 2021. An Environmental Impact Statement on the construction and operation of the WMAT Rural Water System RWS Project must be completed before enforceability can be met.

### *Hualapai Tribe*

Legislation approving and authorizing the settlement of the Hualapai Indian Tribe's claims to the Colorado River was re-introduced to Congress by Senator Jeff Flake and co-sponsor Senator John McCain on September 7, 2017 (S.1770). Hearings were held in the Committee for Indian Affairs in December. An identical bill (H.R.4723) was introduced to the House by Representative Paul Gosar on December 21, 2017 and referred to the Subcommittee on Water, Power and Oceans in January. If enacted, the AWBA would have an obligation to firm 557.5 acre-feet per year through 2107. The federal government would have an equivalent firming obligation.

### *Navajo Nation/Hopi Tribe*

There was no activity on this settlement discussion in 2017 as it relates to firming Navajo/Hopi Colorado River supplies. Staff continues to monitor any activities associated with this settlement.

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<sup>2</sup> The lessees receiving firming NIA Priority CAP water under the Quantification Agreement include the cities of Avondale, Chandler, Gilbert, Glendale, Mesa, Peoria, Phoenix and Tempe.

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In 2012, Councils for the Navajo Nation and Hopi Tribe voted to reject a settlement agreement for the Little Colorado River and its authorizing legislation, respectively. The settlement included an allocation of NIA Priority CAP water to the Navajo Nation for use at Window Rock that would have had an AWBA firming obligation of up to 3,205.5 acre-feet per year. Final efforts among the parties to continue negotiations to try to resolve the outstanding issues were unsuccessful. The Navajo Nation did not request another stay, opting instead to litigate the lawsuit it filed against the Secretary of Interior in 2003. On June 3, 2013, the Nation filed an amended complaint with the U.S. District Court for the District of Arizona that asserts the Department of the Interior breached its fiduciary duty to the Nation by failing to determine the Nation's rights to the waters of the Lower Colorado River. The Nation requested the court hold unlawful and set aside certain operations of the Lower Colorado River, including the guidelines for shortage and surplus conditions, interstate banking regulations and the Storage and Interstate Release Agreement (SIRA) because the Secretary failed to consider the needs of the Nation for Colorado River water. ADWR intervened as a defendant in the lawsuit on behalf of the State of Arizona. Other interveners include CAWCD and SRP, the Arizona Power Authority, Nevada, Metropolitan Water District of Southern California, Imperial Irrigation District, and the Coachella Valley Water District. In 2014, ruling in favor of the parties, the Federal District Court Judge dismissed the lawsuit. The Nation appealed to the 9<sup>th</sup> Circuit Court of Appeals but did not include the dismissal of their claim challenging interstate banking regulations and the SIRA. Oral arguments were held in February 2017. In December, the 9<sup>th</sup> Circuit Court affirmed dismissal of the NEPA claim for lack of standing but reversed the dismissal of the breach of trust claim sending it back to the lower court to be considered on its merits.

## Recovery Planning

AWBA, CAWCD and ADWR staff referred to as the Interagency Recovery Planning Group (IRPG), in cooperation with stakeholders, released a joint recovery plan in 2014 that provides a framework for the recovery of AWBA credits and the delivery of that water during future shortages or for interstate purposes. The IRPG continues to work cooperatively on the next steps of the plan needed to ensure recovery implementation is achievable when needed. Considerable progress was made in 2017 with the execution of the CAP system use agreement between CAWCD and the Bureau of Reclamation (Reclamation). This agreement describes how the CAP system can be used to meet AWBA firming requirements. Commensurate with this agreement, CAWCD Board President Lisa Atkins established a Water Quality Standards Task Force comprised of CAWCD Board members to review the legal, operational and policy matters associated with the introduction of non-project water into the CAP system. The goal of the task force is to develop, through stakeholder involvement, water quality standards for approval by the full Board and recommendation to Reclamation.

As the AWBA's primary recovery agent, CAWCD has also been moving forward on developing recovery partnerships. In 2017, CAWCD entered into an agreement with the Arizona Water Company (AWC) for the future recovery of the AWBA's interstate credits held on behalf of the Southern Nevada Water Authority (SNWA). SNWA is responsible for paying the recovery costs associated with developing intentionally created unused apportionment (ICUA) and has therefore, under separate agreement, provided CAWCD \$1 million for advancement to AWC for this purpose. In return, AWC will provide 2,500 acre-feet of annual recovery capacity for a 26-year period beginning January 1, 2025. Recovery capacity not utilized to develop ICUA for SNWA would be made available to CAWCD for other in-state firming needs. The AWBA has discretion on the recovery facilities used to develop ICUA. By letter agreement,

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dated March 15, 2017, among the AWBA, CAWCD, SNWA and the Colorado River Commission of Nevada (CRCN), the AWBA agreed to prioritize use of AWC recovery capacity when ICUA is requested by SNWA.

CAWCD has also been evaluating the potential for developing a recovery well field at the Tonopah Desert Recharge Project (TDRP). Results from a 2017 hydrologic test well study have indicated that the aquifer is less permeable at current groundwater levels (below 300 feet) than previously estimated and that arsenic and fluoride concentrations are also higher than anticipated. Recommendations were made to evaluate other locations, possibly outside of TDRP.

Additionally, the IRPG continues to update hydrologic modeling projections to determine the likelihood of when Colorado River shortages will occur and the volume of recovery that might be needed to firm supplies. The group has also evaluated the potential costs associated with various recovery methods. ADWR, in coordination with the AWBA and CAWCD, convened a Recovery Planning Advisory Group (RPAG) to assist with recovery planning efforts. The RPAG consists of 14 members that represent various interests in the water community. The RPAG meetings commenced in January 2018.

### **2018 Plan of Operation**

The AWBA 2018 Annual Plan of Operation (APO) was adopted on November 30, 2017. It provides for the development of an estimated 72,530 acre-feet of credits through water storage and acquisition: 59,970 acre-feet for Arizona and 12,560 acre-feet for interstate purposes. The total estimated cost of the APO is \$16.16 million.

The volume of excess CAP water available to the AWBA is 38,000 acre-feet. Of this amount, 22,100 acre-feet will be delivered for storage in the Phoenix AMA, 8,100 acre-feet in the Pinal AMA, and 7,800 acre-feet in the Tucson AMA. Storage will occur at both groundwater savings facilities (GSF) and underground storage facilities (USF). Water delivery and storage costs are estimated to be just over \$7.82 million.

To supplement water storage and continue making progress on the firming goals, the 2018 APO also includes a component to develop an estimated 24,620 acre-feet of credits. This includes potential long-term storage credit purchases for CAP M&I firming in the Phoenix AMA of up to 15,620 acre-feet. The AWBA's request to reserve \$3.62 million in Maricopa County water storage tax funds for this purpose was approved by the CAWCD Board in December. The AWBA also anticipates developing an additional 9,000 acre-feet of firming credit equivalents with the Gila River Indian Community at a cost of \$1.44 million. The total estimated cost for developing credits is \$5.06 million.

For the first time since 2010, the APO will also include an interstate banking component. The Southern Nevada Water Authority (SNWA) has requested the storage of 13,500 acre-feet of Nevada's unused apportionment in 2018<sup>3</sup>. Storage will be at both GSFs and USFs and totals 9,500 acre-feet in the Phoenix AMA and 4,000 acre-feet in the Tucson AMA. The total cost is just over \$3.28 million and will be paid for by SNWA.

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<sup>3</sup> Storage is in accordance with the Third Amended and Restated Agreement for Interstate Water Banking among the Arizona Water Banking Authority, the Southern Nevada Water Authority and the Colorado River Commission of Nevada executed May 20, 2013.

## Monies Collected and Expended from the Banking Fund

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 2017, the AWBA obtained its funding from the following sources:

1. Fees for groundwater pumping are collected within the Phoenix, Pinal and Tucson AMAs. Fees for water banking purposes are charged at \$2.50 per acre-foot. Legislative changes allow for groundwater withdrawal fees to be collected and available to the AWBA beyond 2016 (A.R.S. §45-611(c)(3)). Long-term storage credits accrued with these monies must be used to benefit the AMA in which the monies were collected.
2. The CAWCD Board resolved to retain the water storage taxes levied and collected for the 2016-2017 tax year and to use the funds for meeting operating, maintenance and replacement and/or repayment costs of the Central Arizona Project. CAWCD continues to use the water storage tax funds to offset AWBA water delivery and storage costs as part of CAP operation and maintenance (O&M) costs. The CAWCD Board also agreed to reserve \$17.56 million in revenues to support the purchase of long-term storage credits by the AWBA. Of this amount, just over \$17.35 million was deposited to the AWB Fund for this purpose: \$14.5 million in Maricopa County funds and just over \$2.85 million in Pima County funds. Credits accrued using water storage tax funds must be used to benefit the county in which the funds were collected.

In 2018, the CAWCD Board rescinded all past water storage tax resolutions that identified O&M specifically as water storage by the AWBA and adopted a new resolution that includes use of the funds for all allowable CAWCD uses. While this did not occur in 2017, it does affect the monies available for 2018. Accordingly, Tables 1 and 2 have been updated to show only monies that have been made available for AWBA activities.

3. The AWBA did not receive a general fund appropriation in 2017.

**Table 1** shows the monies the AWBA collected, monies made available by CAWCD and the monies expended in 2017 by source of funds. **Table 2** shows the total monies received, expended and remaining through December 2017 by source of funds. Remaining funds are committed to activities identified in the Plan of Operation adopted for the current year.

**Table 1. Monies Collected, Made Available, and Expended in 2017 by Source of Funds**

Source of Funds	Carryover	Collected/Made Available	Expended
<b>General Funds</b>	\$0	\$0	\$0
<b>State Indian Firming</b>	\$0	\$0	\$0
<b>Water Storage Tax<sup>1</sup></b>			
Maricopa County		\$14,500,000	\$14,500,000
Pinal County		\$890,330	\$890,330
Pima County		\$2,965,806	\$2,965,806
Subtotal		<b>\$18,356,136</b>	<b>\$18,356,136</b>
<b>Groundwater Withdrawal Fees<sup>2</sup></b>			
Phoenix AMA	\$722,597	\$2,337,643	\$1,900,330
Pinal AMA	\$227,077	\$1,382,001	\$945,070
Tucson AMA	\$289,069	\$391,359	\$565,880
Subtotal	<b>\$1,238,743</b>	<b>\$4,111,003</b>	<b>\$3,411,280</b>
<b>TOTAL</b>	<b>\$63,801,897</b>	<b>\$22,467,140</b>	<b>\$21,767,416</b>

<sup>1</sup> Monies made available by CAWCD as part of O&M of the project or deposit to the AWB Fund for credit purchases.

<sup>2</sup> Money collected includes \$1,211,100 in legislative allocations unused by ADWR for FY 2017.

**Table 2. Cumulative Monies Collected, Made Available, and Expended through 2017 for Water Banking Activities and Monies Remaining Available**

Source of Funds	Collected/Made Available	Expended	Remaining <sup>1</sup>
<b>General Funds</b>	<b>\$11,100,865</b>	<b>\$11,100,865</b>	<b>\$0</b>
<b>In-Lieu Fund - MCWA Pre-payments</b>	<b>\$5,123,480</b>	<b>\$5,123,480</b>	<b>\$0</b>
<b>State Indian Firming</b>	<b>\$2,338,171</b>	<b>\$2,338,171</b>	<b>\$0</b>
<b>Interstate Water Banking-NV<sup>2</sup></b>	<b>\$109,331,164</b>	<b>\$109,328,040</b>	<b>\$3,124</b>
<b>Shortage Reparations – NV</b>	<b>\$8,001,948</b>	<b>\$8,001,948</b>	<b>\$0</b>
<b>Water Storage Tax<sup>3</sup></b>			
Maricopa County	\$122,222,056	\$122,222,056	
Pinal County	\$13,982,941	\$13,982,941	
Pima County	\$56,553,739	\$56,553,739	
Subtotal	<b>\$192,758,735</b>	<b>\$192,758,735</b>	
<b>Groundwater Withdrawal Fees</b>			
Phoenix AMA	\$29,818,085	\$28,658,175	\$1,159,910
Pinal AMA	\$23,080,005	\$22,415,997	\$664,008
Tucson AMA	\$9,934,685	\$9,820,137	\$114,548
Subtotal	<b>\$62,832,775</b>	<b>\$60,894,309</b>	<b>\$1,938,466</b>
<b>TOTAL</b>	<b>\$391,727,356</b>	<b>\$389,785,766</b>	<b>\$1,941,590</b>

<sup>1</sup> Funds remaining includes monies committed for the 2018 Plan of Operation and legislative allocation of funds unspent by ADWR.

<sup>2</sup> Pursuant to the Third Amended and Restated Interstate Banking Agreement, monies remaining available are non-reconcilable for interstate purposes and subject to legislative authorization prior to use by the AWBA. Remaining funds include accrued interest and recovered Lehman Brothers bankruptcy monies.

<sup>3</sup> 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.

## Long-term Storage Credits

The AWBA has established long-term storage credit accounts with ADWR for each AMA. After receiving the AWBA's annual reports, ADWR calculates and issues credits to the appropriate accounts. The AWBA receives credit for 95 percent of the stored water after losses are taken into account. After credits are issued to the account, AWBA staff allocates the credits to the appropriate sub-accounts based on source of funding. The number and distribution of credits for 2017 are listed in **Table 3**. Cumulative credits accrued by the AWBA through December 2017 are listed in **Table 4**.

**Table 3. Number and Location of Long-term Storage Credits Accrued in 2017 (AF)<sup>1</sup>**

Funding Source	Phoenix AMA	Pinal AMA <sup>2</sup>	Tucson AMA	Total <sup>3</sup>
Water Storage Tax	59,082	4,759	13,172	77,014
Withdrawal Fees	3,909	5,420	2,918	12,246
General Fund	-	-	-	-
<b>Intrastate TOTAL</b>	<b>62,991</b>	<b>10,179</b>	<b>16,090</b>	<b>89,260</b>
Interstate - Nevada	-	-	-	-
<b>TOTAL</b>	<b>62,991</b>	<b>10,179</b>	<b>16,090</b>	<b>89,260</b>

<sup>1</sup> Includes purchased long-term storage credits.

<sup>2</sup> Additional credits may be issued upon resolution of annual reporting issues associated with GSF participants in the Pinal AMA.

<sup>3</sup> Totals may not sum due to rounding.

**Table 4. Cumulative Long-term Storage Credits Accrued through December 2017 (AF)<sup>1</sup>**

Funding Source	Phoenix AMA	Pinal AMA	Tucson AMA	Total
Water Storage Tax	1,478,641	220,642	473,014	2,172,297
Withdrawal Fees	335,972	426,979	108,652	871,603
General Fund	42,316	306,968 <sup>2</sup>	54,546	403,830
<b>Other Intrastate:</b>				
Indian 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
<b>Intrastate TOTAL</b>	<b>1,877,570</b>	<b>1,029,221</b>	<b>693,033</b>	<b>3,599,824</b>
Interstate - Nevada	51,009	440,241 <sup>3</sup>	109,791	601,041
<b>TOTAL</b>	<b>1,928,579</b>	<b>1,469,462</b>	<b>802,824</b>	<b>4,200,865</b>

<sup>1</sup> Includes purchased long-term storage credits.

<sup>2</sup> Pursuant to the AWBA Agreement to Firm with MCWA dated February 4, 2005, 230,280 acre-feet of credits were transferred to the AWBA long-term storage subaccount for the MCWA in 2005. An additional 25,894 acre-feet of credits were reserved under Exhibit C the Amended Agreement to Firm, dated December 8, 2010, for a total of 256,174 acre-feet.

<sup>3</sup> Includes 50,000 acre-feet of credits transferred from CAWCD pursuant to Amended Agreement for Interstate Water Banking.

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Since inception, the AWBA has focused its efforts on developing long-term storage credits for firming purposes. The AWBA identified 2,700,000 acre-feet of credits as a reasonable amount of credits to firm the CAP M&I subcontracts for 100 years. This volume is divided based on a pro-rata distribution by county based on CAP M&I subcontracts as follows: 58% Maricopa County, 32% Pima County, and 9% Pinal County.

The AWBA also identified 420,000 acre-feet of credits as a reasonable amount of credits to firm the on-River communities for 100 years. In 2002, the AWBA adopted a resolution that identified on-River firming as the highest priority for use of the general fund credits. Consequently, all or part of the general fund credits could be utilized to firm on-River M&I users. When used for this purpose, the AWBA will collect reimbursement for the replacement cost of the credits used. In 2008, the AWBA executed Resolution 2008-1 that established a long-term storage credit replacement account for fourth priority Colorado River M&I users. Under the Resolution, as credits are used and replaced, the replacement credits will be placed in a separate subaccount and earmarked for the entity that reimburses the AWBA for the replacement of those credits.

When the Arizona Water Settlements Act (AWSA) of 2004 became enforceable in December 2007, the AWBA, as agent for the State, assumed the obligation to firm up to 23,724 acre-feet per year of CAP NIA Priority water supplies. Of this amount, up to 15,000 acre-feet will be made available to the Gila River Indian Community and 8,724 acre-feet is allocated for future settlements. The AWBA must firm these supplies for a 100-year period and ensure that the water is delivered to the same priority as CAP M&I priority supplies. In 2005, the Arizona State Legislature created an Indian Firming Study Commission (Study Commission) to develop a Firming Program for Arizona. The analysis performed by the Study Commission estimated a firming target of approximately 550,000 acre-feet: 350,000 acre-feet for the GRIC and 200,000 acre-feet for future settlements. The AWBA periodically re-evaluates these targets to ensure they are still applicable. While the AWBA has focused its future firming efforts on the accrual of long-term storage credits, the AWBA may also use other methods to meet this obligation including contracting for delivery of water supplies other than excess CAP water, engaging in water exchanges, and/or entering into lease agreements with Indian communities and others.

In addition to firming, the AWSA also required that the state contribute \$3 million in cash or in-kind services to assist the Secretary in meeting the Federal obligation to the Tohono O'odham Nation. Pursuant to the AWBA's firming agreement with the Secretary, the parties agreed to accomplish this requirement through the accrual of an equivalent amount of long-term storage credits that would be distributed to the Secretary during shortages. Lastly, as discussed earlier, the AWBA is required to directly deliver 15,000 acre-feet of water to the GRIC to establish the Southside Replenishment Bank. This obligation was fully satisfied in 2015.

**Table 5** illustrates the progress made by the AWBA towards meeting its established goals and obligations. Progress on individual goals varies due to the availability of funds, limitations of how each funding source may be used, and storage capacity that has been available in each AMA historically. It also includes purchased credits and lastly, it includes firming credits developed in accordance with the IGA between the AWBA and the Gila River Indian Community.

**Table 5. Identified Uses of Long-term Storage Credits Accrued through December 2017 and Percentage of AWBA Goals Achieved**

Location and Objective	Funding Source	Estimated Goal	Non-Credit Goal Achieved	Credits Accrued (AF)	Goal Achieved
<b>CAP M&amp;I Firming</b>					
Phoenix AMA	Water Storage Tax collected by County	1,566,000 AF		1,478,641	94%
Pinal AMA		243,000 AF		220,642	91%
Tucson AMA		864,000 AF		473,014	55%
<b>On-River M&amp;I Firming<sup>1</sup></b>	General Fund	420,000 AF		403,830	96%
<b>Indian Settlement Obligations:</b>					
GRIC Firming - <i>up to 15 KAF/year</i>	General Fund Withdrawal Fees	350,000 AF <sup>2</sup>		140,390 <sup>3</sup>	40%
			0	140,390	
Future Settlements - <i>up to 8.7 KAF/year</i>	General Fund Withdrawal Fees	200,000 AF <sup>2</sup>		0	N/A
Federal Assistance (SAWRSA)- <i>\$3 million</i>	General Fund		\$3,000,000	34,102	100%
	Tucson W/Fees		\$2,338,171	28,481	
	Cost of Services <sup>4</sup>		\$630,490	5,621	
Southside Replenishment Bank <i>15 KAF direct delivery</i>				15,000	100%
	General Fund			1,342	
	Pinal W/Fees			13,658	
<b>Groundwater Management<sup>5</sup></b>					
Phoenix AMA	Withdrawal Fees collected by AMA			247,659	
Pinal AMA				409,902	
Tucson AMA				103,031	
<b>Other:</b>					
Shortage Reparations	Agreement with Nevada	\$8,000,000	\$8,001,948	109,489	100%
Pinal Redirect Credits <sup>6</sup>	N/A			14,125	N/A

<sup>1</sup> A total of 256,174 acre-feet of credits reserved for MCWA.

<sup>2</sup> Based on estimates from the Indian Firming Study Commission Report dated January 6, 2006.

<sup>3</sup> Credits accrued from storage at the Gila River Indian Irrigation and Drainage District GSF: Phoenix AMA 88,313 AF, Pinal AMA 17,077. Also includes 35,000 AF of firming credits developed on Community lands.

<sup>4</sup> Expenditures include \$14,883 and \$16,456 deducted for payment of cost of services for FY 08 and FY 09, respectively.

<sup>5</sup> Withdrawal fees could be utilized in addition to water storage tax revenues for M&I firming if needed to reach firming goals and for Indian settlement obligations in the absence of general fund appropriations.

<sup>6</sup> Credits accrued from AWBA water provided to Pinal AMA GSFs at full cost to the GSF operators. These credits are currently identified for use in the Tucson AMA.

The average annual cost for the AWBA to obtain one acre-foot of credit for intrastate storage is presented in **Figure 1** and illustrates that the unit cost per credit is influenced by the type of storage facility used as well as the increase in water delivery costs over time. The significant increase beginning in 2010 reflects CAWCD’s elimination of the incentive recharge rate. Due to the low volume of excess CAP water supplies available to the AWBA, storage in 2017 was predominantly at groundwater savings facilities. Indirect storage at these facilities provides water management benefits through the continued use of renewal supplies in lieu of groundwater for agricultural irrigation.

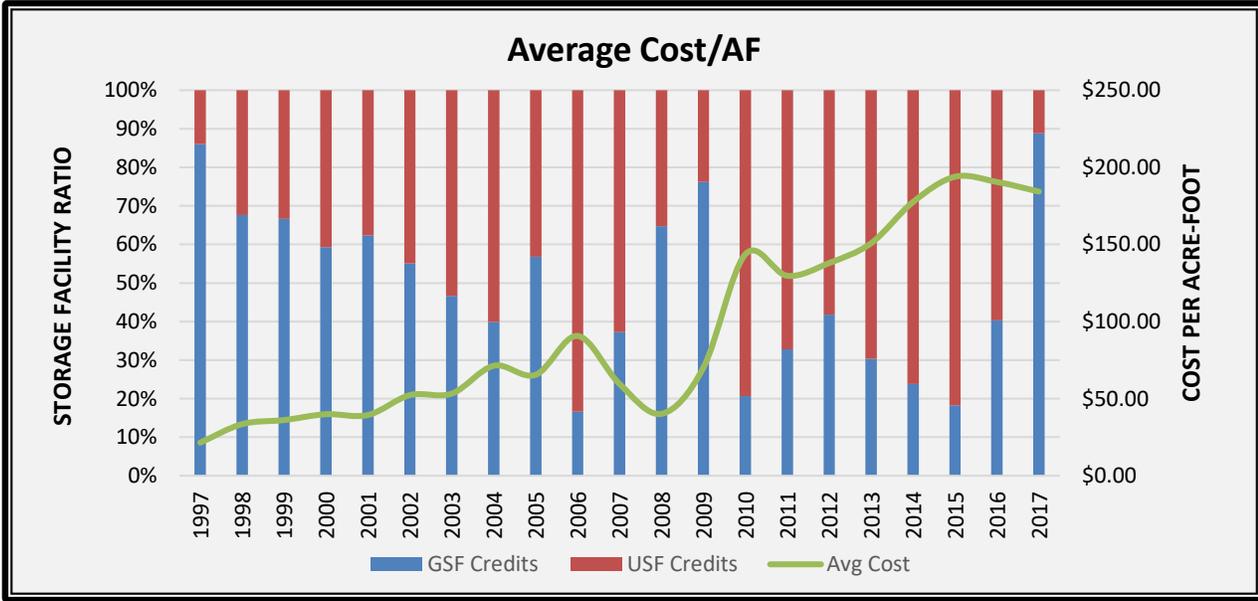


Figure 1. AWBA average cost per acre-foot for accruing one long-term storage credit.

Total annual storage costs since inception are identified in **Figure 2**.

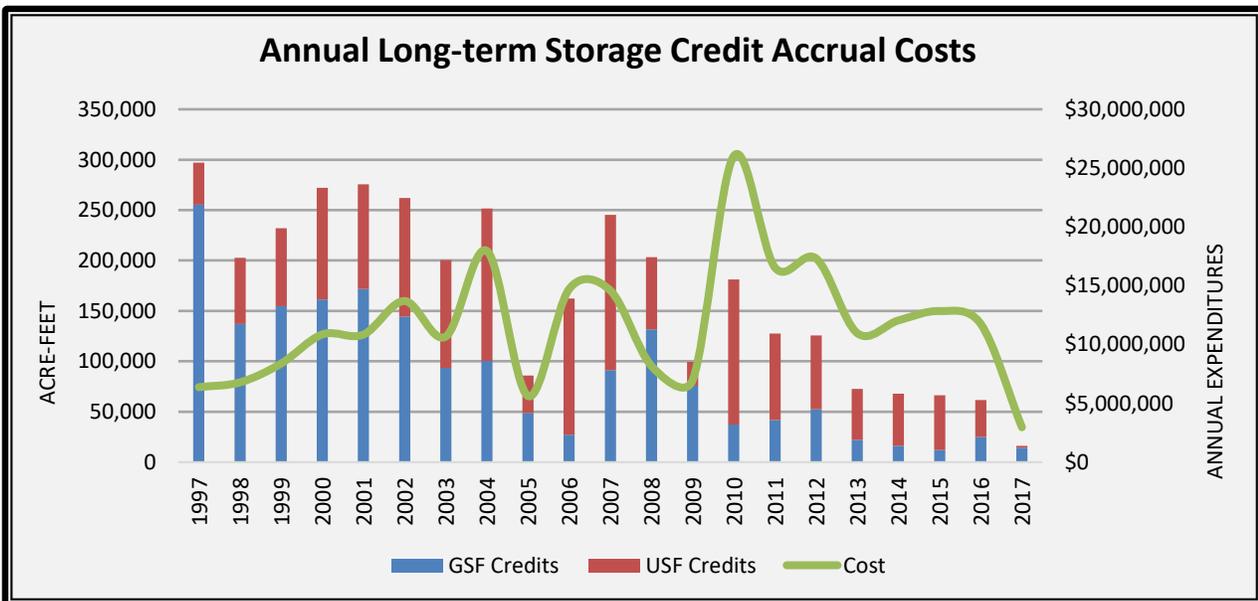


Figure 2. AWBA annual long-term storage credit accrual costs.

## **Long-term Storage Credits Distributed or Extinguished by the Authority**

The long-term storage credits developed by the AWBA to date have been identified for five purposes:

- Firming CAP M&I entitlements;
- Firming the post-1968 M&I entitlements for entities outside the CAP service area;
- Firming for the State's obligation under the AWSA, including the State's Federal obligation;
- 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.

Credits accrued by the AWBA for firming purposes may be distributed or extinguished when the Colorado River system is declared to be in a shortage and demands exceed supply, if there is a water shortage as defined under the AWSA, or if there is an operational disruption of the CAP. There were no shortages or unplanned CAP outages, therefore, no credits were distributed or extinguished for these purposes in 2017. No credits were distributed or extinguished in 2017 for water management purposes.

Under the 1999 amendments to the AWBA legislation, the AWBA is authorized to develop credits with monies collected pursuant to water banking services agreements. In 2017, no credits were developed or distributed under such agreements. Additionally, there were no credits recovered for interstate purposes.

## Ten-Year Plan

### Introduction

Pursuant to A.R.S. §45-2426, the AWBA is required to prepare a Ten-Year Plan. The Ten-Year Plan must include a description of any water banking activities the AWBA intends to undertake in addition to the three primary AWBA functions of firming for M&I supplies, assisting in Indian water rights settlements, and fulfilling State water management objectives. The Ten-Year Plan must also provide an analysis of the AWBA's ability to complete those activities. The Ten-Year Plan is not a guarantee of future credit development or distribution activities. It is prepared only for planning purposes. In any given year, the AWBA's specific activities are governed by the Annual Plan of Operation.

This Ten-Year Plan analyzes potential activity for the period 2019-2028 and projects the AWBA could develop approximately 380,000 acre-feet of credits and have a requirement to firm nearly 16,000 acre-feet of NIA Indian water during the planning period. AWBA accounting for previous years can be found in the 2016 Annual Report and 2018 Plan of Operation. The Ten-Year Plan is an important tool to be utilized in the development of the 2019 Annual Plan of Operation and future policies guiding AWBA activities. The Ten-Year Plan is updated annually based on current information and the priorities of the AWBA.

Hydrologic conditions modeled on the Colorado River continue to reflect diminished supplies with increasing demands. In the last two Ten-Year Plans, the AWBA projected that excess CAP water would only be available in the first year of each planning period (i.e. 2017 and 2018). This Ten-Year Plan assumes no excess CAP water will be available at any time during the planning period.

Additionally, the Basin states continue to address changing hydrologic conditions through operational changes and system conservation efforts. Changing hydrologic conditions and system responses to those changes create a degree of uncertainty for water supplies available to the AWBA. In response to this uncertainty, this Ten-Year Plan continues to rely on an agile strategy that addresses conditions as they become known. The use of excess CAP water is always a priority. However, when excess CAP water is not available or limited, the AWBA's focus will be on purchasing existing long-term storage credits to meet its objectives. Objectives, in terms of target volumes, are now based on the availability of funds relative to the price of developing long-term storage credits. Additionally, the AWBA is getting closer to meeting some of its numerically defined firming goals and as such this comes into play. Today, the Plan relies on a strategy that balances between traditional water storage, credit purchase and reaching certain numerically defined goals.

At the foundation of the Ten-Year Plan, are numerous assumptions. The primary assumptions are presented in Appendix D.

### Ten-Year Plan Components

A number of components are recognized to be important in developing the Ten-Year Plan. Three are mutually dependent and intrinsic to AWBA activities and are therefore always considered: water availability, funding and storage capacity. The availability of one, or lack thereof, will ultimately affect the significance of the other two in developing the Plan. For example, if no excess CAP water will be

available to the AWBA during the next ten years, the availability of storage capacity will be less relevant. The availability of funding, however, will be of particular importance in showing how the AWBA can meet its objectives using methods other than traditional water storage. The components, as they relate to this Ten-Year Plan, are discussed below:

1. Water Available to the AWBA

The volume of excess CAP water available to the AWBA has been decreasing since 2010 when over 200,000 acre-feet were available to the AWBA. In 2016, the AWBA stored less than 70,000 acre-feet. In 2017, the AWBA stored just under 18,000 acre-feet, about 5% of the volume stored in the AWBA’s highest storage year in 2007. In 2019 and beyond, the AWBA does not expect to receive any excess CAP water for water storage. Therefore, it is not included in the Plan.

In addition, a portion of Nevada’s unused apportionment may be available for interstate storage during this planning period. In the 2018 Plan of Operation, the Southern Nevada Water Authority (SNWA) requested interstate storage for the first time since 2010. During this planning period, decisions to store Nevada’s unused apportionment will be made on annual basis.

A. Available Excess CAP Water

**Table 6. Probabilities of Supply Conditions on Colorado River<sup>4</sup>**

	Probabilities %		
	Shortage	Surplus	Normal
<b>2019</b>	0%	0%	100%
<b>2020</b>	52%	0%	48%
<b>2021</b>	64%	3%	33%
<b>2022</b>	68%	6%	26%
<b>2023</b>	65%	10%	25%
<b>2024</b>	65%	13%	22%
<b>2025</b>	66%	17%	17%
<b>2026</b>	66%	20%	15%
<b>2027</b>	67%	22%	12%
<b>2028</b>	65%	23%	12%

*Shortage Conditions*

Based on USBOR projections shown in Table 6, there is no probability of any level of shortage in 2019. In 2020, there is a roughly 50% probability of shortage or normal conditions. In 2021, the probability of shortage escalates to 64% and increases again in 2022 when the probability of shortage reaches a high of 68%. After 2022, the probability settles in at around 65% through the remaining planning period. Under a shortage declaration, there would be no excess CAP water available for AWBA purposes.

Even though 2019 will most likely be a normal supply year, no excess CAP water is expected to be available to the AWBA due to continued implementation of drought conservation measures. This Ten-Year Plan assumes the State will continue existing efforts throughout the planning period. Decisions to leave water in Lake Mead occur on a year-to-year basis including the final decision to leave water in Lake Mead in 2019. These projections show the highest probability of shortage during the planning period of any Ten-Year Plan prepared by the AWBA.

<sup>4</sup> United States Bureau of Reclamation: April 2018 CRSS/MTOM Model Projections - 2019 through 2028

*Surplus Conditions*

The probabilities of surplus conditions remain relatively low throughout the planning period. Starting in 2026, the probability of surplus is higher than the probability of normal conditions, but still eclipsed by the probability of shortage. This Ten-Year Plan assumes there will be no surplus conditions during the planning period.

*Normal Conditions*

In 2020, the probability of normal conditions is about the same as the probability of shortage conditions. From there, the probability of normal conditions gradually decreases to 12% by 2027. While the probability of a surplus matches and then exceeds the probability of normal conditions starting in 2025, the probability of shortage dominates at around 65%. Even so, this Ten-Year Plan assumes there will be no excess CAP water even if normal supply conditions were to resume. This Plan assumes that CAP water forbearance volumes to support Lake Mead conservation efforts will be a part of normal operations during this planning period. Should supply conditions change dramatically on the Colorado River, this assumption will be adjusted in the Ten-Year Plan developed at that time.

**Table 7. CAP Delivery Schedule under Normal Supply Conditions<sup>5</sup>**

Year	Total CAP Deliveries <sup>1</sup>	Federal and M&I Deliveries <sup>2</sup>	Ag Settlement Pool <sup>3</sup>	Statutory Firming Pool	
				Federal & CAGRDRR	AWBA
2019	1,411,200	1,156,200	255,000	0	0
2020	1,410,200	1,155,200	255,000	0	0
2021	1,409,000	1,154,000	255,000	0	0
2022	1,407,900	1,190,600	217,300	0	0
2023	1,406,800	1,197,200	209,600	0	0
2024	1,405,700	1,210,700	195,000	0	0
2025	1,404,700	1,210,400	194,300	0	0
2026	1,403,600	1,217,000	186,600	0	0
2027	1,402,600	1,222,500	180,100	0	0
2028	1,401,600	1,228,000	173,600	0	0

<sup>1</sup> Based on an approximate 1.67 MAF CAP delivery supply reduced by losses and 192,000 AF.

<sup>2</sup> Includes CAGRDRR obligations of 25,000 AF for 2019, 5,000 AF in 2020, and zero thereafter.

<sup>3</sup> Ag Pool volume reflects reductions and extension to Ag Forbearance III program implementation.

**B. Available Nevada Unused Apportionment**

During 2018, the AWBA is expected to store 13,500 acre-feet on behalf of Nevada at a cost of \$3.28 million. SNWA’s decision to store its unused apportionment in Arizona is made on an annual basis, and as such, the Ten-Year Plan does not assume a particular volume of interstate storage. Instead, decisions about interstate storage will be managed during the Annual Plan of Operation process.

<sup>5</sup> Source: CAWCD Resource Planning & Analysis and ADWR Colorado River Management May 10, 2017.

## 2. Funding

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 Tax*

Pursuant to A.R.S. § 48-3715.03(B), ad valorem taxes for water storage levied and collected by CAWCD, not utilized for repayment or O&M costs of the Project, shall be deposited into three subaccounts held by the AWBA for each of the three counties in which the taxes are collected. Today, except for funds used to pay for credit purchases, water storage tax revenues are not deposited into the AWBA subaccounts. CAWCD does, however, use a portion of the water storage tax funds collected to offset AWBA water delivery and storage costs as part of the O&M costs of the Project. The amount of funds made available to the AWBA are determined annually. This Ten-Year Plan assumes the funds needed will be made available by CAWCD.

Today, the water storage tax generates over \$20 million a year with approximately \$16 million in Maricopa County, around \$970,000 in Pinal County and \$3.27 million in Pima County. Water storage tax projections<sup>6</sup> show that, during the planning period, the tax will generate on average \$23 million annually with approximately \$18.26 million in Maricopa County, \$1.1 in Pinal County and around \$3.57 million in Pima County. CAWCD has the authority to levy the water storage tax through 2030. Therefore, this Ten-Year Plan assumes the collection of the water storage tax throughout the planning period. CAWCD is authorized to levy the tax at a rate of up to 4-cent per \$100 of assessed property value through tax year 2024 and up to 3-cent for the remainder of the term. The reduction will affect revenues in the last two years of this Ten-Year Plan. Credits accrued with these funds are used to firm CAP M&I supplies during shortages.

### *Groundwater Withdrawal Fees*

Pursuant to A.R.S. § 45-611(3), the Director of ADWR collects a groundwater withdrawal fee for water banking purposes in the Phoenix and Tucson AMAs equal to \$2.50 per acre-foot per year. In the Pinal AMA, the Director also collects a groundwater withdrawal fee for water banking purposes, but starting in 2017, the Director could collect up to \$2.50 per acre-foot. This Plan assumes the Director will continue to collect the full \$2.50 per acre-foot in the Pinal AMA throughout the planning period. In recent years, the Arizona Legislature gave ADWR and the Arizona Navigable Stream Adjudication Commission (ANSAC) authority to use just over \$1.4 million in withdrawal fee revenues collected annually: over \$1.2 million for ADWR and \$200,000 for ANSAC. Revenues not used in the fiscal year are returned to the AWBA. ADWR did not utilize funds that were made available for fiscal years 2016 and 2017. Because future actions of the legislature cannot be known, this Ten-Year Plan

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<sup>6</sup> Central Arizona Water Conservation District projections dated March 17, 2018.

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does not assume monies will be allocated for other purposes. Any changes will be addressed on an annual basis.

This Plan assumes \$4.0 million in withdrawal fees is collected annually with \$2.2 million collected in the Phoenix AMA, \$1.4 million collected in the Pinal AMA and \$400,000 collected in the Tucson AMA<sup>7</sup>. The AWBA can utilize withdrawal fees to further the water management objectives of the AMAs, including firming for CAP M&I subcontracts and implementing Indian 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.

### *AWBA General Fund Appropriation*

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 expected. Absent future General Fund appropriations, any credit development for Indian firming would require the use of groundwater withdrawal fees.

### *Funding for Interstate Banking*

Pursuant to the Third Amended and Restated Agreement for Interstate Water Banking among the AWBA, SNWA and the Colorado River Commission of Nevada (CRCN), 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 Annual Plan of Operation.

## 3. Targeted Credit Development

Due to the underlying assumption that no excess CAP water supplies will be available during this planning period, the AWBA expects to develop credits to meet firming goals and requirements primarily through credit purchases. Pursuant to A.R.S. § 45-2423.B.2.a and 7.b, the AWBA may purchase long-term storage credits or obtain effluent or surface water other than Colorado River water for storage after it has stored or scheduled all available excess CAP water or when excess CAP water is unavailable or undeliverable. Pursuant to A.R.S. § 45-2491, the AWBA may also deliver water directly to certain Indian communities for Indian firming purposes.

When the Colorado River operates under normal water supply conditions, the AWBA will continue to operate as it always has storing all excess CAP water made available consistent with established priorities. For this Ten-Year Plan, the AWBA established target volumes for credit development in each AMA based on principles described in more detail below:

- a. Projected Indian firming credit development targets in the Phoenix and Pinal AMAs would be based on maximizing withdrawal fee revenues.

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<sup>7</sup> Withdrawal fee revenues vary from year to year. The assumptions used in this Ten-Year Plan are based the average revenues over the last five years (2013 through 2017).

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- b. Projected M&I firming credit development targets for the Pinal and Phoenix AMAs would be based on meeting M&I firming goals as quickly as possible constrained only by funding in those AMAs.
- c. Projected M&I firming and water management credit development targets in the Tucson AMA would be based on maximizing financial resources in the Tucson AMA for both water storage tax and withdrawal fee revenues.
- d. Credit development would be conducted through credit purchase, existing and potential future water services agreements for Indian firming, water supply acquisition and any other tools currently available or made available to the AWBA to develop credits.

If excess CAP water becomes available during the planning period, the AWBA proposes to operate as it has in recent years accordingly:

- a. If the volume of excess CAP water made available to the AWBA is larger than the targeted development volumes, then the AWBA would store all excess CAP water made available until funds and/or storage capacity are exhausted in a manner consistent with water storage priorities.
- b. Up to 50% of the excess CAP water available would be delivered to storage facilities in the Tucson AMA limited only by funding and storage capacity.
- c. Any excess CAP water unused in the Tucson AMA would be divided equally between the Pinal and Phoenix AMAs.
- d. Any excess CAP water unused in the Pinal AMA would cascade to the Phoenix AMA until the remaining volume has been fully utilized.
- e. If the volume of excess CAP water made available to the AWBA is less than the targeted development volumes, the AWBA will concurrently pursue strategies other than traditional water storage until the targeted volumes are reached.

Through 2018, the AWBA will have accrued an estimated 4.3 million acre-feet of credits. Table 8 identifies the number of credits by fund and location.

**Table 8. Existing AWBA Credits through 2018 (acre-feet)**

	Phoenix AMA	Pinal AMA	Tucson AMA	Total
<b>M&amp;I Firming<sup>1</sup></b>	1,514,000	223,000	479,000	2,216,000
<b>Indian Firming</b>	132,000	17,000	34,100	183,100
<b>Water Management<sup>1</sup></b>	248,000	415,000	104,000	767,000
<b>Shortage Reparation</b>	20,600	60,500	28,300	109,400
<b>General Fund</b>	42,300	307,000	54,500	403,800
<b>Other</b>	-	14,100	-	14,100
<b>Interstate<sup>1</sup></b>	59,850	440,240	113,510	613,600
<b>Total</b>	2,016,750	1,476,840	813,410	4,307,000

<sup>1</sup> Credit accrual for 2018 is based on estimates of credits developed in the 2018 Annual Plan of Operation including credits developed through credit purchase.

Because the AWBA does not anticipate receiving a general fund appropriation, the Ten-Year Plan focuses specifically on the use of groundwater withdrawal fees and water storage tax funds. However, if an appropriation were received it would likely be for meeting a specific objective. The aim is to make progress on the AWBA goals for Indian and CAP M&I firming. This Plan envisions developing 204,000 acre-feet of credits for CAP M&I firming, nearly 165,000 acre-feet for Indian firming and around 15,000 acre-feet for meeting remaining water management objectives. If successful, this would result in the development of approximately 384,000 acre-feet of credits. As shown in Table 9, the AWBA is projected to accumulate around 4.7 million acre-feet of credits by the end of the planning period.

**Table 9. Projected AWBA Credits in 2028 (acre-feet)**

	Phoenix AMA	Pinal AMA	Tucson AMA	Total
<b>M&amp;I Firming</b>	1,566,000	243,000	611,000	2,420,000
<b>Indian Firming</b>	227,000	87,000	34,100	348,100
<b>Water Management</b>	248,000	415,000	119,000	782,000
<b>Shortage Reparation</b>	20,600	60,500	28,300	109,400
<b>General Fund</b>	42,300	307,000	54,500	403,800
<b>Other</b>	-	14,100	-	14,100
<b>Interstate</b>	59,850	440,240	113,510	613,600
<b>Total</b>	2,163,750	1,566,840	960,410	4,691,000

The Ten-Year Plan’s Credit Development Plan is shown in Table 10 on the following page. The AWBA percentage of goals achieved through 2028 is shown in Table 11 located on page 25.



**Table 10. Credit Development Plan for 2019 through 2028 (acre-feet)**

Year	Credit Development Target <sup>1</sup>	Projected Indian Firming Credits			Projected M&I Firming Credits <sup>5</sup>			Projected Water Management Credits		
		Phoenix AMA <sup>2</sup>	Pinal AMA <sup>3</sup>	Tucson AMA <sup>4</sup>	Phoenix AMA <sup>6</sup>	Pinal AMA	Tucson AMA	Phoenix AMA	Pinal AMA	Tucson AMA <sup>7</sup>
<b>Pre-Plan</b>		132,000	17,000	34,100	1,514,000	223,000	479,000	248,000	415,000	104,000
2019	61,000	12,000	11,000	-	13,000	8,000	15,000	-	-	2,000
2020	52,000	11,000	7,000	-	13,000	5,000	14,000	-	-	2,000
2021	51,000	10,000	7,000	-	13,000	5,000	14,000	-	-	2,000
2022	47,000	10,000	7,000	-	13,000	2,000	14,000	-	-	2,000
2023	32,000	9,000	7,000	-	-	-	15,000	-	-	2,000
2024	32,000	9,000	7,000	-	-	-	14,000	-	-	1,000
2025	30,000	9,000	6,000	-	-	-	14,000	-	-	1,000
2026	26,000	9,000	6,000	-	-	-	10,000	-	-	1,000
2027	26,000	8,000	6,000	-	-	-	11,000	-	-	1,000
2028	26,000	8,000	6,000	-	-	-	11,000	-	-	1,000
<b>Total</b>	<b>383,000</b>	<b>227,000</b>	<b>87,000</b>	<b>34,100</b>	<b>1,566,000</b>	<b>243,000</b>	<b>611,000</b>	<b>248,000</b>	<b>415,000</b>	<b>119,000</b>

1. Credit Development Target is the sum of all credits developed in a given year.
2. Pre-plan credits include 88,313 acre-feet stored in the Phoenix AMA GRIIDD and 44,000 acre-feet of Indian firming credits developed as described in Exhibit B of the IGA between the AWBA and the GRIC.
3. Pre-plan credits include 17,077 acre-feet stored in the Pinal AMA GRIIDD.
4. Pre-plan credits include 28,481 acre-feet of credits accrued with Indian firming appropriations and 5,621 acre-feet of credits accrued from the Tucson AMA withdrawal fees . These credits will be used to satisfy the AWBA's obligation to the Secretary under the AWSA.
5. Pre-plan credits include actual credits through 2017 and estimated credits in 2018 based on the AWBA's 2018 Plan of Operation.
6. Credits developed in the Phoenix and Pinals AMAs are limited by the remaining volume of credits needed to reach the M&I firming target after 2018 and the amount of ad valorem tax monies available in a particular year.
7. Pre-plan credits include 1,525 acre-feet of credits purchased from the Tohono O'odham Nation pursuant to A.R.S. section 45-841.01.



**Table 11. AWBA Percentage of Goals Achieved through 2028**

Location and Objective	Funding Source	Estimated Goal	Obligation	Non-Credit Goal/Oblig. Achieved	Credits <sup>1</sup> Accrued (AF)	Percent Goal/Oblig. Achieved
<b>CAP M&amp;I FIRMING</b>						
Phoenix AMA	Water Storage Tax (4¢ <i>Ad valorem</i> )	1,566,000	AF		1,566,000	100%
Pinal AMA		243,000	AF		243,000	100%
Tucson AMA		864,000	AF		610,300	71%
<b>On-River M&amp;I FIRMING<sup>2</sup></b>	General Fund	420,000	AF		403,830	96%
<b>Indian Settlement Obligations:<sup>3</sup></b>						
GRIC FIRMING	Withdrawal Fees	350,000	AF	up to 15,000 AF/YR	315,200	90%
Phoenix AMA Pinal AMA					228,200 87,000	
Future Settlements	Withdrawal Fees	200,000	AF	up to 8,724 AF/YR	0	0%
Federal Assistance	Appropriation Withdrawal Fees Cost of Services			\$3,000,000	\$3,000,000	34,102
Tucson AMA					\$2,338,171	28,481
					\$630,490	5,621
					\$31,339	n/a
Southside Replenishment Bank	Pinal AMA Withdrawal Fees			15,000 AF Direct Delivery	15,000	100%
<b>Groundwater Management</b>						
Phoenix AMA <sup>4</sup>	Withdrawal Fees collected by AMA				248,400	
Pinal AMA <sup>4</sup>					415,100	
Tucson AMA <sup>5</sup>					119,300	
<b>Other:</b>						
Shortage Reparations-Nevada <sup>6</sup>	Agreement with Nevada			\$8,000,000	109,400	100%
Pinal Redirect Credits <sup>7</sup>	n/a				14,125	

<sup>1</sup> 1997-2018; actual credits through 2017 and estimated credits for 2018.

<sup>2</sup> By resolution passed in 2002, AWBA established on-river firming as the highest priority of use for credits accrued through expenditure of general fund appropriations. A total of 256,174 acre-feet of credits have been reserved pursuant to AWBA's contract with MCWA.

<sup>3</sup> A.R.S. §45-2491(B)(2) allows for use of withdrawal fees after legislative appropriations for Indian firming have been expended. 105,390 acre-feet of credits stored at GRIIDD are already dedicated through Indian firming agreements. Since 2015, the AWBA will have developed 44,000 acre-feet of Indian firming credits pursuant to Exhibit B of the IGA between the AWBA and the GRIC. Additionally, the Ten-Year Plan assumes credits accrued from withdrawal fees in the Pinal and Phoenix AMAs in this Ten-Year Plan are applied to Indian firming. Given this assumption, 90% of the GRIC firming goals are estimated to be met by 2028.

<sup>4</sup> Volumes reflected include reductions due to assigning credits developed in this planning period to Indian firming.

<sup>5</sup> Credits currently identified for use in Tucson AMA are expected to be used for M&I firming bringing the percentage of M&I firming goal achieved in the Tucson AMA to 84%. This volume also deducts the 5,621 acre-feet of credits under Federal Assistance stored using Tucson AMA withdrawal fee revenues, but includes 234 acre-feet of credits purchased in 2009 and 1,525 acre-feet in 2017 from the Tohono O'odham Nation pursuant to A.R.S. section 45-841.01.

<sup>6</sup> Volume reflected includes 3,665 acre-feet of credits purchased in 2015 from the Tohono O'odham nation pursuant to A.R.S. section 45-841.01.

<sup>7</sup> Credits accrued from AWBA water priced to Pinal AMA GSFs at full cost to the GSF operators. These credits are currently identified for use in the Tucson AMA.

A primary objective of the AWBA is meeting its Indian firming obligations. In this Ten-Year Plan, like last year, the AWBA intends to maximize withdrawal fees in the Phoenix and Pinal AMAs to develop credits for this purpose. This Plan projects that 95,000 acre-feet of credits will be developed in the Phoenix AMA and 70,000 acre-feet in the Pinal AMA. Including 105,000 acre-feet already accrued at the GRIIDD and the 44,000 acre-feet to be developed between 2015 and 2018 pursuant to existing Indian firming agreements, the AWBA will have approximately 315,000 acre-feet of credits available for meeting Indian firming requirements by the end of this planning period. The AWBA also has 34,100 acre-feet of general fund appropriation and withdrawal fee credits set aside for meeting the State's obligation to the Federal government under the AWSA.

Another primary objective of the AWBA is meeting the numeric M&I firming goals. In the Phoenix and Pinal AMAs, the strategy is to purchase, using water storage tax, the number of credits currently under purchase agreements (i.e. 13,100 acre-feet per year) during the planning period, until 100% of the numeric goals in these AMAs are met. This is a departure from strategies in previous years where the volume remaining in the numeric goal was divided evenly across the planning period. In the Tucson AMA, the strategy remains the same, to maximize the use of the water storage tax. If this strategy is achieved, the AWBA will develop enough credits to meet nearly 71% of the numeric goal in the Tucson AMA. For the Tucson AMA, including water management credits, the AWBA expects to reach 84% of the numeric M&I firming goal. Since the goal for the Tucson AMA is still unmet during this planning period, the AWBA continues developing as many credits as possible in the Tucson area. Other water management objectives also continue to be important in the Tucson AMA including storing water in locations where recovery is optimized.

It is important to note that while M&I and Indian firming are both identified as water management objectives, Indian firming is an obligation under the Arizona Water Settlement Act (AWSA). If this Plan is fully implemented, the AWBA expects to develop roughly 315,000 acre-feet of withdrawal fee credits for Indian firming. Absent general fund appropriations, the AWBA will need to rely on withdrawal fee credits to meet its Indian firming requirements. This Plan projects that Indian firming requirements will be just over 15,000 acre-feet during the planning period. Therefore, meeting a firming requirement during the planning period should be easily achieved.

#### 4. Storage Partners and Storage Capacity

Based on recharge permit volumes and discussions with AWBA storage partners, the AWBA is anticipated to have 155,000 acre-feet of storage capacity available at GSFs and over 100,000 acre-feet of capacity available at USFs. In the event there is excess CAP water available to the AWBA, or if the AWBA acquires other renewable supplies, the AWBA should have sufficient capacity available for storage. Details on storage partners, storage permits, and capacity available for use by the AWBA are further described in Appendix B and in the AWBA's 2016 Water Storage Facility Inventory.

A number of facility permits will expire during this Ten-Year Plan. Any difficulty in obtaining new permits could impact the capacity available to the AWBA. However, because impacts of this nature cannot be predicted and because historically these facilities have proven to be stable, this Ten-Year Plan assumes the permits will be renewed by facility owners. In addition to these facility permits, the AWBA will also need to renew several of its water storage agreements. The AWBA's agreements for water storage at many of its GSFs will expire December 31, 2021. Because renewal of these

agreements is anticipated, storage was included at these facilities for the full ten-year planning period.

5. Intrastate Recovery and Distribution of AWBA Credits

While a declared shortage on the Colorado River would result in the elimination of excess CAP water, depending on the level of shortage, a firming requirement could also be triggered for the AWBA. A firming requirement, however, would not be triggered until the reduction in supply impacts the deliveries to CAP and on-River water users for which the AWBA has a firming requirement. Based on data jointly prepared by CAWCD and ADWR staff, modeling projections show a 10-year combined total of between 6,273 and 43,234 acre-feet of firming requirement for the AWBA affecting only the NIA Indian customer class. In its analysis, the AWBA reviewed the probabilities, selected the tier representing the highest probability in a given year and selected the accompanying projected firming requirement in a given year. As illustrated in Table 12, a Tier 1 shortage has the highest probability of occurring until 2023. For 2024 through 2026, a Tier 2 shortage has the highest probability of occurring. In the last two years of the planning period, a Tier 3 shortage has the highest probability of occurring. Selecting the accompanying values, the AWBA projects it will have a requirement to firm nearly 16,000 acre-feet of NIA priority water over the planning period.

**Table 12. Probability of Shortage by Tier and Projected Firming Requirements**

Year	Probability of Shortage <sup>1</sup>				NIA Indian Firming <sup>2</sup> (af)			Total AWBA Firming Volume (af)
	Any	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier3	(af)
2019	0%	0%	0%	0%	-	-	558	-
2020	52%	52%	1%	0%	-	-	1,003	-
2021	64%	43%	21%	0%	-	-	1,689	-
2022	68%	38%	23%	7%	-	-	4,462	-
2023	65%	29%	24%	12%	-	-	4,899	-
2024	65%	22%	26%	17%	-	375	5,327	375
2025	66%	19%	25%	23%	-	842	5,746	842
2026	66%	13%	28%	24%	-	1,299	6,155	1,299
2027	67%	11%	27%	30%	-	1,687	6,518	6,518
2028	65%	9%	26%	31%	-	2,070	6,876	6,876
<b>TOTALS</b>					-	<b>6,273</b>	<b>43,234</b>	<b>15,910</b>

1. Derived from US Bureau of Reclamation Colorado River Simulation System April 2018 Model Run, Lake Mead probabilities of shortage for the period 2019 to 2028.

2. CAWCD Resource Planning & Analysis and ADWR Colorado River Management: May 2018.

The AWBA has several options for firming these supplies including entering into an agreement with an entity such as CAWCD for the recovery and delivery of water or by making water available within the area of the affected water users through the extinguishment of credits (e.g. GRIC). The AWBA has 105,390 acre-feet of water stored at the Gila River Indian Irrigation and Drainage District (GRIIDD)

in the Phoenix and Pinal AMAs and since 2015, another 44,000 acre-feet of firming credits developed with the GRIC for a total of nearly 150,000 acre-feet of existing credits that can be used today to firm supplies.

According to its firming agreement with the GRIC, the AWBA and the GRIC are required to initiate firming discussions when a firming requirement is projected in the third year of the Ten-Year Plan. Since no firming requirement is projected until 2024, this provision of the IGA is not triggered. Irrespective of what the ultimate firming volume is, there are enough existing, let alone projected credits, to cover the entire range of potential firming requirements during the next ten years (see Table 13).

It should also be noted that in addition to the uncertainties regarding hydrologic conditions on the Colorado River, there are also uncertainties within the CAP system that could affect the AWBA’s firming requirements. Increased water delivery costs during shortages, drought-related conservation, or changes in customer ordering patterns could all play a role in the amount of water that is available to the NIA Indian pool and ultimately the volume of water the AWBA will need to firm.

**Table 13. Projected Firming Plan (in acre-feet) 2019 through 2028**

Year	Projected Firming Requirement	Firming Requirement				Balance of Indian Firming Credits			
		NIA Indian	On-River	M&I	Total	Phoenix AMA	Pinal AMA	Tucson AMA	Total
<b>Pre-Plan</b>						132,000	17,000	-	149,000
2019	0	0	0	0	0	144,000	28,000	0	172,000
2020	0	0	0	0	0	155,000	35,000	0	190,000
2021	0	0	0	0	0	165,000	42,000	0	207,000
2022	0	0	0	0	0	175,000	49,000	0	224,000
2023	0	0	0	0	0	184,000	56,000	0	240,000
2024	375	375	0	0	375	192,625	63,000	0	255,625
2025	842	842	0	0	842	200,783	69,000	0	269,783
2026	1,299	1,299	0	0	1,299	208,484	75,000	0	283,484
2027	6,518	6,518	0	0	6,518	209,966	81,000	0	290,966
2028	6,876	6,876	0	0	6,876	211,090	87,000	0	298,090
<b>Total</b>	<b>15,910</b>	<b>15,910</b>	<b>-</b>	<b>-</b>	<b>15,910</b>	<b>211,090</b>	<b>87,000</b>	<b>-</b>	<b>298,090</b>

6. Interstate Water Storage and Requests for Intentionally Created Unused Apportionment (ICUA)

Pursuant to earlier interstate water banking agreements, 601,041 acre-feet of credits are already held in the Southern Nevada Water Authority (SNWA) subaccount. Under the Third Amended and Restated Agreement for Interstate Water Banking, the AWBA no longer has an obligation to accrue future long-term storage credits. However, additional storage may occur annually through mutual agreement. As in the original agreement, any future delivery and storage costs are born by SNWA

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and are now on a “pay-as-you-go” basis. In 2018, for the first time since 2010, the AWBA agreed to store 13,500 acre-feet of Nevada’s unused apportionment. The Ten-Year Plan assumes decisions to store water for Nevada going forward will be made on an annual basis as part of the Plan of Operation process.

This Ten-Year Plan assumes that SNWA will request 2,500 acre-feet per year of recovery for ICUA development pursuant to the Arizona Water Company recovery agreement beginning in 2025<sup>8</sup>. Should SNWA not need this capacity in 2025, it may seek different recovery options at that time. SNWA may pursue additional recovery during the Ten-Year Plan for drought management purposes with concurrence among SNWA, AWBA, CAWCD and CRCN. The Third Amended and Restated Agreement for Interstate Water Banking 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. Existing credits must be recovered by December 31, 2063. Future credits 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.

### Conclusions and Recommendations

The Ten-Year Plan is intended to serve as a guide to assist the AWBA in the development of its Annual Plan of Operation in which the AWBA is required to plan its activities for the following calendar year. As part of the Annual Report, the Ten-Year Plan is reviewed and updated annually. Therefore, it is possible that the Ten-Year Plan may change significantly depending on the goals set by the AWBA and the funding and water supply available to the AWBA. Several conclusions can be reached given this Ten-Year Plan:

- 1) Hydrologic conditions on the Colorado River are trending toward a shortage in 2020 with the probability of shortage increasing to 52% in 2020 and increasing again to 68% by 2022 then hovering in the 65-67% range throughout the remainder of the planning period.
- 2) The probability of a Tier 1 shortage is predominant through 2023.
- 3) Between 2024 and 2026, the probability of a Tier 2 shortage is highest.
- 4) Starting in 2027, the probability of a Tier 3 shortage is higher than either a Tier 1 or Tier 2 shortage.
- 5) While the probability of shortage during this planning period is high, the range of potential recovery volumes projected during this planning period is relatively narrow ranging from 375 acre-feet to around 6,900 acre-feet on the high end.
- 6) The AWBA has sufficient Indian firming credits to meet even the most conservative volume of projected firming requirement for this planning period.
- 7) The Phoenix and Pinal AMA M&I firming goals are achieved in this planning period and without the use of water management credits.

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<sup>8</sup> Agreement for Funding the Recovery of Long-term Storage Credits Stored on Behalf of Southern Nevada between the Central Arizona Water Conservation District and Southern Nevada Water Authority dated March 29, 2017. Projections are based on communication with SNWA June 2018.

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- 8) The Tucson AMA M&I firming goal will not be met during this planning period even if 100% of the water management credits in the Tucson AMA are applied leaving another roughly 134,000 acre-feet of credits to meet the goal.
- 9) Water storage taxes in Maricopa and Pinal Counties are not fully utilized.
- 10) Withdrawal fee revenues are expected to be the only source of funding for meeting the State's obligation for Indian firming, limiting the AWBA's ability to assist in other water management objectives.
- 11) Withdrawal fee revenues in the Phoenix and Pinal AMAs are a limiting factor allowing the AWBA to only develop an average of approximately 16,500 acre-feet of credits per year.
- 12) Interstate storage using Arizona's entitlement is not projected during this planning period. However, it is possible the AWBA could store Nevada's unused apportionment.
- 13) Requests for ICUA are projected to begin in 2025.

Based on these conclusions, staff recommends the following potential actions:

- 1) Continue focusing on making progress on Indian firming:
  - a. Implement agreements with GRIC.
  - b. Develop and implement agreements to firm future water leases from the White Mountain Apache Tribe.
  - c. Fully utilize withdrawal fees in the Pinal and Phoenix AMA to meet Indian firming obligations.
- 2) Continue focusing on developing credits using strategies that do not rely upon excess CAP water.
- 3) Meet and confer with CAWCD and ADWR staff to evaluate conditions on the Colorado River relative to water available to the AWBA and potential firming requirements and adjust models and plans accordingly.
- 4) Meet and confer with CAWCD and ADWR staff to develop an annual credit purchase plan for incorporation into the AWBA Annual Plan of Operation.
- 5) Continue working with CAWCD and ADWR to implement the next steps in the Joint Recovery Plan.
- 6) Meet with CAWCD and ADWR to finalize the IGA supporting the operation of the AWBA.
- 7) Continue quarterly meetings with CAWCD and ADWR regarding AWBA operations and finances.
- 8) Support efforts to retain water in Lake Mead.

## APPENDICES



**APPENDIX A. EXCESS CAP WATER WATER DELIVERIERS FOR WATER BANKING PURPOSES FOR CALENDAR YEAR 2017 BY PARTNER AND ACTIVE MANAGEMENT AREA**

Storage Partner Facilities		Quantity of Water (Acre-feet)	
		Intrastate	Interstate
<b>PHOENIX AMA</b>	Hieroglyphics Mountain Recharge Project	1,900	0
	Queen Creek Irrigation District	2,230	0
	<b><i>Intrastate/Interstate AMA Subtotal</i></b>	<b>4,130</b>	<b>0</b>
	<b><i>Phoenix AMA Subtotal</i></b>	<b>4,130</b>	
<b>PINAL AMA</b>	Central Arizona Irrigation & Drainage District	3,800	0
	Hohokam Irrigation & Drainage District	3,800	0
	Maricopa-Stanfield Irrigation & Drainage District	3,800	0
	<b><i>Intrastate/Interstate AMA Subtotal</i></b>	<b>11,400</b>	<b>0</b>
	<b><i>Pinal AMA Subtotal</i></b>	<b>11,400</b>	
<b>TUCSON AMA</b>	Lower Santa Cruz Recharge Project	1	0
	Cortaro-Marana Irrigation District	2,099	0
	<b><i>Intrastate/Interstate AMA Subtotal</i></b>	<b>2,100</b>	<b>0</b>
	<b><i>Tucson AMA Subtotal</i></b>	<b>2,100</b>	
<b>TOTAL INTRASTATE &amp; INTERSTATE DELIVERIES</b>		<b>17,630</b>	<b>0</b>
<b>TOTAL DELIVERIES</b>		<b>17,630</b>	



**APPENDIX B. AWBA CREDITS DEVELOPED IN CALENDAR YEAR 2017**

**Table 1A. AWBA Long-Term Storage Credits Purchased in 2017**

Funding Source & Transaction	Annual		Cumulative	
	Funds Expended	Credits Accrued (AF)	Funds Expended	Credits Accrued (AF)
<b>Water Storage Tax</b>				
Phoenix AMA	\$14,500,000	59,082	\$14,500,000	59,082
Pinal AMA	-	-	-	-
Tucson AMA	\$2,852,320	2,570	\$5,893,754	27,140
<b>Withdrawal Fees</b>				
Phoenix AMA	-	-	-	-
Pinal AMA	-	-	-	-
Tucson AMA	\$303,435	1,525	\$326,133	1,759
<b>Shortage Reparatons</b>				
Phoenix AMA	-	-	-	-
Pinal AMA	-	-	-	-
Tucson AMA	-	-	\$579,842	3,665
<b>Total</b>	<b>\$17,655,755</b>	<b>73,177</b>	<b>\$21,299,729</b>	<b>91,646</b>

**Table 1B. AWBA Firming Credits Developed with the Gila River Indian Community in 2017<sup>1</sup>**

Firming Credits Developed	Annual	Cumulative
Delivery Reimbursement (AF)	7,000	35,000
Cost of Reimbursement	\$1,148,000	\$5,592,000

<sup>1</sup> Firming credits developed pursuant to Exhibit B of IGA between AWBA and GRIC



**APPENDIX C. MAJOR ASSUMPTIONS UNDERLYING THE TEN-YEAR PLAN**

1. Water Resources

- a. Excess CAP water will not be available for AWBA purposes during this Ten-Year Plan.
- b. 2018 credits are estimated by AWBA.
- c. The White Mountain Apache settlement is enforceable in 2021 and deliveries begin in 2022.
- d. Firming requirements are based on data jointly produced by CAP and ADWR modelers.
- e. CAWCD's CAP Recharge Facility Priority Policy adopted May 2, 2013 and CAWCD's Procedure for Distributing excess CAP Water for the Period of 2015 through 2019 adopted March 6, 2014 continue through 2028.
- f. Assumes US Bureau of Reclamation Colorado River Simulation System April 2018 Model Run, Lake Mead Probabilities of Shortage for the Period 2019 to 2028 for determining shortage, normal and surplus condition for supply and recovery purposes.

2. Financial

- a. CAWCD's adopted Base Case 2018 to 2023 rate schedule is utilized; post 2023, CAWCD's projected rates used consistent with CAWCD's current long-range financial plan (G. Given dated April 17, 2018).
- b. Cost to store at groundwater savings facilities is based on the rates shown in Table 4 of the 2018 Plan of Operation held constant.
- c. Cost to store at non-CAWCD facilities in Tucson is based on rates established in the water storage agreements with Tucson Water.
- d. Water storage tax revenues are based on projections prepared by CAWCD (G. Given dated April 9, 2018).
- e. Use of water storage tax revenues are consistent with the joint CAWCD, ADWR and AWBA intergovernmental agreement.
- f. Withdrawal fee revenues are based on the five-year average for 2013 through 2017 withdrawal fee collections held constant throughout the plan.
- g. The Director of Water Resources will continue to assess \$2.50/acre-foot for withdrawal fees in the Pinal AMA.
- h. Budget is based on the projected cost of developing credits as though the AWBA received excess CAP water directly.
- i. No general fund appropriations.
- j. No legislative transfer of funds during planning period except for \$1.4 million already expected for 2019.



**APPENDIX D. STORAGE FACILITIES AVAILABLE TO THE AWBA  
(as used in the Ten-Year Plan)**

Name of Facility <sup>1</sup>	Facility Permit Expiration	Facility Permitted Capacity (AF)	Capacity Available to AWBA <sup>2</sup> (AF)	Year Water Last Stored	Volume of Water Last Stored (AF)
<b>PHOENIX – GSF<sup>3</sup></b>					
Queen Creek Irrigation District	Nov-21	28,000	7,000	2017	2,230
<b>Subtotal for Phoenix AMA - GSF</b>		<b>28,000</b>	<b>7,000</b>		
<b>PHOENIX – USF</b>					
Agua Fria Recharge Project	May-19	100,000	15,000	2016	5,754
Granite Reef Underground Storage Project	Mar-32	93,000	15,000	2016	10,120
Hieroglyphic Mountains Recharge Project	Dec-21	35,000	15,000	2017	1,900
Superstition Mountains Recharge Project	Jan-28	25,000	10,000	2016	7,174
<b>Subtotal for Phoenix AMA - USF</b>		<b>253,000</b>	<b>55,000</b>		
<b>PINAL – GSF</b>					
Central Arizona Irrigation & Drainage District <sup>3</sup>	Dec-17	110,000	60,000	2017	3,800
Hohokam Irrigation & Drainage District	Jul-19	55,000	20,000	2017	3,800
Maricopa-Stanfield Irrigation & Drainage District	Dec-19	120,000	60,000	2017	3,800
<b>Subtotal for Pinal AMA - GSF</b>		<b>285,000</b>	<b>140,000</b>		
<b>TUCSON – GSF</b>					
BKW Farms	Mar-20	14,316	1,000	2016	1,000
Cortaro-Marana Irrigation District	Mar-19	20,000	5,000	2017	2,099
Kai-Farms – Red Rock <sup>3</sup>	Nov-16	11,231	2,000	2016	540
<b>Subtotal for Tucson AMA - GSF</b>		<b>45,547</b>	<b>8,000</b>		
<b>TUCSON – USF</b>					
Avra Valley Recharge Project <sup>3</sup>	Mar-18	11,000	1,500	2016	1,150
Lower Santa Cruz Recharge Project	Feb-19	50,000	25,000	2017	1
Pima Mine Road Recharge Project	Sep-20	30,000	7,000	2015	1,300
SAVSARP	Jan-28	60,000	15,000	2016	8,160
<b>Subtotal for Tucson AMA - USF</b>		<b>151,000</b>	<b>48,500</b>		
<b>ALL AMAs - GSF</b>		<b>358,547</b>	<b>155,000</b>		
<b>ALL AMAs - USF</b>		<b>404,000</b>	<b>103,500</b>		

<sup>1</sup> As additional facilities are developed, they will be included in future plans.

<sup>2</sup> 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.

<sup>3</sup> Permit renewal application pending with ADWR.