

ARIZONA WATER BANKING AUTHORITY

WEDNESDAY, OCTOBER 16, 1996

LAKE HAVASU CITY, ARIZONA

1	NAME: <u>Don Pope</u> REPRESENTING: <u>YUMA County WATER USERS ASSN</u> <u>AWBA Study Commission</u>	BUSINESS ADDRESS: <u>POB # 5775</u> <u>YUMA, AZ 85366</u>	TEL: <u>520-627-8824</u> FAX: <u>520-627-3065</u>
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5	NAME: <u>JOE FALBO</u> REPRESENTING: <u>MARICOPA WATER DIST</u>	BUSINESS ADDRESS: <u>POB 900</u> <u>WADELLE AZ 85355</u>	TEL: <u>(602) 546-8266</u> FAX: <u>(602) 584-2536</u>
6	NAME: <u>Bruce Brown</u> REPRESENTING: <u>EcoPlan Associates</u>	BUSINESS ADDRESS: <u>1845 S. Dobson</u> <u>Mesa, AZ 85203</u>	TEL: <u>602 831-8780</u> FAX: <u>8861</u>
7	NAME: <u>John Algotz</u> REPRESENTING: <u>Font Mojave Tribe</u>	BUSINESS ADDRESS: <u>300 Merriman Ave</u> <u>Needles, Calif.</u>	TEL: <u>(520) 346-1606</u> FAX: <u>346-1216</u>
8	NAME: <u>G.H. EDWARDS</u> REPRESENTING: <u>CRC-NU</u>	BUSINESS ADDRESS: <u>WASHINGTON AV</u> <u>555 E. 1st St</u> <u>LAS VEGAS NV. 89101</u>	TEL: <u>702-486-2670</u> FAX:
9	NAME: <u>Mike Baughy</u> REPRESENTING: <u>RWCB</u>	BUSINESS ADDRESS: <u>2700 Bank of America Bldg</u> <u>101 N. 1st Ave</u> <u>PHX AZ 85003</u>	TEL: <u>602-440-4811</u> FAX: <u>602-257-9582</u>

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10	NAME: GREG LUCIERO REPRESENTING Town of Parker	BUSINESS ADDRESS: P.O. Box 609 PARKER, AZ 85344	TEL: 520-669-9265 FAX 520-669-5247
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12	NAME: Janice D. Paul REPRESENTING City of Bullhead City	BUSINESS ADDRESS P.O. Box 21179 BHC, AZ 86439	TEL: FAX
13	NAME: MIKE LEONARD REPRESENTING RWOOD	BUSINESS ADDRESS	TEL: 988-9587 FAX
14	NAME: Jim Sweezy REPRESENTING CAIDD	BUSINESS ADDRESS P.O. Box 605 - Eloy, AZ	TEL: 258-3756 FAX
15	NAME: PAUL ORME REPRESENTING CADON/MSDD	BUSINESS ADDRESS H.C. 63, Box 3042 MAYER, AZ. 86333	TEL: (602) 465-0445 FAX (520) 632-4344
16	NAME: Grant Ward REPRESENTING MSIDD	BUSINESS ADDRESS Stanfield Az	TEL: 520-424-3284 FAX
17	NAME: Bill M... REPRESENTING Red...	BUSINESS ADDRESS	TEL: 702-299-8652 FAX
18	NAME: Susan Selby REPRESENTING SNWA	BUSINESS ADDRESS	TEL: FAX

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19	NAME: <i>[Signature]</i> REPRESENTING <i>SNWA</i>	BUSINESS ADDRESS	TEL: <i>258-3948</i> FAX
20	NAME: <i>Jack King</i> REPRESENTING <i>SLP</i>	BUSINESS ADDRESS <i>PO Box 52025 Phx AZ 85072</i>	TEL: <i>2365978</i> FAX <i>2159</i>
21	NAME: <i>Bob McLain</i> REPRESENTING <i>AMWUA</i>	BUSINESS ADDRESS <i>4041 N Central #900 PHX AZ 85012</i>	TEL: <i>2488482</i> FAX <i>2488423</i>
22	NAME: <i>Gary Hansen</i> REPRESENTING <i>Colo River Indian Tribes</i>	BUSINESS ADDRESS <i>Rt 1 Box 23-B Parker, AZ 85344</i>	TEL: <i>669-1381</i> FAX <i>669-8618</i>
23	NAME: <i>Rock Cramer</i> REPRESENTING <i>VICKSBURG FARMS</i>	BUSINESS ADDRESS <i>P.O. Box V PARKER, AZ 85344-4022</i>	TEL: <i>669-2936</i> FAX <i>669-2335</i>
24	NAME: <i>BUSTER JOHNSON</i> REPRESENTING	BUSINESS ADDRESS <i>3941 ALBACORE DR LHC, AZ 86406</i>	TEL: <i>8553947</i> FAX <i>8553947</i>
25	NAME: <i>Bill Alice</i> REPRESENTING <i>Pibela, Parker</i>	BUSINESS ADDRESS <i>38914 N 73rd St Case Creek, AZ 85351</i>	TEL: <i>602 263 9522</i> FAX
26	NAME: <i>Don Aldridge</i> REPRESENTING <i>State Representation</i>	BUSINESS ADDRESS <i>1700 West Washington Phoenix, AZ 85007</i>	TEL: <i>1-800-542-5413</i> ^{<i>602</i>} FAX <i>1-800-352-8404</i> <i>C 602 542-0102</i>
27	NAME: <i>JACK Foley</i> REPRESENTING <i>Met Water District SOLA</i>	BUSINESS ADDRESS <i>350 S. GRAND L.A.</i>	TEL: <i>(714) 643-2006</i> FAX

ARIZONA WATER BANKING AUTHORITY

WEDNESDAY, OCTOBER 16, 1996
LAKE HAVASU CITY, ARIZONA

28	NAME: JACK MALOY REPRESENTING MWDJC	BUSINESS ADDRESS 1171 L STREET # 900 SACRAMENTO, CA 95814	TEL: 916-650-2635 FAX:
29	NAME: Cynthia Stelmovic REPRESENTING Ar State Land Dept	BUSINESS ADDRESS 1616 L. Adams Phx, AZ 85007	TEL: 602-542-3500 FAX:
30	NAME: SAM STAWDEKFER REPRESENTING MOHAVE County Board of Supervisors CHAIRMAN	BUSINESS ADDRESS P.O. Box 7000 Kingman, AZ 86401	TEL: 526-753-0722 FAX 526-753-1679
31	NAME: JAY I. MOYES REPRESENTING Mohave County Water Authority	BUSINESS ADDRESS Box 2199 Phoenix AZ 85001-2199 (3003 N. Central Ave)	TEL: 602-604-2166 FAX 602-263-5333
32	NAME: REPRESENTING	BUSINESS ADDRESS	TEL: FAX:
33	NAME: REPRESENTING	BUSINESS ADDRESS	TEL: FAX:
34	NAME: REPRESENTING	BUSINESS ADDRESS	TEL: FAX:
35	NAME: REPRESENTING	BUSINESS ADDRESS	TEL: FAX:
36	NAME: REPRESENTING	BUSINESS ADDRESS	TEL: FAX:

FINAL AGENDA

ARIZONA WATER BANKING AUTHORITY

Wednesday, October 16, 1996

1:00 - 4:00 p.m.

Lake Havasu City Police Facility
2360 McCulloch Blvd
Lake Havasu City, Arizona

- | | | |
|-------|--|--------------|
| I. | Welcome / Opening Remarks | Rita Pearson |
| II. | Adoption of Minutes of September 10 Meeting | Rita Pearson |
| III. | Presentation and initial recommendation of 1997 Annual Plan of Operation | Tim Henley |
| IV. | AWBA water charge for in-lieu and direct recharge | Tim Henley |
| V. | Update of proposed Storage Site Criteria | Jimmy Jayne |
| VI. | Discussion of Issues Paper concerning the Mohave County Water Authority, RWCD, City of Mesa Proposal | Tim Henley |
| VII. | Discussion on Interstate Water Banking | Herb Dishlip |
| VIII. | Update on Arizona Water Banking Authority Study Commission | Herb Dishlip |
| IX. | Next Meeting - Arizona Department of Water Resources
-Wednesday, November 20, 1996, 9:30 a.m. - 12:30 p.m.
- Proposed agenda items
- Adoption of 1997 Annual Operating Plan | Jimmy Jayne |
| X. | Call to the Public | |
| XI. | Adjournment | |

If, because of a disability, you need a reasonable accommodation to participate equally in this program, activity, or service, please contact the Arizona Banking Authority at (602) 417-2418 or (602) 417-2455 [TDD] with your needs. Many accommodations, such as auxiliary aids and services, alternate format material, or changing facilities, require in excess of 72 hours to arrange. In order for this department to provide timely accommodation, please notify us as far in advance as possible.

MEMO

To: Rita Pearson
Herb Dishlip
Bill Chase
Richard Walden
Senator Stan Barnes

From: Tim Henley 14

Subject: Lake Havasu Meeting

Date: September 20, 1996

Attached please find a tentative travel arrangement / event schedule, including a map to Sawyer aviation, for the Authority trip to Lake Havasu City on Wednesday, October 16.

Jimmy Jayne, Craig Sullivan and Chuck Cahoy will be driving over on Tuesday evening and would be happy to provide assistance in preparation of the meeting or while in Lake Havasu City to Authority members.

I look forward to seeing you at Sawyer Aviation on Wednesday, October 16 at 8:45 a.m. In the meantime, please feel free to contact me if you have any questions concerning the proposed schedule or the Authority.

The new telephone number for the Authority is 417-2418 and the fax number is 417-2401.

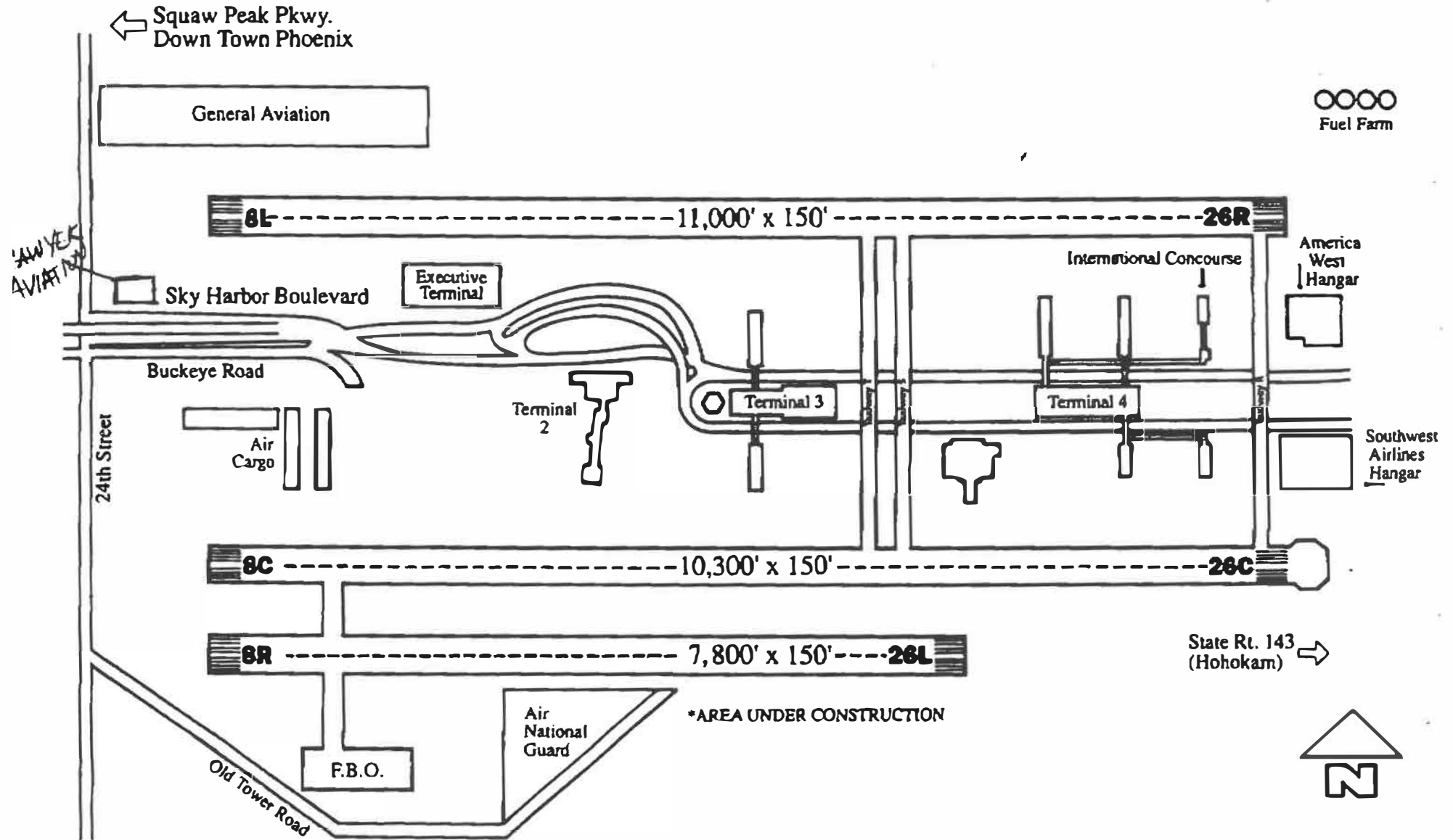
TENTATIVE SCHEDULE
for
LAKE HAVASU CITY TRIP
Wednesday, October 16

- 8:45 **ARRIVE AT SAWYER TERMINAL - Sky Harbor International**
(please see map attached)
- 9:00 **DEPART SAWYER AVIATION TERMINAL FOR LAKE HAVASU**
- Rita Pearson
- Tim Henley
- Herb Dishlip
- Bill Chase
- Richard Walden
- Senator Stan Barnes
- 9:45 **ARRIVE IN LAKE HAVASU CITY**
- Tom Griffin will greet Rita Pearson, Tim Henley and Herb Dishlip
- Arrangements have been made for a representative to greet Senator Stan Barnes, Richard Walden and Bill Chase at the airport for a tour of sites in Lake Havasu City.
- 10:30 **MEETING WITH MAYOR HILEMAN, MAYOR HICKS , TOM GRIFFIN AND MAUREEN GEORGE**
1. M&I water available
Mohave Valley Irrigation & Drainage District.
2. Future M&I water supplies for Mohave County Water Authority members and other non-contracted areas in Mohave County.
3. Brite Line Study
4. Water Bank opportunities for Mohave County
- 11:30 **MOHAVE COUNTY WATER AUTHORITY MEETING**
Lunch provided at *Red Robin*
Senator Barnes, Bill Chase and Richard Walden will rejoin the group at the Red Robin for lunch
- 1:00 **AZ WATER BANKING AUTHORITY, Lake Havasu Police Facility**
- 4:00 to
6:00 **BARBEQUE AT THE HOME OF MAYOR RICHARD (DICK) HILEMAN**
3791 Colt Drive, Lake Havasu City (transportation will be provided from AWBA meeting to the Mayor's home and to the airport)
- 5:45 **DEPART FOR LAKE HAVASU CITY AIRPORT**
- 6:00 **DEPART FOR PHOENIX - Sawyer Aviation Terminal**
- 6:45 **ARRIVE SAWYER AVIATION TERMINAL**



Airport Layout Plan

Phoenix Sky Harbor International Airport



N 1

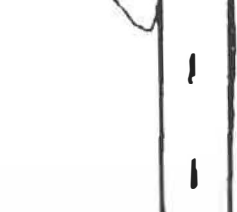
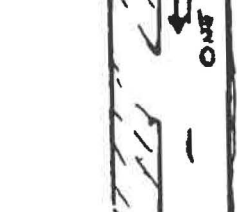
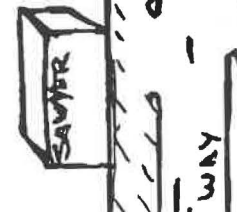
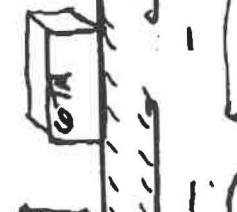
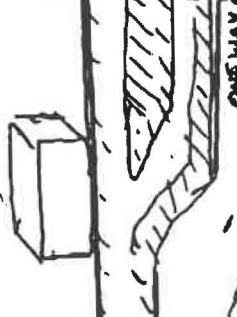
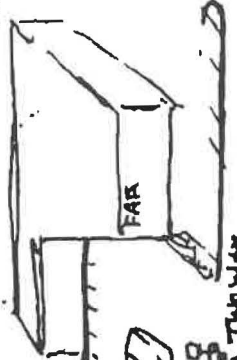
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ARIZONA WATER BANKING AUTHORITY
Draft Minutes



September 10, 1996 Meeting
Arizona Department of Water Resources

Arizona Water Banking Authority Members:

Rita P. Pearson, Chairman
Tom Griffin, Vice-Chairman
Bill Chase, Secretary
Grady Gammage, Member
Richard S. Walden, Member
Senator Stan Barnes, ex officio
Speaker Mark Killian, ex officio

AWBA Personnel:

Tim Henley
Jimmy Jayne

I. WELCOME/OPENING REMARKS

Chairman Rita Pearson opened the meeting at 10:05 a.m. She welcomed attendees and acknowledged special guests. All members of the Authority were present except ex officio member Senator Stan Barnes.

II. APPROVAL OF MINUTES OF AUGUST 20 MEETING

Ms. Pearson asked for adoption of the minutes of the August 20 meeting. Mr. Gammage mentioned that on page 2, VI., the eight factors mentioned are not official policies of the CAWCD Board and should not be attributable to Mr. Gammage. He recommended changing the introductory sentence to "Mr. Gammage went on to talk about how CAWCD considers a series of policies in formulating water pricing." With that correction, Mr. Gammage moved to adopt the minutes of the August 20 meeting. Minutes were adopted as corrected.

III. OVERVIEW OF WATER PRICING/CAWCD BOARD MEETING

Tim Henley discussed CAP water pricing as it relates to the operations of the AWBA. He referred to the motion passed by the CAWCD Board (Tab 3 of the meeting packet). The motion asked that the pricing for the next two years for the AWBA include a postage stamp energy rate plus \$5.00 recovery of fixed O&M. The motion also requests that the Authority appoint two members to assist and work with the CAWCD Policy and Planning Committee on pricing so that when a price is set in two years there will be considerably more information on which to base pricing decisions. A main concern is whether there is any difference between general fund monies verses money collected in service areas, i.e. where benefits are accrued and how they will be paid for. The price of CAP water for calendar year's 1997 and 1998 is "postage stamp" energy costs plus \$5.00. For 1997 the cost will be \$35.00 per acre-foot.

Mr. Walden nominated Messrs. Chase and Griffin to represent the Authority on pricing issues. Mr. Gammage provided some additional background on the CAWCD Board decision. The price set for the Authority represents a subsidy and there is concern on the Board about the appropriateness of that subsidy for the water that is purchased with the general fund appropriation. The Board agreed it was appropriate to do that now while the Authority is getting up and running but that there was

strong sentiment against subsidizing water costs outside the CAWCD service area indefinitely. Chairman Pearson acknowledged that water pricing is a complex issue. The committee unanimously approved Messrs. Chase and Griffin to act as advisors on behalf of AWBA on water pricing.

IV. PRESENTATION OF FY 97 ANNUAL OPERATING BUDGET

Chairman Pearson noted that the Authority had previously adopted an interim budget for July-September. This action would be for the entire 1997 fiscal year, encompassing July - September and October 1, 1996 through June 30, 1997. Mr. Henley directed the Authority to the budget attachments in the packet including the Summary which contains the mission and a description of the Authority and a program summary including the Authority's objectives over the next 3 years. Also included is a summary of funding available. This information was earlier submitted in support of the \$2 million request for general fund appropriation for FY 1998.

Mr. Henley then directed the Members to Attachment 97-2, the budget for the remainder of FY 97, which includes the first 3 months. He explained that salaries were the greatest single expense, that indirect costs represent administrative expenses and that CAP services costs represent additional services required as a direct result of the Authority. At this time no professional services are anticipated although this may change in the future. Mr. Henley also mentioned that travel for members and the AWBA staff represent a considerable cost and that the high equipment costs are a one time cost, representing the initial purchase of furniture and computers. He mentioned that the other key item is Attachment 97-4, the Water Recharge Budget. Through the end of June 1997 the Authority will spend \$4.5 million to purchase 165,000 acre feet of credit.

Chairman Pearson asked for a motion to adopt the budget and Mr. Walden moved for adoption. Mr. Chase asked if any unspent money for staffing would carry over. Mr. Henley answered that the money would carry over to support the budget, including the \$2 million in general funds. The tax revenues that will come in December will also carry over and remain in the fund. There being no further discussion, the budget was unanimously approved.

Mr. Chase asked how the time of support staff, including an attorney would be managed. Mr. Henley answered that especially this year there would be the need to enter into contractual arrangements with CAWCD and with recharge partners resulting in a significant load for an attorney doing specific Authority business including providing general legal advice. Mr. Chase clarified that his question involved internal management; would the attorney have a separate cost key when working on Authority business. Mr. Henley answered that the legislation required setting up different accounts including administration, and that support staff time would be accounted for separately in that account.

V. PRESENTATION AND DISCUSSION ON STORAGE FACILITIES INVENTORY AND STORAGE SITE CRITERIA

Last month's draft siting criteria were distributed and Tim Henley reported that there has been no public comment. He proposed keeping the comment period open through the October 16 meeting. At the August Authority meeting there had been a member comment on inclusion of a ranking procedure and that has been added as a matrix. Facilities would be ranked based on cost, water management, Indian water rights, etc. and would be given a ranking of 1-10. This will allow the Bank to look at different objectives, and could be used to get public input; the matrix could be given to various groups, such as the GUACs for their perspective on ranking. There were

also questions last month about recovery sites in relation to recharge sites. Mr. Henley reported that they are working with computer staff on developing a data base which can be used to generate maps. In the packet is a map showing the location of Groundwater Savings Facilities in the Phoenix AMA in relation to cities. This information can be used, for example, to generate recovery criteria which would recognize distance from users and would feed into the ranking system.

Chairman Pearson thanked Mr. Henley and remarked that there was so much information on the map that it was hard to decipher and asked if information could be broken out into sub-categories of maps. Mr. Henley responded that the system could be manipulated including using overlays, such as poor water quality areas, etc. to get a better presentation.

VI. PRESENTATION ON ISSUES RAISED BY MOHAVE COUNTY PROPOSAL

Tim Henley mentioned that he has been discussing the proposal with Mr. Larry Dozier, Deputy General Manager of CAWCD and with Chuck Cahoy, ADWR legal counsel to the Authority and that the proposal has raised many issues including the use of tax dollars, the real responsibility of the Authority in relation to recovery location, or whether it should just be dealing with credits. Mr. Henley feels the Bank must be involved in recovery to address issues like certainty for those who will benefit from credits in the future especially those that have to pay for recovery and how will they develop those funds. Entities also need certainty in order to effectively plan how this supply will work into other water supplies. He proposed that the AWBA staff develop a recovery plan in conjunction with CAWCD and others that would address many of the issues that have been raised to date and would be available for public review. An outline of a recovery plan will be included as part of a bigger issues paper.

Mr. Gammage asked if the approach was to shelf the proposal until a global plan was developed and whether this would be the general approach at this time for similar proposals as well. Mr. Henley responded that was the case. Mr. Gammage then asked how long it would take to develop the plan. Mr. Henley replied that it could be done relatively quickly but the AWBA staff is now concentrating on recharge activities expected to commence early next year and is working on the operating plan that is due to the GUACs in November. The Authority also needs permits to accumulate credits and needs to enter into contracts. Therefore the next three months will be very busy. He anticipates returning to the recovery issue including the Mohave County proposal early next year with a recovery plan done by June or July of 1997. He went on to say that he did not think the delay would result in a lost opportunity to recharge by RWCD. The Mohave County entities can still accrue credits without the recovery issue being resolved since actual recovery is several years away.

Tom Griffin asked if this would be an issue at the next meeting which is scheduled in Lake Havasu City. Mr. Henley responded that the AWBA staff will continue to work on the issues, could put the item on the next agenda and could possibly put together a short issue paper however, the AWBA staff can't have a formal position by the next meeting. Mr. Griffin then asked if the recovery issue had initially been overlooked. Mr. Henley acknowledged that the importance of the recovery issue had been overlooked. Chairman Pearson mentioned that the other major issue raised by the Mohave Co. Proposal is credit accrual, whether it is done on an AMA basis versus a specific CAP subcontractor basis. Generally speaking, the issue of who

should be receiving benefits of the credits. Mr. Henley asked members that they bring specific issues to the AWBA staff's attention for development of issue papers or inclusion in the plan. Mr. Killian encouraged the development of mechanisms to ensure that the public comes to the Authority with their concerns and ideas.

VII. PRESENTATION BY DWR ON TYPES OF RECHARGE AND PROGRAMS/GROUNDWATER STORAGE

Steve Rossi, manager of the Department's Recharge and Assured Water Supply (AWS) programs presented a program overview. The AWS program represents a water management objective to ensure 100 years of water for new subdivisions and water providers, with the recharge program providing an important tool to achieve that goal. The initial recharge statute was adopted in 1986 with the goal to provide incentives to use alternative water supplies such as CAP water and to provide an alternative to construction of treatment plants and distribution systems for direct delivery of alternative supplies. Mr. Rossi stressed that this is an incredibly important program to AWS in that entities who do not have the financial resources to build treatment plants are depending on the program to meet the assured water supply requirements, either directly through their own recharge projects or indirectly through membership in the Central Arizona Groundwater Replenishment District (CAGR).

Chuck Cahoy then described the basics of the recharge program. The recharge program provides the mechanism by which the Authority can store CAP water underground for future use. There are three types of permits required: 1) Storage Facility Permit which is needed to identify a facility and includes both underground storage facilities and groundwater savings facilities (in-lieu recharge); 2) Water Storage Permit which allows storage at a specific facility for future use; and 3) Recovery Well Permit which allows the withdrawal of water previously recharged. The water withdrawn maintains the legal character of the water that was recharged. Therefore, when CAP water is stored, when it is recovered it is still counted as CAP for purposes of Arizona groundwater law.

Underground storage facilities can include both constructed (e.g. settling pond) or managed (e.g. existing stream bed) projects and require submittal of a hydrologic report showing that storage is hydrologically feasible and will cause no unreasonable harm. A groundwater savings facility permit allows a groundwater user to accept an alternative source of water to use in place of groundwater. The storer earns the credits. A plan of operation must be submitted for a groundwater savings facility permit which explains how the facility permit holder has saved groundwater and how much has been saved.

The water storage permit allows storage of water not immediately needed that is stored for future use. One storage facility may have a number of water storage permits associated with it. The credits accrue to the water storage permit holder. This is the one type of permit under the statute that the Authority is authorized to apply for and to obtain.

Mr. Cahoy described the major components of a permit application which include: a hydrologic report and that storage is feasible for a storage facility permit; a plan of operation showing groundwater savings for a groundwater savings permit; and, for a water storage permit, the right to use the water which may be through a contract with the CAWCD. All permits require public notice unless the water is CAP water and if CAP water has previously been stored at the facility. This can considerably shorten the process for issuance of a water storage permit.

Mr. Cahoy also explained that there are three accounting mechanisms associated with underground water storage; 1) annual recovery which is analogous to a cash transaction, 2) long-term storage which has a number of restrictions and is comparable to a checking account, and 3) replenishment through the CAGR where there is an annual obligation to recharge a certain volume of water and GRD makes minimum payments over time, similar to a credit card mechanism.

Mr. Cahoy went on to describe the factors that influence accrual of recharge credits. First, water is measured when it enters a facility and evaporation and other losses may be subtracted out from the amount that can be credited. Second, groundwater savings facilities must demonstrate how and how much water was saved, i.e. that the alternative supply is actually replacing groundwater use and not supplementing it. Third, there is a 5% cut to the aquifer for CAP so only 95% is registered to the long-term storage account. Fourth, if water stored in an AMA can migrate out of the AMA, the Department can debit that amount from the long term storage credit. Finally, the recovery location does not have to occur in the area in which it was stored. However, recovery must be consistent with the management plan and AMA goals.

Mr. Walden asked about the criteria if an existing user were to recover in a different location. Mr. Cahoy mentioned that there could not be decline rates of more than 4 foot per year. Mr. Walden asked if increases in pumping costs due to declining water tables was considered. Mr. Cahoy answered that is not automatically considered. Mr. Rossi mentioned that there is somewhat of a disconnect between the recharge, AWS and management plan programs regarding cost, regional water level decline rates, water management goals and the objective to use the maximum amount of CAP water, that must be addressed. Tim Henley added that Mr. Walden's question could also be addressed by the AWBA through site ranking and the recovery plan. Mr. Walden said it was important for the Authority to look at future withdrawal sites in terms of cost and legal issues.

VIII. PRESENTATION BY CAWCD ON RECHARGE AND REPLENISHMENT ACTIVITIES

John Newman of CAWCD described the agency's recharge activities as described in the CAP Memo in the meeting packet. The two major areas of activity are State Demonstration Projects and CAWCD's own groundwater recharge programs. There are four State Demonstration projects; Avra Valley Site, Pima Mine Road, Granite Reef Underground Storage Project (GRUSP) and the Agua Fria site. CAWCD programs include, in-lieu projects, an M&I incentive-priced recharge program and a groundwater savings program with CAP Indian communities.

State demonstration project funds were authorized in 1990 and a four cent tax per \$100 assessed valuation was authorized in Pima and Maricopa counties. These monies have been deposited in the Arizona Water Storage Fund (AWSF) for recharge projects in the two counties. The disposition of the four cent tax is now transferred to the AWBA. However, the existing AWSF remains intact for development of new recharge sites by CAWCD.

GRUSP was developed by SRP and a consortium of Valley cities in 1994 and CAWCD entered into a lease agreement with SRP to lease its share of storage capacity. CAWCD has been storing water there for three years, amounting to about 154,000 acre-feet. As of the end of June they have stored 54,000 acre-feet and have

notified SRP that they want to terminate its use for the current year, primarily because of wanting to prioritize use of the remaining AWSF monies to develop new capacity. CAWCD wishes to turn over its capacity and capacity in other facilities to the AWBA and other users.

The Avra Valley Project began in July and about 250 acre-feet have been stored. Recharge has been slowed by canal capacity restrictions and plumbing problems. CAWCD would like to achieve a daily recharge rate of 10-20 acre-feet. The plan for this year is to store 2,000 acre-feet. CAWCD has entered into a lease agreement with MDWID to lease the entire capacity of the site to them over the 2 year pilot program and allows for an option to use 40% of that capacity over the next three years. There is a large variation in permeability in the area with two basins showing infiltration rates of 2 foot per day and two basins where water will not even pond because the permeability is so high.

Mr. Newman explained that there is a new IGA between CAWCD and Tucson Water for the Pima Mine Road Recharge Project. The City has invested about \$1 million in land acquisition and hydrologic study costs. CAWCD has invested about half that amount but there has been no construction yet. The amended IGA allows Tucson Water to contribute cash up to ownership of 50% of the site. Some of the problems relate to obtaining easements across Indian lands necessary for construction of a 3 mile pipeline to the site from the CAP canal. He said they are looking at alternative routes including designing a connection to the south of Pima Mine Road which is off the reservation. The schedule is to have the site up and running by mid to late 1997. Permits have been applied for already and have gone to public notice. One objection was received by ASARCO and ADWR has denied the objection.

Mr. Newman reported that AMWUA and Phoenix have already done considerable work on the Agua Fria project including acquisition of rights of way and installation of monitor wells. This will be both a constructed and managed facility. The managed part will involve running untreated CAP down the Agua Fria riverbed. The constructed site will be in the Happy Valley Road area. A blow out structure will be constructed on the new Agua Fria siphon that will be used to release water into the riverbed and eventually to the site. The blow-out structure capacity is 325 CFS which translates to about 230,000 acre-feet a year. The schedule for completion is late November 1997. CAWCD is hopeful it will be a large recharge project and because of the hydrologic work that has already been done they can probably omit the pilot permit and go for a full scale permit.

Regarding CAWCD's own programs, Mr. Newman reported that they have been involved in in-lieu projects since 1992 with peak years being 1992 and 1993 when 600,000 acre-feet of water was delivered to the Pinal County area. To date about 30,000 acre-feet have been stored in 1996. Projects are planned with SRP and with the Maricopa Water District. Eleven groundwater savings facilities have been permitted since 1992 with a permitted capacity of 429,800 AF. The plan for next year is to turn in-lieu capacity and permits over to the Authority. If there is a need for CAWCD to actually use any in-lieu capacity this will need to be discussed with the Authority. This depends on the Pool 3 agricultural price; if there is demand for that water in Pinal County which is not met by the Authority's in-lieu activities and through pool pricing, then CAWCD would like to follow that up with in-lieu projects of their own to ensure there is a full water supply to districts in Pinal County.

Mr. Newman explained that the M&I incentive-priced recharge program began in 1996. It allows M&I subcontractors to enter into partnership arrangements with in-lieu districts and accrue credits. The program has set aside 107,000 acre feet with a delivery price of about \$34.00 per acre-foot. This program will extend through 1999. Projects are currently authorized for 80,000 to 90,000 acre feet.

Mr. Newman reported that there are no Indian groundwater savings projects currently underway. These projects would operate similar to an in-lieu project except that permits from DWR would not be required since the Department does not have jurisdiction on Indian lands. Under this arrangement CAP would replace groundwater use and credits would accrue to CAWCD. However, tribes would like credits to stay on the reservation.

Future directions include new facility construction from remaining funds. CAWCD feels it has stored enough in Pinal and will turn over capacity to others. It wants to accrue more credits in Phoenix and Tucson because more credits and capacity provide more reliability to customers and to meet CAGRDR replenishment obligations in both AMAs.

Chairman Pearson asked about the amount of remaining AWSF money in Pima and Maricopa counties. Mr. Newman responded that in Pima County the Avra project would exhaust the remaining funds and the hope is that Tucson would exercise its option at Pima Mine Road to fund 50% of the cost. That will free up funds for use on other projects in Pima county such as the lower Santa Cruz River. In Maricopa County there is about \$20-25 million dollars available for development of capacity. Money is being spent faster in Pima County. He also mentioned that CAWCD has already leased capacity in Pima County, that storage reliability in Tucson is low priority because there is no direct CAP use, and that Tucson may become a CAGRDR member.

IX. PRESENTATION BY TUCSON AMA REGIONAL RECHARGE COMMITTEE ON RECHARGE PROGRAM IN THE TUCSON AREA

Kathy Jacobs, Director of the Tucson AMA referred to the Tucson Regional Recharge Report provided to members and mentioned that the report was also available to the audience after the meeting. A summary of the report was provided. She explained that the Tucson Regional Recharge Project has a two pronged objective; to provide a forum for discussion on recharge and to address the critical facility storage situation in Tucson. The first phase, the Technical Background Document, is complete. Committee members consisted of engineers and hydrologists only. The motivation for the report was AWBA formation so that the Tucson area could provide information to be used in the facilities plan. Phase II will be the development of the plan through the Institutional and Policy Advisory Group (IPAG) composed of political and policy people. The intent is to help the Tucson AMA try and move towards a regional consensus.

Ms. Jacobs pointed out that this report was intended to be updated regularly due to constantly changing information and if individuals wished to receive updates they need to return the postcard in the sleeve of the notebook.

There is considerable background material in the report including the relationship of recharge to safe-yield, Proposition 200 implications, a primer to recharge including permitting requirements, and water quality in relation to recharge. The committee also identified eight major recharge issues. The report identifies 16 facilities for further investigation. Conceptual designs and a cost per acre-foot analysis was done

for each of these. Ms. Jacobs stressed that the identification of the 16 facilities does not represent an endorsement by the committee since different sites may serve different needs and because additional sites continue to be identified. Ms. Jacobs pointed out the location of these facilities on a large map done as part of the study. These sites are located throughout the Tucson area and include constructed and managed facilities and groundwater savings facilities.

Ms. Jacobs reported that several conclusions were reached including the following. First, that constraints to recharge are not always obvious. For example, infiltration rate is not necessarily indicative of storage or recharge capacity since there may be impeding layers. Second, water quality considerations are totally site specific. The type of soil, ambient water quality and the supply source are all contributing components necessitating site specific testing. Third, there are numerous cost factors involved in recharge that are often overlooked. These include transportation, pipeline construction, land acquisition, recovery, treatment and regulatory (e.g. The Endangered Species Act) costs. Fourth, that CAP has a salinity/water quality impact on the Tucson aquifer whether it is used directly or indirectly.

Ms. Jacobs reiterated that the Tucson area is in serious straits regarding recharge capacity and that the committee was looking at ways to use the Water Bank to facilitate recharge activities and enhance departmental goals.

X. NEXT MEETING

Jimmy Jayne directed the committee to the updated time line for the Authority in their meeting packet, showing key dates and activities. The next meeting is in Lake Havasu City on October 16 at the Police Facility Auditorium. The proposed agenda includes adoption of a final version of the storage site criteria, the proposed 1997 Annual Operating Plan to go before the GUACs, and hopefully recommendation of an IGA between CAWCD, ADWR and the AWBA. There will also be some discussion of the Mohave Co. Proposal and a discussion on interstate water banking. Mr. Jayne also mentioned that the notebook for this meeting would serve for the next meeting as well.

Ms. Pearson announced the scheduled Study Commission meeting on September 11 at the Phoenix ADWR office, third floor, Conference Room A & B from 9:30 a.m. to 12:30 p.m.

XI. CALL TO THE PUBLIC

There were no comments from the public.

XII. ADJOURNMENT

The meeting was adjourned by Chairman Pearson at 12:11 p.m.

VI. Issues Raised by the Mohave County Water Authority / RWCD / City Of Mesa Proposal

LEGAL CONCERNS

- what outstanding issues need to be solved
- how can the 4 cent tax be used
- can the funds/credits be allocated from the time of acquisition
- entering into long-term agreements

DEVELOPMENT DROUGHT CRITERIA

- under what conditions are credits dispersed by the AWBA
- who does the AWBA give the credits
- definition of a shortage on the river

LONG-TERM AGREEMENTS

- between the AWBA and irrigation districts (similar to the RWCD proposal)

DEVELOPMENT OF RECOVERY PLAN

No issue paper has been developed to date due to the many extenuating factors that still remain. As AWBA staff has talked with various parties in developing the 1997 Annual Plan of Operation, recovery has continually been raised as an issue of concern and little certainty.

The following issues have been identified as key factors in developing a recovery plan:

- certainty of recovery \ issues of supply and demand in times of shortage
- creation of a recovery account within the Water Banking Fund
- extension of 4 cent tax beyond 2016 to pay for recovery
- availability of funds at time of recovery
- who pays recovery costs and when (at time of recharge or recovery)
- who can recover and how
- what is CAP involvement
- mechanisms for recovery
- relationship between where to recharge and future recovery
- developing of agreements to provide for recovery in the future
- replacement or reimbursement
- imposing an interest rate or time factor, in addition to replacement costs

RECOMMENDATION:

- appoint a Recovery Subcommittee of the AWBA to develop a Recovery Plan
- develop an RFP to examine potential recovery options
- address the recovery issue at the AWBA Study Commission meeting scheduled for Thursday, October 31

ARIZONA WATER BANKING AUTHORITY

1997 ANNUAL PLAN OF OPERATION



Rita P. PEARSON, Chairman

December 1, 1996

INTRODUCTION

A.R.S. § 45-2456 requires, by December 1 of each year, the Arizona Water Banking Authority (Authority) to adopt a plan of operation for the following calendar year. The Authority was created with the passage of HB 2494 by the 1996 Legislature. The Authority consists of the following 7 members, 5 of whom are voting and two non-voting ex officio: the Director of the Arizona Department of Water Resources serves as chairman of the Authority (Rita P. PEARSON); the President or designee of the Central Arizona Water Conservation District Board (Grady Gammage); a representative of an entity with an M&I subcontract (Bill Chase); a representative of the Colorado River communities (Tom Griffin); a person knowledgeable in water management (Richard S. Walden); an ex officio member of the Senate appointed by the President of the Senate (Stan Barnes) and an ex officio member of the House appointed by the Speaker of the House (Mark Killian).

The Authority was created with a mission to take the currently unused portion of Arizona's Colorado River allotment and recharge the water in Arizona to develop long-term storage credits for future use. Recharge by the Authority is not meant as a substitute for existing uses or storage of Colorado River water by entities in Arizona, but as a means of utilizing Colorado River water that would otherwise have gone unused by Arizona.

The Authority has approximately \$10 million in calendar year 1997 for direct and in-direct recharge, including all pump tax, 4 cent property tax and general fund revenues. Due to the demonstrated requests, recharge opportunities for 1997 will only be constrained by revenues of the Authority.

1997 ANNUAL PLAN OVERVIEW

Total estimated use on the Colorado River for 1996 and 1997 will exceed the 7.5 million acre feet (maf) allotted to the Lower Basin states of Arizona, California and Nevada (see Figure 1). The 1996 surplus declaration and the expected declaration of a surplus for 1997 have and will provide for delivery to the Lower Basin an amount greater than the 7.5 maf.

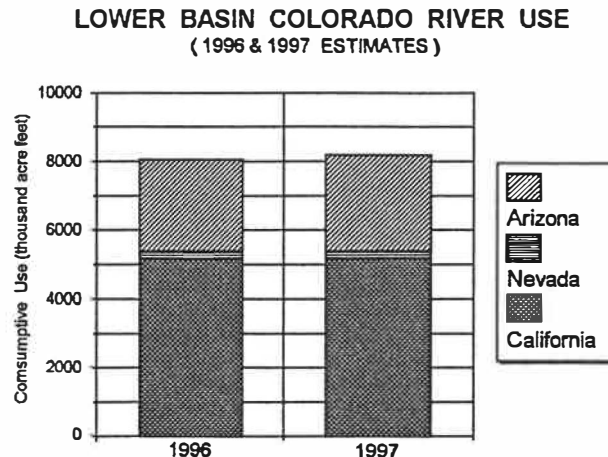


Figure 1

However, total Colorado River consumptive use by the State of Arizona for 1997 is estimated to be 2.7 maf (see Figure 2), still under the allotted 2.8 maf allowed to be diverted by Arizona under *Arizona vs. California*.

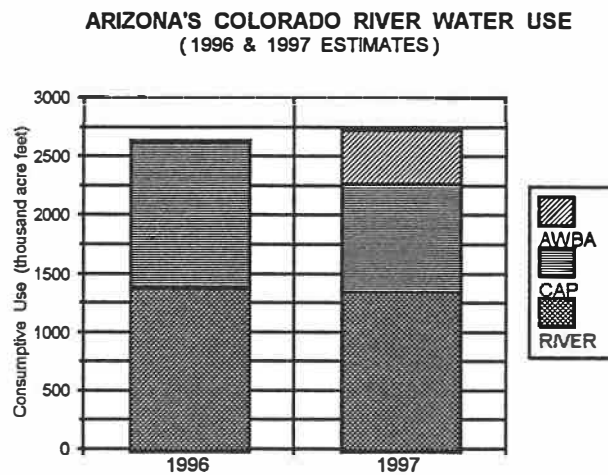


Figure 2

Figure 3 further itemizes Arizona's estimated 2.7 maf of Colorado River use by month, including projected Colorado River uses along the River in Arizona of 1.38 maf; CAP

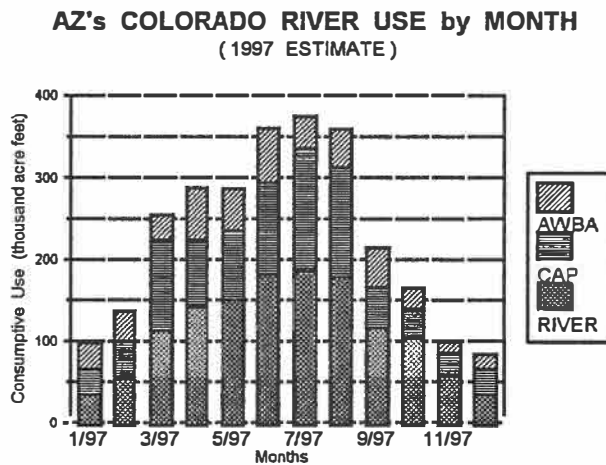


Figure 3

subcontractor deliveries of an estimated 905,000 af, including M&I, Indian, Agriculture Pool 1, 2, and 3, and incentive recharge water; and approximately 436,000 af for recharge by the Authority.

Table 1 reflects the delivery of water by the CAWCD on behalf of the Arizona Water Banking Authority for banking in Arizona. The total storage by the Authority in 1997 will be constrained by CAP aqueduct capacity remaining after the CAP has scheduled its deliveries.

TABLE 1
ARIZONA WATER BANKING AUTHORITY
CAP Water Delivery Schedule for AWBA Recharge
 (Monthly Adjusted AWBA Volumes based on CAP Capacity Values)
 Calendar Year 1997
 (ACRE-FEET)

(PRELIMINARY 10/11/1996)

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
Estimated CAP Deliveries: (M&I, Indian, Ag Pools 1, 2 & 3, Incentive Recharge)	32,891	46,973	112,046	83,566	85,167	111,964	150,844	135,829	52,411	34,582	29,790	29,378	905,441
Available Excess CAP Capacity for AWBA:	29,000	32,000	28,000	59,000	50,000	63,000	37,000	44,000	45,000	23,000	10,000	16,000	436,000
AWBA - Recharge Sites:													
Phoenix AMA:													
Direct > GRUSP	9,000	9,000	4,484	7,669	6,400	1,873	0	0	0	0	2,864	5,300	46,590
AGUA FRIA (1)	0	0	0	0	0	0	0	0	958	1,616	1,432	1,178	5,184
Indirect > CHANDLER HGTS CID (4)	0	0	0	30	36	36	42	40	36	0	0	0	220
MWD	2,250	2,000	1,495	2,559	2,849	3,750	2,137	2,437	2,878	1,616	1,432	589	25,992
NEW MAGMA	2,250	2,000	3,836	0	0	0	3,762	10,359	9,786	1,454	573	883	34,903
QUEEN CREEK	0	0	0	0	0	937	1,603	3,656	959	808	358	1,178	9,499
RWCD	3,500	8,000	3,996	6,821	5,698	7,500	4,274	4,875	7,676	2,424	0	0	54,764
SRP	0	0	1,247	18,047	15,787	16,090	3,829	711	12,152	8,618	477	395	77,353
TONOPAH ID (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
PINAL AMA:													
Direct > (3)													
Indirect > CAIDD	5,500	3,000	4,982	10,232	8,547	13,125	8,015	9,141	3,838	2,424	1,432	2,944	73,180
HOHOKAM	0	0	1,495	1,706	1,424	4,687	4,274	4,875	0	0	0	0	18,461
MSIDD	6,500	8,000	6,477	11,907	9,259	15,000	9,064	7,906	6,716	4,040	1,432	3,533	89,834
TUCSON AMA:													
Direct > AVRA VALLEY (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
PIMA MINE ROAD (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
Indirect > CORTARO MARANA ID (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
BKW FARMS (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL SYSTEM (DIRECT & INDIRECT):	29,000	32,000	28,000	59,000	50,000	63,000	37,000	44,000	45,000	23,000	10,000	16,000	436,000
Remaining CAP Capacity:	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: Agua Fria Siphon Outage (June 16 - September 15, 1997)

The HAV through HSV Pumping Plant Capacity will not be available for recharge downstream of the Waddell Turnout during this period.

(1) - Not Available for Direct Recharge until Fall 1997.

(2) - Capacity Committed to Other Partners.

(3) - No Direct Facilities Currently Permitted.

(4) - Chandler Heights maximum potential delivery was not pro-rated due to the low relative volumes.

BACKGROUND

Absent any existing Storage Site Criteria for selection of potential recharge sites or a facilities inventory of all existing facilities and available capacities, the Authority began putting together a proposed detailed plan for determining the cost and location for storing water in 1997.

The Authority staff made initial visits to virtually all permitted facilities in the three county CAWCD service area of Maricopa, Pinal and Pima counties that currently held would soon have Groundwater Savings Facility permits or Underground Storage Facility permits, as in the case of Salt River Project (SRP) at their Granite Reef Underground Storage Project (GRUSP) facility. In the Tucson AMA, the staff met with Cortaro-Marana. In the Pinal AMA, the Authority staff visited with Central Arizona Irrigation and Drainage District (CAIDD), Maricopa-Stanfield Irrigation and Drainage District (MSIDD), Hohokam Irrigation District, and San Carlos Irrigation District, which has yet to apply for a Groundwater Savings Facility permit. In the Phoenix AMA, the staff met with Roosevelt Water Conservation District (RWCD), Queen Creek Irrigation District (QCID), Salt River Project (SRP), New Magma Irrigation and Drainage District (NMIDD), Chandler Heights Citrus Irrigation District (CHCID), Metropolitan Water District (MWD) and Tonopah Irrigation District. Through these meetings, the Authority was able to gain a better perspective of the potential in-lieu and direct recharge opportunities for 1997 and to help address some concerns and questions raised by districts.

Attachments were developed out of the initial meetings with the districts, reflecting the potential in-lieu demand of each district and direct capacities at the GRUSP and Agua Fria sites. The Central Arizona Project (CAP) staff, in conjunction with the Arizona Water Banking Authority staff, then corresponded all potential recharge amounts provided by the individual districts with the monthly delivery capacities of the CAP and developed Table 16.

Please note that all capacities are given assuming full utilization of historical Pool 1 and Pool 2 water in calendar year 1997. The Authority quickly learned, as shown in these Tables, that more demand existed initially than water was available for purchase by the Authority due to financial limitations of the Authority, even with full use of Pool 1 and Pool 2. The CAWCD and ADWR have made the determination that all Pool 1 and Pool 2 water taken the previous year by the districts must be taken in calendar year 1997 prior to credits being awarded to the Authority for water delivered to a district in-lieu. The Arizona Department of Water Resources has not made an official determination, however, it is believed that Pool 3 will not have the same requirements for delivery prior to credits being awarded as Pool 1 and 2. It should also be noted that the Authority will assume responsibility for all losses incurred from the individual turnouts of the CAP and water delivered as Authority in-lieu water will not carry a take-or-pay provision similar to that of CAP Pool 1 and Pool 2 water.

The following steps were taken in developing the Annual Operating Plan:

- Step 1: Determined interest in participating in the Water Bank (acre feet)
 Determined CAP capacity constraints
 (Results shown on Table 2)

TABLE 2
ARIZONA WATER BANKING AUTHORITY
Potential CAP Delivery Schedule for AWBA Recharge
(Maximum Potential Deliveries for Direct and Indirect Recharge with AWBA Based on User's Requests)
Calendar Year 1997
(ACRE-FEET)

(PRELIMINARY 10/11/1996)

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
Estimated CAP Deliveries: (M&I, Indian, Ag Pools 1, 2 & 3, Incentive Recharge)	32,891	46,973	112,046	83,566	85,187	111,964	150,844	135,829	52,411	34,582	29,790	29,378	905,461
Available Excess CAP Capacity for AWBA:	29,000	32,000	28,000	59,000	50,000	63,000	37,000	44,000	45,000	23,000	10,000	16,000	436,000
AWBA - Recharge Sites:													
Phoenix AMA:													
Direct > GRUSP	9,000	9,000	9,000	9,000	9,000	2,000	0	0	0	0	4,000	9,000	60,000
AGUA FRIA (1)	0	0	0	0	0	0	0	0	1,000	2,000	2,000	2,000	7,000
Indirect > CHANDLER HGTS CID	0	0	0	30	36	36	42	40	36	0	0	0	220
MWD	2,000	2,000	3,000	3,000	4,000	4,000	4,000	4,000	3,000	2,000	2,000	1,000	34,000
NEW MAGMA	2,000	1,800	7,700	0	0	0	7,040	17,000	10,200	1,800	800	1,500	49,840
QUEEN CREEK	0	0	0	0	0	1,000	3,000	6,000	1,000	1,000	500	2,000	14,500
RWCD	3,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	3,000	0	0	70,000
SRP	0	0	2,502	21,166	22,168	17,166	7,168	1,168	12,666	10,666	660	670	96,000
TONOPAH ID (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
PINAL AMA:													
Direct > (3)													
Indirect > CAIDD	5,000	3,000	10,000	12,000	12,000	14,000	15,000	15,000	4,000	3,000	2,000	5,000	100,000
HOHOKAM	0	0	3,000	2,000	2,000	5,000	8,000	8,000	0	0	0	0	28,000
MSIDD	6,000	8,000	13,000	14,000	13,000	16,000	17,000	13,000	7,000	5,000	2,000	6,000	120,000
TUCSON AMA:													
Direct > AVRA VALLEY (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
PIMA MINE ROAD (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
Indirect > CORTARO MARANA ID (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
BKW FARMS (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL SYSTEM (DIRECT & INDIRECT):	27,000	31,800	56,202	69,196	70,202	67,202	69,248	72,206	46,902	28,466	13,966	27,170	579,560
Remaining CAP Capacity:	2,000	200	(28,202)	(10,196)	(20,202)	(4,202)	(32,248)	(28,206)	(1,902)	(5,466)	(3,966)	(11,170)	(143,560)

Note: Agua Fria Siphon Outage (June 16 - September 15, 1997)

The HAV through HSV Pumping Plant Capacity will not be available for recharge downstream of the Waddell Turnout during this period.

(1) - Not Available for Direct Recharge until Fall 1997. (2) - Capacity Committed to Other Partners. (3) - No Direct Facilities Currently Permitted.

- Step 2: General Fund monies divided equally between Phoenix and Pinal AMA's because of lack of facilities in Tucson AMA in 1997.
- Step 3: Calculate the amount of recharge potential in each AMA/county by funds allocated to AMA. Again, because of lack of facilities in Tucson AMA, their recharge was scheduled to occur in Pinal AMA .
- Step 4: Adjusted monthly delivery amounts based on available CAP monthly capacities (Table 1).

PRICING

The total cost to the AWBA to develop approximately 436,000 acre feet of recharge credits is \$8,250,000 including the delivery rate, cost recovery from the in-lieu user, and a direct facility use fee.

Table 3 reflects the water rates the Central Arizona Water Conservation District (CAWCD) will charge the Authority for the delivery of Colorado River water, the Authority will charge irrigation districts for in-lieu water, the rate the Salt River Project (SRP) is expected to charge the Authority for the use of the Granite Reef Underground Storage Project (GRUSP) and an estimated rate for the Agua Fria River facility currently under construction by the CAWCD.

Table 3 WATER RATES For Calendar Year 1997	
CAP delivery rate to AWBA	\$35 per acre foot
AWBA rate to In-Lieu User	\$21 per acre foot
SRP rate to AWBA for Direct Recharge	\$22 per acre foot
CAWCD rate to AWBA for Direct Recharge	\$10 per acre foot (estimate)

(Note: decision on in-lieu pricing policy is scheduled to be made by Authority members at October 16 meeting in Lake Havasu City)

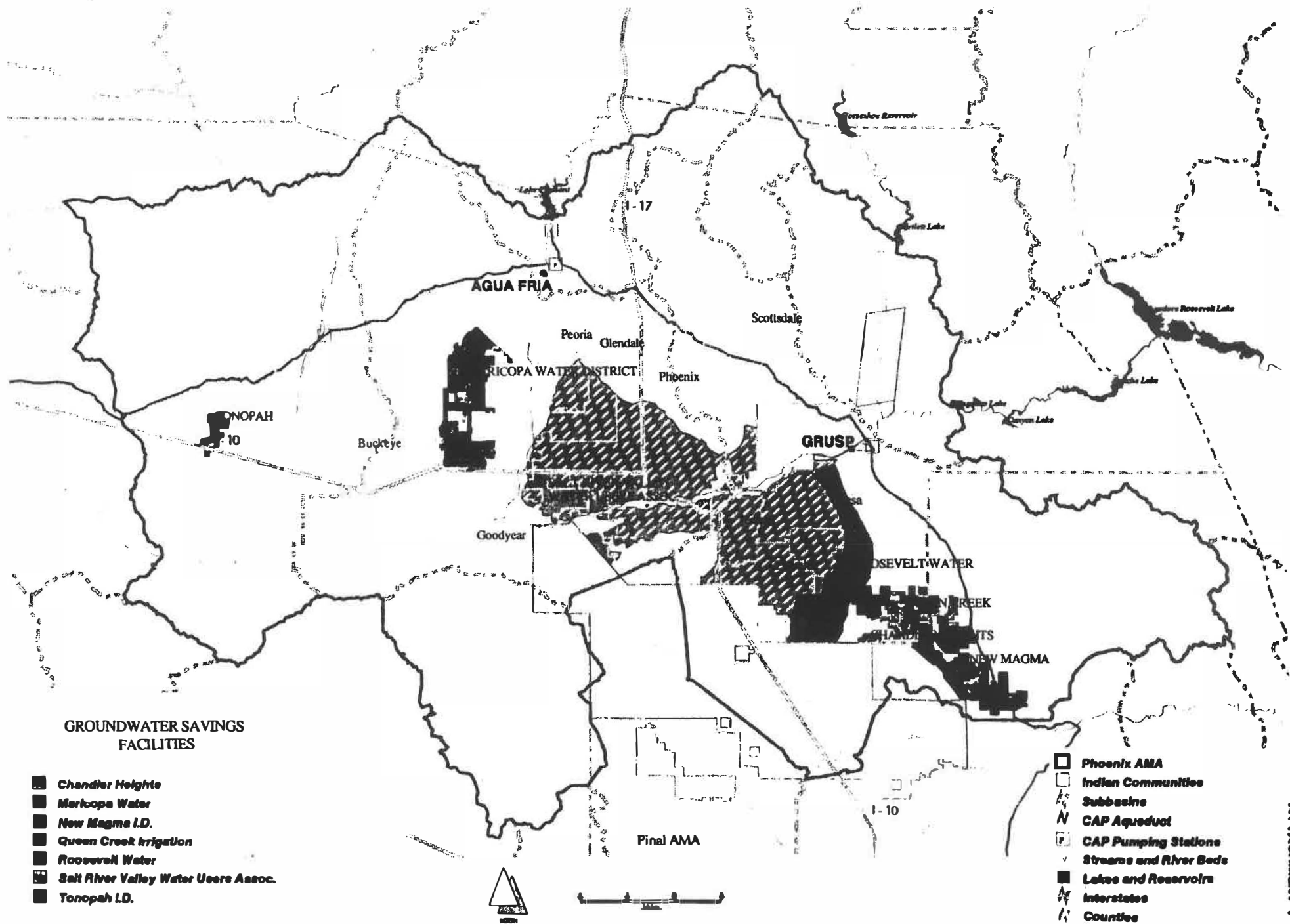
ACCOUNTING

A.R.S. § 45-2457 stipulates that the Authority shall develop an accounting system for the long-term storage credits accrued by the Authority. The accounting system shall be designed to allow the Authority to determine which funding source of the banking fund paid for each long-term storage credit accrued by the Authority.

The Arizona Department of Water Resources has set-up the accounts per A.R.S. § 45-2457 for both funding and credits. Table 4 reflects estimates of the 1997 funding and credits, which will accrue to those accounts based on this Operating Plan.

Table 4
FUNDING AND CREDIT ACCOUNTING
For Calendar Year 1997

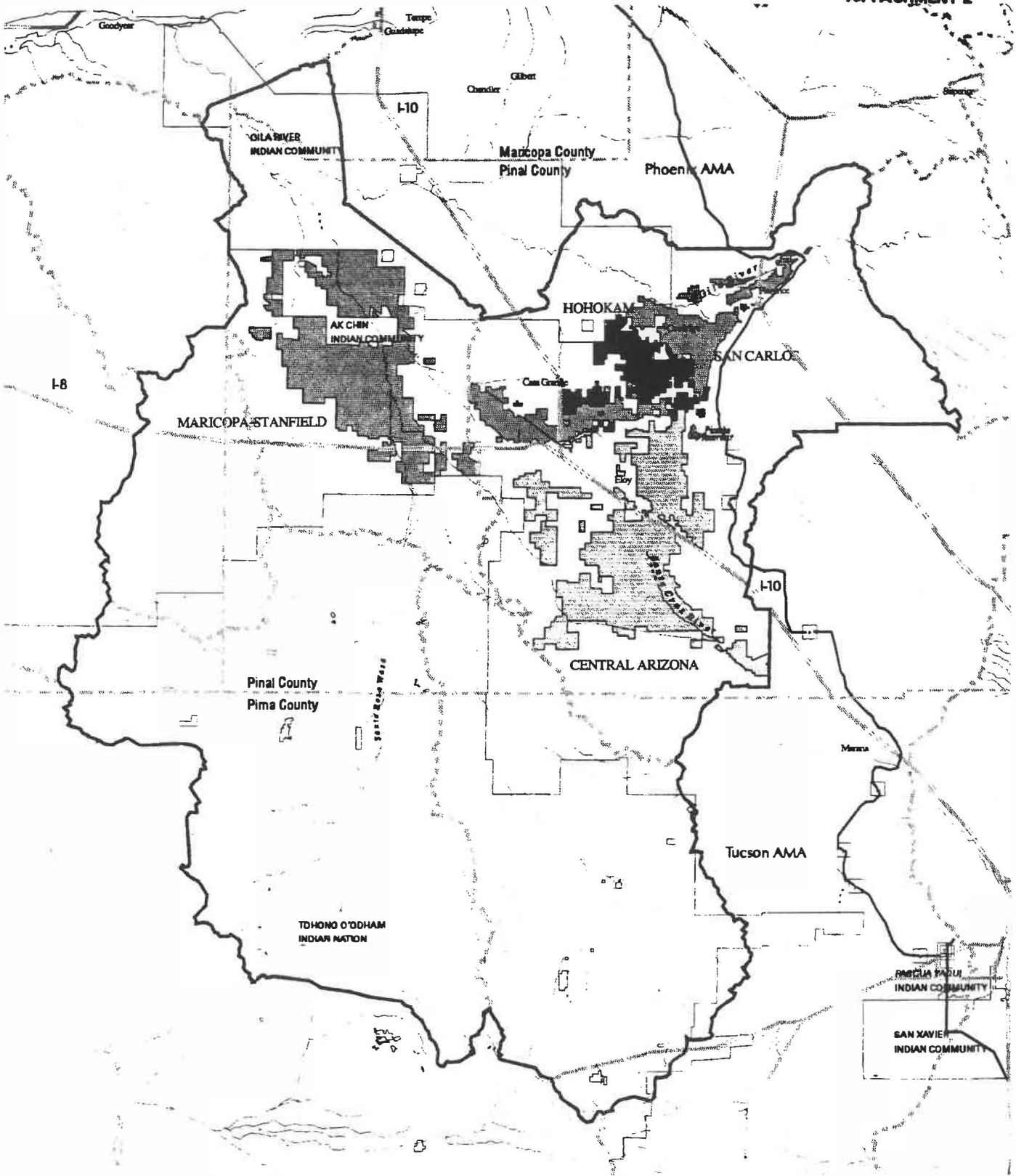
DESCRIPTION	FUNDING		CREDITS	
	AVAILABLE	EXPENDED	AMOUNT	LOCATION
<u>Withdrawal Fee</u>				
Phoenix AMA	(not available)			
Tucson AMA	(not available)			
Pinal AMA	(not available)			
<u>Four Cent Tax</u>				
Maricopa County	\$5,700,000	\$4,729,000	210,000 acre feet	Phoenix AMA
Pima County	\$1,400,000	\$1,242,000	88,700 acre feet	Pinal AMA
Pinal County	\$ 300,000	\$ 300,000	21,300 acre feet	Pinal AMA
<u>Other</u>				
General Fund	\$2,000,000	\$2,000,000	116,000 acre feet	
		(\$1,000,000)	(44,600 acre feet)	(Phoenix AMA)
		(\$1,000,000)	(71,400 acre feet)	(Pinal AMA)
California	(not applicable)			
Nevada	(not applicable)			
TOTAL	\$9,400,000	\$8,271,000	436,000 acre feet	



- GROUNDWATER SAVINGS FACILITIES**
- Chandler Heights
 - Markopa Water
 - New Magma I.D.
 - Queen Creek Irrigation
 - Roosevelt Water
 - Salt River Valley Water Users Assoc.
 - Tonopah I.D.

- Phoenix AMA
- Indian Communities Subbasins
- CAP Aqueduct
- CAP Pumping Stations
- Streams and River Beds
- Lakes and Reservoirs
- Interstates
- Counties
- Direct Recharge Facility
- Water Providers

Phoenix Active Management Area



- Pinal AMA
- Indian Communities
- Subbasins
- CAP Aqueduct
- CAP Pumping Stations
- CAP Water Treatment Plant
- Streams and River Beds

- Interstates
- Counties
- Central Arizona IDD
- Hohokam IDD
- Maricopa-Stanfield IDD
- San Carlos IDD



Scale 1:800,000

Universal Transverse Mercator Projection

Pinal AMA Recharge Facilities

IV. Arizona Water Banking Authority Water Charge for In-Lieu Recharge

Background: At their September Board meeting, the Central Arizona Project established a two year water rate for the Arizona Water Banking Authority. For 1997 the rate will be \$35 per acre foot. This rate includes a postage stamp energy rate, plus five dollars to help offset operating costs. This will be the rate the Authority will be charged for the water it will recharge in 1997 at both groundwater savings facilities and at underground storage facilities. Historically, because water delivered to the user (Irrigation District) at groundwater savings facilities is off setting groundwater pumping, thus saving the user the pumping costs, the in-lieu water has been delivered at some cost to the user. CAP delivered incentive recharge water to the Irrigation Districts at \$32 per acre foot, while the City of Tucson delivered in-lieu recharge water to Cortaro-Marana Irrigation District at \$5 per acre foot. The Authority must decide the rate it will charge the users of the in-lieu water that it will deliver.

Options: There are several options and variations of options that could be discussed when trying to establish the rate to be charged the user for the delivery of in-lieu water. This paper will present two generic options. The first is a simple percentage-based approach. For this option a percentage split of the \$35 between the Authority and the user would be applied. The benefit of this approach is that the calculations are simple. A drawback of this approach is that, because pumping cost among the districts are so different, the benefit to each district will also be very different. The second method would be to calculate the pumping cost for each district and then apply a dollar saving to those costs. This method would provide a more equitable distribution of benefits among the users but would be very data intensive. This option would also create the situation where the Authority would be paying several different rates for indirect recharge.

Recommendation: It is recommended that for this first year the Authority adopt the percentage method. This method appears to be the simplest and most straight forward given the random nature of pumping cost among the users. It is further recommended that a 40%/60% split be applied in 1997, where the user pays 60% of the \$35 delivery rate. This would equal \$21 for 1997, which means in-lieu water would cost the Authority \$14. The \$21 appears to be less than the cost of pumping for most if not all the districts that would be involved with the Authority. Also, because of aqueduct constraints in 1997, the interest in participating with the Authority in indirect recharge exceeds the ability of the Authority to delivery water so there should be no problem selling the water at this price. It also should be high enough that the Authority would not be undercutting other entities that might be interested in doing indirect recharge on their own.

ARIZONA WATER BANKING AUTHORITY

DRAFT

Criteria for Storage Facility Prioritization

One of the significant tasks of the Arizona Water Banking Authority will be to determine in what manner and where water will be stored within the State of Arizona. Although a large number of policy considerations may guide the Authority in making these decisions, some of the decisions will be shaped by the Arizona Water Banking Authority statutes (A.R.S. §§ 45-2401 *et seq.*), the location of the Central Arizona Project water conveyance system, economic factors, the cost of storage, recovery of water, water management objectives, Indian water rights settlements, Western Arizona objectives, environmental issues, regulatory and capacity issues.

One issue for consideration by the AWBA in determining water storage location is assistance in meeting Groundwater Code Objectives. The Groundwater User Advisory Council's (GUAC's) shall be consulted if the proposed facility falls within an AMA. Two statutes provide guidance on where water should be stored - A.R.S. § 45-2453 describes the process and provides some criteria by which the Authority will select types of sites for additional storage facilities, should the Authority decide that additional sites are necessary - A.R.S. § 45-2456 describes the factors the Authority should consider when the Authority develops its annual operating plan, while providing guidance on where water should be stored.

The Second Management Plans, promulgated under the Code for the state's active management areas (AMA), offer some guidance on where water storage should occur. The Second Management Plans deem water storage in the following locations to be inconsistent with the augmentation program of the Department of Water Resources:

- a) in remote or isolated locations where no benefits would be realized.
- b) in locations where storage would contribute to the migration of poor quality water.
- c) in localized areas of high groundwater levels.

[See Phoenix Second Management Plan, Ch. 7(H)(3)]

The Second Management Plan also states that water storage must meet one of the following tests to be deemed consistent with the management goal for the Active Management Area:

- a) Storage must contribute to groundwater supplies that are currently being used or that could be used in the future so long as the areas which are recharged are not experiencing problems associated with a shallow depth to water.
- b) Storage is contributing to an EPA/DEQ corrective management program.

[See Phoenix Second Management Plan, Ch. 7(H)(3)]

In addition to referencing the Groundwater Code Objectives described in the 2nd Management Plan, the Statute states that the Central Arizona Water Conservation District (CAWCD) shall be consulted in determining at what storage locations and during what times of the year water can be delivered for the Authority's use [A.R.S. § 45-2453(B)(3) and § 45-2456(B)(3)]. The proximity of the proposed facility to the CAP canal and the availability of capacities for delivery of water by CAP to in-lieu and direct facilities are two services that CAWCD will provide to the AWBA.

RANKING OF FACILITIES

There are many factors that should be considered in examining the various recharge facilities. Aspects such as meeting Groundwater Code Objectives, including eventual recovery [A.R.S. § 45-2453(B)(5) and § 45-2456(B)(4)] and the ability for CAP to deliver water to the facility are two criteria that should first be examined when considering a proposed sites.

Assuming multiple existing storage facilities meet the above listed criteria, the Authority will need to prioritize those facilities. Based on the results of the ranking process, sites will be grouped into priority categories. This "grouping" will allow for several number one priority facilities, several number two priority facilities and so on, as opposed to a straight number ranking of all facilities. The Authority will use this priority ranking to select the facilities they are interested in using to accomplish future storage. Public meetings should be held by the Authority when conducting the ranking to gain local input on the potential use of sites, including potential presentations to the Groundwater User Advisory Councils (GUAC's) and the AWBA Study Commission.

The ranking process will use the following categories in examining proposed facilities for consideration by the AWBA (a matrix will be developed to assist in the ranking, using these six defined categories).

1) COST

- **COST OF STORAGE**

What are the costs associated with using capacity at an in-lieu or direct recharge facility?
The following are factors to be included in the evaluation of the proposed site in relation to the Cost of Storage:

- * Cost of Water - although the AWBA has a base cost of water from CAP, the cost of credits are influenced by other factors such as amount of losses and transportation costs.
- * Facility Cost - what is the cost per acre foot for use of the facility by the AWBA.
- * Monies returned to the AWBA - money made available back to the AWBA for use of the resource
- * Environmental Mitigation Costs

- **COST OF RECOVERY (including intangible costs)**

What are the costs associated with recovery at an in-lieu or direct recharge facility?
The following are factors to be included in evaluating proposed sites in relation to the Cost of Recovery:

- * Transportation Costs - for ultimate use, does the water have to be moved from where it was recharged and at what cost, including associated infrastructure and operation and maintenance costs? Are there existing wells of M&I providers?
- * Associated Energy Costs - will the cost to recover the water be effected by the pumping depth? Are capital and O&M costs associated with use of a facility

2) WATER MANAGEMENT OBJECTIVES

- **PHYSICAL AVAILABILITY** - does the existing or proposed storage facility increase the supply in areas where groundwater is relied upon, or increase the opportunities for conjunctive use?
The following factor will be used in evaluation of the proposed site in relation to physical availability:
 - * location of recharge facility in relation to existing groundwater supplies
- **SUBSIDENCE** - will the existing or proposed storage facility under evaluation either prevent and/or help alleviate subsidence or earth fissures in the area or will it aggravate subsidence and earth fissures?
The following factor will be used in evaluation of the proposed site in relation to subsidence:
 - * location in relation to subsidence areas
- **GROUNDWATER QUALITY** - does storage at the facility impact the quality of native groundwater?
The following factor will be used in evaluation of the proposed site in relation to groundwater quality:
 - * total dissolved solids

3) INDIAN WATER RIGHTS SETTLEMENTS

- **LOCATION OF STORAGE SITE**
The following factors will be used in evaluation of the proposed site in relation to Indian water rights settlements:
 - * Proximity of proposed site to Indian communities
 - * Opportunity to assist in resolution of Indian water rights settlements

4) WESTERN ARIZONA OBJECTIVES

- **RECOVERY POTENTIAL** - can a site help provide certainty for Western Arizona cities that a substitute supply will be available in the future?
- **COST OF REPLACEMENT** - what is the cost of replacement of the credit?
- **LOCATION OF RECOVERY** - are specific recovery locations identified?
- **FORBEARANCE AGREEMENTS** - have forbearance agreements been entered into at time of storage?

5) ENVIRONMENTAL ISSUES

- **POTENTIAL HARM** - does the proposed storage site cause harm or concern to other parties or the environment? (ADWR is not statutorily allowed to permit a site that will cause unreasonable harm to land or other water users (A.R.S. § 45-811.01(C)(3)).
- **WATER QUALITY** - does storage at the facility impact water quality concerns such as plume management, improve ambient water quality, or improve the quality of the source

- water (stored water) through soil/aquifer treatment?
- **POTENTIAL SOURCE OF CONTAMINATION**
Factors in considering locations selection include - land uses such as landfills, agricultural and other past land uses around the proposed facility propose a potential future risk?
- **MIGRATION OF CONTAMINANT PLUMES** - does the potential exist for the migration of any existing contaminant plumes in the area of proposed recharge?
- **Wetlands Habitat** - could use of a proposed direct facility create wetlands or habitat, potentially establishing a future commitment for the AWBA?

6) REGULATORY ISSUES

- **REQUIRED PERMITS** - Given the statutory deadlines imposed, the time required to implement the proposed facility must be taken into consideration, including the issuance of proper permits. Does the propose facility have the required local, state and federal permits for the operation of the facility?

INFORMATIONAL FACTORS

In addition to the above categorical factors, the following are other issues for consideration:

- Could existing facilities be enlarged to accommodate storage by Water Banking Authority?
- Could existing effluent permitted facilities be modified to include recharge of Colorado River water by the AWBA?
- Does operational availability exist with CAWCD to deliver the water coincide with the ability for the facility to accept the water?
- **Infiltration Rate** - the rate at which water enters the soil. This instantaneous rate, when measured by conducting small-scale infiltration tests, can be substantially larger than larger scale infiltration rate for a surface recharge project.
- **Long-term Average Annual Recharge Rate** - 20 year average amount of water that can be recharged, with and without recovery in the area of hydrologic impact of the recharge project (recovery must be taken into consideration).
- **Volume of potentially recoverable water** below the recharge facility in acre feet (af).
- **Other Technical Issues** - factors including, but not limited to the transmissivity of aquifer, impeding layers in the vadose zone, surface elevation of facility.
- **Regional Benefits** - many include the sharing of conveyance, recharge and/or recovery facilities, potential recreational use, habitat restoration and multiple use benefits, such as combining flood control, recharge objectives and aesthetics.

VI. Issues Raised by the Mohave County Water Authority / RWCD / City Of Mesa Proposal

LEGAL CONCERNS

- what outstanding issues need to be solved
- how can the 4 cent tax be used
- can the funds/credits be allocated from the time of acquisition
- entering into long-term agreements

DEVELOPMENT DROUGHT CRITERIA

- under what conditions are credits dispersed by the AWBA
- who does the AWBA give the credits
- definition of a shortage on the river

LONG-TERM AGREEMENTS

- between the AWBA and irrigation districts (similar to the RWCD proposal)

DEVELOPMENT OF RECOVERY PLAN

No issue paper has been developed to date due to the many extenuating factors that still remain. As AWBA staff has talked with various parties in developing the 1997 Annual Plan of Operation, recovery has continually been raised as an issue of concern and little certainty.

The following issues have been identified as key factors in developing a recovery plan:

- certainty of recovery \ issues of supply and demand in times of shortage
- creation of a recovery account within the Water Banking Fund
- extension of 4 cent tax beyond 2016 to pay for recovery
- availability of funds at time of recovery
- who pays recovery costs and when (at time of recharge or recovery)
- who can recover and how
- what is CAP involvement
- mechanisms for recovery
- relationship between where to recharge and future recovery
- developing of agreements to provide for recovery in the future
- replacement or reimbursement
- imposing an interest rate or time factor, in addition to replacement costs

RECOMMENDATION:

- appoint a Recovery Subcommittee of the AWBA to develop a Recovery Plan
- develop an RFP to examine potential recovery options
- address the recovery issue at the AWBA Study Commission meeting scheduled for Thursday, October 31

Arizona Water Banking Authority
H.B. 2494
Interstate Water Banking Concepts

July 21, 1996

Prepared by the Arizona Department of Water Resources

H.B. 2494, as enacted by the 1996 session of the Arizona Legislature, created the Arizona Water Banking Authority. The Water Banking Authority is a state government organization authorized to purchase unused Colorado River water to provide benefits to Arizona's water users by protecting against future shortages and by providing water supply augmentation opportunities to help meet state water management objectives. In addition to these critical instate functions, the legislation also authorized the Authority to provide the opportunity for water entities in California and Nevada to bank water for their future needs. This paper describes the concepts envisioned by H.B.2494 for allowing interstate water banking agreements.

The interstate banking provisions rely on a legal framework supported by Arizona's Underground Water Storage statutes¹ and Article II(B)(6) of the *Arizona v. California* Supreme Court Decree. The underground storage statutes were first adopted in 1986 to facilitate artificial groundwater recharge activities. Additional amendments were added in subsequent years that provided for new features and concepts. The laws were extensively redrafted in 1994 to eliminate some complex provisions and to streamline permitting and accounting requirements. Article II(B)(6) of the *Arizona* decree is the provision that states that Colorado River water which is apportioned to a lower division state, but is unused by that state, may be released by the Secretary of the Interior for use by the other lower division states.

H.B. 2494 proposes an interstate banking program that would be of a long term nature. Water will probably be stored underground in Arizona aquifers for many years before there will be a need for the other state to call for its recovery. The Arizona Water Banking Authority is authorized to enter long term agreements with appropriate entities in the states of California and Nevada to store Colorado River water on their behalf. It is also given express responsibility to guarantee a mechanism so that water can be recovered when needed by those states. The bill envisions that regulations promulgated by the Secretary of the Interior will be necessary to provide adequate legal certainty that the diversions of water for interstate banking and its later recovery will fit within the accounting mechanism established by the *Arizona* Decree.

Interstate water banking agreements between the Authority and the other state entities would require contracts to artificially recharge Colorado River water in groundwater aquifers in Arizona. The Central Arizona Project (CAP) aqueducts would be used to convey the water from the river to recharge sites. It is anticipated that water storage would occur in the Phoenix, Pinal,

¹Arizona Revised Statutes, §§45-801.01 et seq.

or Tucson Active Management Areas (AMAs), or in recharge facilities located along the CAP aqueduct route in the Parker, Renegras Plains, or Harquahala groundwater basins. Since the CAP aqueduct has a fixed capacity and water demands peak dramatically in the summer months, scheduling deliveries of water for recharge purposes when aqueduct capacity is available will be necessary.

Arizona's underground storage laws create two opportunities to bank water in aquifers. Underground storage facilities may be either constructed or managed projects that are designed and operated to add water directly to the aquifer. Constructed facilities are traditional recharge projects such as spreading basins or injection wells. Managed facilities reduce construction activities but also add water directly to aquifers by slowly releasing water to natural stream beds for infiltration and percolation. Groundwater savings facilities recharge groundwater by indirect means. To become a groundwater savings facility permit holder, groundwater users such as farms or irrigation districts must develop and implement a plan to reduce groundwater withdrawals and receive Colorado River water *in lieu* of the groundwater. Though the Colorado River water is not directly added to the aquifer, there is net equivalency in aquifer storage content because of the exchange. Over the past few years, groundwater savings facilities have been used successfully in the AMAs to store about 750,000 acre feet of excess CAP water.

It is not envisioned that the Arizona Water Banking Authority would directly own or operate either underground storage facilities or groundwater savings facilities. Rather, the Authority would contract with facility owners and operators to use their facilities to store water for both instate and interstate purposes. The Authority may be required to pay a component of capital and operation and maintenance costs to use the facilities. By Arizona law, the Authority would need to obtain a water storage permit to recharge water at each facility it decides to use. The water storage permit is issued by the Arizona Department of Water Resources (ADWR) which oversees the underground storage statutes. The Authority must report the amount of Colorado River water it stored in a facility by April of each year. ADWR verifies the storage volumes and establishes a master credit account for each AMA or groundwater basin. For all water rights purposes within Arizona, the stored or banked water is considered Colorado River water rather than groundwater. As such, it is not regulated as groundwater under Arizona's Groundwater Management Code. Pursuant to a 1996 amendment to the underground storage laws, .95 acre feet of credit will be earned for each acre foot of the recoverable amount of stored water. The recoverable amount of stored water is defined as the water that will reach the aquifer through storage. The recoverable amount does not include water that was purchased but will not be recharged because of evaporative losses or distribution system losses. The combined effect of the 5% regulatory deduction and the deduction for losses may total 8 to 10%, depending upon the efficiency of the storage facility. Once a long term storage credit has been earned by the Authority, it may be held for an indefinite period, even if the water storage permit has expired.

Banked water may be recovered only from wells for which a recovery well permit has been issued by ADWR. Existing wells may be designated as recovery wells or new wells may be drilled for recovery purposes. New wells in AMAs are subject to well spacing criteria before

permits are issued, but existing wells owned or operated by a city, town, private water company, irrigation district, or the Central Arizona Water Conservation District are exempt from this requirement. Water banked in a basin or sub-basin outside an AMA may be recovered at any location within that same basin or sub-basin. Water banked in an AMA must be recovered within the same AMA. It may be recovered in a different location from where it was stored if the recovery is consistent with ADWR management plan limitations. Current management plan criteria allow recovery away from the actual storage location if: (1) the water was stored in an area where the water could be beneficially used by other groundwater users; and (2) the recovery occurs in an area of the AMA which is not experiencing a water table decline of more than four feet per year. Recovery location criteria are subject to change in each ten year management plan and may differ between AMAs. Water quality management criteria may also provide an overlying regulatory limitation on recovery locations.

Selection of storage facilities to be used for interstate banking will be made by the Arizona Water Banking Authority. The Authority consider the comparative costs of different sites, the availability of suitable recovery wells, groundwater management objectives, and other relevant factors. One strategy for interstate banking is to fully integrate projects throughout the AMAs. The AMA strategy will tend to allow maximum opportunity to recover water through existing wells and exchange the recovered water with CAP contractors. The AMAs are also where all of the current groundwater savings facilities are located. An alternative approach would be to isolate interstate banking at underground storage facilities in one of the western Arizona basins. The advantage of this strategy is that the water will remain close to the CAP aqueduct and can be recovered directly into the aqueduct for delivery to downstream customers. This strategy also has the advantage of avoiding an aqueduct capacity conflict during peak summer months since these sites are west of the New Waddell regulatory storage reservoir. Under normal CAP operations, most summer month deliveries are made from New Waddell so the aqueduct tends to be fully utilized to the east of the reservoir. The disadvantage of the western basin strategy is that facilities for both storage and recovery would need to be constructed strictly for banking purposes and the comparative costs will likely be higher.

Water that may be available for interstate banking is likely to be limited to that which is in excess of direct use needs. Several potential sources have been identified, but there is no agreement by Arizona or by other basin states as to the acceptability of off-stream banking of these sources for interstate purposes.

Currently, Arizona and Nevada are both using less than their normal year mainstem apportionment of 2.8 million acre feet and 300,000 acre feet respectively. Supplies within these legal entitlements, but in excess of Arizona's or Nevada's yearly use needs could be a potential water source for interstate banking. When both states are using less than their normal apportionments, the unused water could be brought into Arizona for storage for Nevada's future benefit, but under the control of the Arizona Water Banking Authority, within Arizona's normal 2.8 million acre foot apportionment.

In a year in which Nevada had unused apportionment, but Arizona was using its full 2.8 million acre foot apportionment, Nevada's unused apportionment might be directed into Arizona for storage for Nevada's future benefit under Article II(B)(6) of the Decree. Under this arrangement, it would be necessary, for example, to have an agreement with California water entities not to request that water for their use under Article II(B)(6), or have in place a regulation by the Secretary of the Interior that would allow Nevada's unused entitlement to be directed to a particular state (Arizona) where it would be banked and be available for Nevada in the future. Regulations of this nature would describe the criteria the Secretary would use to interpret Article II(B)(6) of the Arizona Decree in particular situations. It is recognized that water users in California have been diverting the unused entitlement of Nevada for many years and could be affected in normal and limited surplus years if that water were to be banked by interstate agreements.

Water made available because of a surplus condition determination is another potential source of supply for interstate banking. Long term operating criteria for determining surplus conditions have been under discussion and analysis for several years. Water which is released from reservoir storage to comply with flood control operating criteria could probably be made available for interstate off stream banking without creating impact to other water users. Other suggested operating criteria would declare surplus conditions before an actual spill condition existed. Based on a risk assessment to other state interests, declaring surplus conditions in a manner that would allow some additional water to be moved off stream for the benefit of Nevada or California may be possible. If a shortage were later to occur because of this operating criteria, mitigating any direct affects by making banked water available to the impacted users in Arizona or Nevada may be necessary.

Another possible water source for interstate water banking is water that has deliberately been made available within a state. This water may be the result of land fallowing agreements or other types of conservation measures. The saved water could then create an unused apportionment within the conserving state, which would be directed for delivery to Arizona for banking purposes pursuant to Secretary of the Interior's regulations as described previously.

Arizona's ability to divert water into the CAP for other states will be limited by its legal rights to use water under the Law of the River. Interstate water banking activities would not occur until all water users within Arizona had the opportunity to order and use water for their own needs. This would include meeting the needs of the Water Banking Authority for instate purposes and allowing Arizona contractors with unused apportionment contracts (fifth priority) to order extra water. If, after meeting those needs, Arizona's consumptive use is still less than 2.8 million acre feet, water could be diverted to Arizona for interstate banking purposes. In years when Arizona is using more than 2.8 million acre feet as a result of the increased diversion for interstate banking, Arizona would need the ability to use another state's unused apportionment under normal conditions or would need to rely on an increased allowable consumptive use resulting from a surplus condition determination. If neither of these conditions existed, Arizona could not bank water for interstate purposes in that year.

It is impractical and probably economically infeasible for water banked in Arizona aquifers to be delivered directly to interstate water users after it has been recovered from storage. The H.B.2494 water banking concept envisions that recovered water would be returned to the California or Nevada water users through an exchange mechanism. When the recovery of water is requested, water would either be pumped directly into the CAP aqueduct for delivery to contractors or be pumped from a recovery well connected to the distribution system of a CAP contractor. CAP contractors' water orders would be satisfied with the recovered water rather than water diverted from the Colorado River at Lake Havasu. This mechanism will allow Arizona the opportunity to voluntarily forebear from diverting all of its water entitlement from the Colorado River. This purposeful forbearance of diversions will create unused apportionment that would be directed back to the state which requested the recovery. This directed delivery of unused apportionment would also need to be supported by Article II(B)(6) Interior Department regulations. Within Arizona, only the Arizona Water Banking Authority is authorized by the State Legislature to create a voluntary forbearance of the Colorado River apportionment. Therefore, independent Arizona contractors cannot provide a guarantee that unused water created through forbearance would be made available for exchange. The proposed Interior Department regulations must recognize this special authorization.

Once the directed unused apportionment water has been made available to the state entity in Nevada or California, it would be the entity's responsibility to ensure the water would be delivered to the individual contractor who had funded the banking agreement and requested its recovery. The arrangements necessary to direct the banked water to a particular water user would be an internal matter within California or Nevada and would not need to be addressed in the Interior Department regulations.

Arizona Water Banking Authority
Interstate Water Banking Agreements
Relevant Statutory Sections

45-2471. Interstate water banking agreements

A. The Authority may negotiate and enter into interstate water banking agreements with appropriately authorized agencies in California and Nevada if all of the following apply:

1. The provisions of Section 45-2427, Subsection C have been met.
2. The Director and at least two other voting members of the Commission vote in agreement to enter into an interstate banking agreement.
3. The Authority shall not enter into agreements with California and Nevada agencies that require the Authority to reduce Arizona diversions from the Colorado River more than a total of one hundred thousand acre-feet of water in any one year.
4. No interstate banking agreement may be inconsistent with the decree.

B. In each interstate water banking agreement, the Authority may agree to store Colorado River water in Arizona so that the stored water may be used in place of Arizona diversions from the Colorado River in years in which the California or Nevada agency requests water from the Authority.

C. In each interstate water banking agreement, the California or Nevada agency shall agree to pay the Authority all costs that are or will be incurred by the authority in storing and recovering Colorado River water pursuant to the interstate banking agreement. The costs include all of the following:

1. The cost of acquiring Colorado River water.
2. The cost of delivering that Colorado River water through the Central Arizona Project to a storage facility, including fees for the operation, maintenance, pumping energy and capital costs of the Central Arizona Project as established by CAWCD.
3. Amounts equivalent to taxes ordinarily paid by CAWCD subcontractors and their customers to pay for the repayment, operation and maintenance costs of the Central Arizona Project, to the extent those equivalent amounts are not collected by paragraph 8 of this subsection.
4. The costs of storing that Colorado River water.
5. The cost of constructing, operating and maintaining a storage facility to the extent that facility stores water for the California or Nevada water agency.
6. The cost of recovering the stored water and delivering it to Colorado River water users in this state to use in place of Colorado River water that would otherwise be used.
7. A fee equivalent to the approximate amount of administrative, legal and technical expenses incurred by the Authority in storing water for the California or Nevada agency, recovering that stored water and making an equivalent amount of Colorado River water available to the California or Nevada agency.
8. Any fee paid in lieu of taxes pursuant to section 48-3715, subsection B by the Authority in acquiring the water to be stored.

D. In each water banking agreement, the Authority shall agree that in years in which the California or Nevada agency request recovery of water stored in Arizona, the Authority shall

cause a decrease in Arizona diversions from the Colorado River by the amount of water requested for recovery by the California or Nevada agency, thus creating unused entitlement for delivery to that agency by the United States Secretary of the Interior pursuant to Article II(B)(6) of the decree. These banking agreements may provide that during years when the Secretary of the Interior has declared a shortage on the Colorado River, no decrease in Arizona diversions shall be required.

E. Each interstate banking agreement shall specify that if the California or Nevada agency breaches the terms of the agreement the Authority shall cease creating unused entitlement for that entity until the breach is cured.

45-2427. Limitation on powers

C. The Authority shall not enter into contracts with agencies in California and Nevada for the storage of water on their behalf until both of the following occur:

1. Regulations are in effect, promulgated by the Secretary of the Interior of the United States, that facilitate and allow the contractual distribution of unused entitlement under Article II(B)(6) of the decree.

2. The Director finds that the rules promulgated by the Secretary of the Interior adequately protect this state's rights to Colorado River water, as those rights are defined by the decree.

45-3715. Tax levy

A. On or before the second Monday in August of each year, the clerk of the county board of supervisors of each county within the district shall certify to the district board the total assessed valuation of all taxable property in the county. On or before the third Monday in August of each year, the district board shall fix the amount to be raised by direct taxation for the purpose of carrying out the provisions of this chapter, and shall levy a tax sufficient to raise such amount. Such tax shall not exceed ten cents on each one hundred dollars of assessed valuation in the district. The district board shall forthwith certify such tax rate to the board of supervisors of each county within the district, which boards at the time of levying general county taxes shall levy and cause to be collected taxes on the taxable property within such county at the tax rate fixed by the district board. The tax when collected shall be paid to the state treasurer and be credited to the district fund to be expended by the district only for purposes authorized by this chapter, which shall include costs and expenses of administration.

B. The district board shall charge and collect a fee in lieu of taxes paid pursuant to subsection A for each acre foot of Central Arizona Project water purchased or leased and delivered to or credited to a purchaser or lessee. The amount of this fee shall be computed by dividing the sum of the taxes levied in each county within the district pursuant to subsection A in the year in which the fee is charged by the amount of Colorado River water available for diversion in the Central Arizona Project as determined by the Secretary during that year. This fee does not apply to:

1. Indian tribes with respect to water used directly on Indian reservation land in this state or land owned in this state by the Indian tribe.

2. Water service providers whose customers are real property owners within the service

area of the district and who pay the tax levied pursuant to subsection A. For the purposes of this paragraph, "water service provider" means any person that has any obligation or duty of any nature to deliver water within the district's service area.

3. Persons who have entered into a contract with the district under which they agree to make payments in lieu of the tax levied pursuant to subsection A.

4. Persons that are real property owners within the service area of the district and that will use the water within the district's service area.

5. The Arizona Water Banking Authority if that Authority is acquiring water that will be used for the benefit of those persons prescribed in this subsection.

Arizona v California Article II(B)(6)

If, in any one year, water apportioned for consumptive use in a state will not be consumed in that state, whether for the reason that delivery contracts for the full amount of the state's apportionment are not in effect or that users cannot apply all of such water to beneficial uses, or for any other reason, nothing in this decree shall be construed as prohibiting the Secretary of the Interior from releasing such apportioned but unused water during such year for consumptive use in the other states. No rights to the recurrent use of such water shall accrue by reason of the use thereof.

Water Banking Authority Study Commission
Agenda Sub-committee
October 11, 1996

- I. Meeting Dates
 - A. October 31
 - B. November 18 (tentative)
 - C. December 16 (tentative)

- II Study Commission Priorities (from first meeting)
 - A. Colorado River Indian Tribes use of AWBA
 - B. In-lieu recharge opportunities
 - C. Expanding shortage protection concepts
 - D. Interstate banking
 - E. Indian participation/ land fallowing opportunities
 - F. Funding
 - G. Participation by rural Arizona
 - H. Pricing and marketing of water or credits by Authority
 - I. Study committee on Indian water rights issues
 - J. Protecting Arizona's Colorado River entitlement
 - K. Long-term plan of operation for AWBA
 - L. Technical data development
 - M. Recovery planning

- III. Suggestions for future meetings
 - A. Current authorities and limitations of AWBA established by HB 2494
 - B. Presentation on overall demand and shortage issues
 - Basic data on supply and demand in Colorado River Basin
 - C. Briefing on the legal parameters for protecting Arizona's 2.8 maf allocation
 - D. Presentations by California and Nevada
 - What are the needs of California and Nevada for participating in interstate water banking?
 - E. Information on water banks in other states

KEY DATES / TIME LINE

(updated 10/8/96)

1996

April 30

HB 2494 - Chapter 308 signed by Governor Symington

July 9

Appointments made to the Arizona Water Banking Authority and Study Commission

July 31

Annual Reports hand-delivered to Governor, President, Speaker

August 30

FY 98 General Fund appropriation request submitted to Governor, President and Speaker

October 9

Mailing of materials to Authority members for October 16 meeting
Mail copies of the proposed Storage Site Criteria and 1997 Annual Plan of Operation to mailing list and the Phoenix, Pinal and Tucson GUAC members for review prior to October 16 meeting

October 16

AWBA Meeting - Lake Havasu City
Presentation and initial recommendation of 1997 Annual Plan of Operation
Discussion of water charge for in-lieu and direct recharge
Presentation of proposed Storage Site Criteria by Authority
Presentation on Mohave County Water Authority, RWCD, City of Mesa proposal
Discussion on Interstate Water Banking
Update on AWBA Study Commission
Presentation by Consolidated/Geare on Cibola Valley Irrigation and Drainage District

October 24

Presentation of 1997 Annual Operating Plan to Pinal GUAC by Authority staff

October 25

Presentation of 1997 Annual Operating Plan to Tucson GUAC by Authority staff

Week of October 28

Presentation to SRP by Authority staff (John Keane)

KEY DATE / TIME LINE

Page 2

November

First half of 4 cent tax due to Authority

Week of November 4

Begin finalization of 1997 Annual Plan of Operation based on comments received from presentations to GUAC's and the Authority (Phoenix comments to be included)

November 4

Mailing of November 20 tentative agenda and finalized meeting minutes from September 10 meeting to AWBA members, Study Commission members and mailing list

November 6

Presentation of 1997 Annual Operating Plan to Phoenix GUAC by Authority staff

November 7

Presentation of 1997 Annual Operating Plan to CAWCD Board

November 11

Deadline for materials for November 20 meeting

November 12

Mailing of materials for November 20 meeting to Authority members

November 20

AWBA Meeting - AZ Department of Water Resources
Final adoption of 1997 Annual Plan of Operation by Authority
Recommendations and initial adoption of IGA by Authority
Review of draft agreement document by Authority
Discussion on Interstate Water Banking

November 21

Presentation of draft IGA to CAWCD Water Planning and Policy Committee

December 1

ANNUAL PLAN OF OPERATION (45-2456 p.37 lines 25-43, p.38 lines 1-39)
1997 Plan of Operation submitted to Governor, President and Speaker

December 2

Mailing of December 18 tentative agenda and finalized meeting minutes from October 16 meeting to AWBA members, Study Commission members and mailing list

KEY DATE / TIME LINE

Page 3

December 5

Consideration of draft IGA by CAWCD Board for recommendation and approval

December 9

Deadline for materials for December 18 meeting

December 10

Mailing of materials for December 18 to Authority members

December 18

AWBA Meeting - Yuma

Authority consideration and possible approval of applications submitted

Discussion on Interstate Water Banking

1997

March

General Fund appropriation for Authority determined by Legislature

March 1

INVENTORY OF EXISTING STORAGE FACILITIES DUE

(45-2452 p.34 lines 41-44, p.35 lines 1-31)

Determination if existing facilities meet Authority's needs for next 10 years

If Facilities Inventory concludes additional facilities are needed - the Authority must develop plan for the development of additional storage facilities

(45-2453 p.35 lines 33-42, p.36 lines 1-41)

May 1

Any additional requests or changes in Cost of Services budgets submitted by Authority to DWR and CAWCD for FY 98

June 1

DWR/CAWCD submit Cost of Services budget proposals for FY 98 to Authority

Revised Cost of Services budget proposals approved by Authority (if necessary)

FY 98 Annual Operating Budget preliminarily reviewed by Authority

June

FY 98 Annual Operation Budget adopted by Authority

KEY DATE / TIME LINE

Page 4

July 1

TARGET TO STORE 100,000 AF OF COLORADO RIVER WATER

(45-2451 p.34 lines 31 - 39)

Fiscal Year 1998 begins - General Fund appropriations available

August 1

ANNUAL REPORT DUE TO GOVERNOR, PRESIDENT, SPEAKER

(45-2426 p.33 lines 38-44 p.34 lines 1-15) Submit to Governor, President and Speaker

Possible inclusion of request for General Fund appropriation for FY 99

Report amount of water stored / state reasons if not 100,000 acre feet

(45-2451 p.34 lines 31-39)

November 1

STUDY COMMISSION INTERIM REPORT DUE

Interim report developed by Study Commission must be filed with the legislature

December 1

ANNUAL PLAN OF OPERATION (45-2456 p.37 lines 25-43, p.38 lines 1-39)

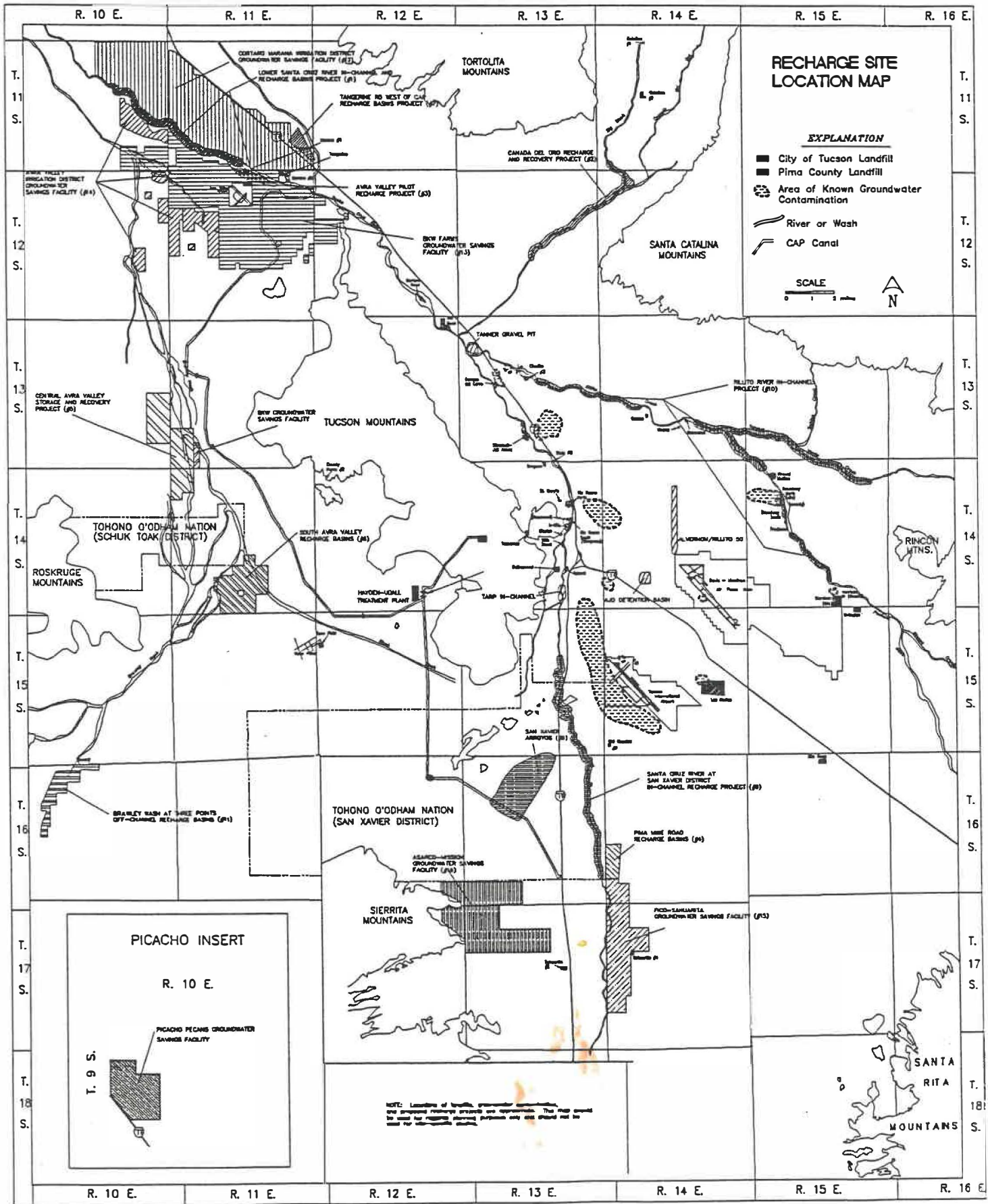
Authority shall adopt a plan for calendar year 1998

1998

November 1

STUDY COMMISSION FINAL REPORT DUE

Final report must be filed with the legislature



RECHARGE SITE LOCATION MAP

EXPLANATION

- City of Tucson Landfill
- Pima County Landfill
- ⊗ Area of Known Groundwater Contamination
- River or Wash
- CAP Canal

SCALE
0 1 2 miles



PICACHO INSERT

R. 10 E.

T. 9 S.

PICACHO PECANS GROUNDWATER SAVING FACILITY

NOTE: Location of landfill, groundwater contamination, and groundwater recovery systems are approximate. This map should be used for planning purposes only and should not be used for other specific details.

SANTA RITA MOUNTAINS

**Arizona Department of Water Resources
Tucson Active Management Area
September 6, 1996**

Regional Recharge Planning Effort - Summary Materials

The first phase of a regional planning effort to enhance recharge opportunities in the Tucson area has culminated in the publication of a new technical report on recharge. The 186 page report is titled "*Regional Recharge Committee - Technical Report*". Phase two of this process will involve actually developing the regional plan, with the participation of the various interests and jurisdictions.

The Tucson Active Management Area office of the Department of Water Resources has been coordinating this effort to overcome the various institutional and political limitations associated with recharge. The first phase of plan development involved the establishment of the Regional Recharge Committee (RRC). In order to develop an objective background document for the planning effort, twenty-two hydrologists and engineers from a broad spectrum of public and private interests were asked to donate their time. The report contains the consensus view of the RRC regarding a number of controversial technical issues associated with recharge. (A list of the RRC members is included in Appendix A).

Objectives of the regional recharge planning effort include:

- Providing a forum for regional cooperation regarding recharge activities
- Maximizing the use of renewable water supplies in the Tucson AMA
- Optimizing the sharing of recharge, pumping and transmission facilities
- Expediting the selection, testing and construction of groundwater recharge facilities
- Providing a background document for the facilities plan that will be required by the Arizona Water Banking Authority

At the end of August, the RRC met jointly with the Institutional and Policy Advisory Group (IPAG) to initiate the second phase of the plan development process. The IPAG is composed of representatives of the various jurisdictions, as well as experts in the fields of economics, law and policy. Their charge is to develop the regional plan in the context of political reality, using the consensus RRC report as a starting point. (A list of the members of the IPAG is in Appendix B).

Although a strategy has not yet been laid out for overcoming political and institutional limitations, several work tasks were agreed to at this first meeting of the IPAG. First, the Tucson AMA staff will spearhead a "needs assessment", whereby all entities who are interested in participating in recharge efforts will be interviewed. The intent is to identify parties who have similar or compatible objectives who can collaborate on development of recharge facilities through a partnering process. Another pending activity is conducting a workshop to develop a draft regional plan once the needs assessment is completed.

The Department of Water Resources is involved in this regional recharge planning process for a number of reasons that go beyond the need to encourage cooperation. Recharge has been identified as a key tool in addressing certain water management problems, such as:

- Ensuring a long term reliable supply of water for municipal, industrial and Indian needs (particularly during shortage years on the Colorado)
- Addressing physical availability problems and groundwater level declines
- Mitigating land subsidence and earth fissures
- Managing contaminant plumes

Findings

Recharge activities have been under consideration in the Tucson area for decades, but few recharge facilities are in place and very little water has been recharged to date. There are several projects still in the permitting stage that may be coming on line in the near future. A listing of 35 existing and potential recharge projects is attached to this summary as Appendix C. Appendix A contains four separate tables: 1) Permitted Recharge Facilities; 2) Proposed Recharge Facilities (not evaluated by RRC); 3) Proposed Recharge Facilities (evaluated by the RRC) and 4) Newly Proposed Recharge Facilities that were not listed at the time the RRC did its initial screening.

Starting with the complete list of 35 recharge facilities, the Regional Recharge Committee identified 16 facilities for further investigation. Site evaluation criteria were selected, including physical, economic and regional considerations. Each of the 16 facilities were reviewed in detail, including a conceptual level facility design and cost breakdown. A summary of the cost-related findings is attached as Appendix D. The map that appears as the cover of this booklet shows the location of all 35 recharge facilities that are on the inventory. The facilities that were reviewed in greater detail appear on the map with the facility number as it appears in Table 3 of Appendix C. Other items on the map include landfill locations and known areas of groundwater contamination.

The RRC report contains substantial information related to recharge:

- **Background information**, including: a summary of demand and supply conditions; summary materials describing the hydrology of the Tucson AMA; water demand by sector; effect of groundwater mining; implications of the Groundwater Management Code; the Central Arizona Project; Proposition 200; and effluent utilization.
- **An introduction to recharge**, including: regulatory requirements; water quality implications for CAP recharge; water quality implications for effluent recharge; land subsidence considerations; habitat/recreation implications; a description of the major players in therecharge arena; alternative recharge objectives; and an analysis of alternative recharge methods.

- **A discussion of water quality considerations** associated with recharge, including: constituents of concern; long-term water quality impacts of recharge; and surface water/groundwater regulatory implications.
- **An in-depth analysis of various recharge related issues of concern to the community**, including: the amount of water that can be recharged in streambeds in the central Tucson wellfield; the effect of in-stream recharge on flooding and rejected natural recharge; landfill risk relative to recharge; the role of recharge in plume management; CAP water delivery and recharge potential; criteria to mitigate subsidence; criteria for habitat management; and implications of the Endangered Species Act.
- **A listing of recharge siting criteria** selected by the RRC.
- **Recharge facility descriptions** for the 16 selected sites, including cost information.
- **Conclusions** regarding site suitability to achieve various recharge objectives.

The appendices include other useful information, such as a history of recharge in the Tucson area, the listing of existing and proposed recharge facilities, and a list of acronyms and abbreviations.

Conclusions

It is the consensus of the RRC that recharge is a valuable way to store water; it can accomplish a number of objectives, so long as site-specific investigations and pilot tests are done to ensure that the source water and recharge method are compatible with the geohydrology and the land and water uses in the area.

The objectives that can be met by recharge include (among others): water storage to offset future droughts and interruptions in CAP supplies; recharge (with or without recovery) as a component of an assured water supply demonstration; mitigation of land subsidence due to depletion of groundwater supplies; habitat enhancement and restoration; and recreational opportunities.

RRC specific observations include:

1) Although the mechanisms of recharge are conceptually simple, the technical aspects are relatively complex. For example, many people believe that the high infiltration rates in the riverbeds in the Tucson basin mean that vast quantities of water can be recharged in these areas. However, the real constraint to recharging large quantities of water in the riverbeds, and elsewhere, is not the surface infiltration rate--it is the rate at which the water can move from the surface alluvial materials down into the regional aquifer. Recharge is a complicated process which requires site-specific studies and pilot tests to assess effectiveness, cost and environmental impacts.

2) Water quality considerations regarding recharge are related to the source water, the ambient groundwater quality of the site, the soil chemistry, the quantity of water to be recharged, the degree of mixing with the ambient groundwater, past land use practices, and the distance traveled in the vadose (unsaturated) zone. Except for source water quality, these are all site-specific considerations. For example, although CAP water has a higher TDS (total dissolved solids) content than the average groundwater in the Tucson AMA, it has a lower TDS level than the groundwater supplies in some parts of the AMA. In some cases, recharge of CAP water would improve the quality of the ambient groundwater.

3) As a source water, CAP is generally viewed as being of appropriate water quality for recharge. From the perspective of regulated constituents (primary maximum contaminant levels for drinking water regulated by the EPA) there are no implications associated with recharging CAP water, other than the higher natural organic content. CAP, like most other surface water, does exceed primary MCLs for bacteria and turbidity. These pollutants are usually removed when recharged. Surface water generally has higher levels than groundwater of organic materials, which can form trihalomethanes (THMs) in combination with chlorine. However, the concentrations of organic constituents can be reduced through the recharge process, depending on the recharge method and the contact time with the vadose zone and aquifer materials. It should be noted that THM formation potential requires additional research.

4) Recharge of CAP will affect secondary water quality standards (primarily aesthetic considerations). These include sulfate, TDS and hardness. These constituents are not likely to be mitigated by the recharge process, except through mixing with the native groundwater. As noted above, additional research and pilot tests are required to address public concerns.

5) There appear to be some misconceptions regarding the costs associated with recharge. The energy-related implications of both delivery to the site and recovery of the recharged water are often overlooked. Releasing effluent or CAP water into riverbeds may be relatively inexpensive if there are existing delivery systems to deliver the water and there are no regulatory, institutional or water quality concerns. However, the cost and time associated with preliminary site investigations and pilot tests to ensure that there are no negative environmental effects, the hydrologic studies and permitting costs, and the costs associated with ongoing monitoring are frequently overlooked.

6) Key cost factors to consider for recharge projects include: a) proximity to source water (i.e. distance from CAP canal); b) short and long-term recharge rates at the site; c) ability to utilize existing infrastructure, d) land acquisition costs; e) recovery costs; f) treatment costs prior to use; and g) regulatory considerations.

7) There are also unknown costs associated with the regulatory environment. For example, the "Section 7 Consultation" component of the Endangered Species Act could add considerable costs to recharge projects in or near a floodplain to mitigate against the possibility that non-native fish could be introduced into a watershed and compete with endangered fish species. This is a significant consideration in the Tucson area at this time, since the U.S. Fish and Wildlife Service has not yet

concluded what degree of mitigation is required and which projects will be affected. Further costs may be associated with recovery of recharged CAP water if that water is deemed to be “groundwater under the influence of surface water.” If this is the case, the recovered water would have to be treated in a standard surface-water treatment facility prior to delivery. There is also the potential for this issue to delay projects.

8) There is no question that “groundwater savings” (in-lieu) recharge is a cost-effective way to utilize renewable water supplies, particularly in the short-term. This is because the need for new infrastructure is minimal, especially where the renewable water supply is readily available to the participating agricultural or industrial groundwater user. However, the benefits that are provided by in-lieu projects may not be as substantial as the long-term benefits provided by direct recharge.

9) There appears to be the capacity to recharge very large volumes of water using multiple sites within the Tucson AMA. However, the opportunities for recharge in the central Tucson basin have been overstated and oversimplified. The primary limitations of in-channel recharge of the central basin are: a) the differences between short-term (at the surface) infiltration rates and long-term (at the regional aquifer) recharge rates; b) the limitations imposed by landfills and existing areas of groundwater contamination; and c) lack of infrastructure to deliver CAP water to the area of the central wellfield or further upgradient.

10) The RRC concluded that significant artificial recharge in some riverbeds with shallow depths to water (particularly the Rillito) will result in reduced natural recharge from storm runoff. This means more of the natural runoff with the lower TDS concentration could move downstream. This may be a consideration in siting recharge facilities relative to wellfields, managing them, and determining the amount of water to store at each location.

11) The higher salinity of CAP water will impact the Tucson area regardless of the way in which the water is used. Direct use of CAP water will result in more saline effluent being produced at the regional treatment plants. Effluent recharge will result in increased salt loading in the aquifer, downstream of the treatment plants. Recharge projects using CAP water will also result in increased salt loading within the aquifer below the recharge sites. The only way that the salts contained in the CAP water will not affect the aquifer is if an advanced treatment facility is used to demineralize the water and the salts are disposed of in a manner that prevents a groundwater impact. This is an extremely expensive proposition. It should be noted that in the general population, there is no known health effect associated with the TDS or hardness levels in CAP.

12) It is possible to mitigate the effects of landfills and to recharge near them. There are various types of barriers and management methods that can be used to prevent the recharge water from intercepting a landfill. However, the RRC recommends that areas containing landfills be avoided in the short term because there are plenty of recharge sites that do not have known landfill or contamination problems. The higher cost associated with recharging near landfills may vary based on site-specific considerations such as what the landfills contain, depth to water, type of mitigation required, etc.

13) Recharge may be particularly attractive where multiple benefits can be accrued, such as subsidence mitigation, environmental enhancement, or management of an existing plume of contaminated groundwater. There appear to be many opportunities for collaboration in developing recharge projects with regional benefits.

14) In addition to the conclusions listed here, the RRC has identified a number of topics that require further study. The highest priority items include:

- Groundwater savings facilities investigations.
- Continuation of the evaluation of potential sites and the refinement and/or expansion of the evaluation matrix provided by the RRC.
- What is the fate of disinfection by-products and organic THM pre-cursors in recharged waters in different soils?
- Reconnaissance level surface and subsurface investigations at selected sites to evaluate recharge capacity, including soils assessment and infiltration tests, and exploratory drilling and sampling of the vadose zone.
- Preparation of hydrologic reports to be used in pilot recharge facility applications for facilities of regional interest.
- Pilot project testing to delineate short-term and long-term infiltration rates in spreading basins using groundwater for the Cañada del Oro and other in-channel recharge projects.

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Appendix C: Existing and Proposed Recharge Facilities

Table 1- Permitted Recharge Facilities

Permit No./ Facility Name	Type of Recharge	Recharge Volume (AF)*	Source Water	Credits Accrued (AF)	Associated Permits	Project Status/ Comments
72-538100 CAWCD/CMID	GSF	10,000	CAP	2,650 as of 12/31/94	73-538100 73-547710	Facility is permitted and operating. Tucson Water & CAWCD are supplying water. One of the two entities may apply to increase the permit volume.
72-538133 CAWCD / Tucson Water / MDWID / BKW Farms	GSF	8,800	CAP	2,014 as of 12/31/94	73-538133 73-545928 73-555750	Facility is permitted & operating. CAWCD and Tucson are supplying water. Augmentation grant awarded to construct delivery ditch - \$51,000.
71-535587 Tucson Water - 1st Pilot Injection Project	IW	10,000	CAP	2,394.9 as of 12/31/93	73-535587	Facility is permitted. No injection was done in 1994 or 1995 due to Mayor & Council decision to cease CAP deliveries.
71-537406 Tucson Water - 2nd Pilot Injection Project	IW	10,000	CAP	2.2 as of 12/31/93	73-537406	Facility is permitted. Reported 1574 AF in 1994. No injection since 10/1/94 maintenance outage and Mayor & Council decision to cease all deliveries of CAP.
71-520083 Sweetwater USF	SB	6,500	Effluent	80.1 as of 12/31/93	73-520083	Facility is permitted. Have applied to increase # of basins to reach max permitted amount of 6,500 AF.
71-551092 CAWCD / MDWID Avra Valley Pilot Project RRC Site No. 3	SB	10,000	CAP	NA	73-551092 73-552745	Capacity of full scale facility may be limited by fine grained layers. Part of Northwest Replenishment Program. Permit issued in June, 1996, project operational in July, 1996.
71-557981 (Pilot) 71-556102 (Full scale) Tucson Water-Central Avra Valley Storage & Recovery (CAVSARP) RRC Site 5	SB	100,000	CAP	NA	73-558078	Pilot permit issued 8/1/96 (500 AF). Application for full scale facility received 9/4/96.

*Estimated recharge volume based on preliminary site facility descriptions.

GSF-Groundwater Savings Facility

IW-Injection Wells

IC-In-channel

SB-Spreading Basins

9/5/96

**Table 2 - Proposed Recharge Facilities
(Not Evaluated by RRC)**

Permit No./ Facility Name	Type of Recharge	Recharge Volume (AF)*	Source Water	Credits Accrued (AF)	Associated Permits	Project/Status/ Comments
71-545944 Tucson Water - Santa Cruz River Managed Project	IC	9,307	Effluent	NA	73-545943	Application found complete/correct on 2/29/96. Two objections received 4/3/96. No hearing date scheduled.
64-544777 SaddleBrooke	IW	621	Effluent	NA	NA	Application found incomplete/incorrect on 10/13/94. Applicant has indicated project will not be pursued.
71-545220 Pima County Wastewater Santa Cruz River	IC	~ 17,000?	Effluent	NA	NA	Applicant has requested that this application be put on hold. Application is based in part upon the County recharging the SAWRSA effluent.
High Plains Effluent Recharge Project	SB	600	Effluent	NA	NA	Research project for riparian enhancement supported by High Plains and Water Protection Fund money. Sponsors include Pima County, Tucson Water, Marana. No application submitted. Pre-application meetings have been held.
Tucson Water /BKW- Central Avra Valley Groundwater Savings	GSF	750	CAP	NA	NA	Proposed. Associated with CAVSARP Project. (A modification of 72-538133)
Picacho Pecans/Kai 72-7558092	GSF	10,000	CAP	NA	NA	Application received 6/5/96, found complete and correct on 8/9/96.
Tucson - San Xavier Surface Basins	SB	10,000	CAP	NA	NA	Proposed. Negotiations with District and Nation are ongoing.
Pima County - Avra Valley & Green Valley Wastewater Treatment facilities	SB	1,500	Effluent	NA	NA	Proposed. County has had discussions with potential buyers of San Ignacio golf course. County would recharge effluent from plants, sell credits to GV Water Co, operate golf course well as recovery well.

*Estimated recharge volume based on preliminary site facility descriptions.

GSF-Groundwater Savings Facility

IW-Injection Wells

IC-In-channel

SB-Spreading Basins

9/5/96

**Table 3- Proposed Recharge Facilities
(Evaluated by RRC)**

Permit No./ Facility Name	Type of Recharge	Recharge Volume (AF)*	Source Water	Credits Accrued (AF)	Associated Permits	Project Status/ Comments
Pima Co., Metro Water, etc. - Lower Santa Cruz River Replenishment Project RRC Site 1	SB IC	44,000	CAP and Effluent	NA	NA	Part of overall NW Replenishment Program. Studies are underway and partially supported with a \$296,000 augmentation grant. Additional funding/in-kind services provided by BOR and other NW area interests. Pre-application meeting held on 11/27/95.
Metro Water, Pima Co. - Oro Valley Cañada Del Oro Recharge Project RRC Site 2	SB IC	25,000	CAP	NA	NA	Area is under investigation. Studies are being supported by two augmentation grants for ~ \$75,000 and part of another grant for \$296,000. Additional funding/in-kind services provided by BOR and other NW area interests. Part of Northwest Replenishment Program.
71-551092 CAWCD /MDWID Avra Valley Pilot Project RRC Site No. 3	SB	10,000	CAP	NA	73-551092 73-552745	Capacity of full scale facility may be limited by fine grained layers. Part of Northwest Replenishment Program. Permit issued in June, 1996, project operational in July, 1996.
Tucson Water/CAWCD - Pima Mine Road Project RRC Site 4	SB	10,000	CAP	NA	NA	Application submitted on 12/20/95. Objection received, denied on 8/2/96.
71-557981 (Pilot) 71-556102 (Full scale) Tucson Water-Central Avra Valley Storage & Recovery (CAVSARP) RRC Site 5	SB	100,000	CAP	NA	73-558078	Pilot permit issued 8/1/96 (500 AF). Application for full scale facility received 9/4/96.
Tucson Water - South Avra Valley RRC Site 6	SB	44,000	CAP	NA	NA	Proposed.
West of CAP @ Tangerine Rd. RRC Site 7	GSF	50,000	CAP	NA	NA	Proposed.
Tucson/BOR-San Xavier Arroyos RRC Site 8	IC	9,000	CAP	NA	NA	Proposed. Use natural arroyos within San Xavier District to recharge water released from blowoff structures. Tohono O'odham Nation has not yet endorsed this project.

*Estimated recharge volume based on preliminary site facility descriptions.

GSF-Groundwater Savings Facility

IW-Injection Wells

IC-In-channel

SB-Spreading Basins

9/5/96

**Table 3- Proposed Recharge Facilities
(Evaluated by RRC)**

Permit No./ Facility Name	Type of Recharge	Recharge Volume (AF)*	Source Water	Credits Accrued (AF)	Associated Permits	Project Status/ Comments
Tucson Water - Santa Cruz River at Pima Mine Road RRC Site 9	IC	8,500	CAP	NA	NA	Proposed. Pipeline required from CAP terminus to river. Tohono O'odham Nation has not yet endorsed this project.
Pantano, Tanque Verde Rillito River RRC Site 10	IC	17,000	CAP	NA	NA	Proposed.
Tucson Water - Brawley Wash at Three Points RRC Site 11	SB	40,000	CAP	NA	NA	Proposed. Pilot tests show good recharge rates, but site is not close to CAP canal.
Cortaro Marana Irrigation District Expansion RRC Site 12	GSF	6,000	CAP	NA	75-538100 73-547710	Expansion of existing GSF from 10,000 AF/year to 16,000 AF/year.
BKW Farms Expansion 72-538133 RRC Site 13	GSF	6,200	CAP	NA	73-538133 73-545928 73-555750	Expansion of existing GSF from 8,800 AF/year to 15,000 AF/year.
Avra Valley Irrigation District RRC Site 14	GSF	20,000	CAP	NA	NA	Preliminary meeting held in late 1994. No application submitted to date.
Farmers Investment Co. RRC Site 15	GSF	20,000	CAP	NA	NA	Conceptual phase. Pipeline construction required.
ASARCO - Mission RRC Site 16	GSF	9,000+	CAP	NA	NA	Proposed.

*Estimated recharge volume based on preliminary site facility descriptions.

GSF-Groundwater Savings Facility

IW-Injection Wells

IC-In-channel

SB-Spreading Basins

9/5/96

**Table 4- Newly Proposed Recharge Facilities
(Not Evaluated by RRC)**

Permit No./ Facility Name	Type of Recharge	Recharge Volume (AF)*	Source Water	Credits Accrued (AF)	Associated Permits	Project Status/ Comments
Tanner Gravel Pit	SB	7,000	CAP	NA	NA	Proposed.
Tucson Airport Remediation Project (TARP)-Santa Cruz River	IC	10,000	Reme- diated GW	NA	NA	Proposed.
Alvernon/Rillito Storm Drain	IC	50,000	CAP	NA	NA	Proposed.
Pascua Yaqui	SB	10,000	CAP	NA	NA	Proposed.
Avra Valley Gravel Pit	SB	10,000	CAP	NA	NA	Proposed.
Ajo Detention Basin	SB	10,000	CAP	NA	NA	Proposed.

*Estimated recharge volume based on preliminary site facility descriptions.

GSF-Groundwater Savings Facility

IW-Injection Wells

IC-In-channel

SB-Spreading Basins

9/5/96

Appendix D: Recharge Facility Descriptions

RRC SITES COST SUMMARY*

(Assuming 20 year amortization)

SITE NO.	SITE NAME	ANNUAL RECHARGE VOLUME AF	CAPITAL COST	RECHARGE UNIT COST \$/AF		RECOVERY UNIT COST \$/AF		TOTAL UNIT COST \$/AF
				CAPITAL	O&M	CAPITAL	O&M	
1	Lower Santa Cruz River	30,000	\$4,975,150 ¹	\$16.90	\$6.35	\$37.00	\$8.50	\$68.75
2	Cañada del Oro Recharge & Recovery	25,000	\$18,087,800 ²	\$73.70	\$26.10 min. \$98.25 max.	Assume Use of Existing Wells	Not Yet Estimated	
3	Avra Valley Pilot Recharge Project	4,000	\$654,600	\$16.10	\$27.70	\$37.00	\$8.50	\$89.30
4	Pima Mine Road Basins	23,000	\$16,722,270 ³	\$74.05	\$3.25		No Recovery	\$77.30
5	Central Avra Valley Storage & Recovery	60,000	Recharge: \$8,687,440 Recovery: \$51,527,890	\$14.75	\$2.85	\$87.45	\$24.00	\$129.05
6	South Avra Valley Basins	43,800	\$27,131,280	\$63.10	\$7.70	Assume Use of Existing Wells	Not Yet Estimated	
7	West of CAP @ Tangerine Road	50,000	\$6,874,590 ¹	\$14.05	\$4.30	Not Determined	Not Yet Estimated	
8	San Xavier Arroyos	9,000	\$290,420	\$3.30	\$6.10	No Recovery	No Recovery	\$9.40
9	Santa Cruz River @ San Xavier	8,500	\$448,500	\$5.35	\$4.70	No Recovery	No Recovery	\$10.05
10	Pantano, Tanque Verde & Rillito Rivers	17,000	\$4,744,000	\$28.40		Assume Use of Existing Wells	Not Yet Estimated	
11	Brawley Wash @ Three Points	40,000	\$22,114,880	\$56.30	\$2.25	Assume Use of Existing Wells	Not Yet Estimated	
12	Cortaro Marana Irrigation District Expansion	6,000 (In-lieu)	\$120,000	\$2.05	\$0.70	N/A	N/A	\$2.75

SITE NO.	SITE NAME	ANNUAL RECHARGE VOLUME AF	CAPITAL COST	RECHARGE UNIT COST \$/AF		RECOVERY UNIT COST \$/AF		TOTAL UNIT COST \$/AF
				CAPITAL	O&M	CAPITAL	O&M	
13	BKW Farms Expansion	6,200 (In-lieu)	\$75,000	\$1.25	\$2.35	N/A	N/A	\$3.60
14	Avra Valley Irrigation District	19,800 (In-lieu)	\$3,361,800	\$17.30	\$4.05	N/A	N/A	\$21.35
15	FICO-Sahuarita Farms	20,000 (In-lieu)	\$6,686,750	\$34.05	\$21.40	N/A	N/A	\$55.45
16	ASARCO-Mission Mine	13,000 (In-lieu)	\$981,500**	\$7.70	\$12.00	N/A	N/A	\$19.70**

9/5/96

* The purchase cost of CAP water has not been included in the estimates for any of the potential sites. Permitting costs have not been included.

** The costs for water quality monitoring and/or treatment by the mines to compensate for variable quality and reliability of CAP water are not included.

N/A=Not applicable to in-lieu projects.

¹ Includes land acquisitions @ \$3,000/acre

² Includes land acquisitions @ \$10,000/acre

³ Includes land acquisitions @ \$9,000/acre and pipeline which is sized to allow deliveries to Sites 9 and 15 (Note: land acquisition includes acreage to allow for significant future expansion and possible flood plain mitigation required as a result of expansion beyond pilot facilities)

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ARIZONA WATER BANKING AUTHORITY

Storage Site Criteria for Existing and Potential Sites:

One of the significant tasks of the Arizona Water Banking Authority will be to determine in what manner and where water will be stored within the State of Arizona. Although a large number of policy considerations may guide the Authority in making these decisions, some of the decisions will be shaped by the Arizona Water Banking Authority statutes (A.R.S. §§ 45-2401 *et seq.*), the location of the Central Arizona Project water conveyance system, economic factors, the cost of storage, recovery of water, water management objectives, Indian water rights settlements, Western Arizona objectives, environmental issues, regulatory and capacity issues.

One issue for consideration by the AWBA in determining water storage location is assistance in meeting Groundwater Code Objectives. The Groundwater User Advisory Council's (GUAC's) shall be consulted if the proposed facility falls within and AMA. Two statutes provide guidance on where water should be stored - A.R.S. § 45-2453 describes the process and provides some criteria by which the Authority will select types of sites and locations for additional storage facilities, should the Authority decide that additional sites are necessary - A.R.S. § 45-2456 describes the factors the Authority should consider when the Authority develops its annual operating plan, while providing guidance on where water should be stored.

The Second Management Plans, promulgated under the Code for the state's active management areas (AMA), offer some guidance on where water storage should occur. The Second Management Plans deem water storage in the following locations to be inconsistent with the augmentation program of the Department of Water Resources:

- a) in remote or isolated locations where no benefits would be realized.
- b) in locations where storage would contribute to the migration of poor quality water.
- c) in localized areas of high groundwater levels.

[See Phoenix Second Management Plan, Ch. 7(H)(3)]

The Second Management Plan also states that water storage must meet one of the following tests to be deemed consistent with the management goal for the Active Management Area:

- a) Storage must contribute to groundwater supplies that are currently being used or that could be used in the future so long as the areas which are recharged are not experiencing problems associated with a shallow depth to water.
- b) Storage is contributing to an EPA/DEQ corrective management program.

[See Phoenix Second Management Plan, Ch. 7(H)(3)]

In addition to referencing the Groundwater Code Objectives described in the 2nd Management Plan, the Statute states that the Central Arizona Water Conservation District (CAWCD) shall be consulted in determining at what storage locations and during what times of the year water can be delivered for the Authority's use [A.R.S. § 45-2453(B)(3) and § 45-2456(B)(3)]. The proximity of the proposed facility to the CAP canal and the availability of capacities for delivery of water by CAP to in-lieu and direct facilities are two services that CAWCD will provide to the AWBA.

RANKING OF PROPOSED SITES

There are many factors that should be considered in examining various recharge site locations. The beneficial use aspects in areas such as meeting Groundwater Code Objectives and eventual recovery should be considered [A.R.S. § 45-2453(B)(5) and § 45-2456(B)(4)] and consultation with CAWCD on the delivery of CAP water are two factors that should first be examined when considering a proposed facility.

Assuming there are multiple existing storage facilities that meet the above listed criteria, the Authority will need to rank or select from the qualifying sites. Public meetings should be held by the Authority when conducting the ranking to gain local input on the potential use of sites (possibly using the GUAC forum).

The following categories will be used in examining a proposed site for consideration by the AWBA. Attached is a matrix to assist in the ranking, using these eight defined categories.

- 1) **COST OF STORAGE** - what are the costs associated with using capacity at an in-lieu or direct recharge facility? Where can the Authority store water and get the most long-term storage credits for their dollars? Storage costs could include but are not limited to:
 - **Capital Costs** - if it is determined that a facility is needed, capital expenditures for the construction of the facility would be the biggest cost of storage. These capital costs could include any conveyance and/or pumping systems required, including any earthwork, on-site construction, piping and control systems.
 - **Annual Operation and Maintenance Costs** - examine the average annual costs of operating the facility, including energy pumping costs, conveyance system or recharge system maintenance.
 - **Land and Right-of-Way Acquisition** - any acquisition needed, including land availability and ownership, cost per acre vs. acres required and land use compatibility must be considered.

- 2) **RECOVERY OF WATER** - costs (including intangible costs) and issues of eventual recovery of the water must be examined in choosing a site, including but not limited to the location of recovery system, depth to groundwater and associated energy costs, transmissivity of aquifer, potential use of existing wells and pipelines, requirements for future treatment and proximity to final user. Recovery locations and all recovery costs should first be considered when evaluating an application submitted to the Authority.

- 3) **WATER MANAGEMENT OBJECTIVES** - are there storage sites that help alleviate existing or projected water problems or contribute to AMA safe yield? If within an AMA, does AWBA use of the facility have the support of the GUAC? To the extent that water is stored for purposes that call for its recovery, recovery location may be significant. While recovery can occur anywhere in the AMA in which storage occurred and deemed appropriate by DWR, recovery outside of the area of storage might contribute to dropping

water tables in the area of recovery. Therefore, recovery locations should be considered in determining where it is advisable to store water. To the extent possible, water storage should occur in the same aquifer from which recovery will occur.

4) INDIAN WATER RIGHTS SETTLEMENTS - are there storage sites that might assist in the resolution of an Indian water rights settlement? Is the site in proximity to an Indian reservation? How could the water eventually be recovered if decision is made to do so? Instead of pumping the credits in the future, could the possible extinguishment of long-term storage credits in helping to settle an Indian water rights claim?

5) WESTERN ARIZONA OBJECTIVES - to the extent General Fund monies are available, where could water be stored so that it is available as a substitute water supply for CAWCD customers when western Arizona cities need additional supplies from the Colorado? Is there a recovery plan/agreement in place with specific sites?

6) ENVIRONMENTAL ISSUES - does the proposed storage site cause harm or concern to other parties or the environment? ADWR is not statutorily allowed to permit a site that will cause unreasonable harm to land or other water users (A.R.S. § 45-811.01(C)(3). Impacts on groundwater quality, including potential to change native groundwater through recharge activities; potential sources of contamination such as landfills, agricultural and other past land use; migration of contaminant plumes and other hydrologic effects must be taken into consideration. Other environmental impacts, including archaeological sites in the vicinity, habitat-related issues, flooding potential, compliance with local, state and federal environmental ordinances and laws, and consideration of the local community should also be considered in examining a site. Could use of a proposed direct facility create a wetland or habitat, potentially establish any future commitment by the AWBA? In addition, any potential costs associated with these environmental issues should be disclosed and considered in the ranking of a proposed site.

7) REGULATORY ISSUES - all regulatory issues must be considered, including the proposed site having required permits by all local, state and federal agencies. Given the statutory deadlines imposed, the time required to implement the proposed facility must be taken into consideration, including obtaining required permits.

8) Capacity - does the proposed direct or in-lieu facility have capacity for use by the AWBA? Does the in-lieu recipient have an existing partner already that the AWBA would be supplanting?

INFORMATIONAL FACTORS IN THE CONSIDERATION OF SITES

(factors to be used as a guide when considering a facility)

- Time line for operation of the facility.
- Infiltration Rate - the rate at which water enters the soil. This instantaneous rate, when measured by conducting small-scale infiltration tests, can be substantially larger than larger scale infiltration rate for a surface recharge project.
- Long-term Average Annual Recharge Rate - 20 year average amount of water that can be recharged, with and without recovery in the area of hydrologic impact of the recharge project (recovery must be taken into consideration).
- Volume of potentially recoverable water below the recharge facility in acre feet (af).
- Depth to groundwater and direction of flow.
 - pumping lift necessary and associated energy costs
- Other Technical Issues - factors including, but not limited to the transmissivity of aquifer, impeding layers in the vadose zone, surface elevation of facility.
- Regional Benefits - many include the sharing of conveyance, recharge and/or recovery facilities, potential recreational use, habitat restoration and multiple use benefits, such as combining flood control and recharge objectives.

PERMITS REQUIRED FOR USE AND/OR CONSTRUCTION OF FACILITIES

Permits Issued Under the Underground Water Storage, Savings and Replenishment Program

- **Underground Storage Facility Permit - ADWR (A.R.S. § 45-811.01)**
Permit is required prior to construction of a "constructed", "managed" or direct recharge facility. Water is recharged into the aquifer by percolation or injection wells.
(AWBA cannot hold such a permit)
- **Groundwater Savings Facility Permit - ADWR (A.R.S. § 45-812)**
Permit is required prior to operation of an in-direct or in-lieu recharge facility. Colorado River water would be delivered to a recipient (referred to as in-lieu water) who agrees to use this renewable surface (in-lieu) water to replace an equivalent amount of groundwater pumping.
(AWBA cannot hold such a permit)
- **Water Storage Permit - ADWR (A.R.S. § 45-831.01)**
Allows the permit holder to store water at a facility. The applicant must have a right to use the source water, must ensure that the storage occurs at a permitted facility and must have applied for all necessary water quality permits.
(Permit that will be applied for and held by the AWBA for storage of water at Groundwater Savings Facilities (GSF's) or Underground Storage Facilities (USF's).

- Recovery Well Permit - ADWR (A.R.S. § 45-834.01)
Permit is required for the withdrawal of recharged water, no matter the location.
(It is not yet clear if the AWBA will be holding Recovery permits)

Permits Primarily Related to Construction of Facilities

- National Pollution Discharge Elimination System Permit, Sec. 402 of Clean Water Act - EPA / ADEQ (33 U.S.C. § 1251 et.seq.)
Permit required for any private or public entity who discharges pollutants from a point source into navigable waters of the U.S. Would apply to in stream recharge if CAP water would invoke NPDES criteria.
- Section 404 of Clean Water Act (Dredge and Fill) - Corps of Engineers/EPA
A Section 404 permit is required for any project that will result in the discharge of dredged or fill material into navigable streambeds. This provision would pertain to the construction of in stream recharge projects.
- Section 7 of the Endangered Species Act - U.S.F.W.S. (166 U.S.C. §§ 1531 et.seq.)
A biological opinion is required from the U.S. Fish and Wildlife Service regarding the likelihood of any action proposed to be taken by or funded by a federal agency which would jeopardize the continued existence of any endangered species or result in the destruction or modification of the species' critical habitat. The ESA prohibits the taking of an endangered species even absent federal involvement.
- Local Flood Control District Floodplain Use Permit - Local Governments (A.R.S. § 48-3609) Permit needed for doing virtually any work within the 100 year flood plain as designated by the Arizona Department of Water Resources.
- State Historic Preservation Act - (A.R.S. § 41-844)
Permit is needed if project involves the potential disturbance of the surface and/or subsurface of the ground to prevent any prehistoric and/or historic archaeological sites to be disturbed.