



FINAL REPORT
of the
**JOINT INTERIM COMMITTEE ON
COLORADO RIVER WATER ISSUES**

Presented to:

*Speaker of the House Mark Killian
President of the Senate John Greene*

December 19, 1995



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JOINT INTERIM COMMITTEE ON COLORADO RIVER WATER ISSUES

BACKGROUND

The Speaker of the House of Representatives, Mark Killian, and the President of the Senate, John Greene established the Joint Interim Committee on Colorado River Water Issues by letter of appointment (See Attachment A - letter of appointment). The committee was charged with the following:

“Examine the possibilities of interstate water marketing, possible revenue sources for the recharge of water in Arizona, and the operations of the Central Arizona Water Conservation District (CAWCD), including financial liability, membership and other relevant issues.”

COMMITTEE MEMBERSHIP

The members appointed to the committee were:

Senator Jim Buster (co-chair)
Senator Carol Springer
Senator Stan Barnes
Senator Chris Cummiskey
Senator James Henderson Jr.

Representative Rusty Bowers (co-chair)
Representative Becky Jordan
Representative Joe Hart
Representative Ruben Ortega
Representative Benjamin Hanley

Mike Brophy, Esq., Ryley, Carlock and Applewhite
Karl Polen, Vice President of Finance, Robson Communities
Kathleen Ferris, Esq.
Rod Lewis, Gila River Indian Tribe
David Frank, Tohono O’odham Nation

David Frank notified the committee on December 12, 1995 that he was not authorized by the Tohono O’odham Nation to serve on the committee.

COMMITTEE MEETINGS

The committee met four times, on September 19, 1995, October 18, 1995, November 30, 1995 and December 13, 1995 (See Attachment B - meeting agendas). Copies of minutes and attachments are on file with the Chief Clerk of the House of Representatives and the Secretary of the Senate, with the exception of the minutes of the December 13, 1995 meeting which are Attachment C.

The committee heard presentations from:

- 1) Legislative Council on the history and background of Colorado River water issues;
- 2) The Arizona Department of Water Resources on a discussion paper for a water recharge and water banking program;
- 3) Rod Lewis, Joe Sparks and Gary Hanson on Indian issues relating to the Colorado River and the CAWCD;
- 4) The CAWCD; and
- 5) The City of Tucson on the recently passed proposition relating to the use of CAP water.

RECOMMENDATIONS

At the final meeting of the committee several recommendations were discussed and agreed to:

- Introduce legislation to establish a recharge and banking program utilizing the CAP, and recognizing the possibility for interstate and intrastate water marketing in the future. (See Attachment D - ADWR Discussion Paper).
- Add Indian representation to the CAWCD Board in the form and number to be determined in a manner that complies with the Voting Rights Act and the Arizona and U.S. Constitutions.
- Petition the federal government to buy down the costs of Indian CAP water.
- Continue the Joint Interim Committee on Colorado River Water Issues for an additional year.

NOTE: All materials submitted to the committee and tapes of the meetings are on file with the Office of the Chief Clerk in the Arizona House of Representatives or the Secretary of the State Senate's Office.



Arizona State Senate

Phoenix, Arizona

JOHN GREENE
PRESIDENT

October 4, 1995

The Honorable James J. Henderson, Jr.
Arizona State Senate
Phoenix, Arizona 85007

Dear Senator Henderson:

The Speaker and I have created a Joint Interim Committee on Colorado River Water Issues, and I am pleased to appoint you to serve as an additional member of this ad hoc committee. The Committee is in effect and has had one meeting to date. Enclosed are copies of minutes and written information provided at the first meeting. The Committee is repealed from and after December 31, 1995.

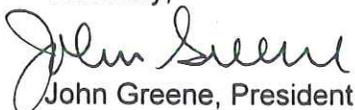
The Committee is charged with examining the possibilities of interstate water marketing, possible revenue sources for the recharge of water in Arizona, and the operations of the Central Arizona Water Conservation District (CAWCD), including financial liability and membership, as well as other relevant issues. The Committee shall submit its report on or before December 15, 1995.

The members of the Committee are:

Senator Jim Buster, Co-Chair	Representative Rusty Bowers, Co-Chair
Senator Carol Springer	Representative Becky Jordan
Senator Chris Cumiskey	Representative Ruben Ortega
Senator Stan Barnes	Representative Benjamin Hanley
Senator James J. Henderson, Jr.	Representative Joe Hart
Mr. Michael J. Brophy, Esq., Ryley, Carlock and Applewhite	
Mr. Karl Polen, Vice President of Finance, Robson Communities	
Ms. Kathleen Ferris, Esq.	
Mr. Rodney B. Lewis, Gila River Indian Tribe	
Mr. David Frank, Tohono O'odham Tribe	

Thank you for your willingness to serve on this Committee.

Sincerely,


John Greene, President

CC: Mark Killian, Speaker of the House of Representatives
Peter Goudinoff, Senate Minority Leader
Rita Pearson, Director, Department of Water Resources
Susan Anable, Senate NRAE Analyst





ATTACHMENT B
ARIZONA STATE LEGISLATURE

MEETING NOTICE

OPEN TO THE PUBLIC

JOINT INTERIM COMMITTEE ON COLORADO RIVER WATER ISSUES

DATE: Tuesday, September 19, 1995

TIME: 1:30 PM

PLACE: Senate Hearing Room 3

AGENDA

1. Committee Purpose Speaker of the House, Mark Killian
2. Staff Presentation on the History of the Colorado River in Arizona Legislative Staff
3. Relationship of 1980 Groundwater Management Act to the Development of the Central Arizona Project (CAP) Kathleen Ferris
4. Adjourn

MEMBERS:

Senator Carol Springer
Senator Chris Cumiskey
Representative Becky Jordan
Representative Ruben Ortega
Michael Brophy, Esq.
Karl Polen, Robson Communities
Kathleen Ferris, Esq.
Rodney B. Lewis, Gila River Indian Tribe
David Frank, Tohono O'odham Tribe

ARIZONA STATE LEGISLATURE

MEETING NOTICE

OPEN TO THE PUBLIC

JOINT INTERIM COMMITTEE ON COLORADO RIVER WATER ISSUES

DATE Wednesday, October 18, 1995

TIME: 1:30 p.m.

PLACE: Senate Hearing Room 1

AGENDA

1. Presentation of the Tribal perspective on Colorado River issues
 Tribal representative (s)
2. Overview and Status Report of Colorado River issues
 Department of Water Resources
3. Public Testimony
4. Committee Discussion
5. Adjourn

MEMBERS:

Senator Jim Buster, Co-Chair
Senator Carol Springer
Senator Chris Commiskey
Senator Stan Barnes
Senator James J. Henderson, Jr.
Michael Brophy, Esq.
Kathleen Ferris
David Frank, Tohono O'odham Tribe

Representative Rusty Bowers, Co-Chair
Representative Becky Jordan
Representative Ruben Ortega
Representative Benjamin Hanley
Representative Joe Hart
Karl Polen
Rodney B. Lewis, Gila River Indian Tribe

nlw
10/11/95

ARIZONA STATE LEGISLATURE

MEETING NOTICE

OPEN TO THE PUBLIC

JOINT INTERIM COMMITTEE ON COLORADO RIVER WATER ISSUES

DATE Thursday, November 30, 1995
TIME: 9:00 a.m.
PLACE: House Hearing Rooms #2 and #3

AGENDA

1. Presentation by the Central Arizona Water Conservation District and Committee Discussion
2. Discussion of Format for Final Meeting and Possible Committee Recommendations
3. Public Testimony (if time allows)
4. Adjourn

MEMBERS:

Senator Jim Buster, Co-Chair
Senator Carol Springer
Senator Chris Commiskey
Senator Stan Barnes
Senator James J. Henderson, Jr.
Michael Brophy, Esq.
Kathleen Ferris
David Frank, Tohono O'odham Tribe

Representative Rusty Bowers, Co-Chair
Representative Becky Jordan
Representative Ruben Ortega
Representative Benjamin Hanley
Representative Joe Hart
Karl Polen
Rodney B. Lewis, Gila River Indian Tribe

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11/16/95

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ARIZONA STATE LEGISLATURE

MEETING NOTICE

OPEN TO THE PUBLIC

JOINT INTERIM COMMITTEE ON COLORADO RIVER WATER ISSUES

DATE Wednesday, December 13, 1995

TIME: 3:00 p.m.

PLACE: Senate Hearing Room #1

AGENDA

1. Presentation by the City of Tucson
2. Presentation and discussion of possible committee recommendations
3. Public Testimony
4. Adoption of committee recommendations
5. Adjourn

MEMBERS:

Senator Jim Buster, Co-Chair
Senator Carol Springer
Senator Chris Cummiskey
Senator Stan Barnes
Senator James J. Henderson, Jr.
Michael Brophy, Esq.
Kathleen Ferris
David Frank, Tohono O'odham Tribe

Representative Rusty Bowers, Co-Chair
Representative Becky Jordan
Representative Ruben Ortega
Representative Benjamin Hanley
Representative Joe Hart
Karl Polen
Rodney B. Lewis, Gila River Indian Tribe

nlw
12/08/95

ATTACHMENT C

ARIZONA STATE LEGISLATURE
Forty-second Legislature - First Regular Session

**JOINT INTERIM COMMITTEE ON
COLORADO RIVER WATER ISSUES**

Minutes of Meeting
Wednesday, December 13, 1995
Senate Hearing Room 1 - 3:00 p.m.

(Tape 1, Side A)

The meeting was called to order at 3:08 p.m. by Cochairman Buster and attendance was noted by the secretary.

Members Present

Michael Brophy
Kathleen Ferris
Senator Cummiskey
Senator Henderson
Senator Springer
Senator Buster, Cochairman

Rodney B. Lewis
Representative Hanley
Representative Hart
Representative Jordan
Representative Bowers, Cochairman

Members Absent

David Frank
Senator Barnes

Karl Polen
Representative Ortega

Speakers Present

Sandy Price, Lobbyist, representing City of Tucson
Mayor George Miller, City of Tucson
Bruce Johnson, Chief Hydrologist, City of Tucson
Marvin Cohen, Attorney, representing City of Tucson
Don Isaacson, Attorney, representing Central Arizona Water Conservation District (CAWCD)
Herb Dishlip, Assistant Director, Arizona Department of Water Resources (ADWR)

Guest List (Attachment 1)

JOINT INTERIM COMMITTEE ON
COLORADO RIVER WATER ISSUES
DECEMBER 13, 1995

Sandy Price, Lobbyist, representing City of Tucson, related that the citizens of Tucson recently passed Proposition 200, the Water Consumer Protection Act, which strictly limits the City's options for using CAP water.

Mayor George Miller, City of Tucson, related the cause of Proposition 200, a proposal developed by Tucson Water for using Central Arizona Project (CAP) water over the next five years, terminal storage, and the economic impacts of the Proposition to the Central Arizona Water Conservation District (CAWCD) (Attachment 2).

He submitted that the concept of delivering CAP water in Arizona began about 50 years ago on the premise that it was needed for farming and mining. Due to unbelievable growth in Arizona, about 82 percent of the population currently live in cities rather than in areas which were previously predominantly mining and farming areas. Thus, the whole character of the concept has changed. He said the City has made arrangements with CAWCD to provide CAP water for farmers at half the price of what the City is paying so that it is utilized. However, the farmers nor the mines have to take the water because it costs them more than it costs them to pump the water themselves, and they have the right under the Water Act in Arizona to continue pumping. So there is a struggle going on to utilize the CAP water and have the mines and farmers take it. He said, at the present time, the City Water Department and Asarco Mines are experimenting to see if CAP water can be used for the mining process in which copper is separated from other materials in the ground.

He added that, at this point, due to Proposition 200, the City's hands are tied but it is seeking methods to use its CAP water. He submitted that the distribution problem with CAP water in Tucson has, unfortunately, become politicized. He indicated that people, in most cases, vote no on initiatives on which they are not informed. In the case of Proposition 200, the citizens believed that CAP water and water containing vast amounts of Trichloroethylene (TCE) are similar. He commented that the City is going to do the best it can to work its way out of the dilemma that has been created. He concluded by stating that, based on projections of population for the year 2030, it is estimated that there will be \$1.1 million people in Tucson. This means the City will need CAP water, all of its current wells, and reclaimed water for drinking.

Bruce Johnson, Chief Hydrologist, City of Tucson, related to Mr. Bowers that the opportunity for recharge in the local channels varies in terms of the filtration rates and the ability of the channels to accept the water. He said, in the Tucson Basin, the system flows from the southeast to the northwest, and bringing CAP water to points of recharge upstream and allowing it to move into the watercourses, would impact recharge throughout the Basin. He added that there are multiple landfills that could interact with the water that is recharged. He said there are locations where channel recharge can be effectively implemented, and a portion of the recharge programs that the City is pursuing address those opportunities. However, he added, it has to be reviewed very carefully in terms of potential impact. He said, in terms of the beneficiaries, the City of Tucson and other water users have wells throughout the Tucson Basin in various locations. Recharging water south of Tucson could effectively recharge well fields that the City operates. This could also happen

in areas in other parts of the Basin, i.e., other water utilities could benefit from the recharge as well as the City.

Cochairman Bowers asked how the salt in the Colorado River water would affect the aquifer.

Mr. Johnson replied that total dissolved solids in CAP water that are currently experienced at the treatment plant (at the end point of the delivery system to the aqueduct) ranges from 600-700 parts per million. In the Tucson Basin, it ranges from 300-450 parts per million so there will be that difference. He agreed that it is a condition associated with recharge programs, and water quality will change to that extent.

Ms. Jordan noted that Proposition 200 requires that CAP water must be equal or better in salinity to water in the Avra Valley. She stated that in Glendale about 40 percent of CAP water is blended with groundwater, and asked if there is another water supply that could be blended with the CAP water in Tucson to achieve the Avra Valley standard.

Mr. Johnson answered that the water specified in the initiative is the highest quality groundwater within Tucson's service area. He said the groundwater does vary in quality but the water in the Avra Valley is the lowest in dissolved solids. He stated that the City is actively pursuing the construction and acquisition of an enhanced treatment plant that would produce water of the quality specified in the initiative using reverse osmosis technology. He explained that the City is sending statements of interest to firms throughout the world soliciting their interest in construction and design of such a plant to treat Tucson's entire allocation for direct delivery for potable purposes. He noted that there has been interest expressed from all of the major firms in the United States as well as firms in Britain and France. He said the plant would be the largest of its kind in the world. He reiterated the fact that direct delivery presupposes and demands that terminal storage be available for backup to the delivery system.

Marvin Cohen, Attorney, representing City of Tucson, advised the Committee of a problem relating to the Santa Cruz River. He said the U.S. Fish and Wildlife Service has raised questions relating to the Endangered Species Act (ESA) with respect to a government entity using the water for recharge and the possibility that pernicious nonnative fish will go back upstream from Tucson and kill off the native fish. He explained that, apparently, there was one 30 or 35-day period in the past 50 years in which the Santa Cruz River flowed constantly, and if that occurs again, this could happen. He added that the City is currently speaking on a regular basis with the Tohono O'odham nation and others who have a strong interest in having a running river through the reservation. The City is concerned about Fish and Wildlife's assertion of jurisdiction over nonfederal activities. He indicated that the City may need help from the Legislature in the future.

Senator Springer commended the City of Tucson representatives for their attempts to address the Proposition. She said a good effort was made to defeat such an irrational proposal. Cochairman Buster agreed with Senator Springer's comment. He submitted that it is important that Arizona's CAP allocation be accessed and used as much as possible.

Referring to a memo regarding Proposed Committee Recommendations (Attachment 3), Cochairman Buster remarked that the consensus of the Committee is that Recommendation #1 be adopted.

Mr. Brophy conveyed the fact that the Arizona Department of Water Resources' (ADWR) discussion paper included a banking proposal. He suggested that ADWR be encouraged to submit legislation on that issue. He added that ADWR should also be encouraged to include intrastate water banking as well as interstate banking because it will be very important for Bullhead City, Lake Havasu City, and perhaps other Arizona cities along the river.

Cochairman Buster agreed that language should be included in the recommendation indicating the Committee's interest in water banking.

Senator Springer stressed the fact that it is important, with regard to intrastate issues, that Arizona does everything possible to avoid a situation in which water is being exported to other states. She contended that Arizona water should stay in Arizona.

Referring to Recommendation #2, Senator Henderson remarked that since there are three counties, there should be three members. He asked if, legally, it could be a voting member/s.

Cochairman Buster indicated that the number of members could remain blank leaving an indication of some support and representation of an exofficio tribal member, and maybe the number of members could be discussed during the next Session.

Don Isaacson, Attorney, representing Central Arizona Water Conservation District (CAWCD), explained that CAWCD had the opportunity to review the one-man, one-vote issue in 1989 as it applied to the District. At that time, the District was facing the possibility of the population of Pima County going over 700,000 and the statutory trip wire of an additional ten members for Pima County being added, depending on the 1990 decennial census. Research conducted by the District indicated that the basic principal of a one-man one-vote, which dictates basically an open panel with everyone being able to vote, applies to the CAWCD and prevents allocation of a specific block of votes for one group or another. Historically, he said, in settings such as irrigation districts where bonds (versus taxes) and large landowners are involved, there have been situations in which the courts have allowed a designated set group of voters in which the general population is not voting. However, those characteristics do not apply to CAWCD; therefore; in no area could a block of votes be set aside based on either the percentage of population culturally or by water use.

Senator Henderson contended that an Indian will not be elected to the Board so it needs to be restructured because the Indian tribes have an interest. He expressed a hope that CAWCD will work with the tribes on this issue.

Cochairman Buster read suggested language that Indian representation be added to the CAWCD's Board in form and number to be determined in a manner that complies with the Voting Rights Act and the Arizona and United States Constitutions.

Mr. Lewis expressed his support for Cochairman Buster's recommended language. He said the reason this is an important item is because 48 percent of the water will be delivered to the Indian tribes, and a tremendous amount of the cost of the CAP is justified based on the Leavitt Act. He said he would like to see members added to the Board or maybe even a separate board created to work with the CAWCD Board to insure that the interests of the tribes are included.

Mr. Hanley submitted that there should be at least three members on the CAWCD Board from the Indian community.

Cochairman Buster noted that all Members agree that there should be some tribal input on the CAWCD Board. He indicated that the wording he suggested previously should be used.

Referring to Recommendation #3, Cochairman Buster noted that it is the consensus of the Committee that it be adopted.

Cochairman Bowers asked if it would be appropriate to petition the federal government to buy down the associated costs of Indian water usage as the property taxes paid by nonIndian users has been used to remediate those costs.

Cochairman Buster and Senator Henderson agreed that Cochairman Bower's suggestion should be included in the Committee's recommendations.

Herb Dishlip, Assistant Director, Arizona Department of Water Resources (ADWR), provided an update on activities that have occurred with the states of California and Nevada. He noted that ADWR met with them in San Diego in September 1995 to explore options for additional negotiations. California prepared a brief on their position looking forward to opportunities for a regional solution. On November 7, 1995, ADWR prepared a paper giving its perspective on four issues that could be negotiated in the regional solution but no agreements were made. ADWR did not agree to top water banks on the river system and party-to-party transfers.

He noted that ADWR discovered before the next meeting that the Metropolitan Water District of Southern California and the Southern Nevada Water Authority had been privately negotiating a memorandum of understanding to participate jointly in the lining of the All-American Canal which is part of a San Luis Rey Indian water rights settlement. In that agreement, they called for the formation of a top water bank, one of the provisions ADWR believes is a violation of the law of the river. They intend to forward the recommendation to the U.S. Department of Interior Secretary Bruce Babbitt as the implementing tool for the settlement. As a result, Governor Symington sent letters of objection to the Governors of California and Nevada, and a strong letter of objection to Secretary Babbitt indicating that he would take any action necessary to protect Arizona's rights to the law of the river.

On November 20, 1995, another tri-state meeting was held in Burbank, California to discuss Arizona's paper. California continued to suggest that top water bank provisions are needed but

agreed to give Arizona the opportunity to negotiate a change to the law of the river with regard to Arizona's low priority in times of shortage. ADWR indicated that, depending on how the change would be implemented, ADWR would be interested in negotiating that kind of an arrangement.

Shortly thereafter, Metropolitan Water District sent Rita Pearson, Director, ADWR, a letter in reaction to the Governor's letter and asked again if ADWR is interested in negotiating a shortage sharing arrangement. Ms. Pearson responded that ADWR's perspective is dependent on Arizona's low priority position, i.e., if it can be changed, ADWR's position would probably change. Mr. Dishlip contended that this is a change in the law of the river which is specifically spelled out by Congress. California is offering a proposal where the change in the law of the river does not have to be made by Congress. He noted that ADWR's longstanding position has been that it would not support a change in the law of the river but the context of what is being offered by California makes that somewhat appealing. He added that ADWR believes the creation of a top water bank is also a change in the law of the river but California disputes that.

Mr. Dishlip said last week Secretary Babbitt spoke to the Colorado River Water Users Association. He addressed the issue of the Metropolitan Southern Nevada Water Authority agreement. He stated that he has not seen the agreement so he cannot dispute it; however he indicated that he will endorse it. Mr. Dishlip said this causes a great deal of concern because it implies that Secretary Babbitt has not listened to Arizona's concern as to how the agreement will violate the law of the river and how it will damage or impact Arizona. He said the issue may have to be taken to court to protect Arizona's interest.

Mr. Dishlip related to Senator Springer that he and Ms. Pearson were recently in Washington, D.C. and talked to the staff of the Congressional delegation, Senator Kyle and Representative Kolbe. This was before Secretary Babbitt indicated his position. He said the Congressional delegation was fully informed of Arizona's position and the agreement, and they agree that any change of the law of the river should go through Congress or the courts.

Without objection, the meeting adjourned at 3:57 p.m.


Linda Taylor, Committee Secretary

(Attachments and tape are on file in the Office of the Chief Clerk.)

DISCUSSION PAPER

**A PROPOSAL TO INCREASE THE USE OF COLORADO RIVER WATER IN THE
STATE OF ARIZONA**

Prepared by the Arizona Department of Water Resources

October 1995

INTRODUCTION

The people of Arizona are reminded daily by their desert environment of the importance of water. Water sustains the Sonoran desert, and without that water, life in the desert quickly fades. Perhaps it is because of this daily reminder that Arizona leaders have always looked ahead to potential challenges in managing the state's water resources and have always taken steps to meet those challenges before the challenges became crises.

Almost since statehood, our leaders have been looking ahead toward these challenges. In the 1920's and 1930's, while our economy was growing on our generous supply of groundwater, the state's leaders were fighting for a secure supply of water from the Colorado River, seeing the day in the future when those finite groundwater resources would need to be replaced and supplemented. As early as the 1940's, the state was exploring ways to move our supply of Colorado River water to the burgeoning development in the central part of the state. Even after securing our rights to the Colorado River before the United States Supreme Court in *Arizona v. California* in 1963 and winning federal authorization of the Central Arizona Project in 1968, the state's leaders recognized the need to use our water resources, particularly groundwater, wisely and enacted the Groundwater Management Act in 1980.

All of these efforts have contributed to the agricultural, industrial and municipal oases that now fill our desert. The economic health of our central desert lands have contributed to a sound economy throughout Arizona. Neighboring states envy our secure water supplies and the physical and regulatory systems that ensure that those supplies are put to good use

Arizona cannot, however, simply rest upon its accomplishments. We must continue our history of progressive water management. The same kind of forward-thinking used by leaders in our earlier days must be used now to ensure that future generations in our state can enjoy the same security in their water supplies that we do.

A PROBLEM AND AN OPPORTUNITY

Although Arizona won the right to 2.8 million acre-feet of water annually from the mainstream of the Colorado river in *Arizona v. California*, part of that victory was surrendered in 1968 when, in

order to secure authorization of the Central Arizona Project (CAP) by Congress, Arizona was required to agree that any use of water diverted through the CAP would be of a lower priority in times of shortage than most water uses in California and Nevada. In other words, in times of shortage on the Colorado River, diversions of water into central Arizona will be reduced while most diversions into California and Nevada will be unaffected until the CAP is dry.

Arizona water managers have been planning around the CAP's low priority since 1968. It is one of the major reasons the state encourages its water users to use renewable water supplies, like Salt River water and Colorado River water now, and to save our non-renewable supply of groundwater for times of shortages of the other supplies.

An opportunity exists now and for a limited time into the future, however, to take a large additional step toward safeguarding Arizona water users against eventual shortages of CAP water. That opportunity lies in Arizona's current under-utilization of both CAP capacity and the state's share of the Colorado River.

Currently, most of our unused Colorado River water is legally used by California, but that water could instead be brought into central Arizona through the CAP. It could then be stored for future use during times of CAP shortages and be used to replace existing groundwater demands, further preserving our groundwater supplies.

A legislative program that would bring a substantial amount of our currently unused Colorado River water into the state now for future use would greatly mitigate the challenge of CAP's low priority and would help secure Arizona's water supply for future generations.

THE PROPOSED SOLUTION

- Program Description

The Arizona Legislature would enact in 1996 a program that will allow the state to increase diversions and use of Colorado River water through the CAP. The program would provide the mechanisms and funding necessary to store currently unused Colorado River water for future use during times of CAP water shortages and to replace some existing uses of groundwater by central Arizona agricultural entities with CAP water that would otherwise be unused and unstored. Funding would also be made available for Colorado River water users outside of the CAP service area, including the rapidly growing communities in Mohave, La Paz, and Yuma Counties.

The program might also provide a mechanism by which California and Nevada could store additional amounts of Arizona's unused Colorado River water in central Arizona to be exchanged in the future by those states for limited amounts of Colorado River water diverted out of the mainstream for use by those states in addition to their established apportionments. This part of the program will be referred to as the "Arizona State Water Bank" and will be more fully explained below.

- Program Goals
 - ▶ Beginning in 1997 and continuing for the following twenty years, to increase the diversion and uses of Colorado River water on a statewide basis, above and beyond currently expected levels, through artificial recharge and increased direct use. The program will benefit the state by enhancing the long term yield from the Colorado River in Arizona and by helping to meet the goals of the Groundwater Code.
 - ▶ To initiate an Arizona State Water Bank that could bring additional unused Colorado River supplies into the state and further utilize the CAP while, at the same time, temporarily assisting neighboring states in meeting their water needs without adversely impacting Arizona.

ESTIMATES OF UNUSED SUPPLY

- Historic Diversions

Figure 1 depicts the data developed by the Bureau of Reclamation which accounts for consumptive uses in Arizona resulting from mainstem Colorado River diversions for the years 1985-1994. These figures indicate that Arizona's use against its 2.8 million acre foot entitlement has been as high as 2,260,000 acre feet in 1990. However, the Arizona Department of Water Resources (ADWR) disputes the accounting method used by the Bureau and feels that the data may be as much as 200,000 acre feet too high. Therefore, Arizona's unused apportionment has at a minimum been somewhere between 540,000 to 740,000 acre feet.

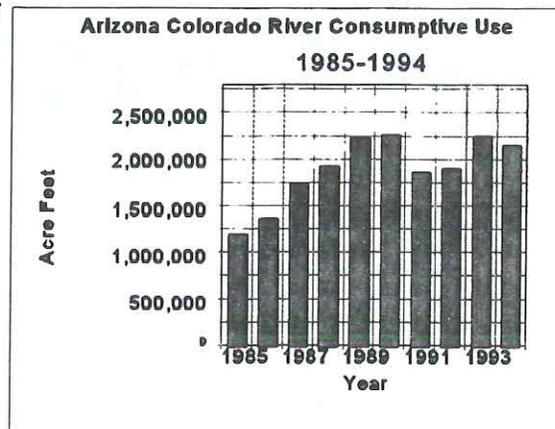


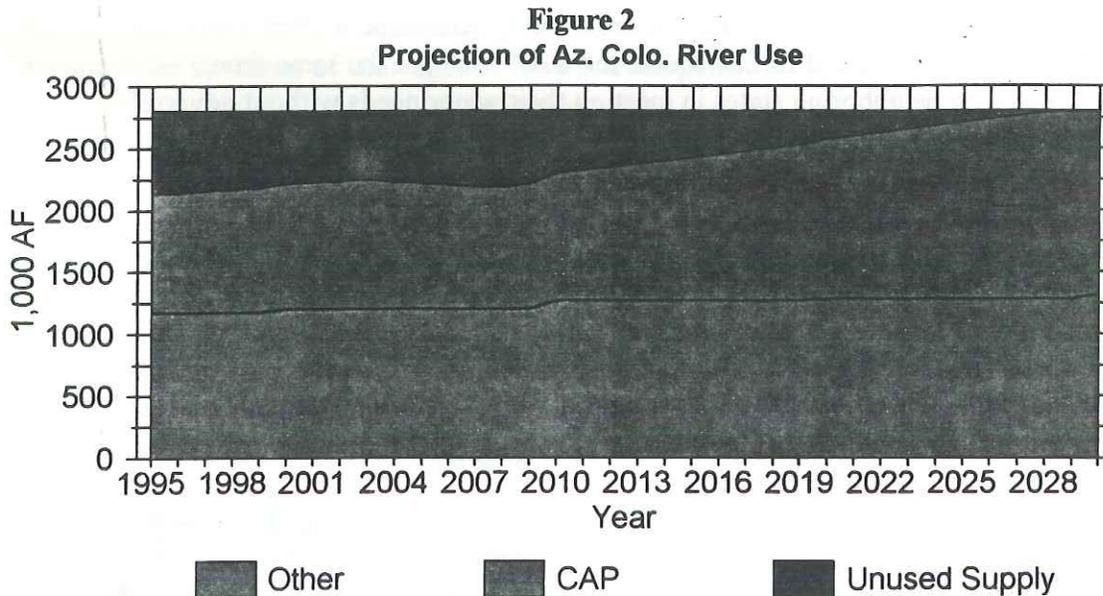
Figure 1

- Projected Diversions

ADWR regularly prepares projections of future diversions and use of Colorado River water for planning purposes. The assumptions used in preparation of the estimates are based on the best currently available information and judgement, but are by no means certain. Variable factors include the increase or decrease in irrigated acreage based on cropping patterns and market conditions, construction schedules for municipal treatment plants and distribution works, construction schedules for Indian irrigation distribution systems, and the effects of target pricing strategies developed by the Central Arizona Water Conservation District (CAWCD) for sale of CAP water. The graph shown in Figure 2 below displays the gradual build up in demand for Colorado River water until the full entitlement is realized in the year 2029. The amount of unused water is initially about 650,000 acre feet but gradually diminishes. The accumulated volume of

water available, but left unused, is approximately 13.95 million acre feet. For the twenty year period 1997-2016 that this proposal addresses, the amount of unused water is estimated at 10.7 million acre feet.

Based on this preliminary analysis it appears reasonable to develop a program which would seek to increase Colorado River utilization by between 250,000 and 400,000 acre feet per year.



POTENTIAL USES

- Increased Artificial Groundwater Recharge

Arizona's statutory system for underground storage and recovery will facilitate increased diversions and deliveries of Colorado River water. Water which is in excess of direct delivery requirements may be purchased and stored underground for later withdrawal. Credits may be earned for such storage and those credits are generally marketable to other water users. Recharge and recovery on an annual basis is also allowed as an alternative to the construction of treatment plants and pipeline facilities.

The availability of adequate recharge facilities is particularly important to the ability to store excess water over the near term. One large storage site, the Granite Reef Underground Storage Project or GRUSP, has been constructed by the Salt River Project and Phoenix AMA municipalities. Other project facilities of a similar nature and capacity have been proposed in the Phoenix, Pinal, and Tucson AMA's and in useful areas to the west of Phoenix along the CAP route. A partial list of those sites and their potential annual storage capacities are shown in Table A.

The Legislature has previously enacted laws which authorized the levying of a four cent property tax to be used by the CAWCD to construct and operate demonstration recharge projects in Maricopa and Pima Counties. The June 1995 balance in the State Demonstration Recharge Project Fund was approximately \$15,790,000 for use in Maricopa County and \$4,306,000 for use in Pima County. It is anticipated that these funds and additional funds collected under this authorization will be spent to increase the number of recharge facilities over the next few years, however, to date, no new recharge facilities have been constructed. Since the facilities will be constructed with money authorized by the Legislature, it would be reasonable to make these facilities available for use by CAWCD and the state on behalf of Arizona water users in the furtherance of the proposed program without requiring any charges for recovery of capital investment costs.

In addition to the traditional underground storage facilities described above, state law authorizes equivalent recharge through indirect means by recognizing groundwater savings facilities. A groundwater savings facility is basically an authorized exchange of surplus surface water for an equivalent amount of groundwater which would have been pumped and used had the substitute water not been made available. The person or entity who provided the exchange or "in lieu" water source is recognized through ADWR's administrative accounting procedures as having earned or banked a water credit which is no different than the credits earned through direct underground storage. Table B lists existing and potential groundwater savings facilities which could be used to bank additional excess Colorado River water.

Table A
Permitted and Potential Underground Storage Facilities

Facility Description * = permitted facilities	Location	Approximate Capacity
Avondale Pilot*	Phoenix AMA	5,000
Granite Reef*	Phoenix AMA	200,000
Mesa Spook Hill*	Phoenix AMA	2,300
Scottsdale Water Campus Pilot*	Phoenix AMA	5,000
Peoria Skunk Creek	Phoenix AMA	30,000
Hassayampa CAP	Phoenix AMA	100,000
SRP/CAP Filtration	Phoenix AMA	10,000
Citizens Utilities	Phoenix AMA	15,000
Auga Fria near CAP aqueduct	Phoenix AMA	90,000
Southwest Facility	Phoenix AMA	20,000
Scottsdale Water Campus/ CAP	Phoenix AMA	22,800
West Maricopa Combine	Phoenix AMA	14,000
McMicken Dam	Phoenix AMA	7,500

Queen Creek Wash	Phoenix AMA	10,000
Picacho Reservoir	Pinal AMA	5,000
Tucson Injection Pilot*	Tucson AMA	20,000
Pima Mine Road	Tucson AMA	18,000
Avra Valley	Tucson AMA	30,000
Canada Del Oro	Tucson AMA	30,000
Brawley Wash at Three Points	Tucson AMA	40,000
Santa Cruz River In Channel	Tucson AMA	45,000
APS Ranch Project	La Paz County	100,000
Centennial Wash	Harquahala Valley	50,000
Total		869,600

Table B
Permitted and Potential Groundwater Savings Facilities

Facility Description * = permitted facilities	Location	Approximate Capacity
Tonopah IDD*	Phoenix AMA	15,000
Queen Creek IDD*	Phoenix AMA	28,000
Maricopa Water Dist.	Phoenix AMA	30,000
New Magma IDD*	Phoenix AMA	70,000
Salt River Project	Phoenix AMA	100,000
San Tan ID*	Phoenix AMA	5,000
Roosevelt WCD*	Phoenix AMA	100,000
Chandler Heights Citrus ID*	Phoenix AMA	3,000
Maricopa Stanfield IDD*	Pinal AMA	120,000
Central Arizona IDD*	Pinal AMA	110,000
Hohokam IDD *	Pinal AMA	40,000
Cortaro Marana IDD*	Tucson AMA	10,000
BKW Farms*	Tucson AMA	8,800
Avra Valley IDD	Tucson AMA	20,000
Farmers Investment Co.	Tucson AMA	20,000
Harquahala Valley IDD	Harquahala INA	5,000
Total		684,800

- Increased Direct Use

The direct use of CAP water has been constrained for a variety of reasons. The most widely documented problem has been the inability of agricultural water users to profitably use CAP water due to its high cost when crop commodity prices are generally low. CAWCD has addressed a portion of this problem by adopting a ten year program to sell agricultural water at discounted prices. Other constraints include limitations of the federal Reclamation Reform Act and the slow progress in constructing lined Indian irrigation distribution systems by the federal government.

The primary opportunities for increased direct use lie with water users who currently have turnout capability on the CAP aqueduct. Increased direct use can be used to offset residual groundwater pumping which as shown in Table C on page 10 remained at about 1.4 million acre feet in 1994 for the Phoenix, Pinal, and Tucson AMAs. In addition to irrigation district deliveries, the Gila River Indian Community indicates they could increase direct use by about 120,000 acre feet if they could use the unlined distribution system of the San Carlos Project. In order to avoid increasing problems with summer time canal capacity limitations, it may be advisable to limit any program related incentive pricing for direct use to off peak months.

- Advanced Storage of CAP to Protect Against Future Shortages

During the negotiation process leading to the authorization of the Central Arizona Project by Congress, Arizona agreed that the CAP would take a lower priority in times of Colorado River shortages than existing users in Arizona, California, and Nevada. This lower priority means that drought conditions will affect the CAP users most directly. While no shortage criteria has been formally adopted by the Bureau of Reclamation, planning studies have been conducted. ADWR has recently been advocating an operating regime which would attempt to provide the CAP and similar priority users at least one million acre feet in times of shortage. This criteria would result in more frequent shortage declarations, but the cut backs would not be as severe.

The opportunity exists to use the current unused apportionment to bank water underground to protect against future shortages. Additional water could be imported and recharged, and then withdrawn for distribution to customers when drought conditions exist. This prior banking is an opportunity to "firm up" CAP supplies to increase the Project's reliability. Based on an assumption that a shortage condition would deliver one million acre feet to CAP and similar priority users, ADWR estimates that over a 100 year planning horizon, the potential for shortage declaration exists about 35% of the years. However, most of the probability of shortage declaration exists in the second fifty years of the 100 year period. This means that shortages in the second fifty years are likely to be frequent. It is not feasible to attempt to firm up the entire 1.5 million acre feet of normal year CAP diversions. However, highest priority municipal and industrial (M&I) supplies are currently vulnerable to about a 20% maximum cut back, or about 130,000 acre feet assuming an M&I supply of 640,000 acre feet. It would take about 4.5 million acre feet of advanced storage to provide the water supply to reduce this potential cut back. Reducing the risk of shortage to a probability of 10% would require about 3.25 million acre

feet. Banking these volumes of water over the twenty year period in this program proposal would take between about 165,000 to 225,000 acre feet per year.

- **Arizona State Water Bank**

The Arizona State Water Bank is a proposed mechanism to store Colorado River water in Arizona which is paid for by the states of California or Nevada. The Bank, if created, would contract with similar authorities in the other states to import water that would be either unused Lower Basin states' apportionment or other surplus supply that Arizona has chosen not to divert and use for its own benefit. Out-of-state participants in the Arizona Water Bank would bear the full cost of the program, including the cost to construct the storage facilities, as well as any capital, OM&R and energy costs associated with the use of the CAP aqueduct.

The Bank would store the water in either underground storage facilities or groundwater savings facilities. At the time California or Nevada wished to use the stored water, the Bank would recover the supply and either have the water put back into the CAP aqueduct or would have the water delivered directly to a CAP water user. The recovery of the water allows Arizona to maintain full deliveries to meet its needs, but also allows an equivalent amount of Colorado River water to be diverted to the other state. The exchange technique allows the other state to take advantage of storing water in the near term, when it is unused, and recovering the water in future years when the river supply will likely be fully utilized. The storage and recovery through the State Water Bank can be accomplished without a change to the current Law of the River.

The Arizona Department of Water Resources has been discussing the concept of a water bank with the other two states for the past year. Both California and Nevada have expressed an interest in such a bank, but no commitments have been made to purchase and store water on a long term basis. The Legislature would need to provide enabling legislation to create the Bank and to define its authority.

ESTIMATED COSTS

There are a number of cost factors involved in the increased use of Colorado River water. As described previously, there must be adequate availability of either underground storage facilities, groundwater savings facilities, or the infrastructure for direct use. In addition, there are costs associated with the diversion and conveyance of water from the River to the place of storage or use. For the most part, these conveyance costs are associated with the operation and maintenance and the capital repayment of the Central Arizona Project. It has been well publicized that the overall cost of CAP water has been an impediment to its direct use by agriculture. Categories of costs are described briefly below.

- ▶ **Energy cost**

Energy to pump water from the Colorado River to central Arizona is primarily obtained from the

Navajo Generating Station. Energy costs are averaged across the CAP service area in what is commonly called "postage stamp" pricing. CAWCD planning studies show a gradual increase in energy costs over the 20 year planning horizon. The 1997 cost estimate is \$30.60 per acre foot which increases to \$44.58 per acre foot in the year 2016.

► Fixed Operation, Maintenance, and Replacement Cost (OM&R)

Fixed OM&R costs are associated with those expenses which are made to operate the CAP system and are generally independent of the amount of water actually delivered. Since these costs are fixed, the cost per acre foot equivalent is dependent upon the volume of water delivered. Increasing the amount of Colorado River water diverted to the CAP would have the benefit of lowering the cost per acre foot charges for fixed OM&R. CAWCD planning studies estimate fixed OM&R expenses at \$44,200,000 for 1997, increasing to \$93,120,000 by 2016. The equivalent cost per acre foot, assuming a base case where CAP diversions are not increased as a result of this program proposal, are \$45.95 increasing to \$81.69.

► Capital Repayment costs

The master repayment contract between the United States and CAWCD requires reimbursable costs to be paid over a fifty year period. Costs allocated to M&I and power are repaid with interest while costs allocated to agriculture are repaid without interest. The amount of money to be repaid is currently being disputed and litigated. For planning purposes, CAWCD has previously indicated that M&I capital repayment in 1997 would be about \$39 per acre foot, but that figure would increase to \$54 per acre foot by the year 2000 and then would remain at that level. M&I capital repayment is on "take or pay" terms with the subcontract annual allocation used for the payment calculation. Capital repayment costs associated with agricultural water is limited by federal Reclamation law based on the "ability to pay" concept. Estimated agricultural capital repayment is \$2.00 per acre foot delivered.

► Recharge facilities and recharge OM&R

Underground storage facilities must be constructed and then operated and maintained. Costs for construction are very site specific, and are dependent on the type of structures and monitoring used, conveyance facilities from the CAP aqueduct to the site, land lease or purchase costs, and number of acres of basins needed. Operation and maintenance costs are associated with daily control of water inflow and rotation of spreading basins, maintenance of basins to keep infiltration rates optimum, monitoring of water mounding and movement, and reporting requirements for ADWR purposes. Groundwater savings facilities generally do not require additional structural works, although a portion of the costs of irrigation distribution systems and irrigation district OM&R could be allocated as recharge costs.

While it is difficult to accurately determine construction costs, a rough estimate was prepared for this discussion paper. Assuming shallow spreading basins would be constructed at a variety of

sites, construction costs per acre foot would vary from about \$5.50 per acre foot to about \$6.60 per acre foot. OM&R costs are estimated to increase with time from about \$2.50 per acre foot initially to \$4.33 per acre foot by 2016.

► Recovery facilities and recovery OM&R

Water stored underground for future use must be recovered by wells. Much of this underground storage could be recovered through existing wells by CAP contractors. However, if new wells are needed, water well construction costs are site specific, but a large production well could cost between \$0.5 million to \$1.3 million. Costs associated with recovery OM&R include well maintenance and repair, and pumping energy. No attempt has been made to estimate recovery facility costs or recovery OM&R at this time. Presumably, CAP power resources would be available for recovery of water stored for project drought protection purposes.

REVENUE SOURCES AND REQUIREMENTS

● AMA Withdrawal fees

ARS §45-611 establishes three types of withdrawal fees to be levied and collected on groundwater pumping within AMAs. ARS§ 45-814 establishes a fee for withdrawal of water which has been stored underground. It is proposed that funds obtained from these fees be used in the proposed program to purchase or provide incentive to increase the use of Colorado River water. Funds collected within an AMA would only be used within that same AMA.

The amount of money obtained from withdrawal fees is entirely dependent upon the volume of groundwater and recovered stored water withdrawn in any year. Table C lists the 1984-1994 reported withdrawal volumes for the Phoenix, Pinal, and Tucson AMAs. Since it is highly unlikely that water users in the Prescott or Santa Cruz AMAs could benefit from the proposed program, collection of fees from those AMAs has not been included in this discussion.

Table C
Groundwater Withdrawals in Phoenix, Pinal, and Tucson AMAs

	Phoenix AMA	Pinal AMA	Tucson AMA	Total
1985	937,380	590,359	259,723	1,787,462
1986	904,010	480,134	248,586	1,632,730
1987	838,595	536,092	255,532	1,630,219
1988	895,432	500,746	262,071	1,658,249
1989	991,918	498,217	280,095	1,770,230
1990	1,152,374	393,472	245,038	1,790,884
1991	878,803	426,027	258,051	1,562,881

1992	581,415	251,671	246,601	1,079,687
1993	679,477	213,554	218,498	1,111,529
1994	884,360	316,500	262,753	1,463,613
High	1,152,374	590,359	280,095	1,790,884
Low	581,415	213,554	218,498	1,079,884
Average	874,376	420,677	253,695	1,548,748

► **Augmentation and Conservation Assistance Funds**

The Groundwater Code allows up to \$2.00 per acre foot to be levied and collected for the purposes of augmenting the water supply of the AMA and to assist water users in conservation programs. Expenditure of the funds have been through grants to applicants and to a limited extent for use within ADWR. The AMA Management Plans specify the criteria used in judging grant applications. In the Pinal AMA one-half of unencumbered funds collected from this fee are transferred to the Pinal AMA Augmentation Authority. The fee assessment for calendar year 1995 is \$1.75 per acre feet in the Phoenix AMA, \$0.50 per acre foot in the Pinal AMA, and \$2.00 per acre foot in the Tucson AMA. In addition to the fees collected annually, each AMA has developed a balance from previous year collections. The largest current balance is in the Phoenix AMA where over \$2,000,000 has been carried over.

Use of the Augmentation Funds would be a logical component of a program to increase Colorado River use. Funds would only be spent in the same AMA where they were generated. While it is discretionary how to divide the funds between augmentation and conservation assistance, for the purpose of this discussion it is proposed that all uncommitted balances and 75% of new revenues be dedicated to the Colorado River use program.

► **Administration and Enforcement Fees**

Up to \$1.00 per acre foot may be levied and collected on groundwater withdrawals and recovery of water stored underground. This money is deposited in the general fund and was intended to be used to offset the administrative expenses of ADWR. It is proposed that instead of depositing this money in the general fund, the money collected be used for the proposed program.

► **Purchase and Retirement of Grandfathered Rights Fees**

Up to \$2.00 per acre foot may be levied and collected on groundwater withdrawals after the year 2006 for the purchase and retirement of grandfathered rights. It is proposed that these fees also should be made available for the Colorado River use program. To enhance revenues in the early years of the program, the 2006 implementation limit could be eliminated. Since these fees are not currently being collected, groundwater users would see an immediate increase in their withdrawal fees if the fees were levied on an accelerated basis.

► Summary of Withdrawal Fee Revenue Potential

Table D summarizes the potential revenue which could be generated annual from withdrawal fees based on historic average groundwater withdrawals and on low year groundwater withdrawals. The totals reflect a 20 year collection period at maximum rates with the retirement fee levied starting in 2006.

Table D
Potential Revenue from Groundwater Withdrawal Fees

	Phoenix AMA	Pinal AMA	Tucson AMA
Average Pumping Condition			
Augmentation	\$1,312,000	\$316,000	\$381,000
Administration	\$874,000	\$421,000	\$254,000
Retirement	\$1,749,000	\$841,000	\$507,000
Yearly Total	\$3,935,000	\$1,578,000	\$1,142,000
20 Year Total	\$61,210,000	\$23,150,000	\$17,770,000
Low Pumping Condition			
Augmentation	\$872,000	\$160,000	\$328,000
Administration	\$581,000	\$214,000	\$218,000
Retirement	\$1,163,000	\$427,000	\$437,000
Yearly Total	\$2,616,000	\$801,000	\$983,000
20 Year Total	\$40,690,000	\$11,750,000	\$15,290,000

● CAWCD Four Cent Water Storage Ad Valorem Tax

In 1994, the Legislature authorized the CAWCD to levy an ad valorem tax of up to four cents per one hundred dollars of assessed valuation to be used for recharging excess Colorado River water. The funds are to be separated into funds for each county where they were raised and spent appropriately in that county. An option was provided which allows the CAWCD board to use the tax revenue for CAP repayment if necessary. The tax authority is scheduled to expire in 2001.

As part of the program to increase Colorado River use, the four cent tax authority should be extended through 2016. Recharged water would be stored as needed to provide protection against municipal and industrial water shortages in years when the Colorado River would yield less than 7.5 million acre feet to the lower basin.

The current estimate of assessed value in the three counties is \$18.574 billion. This value results in an estimated tax revenue of \$7,429,000 for 1995. However, assessed value in Central Arizona

has grown steadily. It is reasonable to assume an average growth rate of about 2.5% per year. If the tax were levied starting in 1997 and continued through 2016 it is estimated the revenues generated would total approximately \$210,435,000. This total would represent \$174,742,000 for Maricopa County, \$5,410,000 for Pinal County, and \$30,284,000 for Pima County.

- **Statewide general fund appropriation**

The proposed program for increasing Colorado River diversions will provide an important economic benefit to the state. State general fund appropriations would provide flexibility to recharge water without expectation of future recovery to help meet Groundwater Code objectives and to assist in programs to increase direct deliveries. Statewide funding sources would allow the benefits of this program to be extended outside the CAP service area to other water users. Funding availability will be dependent upon the Legislative appropriation process. For the purpose of this discussion paper a maximum annual funding level of \$7.5 million is assumed. Under some of the cost assumptions described later, much smaller appropriations would be required.

- **Cost Sharing Partnerships**

Experience by the CAWCD in both their target pricing program and their groundwater savings facilities programs has shown that Arizona water users who are the recipients of Colorado River water are often willing to pay a portion of the expense of delivering the water. Agricultural water users who would take advantage of increased direct deliveries or in lieu water would be required to reduce groundwater use on an acre foot for acre foot basis. These users are then able to save the expenses associated with pumping of groundwater, which vary greatly depending upon energy sources and pumping depths. An average figure of \$20-\$25 per acre foot is a reasonable estimate of the savings. Irrigators, who are faced with the outlay of this amount to pump are usually willing to pay this amount to help defray the cost of CAP water.

- **State Water Bank Fees**

The State Water Bank would collect money from its counterpart authority in California or Nevada to obtain and store water. Bank fees would be based on the cost of providing service and would be received in advance through a contract arrangement.

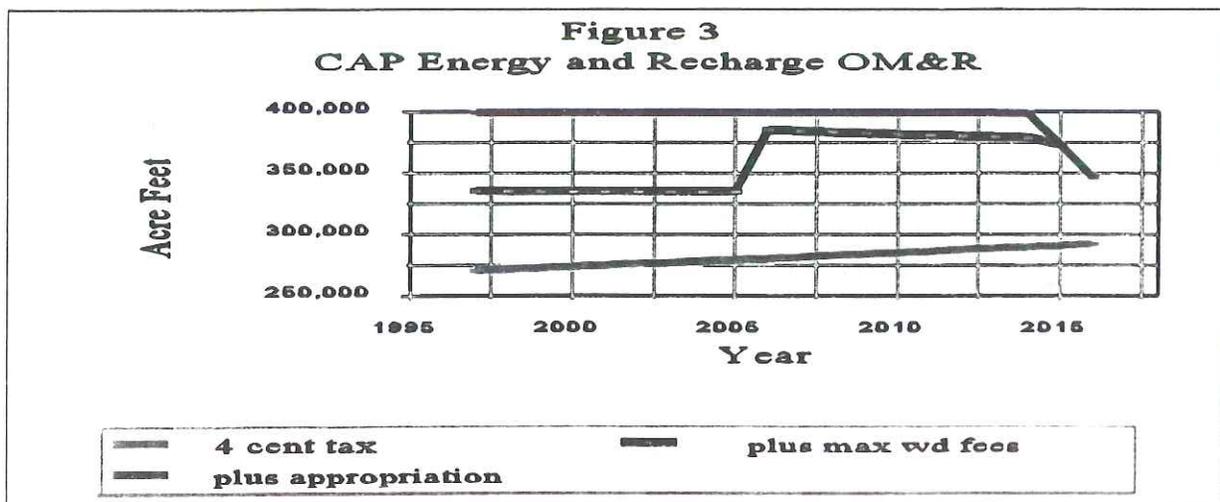
COMPARISON OF ESTIMATED COSTS VS. ESTIMATED REVENUES

The ability to meet the target volumes estimated for this proposed program is dependent on the costs associated with increased diversions and the availability of revenues to pay those costs. The following examples are offered to provide comparison of costs and revenues under different sets of assumptions. Since there are a wide range of assumptions that can be made, this discussion paper focuses on the amount of water which could be purchased based on three levels of assumed revenue sources. In each alternative described below, the amount of water which may be

purchased is calculated based on a) use only of the CAWCD four cent property tax; b) on the four cent property tax plus the maximum amount of withdrawal fees based on low pumpage assumptions; and c) the previous amount of funds plus up to \$7.5 million of general appropriation from the state budget.

- Costs for CAP energy and recharge OM&R

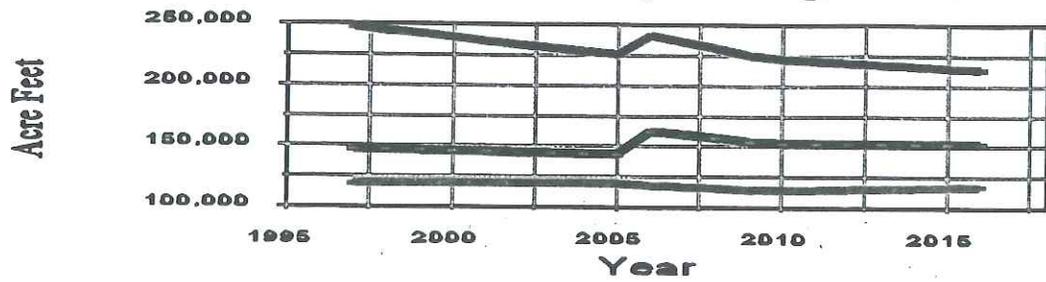
The minimum level of expense is based on assumptions that require assessing charges only for the costs associated with pumping energy and the OM&R associated with recharge facilities. This alternative assumes that other costs are either waived or would be collected at the time the water is recovered from storage. Under this alternative, maximum levels of funding could purchase up to about 400,000 acre feet per year. Purchases tail off after the year 2014 because the state would be fully utilizing its 2.8 million acre feet entitlement. Cost per acre foot in this example range from \$33 initially to \$49 by the year 2016.



- Costs for CAP energy, fixed OM&R, recharge capital and recharge OM&R

This example increases the expenses over the previous one by adding in CAP fixed OM&R costs and costs associated with capital construction of underground storage facilities. These costs may be representative of those associated with increased direct use without a cost sharing partner or of direct underground storage at a facility which was not constructed with state demonstration recharge project funds. The cost per acre foot is initially approximately \$75 but increases to \$121 by the year 2016. As can be seen from Figure 4, maximum revenue collection from the three funding sources increases deliveries to a peak of about 250,000 acre feet per year

Figure 4
CAP Energy, Fixed OM&R, Recharge Costs

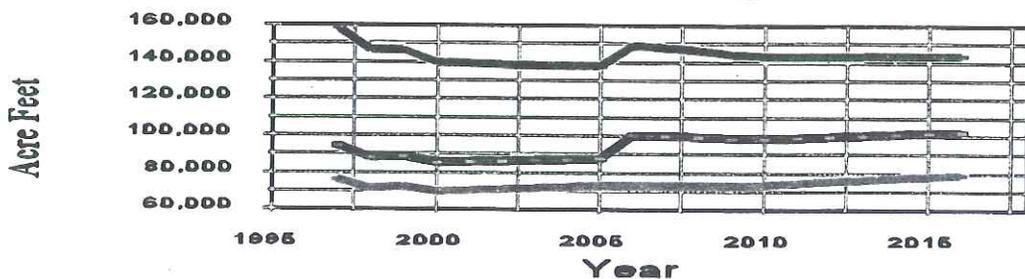


— 4 cent tax — plus max wd fees
 — plus appropriation

- Costs for CAP energy, fixed OM&R, M&I capital repayment, recharge capital, and recharge OM&R.

Figure 5 represents the relationship between costs and revenues under a near full cost assumption. The only costs not considered are those associated with recharge recovery capital and OM&R. This example may be representative of charges required for a State Water Bank contractor. Cost per acre foot estimates are \$117 initially increasing to \$180 over a 20 year period. Use of all of the available revenues used in these examples would only generate enough funding for about 140,000 to 160,000 acre feet per year under this set of assumptions.

Figure 5
Full CAP Costs and Full Recharge Costs



— 4 cent tax — plus max wd fees
 — plus appropriation

SUMMARY

Arizona has a limited opportunity in the immediate future to store and use Colorado River water that would otherwise not be used. A program, such as the one described in this paper, could be used to store substantial amounts of water in central Arizona to safeguard against future shortages on the CAP system, to preserve groundwater supplies and assist in meeting the goals of the Groundwater Code, and to assist neighboring states without harming Arizona. The program would have the additional benefit of more fully utilizing the CAP which would be an advantage to the CAP system and its users.

Current under-utilization is estimated to be about 650,000 acre feet and projections indicate that full use may not occur until about the year 2030. Increasing use by between 250,000 and 400,000 acre feet per year over a 20 year period would be feasible and would provide significant benefits to the state.

Increased use could be attained through direct underground storage, groundwater savings facilities, direct use by Arizona water users, and storage of water on behalf of other states through an Arizona State Water Bank.

Costs associated with increased use are primarily the cost of delivery of Central Arizona Project water and the costs associated with constructing and operating recharge projects. Actual costs charged will depend on who is making use of the water and how it is used.

Revenues to fund the proposed program would come from AMA withdrawal fees, a continuation of the CAWCD four cent property tax, statewide general fund appropriations, cost sharing partnerships, and State Water Bank fees.

Preliminary estimates of costs and potential revenues indicate a wide range of options. If costs can be kept to only the variable costs for CAP pumping and recharge facilities, up to 400,000 acre feet of additional use may be realized. If water must be priced to include all costs, including a component of capital repayment, increased use would peak at about 160,000 acre feet per year. Further study is needed in order to develop a plan which optimizes water costs against revenue sources. However, this preliminary analysis is encouraging that the potential to significantly increase use of Colorado River water within Arizona appears to be technically feasible and financially attainable.

