

**ARIZONA WATER BANKING AUTHORITY
INDIAN FIRING WORKSHOP**

TABLE OF CONTENTS

Section I: Agenda

Section II: Overview of the Water Settlement Act Elements

- A. Firming
 - 1. Why Did the State Agree to this?
 - 2. What is Firming?
 - 3. State Firming Obligations
 - a. Gila River Indian Community
 - b. Other Unallocated Obligation
 - 4. Federal Firming Obligations
 - a. Southern Arizona Water Rights Settlement Act (SAWRSA)
 - b. Other Unallocated Obligation
- B. Southside Replenishment Obligation

Section III: Shortage Sharing

- A. Agriculture
- B. M&I/Indian

Section IV: Colorado River Water Supply Availability/CAP Water Availability Modeling

- A. Colorado River Operations
- B. Water Operation Model & Model Variables
- C. Calculation of the Firming Requirement
- D. Estimated Firming Obligation

Section V: Current Commitments for Excess CAP Water

Section VI: Potential Options for AWBA to Meet State Obligations

Section VII: Funding Availability/Options

Section VIII: Recommendation

What is “Firming”

BACKGROUND

Section 105 of the Arizona Water Settlements Act (S. 437) is titled “Firming of Central Arizona Project Indian Water.” The provision reflects the result of lengthy negotiations between state parties, who were primarily represented by the Arizona Department of Water Resources, and the Department of the Interior. The provision authorizes the Secretary (of the Interior) and the State (Arizona) to develop a firming program to ensure that 60,648 acre feet of agricultural priority water made available for re-allocation to Indian tribes shall, for a 100 year period, be delivered during water shortages in the same manner as water with an M&I priority is delivered during water shortages. The Act then goes on to specify specific responsibilities for the Secretary and for the State. While the Act reflects an agreement between the State and the Department of the Interior on many aspects of the firming commitment, there are still unresolved issues that must be negotiated as the program is developed.

The need for a firming program is based on the negotiators’ understanding of the priorities that would be used to allocate water during times when there would not be enough water available to the CAP to meet all contract commitments. In the early 1980’s, when the Secretary was completing initial allocations of CAP water, he established four categories of water contracts. Miscellaneous contracts would be the first reduced, followed by non-Indian Agriculture. A co-equal priority was established for Indian and Municipal and Industrial allocations. The reason for these priorities was to establish a logical method for reducing water orders when demands exceeded supply. Most surface water systems operating in the western United States use the law of prior appropriation, which establishes a “first in time, first in right” method for allocating water during shortages. This law does not apply to Colorado River water that is contracted pursuant to Section 5 of the Boulder Canyon Project Act, so the Secretary sought to develop his own system for CAP water. During the recent settlement negotiations process, a decision was made not to alter the previously adopted priority system. Therefore, the term non-Indian agricultural priority remains a term used for purposes of shortage allocation, even though, after the settlement process, the water used in this category is likely to be for Indian or M&I purposes rather than non-Indian agriculture.

In recognition that a higher priority in times of shortage means greater reliability, and therefore greater value, the Interior negotiators sought to increase the amount of M&I priority water that could be dedicated for Indian water rights settlements. In particular, they sought control over 65,647 acre feet of allocations that had originally been allocated and offered to M&I water users, but were declined prior to signing of subcontracts. At various stages in the negotiations over CAP repayment with CAWCD, the Interior Department was willing to give extra consideration for this firmer supply if it could be used for federal purposes. During negotiations with various Indian Tribes, the Department had suggested that M&I priority water would be re-allocated to those tribes as part of future settlement agreements. However, as CAWCD/Interior negotiations proceeded, many state parties, as well as ADWR objected to the use of the 65,647 acre feet for any use other than non-Indian M&I. In an effort to develop a “win-win” approach, the State parties suggested that a water management program could be developed for a portion of the lower priority non-Indian agricultural water that would improve its reliability or “firmness.”

After agreement that a firming program would be acceptable as a substitute for reallocation of the M&I unallocated water, the parties further negotiated levels of responsibility. The amount of firming was reduced by 5,000 acre feet in recognition that ASARCO had increased its settlement offer toward the GRIC water budget by an additional 5,000 acre feet from its M&I allocation. Of the remaining 60,647 acre feet, the Secretary took responsibility for firming 28,200 acre feet as required by the Southern Arizona Water Rights Settlement Act and the State agreed to firm 15,000 acre feet toward the GRIC settlement. The balance of 17,447 af, which would be dedicated for future settlements, was divided equally with each party accepting the responsibility for 8,724 af. These levels of responsibility are specified in Section 105 of the Settlements Act. Arizona’s commitment to firm 15,000 af for the benefit of the GRIC settlement is also confirmed in paragraph 8.23 of the GRIC Settlement Agreement.

Section II-A

WHAT IS MEANT BY “IN THE SAME MANNER AS WATER WITH AN M&I PRIORITY IS DELIVERED DURING WATER SHORTAGES?”

The State and the Department of the Interior have not reached a mutual understanding of what is meant by the phrase “in the same manner as water with an M&I priority is delivered during water shortages.” The difference of interpretations was not discovered until after most of the other negotiations had been completed, and so it was decided that this and any other remaining issues could be resolved as the firming program was developed. The significance of the divergent viewpoints may have very limited practical application, depending upon the degree of severity of CAP water supply shortfalls. In short, the State’s interpretation is that the obligation to provide a replacement water supply only occurs when the water supply drops below the level required to meet the “firmed” water target level. In the case of GRIC, if the amount of NIA water available to the Community drops below 15,000 af, the State would have some obligation to provide alternative supply. The federal viewpoint is that GRIC could be affected, and therefore is owed firming water, even if the NIA supply is greater than 15,000 af, but is lower than their full settlement budgeted volume of 120,600 af. The following examples illustrate how this difference in interpretation translates into firming obligation:

Examples – Baseline calculation

Total NIA contract amount = 317,000 af. GRIC share is 120,200 af or about 38%

If GRIC had received 15,000 af of M&I priority water, its share of NIA water would be reduced to 105,200 af or about 33%.

Example 1 – Full NIA Supply of 317,000 af is available.

State perspective

GRIC receives 120,200 af which is greater than 15,000 af so no firming is required.

Fed perspective

GRIC should receive 15,000 af as if it were M&I priority and 33% of the 317,000 af NIA water or about 105,200 af. The total GRIC should receive is 120,200 which is what it does receive, so no firming is required.

Example 2 – 33% shortage to NIA
Available NIA supply is 211,000 af

State perspective

GRIC receives 38% of 211,000 af or about 80,000 af. Since this is greater than 15,000 af **no firming is required.**

Fed perspective

GRIC should receive 15,000 af as if it were M&I priority and 33% of the 211,000 af NIA water or 69,600 af. The total GRIC should receive is 84,600 af. The state needs to make up the **shortfall of 4,600 af** between what GRIC received and what they would have received if the 15,000 af was M&I priority.

Example 3 – 50% shortage to NIA
Available NIA supply is about 159,000 af.

State perspective

GRIC receives 38% of 159,000 af or about 60,000 af. Since this is greater than 15,000 af, **no firming is required.**

Fed perspective

GRIC should receive 15,000 af as if it were M&I priority and 33% of the 159,000 af of NIA water or 52,500 af. The total GRIC should receive is 67,500 af. The state needs to make up the **shortfall of 7,500 af.**

Section II-A

Example 4 – 90% shortage to NIA
Available NIA supply is about 32,000 af

State perspective

GRIC receives 38% of 32,000 af or about 12,000 af. Since this is less than the 15,000 af, **firming is required of 3,000 af** to guarantee equivalency with M&I priority water users.

Fed perspective

GRIC should receive 15,000 af as if it were M&I priority and 33% of the 32,000 af of NIA water or 10,600 af. The total GRIC should receive is 25,600 af. The state needs to make up the **shortfall of 13,600 af**.

Example 5 – 100% shortage to NIA
Available NIA supply is 0.

State perspective

GRIC receives 38% of 0 or 0 af. Since this is less than the 15,000 af, the **firming required is 15,000 af**.

Fed perspective

GRIC should receive 15,000 af as if it were M&I priority and 33% of 0 af or 0 af. The total GIRC should receive is 15,000 af. The state needs to make up the **shortfall of 15,000 af**.

The examples show that there is no difference in perspective when there is no shortage to NIA or there is a 100% shortage to NIA, but in between, there is a considerable difference in the resulting firming requirement.

One additional example illustrates the more commonly anticipated firming requirement when the CAP supply is less than adequate to satisfy all M&I subcontract needs.

Example 6 – 100% shortage to NIA and 25% Shortage to M&I

An M&I subcontract for 15,000 af would only receive 75% of its supply or about 11,250 af.

The State would be required to provide an equivalent supply of 11,250 af to satisfy the firming obligation, but GRIC would still fall short by all of its other NIA priority water.

While the examples shown above used the GRIC firming commitment of 15,000 af, they situations would be similar for the remaining 8,724 af of unidentified state firming obligation.

SOUTHSIDE REPLENISHMENT PROGRAM

The Arizona Legislature must enact the Southside Replenishment Program in order for Gila River Indian Community Settlement to take effect.

A. Establish Protection Zones – (See Map)

1. Central Protection Zone
2. Western M&I Protection Zone
3. Western Municipal Protection Zone
4. Eastern Protection Zone North
5. Eastern Protection Zone South

C. Prohibition on Underground Water Exportations

Prohibition on water pumped from within either of the two Eastern Protection Zones or either of the two Western Protection Zones and transported outside of that Protection Zone for:

1. A new use; or
2. Use in excess of the highest historic (1999, 2000 or 2001) non-irrigation use transported outside of that Protection Zone.

D. Establishment of a Southside Replenishment Bank

1. State required to deliver not less than 1,000 acre-feet each year directly onto the Reservation until the balance of the Community's account in the Southside Replenishment Bank has reached 15,000 acre-feet.
2. State required to replace water in the Southside Replenishment Bank for debits incurred to ensure that the Community's account balance does not fall below 5,000 acre-feet.

E. Replenishment Obligations

1. State replenishment obligation – Beginning in the first calendar year after the effective date (when the Secretary with the concurrence of the Community and ADWR certifies in writing that the legislation has been enacted) the State will be required to replenish when pumping exceeds the following limitations in the protection zones:
 - a. Western Municipal and Industrial Protection Zone greater than 2.0 acre-feet per acre.
 - b. Western Municipal Protection Zone greater than 2.0 acre-feet per acre.
 - c. Eastern Protection Zone North greater than 2.33 acre-feet per acre.
 - d. Eastern Protection Zone South greater than 2.33 acre-feet per acre.
 - e. Prior to December 31, 2023, when AWC pumps greater than 1,275 acre-feet from within the Eastern Protection Zone South and transports the water outside of the Eastern Protection Zones
 - f. Western Protection Zones when pumping for Irrigation Use is greater than the cumulative IGFR allotments under the TMP Base Agricultural Conservation Program (or modifications) for the Pinal AMA, allowing for:
 - i. The Western Protection Zones to be considered a single area with its own replenishment obligations
 - ii. Imported water (including in-lieu) used for irrigation within the Western Protection Zones to be excluded from the calculation of Pumping for Irrigation Use.
 - g. Eastern Protection Zones when pumping for Irrigation Use is greater than the cumulative IGFR allotments under the TMP Base Agricultural Conservation Program (or modifications) for the Pinal AMA, allowing for:
 - i. The Eastern Protection Zones considered as a single area with its own replenishment obligations
 - ii. Imported water (including in-lieu) used for irrigation within the Eastern Protection Zones to be excluded from the calculation of Pumping for Irrigation Use.

F. Options for meeting the Replenishment obligations:

1. Direct delivery;
2. Extinguishment of Long-Term Storage Credits;
 - a) In the Western Protection Zones credits must be earned:
 - (1) in accordance with State law within the five (5) years immediately prior to extinguishment; and
 - (2) within either of the Western Protection Zones.
 - b) In the Eastern Protection Zones credits must be earned:
 - (1) in accordance with State law within the seven (7) years immediately prior to extinguishment; and
 - (2) within either of the Eastern Protection Zones.
3. Debiting the Community account in the Southside Replenishment Bank

Shortage Sharing Agreement

Background

Throughout the development period for the Central Arizona Project the issue of the long term availability of water supply was a critical issue. After collecting stream flow data on the Colorado River for an extended period of time, planners began to conclude that the combination of the Colorado River Compact and the Mexican Treaty of 1944 would result in an over-appropriation of the River's supply. Large-scale storage projects including Hoover Dam and Glen Canyon Dam were constructed to maximize the carry over storage capability in an attempt to even out high flow years with low flow years. Even with this huge federal investment in infrastructure, studies continued to predict that at some future date the demands for water within the basin will exceed the available supplies, leading to shortages. The issue of how those shortages would be shared between water users in the Lower Basin was a major point of controversy in the Arizona v California lawsuit.

In 1968, the Congress passed the Colorado River Basin Project Act which included authorization for construction of the CAP. In order to secure passage of the Act, under much duress, Arizona agreed to a compromise provision that placed the CAP in a position of facing the lowest priority in times of shortages. In light of this lower priority, and in recognition that some shortage to the Lower Basin supplies in the future is likely, the Secretary of the Interior adopted a priority system within the CAP supply. The highest priority would be shared between Indian contracts and M&I subcontracts. Non-Indian agricultural subcontracts would be reduced to zero before those other priority uses were reduced. The Secretary implemented this shortage sharing policy through provisions in Indian contracts and M&I subcontracts.

Over time, contracts and subcontracts were issued with provisions that could be interpreted to be in conflict with each other. Also, as conditions changed and the size of the Indian and M&I overall allocations grew, the shortage sharing provisions were modified in ways that some felt created unanticipated impacts on parties who had not been involved in certain Indian settlements. While neither the Interior Department nor the Arizona Department of Water Resources were predicting shortages to CAP for a number of years, both sides agreed that the conflicting contract language would likely lead to litigation in the future when shortage sharing had to be enforced. Since many other CAP related issues were being resolved through settlement negotiations, the State and the Interior Department agreed to find a solution to the shortage sharing issue as well. The results of the negotiation are documented in paragraph 8.16 of the GRIC Settlement agreement. These provisions will be incorporated into all CAP contracts and subcontracts whenever those contracts would need to be modified.

Non-Indian Agricultural Priority

Under the new concepts in the overall CAP settlement, non-Indian agricultural subcontracts will be relinquished by existing subcontractors. The relinquished subcontract allocations combined with uncontracted water would be changed from being quantified as a percentage to being quantified as an acre-foot per year amount.

Most planning studies envision shortage declarations that will result in no water being available for the non-Indian agricultural priority contracts in those years. However, there is currently no established shortage criteria, and there is also the possibility that CAP will not have a full supply as a result of higher than normal uses by other Arizona Colorado River contractors. In anticipation of these possibilities, the proposed shortage sharing criteria call for an allocation of available water on a pro-rata basis. The measure of the pro rata calculation will be based on amount of recent use. The exception to this method is that the GRIC will be given credit for water that it has under contract, but did not put to use because distribution systems have not yet been completed.

M&I/Indian Priorities

The revised shortage sharing criteria eliminates many of the ambiguities that existed in prior contracts. The fundamental approach used is to lock in the size of the Indian priority pool and the

Section III

M&I priority pool. The M&I pool enlarges after the year 2044 in recognition of the conversion from non-Indian agricultural priority to M&I priority allowed in the Cliff Dam replacement contract.

The other fundamental change is that the criteria eliminates the steps that were used in the previous criteria, and replaces it with a true co-equal priority. For any volume of water supply that may be available, an established formula calculates the total amount of water in the Indian pool and the M&I pool. The distribution of the available supply within each of the pools is then determined based on the percent of water recently used prior to the shortage. The sharing of shortages among Indian contractors is more complicated due to pre-existing conditions in several of the Indian contracts.

LAW OF THE RIVER

The Colorado River is managed and operated under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River." This collection of documents apportions the water and regulates the use and management of the Colorado River among the seven basin states and Mexico. Following is a synopsis of the most significant documents:

The Colorado River Compact of 1922 - The cornerstone of the "Law of the River", this Compact was negotiated by the seven Colorado River Basin states and the federal government in 1922. It defined the relationship between the upper basin states, where most of the river's water supply originates, and the lower basin states, where most of the water demands were developing. At the time, the upper basin states were concerned that plans for Hoover Dam and other water development projects in the lower basin would, under the Western water law doctrine of prior appropriation, deprive them of their ability to use the river's flows in the future.

The states could not agree on how the waters of the Colorado River Basin should be allocated among them, so the Secretary of Commerce Herbert Hoover suggested the basin be divided into an upper and lower half, with each basin having the right to develop and use 7.5 million acre-feet (maf) of river water annually. This approach reserved water for future upper basin development and allowed planning and development in the lower basin to proceed.

The Boulder Canyon Project Act of 1928 - This act: (1) ratified the 1922 Compact; (2) authorized the construction of Hoover Dam and related irrigation facilities in the lower Basin; (3) apportioned the lower basin's 7.5 maf among the states of Arizona (2.8 maf), California (4.4 maf) and Nevada (0.3 maf); and (4) authorized and directed the Secretary of the Interior to function as the sole contracting authority for Colorado River water use in the lower basin.

California Seven Party Agreement of 1931 - This agreement helped settle the long-standing conflict between California agricultural and municipal interests over Colorado River water priorities. The even principal claimants - Palo Verde Irrigation District, Yuma Project, Imperial Irrigation District, Coachella Valley Irrigation District, Metropolitan Water District, and the City and County of San Diego - reached consensus in the amounts of water to be allocated on an annual basis to each entity. Although the agreement did not resolve all priority issues, these regulations were also incorporated in the major California water delivery contracts.

The Mexican Water Treaty of 1944 - Committed 1.5 maf of the river's annual flow to Mexico.

Upper Colorado River Basin Compact of 1948 - Created the Upper Colorado River Commission and apportioned the Upper Basin's 7.5 maf among Colorado (51.75 percent), New Mexico (11.25 percent), Utah (23 percent), and Wyoming (14 percent); the portion of Arizona that lies within the Upper Colorado Basin was also apportioned 50,000 acre-feet annually.

Colorado River Storage Project of 1956 - Provided a comprehensive Upper Basin-wide water resource development plan and authorized the construction of Glen Canyon, Flaming Gorge, Navajo and Curecanti dams for river regulation and power production, as well as several projects for irrigation and other uses.

The Arizona v. California U.S. Supreme Court Decision of 1964 - In 1963, the Supreme Court issued a decision settling a 25-year-old dispute between Arizona and California. The dispute stemmed from Arizona's desire to build the Central Arizona Project so it could use its full Colorado River apportionment. California objected and argued that Arizona's use of water from the Gila River, a Colorado River tributary, constituted use of its Colorado River apportionment, and that it had developed a historical use of some of Arizona's apportionment, which, under the doctrine of prior appropriation, precluded Arizona from developing the project.

The Supreme Court rejected California's arguments, ruling that lower basin states have a right to appropriate and use tributary flows before the tributary co-mingles with the Colorado River, and that the doctrine of prior appropriation did not apply to apportionments in the lower basin. In 1964, the Court issued its decree. This decree enjoined the Secretary of the Interior from delivering water outside the framework of apportionments defined by the law and mandated the preparation of annual reports documenting the uses of water in the three lower basin states.

In 1979, the Supreme Court issued a Supplemental Decree that addressed present perfected rights referred to in the Colorado River Compact and in the Boulder Canyon Project Act. These rights are entitlements essentially established under state law, and have priority over later contract entitlements.

The Colorado River Basin Project Act of 1968 - This Act authorized construction of a number of water development projects in both the upper and lower basins, including the Central Arizona Project (CAP). It also made the priority of the CAP water supply subordinate to California's apportionment in times of shortage, and directed the Secretary to prepare, in consultation with the Colorado River Basin states, long-range operating criteria for the Colorado River reservoir system.

The Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs of 1970 - Provided for the coordinated operation of reservoirs in the upper and lower basins and set conditions for water releases from Lake Powell and Lake Mead.

Minute 242 of the U.S.-Mexico International Boundary and Water Commission of 1973 - Required the U.S. to take actions to reduce the salinity of water being delivered to Mexico at Morelos Dam.

The Colorado River Basin Salinity Control Act of 1974 - Authorized desalting and salinity control projects, including the Yuma Desalting Plant, to improve Colorado River quality.

There are several other laws, contracts and document which are part of the "Law of the River" in addition to these provisions, the federal Endangered Species Act and various Native American water claim settlements both affect the extent to which water developments and diversions can be utilized in the Colorado River Basin.

WATER OPERATION (CRSS_{ez}) MODEL ASSUMPTIONS

ASSUMPTIONS THAT IMPACT DEGREE OF PROJECTED SHORTAGE

1. Upper Basin Development: This includes both the amount of upper basin depletion and the rate at which the upper basin use increases over time. ADWR studies evaluated a moderate rate of use of 4.8 maf (used by the AWBA Study Commission for determining M&I Firming requirements) and a high rate of use of 5.2 maf (used by ADWR's Colorado River Management office for non-AWBA projections). The studies also evaluated a higher rate of use utilized by the Bureau of Reclamation of 5.4maf.
2. Colorado River Surplus Strategy: The surplus strategy can be designed to meet different objectives. Surplus can be declared to avoid spills or can be declared to use water stored in Lake Mead to meet excess demands. More conservative strategies minimize the risk of shortage while more liberal strategies increase the risk of shortage. ADWR studies utilize two approaches. The conservative approach assumes a strategy of spill avoidance based upon a presumed inflow from the upper basin of approximately 17maf (70th percentile level of historic runoff), referred to as "70R". A more liberal assumption is based on the Interim Surplus Guidelines (ISG), which allows for a surplus to be declared to use water stored in Lake Mead to allow California to gradually reduce their use to 4.4maf by the year 2016.
3. Colorado River Shortage Strategy: Lake Mead can be operated to reduce the probability of lowering the reservoir below some predetermined level called the protection level. The protection level can determine the frequency and amount of Arizona shortages. The standard probability of protection is to protect a lake elevation at a probability of 80%. In other words, if Lake Mead is at the probability protection elevation, there is an 80% chance, based upon all stochastic hydrologic series that the lake level will not drop below the protection level or there is a 20% chance of the elevation dropping below the protection level. For purposes of this evaluation, ADWR studies assume Arizona's users will be reduced from 2.8maf to 2.3maf when the probability protection elevation is reached that will protect Lake Mead elevations to 1000 feet (more liberal – less shortage) which is the elevation of the new Southern Nevada Water Authorities intake, 1050 feet (moderate) which is the elevation of the current intake for the Southern Nevada Water Authority, and 1083 feet (more conservative – more shortage) which is the minimum power elevation.
4. Operation of the Yuma Desalting Plant
Title I of the Colorado River Basin Salinity Control Act (P.L. 93-320, 43 U.S.C. § 1571, June 24, 1974) authorized construction of the Yuma Desalting Plant (YDP) near Yuma, Arizona, to meet the salinity control provisions of Minute No. 242 and to recover saline agricultural drainage water from the Wellton-Mohawk Division of the Gila Project for delivery to Mexico. The Act also authorized construction of a Bypass Drain to transport untreated saline agricultural drainage water and the more saline wastewater (i.e., the reject stream) from the desalting process to the Cienega de Santa Clara in Mexico (Cienega) near the Gulf of California.

Because the Colorado River has had many years of surplus flow available, the YDP operated for only a few months in 1992. With the exception of 1992 the U.S. salinity control obligations to Mexico have been met through the bypass of about 108,000 acre-feet per year¹ of saline agricultural drainage water to the Cienega, without charge against the United States Treaty delivery obligation to Mexico and through selective pumping of the remaining Yuma Area agricultural drainage. Because the drainage water in the bypass drain is not desalted and returned to the river, this method of operation results in the release from Lake Mead of comparable quantities of water, which otherwise would not be needed if the bypassed water was delivered to Mexico as a part of the U.S. Treaty delivery obligation. If this release from Lake Mead continues indefinitely, the declining storage in Colorado River Basin reservoirs

could cause additional and/or larger water supply shortages in the future to Colorado River water users in the United States.

For purposes of this analysis, ADWR studied two approaches – first, beginning operation of the YDP in 2004 (reduce the likelihood of shortages occurring earlier) and secondly, delay operation of the YDP until 2030 (increase the likelihood of shortages occurring earlier).

OTHER MODEL ASSUMPTIONS

1. Hydrology: The model uses an historic hydrology (Usually 1906 through 2002). The start year for hydrology can be modified to for any year in this period to reflect current or expected conditions.
2. Lower Basin State's Water Demand Schedules: Based on projected demands for each of the Lower Basin State's
3. Mexican Surplus: If Surplus is declared an additional 200,000 acre-feet is provided to Mexico. If Flood Control Releases are made any excess is delivered to Mexico.
4. Shortage Sharing between Arizona P4 contractors: CAP will share shortage with the approximately 164,000 acre-feet of diversion contracts along the Colorado River. ADWR studies assume that the consumptive use volume of the River contracts would share shortage with CAP on a proportional basis.
5. Shortage Sharing between CAP M&I and Indian Priority water users: ADWR studies assumed that shortage will be shared as proposed in the compromise agreement between the State and US in the GRIC Settlement.

CALCULATION OF THE FIRING REQUIREMENTS

The assumptions used to estimate the firming obligations are outlined in the Table below with scenarios ranging from low probability of shortages (A) to high probability of shortages (D).

MODELING SCENARIOS

Scenario A	Scenario B	Scenario C	Scenario D
<u>Hydrology Start Year</u> 1906	<u>Hydrology Start Year</u> 1906	<u>Hydrology Start Year</u> 1906	<u>Hydrology Start Year</u> 1906
<u>YDP</u> Begin Operations 2004	<u>YDP</u> Begin Operations 2004	<u>YDP</u> Begin Operations 2030	<u>YDP</u> Begin Operations 2030
<u>Upper Basin Demands</u> AWBA Study Commission 4.8 MAF	<u>Upper Basin Demands</u> ADWR 5.2 MAF	<u>Upper Basin Demands</u> ADWR 5.2 MAF	<u>Upper Basin Demands</u> BOR 5.4 MAF
100 Year Analysis (1906 – 2002) using 96 traces	100 Year Analysis (1906 – 2002) using 96 traces	100 Year Analysis (1906 – 2002) using 96 traces	100 Year Analysis (1906 – 2002) using 96 traces
<u>Surplus Strategy</u> 70R	<u>Surplus Strategy</u> 70R	<u>Surplus Strategy</u> Interim Surplus Guidelines through 2016 then 70R	<u>Surplus Strategy</u> Interim Surplus Guidelines through 2016 then 70R
<u>Shortage Strategy</u> 80P1000	<u>Shortage Strategy</u> 80P1050	<u>Shortage Strategy</u> 80P1050	<u>Shortage Strategy</u> 80P1083
January 1, 2003 reservoir levels	January 1, 2003 reservoir levels	January 1, 2003 reservoir levels	January 1, 2003 reservoir levels

INDIAN FIRING - Potential Scenarios

A. On-Reservation Recharge & Recovery

1. Indian Community Develop Facility

- Indian Community to develop a recharge facility on reservation, bearing the cost of construction and maintenance of the facility and delivery infrastructure.
- AWBA to develop water supply and pay fee to store water at facility
- Indian Community accepts water as part of obligation
- Indian Community may recover credits from its existing wells or wells that it develops on reservation in times of shortage to make up reductions in NIA water deliveries.

POTENTIAL WATER SUPPLIES:

- Excess CAP available to AWBA pursuant to Excess CAP Contract;
- Excess effluent unused by the cities;
- GRIC's unused CAP entitlement – (GRICs make this supply available to AWBA for this purpose and/or can also conduct their own supplemental recharge at same sight?).

POTENTIAL RECHARGE SITES:

- USF
 - a. For GRICs - "Area – 2" or "Area- 3" identified in a paper presented by Dennis McCrane and John Ford of Leonard Rice Consulting Water Engineers, Inc. at *Conserve 90* regarding possible recharge sites.
 - 1) "Area 2" is a 14 mile stretch of the Gila River floodplain located between the Santan and Sacaton Mountains with a potential for recharge of 163,000 af/yr (can also accommodate in-channel recharge in this location).
 - 2) "Area 3" is a five mile stretch of the Gila River floodplain located in the western portion of the reservation (north east of the Maricopa basin) with potential recharge of 93,000 af/yr (can also accommodate in-channel recharge in this location).
 - a. In-Lieu
 - a. For GRICs - Through the Pima-Maricopa Irrigation Project to lands located in the San Carlos Irrigation Project (historic groundwater pumping on SCIP is approximately 27,800 acre-feet per year, with total historic irrigation pumping totaling approximately 108,600 acre-feet per year)¹.
 - b. For GRICs - Through SRP/SCIID to lands located south of the Foothills development and lands located between South Mountain and the Sierra Estrella Mountains.

POTENTIAL FUNDING SOURCES:

- General Fund appropriation
- Phoenix or Pinal AMA Withdrawal Fees

ESTIMATED COST:

PRO/CONS:

- (+) Low maintenance - Provide water to Indian Community and let them manage the recharge and recovery.

2. AWBA Develop Facility

¹ Gila River Indian Reservation HSR, ADWR

Section VI

- AWBA get water storage permit and pay a facility charge for a recharge facility located on reservation. Indian Community to finance the cost of construction and maintenance of the facility and delivery infrastructure.
- AWBA to develop supply and store water at the Indian Community facility.
- AWBA obtain long-term storage credits and transfer credits in times of shortage.
- Indian Community to recover credits from its existing wells or wells that it develops on reservation in times of shortage to make up reductions in NIA water deliveries.

POTENTIAL WATER SUPPLIES:

- Excess CAP available to AWBA pursuant to Excess CAP Contract;
- Effluent

POTENTIAL RECHARGE SITES:

- USF
 - a. For GRICs - "Area - 2" or "Area- 3" identified in a paper presented by Dennis McCrane and John Ford of Leonard Rice Consulting Water Engineers, Inc. at Conserve 90 regarding possible recharge sites.
 - 1) "Area 2" is a 14 mile stretch of the Gila River floodplain located between the Santan and Sacaton Mountains with a potential for recharge of 163,000 af/yr.
 - 2) "Area 3" is a five mile stretch of the Gila River floodplain located in the western portion of the reservation (north east of the Maricopa basin) with potential recharge of 93,000 af/yr.
- In-Lieu
 - a. For GRICs - Through the PMIP to lands located in the San Carlos Irrigation Project (historic groundwater pumping on SCIP is approximately 27,800 acre-feet per year, with total historic irrigation pumping totaling approximately 108,600 acre-feet per year)².

POTENTIAL FUNDING SOURCES:

- General Fund appropriation
- Phoenix or Pinal AMA Withdrawal Fees

ESTIMATED COST:

PRO/CONS:

- (+) Better accounting of credits

B. Off-Reservation Recharge/On-Reservation Recovery

- AWBA to store water at a recharge facility located in close proximity to Indian Community
- Indian Community to recover credits from its existing wells or wells that it develops on reservation in times of shortage to make up reductions in NIA water deliveries (w/in the same AMA boundaries as storage).

POTENTIAL WATER SUPPLIES:

- Excess CAP available to AWBA pursuant to Excess CAP Contract;
- Effluent
- GRIC's unused CAP entitlement – (GRICs make this supply available to AWBA for this purpose and/or can also conduct their own supplemental recharge at same sight?).

POTENTIAL RECHARGE SITES:

- Many potential sites, but if using withdrawal fees there must be a tangible water management benefit to the AMA.

² Gila River Indian Reservation HSR, ADWR

POTENTIAL FUNDING SOURCES:

- General Fund appropriation
- Phoenix or Pinal AMA Withdrawal Fees

ESTIMATED COST:

PRO/CONS:

- (+) Utilize existing facilities
- (+) Better accounting of Credits
- (-) Recovery outside area of impact

C. Off Reservation Recharge/Off-Reservation Recovery

1. AWBA to store water at a recharge facility located in close proximity to the Indian Community.
2. AWBA/CAP to recover credits and deliver water through the CAP to Indian Community in times of shortage to make up reductions in NIA water deliveries.

POTENTIAL WATER SUPPLIES:

- Excess CAP available to AWBA pursuant to Excess CAP Contract;
- Effluent;
- GRIC's unused CAP entitlement – (GRICs make this supply available to AWBA for this purpose and/or can also conduct their own supplemental recharge at same sight?).

POTENTIAL RECHARGE SITES:

- Many potential sites, but if using withdrawal fees there must be a tangible water management benefit to the AMA.

POTENTIAL FUNDING SOURCES:

- General Fund appropriation
- Phoenix or Pinal AMA Withdrawal Fees

ESTIMATED COST:

PRO/CONS:

- (+) Utilize existing facilities

D. Lease/Exchange

- Indian Community and one or more cities enter into an exchange agreement
- AWBA to store at a facility located within an AMA
- During time of shortage:
 - a) CAP to deliver water otherwise delivered pursuant to the lease agreements directly to the Indian Community.
 - b) City (Cities) is given access to firmed credits, either as pumped and delivered by CAWCD or by recovery from their own service area wells.

POTENTIAL WATER SUPPLIES:

- Excess CAP
- Effluent

POTENTIAL RECHARGE SITES:

- Many potential sites, but if using withdrawal fees there must be a tangible water management benefit to the AMA.

POTENTIAL FUNDING SOURCES:

- General Fund appropriation
- Phoenix AMA Withdrawal Fees

ESTIMATED COST:

PRO/CONS:

- (+) Utilize existing facilities
- (+) Continue to provide a direct supply to the Tribes

E. Recovery of Existing Stored Credits

- AWBA transfers existing long-term storage credits to the Indian Community to firm up NIA water reallocated to the Indian Community.
- Indian Community to recover credits at its discretion from its existing wells or wells that it develops on reservation in times of shortage to make up reductions in NIA water deliveries.

POTENTIAL WATER SUPPLIES:

- Existing CAP or effluent credits

POTENTIAL RECHARGE SITES:

- n/a

POTENTIAL FUNDING SOURCES:

- General Fund appropriation
- Pinal or Phoenix AMA Withdrawal Fees

ESTIMATED COST:

PRO/CONS:

- (+) Reduces cost for recharging water

F. Groundwater Transfers from outside the AMAs

- AWBA obtains groundwater from a groundwater basin outside of the AMAs for delivery through the CAP canal to the Indian Community in times of shortage to firm up the supply that has been shorted.

POTENTIAL WATER SUPPLIES:

POTENTIAL RECHARGE SITES:

- n/a

POTENTIAL FUNDING SOURCES:

- General Fund appropriation

ESTIMATED COST:

PRO/CONS:

- (-) no existing authority for AWBA to obtain water
- (-) competition with CAGR for supply

G. Non-AWBA Options

- Payment in-lieu of damages
- **Demand Reduction**
 - Water conservation
 - Minimizing waste of all water supplies
 - Maximizing efficiency in indoor and outdoor watering
 - Encouraging reuse of water supplies
 - Forbearance/Land Fallowing

H. Various Combinations of Potential Scenarios

FUNDING OPTIONS:

A. The Arizona Water Banking Authority currently has three primary funding sources available to meet its objectives:

1. State General Fund

a. Source:

- i. Monies appropriated from the State general fund by the Arizona Legislature.

b. Limitations:

- i. AWBA shall reserve a reasonable number of long-term storage credits for the benefit of municipal and industrial users of Colorado River water in this state that are outside of CAWCD's service area¹;
- ii. AWBA may distribute long-term storage credits to CAWCD to the extent necessary to meet the demands of its municipal and industrial subcontractors during times in which CAWCD's diversions from the Colorado River are disrupted by shortage on the Colorado River or by disruptions in operation of the Central Arizona Project – after the needs of the municipal and industrial users of Colorado River water in this state that are outside of CAWCD's service area have been met;
- iii. AWBA may distribute or extinguish long-term storage credits to implement to the settlement of water rights claims by Indian communities;
- iv. AWBA may distribute or extinguish long-term storage credits to meet the water management objectives of the active management areas;
- v. AWBA may exchange long-term storage credits for other long-term storage credits that are stored in a location that better enable the AWBA to meet its objectives².

c. Historic Use:

General Fund Appropriation (in \$)				
Collected		Phoenix AMA	Expended	
1997	2,695,000		1997	632,350
1998	2,000,000	1998	645,060	
1999	2,000,000	1999	777,079	
2000	2,000,000	2000	0	
2001	2,000,000	2001	0	
2002		2002		
		Total	2,054,489	
Total	10,695,000			
Expended	10,690,203			
Carryover	4,797			
		Pinal AMA	1997	2,062,650
			1998	1,354,940
			1999	1,222,921
			2000	360,870
			2001	451,800
			2002	
			Total	5,453,181
		Tucson AMA	1997	0
			1998	0
			1999	0
			2000	1,639,130
			2001	1,543,403
			2002	
		Total	3,182,533	

¹ By Resolution of the Authority, long-term storage credits developed through General Fund Appropriation shall first be used to meet the firming obligation for the on-River communities.

² These exchanges can be made for long-term storage credits stored in one AMA for long-term storage credits stored in a different AMA or can be made for long-term storage credits stored in one groundwater basin for long-term storage credits stored in a different groundwater basin.

2. A Valorem Tax

a. Source:

- i. A tax levied by CAWCD, not to exceed 4-cents per one hundred dollars of assessed valuation, on the taxable property in Maricopa, Pima, and Pinal counties, collected by those respective counties. Money collected via this assessment not deposited by CAWCD for the purpose of applying the money to the repayment of the construction costs of the Central Arizona Project including the interest owed on district repayment contracts or to the annual operation, maintenance and replacement cost of the CAP, as determined by Resolution of the CAWCD Board annually, are to be deposited in the Arizona Water Banking fund. (A.R.S. § 48-3715.03(A&B)).

b. Limitations:

- i. Pursuant to session laws, this tax is repealed effective January 2, 2017.
- ii. AWBA shall distribute long-term storage credits only for the benefit of the county in which the monies were collected;
- iii. AWBA shall distribute long-term storage credits to CAWCD, to the extent necessary, to meet the demands of CAWCD's municipal and industrial subcontractors during times in which CAWCD's diversions from the Colorado River have been or will be disrupted by shortages on the Colorado River or by disruptions in operation of the Central Arizona Project.
- iv. AWBA shall distribute long-term storage credits to municipal water providers experiencing surface water supply shortages not associated with the Central Arizona Project – only if the long-term storage credits accrued with these funds are in excess of the amount needed to meet the needs of CAWCD's municipal and industrial subcontractors during times in which CAWCD's diversions from the Colorado River are disrupted by shortage on the Colorado River or by disruptions in operation of the Central Arizona Project.

c. Historic Use:

4 ¢ Ad valorem Tax (in \$)				
	Year	Collected	Expended	Carryover
Phoenix AMA	1997	8,197,221	3,193,575	5,003,646
	1998	7,549,730	3,892,170	8,661,206
	1999	7,258,660	4,920,798	10,999,068
	2000	8,102,232	6,458,492	12,642,808
	2001	8,851,967	5,631,138	15,863,637
	2002			
	Total		39,959,810	24,096,173
Pinal AMA	1997	337,397	330,000	7397
	1998	241,940	240,000	1940
	1999	259,232	268,569	[9337]
	2000	273,702	270,066	3636
	2001	298,720	302,356	[3636]
	2002			
	Total		1,410,991	1,410,991
Tucson AMA	1997	1,653,653	172,252	1,481,401
	1998	1,412,610	637,103	775,507
	1999	1,937,909	1,181,608	756,301
	2000	1,590,900	507,008	1,083,892
	2001	1,540,692	990,273	550,419
	2002			
	Total		8,135,764	3,488,244

3. GW Withdrawal Fees

a. Source:

Section VII

- i. A groundwater withdrawal fee collected by ADWR from each person withdrawing groundwater in the Phoenix, Pinal and Tucson Active Management Areas, not to exceed \$5.00 per acre-foot. Of that fee, \$2.50 per acre-foot per year is to be deposited into the Arizona Water Banking fund³. (A.R.S. § 45-611(C)(3))

b. Limitations:

- i. Deposit of these funds into the Arizona Water Banking only through 2016.
- ii. AWBA shall distribute long-term storage credits only for the benefit of the active management area in which the money was collected;
- iii. AWBA may distribute or extinguish long-term storage credits to meet the water management objectives of the active management area in which the money was collected – as directed by ADWR;
- iv. AWBA may distribute or extinguish long-term storage credits to implement the settlement of water rights claims by Indian communities.

c. Historic Use:

		<i>Groundwater Withdrawal Fees (in \$)</i>			
		Year	Collected	Expended	Carryover
Phoenix AMA	1997		0	0	0
	1998		2,691,713	0	2,691,713
	1999		1,952,622	0	1,952,622
	2000		2,700,862	0	2,700,862
	2001		2,495,299	0	2,495,299
	2002				
	Total		9,840,496	0	9,840,496
Pinal AMA	1997		0	0	0
	1998		1,196,467	0	1,196,467
	1999		955,311	0	955,311
	2000		927,492	1,627,940	[700,448]
	2001		1,137,075	1,974,620	[837,545]
	2002				
	Total		4,216,345	3,602,560	613,785
Tucson AMA	1997		0	0	0
	1998		716,246	0	716,246
	1999		650,264	0	650,264
	2000		655,502	0	655,502
	2001		733,584	0	733,584
	2002				
	Total		2,755,596	0	2,755,596

³ Except for groundwater withdrawals within an irrigation district for an irrigation use – the amount transferred to the AWBA is 75-cents per acre-foot beginning in 1997 and cumulating an additional 25-cents per acre-foot each year thereafter, to a maximum of \$2.50 per acre-foot per year. The per acre-foot collection from the Pinal AMA for calendar year 2003 is \$2.25.

SUMMARY

What We Know

- Why and What the Firming Obligation means;
- What the Southside Replenishment Program requires;
- The range of modeling assumptions that can be used to project the volume of water needed to meet the firming obligation;
- Approximate range of the volume of water needed to meet the firming obligation;
- The variety of methods that can be used to meet the firming obligation;
- Current cost of excess CAP water supplies – and cost to recharge;
- Current funding sources available;
- Current statutory authorities; and
- Determine impacts to other AWBA functions.

RECOMMENDATION

Establish a Technical Advisory Committee

- Determine the modeling assumptions that are most appropriate to estimate the volume of water needed to meet the firming obligation;
- Determine the projections necessary to maintain or replenish the Southside Replenishment Bank;
- Develop options for meeting the firming obligations;
- Develop options to build the Southside Replenishment Bank;
- Determine cost components for each of the firming options;
- Determine cost components to develop the Southside Replenishment Bank;
- Develop criteria for ranking the options;
- Determine the funding sources appropriate to finance the options;
- Determine the necessary changes to statute to meet the obligations; and
- Determine potential impacts to other AWBA functions.

