

DRAFT
ENVIRONMENTAL IMPACT STATEMENT
JUNE 2000

VOLUME 2
Technical Appendices A-H

ALLOCATION
OF
WATER SUPPLY
AND
LONG-TERM
CONTRACT
EXECUTION

CENTRAL ARIZONA PROJECT

U.S. Department of the Interior
Bureau of Reclamation

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
Central Arizona Project**

JUNE 2000

VOLUME 2

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BACKGROUND ASSUMPTIONS FOR TECHNICAL ANALYSIS

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
Central Arizona Project**

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A.I. INTRODUCTION

In order to describe and evaluate the anticipated environmental consequences of implementing any of the action alternatives considered in the draft Environmental Impact Statement (EIS), it is first necessary to identify questions whose “answers” are critical to performing the necessary impact analyses. These questions include key issues such as, “What would water use patterns be in Arizona for the next fifty years?” “Would farmers be able to afford Central Arizona Project (CAP) water and how much of it would be available?” “How would municipal and industrial (M&I) entities meet their projected populations’ water demands?” and “What would the Indians do with the water proposed to be allocated to them?” Since “answers” for these types of questions are not available, it falls to the technical and professional staff to develop assumptions about what are the most likely outcomes based upon past, current and projected practices.

Fundamental to the development of the background assumptions used in the impact analyses conducted for the “Allocation of Water Supply and Expected Long-Term Contract Execution – CAP EIS” is an understanding of the conditions and policies that exist and are expected to exist throughout the project period (2001-2051). These conditions and policies determine, to a great extent, the distribution and use of CAP water supplies by the three primary CAP water use sectors. The assumptions are primarily related to the availability and pricing of CAP water for the project period. They are referred to as “background assumptions” because they help determine each affected entity’s water budget, which, in turn, drives the impact analyses. The assumptions were developed based upon input from Navigant Consulting, Inc., the Bureau of Reclamation (Reclamation) Phoenix Area and Lower Colorado Regional offices, the Department of the Interior Solicitor’s Office, Arizona Department of Water Resources (ADWR), Central Arizona Water Conservation District (CAWCD), Central Arizona Groundwater Replenishment District (CAGRD), Arizona Water Banking Authority (AWBA), and others.

This appendix identifies the background assumptions that were developed to establish the inputs for the impact analyses as well as for the groundwater and socioeconomic evaluations. The assumptions are based on existing water management policy, available information, and discussions with representatives of water users and involved institutions and entities. Assumptions made for each particular impact analysis are noted in the appropriate technical appendices. This appendix documents only the background assumptions common to all analyses.

Every analysis contains assumptions through which the accuracy of the results should be viewed, and this Draft EIS is no exception. It is likely that the assumptions involved in the Draft EIS may be as important to the outcome of the impact analyses as the analyses themselves. The analysis of the potential impacts to the NIA sector is a good example. If the assumption is made that competitively-priced CAP water would be available in today’s volumes and prices to non-Indian agriculture (NIA) for the entire 50-year project period, very different impacts would emerge than if the assumption is made that CAP water for NIA is not available due to increased demand by other users in the early years.

Careful consideration was given to the ramifications of CAP water availability to the various sectors. In developing the assumptions, an effort was made to forecast what policies would be put in place under each alternative evaluated in the Draft EIS, based upon a thorough analysis of currently available information. Sensitivity was also given to avoid skewing the impacts in any sector through the background assumptions. In particular, great care was taken in developing the assumptions for the No Action Alternative in an effort to provide a fair baseline against which the impacts of the other alternatives would be evaluated.

It should be noted that the future may likely diverge from the Draft EIS background assumption projections, and it is entirely possible other actions would occur. These other actions could include the adoption of a wheeling policy for CAP, settlement of additional Indian water right claims, and other actions that cannot be predicted. They are not included in the Draft EIS analysis, as their outcomes and timing would be pure speculation. While it is likely the future would not look exactly like any of the projections made in this Draft EIS, this analysis reflects the most reasonably expected future scenarios, based upon information available at the time of this analysis.

The assumptions are consistent with the existing legal and institutional constraints that include the following:

◆ Federal Reclamation Law

- Act of June 17, 1902, as amended and supplemented;
- Boulder Canyon Project Act of 1928 (Public Law[PL] 70-642);
- Reclamation Project Act of 1939, as amended; and
- Colorado River Basin Project Act of 1968 (PL 90-537).

◆ Indian Water Rights Settlement Acts

- Southern Arizona Water Rights Settlement Act of 1982 (PL 97-293);
- Ak-Chin Indian Community Water Rights Settlement Act of 1984 (as amended) (PL 98-530);
- Salt River Pima-Maricopa Indian Community (SRPMIC) Water Rights Settlement Act of 1988 (PL 100-512);
- Fort McDowell Indian Community (FMIC) Water Rights Settlement Act of 1990 (PL 101-628);
- San Carlos (SC) Apache Tribe Water Rights Settlement Act of 1992 (as amended) (PL 102-575); and
- Yavapai-Prescott Indian Tribe Water Rights Settlement Act of 1994 (PL 103-434).

◆ Secretary of the Interior Decisions and Actions

- 1980 Indian Contracts;
- 1983 Record of Decision (ROD) CAP Allocation;
- 1988 CAP Master Repayment Contract; and
- 1992 Federal Register (FR) Notice (NIA Allocation)

◆ Arizona State Law and Regulations

- Groundwater Management Act (GMA);
- Assured Water Supply (AWS) Rules;
- CAGRDLaws;
- AWBA Laws; and
- Recharge Permit / Accounting Laws.

The key assumptions are listed below. Detailed discussions of each category of assumptions are included after the list of key assumptions. Descriptions of the assumptions per each alternative are included following the discussion. All tables and figures follow the text at the end of the appendix.

A.II. LIST OF KEY ASSUMPTIONS

Following are the key assumptions made for the Draft EIS impacts analysis.

A.II.a. CAP Diversions and Available Colorado River Water – Assumptions regarding the volume of water delivered by CAP from 2001 through 2051 are based upon analyses of the 1996 Reclamation CAP water supply study. Regardless of annual delivery volume, the conveyance/system losses are assumed to be 75 thousand acre-feet (kaf). The amounts that are diverted and delivered would be as follows:

- ◆ Normal Year (2001-2043):

CAP priority water diversion	1,418 kaf
Pre-1968 higher priority Colorado River water diversion	<u>72 kaf</u>
Total Diversions	1,490 kaf
System losses	<u>- 75 kaf</u>
Total Deliveries	1,415 kaf

- ◆ Shortage year (2044-2051):

CAP priority water diversion	928 kaf
Pre-1968 higher priority Colorado River water diversion	<u>+ 72 kaf</u>
Total Diversions	1,000 kaf
System losses	<u>- 75 kaf</u>
Total Deliveries	925 kaf

- ◆ For purposes of this Draft EIS, it has been assumed there would be shortage conditions from 2044 through 2051. For a more detailed explanation of how availability of Colorado River water was estimated, see the discussion on “Shortage” that follows on page A-7.

- ◆ Absent the Settlement Alternative, priority in case of shortage would be pursuant to the Secretary of the Interior's (Secretary's) water allocation decisions, the Master Repayment Contract and contracts for delivery of water to Indian Reservations.
- ◆ A separate water priority schedule would be applied under the Settlement Alternative per a negotiated agreement.
- ◆ Surplus Colorado River water may be available for diversion to CAP through the study period. For purposes of this study, however, no assumptions were made regarding the potential distribution of CAP water above 1,415 kaf. Although it is likely surplus water would be recharged directly through the AWBA or utilized by M&I or Indian entities absent an understanding of the distribution of this water, the potential environmental impacts from recharging surplus water cannot be addressed. Further, although surplus conditions may occur in the early years of the study period, limited demand for water during this time-frame may make surplus deliveries largely irrelevant to the impact analysis.

A.II.b. Water Priorities

- ◆ **First:** 72 kaf of Colorado River water (Yuma Mesa Division [YMD] and WMIDD water).
- ◆ **Second:** Indian CAP contracts (less 25 percent Gila River Indian Community (GRIC) and 10 percent other Indian agriculture) pro-rata with M&I CAP subcontracts less than 510 kaf.
- ◆ **Third:** Indian agriculture contracts (up to 25 percent of GRIC and up to ten percent of other Indian agriculture).
- ◆ **Fourth:** M&I CAP subcontracts above 510 kaf.
- ◆ **Fifth:** NIA CAP contracts (does not include "letter agreements" or relinquished contracts). NIA CAP contracts retain their priority upon transfer or assignment.
- ◆ **Sixth:** "Excess Water"
 - For Settlement Alternative:
 - 6A-Ag Pool
 - 6B-AWBA Recharge Pool (for in-state purposes)
 - 6C-Full Price Excess – CAGR
 - 6D-Any use except interstate storage
 - 6E-AWBA Recharge Pool (for interstate storage purposes)
 - For No Action and Non-Settlement Alternatives:
 - 6A-Full Price Excess – CAGR

- 6B-Ag Pool/Incentive Recharge share depending on alternative
- Other residual “Excess” Water Pools

A.II.c. Indian Development Schedule and Water Use

- ◆ The United States. would fund Indian development projects to the level necessary in order to achieve full development prior to 2044.
- ◆ The Settlement Alternative would provide accelerated funding through settlement.
- ◆ Indian CAP water use would take place on Reservation lands in the alternatives, except for leased water (shown in Table A-1).
- ◆ Absent the Settlement Alternative, Indian CAP water costs include variable (energy) operation and maintenance (O&M) plus fixed O&M. Current cost is \$54 per acre-foot (af). Appendix M contains a comprehensive discussion of CAWCD pricing policies.
- ◆ In the Settlement Alternative, Indian CAP water costs include variable O&M. Current cost is \$26 per af.

A.II.d. M&I Development Schedule and Water Use

- ◆ Salt River Project (SRP) supplies would meet water demands within the SRP service area; they cannot be used outside the SRP service area.
- ◆ Demands outside the SRP service area would be met by CAP water, CAGRD, effluent reuse, groundwater, and other supplies.
- ◆ 1997 Department of Economic Security (DES) population projections for 2000 through 2050 have been used to approximate the population from 2001 through 2051.
- ◆ M&I demands have been based on ADWR water conservation targets (gallons per capita per day [gpcd]) outlined in current state management guidelines (Third Management Plan, [TMP] [ADWR, 1999]), shown in Table A-9.
- ◆ An additional seven percent has been added to the ADWR gpcd water conservation targets to account for lost and unaccounted water¹.
- ◆ M&I water costs would include variable and fixed O&M, and capital repayment. Current cost is \$102 per af.

¹ For more detailed explanation regarding this additional seven percent, see page A-11.

- ◆ M&I entities would build necessary facilities (treatment plants, etc.) in order to use their full allocations and entitlements.

A.II.e. M&I Leases

No new leases of Indian CAP water (that would require additional Federal approval) would be authorized absent the Settlement Alternative. The leases are listed in Table A-1.

A.II.f. CAGRDR and Interim Contracts

- ◆ CAGRDR would be able to meet components of M&I demands up to 200 kaf.
- ◆ CAGRDR would pay full price for excess water, including variable O&M, fixed O&M, and capital repayment. Current cost is \$102 per af.
- ◆ Replenishment would include the cost of water (\$102 per af) plus the cost of recharge, program administration, and other fees and costs for which CAGRDR currently charges approximately \$188 per af to its members.
- ◆ CAGRDR could receive a limited allocation for CAP water and would purchase the balance of its requirements from excess water.
- ◆ CAGRDR would have first priority of excess water under No Action and Non-Settlement Alternatives. In the Settlement Alternative, prior to 2030, the CAGRDR would have third priority of Excess Water, behind the Ag Pool and AWBA Recharge Pool.
- ◆ Unless currently enrolled, membership in CAGRDR would not be the preferred option for M&I entities to meet their AWS² obligations.

A.II.g. Recharge Pool

- ◆ As provided pursuant to existing state law, AWBA would fund recharge of excess CAP water through 2016, including in-lieu water. AWBA in-lieu deliveries would be based on projected 2000 deliveries and / or facility capacities as shown in Table A-2.
- ◆ From 2017 through 2051, water available for recharge would be recharged directly by individual M&I entities or in lieu with SRP, Maricopa Water District (MWD), or Cortaro-Marana Irrigation District (CMID) or other districts outside of Pinal County.
- ◆ Incentive recharge would be no less than 400 kaf from 2001 through 2016, absent the Settlement Alternative. Recharge would follow the pattern outlined in Table A-2.

² In order to subdivide and sell land within an Active Management Area (AMA), the land must be shown to have an AWS for 100 years.

- ◆ Absent the Settlement Alternative, recharge would have second priority to the Ag Pool from 2017 through 2051. However, CAWCD would reduce the Ag Pool to zero by the end of the repayment period in 2046.
- ◆ In the Settlement Alternative, CAP would commit to an Ag Pool through 2030, with recharge having lower priority. After 2030, the Recharge and Ag Pool would share priority of the remaining “Excess Water” pool. Others could also participate, including the Tribes and the United States.
- ◆ Incentive recharge costs (applicable 2001–2016) would include variable O&M (Energy ²³), plus 10 percent of fixed O&M, plus a “contribution for lost revenue.” Current cost is \$44 per af.
- ◆ Water for recharge after 2016 would be at full cost including fixed plus variable operation, maintenance and replacement (OM&R). This rate would be \$102 per af on the year 2000 rate schedule.
- ◆ Under the Settlement Alternative the Recharge Pool is actually split into the following categories: AWBA recharge for in-state purposes, non-AWBA recharge, and AWBA recharge for interstate storage purposes. For ease of computation, these are shown together as the Recharge Pool.

A.II.h. Ag Pool

- ◆ Only one pool would be available after 2004, at current pool one⁴ pricing for all alternatives. The rate would be the year 2001 Energy Rate 1, currently targeted to be \$26 per af.
- ◆ The Ag Pool would be distributed to the NIA entities based on the percentages as shown in Table A-11.
- ◆ In the Settlement Alternative, CAWCD would commit to providing water to the Ag Pool through 2030. After 2030, the Recharge and Ag Pool share priority of the remaining “Excess Water” Pool. Others could also participate.
- ◆ Absent settlement, the Ag Pool would be linearly reduced from 2017 levels to zero by 2046 (end of the repayment period).

A.II.i. NIA Sub-Contractors Under Non-Settlement Alternative 3A

- ◆ Under Non-Settlement Alternative 3A, allocations would be made to Central Arizona Irrigation and Drainage District (CAIDD), Chandler Heights Citrus Irrigation District

³ Energy Rate 2 applies only to AWBA and other recharge deliveries. Please see Appendix M for more details.

⁴ Currently CAWCD has a structure of three Ag Pools, with varying pricing and eligibility requirements. Please see Appendix M for more details.

(CHCID), Maricopa-Stanfield Irrigation & Drainage District (MSIDD), New Magma Irrigation and Drainage District (NMIDD), Roosevelt Irrigation District (RID), and San Carlos Irrigation & Drainage District (SCIDD) as shown on Table A-12.

A.III. DISCUSSION OF KEY ASSUMPTIONS

A.III.a. CAP Diversions

The normal year diversions available to CAP are assumed to be 1,490 kaf. This is composed of 72 kaf of high priority water from Wellton-Mohawk Irrigation and Drainage District (WMIDD) and the YMD plus 1,418 kaf of CAP (1968) priority water. The normal year diversions are based on the agreement among the parties--for discussion and negotiation purposes only--that deliveries are 1,415 kaf and losses are 75 kaf.

A.III.b. Shortage

Reclamation's latest water supply projections for the CAP were completed in 1996. This analysis consisted of 17 traces of water supply projections, each starting in a different historical hydrological year and continuing for 50 years of analyses. The average of all 17 traces was then used for cost allocation purposes and to evaluate general impacts of water deliveries to various sectors. Although appropriate for these purposes, it was determined that this type of 17-trace average analysis would not be the most appropriate for this study. Therefore, a single trace representative water supply was developed. In developing this single trace, all 17 traces were examined for both the number of shortage years and when the shortages occurred. Four traces contained no shortage years, one trace contained 22 years of shortage, and the average shortage years among all traces was 8.4 years. The shortage years, in those traces that had shortages, usually occur at the end of the 50 years of analysis. Therefore, the representative trace developed for use in this study contains eight years of shortage occurring in the last eight years of the study period.

To determine if the representative water supply is reasonable, the Colorado River Simulation System (CRSS)⁵ runs (currently used by Reclamation for study purposes) were evaluated. The probability of shortage conditions on the river was found to be approximately 30 percent, occurring in year 2043/2044. The probability of shortage gradually increases annually prior to 2043, and it appears that after 2043/2044, the increase in the probability of shortage increases at a greater rate. The representative water supply is believed to be consistent with current Reclamation CRSS model runs and the 1996 water supply analyses. For the purposes of this Draft EIS, normal year water supplies are assumed to be available from 2001 through 2043, and shortage years would occur from 2044 through 2051, as shown on Figure A-1.

As discussed briefly in Chapter I, CAP water is assigned a priority of Indian, M&I, or NIA. NIA-water has the lowest priority and is reduced to zero prior to any reductions to Indian or M&I priority water during shortage. For the 50-year study period of the Draft EIS Reclamation studies show that an average rate of shortage occurrence is approximately 17 percent, with a range of zero to 44 percent. Beyond the 50-year study period in 2055, Reclamation studies

⁵ CRSS-a computer model used by Reclamation for long-range studies of Colorado River basin operations.

predict the probability of shortage to increase to approximately 50 to 55 percent and to continue at that level thereafter.

To fully understand potential impacts to CAP water users during shortage conditions, other factors must be considered. Shortages are based on assumptions regarding Upper Basin demands and projections of future watershed runoff. Furthermore, during shortage years, impacts to specific entities receiving CAP diversions must include an assessment of the extent of the demand for Arizona's higher priority Colorado River water; this is beyond the scope of this Draft EIS.

A.III.c. Surplus

For the purpose of this Draft EIS, diversions above 1,490,000 af are not analyzed. Although surplus Colorado River water may be available in some years, such as the year 2000, the potential uses of surplus water and resulting environmental impacts cannot be addressed. Further, although surplus conditions may occur in the early years of the study period, limited demand for water during this time-frame may make surplus deliveries largely irrelevant to the impact analysis.

A.III.d. CAP Deliveries

CAP deliveries are assumed to be 1,415 kaf in normal years and 925 kaf in shortage years. Losses are assumed to be 75 kaf regardless of normal, surplus, or shortage conditions. Normal year deliveries are composed of 68.4 kaf of WMIDD and YMD Colorado River water and 1,346.6 kaf of CAP water. Shortage year deliveries are composed of 68.4 kaf of WMIDD and YMD Colorado River water plus 856.6 kaf of CAP water.

A.III.e. Water Priority

For purposes of this Draft EIS, it is assumed CAP water would be delivered based upon the following priorities (from highest to lowest):

First - YMD and WMIDD water provided by the Ak-Chin and SRPMIC settlement acts. This water is Colorado River water with priority higher than CAP.

Second - Indian and M&I users share priority pro rata. The Indian water does not include 25 percent (43,275 acre-feet annually [afa]) of the 1982 GRIC allocation (173,100 afa), nor 10 percent (8,230 afa) of the other Indian allocations (82,300 afa). The M&I water does not include M&I uses above 510,000 afa per the 1980 Indian contracts.

Third - The portion of Indian allocations not included in priority 2 (25 percent of GRIC plus 10 percent of other Indian entitlements) is in priority 3.

Fourth - M&I contracts above 510,000 afa are fourth priority.

Fifth - NIA contracts are the fifth priority. Water that is assigned, relinquished or transferred would retain its priority when reallocated.

Sixth - Unordered or contracted but unordered (by the contract holder) water in a normal year is termed “Excess Water” for the purposes of this Draft EIS. It is available to full price users such as interim direct delivery users and CAGR first (6A) except under the Settlement Alternative, where the Ag Pool and AWBA in-state Recharge Pool would have priority over the CAGR until 2030. Depending on the alternative, the remaining “Excess Water” Pool would be divided between the Ag Pool and the Recharge Pool. This distribution is different for the Settlement Alternative and the other alternatives.

The distribution of water that would occur under each alternative is shown in Tables A-3 through A-8 and Figures A-4 through A-9⁶. In addition, the Settlement Alternative may have a different priority schedule to accommodate negotiated settlement. For the purposes of analysis in this Draft EIS, the shortage schedule for the Settlement Alternative is based on defining three classes of CAP water (Colorado River maintains priority higher than CAP water): Indian / M&I, NIA, and Excess Water. The Indian users and non-Indian M&I users would share shortages when deliveries are between 1,009,079 and 853,100 af pro rata (36.4 percent and 63.6 percent respectively). The NIA and Excess Water classes would maintain their current priority status.

A.III.f. Indian Development Schedule and Water Use

It is assumed that Indian users would purchase and use their full CAP allocation on Reservation lands, except water authorized for lease for off-Reservation uses, in a build-up

⁶ Figures A-2 and A-3 depict the Settlement Alternative and No Action Alternative. CAP water distribution without the 2043-2051 shortage. Figures A-4 and A-5 depict the same alternatives with shortage and these are the distributions analyzed in the draft EIS.

schedule reaching maximum use before shortages are experienced. The authorized leases and leases contemplated in the Settlement Alternative are listed in Table A-1. It is assumed the United States would continue to provide funding for Indian water development projects on Tribal lands to the extent necessary to fully use the CAP water allocated to Indian users. These assumptions are based on solicited input from the Indian communities, anticipated Federal funding levels for Indian projects, amounts of CAP water contractually available, and input from Indian project specialists from the Bureau of Indian Affairs (BIA) and Reclamation.

The Settlement Alternative includes an accelerated build-out of on-Reservation delivery systems to accommodate Indian uses. This reflects accelerated funding for Indian projects contemplated in the proposed settlement agreement.

The cost of CAP water for Indian uses is assumed to be consistent with current CAWCD policies such that Federal users would pay the variable OM&R plus fixed OM&R. At present, Indian water is approximately \$54 per af. It is contemplated in the Settlement Alternative that the United States would provide the fixed OM&R component so that Indian users would pay only the variable OM&R rate, currently \$26 per af. Indian build-out schedules for on-Reservation uses are shown in Figure A-10.

A.III.g. M&I Development Schedules and Water Use

Reclamation received recommendations from ADWR in a letter to the Secretary dated January 20, 2000, regarding which M&I entities should receive 65,647 afa of uncontracted M&I priority CAP water. Allocation of currently uncontracted M&I priority water under the Settlement Alternative and Non-Settlement Alternative 1 would be consistent with these recommendations as would the allocation of the 71,815 afa of uncontracted NIA priority water under Non-Settlement Alternative 3B. These M&I water providers are listed in Table A-9. The M&I related impact analyses in this Draft EIS include only these entities.

M&I entities in the AMAs must be granted 100-year AWS designations (or certificates) by ADWR in order to legally subdivide and sell land. In order to have their AWS applications approved by ADWR, M&I entities must meet stringent criteria including the proof of physically and legally available water. Supplies that count toward an AWS include, among others, CAP subcontracts, Indian leases, and CAGRD membership. Purchase of CAP water through an interim contract or the Recharge Pool would not be sufficient because there is not a 100-year commitment of its availability. M&I entities do and are expected to continue to purchase water from the Recharge Pool and store water to support demonstration of an AWS.

It is assumed that M&I water users in the Phoenix area would use CAP water to satisfy only water demands outside of the SRP service area. This is based on ADWR data that show sufficient SRP supplies are available to meet M&I demands within the SRP service area.

The M&I development schedules are based on the DES 1997 population projections for 2000 through 2050. Based upon a review of existing population projection data currently available, DES 1997 population projections for 2000 through 2050 were determined to provide a sound basis for approximating the population for the project period, 2001 through 2051.

M&I water uses are based on projections of population and water use rates. Water use rates are typically expressed as gpcd. To calculate the water demand, the population projection is multiplied by the water use rate, and available non-CAP supplies are subtracted from the demand:

$$\text{CAP M\&I Entity Demand} = \{[\text{Population Projection}] * [\text{Use Rate}]\} - \{\text{Available Non-CAP Water Supplies}\}$$

The water use rates used in this Draft EIS are from the ADWR TMPs. The TMPs provide water use targets for large municipal water providers. By statute, these providers are required to make conservation efforts to achieve these targets. By using these targets, it is assumed the M&I entities would meet their water conservation targets as outlined by the TMPs by 2010. The use rates are held constant through the study period. While most M&I entities currently experience use rates higher than those listed in the TMP, they may be required by the GMA to decrease their use rates even further in the future through the Fourth and Fifth Management Plans. Therefore, using the current TMP use rates may actually overstate demand. For purposes of this Draft EIS, the use rates have been increased by seven percent⁷ of the TMP target so that lost or unaccounted water is included.

M&I water demand in the CAP service area is shown in Table A-9. By 2051, M&I water use of entities receiving an allocation of water, excluding the SRP service area, is estimated to be approximately 1.0 million acre-feet annually (mafa). It is assumed that entities not included in the allocation would have sufficient supplies to meet M&I demand from existing supplies, including their 1983 CAP allocations. The M&I users included in the Draft EIS are shown in Table A-10 with their 2051 demands, existing and proposed allocations, other non-CAP supplies, and assumed effluent and CAGR D supplies.

The non-CAP allocation supplies were derived from each entity's AWS application and water resource master plans (where available). It is assumed that each entity would construct facilities necessary to fully use their CAP allocations. In addition, the effluent use is assumed to remain constant, consistent with their AWS applications. It is also assumed that use of CAGR D would not be the preferred supply of water. Consistent with statements made by CAGR D staff in CAGR D workshops of December 1999 and January 2000, this Draft EIS would assume that CAGR D membership would be used only to meet the last increment of demand unmet by CAP or other sources. This is due to the high cost of CAGR D membership and the requirement of physical availability of groundwater for most members.

It is assumed that M&I CAP water costs would continue consistent with CAWCD pricing policy.

A.III.h. M&I Leases of Indian Water

It is assumed Indian water entitlements leased to M&I users would be used to the extent they are authorized by existing water rights settlements and are currently under contract or in final stages of contract negotiations. The leases are summarized in Table A-1. It is assumed that,

⁷ The current range for lost and unaccounted water is five to 10 percent. Seven percent was chosen in recognition of water users' increasing efforts to minimize lost and unaccounted water.

absent settlement, no additional CAP water allocated to Indian users would be leased for off-Reservation use. Entering into additional leases would require additional future Federal actions, and would be pure speculation as to the quantity and parties involved.

A.III.i. CAGRD and Interim Contracts

CAGRD and interim contracts (e.g., for temporary construction water purposes) are full price users of Excess Water, and for that reason, it is assumed these users would have first priority to the Excess Water Pool under the No Action and Non-Settlement Alternatives. Under the Settlement Alternative, the CAGRD would have a lower priority than the Ag Pool and AWBA Recharge Pool (for in-state purposes) until 2030. After 2030, it is assumed that the CAGRD would have top priority of Excess Water. Interim contracts are assumed to continue at current levels so long as Excess Water is available. In 1998, interim contract deliveries amounted to less than 5,000 afa.

It is assumed the CAGRD would be able to meet M&I water demands, unmet by CAP or other water supplies available in their service areas, to the extent that groundwater is physically available or limited volumes of direct delivery are legally allowed. This is consistent with the statutory purpose and intent outlined in the establishment of the CAGRD. It should be noted that the other available supplies do not include non-Project water “wheeled” through the CAP system, such as Harquahala groundwater. At present, CAWCD does not have an approved wheeling policy, nor does it have the Federal authorization and approval that would allow wheeling of such supplies.

It is assumed that the CAGRD would pay full price for CAP water. This price includes fixed OM&R, variable OM&R, and capital repayment component. In addition, replenishment costs would include recharge fees, administration, and other fees. Currently, CAGRD members pay approximately \$188 per af for replenishment. Finally, it is also assumed CAGRD membership would not be the preferred solution for M&I users to meet their water demands, and CAGRD could acquire only a limited CAP allocation within the project period.

A.III.j. Recharge Pool

The Recharge Pool is supplied by Excess Water. The size of the Recharge Pool is directly related to the commitment of CAWCD to provide water to the CAGRD and the Ag Pool. Key assumptions relate to the distribution of Excess Water between the Ag and Recharge Pools. Absent settlement, CAWCD has a financial interest in keeping some volume of Ag Pool as NIA deliveries to reduce the interest-bearing portion of CAWCD’s repayment obligation to the United States. But also, absent settlement, M&I entities would have access to significantly less CAP supplies which would allow them to continue to keep their AWS status. In view of these competing interests, the background assumptions reflect an accommodation of both factors.

It is anticipated the CAWCD would make water available and AWBA would continue to provide recharge water through its in-lieu program to Pinal County Irrigation Districts (IDs) through 2016 at levels consistent with current recharge volumes (see Table A-2) and current AWBA policy, as described in its annual report for 2000. After 2016, the funding for the AWBA would sunset under current Arizona State law. It is assumed that M&I entities would continue

to recharge directly or through in-lieu programs with SRP, MWD or CMID (i.e., not in Pinal County), based on current descriptions of AWBA policy (see AWBA's December meeting notes).

Absent settlement, it is assumed that the AWBA and M&I entities would recharge no less than 400 thousand acre-feet annually (kafa) through 2016. This is consistent with the stated goals of the AWBA (see AWBA study commission report). After that time, it is assumed the Recharge Pool would share priority with the Ag Pool through 2051 to the extent that CAWCD commits to providing water to the Ag Pool. However, it is assumed that CAWCD would linearly reduce the Ag Pool from the volume in 2017 to zero in 2046 (the end of the repayment period). Based on the existing Master Contract between CAWCD and the United States, delivery of Ag water provides a reduction in the interest bearing component of the CAP for repayment purposes. Absent settlement, it is assumed that CAWCD would continue to provide water to the Ag Pool to reduce CAP repayment obligations. This is consistent with CAWCD's 10-year forward pricing policy.

In the Settlement Alternative, CAWCD would commit to availability of Ag Pool water through 2030 and may utilize a staged drawdown of the Ag Pool as shown in Table A-3. It is assumed that the Ag Pool would take priority over the Recharge Pool through 2030. After 2030, the two pools would be of equal volume and share priority in the Excess Water Pool.

A.III.k. Ag Pool

For purposes of this Draft EIS, the Ag Pool would be supplied by Excess Water. With or without settlement, it is assumed the Ag Pool program would continue into the future. However, it is expected that after 2003, only one Ag Pool would continue forward. Water would be priced at Energy Rate 1 only. For 2004, the published advisory rate is \$35 per af (CAWCD, January 14, 2000).

Under the Settlement Alternative, there would be only one Ag Pool, as described in the September 23, 1999 CAWCD memorandum, *Excess Water Pools and Pricing 2004-2030*. It is assumed it would initially (in 2004) have a supply, as available, of 400,000 afa, which would decline to 225,000 af in year 2030 (see Table A-3). It is assumed that after 2030, the Ag Pool would equally share the remaining Excess Water with the Recharge Pool.

Absent the Settlement Alternative, it is assumed CAWCD would provide water as available to the Ag Pool while keeping the Recharge Pool (AWBA and other recharge activities) at no less than 400 kaf through 2016. Prior to 2016, when supplies to the Excess Water Pool are greater than 800 kaf, the water supply would be shared between ag and recharge. Below 800 kaf, it is assumed that recharge would take the first 400 kaf and ag would receive the remaining supply. It should be noted that through 2016, NIA water users are assumed to receive in-lieu water consistent with current trends. After 2016, it is assumed that CAWCD would linearly reduce the Ag Pool so that by the end of the repayment period, year 2046, the Ag Pool would be zero. This reduction is shown in Tables A-3 through A-8. This assumption is consistent with

CAWCD's current policy of supplying ag water through two-party letter agreements⁸ to reduce its interest obligation to the United States.

It is assumed that the Ag Pool would be distributed to the NIA entities based on either their CAP-eligible acreage (Settlement Alternative) or their CAWCD Ag Pool percentage "allocation" (Non-Settlement Alternatives). The NIA entities and these percentages are listed in Table A-11.

NIA entities have three sources of CAP water: Ag Pool water; in-lieu water, and, under Non-Settlement Alternative 3A, subcontracted water. Ag Pool water is competitively priced with groundwater pumping. In-lieu water is the amount of CAP water an entity uses "in-lieu" of pumping groundwater and is priced by the banking recharging entities. An entity must use all of its Ag Pool water before it can participate in the in-lieu program.

A.III.1. Contracted NIA Water

Under Non-Settlement Alternative 3, subcontracts for the currently uncontracted 71,815 afa NIA-priority water would be offered, in accordance with the SRPMIC Water Rights Settlement Act of 1988 (PL 100-512). Reclamation initiated consultation regarding the distribution of this water in a December 1, 1999 letter to ADWR. In the absence of input from ADWR, Table A-12 was developed, which distributes the water to the entities proposed for this allocation in the 1992 relocation decision 57 FR 4470. Several entities, such as Farmers Investment Company (FICO), declined the allocation and several others, such as the Arizona State Land Department (ASLD) leasee Pichacho Pecans, are no longer farming. These entities were removed from consideration and the water re-distributed based on CAP eligible acres, with an adjustment for NMIDD resulting from their 1983 allocation relinquishment during bankruptcy proceedings.

An economic analysis of the NIA entities' ability to subcontract for the water was considered to be inappropriate as it is possible that other entities would contribute to allow the NIA subcontracts to occur. M&I entities in Pinal County could consider it in their interest to do so in order to secure the long-term CAP M&I conversion rights to that water. This concept is not without precedent as M&I interests in the CAP three-county area agreed to the subsidized Ag Pool structure during the NIA financial difficulties around 1993 as a mechanism to keeping CAP repayment costs down.

As it is also possible that the NIA entities would decline these subcontracts, Non-Settlement Alternative 3 is evaluated with two outcomes. Under analysis 3A, the subcontracts are offered to and accepted and used by the NIA entities as shown on Table A-12. This acceptance also implies that the CAP water could be delivered. For example, SCIDD would line their canals.

Under analysis 3B, the subcontracts are offered to, but declined by, the NIA entities. The Secretary would allow the state to recommend subsequent allocations of this water. As the 65,647 afa of M&I priority water is not offered to the M&I sector under this Alternative, it is assumed that the 71,815 afa of NIA-priority water would be allocated to the M&I sector in the same pattern as the 65,647 afa would have been. Furthermore, it is assumed that the M&I

⁸ Excess water assumptions in the draft EIS differ from positions taken by the United States in CAWCD v. U.S. litigation; however, they are generally consistent with CAWCD's practices between 1993 and 2000.

allocation recipients would directly use 65,647 afa of the 71,815 afa and recharge the balance in an effort to firm it closer to M&I priority.

A.III.m. NIA Entities

Initially, the Draft EIS planned to focus on seven CAP NIA subcontractors listed below:

- ◆ MSIDD
- ◆ CAIDD
- ◆ NMIDD
- ◆ Queen Creek Irrigation District (QCID)
- ◆ CHCID
- ◆ San Tan Irrigation District (STID), and
- ◆ Tonopah Irrigation District (TID)

These districts were included in the impact analyses because their NIA allocations are to be relinquished in the Settlement Alternative. Two additional districts were added to the study because they may receive NIA allocations under one of the alternatives contemplated in the federal action: SCIDD, and RID.

A.IV. ALTERNATIVES IN THE DRAFT EIS

Using full CAP supplies (normal year), the water supplies have been distributed in terms of priority category, volume and timing. The distribution of CAP water would be influenced by the estimates of Indian development schedules and M&I water demand projections. The full CAP water distributions are shown for the Settlement Alternative and No Action Alternative in Figures A-2 and A-3. These graphs show the distribution of a full CAP water supply for the study period. The distribution of available CAP water (which includes shortage year deliveries from 2044 through 2051) is shown for each alternative in Figure A-4 through A-9. The distribution of water supplies was modified for the period when shortages are imposed in 2044 through 2051.

This section traces how the key assumptions interplay in each alternative. Tables A-13 through 16 summarize some of the key assumptions made across the alternatives. Key assumptions to all alternatives are the following:

- ◆ Normal year deliveries of 1,415 kafa for 2001 through 2043
- ◆ Surplus flows may occur, but are not included in the Draft EIS analysis

- ◆ Shortage year deliveries of 925 kafa from 2044 through 2051.

A.IV.a. No Action Alternative and Non-Settlement Alternatives 1, 2, and 3

The No Action Alternative is defined as the continuation of the status quo for 50 years into the future. No new Federal actions or changes in existing water management policies or laws would be implemented. All uncertainty that exists today continues to exist in the future. The No Action Alternative represents a baseline against which the Settlement Alternative and the Non-Settlement Alternatives may be compared. The No Action Alternative does not represent a prediction of future events absent this Federal action but is a continuation of the present conditions. It provides a baseline against which to measure the impacts of the other four alternatives.

The No Action Alternative includes the following:

- ◆ No new CAP allocations / contracts
- ◆ No additional Indian water rights settlements
- ◆ No litigation is resolved
- ◆ No additional Federal actions (e.g., no wheeling policy for the CAP, no new CAP contracts to Indian or non-Indians)

Non-Settlement Alternatives 1, 2, and 3 operate under the same background assumptions as the No Action Alternative and differ only in the CAP water allocations that define the alternatives.

A.IV.a.1. Key Assumptions

- ◆ Indian development and water use
 - Indian on-Reservation water use would reach a maximum of 331,326 afa.
 - Indian water costs would be \$54 per af.
 - Indian water development projects would be funded and constructed.

Build-out would occur in 2026, which reflects completion of the GRIC and Tohono O’odham Nation (TON) projects.

- ◆ Ag Pool
 - Ag Pool pricing after 2003 would be equal to Energy Rate 1.
 - After 2016, Ag Pool would be reduced to zero by 2046 (absent shortage).
 - Ag Pool distributed based on CAWCD Ag Pool “Allocation” percentage.

◆ Recharge Pool

- AWBA funding sunsets in 2017.
- AWBA and M&I entities would recharge no less than 400 kafa from 2001 through 2016.
- From 2017 through 2051, M&I entities would recharge directly or in lieu with adjacent agricultural operations such as SRP, MWD, and CMID (i.e., not in Pinal County).
- After 2017, M&I entities would pay full cost for recharge water.
- Recharge would share priority with the Ag Pool after 2017 to the extent that CAWCD provides water to the Ag Pool. However, CAWCD would reduce the Ag Pool to zero by 2046.

◆ M&I Development and Uses / M&I Leases - No additional exchanges or leases of Indian water would be available.

Alternatives 1, 2, and 3 operate under the same background assumptions as the No Action Alternative and differ only in the CAP water allocations that define the alternatives.

A.IV.b. Settlement Alternative

The Settlement Alternative is the alternative under which a settlement is successfully negotiated. As such, it contains many unique features including the following:

◆ NIA

- Voluntary relinquishment of CAP subcontracts would occur.
- A degree of Reclamation 9(d) debt relief would be provided.
- A degree of Reclamation Reform Act (RRA) relief would be provided.
- CAWCD would commit to continue the Ag Pool structure through 2030.
- Ag Pool distributed based on CAP eligible acreage.

◆ Indian Tribes

- Final water rights settlement for the GRIC would occur.
- Increased CAP allocation for the GRIC and TONs would occur.
- Mandatory leases of approximately 70,000 afa to the M&I sector as part of the GRIC settlement would be made.
- Groundwater pumping agreements would be implemented.
- Funding for the GRIC to increase the rate of agricultural development would occur.
- Pool of water reserved for future Federal purposes would be established.

◆ M&I Entities

- Allocation of 65,647 afa would be completed.

- Fixed repayment schedule would be established.
- Indian leases would be executed.
- ◆ Excess Water – Water for environmental purposes would potentially be made available.
- ◆ Pool of NIA-Priority Water Reserved for M&I and/or NIA Use-A pool of 95,263 afa of NIA-priority water is reserved for M&I and/or NIA use. It would be distributed to users in a process to be determined later. As the distribution of this water is currently unknown, it is treated as Excess Water for the study period.

Tables A-13 through A-16 summarize some of the background assumptions across the alternatives.

APPENDIX A

TABLES

TABLE A-1
CAP Allocation Draft EIS
SETTLEMENT ALTERNATIVE INDIAN LEASES BY ALTERNATIVE

Settlement Alternative Leases

Tribal Entity	Priority	Volume	Uses	Recipient
Ak Chin	Colorado River	10,000	Lease	Del Webb
FMIC	Indian	4,300	Lease	City of Phoenix
GRIC	Indian	41,000	Lease	7 Maricopa County cities
GRIC	Indian	32,500	Exchange	Mesa/Chandler effluent exchange
GRIC	M&I	17,000	Lease	ASARCO
GRIC	Indian	12,000	Lease	Phelps Dodge
SC Apache Tribe	Indian	12,500	Lease	City of Scottsdale
SC Apache Tribe	M&I	3,480	Lease	Unspecified
SC Apache Tribe	M&I	14,000	Lease	Phelps Dodge
SRPMIC	NIA	5,000	Exchange	from Roosevelt Water Conservation District (RWCD) to 7 Maricopa County cities
SRPMIC	Colorado River	20,900	Exchange	Maricopa County cities for groundwater (SRP)
SRPMIC	Indian	13,300	Lease	City of Phoenix
Yavapai Prescott	Indian	500	Transfer	City of Scottsdale
TOTAL		186,480		

No Action (and Non-Settlement Alternatives 1 - 3) Leases

Tribal Entity	Priority	Volume	Uses	Recipient
Ak Chin	Colorado River	10,000	Lease	Del Webb
FMIC	Indian	4,300	Lease	City of Phoenix
SC Apache Tribe	Indian	12,500	Lease	City of Scottsdale
SC Apache Tribe	M&I	3,480	Lease	Unspecified
SC Apache Tribe	M&I	14,000	Lease	Phelps Dodge
SRPMIC	NIA	5,000	Exchange	from RWCD to 7 Maricopa County cities
SRPMIC	Colorado River	20,900	Exchange	Maricopa County cities for groundwater (SRP)
SRPMIC	Indian	13,300	Lease	City of Phoenix
Yavapai Prescott	Indian	500	Transfer	City of Scottsdale
TOTAL		83,980		

TABLE A-2
CAP Allocation Draft EIS
Projected Direct and In-Lieu Recharge Pattern, 2001 - 2051

TYPE	ENTITY	LOCATION	CAPACITY	Projected Annual Recharge Pattern	
				2001-2016 AMOUNT(af) ^b	Post 2016 AMOUNT(af)
DIRECT	FUTURE WESTSIDE	PHOENIX AMA	50,000	0	50,000
	GRUSP*	PHOENIX AMA	200,000	70,000	70,000
	AGUA FRIA	PHOENIX AMA	100,000	100,000	100,000
	AVRA VALLEY	TUCSON AMA	11,000	11,000	11,000
	CAVSARP*	TUCSON AMA	60,000	15,000	60,000
	PIMA MINE	TUCSON AMA	23,000	10,000	23,000
	LOWER SANTA CRUZ	TUCSON AMA	30,000	9,000	30,000
	SUB-TOTAL		424,000	215,000	344,000
IN-LIEU	CHCID	PHOENIX AMA	0	0	0
	MWD	PHOENIX AMA	40,000	18,800	20,000
	NMIDD	PHOENIX AMA	54,000	34,000	0
	QCID	PHOENIX AMA	28,000	11,000	0
	RWCD	PHOENIX AMA	100,000	20,000	20,000
	SRP	PHOENIX AMA	200,000	22,000	22,000
	TID	PHOENIX AMA	15,000	4,000	4,000
	CAIDD ^a	PINAL AMA	110,000	15,100	0
	HIDD ^a	PINAL AMA	55,000	46,200	0
	MSIDD ^a	PINAL AMA	120,000	14,220	0
	Kai Farms	TUCSON AMA	11,231	8,000	8,000
	CMID	TUCSON AMA	20,000	9,000	9,000
	Bing K. Wong Farms	TUCSON AMA	16,615	7,000	7,000
	SUB-TOTAL		769,846	209,320	90,000
TOTAL				424,320	434,000

NOTES:

- * Granite Reef Underground Storage Project
- Central Avra Valley Storage and Recovery Project
- Hohokam Irrigation and Drainage District

a) Based on projected AWBA 2000 deliveries

b) Based on 1998 deliveries and facility capacities.

TABLE A-3
CAP Allocation Draft EIS
SETTLEMENT ALTERNATIVE
DISTRIBUTION OF CAP SUPPLY

Year	NIA PRIORITY				EXCESS WATER			TOTAL DELIVERIES	Milestones
	INDIAN	M&I	M&I LEASE	INDIAN USE	AG POOL	CAGRD	RECHARGE POOL		
2001	65,000	203,000	92,700	0	550,000	17,635	486,665	1,415,000	
2002	73,500	211,171	112,980	0	547,000	18,539	451,811	1,415,000	
2003	77,800	219,341	112,980	0	530,000	19,609	455,270	1,415,000	
2004	78,800	227,512	112,980	0	513,000	20,793	461,914	1,415,000	Onset of 1 Price Ag Pool
2005	79,800	235,683	112,980	0	497,000	21,978	467,559	1,415,000	
2006	151,000	243,854	153,980	2,500	400,000	23,162	440,504	1,415,000	
2007	171,465	252,024	156,147	5,200	400,000	24,347	405,817	1,415,000	
2008	200,265	260,195	158,313	25,200	400,000	25,531	345,496	1,415,000	
2009	226,093	268,366	160,480	35,200	400,000	26,715	298,146	1,415,000	
2010	232,093	276,537	162,647	45,200	400,000	27,900	270,624	1,415,000	
2011	244,193	284,707	164,813	55,200	400,000	29,537	236,550	1,415,000	
2012	249,355	292,878	166,980	65,200	400,000	31,223	209,364	1,415,000	
2013	253,017	301,049	169,147	75,200	400,000	32,955	183,633	1,415,000	
2014	255,680	309,220	171,313	85,200	400,000	34,687	158,900	1,415,000	
2015	256,342	317,390	173,480	95,200	400,000	36,419	136,169	1,415,000	
2016	257,004	325,561	175,647	110,200	400,000	38,151	108,438	1,415,000	
2017	257,666	333,732	177,813	125,200	400,000	39,883	80,706	1,415,000	AWBA Funding Ends
2018	258,328	341,902	179,980	140,200	400,000	41,615	52,975	1,415,000	
2019	258,989	350,073	182,147	145,800	300,000	43,601	134,390	1,415,000	
2020	259,653	358,244	184,313	148,800	300,000	45,667	118,322	1,415,000	
2021	260,315	366,415	186,480	148,800	300,000	47,734	105,257	1,415,000	
2022	260,977	374,585	186,480	148,800	300,000	49,216	94,942	1,415,000	
2023	261,639	382,756	186,480	148,800	300,000	50,698	84,627	1,415,000	
2024	262,302	390,927	186,480	148,800	300,000	52,994	73,498	1,415,000	
2025	262,964	399,098	186,480	148,800	300,000	55,769	61,889	1,415,000	
2026	263,626	407,268	186,480	148,800	225,000	58,551	125,274	1,415,000	
2027	263,626	415,439	186,480	148,800	225,000	60,669	114,986	1,415,000	
2028	263,626	423,610	186,480	148,800	225,000	62,822	104,662	1,415,000	
2029	263,626	431,780	186,480	148,800	225,000	64,990	94,324	1,415,000	
2030	263,626	439,951	186,480	148,800	225,000	67,158	83,985	1,415,000	End of CAP Ag Pool Commitment
2031	263,626	448,122	186,480	148,800	149,323	69,326	149,323	1,415,000	
2032	263,626	456,293	186,480	148,800	144,207	71,388	144,207	1,415,000	
2033	263,626	464,463	186,480	148,800	139,090	73,450	139,090	1,415,000	
2034	263,626	472,634	186,480	148,800	133,974	75,512	133,974	1,415,000	
2035	263,626	480,805	186,480	148,800	128,858	77,574	128,858	1,415,000	
2036	263,626	488,976	186,480	148,800	123,741	79,636	123,741	1,415,000	
2037	263,626	497,146	186,480	148,800	118,565	81,817	118,565	1,415,000	
2038	263,626	505,317	186,480	148,800	113,212	84,353	113,212	1,415,000	
2039	263,626	513,488	186,480	148,800	106,756	89,094	106,756	1,415,000	
2040	263,626	521,659	186,480	148,800	100,050	94,336	100,050	1,415,000	
2041	263,626	529,829	186,480	148,800	93,210	99,845	93,210	1,415,000	
2042	263,626	538,000	186,480	148,800	85,955	106,183	85,955	1,415,000	
2043	263,626	549,000	186,480	148,800	77,286	112,521	77,286	1,415,000	
2044	235,026	514,825	175,149	0	0	0	0	925,000	Onset of Shortage
2045	235,026	514,825	175,149	0	0	0	0	925,000	
2046	235,026	514,825	175,149	0	0	0	0	925,000	End of Repayment Period
2047	235,026	514,825	175,149	0	0	0	0	925,000	
2048	235,026	514,825	175,149	0	0	0	0	925,000	
2049	235,026	514,825	175,149	0	0	0	0	925,000	
2050	235,026	514,825	175,149	0	0	0	0	925,000	
2051	235,026	514,825	175,149	0	0	0	0	925,000	End of Study Period
Total	11,839,716	20,228,600	8,772,052	4,581,900	12,576,228	2,285,579	7,960,924	68,245,000	

COMPROMISE SHORTAGE SCHEME FOR THE PURPOSE OF SETTLEMENT

- Colorado River water
- Pro rata of Indian (36.4% of supply) and M&I (63.6% of supply)
 - GRIC absorbs Indian shortage when available supplies are between 853,100 and 1,009,079 af
 - Other Indian users and GRIC share Indian shortage between 827,100 and 853,100 af
 - Traditional Reclamation shortage applies when available supplies are below 827,100 af.
- NIA water
- "Excess Water"
 - priority within excess water prior to 2030 = 1. Ag Pool, 2. Recharge Pool (AWBA), 3. CAGRD
 - priority within excess water after 2030 = 1. CAGRD, 2. Recharge Pool, 3. Ag Pool

Shortage reductions (year 2043 - 2050)

Indian priority water is reduced to 311,802 af (reduction of 28,759 af).

M&I priority water is reduced to 514,825 af (reduction of 93,881 af).

5,000 afa from RWCD NIA to cities (SRPMIC settlement) from M&I lease column.

18,600 afa from RWCD NIA to GRIC from Indian column.

148,800 afa from Indian NIA column.

All Excess Water reduced to 0.

TABLE A-4
CAP Allocation Draft EIS
NO ACTION ALTERNATIVE
DISTRIBUTION OF CAP SUPPLY

Year					EXCESS WATER			TOTAL DELIVERIES	Milestones
	INDIAN	M&I	M&I LEASE	NIA PRIORITY INDIAN USE	CAGRD	RECHARGE POOL	AG POOL		
2001	65,000	203,000	63,700	0	23,321	529,989	529,989	1,415,000	
2002	73,500	211,171	83,980	0	24,821	510,764	510,764	1,415,000	
2003	77,800	219,341	83,980	0	26,323	503,778	503,778	1,415,000	
2004	78,800	227,512	83,980	0	27,842	498,433	498,433	1,415,000	Onset of 1 Price Ag Pool
2005	79,800	235,683	83,980	0	29,429	493,054	493,054	1,415,000	
2006	110,000	243,854	83,980	0	31,015	473,076	473,076	1,415,000	
2007	130,465	252,024	83,980	0	33,022	457,754	457,754	1,415,000	
2008	152,965	260,195	83,980	0	35,098	441,381	441,381	1,415,000	
2009	183,893	268,366	83,980	0	37,175	420,793	420,793	1,415,000	
2010	207,193	276,537	83,980	0	39,252	404,019	404,019	1,415,000	
2011	228,793	284,707	83,980	0	41,438	400,000	376,082	1,415,000	
2012	248,955	292,878	83,980	0	44,321	400,000	344,866	1,415,000	
2013	267,617	301,049	83,980	0	47,206	400,000	315,148	1,415,000	
2014	285,280	309,220	83,980	0	50,091	400,000	286,430	1,415,000	
2015	300,942	317,390	83,980	0	52,975	400,000	259,712	1,415,000	
2016	316,604	325,561	83,980	0	55,860	400,000	232,995	1,415,000	
2017	325,366	333,732	83,980	0	59,264	301,890	310,768	1,415,000	AWBA Funding Ends
2018	326,028	341,902	83,980	0	62,668	300,370	300,052	1,415,000	
2019	326,689	350,073	83,980	0	66,071	298,850	289,336	1,415,000	
2020	327,353	358,244	83,980	0	69,475	297,328	278,620	1,415,000	
2021	328,015	366,415	83,980	0	73,008	295,678	267,904	1,415,000	
2022	328,677	374,585	83,980	0	76,235	294,335	257,188	1,415,000	
2023	329,339	382,756	83,980	0	79,462	292,991	246,471	1,415,000	
2024	330,002	390,927	83,980	0	82,689	291,647	235,755	1,415,000	
2025	330,664	399,098	83,980	0	85,916	290,304	225,039	1,415,000	
2026	331,326	407,268	83,980	0	89,143	288,960	214,323	1,415,000	
2027	331,326	415,439	83,980	0	91,780	288,868	203,607	1,415,000	
2028	331,326	423,610	83,980	0	94,417	288,777	192,891	1,415,000	
2029	331,326	431,780	83,980	0	97,054	288,685	182,175	1,415,000	
2030	331,326	439,951	83,980	0	99,691	288,593	171,458	1,415,000	CAP Ends Ag Commitment
2031	331,326	448,122	83,980	0	102,329	288,501	160,742	1,415,000	
2032	331,326	456,293	83,980	0	105,049	288,326	150,026	1,415,000	
2033	331,326	464,463	83,980	0	107,877	288,044	139,310	1,415,000	
2034	331,326	472,634	83,980	0	114,037	284,429	128,594	1,415,000	
2035	331,326	480,805	83,980	0	120,791	280,221	117,878	1,415,000	
2036	331,326	488,976	83,980	0	126,605	276,952	107,162	1,415,000	
2037	331,326	497,146	83,980	0	132,628	273,474	96,445	1,415,000	
2038	331,326	505,317	83,980	0	138,652	269,996	85,729	1,415,000	
2039	331,326	513,488	83,980	0	144,675	266,518	75,013	1,415,000	
2040	331,326	521,659	83,980	0	150,698	263,040	64,297	1,415,000	
2041	331,326	529,829	83,980	0	156,722	259,562	53,581	1,415,000	
2042	331,326	538,000	83,980	0	163,060	255,769	42,865	1,415,000	
2043	331,326	538,000	83,980	0	169,398	260,147	32,148	1,415,000	
2044	331,326	515,409	78,265	0	0	0	0	925,000	Onset of Shortage
2045	331,326	515,409	78,265	0	0	0	0	925,000	
2046	331,326	515,409	78,265	0	0	0	0	925,000	End of Repayment Period
2047	331,326	515,409	78,265	0	0	0	0	925,000	
2048	331,326	515,409	78,265	0	0	0	0	925,000	
2049	331,326	515,409	78,265	0	0	0	0	925,000	
2050	331,326	515,409	78,265	0	0	0	0	925,000	
2051	331,326	515,409	78,265	0	0	0	0	925,000	End of Study Period
Total	14,374,216	20,222,272	4,216,980	0	3,458,584	14,795,296	11,177,651	68,245,000	

TRADITIONAL USBR CAP PRIORITY SCHEME (highest priority to lowest priority)

1. Colorado River water
 2. Pro rata of Indian and M&I water
 3. Indian Ag water (25% of GRIC Indian Ag + 10% of other Indian Ag)
 4. M&I water above 510,000 afa
 5. NIA water
 6. "Excess Water"
- within excess water - highest to lowest = 1. CAGRD, 2. Ag Pool, 3. Recharge Pool (AWBA +others)

Shortage reductions (year 2043 - 2050)

5000 afa from RWCD NIA to cities (SRPMIC settlement) from M&I lease column

22622 afa from M&I column (reduction prior to 510,000 afa per 1980 Indian contracts)

715 afa from M&I lease column (reduction pro rata of 17,000 afa of M&I water to Indians leased to M&I users)

TABLE A-5
CAP Allocation Draft EIS
NON-SETTLEMENT ALTERNATIVE 1
DISTRIBUTION OF CAP DELIVERIES BY CATEGORY

Year	NIA PRIORITY INDIAN USE				EXCESS WATER			TOTAL DELIVERIES	Milestones
	INDIAN	M&I	M&I LEASE	USE	CAGRD	RECHARGE POOL	AG POOL		
2001	65,000	203,000	63,700	0	17,635	532,833	532,833	1,415,000	
2002	73,500	211,171	83,980	0	18,539	513,905	513,905	1,415,000	
2003	77,800	219,341	83,980	0	19,609	507,135	507,135	1,415,000	
2004	78,800	227,512	83,980	0	20,793	501,957	501,957	1,415,000	Onset of 1 Price Ag Pool
2005	79,800	235,683	83,980	0	21,978	496,780	496,780	1,415,000	
2006	110,000	243,854	83,980	0	23,162	477,002	477,002	1,415,000	
2007	130,465	252,024	83,980	0	24,347	462,092	462,092	1,415,000	
2008	152,965	260,195	83,980	0	25,531	446,164	446,164	1,415,000	
2009	183,893	268,366	83,980	0	26,715	426,023	426,023	1,415,000	
2010	207,193	276,537	83,980	0	27,900	409,695	409,695	1,415,000	
2011	228,793	284,707	83,980	0	29,537	400,000	387,983	1,415,000	
2012	248,955	292,878	83,980	0	31,223	400,000	357,964	1,415,000	
2013	267,617	301,049	83,980	0	32,955	400,000	329,399	1,415,000	
2014	285,280	309,220	83,980	0	34,687	400,000	301,834	1,415,000	
2015	300,942	317,390	83,980	0	36,419	400,000	276,269	1,415,000	
2016	316,604	325,561	83,980	0	38,151	400,000	250,704	1,415,000	
2017	343,966	333,732	83,980	0	39,883	309,033	304,406	1,415,000	AWBA Funding Ends
2018	344,628	341,902	83,980	0	41,615	308,965	293,910	1,415,000	
2019	345,289	350,073	83,980	0	43,965	308,280	283,413	1,415,000	
2020	345,953	358,244	83,980	0	47,289	306,618	272,916	1,415,000	
2021	363,615	366,415	83,980	0	50,613	287,958	262,419	1,415,000	
2022	364,277	374,585	83,980	0	53,359	286,876	251,923	1,415,000	
2023	364,939	382,756	83,980	0	56,105	285,794	241,426	1,415,000	
2024	365,602	390,927	83,980	0	58,851	284,712	230,929	1,415,000	
2025	366,264	399,098	83,980	0	61,626	283,600	220,432	1,415,000	
2026	384,726	407,268	83,980	0	64,408	264,682	209,936	1,415,000	
2027	384,726	415,439	83,980	0	66,526	264,890	199,439	1,415,000	
2028	384,726	423,610	83,980	0	68,679	265,063	188,942	1,415,000	
2029	384,726	431,780	83,980	0	70,847	265,221	178,445	1,415,000	
2030	384,726	439,951	83,980	0	73,015	265,380	167,948	1,415,000	CAP Ends Ag Commitment
2031	385,485	448,122	83,980	0	75,183	264,779	157,452	1,415,000	
2032	386,244	456,293	83,980	0	77,245	264,284	146,955	1,415,000	
2033	386,244	464,463	83,980	0	79,546	264,309	136,458	1,415,000	
2034	386,244	472,634	83,980	0	82,267	263,914	125,961	1,415,000	
2035	386,244	480,805	83,980	0	84,987	263,519	115,465	1,415,000	
2036	386,244	488,976	83,980	0	88,289	262,543	104,968	1,415,000	
2037	386,244	497,146	83,980	0	93,641	259,518	94,471	1,415,000	
2038	386,244	505,317	83,980	0	99,346	256,139	83,974	1,415,000	
2039	386,244	513,488	83,980	0	105,369	252,442	73,477	1,415,000	
2040	386,244	521,659	83,980	0	111,392	248,744	62,981	1,415,000	
2041	386,244	529,829	83,980	0	117,416	245,047	52,484	1,415,000	
2042	386,244	538,000	83,980	0	123,754	241,035	41,987	1,415,000	
2043	386,244	549,000	83,980	0	130,092	234,193	31,490	1,415,000	
2044	363,779	486,106	75,115	0	0	0	0	925,000	Onset of Shortage
2045	345,179	486,106	75,115	0	0	0	0	906,400	
2046	345,179	486,106	75,115	0	0	0	0	906,400	End of Repayment Period
2047	345,179	486,106	75,115	0	0	0	0	906,400	
2048	345,179	486,106	75,115	0	0	0	0	906,400	
2049	345,179	486,106	75,115	0	0	0	0	906,400	
2050	345,179	486,106	75,115	0	0	0	0	906,400	
2051	345,179	486,106	75,115	0	0	0	0	906,400	End of Study Period
Total	15,736,215	19,998,848	4,191,780	0	2,494,486	14,481,125	11,212,346	68,114,800	

TRADITIONAL USBR CAP PRIORITY SCHEME (highest priority to lowest priority)

1. Colorado River water
 2. Pro rata of Indian and M&I water
 3. Indian Ag water (reduce 25% of GRIC Indian Ag then 10% of other Indian Ag)
 4. M&I water above 510,000 afa
 5. NIA water
 6. "Excess Water"
- priority within excess water = 1. CAGRD, 2. NIA Pool, 3. Incentive Recharge (AWBA)

Shortage reductions (year 2043 - 2050)

5,000 afa from RWCD NIA to cities (SRPMIC settlement) from M&I lease column
18,600 afa from RWCD NIA to GRIC from Indian column
125,302 afa from M&I water to get to 510,000 (per the 1980 Indian contracts)
reductions to the Indian and M&I leases are only to the M&I portion of the supply

TABLE A-6
CAP Allocation Draft EIS
NON-SETTLEMENT ALTERNATIVE 2
CAP DELIVERIES BY CATEGORY

Year	NIA PRIORITY				EXCESS WATER			TOTAL DELIVERIES	Milestones
	INDIAN	M&I	M&I LEASE	INDIAN USE	CAGR	POOL	AG POOL		
2001	65,000	203,000	63,700	0	23,321	529,989	529,989	1,415,000	
2002	73,500	211,171	83,980	0	24,821	510,764	510,764	1,415,000	
2003	77,800	219,341	83,980	0	26,323	503,778	503,778	1,415,000	
2004	78,800	227,512	83,980	0	27,842	498,433	498,433	1,415,000	Onset of 1 Price Ag Pool
2005	79,800	235,683	83,980	0	29,429	493,054	493,054	1,415,000	
2006	110,000	243,854	83,980	0	31,015	473,076	473,076	1,415,000	
2007	130,465	252,024	83,980	0	33,022	457,754	457,754	1,415,000	
2008	152,965	260,195	83,980	0	35,098	441,381	441,381	1,415,000	
2009	183,893	268,366	83,980	0	37,175	420,793	420,793	1,415,000	
2010	207,193	276,537	83,980	0	39,252	400,000	408,038	1,415,000	
2011	242,293	284,707	83,980	0	41,438	400,000	362,582	1,415,000	
2012	262,455	292,878	83,980	0	44,321	400,000	331,366	1,415,000	
2013	281,117	301,049	83,980	0	47,206	400,000	301,648	1,415,000	
2014	298,780	309,220	83,980	0	50,091	400,000	272,930	1,415,000	
2015	314,442	317,390	83,980	0	52,975	400,000	246,212	1,415,000	
2016	330,104	325,561	83,980	0	55,860	400,000	219,495	1,415,000	
2017	338,866	333,732	83,980	18,600	59,264	289,925	290,633	1,415,000	AWBA Funding Ends
2018	339,528	341,902	83,980	18,600	62,668	287,711	280,611	1,415,000	
2019	340,189	350,073	83,980	18,600	66,071	285,497	270,589	1,415,000	
2020	340,853	358,244	83,980	18,600	69,475	283,280	260,568	1,415,000	
2021	358,515	366,415	83,980	18,600	73,008	263,936	250,546	1,415,000	
2022	359,177	374,585	83,980	18,600	76,235	261,899	240,524	1,415,000	
2023	359,839	382,756	83,980	18,600	79,462	259,861	230,502	1,415,000	
2024	360,502	390,927	83,980	18,600	82,689	257,822	220,480	1,415,000	
2025	361,164	399,098	83,980	18,600	85,916	255,784	210,458	1,415,000	
2026	407,826	407,268	83,980	18,600	89,143	207,747	200,437	1,415,000	
2027	407,826	415,439	83,980	18,600	91,780	206,960	190,415	1,415,000	
2028	407,826	423,610	83,980	18,600	94,417	206,174	180,393	1,415,000	
2029	407,826	431,780	83,980	18,600	97,054	205,388	170,371	1,415,000	
2030	407,826	439,951	83,980	18,600	99,691	204,602	160,349	1,415,000	CAP Ends Ag Commitment
2031	408,585	448,122	83,980	18,600	102,329	203,057	150,327	1,415,000	
2032	433,291	456,293	83,980	18,600	105,049	200,000	117,787	1,415,000	
2033	433,291	464,463	83,980	18,600	107,877	200,000	106,789	1,415,000	
2034	433,291	472,634	83,980	18,600	114,037	200,000	92,458	1,415,000	
2035	433,291	480,805	83,980	18,600	120,791	200,000	77,534	1,415,000	
2036	433,291	488,976	83,980	38,100	126,605	200,000	44,049	1,415,000	
2037	433,291	497,146	83,980	57,599	132,628	200,000	10,355	1,415,000	
2038	433,291	505,317	83,980	57,599	138,652	196,161	0	1,415,000	
2039	433,291	513,488	83,980	57,599	144,675	181,967	0	1,415,000	
2040	433,291	521,659	83,980	57,599	150,698	167,773	0	1,415,000	
2041	433,291	529,829	83,980	57,599	156,722	153,579	0	1,415,000	
2042	433,291	538,000	83,980	57,599	163,060	139,070	0	1,415,000	
2043	433,291	549,000	83,980	57,599	169,398	121,732	0	1,415,000	
2044	416,950	432,499	75,551	0	0	0	0	925,000	Onset of Shortage
2045	400,609	432,499	75,551	0	0	16,341	0	925,000	
2046	400,609	432,499	75,551	0	0	16,341	0	925,000	End of Repayment Period
2047	400,609	432,499	75,551	0	0	16,341	0	925,000	
2048	400,609	432,499	75,551	0	0	16,341	0	925,000	
2049	400,609	432,499	75,551	0	0	16,341	0	925,000	
2050	400,609	432,499	75,551	0	0	16,341	0	925,000	
2051	400,609	432,499	75,551	0	0	16,341	0	925,000	End of Study Period
Total	16,915,660	19,569,992	4,195,268	794,693	3,458,584	13,083,334	10,227,468	68,245,000	

TRADITIONAL USBR CAP PRIORITY SCHEME (highest priority to lowest priority)

1. Colorado River water
 2. Pro rata of Indian and M&I water
 3. Indian Ag water (reduce 25% of GRIC Indian Ag then 10% of other Indian Ag)
 4. M&I water above 510,000 afa
 5. NIA water
 6. "Excess Water"
- priority within excess water = 1. CAGR, 2. NIA Pool, 3. Incentive Recharge (AWBA)

Shortage reductions (year 2043 - 2050)

5,000 afa from RWCD NIA to cities (SRPMIC settlement) from M&I lease column
18,600 afa from RWCD NIA to GRIC from Indian column
57599 afa from Indian NIA column
125,302 afa from M&I water to get to 510,000 (per the 1980 Indian contracts)
includes 116,492 afa from M&I column
3,429 afa from M&I lease column (pro rata share based on M&I component of leased water)
16,341 afa from Indian column (pro rata share based on M&I component of Indian supply)

TABLE A-7
CAP Allocation Draft EIS
NON-SETTLEMENT ALTERNATIVE 3 - A
CAP DELIVERIES BY CATEGORY

Year	NIA					EXCESS WATER			TOTAL DELIVERIES	Milestones
	INDIAN	M&I	M&I LEASE	INDIAN USE	CONTRACTED NIA	CAGRDR	RECHARGE POOL	AG POOL		
2001	65,000	203,000	63,700	0	71,815	23,321	494,082	494,082	1,415,000	
2002	73,500	211,171	83,980	0	71,815	24,821	474,857	474,857	1,415,000	
2003	77,800	219,341	83,980	0	71,815	26,323	467,870	467,870	1,415,000	
2004	78,800	227,512	83,980	0	71,815	27,842	462,525	462,525	1,415,000	Onset of 1 Price Ag Pool
2005	79,800	235,683	83,980	0	71,815	29,429	457,147	457,147	1,415,000	
2006	110,000	243,854	83,980	0	71,815	31,015	437,168	437,168	1,415,000	
2007	130,465	252,024	83,980	0	71,815	33,022	421,847	421,847	1,415,000	
2008	152,965	260,195	83,980	0	71,815	35,098	405,473	405,473	1,415,000	
2009	183,893	268,366	83,980	0	71,815	37,175	384,885	384,885	1,415,000	
2010	207,193	276,537	83,980	0	71,815	39,252	400,000	336,223	1,415,000	
2011	242,293	284,707	83,980	0	71,815	41,438	400,000	290,767	1,415,000	
2012	262,455	292,878	83,980	0	71,815	44,321	400,000	259,551	1,415,000	
2013	281,117	301,049	83,980	0	71,815	47,206	400,000	229,833	1,415,000	
2014	298,780	309,220	83,980	0	71,815	50,091	400,000	201,115	1,415,000	
2015	314,442	317,390	83,980	0	71,815	52,975	400,000	174,397	1,415,000	
2016	330,104	325,561	83,980	0	71,815	55,860	400,000	147,680	1,415,000	
2017	338,866	333,732	83,980	18,600	71,815	59,264	218,110	290,633	1,415,000	AWBA Funding Ends
2018	339,528	341,902	83,980	18,600	71,815	62,668	215,896	280,611	1,415,000	
2019	340,189	350,073	83,980	18,600	71,815	66,071	213,682	270,589	1,415,000	
2020	340,853	358,244	83,980	18,600	71,815	69,475	211,465	260,568	1,415,000	
2021	358,515	366,415	83,980	18,600	71,815	73,008	200,000	242,667	1,415,000	
2022	359,177	374,585	83,980	18,600	71,815	76,235	200,000	230,607	1,415,000	
2023	359,839	382,756	83,980	18,600	71,815	79,462	200,000	218,548	1,415,000	
2024	360,502	390,927	83,980	18,600	71,815	82,689	200,000	206,487	1,415,000	
2025	361,164	399,098	83,980	18,600	71,815	85,916	200,000	194,428	1,415,000	
2026	407,826	407,268	83,980	18,600	71,815	89,143	200,000	136,368	1,415,000	
2027	407,826	415,439	83,980	18,600	71,815	91,780	200,000	125,560	1,415,000	
2028	407,826	423,610	83,980	18,600	71,815	94,417	200,000	114,752	1,415,000	
2029	407,826	431,780	83,980	18,600	71,815	97,054	200,000	103,944	1,415,000	
2030	407,826	439,951	83,980	28,600	71,815	99,691	200,000	83,136	1,415,000	CAP Ends Ag Commitment
2031	408,585	448,122	83,980	38,600	71,815	102,329	200,000	61,570	1,415,000	
2032	433,291	456,293	83,980	48,600	71,815	105,049	200,000	15,972	1,415,000	
2033	433,291	464,463	83,980	58,600	71,815	107,877	194,974	0	1,415,000	
2034	433,291	472,634	83,980	68,600	71,815	114,037	170,643	0	1,415,000	
2035	433,291	480,805	83,980	78,600	71,815	120,791	145,719	0	1,415,000	
2036	433,291	488,976	83,980	108,100	71,815	126,605	102,234	0	1,415,000	
2037	433,291	497,146	83,980	123,100	71,815	132,628	73,039	0	1,415,000	
2038	433,291	505,317	83,980	138,100	71,815	138,652	43,845	0	1,415,000	
2039	433,291	513,488	83,980	153,100	71,815	144,675	14,651	0	1,415,000	
2040	433,291	521,659	83,980	164,653	71,815	139,602	0	0	1,415,000	
2041	433,291	529,829	83,980	169,253	71,815	126,832	0	0	1,415,000	
2042	433,291	538,000	83,980	169,253	71,815	118,661	0	0	1,415,000	
2043	433,291	549,000	83,980	169,253	71,815	107,661	0	0	1,415,000	
2044	416,950	432,499	75,551	0	0	0	0	0	925,000	Onset of Shortage
2045	400,609	432,499	75,551	0	0	0	16,341	0	925,000	
2046	400,609	432,499	75,551	0	0	0	16,341	0	925,000	End of Repayment Period
2047	400,609	432,499	75,551	0	0	0	16,341	0	925,000	
2048	400,609	432,499	75,551	0	0	0	16,341	0	925,000	
2049	400,609	432,499	75,551	0	0	0	16,341	0	925,000	
2050	400,609	432,499	75,551	0	0	0	16,341	0	925,000	
2051	400,609	432,499	75,551	0	0	0	16,341	0	925,000	End of Study Period
Total	16,915,660	19,569,992	4,195,268	1,758,212	3,088,045	3,311,462	10,924,500	8,481,862	68,245,001	

TRADITIONAL USBR CAP PRIORITY SCHEME (highest priority to lowest priority)

1. Colorado River water
 2. Pro rata of Indian and M&I water
 3. Indian Ag water (reduce 25% of GRIC Indian Ag then 10% of other Indian Ag)
 4. M&I water above 510,000 afa
 5. NIA water
 6. "Excess Water"
- priority within excess water = 1. CAGRDR, 2. NIA Pool, 3. Incentive Recharge (AWBA)

Shortage reductions (year 2043 - 2050)

5,000 afa from RWCD NIA to cities (SRPMIC settlement) from M&I lease column
 18,600 afa from RWCD NIA to GRIC from Indian column
 169,253 afa from Indian NIA column
 125,302 afa from M&I water to get to 510,000 (per the 1980 Indian contracts)
 includes 116,492 afa from M&I column
 3,429 afa from M&I lease column (pro rata share based on M&I component of leased water)
 16,341 afa from Indian column (pro rata share based on M&I component of Indian supply)

TOTAL CAGRDR SHORTAGE = 193,412 afa at 2051

TABLE A-8
CAP Allocation Draft EIS
NON-SETTLEMENT ALTERNATIVE 3 - B
CAP DELIVERIES BY CATEGORY

Year							EXCESS WATER			TOTAL DELIVERIES	Milestones
	INDIAN	M&I	M&I LEASE	NIA PRIORITY INDIAN USE	NIA CONTRACTED TO M&I		CAGR D	RECHARGE POOL	AG POOL		
2001	65,000	203,000	63,700	0	71,815		17,635	496,925	496,925	1,415,000	
2002	73,500	211,171	83,980	0	71,815		18,539	477,998	477,998	1,415,000	
2003	77,800	219,341	83,980	0	71,815		19,609	471,227	471,227	1,415,000	
2004	78,800	227,512	83,980	0	71,815		20,793	466,050	466,050	1,415,000	Onset of 1 Price Ag Pool
2005	79,800	235,683	83,980	0	71,815		21,978	460,872	460,872	1,415,000	
2006	110,000	243,854	83,980	0	71,815		23,162	441,095	441,095	1,415,000	
2007	130,465	252,024	83,980	0	71,815		24,347	426,185	426,185	1,415,000	
2008	152,965	260,195	83,980	0	71,815		25,531	410,257	410,257	1,415,000	
2009	183,893	268,366	83,980	0	71,815		26,715	390,115	390,115	1,415,000	
2010	207,193	276,537	83,980	0	71,815		27,900	400,000	347,576	1,415,000	
2011	242,293	284,707	83,980	0	71,815		29,537	400,000	302,668	1,415,000	
2012	262,455	292,878	83,980	0	71,815		31,223	400,000	272,649	1,415,000	
2013	281,117	301,049	83,980	0	71,815		32,955	400,000	244,084	1,415,000	
2014	298,780	309,220	83,980	0	71,815		34,687	400,000	216,519	1,415,000	
2015	314,442	317,390	83,980	0	71,815		36,419	400,000	190,954	1,415,000	
2016	330,104	325,561	83,980	0	71,815		38,151	400,000	165,389	1,415,000	
2017	338,866	333,732	83,980	18,600	71,815		39,883	237,491	290,633	1,415,000	AWBA Funding Ends
2018	339,528	341,902	83,980	18,600	71,815		41,615	236,949	280,611	1,415,000	
2019	340,189	350,073	83,980	18,600	71,815		43,965	235,788	270,589	1,415,000	
2020	340,853	358,244	83,980	18,600	71,815		47,289	233,652	260,568	1,415,000	
2021	358,515	366,415	83,980	18,600	71,815		50,613	200,000	265,063	1,415,000	
2022	359,177	374,585	83,980	18,600	71,815		53,359	200,000	253,484	1,415,000	
2023	359,839	382,756	83,980	18,600	71,815		56,105	200,000	241,905	1,415,000	
2024	360,502	390,927	83,980	18,600	71,815		58,851	200,000	230,326	1,415,000	
2025	361,164	399,098	83,980	18,600	71,815		61,626	200,000	218,717	1,415,000	
2026	407,826	407,268	83,980	18,600	71,815		64,408	200,000	161,102	1,415,000	
2027	407,826	415,439	83,980	18,600	71,815		66,526	200,000	150,814	1,415,000	
2028	407,826	423,610	83,980	18,600	71,815		68,679	200,000	140,490	1,415,000	
2029	407,826	431,780	83,980	18,600	71,815		70,847	200,000	130,152	1,415,000	
2030	407,826	439,951	83,980	28,600	71,815		73,015	200,000	109,813	1,415,000	CAP Ends Ag Commitment
2031	408,585	448,122	83,980	38,600	71,815		75,183	200,000	88,715	1,415,000	
2032	433,291	456,293	83,980	48,600	71,815		77,245	200,000	43,777	1,415,000	
2033	433,291	464,463	83,980	58,600	71,815		79,546	223,305	0	1,415,000	
2034	433,291	472,634	83,980	68,600	71,815		82,267	202,413	0	1,415,000	
2035	433,291	480,805	83,980	78,600	71,815		84,987	181,522	0	1,415,000	
2036	433,291	488,976	83,980	108,100	71,815		88,289	140,549	0	1,415,000	
2037	433,291	497,146	83,980	123,100	71,815		93,641	112,027	0	1,415,000	
2038	433,291	505,317	83,980	138,100	71,815		99,346	83,151	0	1,415,000	
2039	433,291	513,488	83,980	153,100	71,815		105,369	53,957	0	1,415,000	
2040	433,291	521,659	83,980	164,653	71,815		111,392	28,210	0	1,415,000	
2041	433,291	529,829	83,980	169,253	71,815		117,416	9,416	0	1,415,000	
2042	433,291	538,000	83,980	169,253	71,815		118,661	0	0	1,415,000	
2043	433,291	549,000	83,980	169,253	71,815		107,693	0	0	1,415,032	
2044	416,950	432,499	75,551	0	0		0	0	0	925,000	Onset of Shortage
2045	400,609	432,499	75,551	0	0		0	16,341	0	925,000	
2046	400,609	432,499	75,551	0	0		0	16,341	0	925,000	End of Repayment Period
2047	400,609	432,499	75,551	0	0		0	16,341	0	925,000	
2048	400,609	432,499	75,551	0	0		0	16,341	0	925,000	
2049	400,609	432,499	75,551	0	0		0	16,341	0	925,000	
2050	400,609	432,499	75,551	0	0		0	16,341	0	925,000	
2051	400,609	432,499	75,551	0	0		0	16,341	0	925,000	End of Study Period
Total	16,915,660	19,569,992	4,195,268	1,758,212	3,088,045		2,466,994	11,333,541	8,917,321	68,245,032	

TRADITIONAL USBR CAP PRIORITY SCHEME (highest priority to lowest priority)

1. Colorado River water
 2. Pro rata of Indian and M&I water
 3. Indian Ag water (reduce 25% of GRIC Indian Ag then 10% of other Indian Ag)
 4. M&I water above 510,000 afa
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 6. "Excess Water"
- priority within excess water = 1. CAGR D, 2. NIA Pool, 3. Incentive Recharge (AWBA)

Shortage reductions (year 2043 - 2050)

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includes 116,492 afa from M&I column
3,429 afa from M&I lease column (pro rata share based on M&I component of leased water)
16,341 afa from Indian column (pro rata share based on M&I component of Indian supply)

TOTAL CAGR D SHORTAGE = 193,412 afa at 2051

Table A-9
CAP Allocation Draft EIS
M&I Population Projections and Projected Demands
(Excludes SRP Service Area)

	TMP GPCD	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2051
Arizona Water Company-Apache Junction Population	238	25,109	27,041	28,812	30,417	33,026	35,849	38,129	39,134	40,008	40,828	41,683
Demand (afa)		6,694	7,209	7,681	8,109	8,804	9,557	10,165	10,433	10,666	10,885	11,113
AVRA Water Cooperative Population	120	5,623	7,031	8,440	9,848	11,257	12,651	14,045	15,439	16,833	18,227	19,621
Demand (afa)		755	944	1,133	1,322	1,511	1,698	1,885	2,073	2,260	2,447	2,634
Cave Creek Water Company Population	163	4,968	6,871	8,773	10,676	12,579	13,569	14,559	15,548	16,538	17,528	18,518
Demand (afa)		905	1,252	1,598	1,945	2,292	2,472	2,652	2,833	3,013	3,193	3,374
City of Chandler Population	198	32,515	54,578	71,197	83,526	94,861	101,029	107,426	113,967	114,037	124,387	130,936
Demand (afa)		7,210	12,102	15,787	18,520	21,034	22,401	23,820	25,270	25,286	27,581	29,033
Chaparral City Water Company Population	270	22,138	30,262	38,385	46,509	54,632	54,709	54,787	54,864	54,941	55,018	55,096
Demand (afa)		6,687	9,140	11,594	14,047	16,501	16,524	16,547	16,571	16,594	16,617	16,641
Community Water Company of Green Valley Population	140	14,290	16,101	17,911	19,722	21,532	22,656	23,780	24,903	26,027	27,151	28,275
Demand (afa)		2,244	2,528	2,812	3,096	3,381	3,557	3,734	3,910	4,087	4,263	4,439
City of El Mirage Population	149	6,006	6,323	6,639	6,956	7,272	8,780	10,288	11,796	13,304	14,812	16,320
Demand (afa)		1,001	1,053	1,106	1,159	1,212	1,463	1,714	1,965	2,216	2,468	2,719
City of Glendale Population	182	63,848	70,890	79,037	88,709	95,279	106,521	108,927	110,627	111,278	111,717	112,147
Demand (afa)		13,009	14,444	16,104	18,075	19,413	21,704	22,194	22,541	22,673	22,763	22,850
City of Goodyear Population	232	15,479	21,790	28,829	43,029	67,205	91,502	119,785	146,032	174,583	194,199	204,586
Demand (afa)		4,026	5,667	7,498	11,191	17,479	23,798	31,155	37,981	45,407	50,508	53,210
H2O Water Company Population	176	793	886	979	1,072	1,165	1,281	1,397	1,513	1,629	1,745	1,861
Demand (afa)		157	175	193	212	230	253	276	299	322	345	368
City of Mesa Population	165	183,579	231,465	284,870	304,963	324,144	344,760	351,771	353,116	354,484	362,685	366,723
Demand (afa)		33,885	42,723	52,580	56,289	59,830	63,635	64,929	65,177	65,430	66,943	67,689
Metropolitan Domestic Water Improvement District Population	168	47,750	54,630	61,509	68,389	75,269	79,966	84,663	89,360	94,057	98,754	103,451
Demand (afa)		8,985	10,280	11,574	12,869	14,164	15,047	15,931	16,815	17,699	18,583	19,467
Town of Oro Valley Population	180	27,362	33,392	39,423	45,453	51,484	58,143	64,801	71,460	78,118	84,777	91,435
Demand (afa)		5,509	6,724	7,938	9,152	10,367	11,707	13,048	14,389	15,730	17,070	18,411
City of Peoria Population	157	39,933	70,316	82,744	106,564	120,675	131,873	145,191	163,884	186,070	221,507	285,778
Demand (afa)		7,036	12,389	14,578	18,775	21,261	23,234	25,581	28,874	32,783	39,027	50,351
City of Phoenix Population	202	600,736	661,404	733,538	804,317	871,775	977,823	1,095,192	1,192,833	1,287,982	1,367,926	1,415,679
Demand (afa)		136,083	149,826	166,166	182,199	197,480	221,503	248,090	270,209	291,762	309,872	320,689
City of Scottsdale Population	249	133,885	169,106	195,624	216,976	227,441	248,970	273,252	286,671	286,496	286,757	286,946
Demand (afa)		37,389	47,225	54,630	60,593	63,516	69,528	76,309	80,057	80,008	80,081	80,133
Town of Superior/Arizona Water Company-Superior Population	126	3,483	3,516	3,550	3,583	3,616	3,632	3,647	3,663	3,678	3,694	3,709
Demand (afa)		493	497	502	507	511	514	516	518	520	522	525
City of Surprise Population	214	15,030	20,678	22,428	25,159	31,674	36,033	47,590	59,955	73,972	108,684	153,282
Demand (afa)		3,603	4,957	5,376	6,031	7,592	8,637	11,408	14,372	17,732	26,053	36,743
City of Tucson Population	153	644,223	691,429	738,635	785,841	833,047	882,295	931,543	980,791	1,030,039	1,079,287	1,128,535
Demand (afa)		110,415	118,506	126,597	134,688	142,779	151,219	159,660	168,101	176,542	184,982	193,423
Vail Water Company Population	164	3,100	5,156	7,211	9,267	11,323	12,706	14,090	15,473	16,856	#REF!	#REF!
Demand (afa)		568	945	1,323	1,700	2,077	2,330	2,584	2,838	3,091	#REF!	#REF!
Valley Utilities Water Company Population	126	7,726	8,693	9,659	10,626	11,593	12,735	13,877	15,019	16,161	17,303	18,445
Demand (afa)		1,093	1,229	1,366	1,503	1,640	1,801	1,963	2,124	2,286	2,447	2,609
TOTAL POPULATION		1,872,466	2,164,516	2,439,381	2,691,185	2,927,823	3,201,633	3,480,609	3,726,914	3,957,083	#REF!	#REF!
TOTAL ENTITIES NON-SRP DEMAND		381,051	442,607	500,457	553,874	604,268	663,028	723,996	776,915	825,439	#REF!	#REF!
OTHER ENTITIES NON-SRP DEMAND		5,455	12,109	18,764	25,418	32,073	38,727	45,382	52,036	58,691	65,345	72,000
TOTAL NON-SRP DEMAND		386,505	454,716	519,221	579,292	636,341	701,755	769,378	828,951	884,130	#REF!	#REF!
CAP/AWBA Demand Projection		241,000	346,854	458,707	575,561	621,415	670,268	721,122	778,976	829,829	882,000	937,000

Note:

TMP gpcd from Phoenix and Tucson AMA TMP, ADWR, 1999

Lost and unaccounted water estimated at 7% of gpcd and added to TMP gpcd rate

Vail Water Company gpcd = City of Tucson

H2O Water Company gpcd = City of Mesa

City of Surprise gpcd from ADWR worksheet

Table A-10
CAP Allocation Draft EIS
Preliminary Summary of M&I Entities at 2051

	TMP gpcd	DEMAND	SUPPLIES				DEMAND	SUPPLIES			DEMAND	SUPPLIES			DEMAND	SUPPLIES		
		2051 Total Demand	2051 Non-CAP Allocations Supplies ^a	Existing Allocation	Proposed Allocation	GRIC Lease	Settlement Alternative			Non-Settlement Alternatives 1 and 3B			Non-Settlement Alternatives 2, 3A, and No Action Alternative					
							Residual	Effluent	CAGR ^d	Residual	Effluent	CAGR ^d	Residual	Effluent	CAGR ^d	Residual	Effluent	CAGR ^d
Arizona Water Company -Apache Junction ^b	143	11,114	5,114	6,000	285	0	0	0	0	0	0	0	0 ^d	0	0	0		
AVRA Water Cooperative	120	2,634	0	0	808	0	1,826	0	1,826	1,826	0	1,826	2,634	0	2,634			
Cave Creek Water Company	163	6,411	65	1,600	806	0	3,941	2,973	968	3,941	2,973	968	4,746	2,973	1,774			
City of Chandler	198	75,483	60,972	3,668	4,986	5,857	0	0	0	5,857 ^h	5,857	0	10,843	10,843	0			
Chaparral City Water Company	270	16,641	546	6,978	1,931	0	7,186	1,686	5,500	7,186	1,686	5,500	9,117	1,686	7,431			
Community Water Company of Green Valley	140	4,439	0	1,337	1,521	0	1,581	0	1,581	1,581	0	1,581	3,102	0	3,102			
City of El Mirage	149	4,003	460	0	508	0	3,035	560	2,475	3,035	560	2,475	3,543	560	2,983			
City of Glendale	182	69,518	54,428	14,183	3,053	5,857	0	0	0	0	0	0	906 ^e	906	0			
City of Goodyear	232	76,218	23,656	3,381	7,211	5,857	36,113	3,360	32,753	41,970	3,360	38,610	49,181	3,360	45,821			
H2O Water Company	176	368	0	0	147	0	221	0	221	221	0	221	368	0	368			
City of Mesa	165	122,689	74,838	36,388	7,115	5,857	0	959	0	4,348	4,348	0	11,463 ^f	11,463	0			
Metropolitan Domestic Water Improvement District	168	19,467	0	8,858	4,602	0	6,007	0	6,007	6,007	0	6,007	10,609	0	10,609			
Town of Oro Valley	180	18,411	0	2,294	3,557	0	12,560	0	12,560	12,560	0	12,560	16,117	0	16,117			
City of Peoria	157	63,132	15,203	18,709	5,527	5,857	17,835	0	17,835	23,692	0	23,692	29,219	0	29,219			
City of Phoenix	202	577,341	391,461	113,914	8,206	5,857	57,903	41,541	16,362	63,760	41,541	22,219	71,966	41,541	30,425			
City of Scottsdale	249	104,135	48,574	49,029	2,981	5,857	0	1,000	0	0	2,247	0	6,532 ^g	6,532	0			
Town of Superior/Arizona Water Company-Superior	126	525	0	0	285	0	240	0	240	240	0	240	525	0	525			
City of Surprise	214	56,566	21,352	7,373	2,876	0	24,965	3,584	21,381	24,965	3,584	21,381	27,841	3,584	24,257			
City of Tucson	153	193,423	44,733	138,920	8,206	0	1,564	0	1,564	1,564	0	1,564	9,770	0	9,770			
Vail Water Company	164	3,598	0	786	1,071	0	1,741	0	1,741	1,741	0	1,741	2,812	0	2,812			
Valley Utilities Water Company	126	2,609	0	0	250	0	2,359	0	2,359	2,359	0	2,359	2,609	0	2,609			
TOTAL:		1,428,724	741,402	413,418	65,932^c	40,999	179,077	55,663	125,372	206,853	66,156	142,943	273,903	83,448	190,455			

NOTES:

^aIncludes SRP water, Gatewater, Indian settlement water Reclaimed Wastewater for Turf, Groundwater, Roosevelt Conservation Space, Salt River Pima-Maricopa Indian Community (SRPMIC)/Roosevelt Irrigation District Exchange, Hohokam Irrigation and Drainage District (HIDD) Buyout, and Poor Quality Groundwater.

^bApache Junction reallocated CAP supply would only be provided if Superior does not accept the offered allocation.

^cTotal proposed allocation volume includes Superior and Apache Junction, only one of these entities will receive an allocation, so that the total water available is 64,647 afa.

^dApache Junctions residual will be made up from additional groundwater pumping, from outside of the AMA.

^eGlendale has additional non-CAP supplies that may be applied if it does not receive additional CAP water including the use of effluent pledged in its AWS designation.

^fMesa has additional non-CAP supplies that may be applied if it does not receive additional CAP water including the use of effluent pledged in its AWS designation.

^gScottsdale has additional non-CAP supplies that may be applied if it does not receive additional CAP water including the use of effluent pledged in its AWS designation.

^hChandler has additional non-CAP supplies that may be applied if it does not receive additional CAP water including the use of effluent pledged in its AWS designation.

Table A-11
CAP Allocation Draft EIS
CAP Ag Pool Percentage Distribution

	CAWCD Proposed SETTLEMENT	CAWCD "Allocation" ALL NON-SETTLEMENT ALTERNATIVES
CAIDD	27.02%	33.1%
CHCID	0.14%	0.5%
CMID	1.39%	-
HVID*	7.98%	5.3%
HIDD	8.28%	4.5%
MSIDD	27.02%	32.4%
MWD	0.97%	-
NMIDD	8.58%	10.3%
QCID	2.19%	7.8%
RWCD	2.18%	3.8%
RID	2.31%	-
SCIDD	8.13%	-
STID	0.34%	1.1%
TID	0.42%	1.3%
Total	96.95%	100.0%

* Harquahala Valley Irrigation District

Note, CAWCD Proposed column does not add to 100%
because it includes districts not listed in this table.

Table A-12
CAP Allocation Draft EIS
Non-Settlement Alternative 3A NIA Allocation

	CAP Eligible Acreage (acres)	CAP Eligible Acreage	Source	Districts in 1992 Environmental Assessment	Adjust NMIDD	NIA Alt. 3A Allocation Percentage	NIA Alt. 3A Allocation Volume
CAIDD	85,434	22.7%	1	85,434	85,434	38.07%	27,342
CHCID	542	0.1%	1	542	542	0.24%	173
CMID	9,368	2.5%	2				
HVID	27,591	7.3%	1				
HIDD	32,537	8.6%	1				
MSIDD	82,795	22.0%	1	82,795	82,795	36.90%	26,497
MWD	17,769	4.7%	2				
NMIDD	26,548	7.0%	1	26,548	10,612 ⁽⁵⁾	4.73%	3,396
QCID	19,161	5.1%	1				
RWCD	23,933	6.3%	3				
RID	19,130	5.1%	4	19,130	19,130 ⁽⁶⁾	8.53%	6,122
SCIDD	25,884	6.9%	4	25,884	25,884 ⁽⁶⁾	11.53%	8,284
STID	2,832	0.8%	1				
TID	3,433	0.9%	1				
Total	376,957	100.0%			224,397	100.00%	71,815
							71,815

Notes:

Source:

1. Reclamation's Phoenix Area Office Determination from 12/17/99 Review of CAP Eligible Acreage Memorandum Copied to CAWCD
2. CAP May 1986 Water Supply Study, pg.15
3. CAP 1996 Water Supply Study for Stage II Cost Allocation, page 17.
4. 1992 Appraisal-level estimate.
5. NMIDD adjusted by $(7.23-4.34=2.89)/7.23$ (1992 allocation/total allocation)
6. Decreased CAP eligible acreage of RID and SCIDD to CAWCD's eligible acreage based on other surface water supplies. (CAWCD memo dated March 30, 2000.)

Table A-13 CAP Allocation Draft EIS Summary of Key Assumptions Affecting NIA Sector					
Assumption	No Action Alternative	Settlement Alternative	Alternative 1	Alternative 2	Alternative 3
CAWCD Ag Pool Structure	No commitment	CAWCD commitment through 2030	No commitment	No commitment	No commitment
Reclamation 9(d) Debt Relief	None	Degree under negotiation	None	None	None
In-lieu Recharge Program in Pinal County	Continues through 2016	Continues through 2016	Continues through 2016	Continues through 2016	Continues through 2016

Table A-14 CAP Allocation Draft EIS Summary of Key Assumptions Affecting Indian Sector					
Assumption	No Action Alternative	Settlement Alternative	Non-Settlement Alternative 1	Non-Settlement Alternative 2	Non-Settlement Alternative 3
Increased CAP Allocations	No	Yes (217,000 af)	Yes (17,000 af)	Yes (121,646 af)	Yes (306,095 af)
Increased Federal Funding for Distribution Systems	No	Yes	No	Increase in later years	Increase in later years
Water Use Projection	Continue current trend	Accelerated schedule	Continue current trend	Continue current trend until later years, then accelerate based on allocation	Continue current trend until later years, then accelerate based on allocation
Additional Leases to M&I Sector	No	Yes	No	No	No
Water Rights Settlement	No	Yes	No	No	No
Water Reserved for Future Indian Water Rights Settlements	None	Treated as excess water for period of analysis	None	None	Treated as excess water for period of analysis

Table A-15 CAP Allocation Draft EIS Summary of Key Assumptions Affecting M&I Sector					
Assumption	No Action Alternative	Settlement Alternative	Non-Settlement Alternative 1	Non-Settlement Alternative 2	Non-Settlement Alternative 3
Additional leases to M&I sector	No	Yes	No	No	No
Wheeling of Non-CAP water	No	No	No	No	No

Table A-16 CAP Allocation Draft EIS Summary of Key Assumptions Affecting AWBA and CAGR D					
Assumption	No Action Alternative	Settlement Alternative	Non-Settlement Alternative 1	Non-Settlement Alternative 2	Non-Settlement Alternative 3
AWBA funding sunsets in 2017	Yes	Yes	Yes	Yes	Yes
Recharge activities post 2017	Continued by M&I entities, as excess water is available	Continued by M&I entities, as excess water is available	Continued by M&I entities, as excess water is available	Continued by M&I entities, as excess water is available	Continued by M&I entities, as excess water is available
Direct Recharge activities based on current pattern plus Agua Fria and future westside sites	Yes	Yes	Yes	Yes	Yes
In-lieu Recharge activities based on current pattern	Yes, but no recharge in Pinal County after 2016	Yes, but no recharge in Pinal County after 2016	Yes, but no recharge in Pinal County after 2016	Yes, but no recharge in Pinal County after 2016	Yes, but no recharge in Pinal County after 2016
AWBA receives CAP allocation	No	No	No	No	No
CAGR D receives CAP allocation	Limited	Limited	Limited	Limited	Limited
CAGR D direct delivery	Only as currently allowed by law	Only as currently allowed by law	Only as currently allowed by law	Only as currently allowed by law	Only as currently allowed by law

**FIGURE A-1
CAP ALLOCATION DRAFT EIS
PROJECTED CAP WATER SUPPLY DELIVERIES**

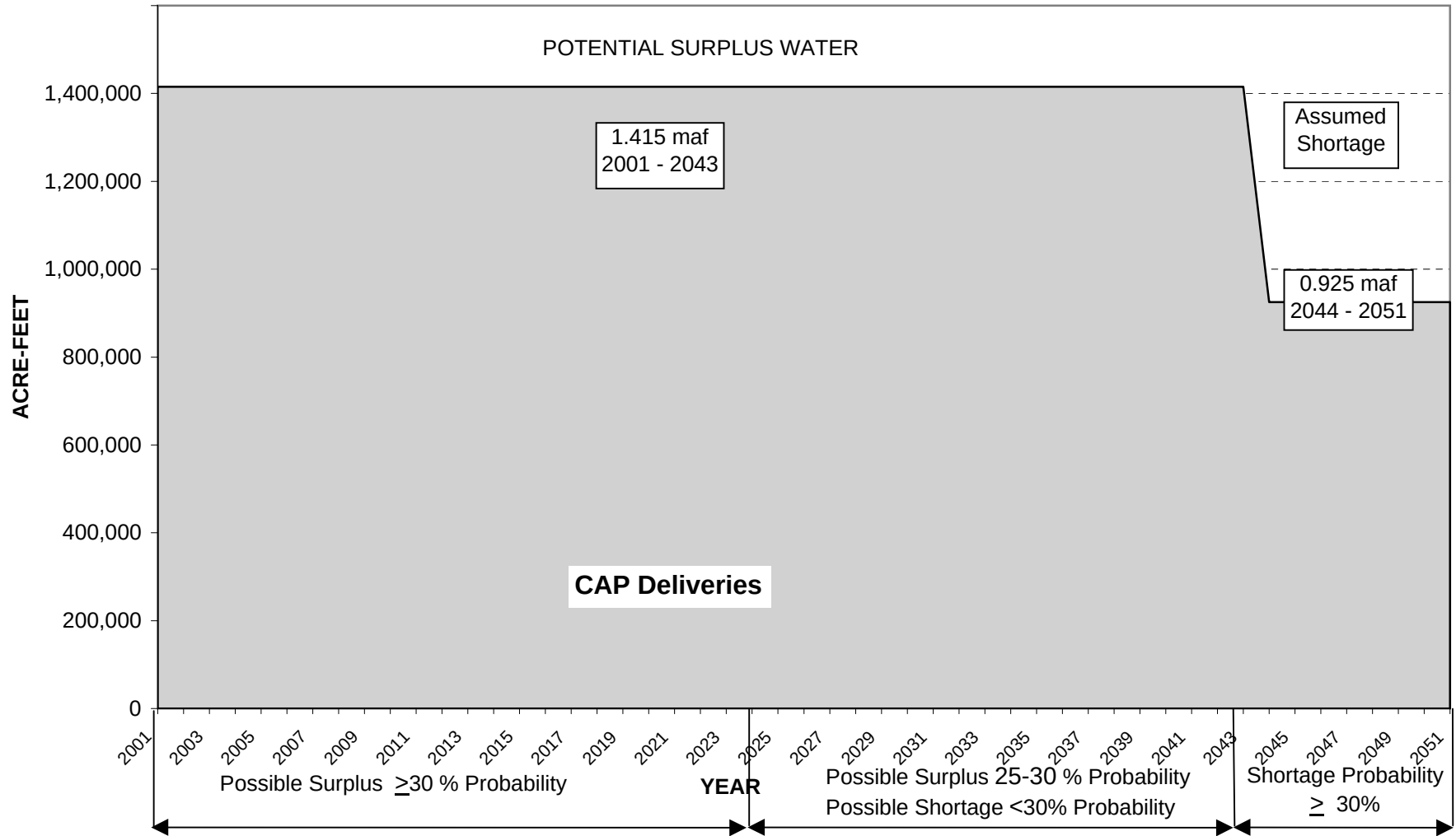


FIGURE A-2
CAP ALLOCATION DRAFT EIS
SETTLEMENT ALTERNATIVE - FULL CAP WATER SUPPLY DISTRIBUTION
(shortages not considered)

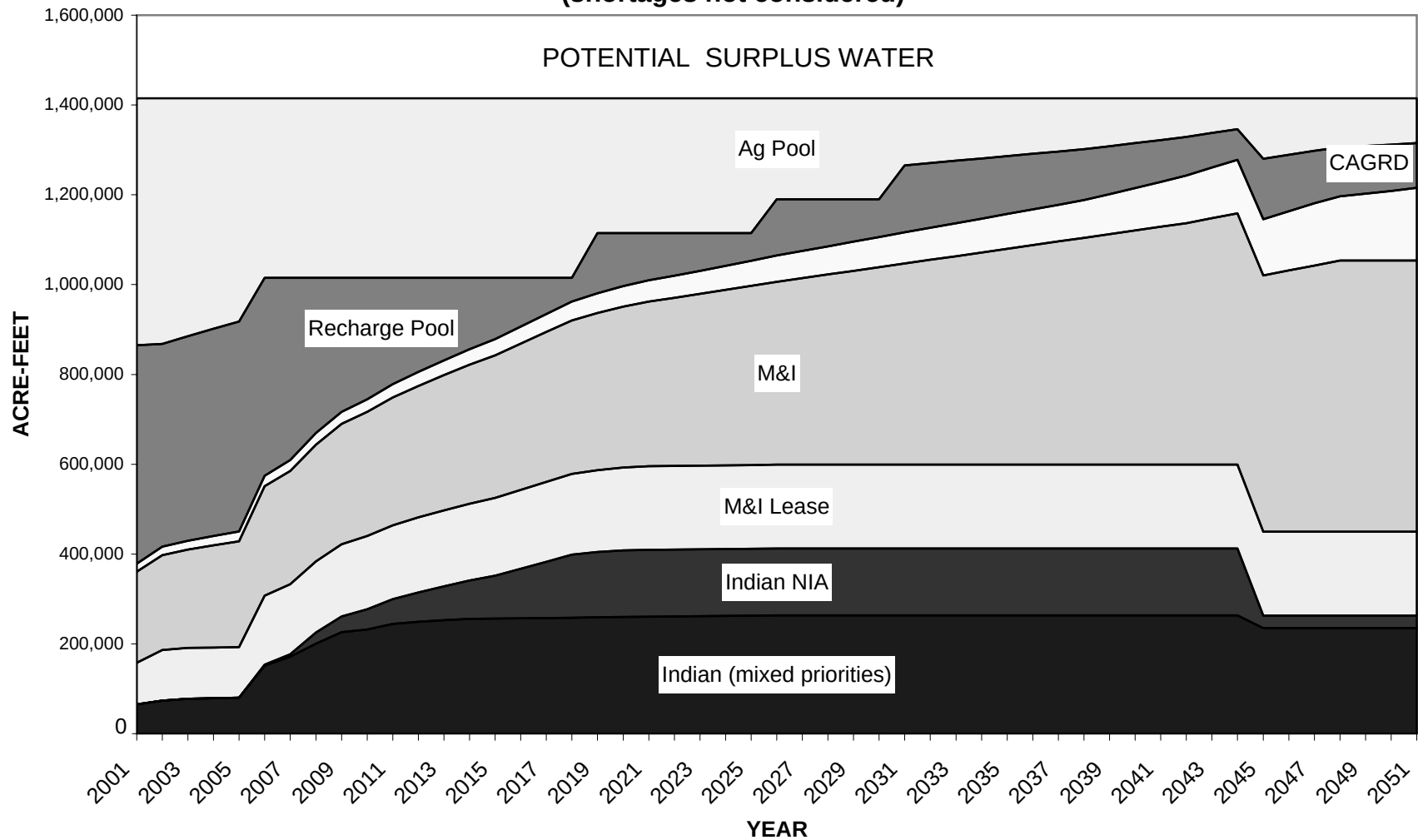


FIGURE A-3
CAP ALLOCATION DRAFT EIS
NO ACTION - FULL CAP WATER SUPPLY DISTRIBUTION
(shortages not considered)

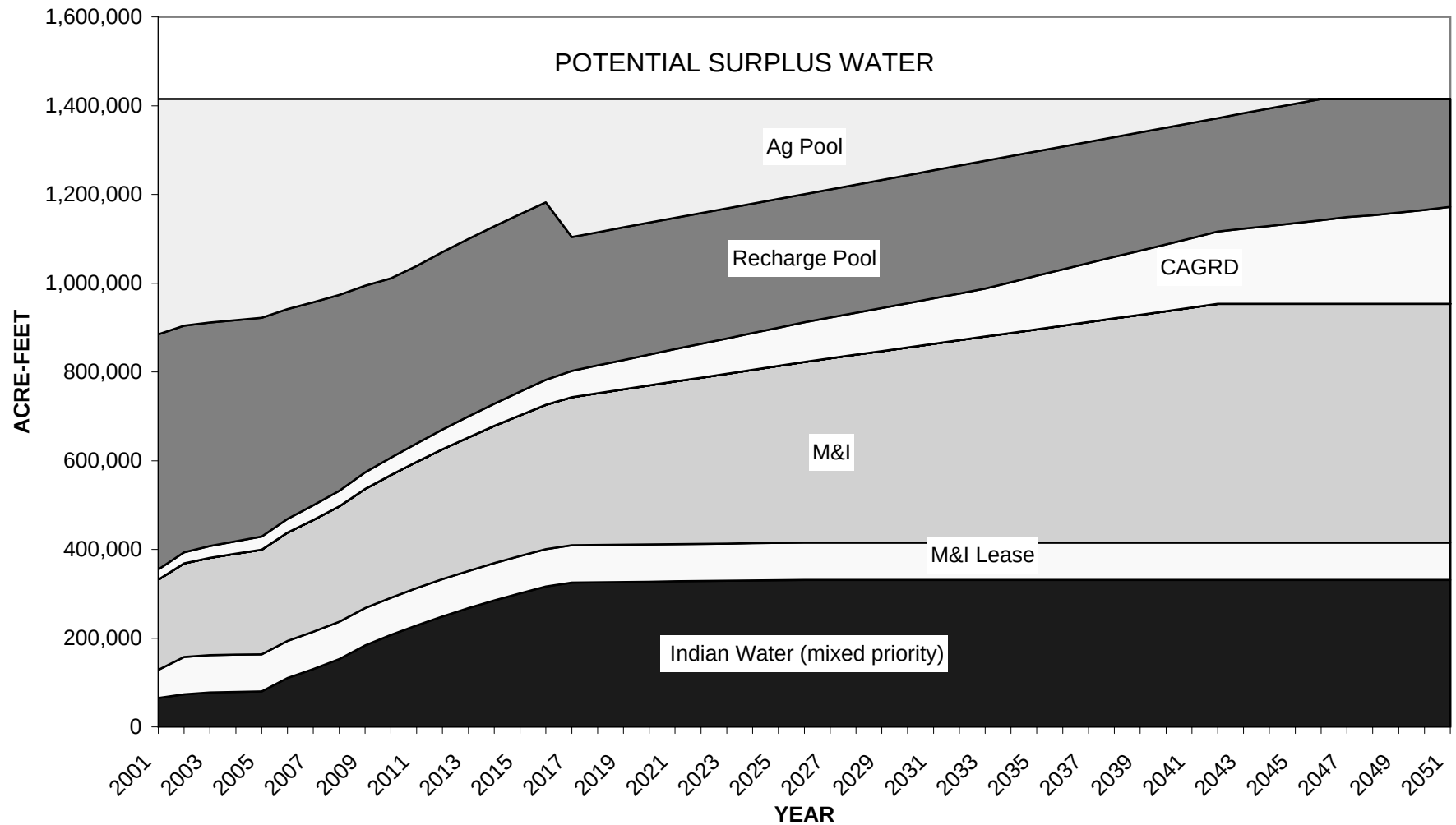


FIGURE A-4
CAP ALLOCATION DRAFT EIS
SETTLEMENT ALTERNATIVE - DISTRIBUTION OF CAP WATER DELIVERIES
(Shortage assumed for evaluation purposes)

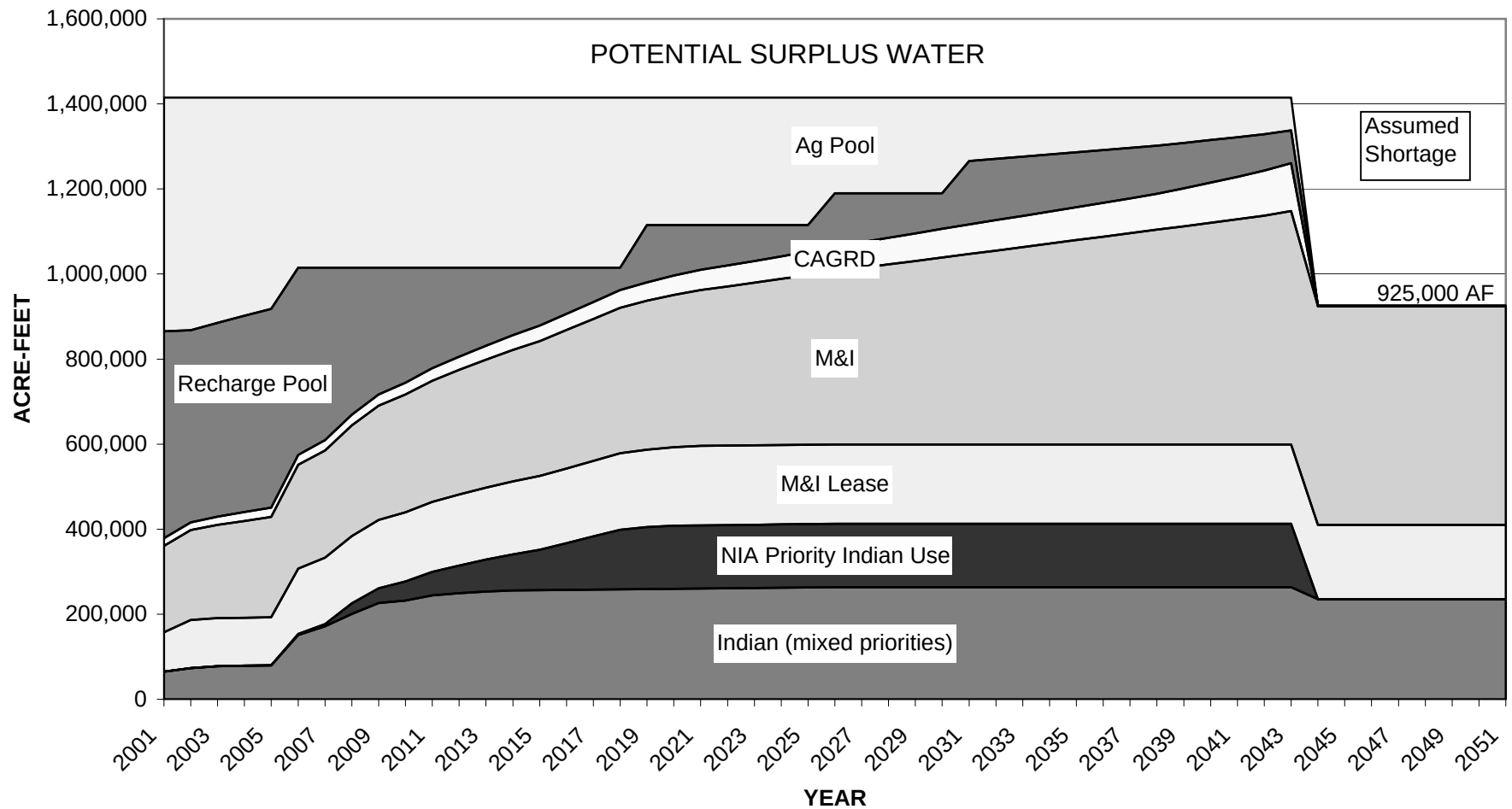


FIGURE A-5
CAP ALLOCATION DRAFT EIS
NO ACTION - DISTRIBUTION OF CAP WATER DELIVERIES
(Shortage assumed for evaluation purposes)

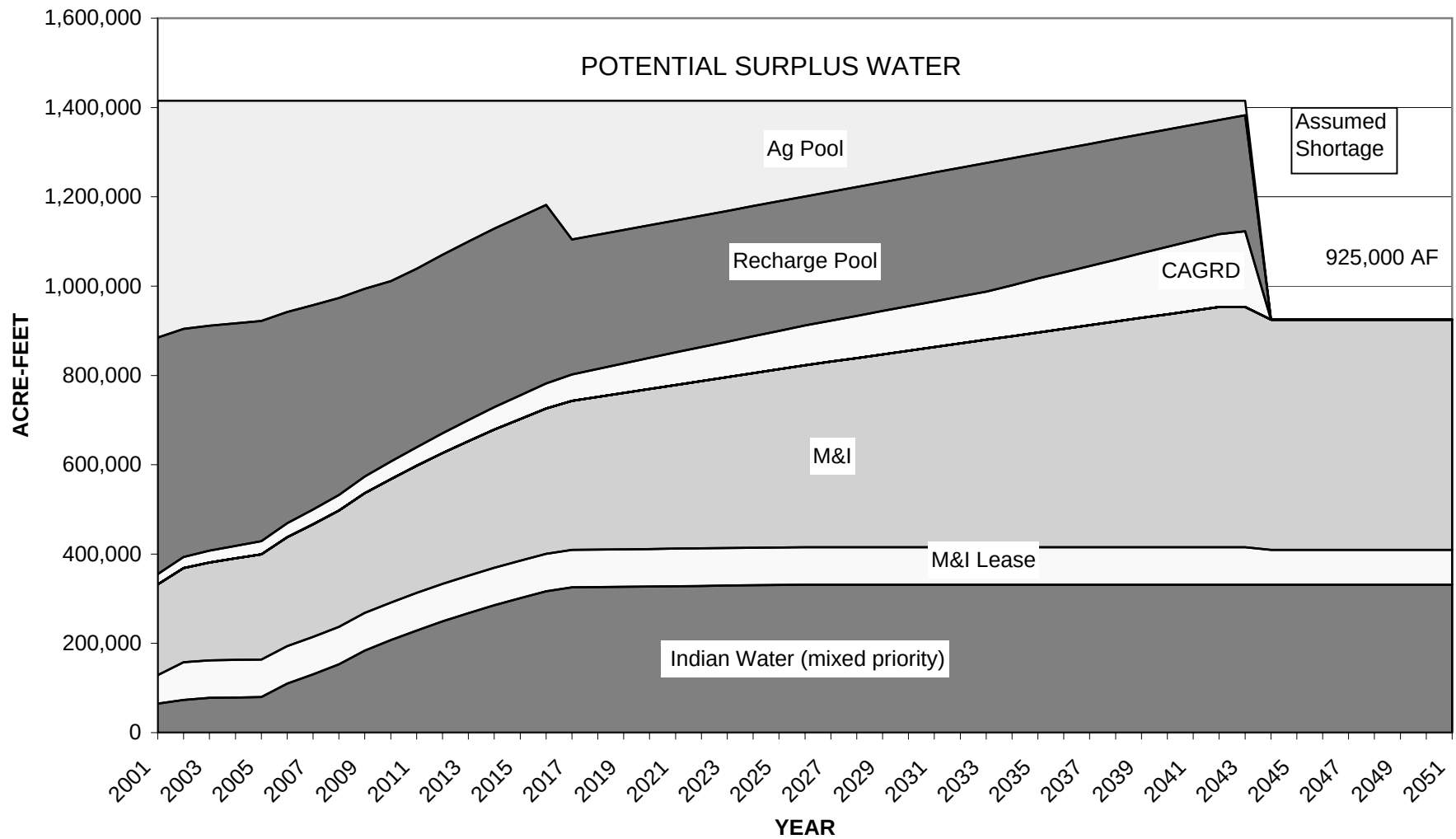


FIGURE A-6
CAP ALLOCATION DRAFT EIS
ALTERNATIVE 1 - DISTRIBUTION OF CAP WATER DELIVERIES
(Shortage assumed for evaluation purposes)

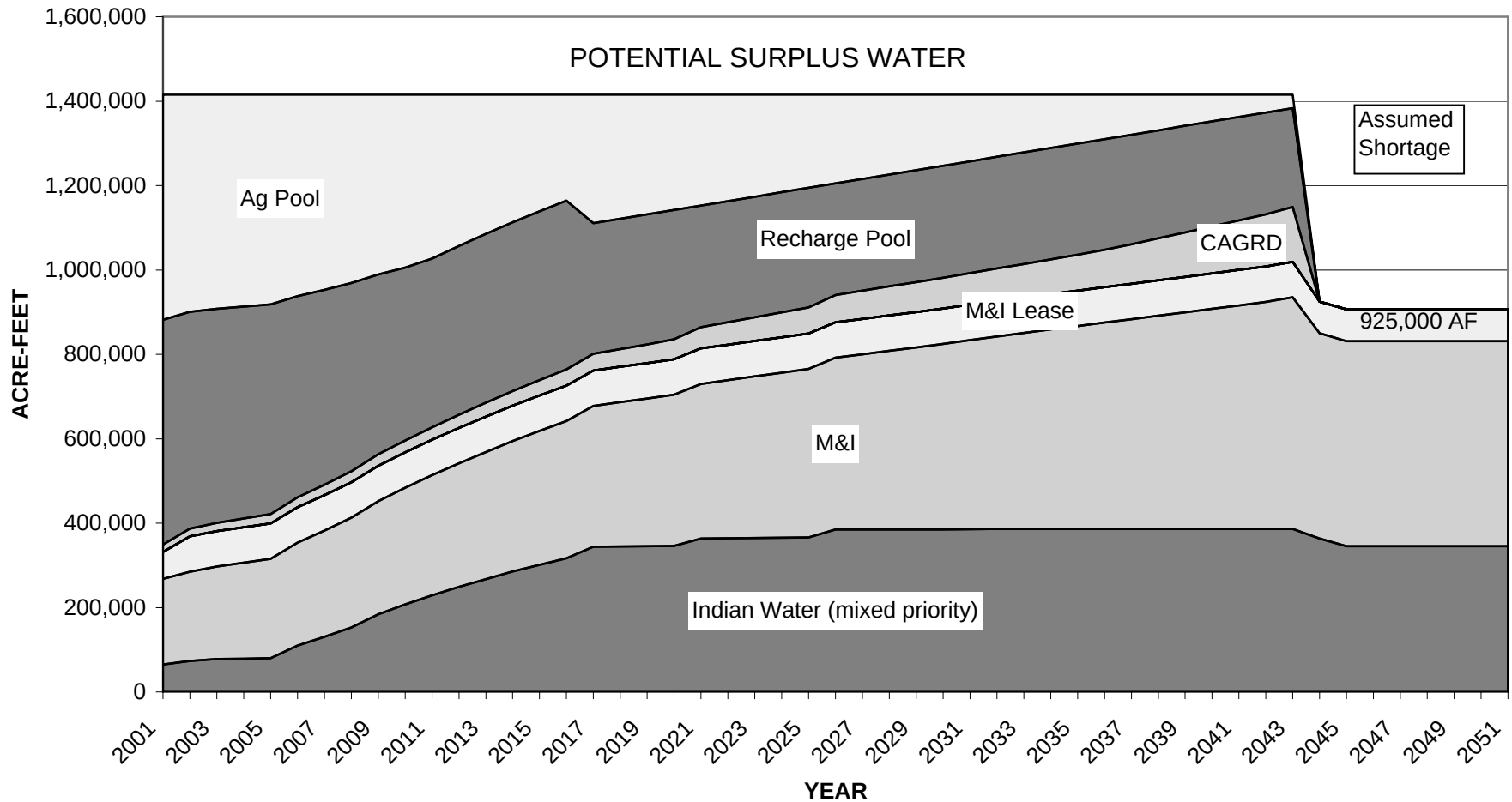


FIGURE A-7
CAP ALLOCATION DRAFT EIS
ALTERNATIVE 2 - DISTRIBUTION OF CAP WATER DELIVERIES
(Shortage assumed for evaluation purposes)

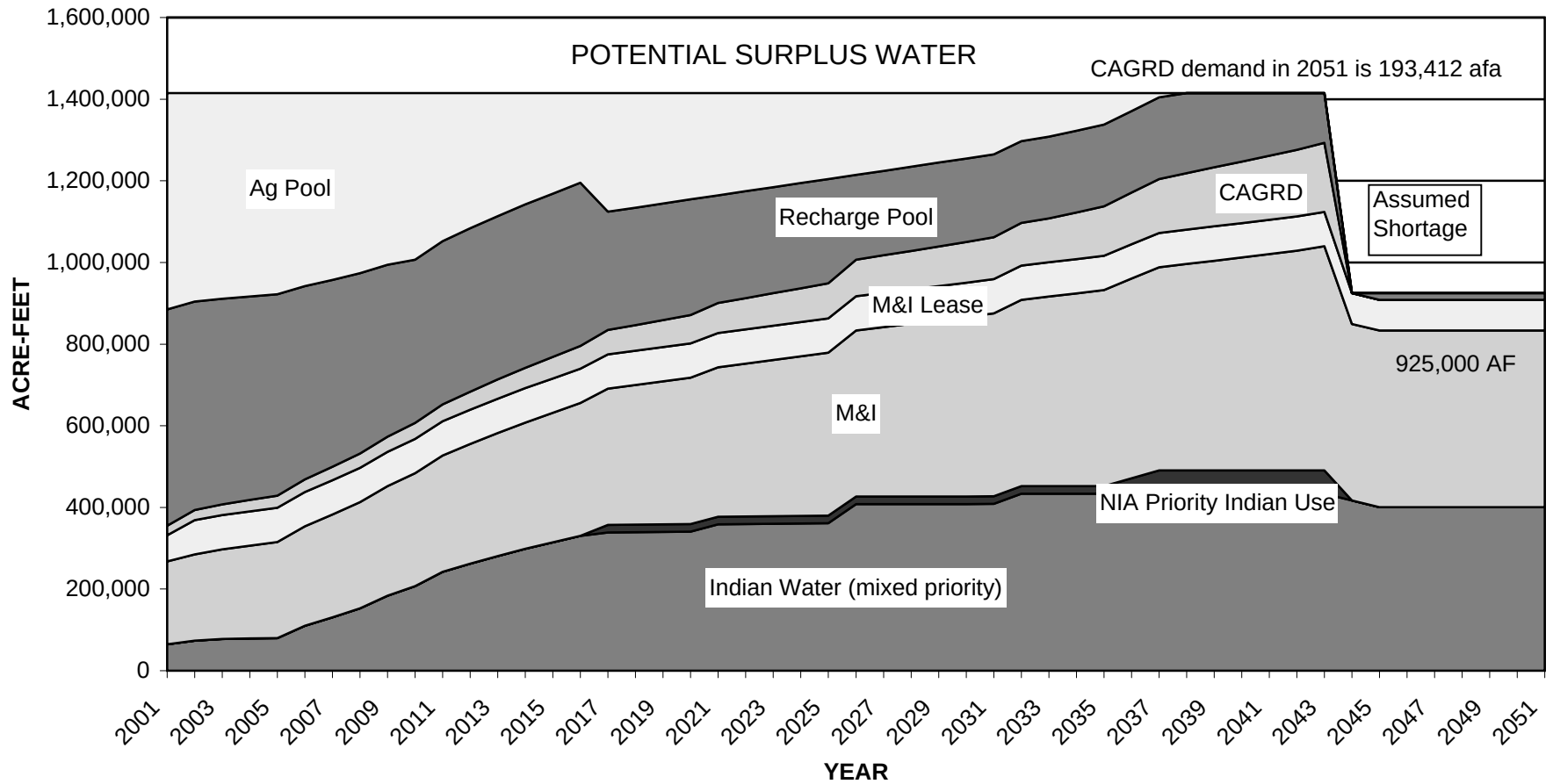


FIGURE A-8
CAP ALLOCATION DRAFT EIS
ALTERNATIVE 3 A - DISTRIBUTION OF CAP WATER DELIVERIES
 (Shortage assumed for evaluation purposes)
 (Assumes that NIA is contracted to NIA entities)

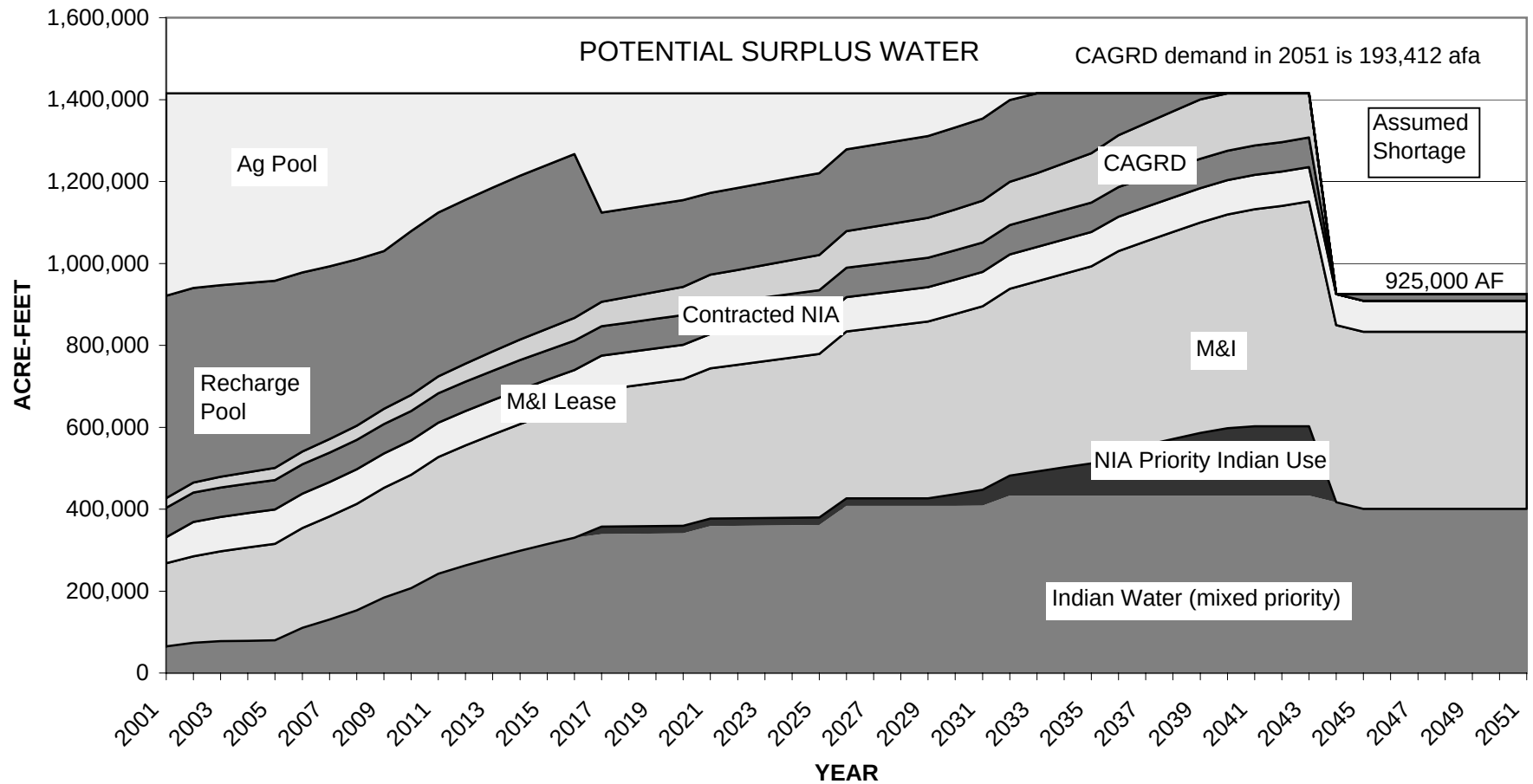


FIGURE A-9
CAP ALLOCATION DRAFT EIS
ALTERNATIVE 3 B - DISTRIBUTION OF CAP WATER DELIVERIES
 (Shortage assumed for evaluation purposes)
 (Assumes that NIA is contracted to M&I entities)

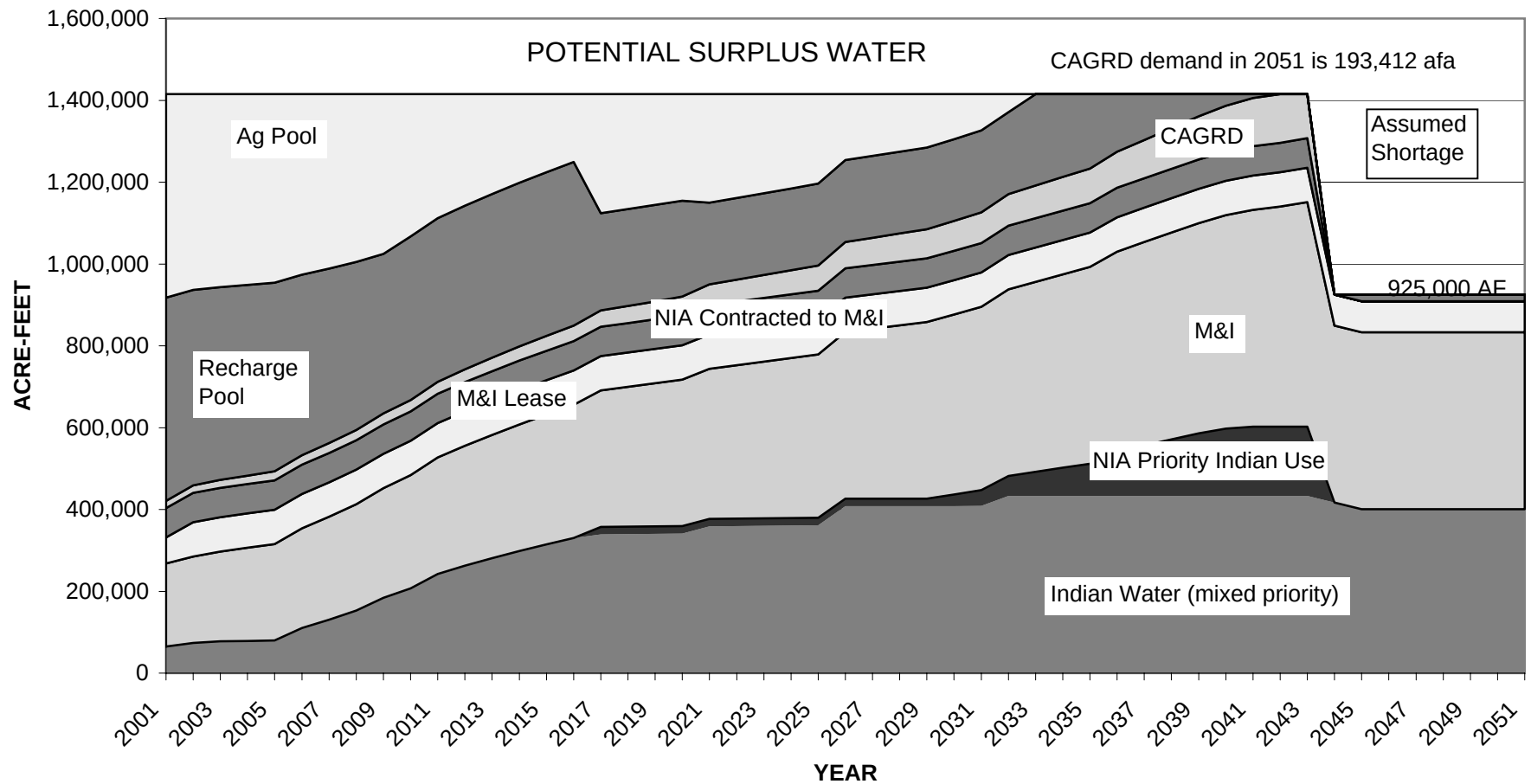
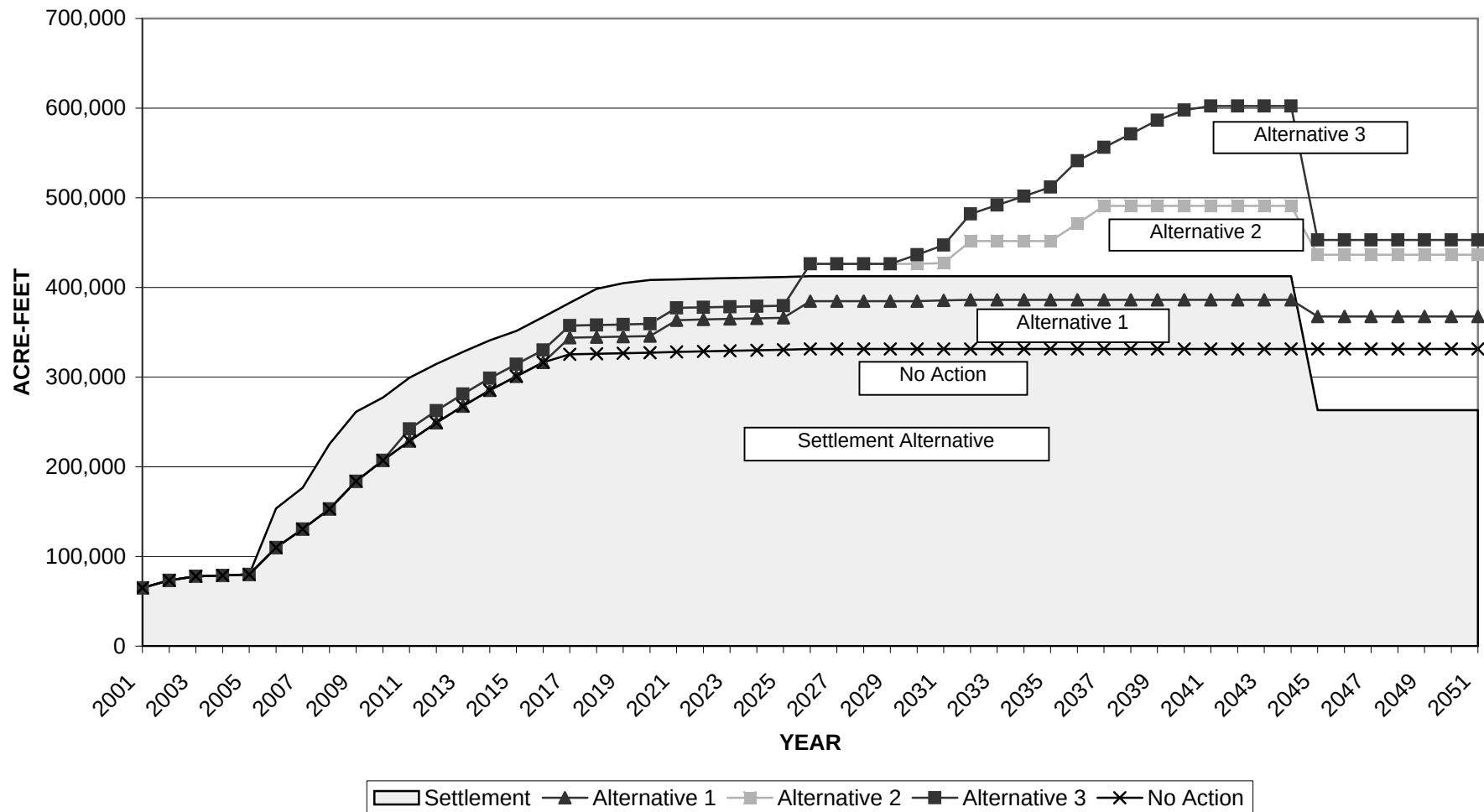


FIGURE A-10
CAP ALLOCATION DRAFT EIS
INDIAN BUILD OUT - ON RESERVATION USE BY ALTERNATIVE
(Does not include impact of shortages)



APPENDIX B

CAP ALLOCATION HISTORY

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
Central Arizona Project**

APPENDIX B

CAP ALLOCATION HISTORY

B.I. INTRODUCTION

This appendix summarizes the Central Arizona Project (CAP) allocation history and identifies the events that have changed the allocation of CAP water among the three pools of water: Indian, municipal and industrial (M&I), and non-Indian Agriculture (NIA).

The following summarizes the history of the allocation of CAP water.

- ◆ 1968 – Colorado River Basin Project Act authorized the construction of the CAP and contracting for CAP water supplies;
- ◆ 1976 – “Kleppe Allocation” provided 257,000 acre-feet annually (afa) for five Indian entities;
- ◆ 1977 – Arizona Department of Water Resources (ADWR) recommended M&I entity allocation;
- ◆ 1979 – ADWR recommended NIA allocation;
- ◆ 1980 – “Andrus Allocation” provided 309,828 afa for 10 Indian entities. ADWR filed a lawsuit to prevent the implementation of the allocations due to inadequate National Environmental Policy Act (NEPA) compliance. The lawsuit was dismissed when Secretary of the Interior (Secretary) Andrus agreed to prepare an Environmental Impact Statement (EIS) on the CAP water allocations;
- ◆ 1983 – 1983 Allocation revised the non-Indian allocations included in the 1980 proposed Andrus allocation. The 1983 Allocation provided 309,828 afa for 12 Indian entities, 638,823 afa to 85 non-Indian M&I entities, and the remaining supply (up to 466,349 afa in a normal year) to 23 NIA districts;
- ◆ 1984 – Ak-Chin Indian Community Water Rights Settlement Act provided settlement of water rights claims by the Ak-Chin Indian Community. In addition to its CAP water allocation, the Community received 50,000 afa of Colorado River water from the Yuma Mesa Division (YMD) to be delivered by CAP. This amounted to 47,500 acre-feet, after deducting estimated system loss.
- ◆ 1988 – Salt River Pima-Maricopa Indian Community (SRPMIC) Water Rights Settlement Act authorized settlement of water rights claims by the SRPMIC. Through this settlement, the RWCD in Phoenix, Arizona, relinquished 5,000 af of its CAP NIA allocation for use in a water rights settlement with the SRPMIC. This act also addressed reallocation of uncontracted NIA water and provided authorization for the RWCD to relinquish its NIA allocation. In 1992, RWCD assigned its remaining allotment to the Secretary for use and benefit of the Gila River Indian Community (GRIC). (For settlement negotiations and NEPA purposes, this amount is assumed to be 18,600 af). These two relinquishments by RWCD resulted in an increase of 23,600 af of CAP water

available for Indian use. Also under authority of this settlement, the United States secured additional Colorado River water entitlement in 1990 from the Wellton-Mohawk Irrigation and Drainage District in Yuma, Arizona, for use in settling water rights claims with SRPMIC. This amounted to 20,900 af after deducting estimated system losses.

- ◆ 1990 – Fort McDowell Indian Community (FMIC) Water Rights Settlement Act authorized settlement of water rights claims of the FMIC. Under this settlement, the HVID relinquished its CAP allotment to the Secretary in 1992. Harquahala Valley Irrigation District's (HVID's) allotment was determined to be equivalent to 33,251 af, of which an amount of 13,933 af was converted to Indian priority water and assigned to FMIC; the remaining 19,318 af continues to be held by the Secretary for use in settlement of water rights claims. (For settlement negotiation and NEPA purposes, it is assumed this amount will be converted to Indian priority water.)
- ◆ 1992 – “Reallocation of NIA Water” authorized in the SRPMIC Water Rights Settlement Act, the remaining uncontracted NIA was to be reallocated to other NIA users. NEPA compliance has been completed and Secretarial decision noticed in the Federal Register (FR). However, the contracting of the NIA water pursuant to the reallocation has been put on hold.
- ◆ 1992 –San Carlos (SC) Apache Tribe Water Rights Settlement Act authorized settlement of water rights claims to the Salt River watershed by the SC Apache Tribe. This Act, among other things, reallocated CAP M&I water previously allocated for use by the City of Globe and Phelps Dodge (PD) (3,480 af and 14,665 af, respectively) to the SC Apache Tribe. Subject to final implementation of the Act, this would amount to 18,145 af.

Figure B-1 summarizes the changes from the 1983 Record of Decision (ROD) to the present.

B.II. INDIAN POOL EVOLUTION

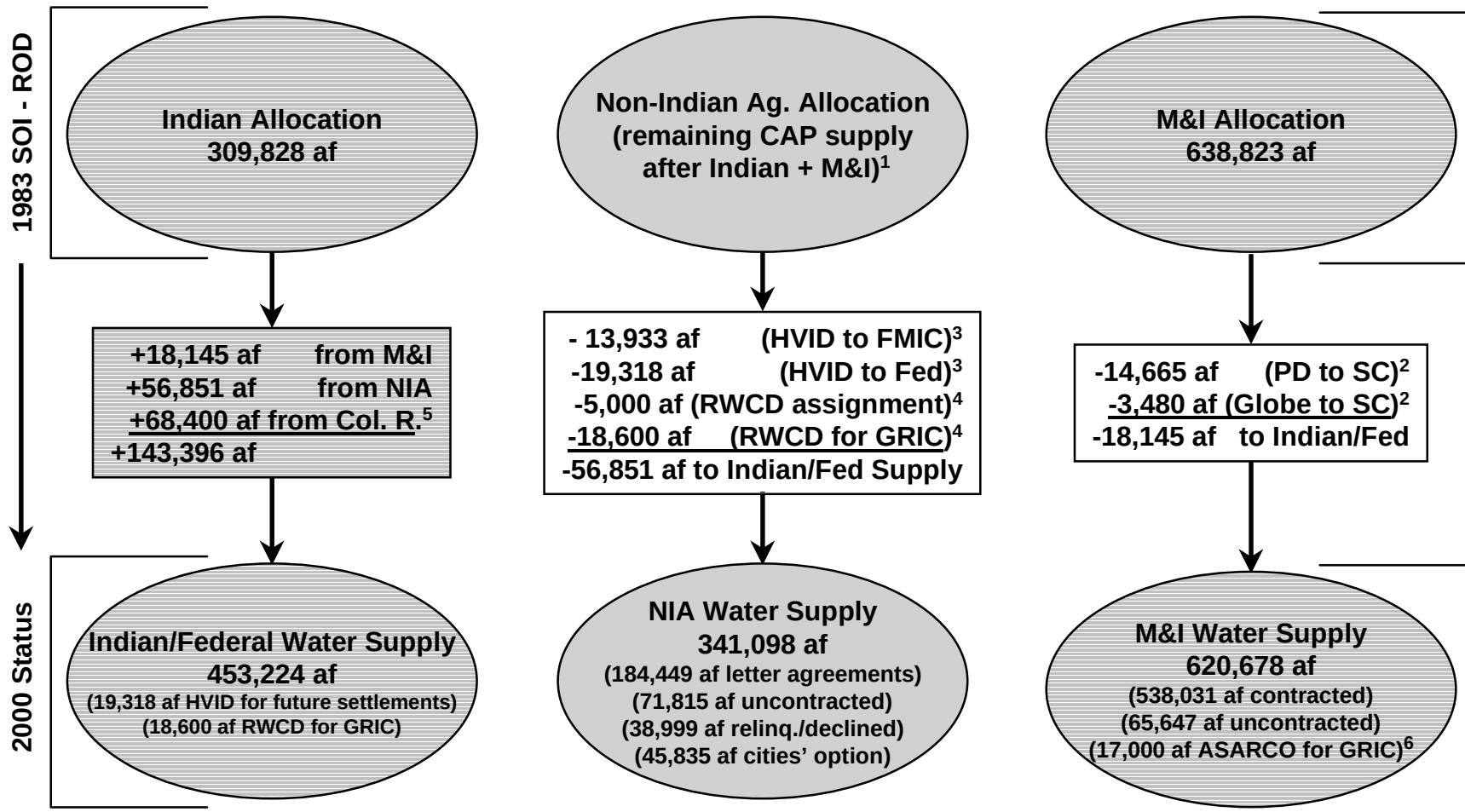
The summary of events that have impacted the allocation of CAP water includes allocations and water rights settlements. The impact of these events to the 10 original Indian entities to the current status is shown in Table B-1. At present, the water supply allocated to or reserved for Indian entities is 453,224 afa. This represents an increase of 196,224 afa from the 1976 “Kleppe Allocation.”

B.III. M&I POOL EVOLUTION

The allocation of water to non-Indian M&I entities was initiated by ADWR recommendation in 1977 and modified in the 1983 Allocation. Since 1983, the water supply in the M&I pool has been modified by three types of events: Indian water rights settlements, assignment from one M&I entity to another, and relinquishment of allocations to an uncontracted status. The evolution of the M&I allocations from 1983 to present is summarized in Table B-2.



FIGURE B-1
CAP Allocation Draft EIS
HISTORY OF CURRENT CAP WATER SUPPLIES
(1983 Record of Decision to Present)



¹NIA allocations were defined as percentages of CAP supply remaining after Indian and M&I use. It is assumed that the NIA supply is approximately 341,098 af in 1999.

²Subject to implementation of the San Carlos Apache Tribe Water Rights Settlement Act of 1992.

³Pursuant to Fort McDowell Indian Community Water Rights Settlement Act of 1990.

⁴Assigned pursuant to 1988 SRPMIC settlement agreement and relinquished in the 1992 GRIC/RWCD agreement.

⁵Colorado River sources provided from Yuma Mesa Division in the 1984 Ak Chin Indian Community Settlement Act and from Wellton-Mohawk IDD in the 1988 SRPMIC Settlement Act.

⁶Agreement to assign 17,000 af from ASARCO to GRIC subject to SOI consent.

Table B-1
CAP Allocation Draft EIS
Summary of Allocation to Indian Entities

INDIAN CONTRACTS	1983 Allocation	Contract Current Amounts	Additional Supply
Ak-Chin	58,300	75,000	Yuma-Mesa Div. Colorado River water
Camp Verde	1,200	1,200	na
Fort McDowell	4,300	18,233	CAP water (HVID water)
GRIC	173,100	173,100	na
Pasqua Yaqui	500	500	na
Salt River Pima Maricopa	13,300	39,200	Wellton Mohawk Colorado River water, RWCD NIA water
SC Apache Tribe	12,700	61,645	CAP water (Ak Chin, City of Globe, and PD water)
Tohono O'Odham Nation			
Chui Chui District	8,000	8,000	na
San Xavier District	27,000	27,000	na
Schuk Toak District	10,800	10,800	na
Tonto-Apache	128	128	na
Yavapai-Prescott	500	500	na
Reserved for Additional Settlements	0	37,918	CAP water (remaining HVID water, remaining RWCD water)
TOTAL	309,828	453,224	143,396

na - not applicable

Table B-2				
CAP Allocation Draft EIS				
Summary of M&I Entities CAP Allocations				
M&I - ENTITY	1983 ALLOCATION (YEAR 2034)	TRANSFERS WITHIN M&I POOL	CURRENT CONTRACTED AMOUNTS	COMMENTS
MUNICIPAL PROVIDERS				
Citizens Utility Company (Aqua Fria)	1,439	9,654	11,093	
Arizona Water Company-Apache Junction	6,000		6,000	
City of Avondale	4,099	647	4,746	
Berneil Water Company	432	-232	200	City of Scottsdale - 200; City of Phoenix - 32
City of Buckeye	25		25	
Camp Verde Water Company	1,443	-1,443	0	Transferred to City of Scottsdale
Arizona Water Company (Casa Grande)	8,884		8,884	
Carefree Ranch Water Company	954	-954	0	Acquired by City of Scottsdale
Carefree Water Company	400		400	
Cave Creek Water Company	1,600		1,600	
City of Chandler	3,668		3,668	
Chandler HeightsCitrus Irrigation District (CHCID)	315		315	
Chaparral City Water Company	6,978		6,978	
Clearwater Company	2,849	-2,849	0	Acquired by City of Peoria
Arizona Water Company (Coolidge)	2,000		2,000	
Community Water Company of Green Valley	1,100	-237	1,337	
Consolidated Water Company (Maricopa)	3,932		3,932	Acquired by Brooke LLC
Cortaro-Marana Irrigation District	47	-47	0	Transferred to Town of Marana
Cottonwood Water Company	1,789	-1,789	0	Transferred to City of Scottsdale
Crescent Valley Water Company	2,697	-2,697	0	Acquired by City of Mesa
Vail Water Company	786		786	
Desert Ranch Water Company	139	-139	0	Acquired by City of Scottsdale
Desert Sage Water Company	5,933	-5,933	0	Acquired by City of Mesa
Desert Sands Water Company	768	-768	0	Acquired by City of Mesa
City of Eloy	2,171		2,171	
E&R Water Company	161		161	Acquired by Pine Water Company
City of Florence	1,641	407	2,048	

Table B-2				
CAP Allocation Draft EIS				
Summary of M&I Entities CAP Allocations				
M&I - ENTITY	1983 ALLOCATION (YEAR 2034)	TRANSFERS WITHIN M&I POOL	CURRENT CONTRACTED AMOUNTS	COMMENTS
Florence Gardens	407	-407	0	Became Arizonarra Utility; Acquired by City of Florence
Flowing Wells Irrigation District	4,354		4,354	
Foothills Water Company	1,652	-152	0	Transferred to Town of Oro Valley
City of Gilbert	7,235		7,235	
City of Glendale	14,083	100	14,183	
City of Globe	3,480	-3,480	0	Transferred to SC Apache Tribe in water rights settlement
City of Goodyear	2,374	1,007	3,381	
Green Valley Water Company	1,900		1,900	
Ironwood Water Company	393	-393	0	Acquired by City of Scottsdale
Litchfield Park Service Company	5,580		5,580	
Maricopa Mountain Water Company	108		0	<i>Uncontracted Pool</i>
Mayer-Humboldt Water Company	332	-332	0	Transferred to City of Scottsdale
McMicken Irrigation District	9,513	-9,027	486	City of Avondale-647; City of Surprise-7373; City of Goodyear-1007
City of Mesa	20,129	14,759	36,388	
Arizona Water Company (Miami-Claypool)	1,829		0	<i>Uncontracted Pool</i>
Midvale Farms Water Company	1,500		1,500	
New Pueblo	237	-237	0	Transferred to Community Water Company of Green Valley
New River Utility Company	2,359	-474	1,885	Transferred 100 af to City of Glendale
City of Nogales	3,949	-3,949	0	Transferred to City of Scottsdale
North Valley Water Company	393	-393	0	Acquired by City of Scottsdale
Palm Springs Water Company	2,919	-2,919	0	Per CAWCD, held by Consolidated Water Utilities (Pinal), then assigned to Water Utilities Community Facilities District (Apache Junction)
Paradise Valley Water Company	3,231		3,231	
City of Payson	4,995	-4,995	0	Transferred to City of Scottsdale

Table B-2				
CAP Allocation Draft EIS				
Summary of M&I Entities CAP Allocations				
M&I - ENTITY	1983 ALLOCATION (YEAR 2034)	TRANSFERS WITHIN M&I POOL	CURRENT CONTRACTED AMOUNTS	COMMENTS
City of Peoria	15,000	4,486	18,709	
City of Phoenix	113,882	32	113,914	
City of Prescott	7,127	-7,127	0	Transferred to City of Scottsdale
Queen Creek Irrigation District (QCID)	944	-596	348	596 af transferred to City of Mesa
Ranch Lands Water Company	393		3,037	Contracted amount included 2644 from City of Tucson; Became Spanish Trails
Rio Rico Citizens Utility	2,683	-2,683	0	Transferred to City of Scottsdale
Rio Verde Utilities, Inc.	812		812	
San Tan Irrigation District (STID)	236		236	Yavapai-Prescott Tribe + 500
City of Scottsdale	19,702	24,397	49,029	ASLD + 530 + 3900
Citizens Utility Company (Sun City)	15,835	-12,026	3,809	Citizens Utility Company (Agua Fria)-9654; Sun City West-2372
Sunrise Water Company	944		944	
Sunshine Water Company	16		64	Now Water Utility of Greater Tonopah; Contracted amount + 48 from West Phoenix Water
City of Tempe	4,315		4,315	
Trails End Water Company	226		0	<i>Uncontracted Pool</i>
City of Tucson	151,064	-9,500	138,920	Contracted amount - 2644 to Ranch Lands
Turner Ranches	3,932	-3,932	0	Acquired by City of Mesa
West End Water Company	157		157	
West Phoenix Water Company	91		43	Now Water Utility of Greater Buckeye; contracted amount - 48 to Sunshine
Arizona Water Company (White Tank)	968		968	
Williams Air Force Base	833	-833	0	Acquired by City of Mesa
City of Youngtown	380		380	Acquired by Sun City Water Company
Town of Marana	na	47	47	
MetroDomestic Water ID/ (1st Trust of Arizona)	na	8,858	8,858	
Town of Oro Valley/1st Trust of Arizona	na	2,294	2,294	
Sun Cities West Utilities Company	na	2,372	2,372	

Table B-2				
CAP Allocation Draft EIS				
Summary of M&I Entities CAP Allocations				
M&I - ENTITY	1983 ALLOCATION (YEAR 2034)	TRANSFERS WITHIN M&I POOL	CURRENT CONTRACTED AMOUNTS	COMMENTS
Town of Surprise	na	7,373	7,373	
Water Utility Community Facilities (Apache Junction)	na	2,919	2,919	
subtotal Municipal Water Providers	494,742		496,015	Includes water from other pools
UTILITY PROVIDERS				
Salt River Project/Arizona Public Service	43,218		0	<i>Uncontracted Pool</i>
MINING PROVIDERS				
Anamax-Twin Buttes	4,444		0	<i>Uncontracted Pool</i>
ASARCO Hayden	582		582	
ASARCO Mission	0		0	
Cities Service Company - Pinto Valley	2,271		2,271	Now BHP Copper Company
Cyprus-Pima	5,339		0	<i>Uncontracted Pool</i>
Duval	8,549		0	<i>Uncontracted Pool</i>
Inspiration Copper	2,906		2,906	Now Cyprus Miami Mining Corporation
Kennecott	22,028		20,418	1,610 <i>Uncontracted Pool</i> , now ASARCO Ray
PD	14,665	-14,665	0	Transferred to SC Apache Tribe in water rights settlement
Sub-total Mines	60,784		26,177	
RECREATION PROVIDERS				
Arizona Game and Fish Department	324		0	<i>Uncontracted Pool</i>
Maricopa County	665		665	
Sub-Total Recreation	989		665	
OTHER PROVIDERS				
Phoenix Memorial Park	84		84	
Arizona State Lands Department (ASLD)	39,006	-5,930	33,076	Transferred to M&I entities
Sub-Total Other	39,090		33,160	
Total M&I Sector Pool	638,823		556,017	65,647 uncontracted pool
na = non applicable				

B.IV. NIA POOL EVOLUTION

The calculation of NIA allocations was the subject of many comments received through the scoping process. The comments focused primarily on the process used to convert the percentage of NIA water allocated to individual entities into volumes in the definition of alternatives identified for evaluation in this draft EIS. It should be noted that with the exception of the proposed action (or Settlement Alternative), it is anticipated that NIA contracts and subcontracts will continue to be based on the allocation of a percentage of NIA priority water available. The conversion of percentage allocations to volumes is for the purpose of providing consistent definition of alternatives in the scoping process only.

Table B-3 documents the process used to convert NIA percentage allocations to volumes for individual entities for the purposes of this draft EIS. The worksheet describes the steps taken in the process, then shows the calculations.

Table B-3
CAP Allocation Draft EIS
CAP NIA Sector Worksheets

1. **Determine normal year deliveries** - The normal year supply of 1,490,000 afa is based on a normal supply from the Colorado River for the purposes of this draft EIS. The normal year delivery is the normal year supply less estimated losses of 75,000 afa. The normal year delivery is 1,415,000 afa.
2. **Calculate the Initial NIA Pool**– The NIA supply is the CAP water available after the Indian and M&I uses are delivered. The NIA supply is defined as normal year delivery minus Indian and M&I uses. Assuming full use of the 1983 contracts in the 1983 ROD, the NIA supply is 466,394 afa.
3. **Determine NIA Pool after 1984 Ak-Chin Settlement Act and 1988 SRPMIC Settlement Act** – The addition of Colorado River water supplies in the CAP system reduced the NIA supply to 397,949 afa based on normal year deliveries minus full use of Indian and M&I allocations and the addition of Colorado River water into the system.
4. **Convert the NIA percentage allocation to volumes per entity based on the 1988 starting line** – Using the NIA supply calculated in step 3, multiply the allocation percentage per entity by the 1988 NIA supply of 397,949 afa. The results of the conversion are shown in the attached worksheet. In addition, the 1992 ROD provided additional percentages of NIA supply to each entity. Conversion of the 1992 reallocation is shown in the attached worksheet.
5. **Calculate the NIA supply at its current level** – The current NIA supply has been reduced by the relinquishment and conversion of HVID water to Indian priority for Federal use, and for the sake of this analysis, the definition of RWCD’s assignment as part of SRPMIC and relinquishment to the Secretary of 23,600 afa. These actions reduce the NIA supply available for NIA use to 341,098 afa.
6. **Determine the water reserved for the Cities pursuant to the Hohokam Irrigation and Drainage District (HIDD) Agreement** – In the HIDD Agreement, several Plan 6 Cities received the assignment of NIA water from HIDD as well as an option to contract for five percent of the NIA supply. The assignment and option combine for approximately 11.97 percent of the NIA supply. The agreement includes a formula for calculation of the NIA supply that reflects the inclusion of a portion of the HVID water as Indian water and WMIDD water as M&I water, while the YMD water reduces the normal year delivery by 47,500 afa. In addition, the formula includes provisions for providing conversion of the CAP water associated with up to 7,077 acres of land in HIDD to M&I uses. The formula is based on $11.97 \text{ percent} * \text{NIA}$, where $\text{NIA} = 1,415,000 - 47,500 \text{ YMD} - (309,828 + 13,933 \text{ HVID}) - (638,823 + 22,000 \text{ WMIDD})$. The resulting volume of NIA water reserved for the cities is 45,835 afa for the purposes of this draft EIS.
7. **Calculate the NIA uncontracted supply** – The NIA uncontracted supply is the residual of the currently available NIA supply less the water reserved for the cities, 2-Party

Agreements, relinquished water (exclusive of RWCD which was removed from the available NIA supply), and declined water. The uncontracted supply is 71,815 afa and includes supplies allocated in the 1992 ROD for entities that have not relinquished or declined their allocations under the 1992 ROD.

STEP 1 - Determine Normal Year Delivery as Normal Year Supply - losses

	Volume
Normal year supply	1,490,000
Losses	-75,000
Delivery	1,415,000

STEP 2 - Calculate Initial NIA Pool as Delivery - (M&I + Indian)

Delivery	1,415,000
Indian	-309,828
M&I	-638,823
NIA (residual after Indian+M&I)	466,349

STEP 3 - Determine NIA Pool reduction as 83 NIA - (YMD + WMID)

1983 ROD Allocation	466,349	
YMD (50,000 without losses)	-47,500	(Ak-Chin Settlement 1984)
WMIDD / SRPMIC (22k w / losses)	-20,900	(SRPMIC Settlement 1988)
1988 NIA POOL	397,949	1988 STARTING LINE

STEP 4 - Convert NIA percentage allocations to volumes based on 1988 STARTING LINE as 1988 NIA POOL * Allocation Percentage

ORIGINAL IDS					
Entity	Allocation % 1983	Volume	Allocation % 1992	Volume	Current Status
Central Arizona Irrigation and Drainage District (CAIDD)	18.01	71,671	22.74	90,494	
Chandler Height Citrus Irrigation District (CHCID)	0.28	1,114	0.3	1,194	
HVID	7.67	30,523	8.73	34,741	
HID	6.36	25,310	6.97	27,737	To Cities
Maricopa-Stanfield Irrigation and Drainage District (MSIDD)	20.48	81,500	22.75	90,533	
New Magma Irrigation and Drainage District (NMIDD)	4.34	17,271	7.23	28,772	Relinquished (1983%)
Queen Creek Irrigation District (QCID)	4.83	19,221	4.83	19,221	
RWCD	5.98	23,797	6.33	25,190	Relinquished Federal Uses
San Tan Irrigation District (STID)	0.77	3,064	0.77	3,064	
Tonopah Irrigation District (TID)	1.98	7,879	1.98	7,879	
TOTAL	70.7	281,350	82.63	328,825	
DECLINED IDS					
Entity	Allocation % 1983	Volume	Allocation % 1992	Volume	Current Status
Farmers Investment Company	1.39	5,531	1.64	6,526	Declined
San Carlos Irrigation & Drainage District	4.09	16,276	6.84	27,220	
TOTAL	5.48	21,808	8.48	33,746	
NEW ENTITIES					
Entity	Allocation % 1983	Volume	Allocation % 1992	Volume	Current Status
ASLD LEASE - Pichacho Pecans	-	-	0.54	2,149	Declined
ASLD LEASE – Aguire	-	-	0.11	438	Declined
McMullen Valley Water Conservation District	-	-	3.17	12,615	Declined
Roosevelt Irrigation District	2.61	-	5.07	20,176	
TOTAL			8.89	35,378	
NIA 1992 TOTAL	70.70	281,350	100.00	397,949	

STEP 5 - Calculate Current NIA Pool at its current level

1988 Starting Line	397,949	
HVID (fixed)	-33,251	1990 FMIC Settlement
RWCD (fixed)	-23,600	1992 Agreement
CURRENT NIA POOL	341,098	

STEP 6 - Determine NIA water reserved for Cities pursuant to HIDD Agreement

HIDD (assigned to cities)	26,689	HIDD Agreement Calculation
5% NIA Options	19,146	HIDD Agreement Calculation
NIA TO CITIES	45,835	

STEP 7 - Calculate NIA Uncontracted Pool

Current NIA Pool	341,098	
Reserved For Cities	-45,835	
2-Party Agreements	-184,449	1983%(CAIDD, CHCID, MSIDD, QCID, STID, TID)
Relinquished	-17,271	1983% NMIDD per bankruptcy
Declined	-21,728	
UNCONTRACTED POOL	71,815	

APPENDIX C

FUTURE WATER USES BY MUNICIPALITIES

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
Central Arizona Project**

**Central Arizona Project Allocation
Administrative Draft Environmental Impact Statement
Appendix C – Future Water Uses By Municipalities
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C.I. INTRODUCTION

The description of anticipated environmental consequences of implementing the proposed Central Arizona Project (CAP) allocations requires an understanding of the present and future water uses for each water use sector. This appendix provides the details of analyses used to estimate current and future water uses by the 21 municipal and industrial (M&I) sector entities, which would receive an allocation of CAP water. The M&I entities included in the draft Environmental Impact Statement (EIS) and their respective CAP allocations for each alternative are shown in Table C-1.

In addition, a question that arose during scoping was “Will the allocation of additional CAP water to M&I entities cause urban growth that would not otherwise occur?” Conversely, would M&I entities have insufficient water supplies to meet their projected water demands in the absence of the allocation? To address this question, the population projections and resulting water demands for each of the M&I entities were compared to their available water supplies, absent the additional CAP water. If the entity was found to have sufficient water resources available without the additional CAP water, then the entity is estimated to be able to meet its population projections without additional CAP water. In other words, the answer to the question raised during scoping would be no, additional CAP water does not induce growth. However, if an entity was found to lack sufficient available water supplies to meet demands, then the additional CAP water could drive direct environmental impacts due to urban growth.

In all cases, the M&I entities recommended to receive additional CAP allocations (Arizona Department of Water Resources [ADWR] letter, Appendix N) were determined to have sufficient available water supplies to meet the projected water demands. The available alternative water supplies include permissible groundwater pumping, other surface water, exchanges and leases associated with the Indian water rights settlements, membership in the Central Arizona Groundwater Replenishment District (CAGRD) and the reuse of effluent.

Fundamental to the description of present and future water uses and to answering the urban growth question is an understanding of four components that impact water uses for the M&I sector. The components are identified below and discussed in the following section:

- ◆ Population projections over the study period (2001 – 2051);
- ◆ Water use rates and projected water requirements;
- ◆ Water supplies available to the meet water requirements; and
- ◆ Projection of timing and volume of water use over the study period.

It should be noted that the water supply and water use constraints imposed by existing State and Federal laws and agreements are reflected in the analysis of available water supply and

projected water use requirements. These constraints include but are not limited to the following:

- ◆ Arizona Groundwater Management Act (GMA) conservation requirements (outlined in the Third Management Plan [TMP]);
- ◆ Pledged water supply for designation of Assured Water Supply (AWS);
- ◆ Existing CAP allocation;
- ◆ Proposed CAP allocation;
- ◆ Existing water supply provided through Indian water rights settlements (by lease or exchange);
- ◆ Other surface water supplies; and
- ◆ CAGR obligations.

C.II. DISCUSSION

C.II.a. Population Projections

Population projections were prepared for the M&I entities. The population projections were developed from Department of Economic Security (DES) 1997 population projections for water planning (DES, 1997). For entities in large municipal water providers in Maricopa County, the population projections were based on municipal planning areas (MPAs) for 2000 through 2050 consistent with the projections used by ADWR for water planning. The projections used five-year time steps. It was assumed that the population projections were valid for the period 2001 through 2051. For entities in Pima County and private water companies, the population projections used by ADWR in recommending allocation of CAP water were used through 2040 and extrapolated to 2051. The population projections for the M&I entities are listed in Table C-2.

The DES data were used in this analysis because the projections are based on consistent methodology and assumptions for all entities. The DES data formed the population base for ADWR in their allocation recommendation. Additionally, the DES data are the most current state-wide population projections available. However, current planning efforts for some entities in Maricopa County are using population projections that are higher than the 1997 data. For example, the West Salt River Valley CAP Subcontractors (WESTCAPS) group is using population projections that were developed by the individual entities for the period 2000 through 2020. A review of these data show that the WESTCAPS' projections may be as much as 70 percent higher than the 1997 DES data.

The result of using the DES data may be that the population projections used in this study may not completely reflect current growth trends and could understate water demands. It is

unclear, however, if current growth trends used by some entities (i.e., the WESTCAPS group) reflect long-term growth or are representative of short-term growth. Population projections are sensitive to temporal variations in economic conditions. For example, population projections made during the recession of the early 1980s have understated population growth to date. Conversely, current projections are also likely influenced by the current economic expansion.

C.II.b. Water Use Rates and Projected Water Use Requirements

The water use rates were developed from the ADWR TMP for the Phoenix and the Tucson active management areas (AMAs) (ADWR, 1999). The water use rates were specified in gallons per capita per day (gpcd) as mandated by the GMA. The gpcd rates were selected from the final conservation requirement in the management period (2005 – 2010) outlined for each M&I entity, as shown in Table C-3. The gpcd rate used for this analysis includes a seven percent increase to accommodate unaccounted-for water. Lost and unaccounted-for water includes leaks, spills, and flows too low to meter. The seven percent increase was derived from a review of several water providers including the cities of Peoria, Scottsdale, and Phoenix. Lost and unaccounted-for water is typically between five and 10 percent of total water use. Several of the smaller entities did not have conservation requirements listed in the TMP. For those not listed, the conservation requirement of a similar water provider was used (see Table C-3).

The projected water demands were calculated by multiplying the projected population by the water use rate (gpcd) and converting to acre-feet annually (afa). The projected water demands for each entity are shown in Table C-4.

The water use rates used in this study are based on ADWR TMP conservation requirements and are held constant through the study period. The conservation requirements were developed by ADWR to enforce conservation practices pursuant to provisions in the GMA. In each planning period, the conservation goals are increased with the goal of achieving safe yield by 2025.

Using the conservation requirements to estimate water use rates in the future may understate water uses in the early years of the study (2001 through 2010). However, the conservation requirements are phased in over the TMP planning period (2000 through 2010). The impact of the assumption likely would be muted by the phase-in of conservation requirements.

The water use rates are held constant over the study period. It is likely that ADWR will require additional conservation requirements after 2010 pursuant to the requirements of the GMA in the Fourth and Fifth Management Plans. The impact of this assumption may be to overstate water requirements after 2010 for the entities.

It should be noted that most large water providers reduce water use over time (Table C-4). For example, the City of Mesa has reduced the water demand rate 11 percent from 211 gpcd in 1980 to 187 gpcd in 1995. Exceptions to this are generally related to expansion of non-residential uses such as golf courses and low person per household domestic uses. The city of Scottsdale's increase in water use rates from 1980 to 1995 is related to these issues.

C.II.c. Water Supplies Available

Each entity's water supply available to meet the water requirement was estimated from available information including AWS designation data, GMA annual report data, and water resource plans. The water supply projected to be available to each entity is shown in Table C-5. The water supplies included:

1. Existing CAP Allocation – Water supply allocated to the entity in the 1983 allocation process and additional CAP water provided through assignments (see Appendix B for a complete listing).
2. Additional CAP Allocation – As contemplated in the proposed allocations.
3. Other Supplies
 - a. Surface Water – Verde and Salt River water, as applicable
 - b. Groundwater “Allowance” – Groundwater supply provided pursuant to the GMA includes groundwater allowance and pumping due to incidental recharge. For this analysis, incidental recharge is held at current levels and is assumed not to increase through time.
 - c. Additional CAP Water – CAP water provided through exchanges and leases, generally through Indian water rights settlements.
4. Settlement Alternative Gila River Indian Community (GRIC) Lease and Exchange – CAP water provided pursuant to a GRIC water rights settlement that includes the ability to lease CAP water for use outside Reservation lands and CAP/reclaimed water exchanges with Mesa and Chandler.
5. Effluent Reuse – The volume of effluent pledged to meet demands as outlined in AWS designation documents. In the case of the City of Phoenix, additional effluent was assumed to be available to meet water demands and reduce the volume necessary from the CAGRDR.
6. CAGRDR Membership – Membership in the CAGRDR was included as a water supply. Several of the entities are currently service area members and/or have pledged membership to obtain AWS designation. Membership in the CAGRDR is assumed to be the most expensive water supply and was assumed to meet the last increment of demand after other supplies were used or as specified by existing agreements. In addition, it was assumed that the total demand for CAGRDR services from the entities could not exceed 200,000 afa. It was also assumed that the CAGRDR members could overcome physical availability limitations by using recent changes in the CAGRDR laws that now allow for limited direct delivery of water from CAGRDR to members.

M&I entities in the AMAs must be granted 100-year AWS designations (or certificates) by ADWR in order to legally subdivide and sell land. In order to have their AWS applications approved by ADWR, M&I entities must meet stringent criteria including the proof of physically

and legally available water. Supplies that count toward an AWS include, among others, CAP subcontracts, Indian leases, and CAGR D membership. Purchase of CAP water through an interim contract or the Recharge Pool would not be sufficient because there is not a 100-year commitment of its availability. M&I entities do and are expected to continue to purchase water from the Recharge Pool and store water for use during peak demand times and shortage to support demonstration of an AWS.

The entities with their 2051 demands, existing allocations, proposed allocations, other non-CAP supplies, and assumed effluent and CAGR D supplies are shown in Table C-6. The table shows the assumed water deliveries for each entity under the Settlement Alternative, Non-Settlement Alternative 1 (equivalent to Non-Settlement Alternative 3A), and No Action (equivalent to Non-Settlement Alternative 2 and Non-Settlement Alternative 3B). The table shows the increment of water supply that is gained by the entities under the Settlement Alternative.

It is assumed that M&I water users in the Phoenix area would use CAP water to satisfy only water demands outside of the Salt River Project (SRP) service area. This is based on ADWR data that show sufficient SRP supplies are available to meet M&I demands within the SRP service area.

The non-CAP allocation supplies were derived from each entity's AWS application and water resource master plans (where available). It is assumed that each entity either already has or would construct facilities necessary to fully use their CAP allocations. In addition, the effluent use is assumed to remain constant, consistent with their AWS application. Even if additional effluent is produced with additional population growth, the volume of effluent used is fixed. It is also assumed that CAGR D membership or pledged membership would not be the preferred vehicle to obtain a supply of water. Consistent with statements made by CAGR D staff in CAGR D workshops of December 1999 and January 2000, this draft EIS will assume CAGR D membership would be used only to meet the last increment of demand unmet by CAP or other sources. Exceptions to this generalization are for those entities that currently have pledged CAGR D membership. In most cases, entities that have CAGR D membership have not pledged effluent as a component of their supply. This is due to the high cost of CAGR D membership and the requirement of physical availability of groundwater for most members.

It is assumed that M&I CAP water costs would continue consistent with CAWCD pricing policy, as described in Appendix A.

The Pima County entities, in general, follow the hierarchy illustrated above except that those entities generally do not have additional surface water supplies to use. Further, it has been assumed that the Pima County entities will take and use CAP water as soon as it is available, using mechanisms consistent with local laws and regulations.

It should be noted that the foregoing are broad generalizations. Each individual entity makes unique water supply delivery decisions based on its unique circumstances. The following worksheets (Tables C-7 to C-27) illustrate the estimated water deployment of water supplies for each entity per alternative.

C.III. DEVELOPMENT OF ESTIMATED COSTS OF ALTERNATIVE SUPPLIES

The figures expressed in this estimated cost analysis, or constant dollar analysis, are expressed in year 2000 values. Where applicable, a discount rate of 6.875 percent was assumed and payments for municipal bonds were assumed over a 25 year period.

C.III.a. CAGRD

The total cost for pumping groundwater via CAGRD membership was calculated by summing up the costs for electric power, maintenance, Pump tax and CAGRD charges; wellhead treatment costs were excluded. The electric power required for pumping water was calculated by the product of the terms for pump efficiency (70 percent assumed), water density (1.94 slug/ft³), acceleration of gravity (32.174 ft/s²), flow or pumping demand (ft³/s), and total head (ft). The cost for electricity was set at \$0.06/(kW*hr) and the cost for power was figured by multiplying the power required for pumping by the unit cost for electricity. This formulation was applied for all entities and for all years from 2001 to 2051, and captured the variable costs associated with changing demands and groundwater pumping depths; and other associated costs proportional to either of the two.

The flows, or pumping demands, were provided for all entities and were expressed in terms of AF/yr, for each and every year. The total system head for pumping is comprised of the depth to groundwater term (which was developed in the groundwater analysis [See Appendix I] and varied every year for all entities), an operating pressure head of 80 psig (which converts to 184.6 feet of head), and an assumed system pumping head loss of 5.4 feet. The mean, non-zero, energy cost for pumping groundwater was calculated to be \$25.83/AF and the figures for all entities varied from \$15.01/AF to \$35.95/AF.

Other related costs were figured as follows: O&M was assumed to be equal to half the pumping energy cost and varied with year to year changes in demand and pumping depth. Pump tax and CAGRD charges used are \$2.75 and \$188 per AF pumped, respectively.

C.III.b. Tertiary Treatment and Reuse

The costs for the reuse of treated effluent incorporates the costs of building and operating a Class IV tertiary treatment facility as well as secondary, non-potable, water distribution system. The cost for building a tertiary WWTP was based a typical cost figure of 350 million dollars for a plant with a capacity of 100 mgd. Over a 25 year period, the capital cost was figured to be roughly \$126/AF. For tertiary treatment, the O&M costs (including pumping and chemicals) are estimated to be \$16/AF. This figure is highly variable and based upon site specific conditions. The cost for a secondary distribution system for the reuse of treated water on "turf" was developed assuming a cost of \$100/ft for pipeline installation and evaluating current land use densities. Per square mile of urbanized land, a ratio of 1,300 feet of transmission line was applied. The figure for pipeline cost was doubled to capture all system capital costs and a value \$255,000 per square mile of city was derived. Assuming a 25 year bond, the total capital cost was estimated to be about \$80/AF, and the typical system O&M cost is estimated to be \$15/AF. It is assumed that the distribution costs for treated water are lower than potable water distribution because fewer customers are served with bulk purchases, and

require fewer overhead expenses.

C.III.c. CAP Allocation

The cost for CAP Allocation direct use was figured by summing the following terms: \$54/af for CAP energy and fixed pumping costs, \$48/af CAP capital costs, \$37/af for treatment plant O&M costs, and \$15/af for distribution costs, for a total of \$154/af.

TABLE C-1
CAP Allocation Draft EIS
M&I ENTITIES AND CAP ALLOCATIONS PER ALTERNATIVE

M&I Entity	Current Allocation ¹	PROPOSED CAP ALLOCATIONS			PROPOSED TOTAL CAP ALLOCATION				
		Settlement Alt. Proposed Allocation ²	Non-Settlement Alt. 1 Proposed Allocation ²	Non-Settlement Alt. 3B Proposed Allocation ³	Settlement and Non-Settlement Alternative 1	Non-Settlement Alternative 2	Non-Settlement Alternative 3A	Non-Settlement Alternative 3B	No Action Alternative ⁴
Arizona Water Company-Apache Junction	6,000	285	285	312	6,285	6,000	6,000	6,312	6,000
AVRA Water Cooperative	0	808	808	884	808	0	6,000	884	0
Cave Creek Water Company	1,600	806	806	882	2,406	1,600	1,600	2,482	1,600
City of Chandler	3,668	4,986	4,986	5,454	8,654	3,668	3,668	9,122	3,668
Chaparral City Water Company	6,978	1,931	1,931	2,112	8,909	6,978	6,978	9,090	6,978
Community Water Company of Green Valley	1,337	1,521	1,521	1,664	2,858	1,337	1,337	3,001	1,337
City of El Mirage	0	508	508	556	508	0	0	556	0
City of Glendale	14,183	3,053	3,053	3,340	17,236	14,183	14,183	17,523	14,183
City of Goodyear	3,381	7,211	7,211	7,889	10,592	3,381	3,381	11,270	3,381
H2O Water Company	0	147	147	161	147	0	0	161	0
City of Mesa	36,388	7,115	7,115	7,784	43,503	36,388	36,388	44,172	36,388
Metropolitan Domestic Water Improvement District	8,858	4,602	4,602	5,034	13,460	8,858	8,858	13,892	8,858
Town of Oro Valley	9,699	3,557	3,557	3,891	13,256	9,699	9,699	13,590	9,699
City of Peoria	18,709	5,527	5,527	6,046	24,236	18,709	18,709	24,755	18,709
City of Phoenix	113,914	8,206	8,206	8,977	122,120	113,914	113,914	122,891	113,914
City of Scottsdale	49,029	2,981	2,981	3,261	52,010	49,029	49,029	52,290	49,029
Town of Superior/Arizona Water Company-Superior	0	285	285	312	285	0	0	312	0
City of Surprise	7,373	2,876	2,876	3,146	10,249	7,373	7,373	10,519	7,373
City of Tucson	138,920	8,206	8,206	8,977	147,126	138,920	138,920	147,897	138,920
Vail Water Company	786	1,071	1,071	1,172	1,857	786	786	1,958	786
Valley Utilities Water Company	0	250	250	273	250	0	0	273	0

1 - Pursuant to 1983 Record of Decision and subsequent assignments. Does not include existing leases or exchanges.

2 - Based on ADWR Allocation Recommendation.

3 - Non-Settlement Alternative 3B evaluates the allocation of 71,815 afa of non-Indian agriculture-priority CAP water distributed in the same proportion as the 65,647 afa of M&I - priority water proposed to be allocated under the Settlement Alternative and Non-Settlement Alternative 1. It is assumed that the M&I entities would directly use 65,647 afa of the 71,815 afa and recharge the balance.

4 - Assumes no additional CAP water supply is made available during the study period.

TABLE C-2
CAP Allocation Draft EIS
POPULATION PROJECTIONS M&I ENTITIES

M & I ENTITY	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2051
Arizona Water Company-Apache Junction	22,621	24,361	25,957	27,403	28,718	29,874	30,861	31,675	32,382	33,046	33,738
AVRA Water Cooperative	5,623	7,031	8,440	9,848	11,257	12,651	14,045	15,439	16,833	18,227	19,621
Cave Creek Water Company MPA	4,181	6,259	8,981	11,163	12,579	13,682	14,705	15,599	16,538	16,615	16,615
City of Chandler MPA	169,395	198,252	221,664	240,787	258,915	271,877	285,067	298,402	305,265	315,615	322,164
Chaparral City Water Company	22,138	30,262	38,385	46,509	54,632	54,709	54,787	54,864	54,941	55,018	55,096
Community Water Company of Green Valley	14,290	16,101	17,911	19,722	21,532	22,656	23,780	24,903	26,027	27,151	28,275
City of El Mirage MPA	5,846	5,914	5,927	6,078	7,273	7,855	9,141	10,815	13,304	17,836	24,026
City of Glendale MPA	216,843	237,178	260,561	288,225	305,164	336,382	339,219	339,809	340,320	340,759	341,189
City of Goodyear MPA	19,640	28,204	38,082	58,031	92,579	128,809	172,400	214,989	263,047	282,663	293,050
H2O Water Company	793	886	979	1,072	1,165	1,281	1,397	1,513	1,629	1,745	1,861
City of Mesa MPA	425,238	480,164	540,608	567,741	593,962	621,618	635,668	644,053	652,461	660,662	664,700
Metropolitan Domestic Water Improvement District	47,750	54,630	61,509	68,389	75,269	79,966	84,663	89,360	94,057	98,754	103,451
Town of Oro Valley	27,362	33,392	39,423	45,453	51,484	58,143	64,801	71,460	78,118	84,777	91,435
City of Peoria MPA	93,675	126,408	141,185	167,355	183,815	197,363	213,030	234,073	258,608	294,045	358,317
City of Phoenix MPA	1,288,409	1,404,741	1,532,540	1,658,983	1,782,105	1,943,817	2,116,851	2,270,156	2,420,969	2,500,913	2,548,666
City of Scottsdale MPA	204,892	242,179	270,763	294,181	306,713	330,308	356,656	372,141	374,032	374,293	374,482
Town of Superior/Arizona Water Company-Superior MPA	3,483	3,516	3,550	3,583	3,616	3,632	3,647	3,663	3,678	3,694	3,709
City of Surprise MPA	26,506	37,245	41,278	47,338	60,955	70,963	95,964	123,859	156,667	191,379	235,977
City of Tucson	644,223	691,429	738,635	785,841	833,047	882,295	931,543	980,791	1,030,039	1,079,287	1,128,535
Vail Water Company	3,100	5,156	7,211	9,267	11,323	12,706	14,090	15,473	16,856	18,239	19,623
Valley Utilities Water Company	7,726	8,693	9,659	10,626	11,593	12,735	13,877	15,019	16,161	17,303	18,445

Note: Population projections for MPA based on 1997 Arizona Department of Economic Security (ADES) planning population projections.
All values moved forward so that ADES 2000 = Study year 2001. All other population data based on ADWR population projections provided in ADWR Allocation Recommendation, December 1999. Data extended to 2041 to 2051.

TABLE C-3
CAP Allocation Draft EIS
M&I ENTITY PROJECTED WATER USE RATES

M&I ENTITY	RESIDENTIAL USE	NON-RESIDENTIAL	LOST & UNACCOUNTED	TOTAL
Arizona Water Company-Apache Junction	100	33	10	143
AVRA Water Cooperative	108	8	8	124
Cave Creek Water Company	107	45	11	163
City of Chandler	119	66	13	198
Chaparral City Water Company	133	119	18	270
Community Water Company of Green Valley	110	21	9	140
City of El Mirage	100	39	10	149
City of Glendale	118	52	12	182
City of Goodyear	100	117	15	232
H2O Water Company	103	51	11	165
City of Mesa	103	51	11	165
Metropolitan Domestic Water Improvement District	132	25	11	168
Town of Oro Valley	128	40	12	180
City of Peoria	102	45	10	157
City of Phoenix	123	66	13	202
City of Scottsdale	159	71	16	246
Town of Superior/Arizona Water Company-Superior	100	18	8	126
City of Surprise	137	62	14	213
City of Tucson	106	37	10	153
Vail Water Company	122	23	10	155
Valley Utilities Water Company	100	18	8	126

TABLE C-4
CAP Allocation Draft EIS
M&I ENTITY PROJECTED WATER DEMANDS

M&I ENTITY	2001	2006	2011	2016	2021	2026	2031	2036	2041	2046	2051
Arizona Water Company-Apache Junction	11,393	13,324	15,129	16,763	18,250	19,556	20,673	21,593	22,392	23,142	23,924
AVRA Water Cooperative	755	944	1,133	1,322	1,511	1,698	1,885	2,073	2,260	2,447	2,634
Cave CreekWater Company	762	1,140	1,636	2,034	2,292	2,493	2,679	2,842	3,013	3,027	3,027
City of Chandler	37,560	43,959	49,150	53,390	57,410	60,284	63,209	66,165	67,687	69,982	71,434
Chaparral City Water Company	6,687	9,140	11,594	14,047	16,501	16,524	16,547	16,571	16,594	16,617	16,641
Community Water Company of Green Valley	2,244	2,528	2,812	3,096	3,381	3,557	3,734	3,910	4,087	4,263	4,439
City of El Mirage	974	985	987	1,013	1,212	1,309	1,523	1,802	2,216	2,971	4,003
City of Glendale	44,183	48,326	53,090	58,727	62,178	68,539	69,117	69,238	69,342	69,431	69,519
City of Goodyear	5,108	7,335	9,905	15,093	24,079	33,501	44,839	55,916	68,415	73,517	76,218
H2O Water Company	157	175	193	212	230	253	276	299	322	345	368
City of Mesa	78,489	88,627	99,784	104,792	109,632	114,737	117,330	118,878	120,429	121,943	122,689
Metropolitan Domestic Water Improvement District	8,985	10,280	11,574	12,869	14,164	15,047	15,931	16,815	17,699	18,583	19,467
Town of Oro Valley	5,509	6,724	7,938	9,152	10,367	11,707	13,048	14,389	15,730	17,070	18,411
City of Peoria	16,504	22,272	24,875	29,486	32,386	34,773	37,533	41,241	45,563	51,807	63,131
City of Phoenix	291,859	318,211	347,161	375,804	403,694	440,326	479,523	514,251	548,414	566,524	577,341
City of Scottsdale	56,482	66,761	74,641	81,096	84,551	91,055	98,318	102,587	103,108	103,180	103,232
Town of Superior/Arizona Water Company-Superior	493	497	502	507	511	514	516	518	520	522	525
City of Surprise	6,354	8,928	9,895	11,347	14,612	17,011	23,004	29,690	37,555	45,876	56,566
City of Tucson	110,415	118,506	126,597	134,688	142,779	151,219	159,660	168,101	176,542	184,982	193,423
Vail Water Company	568	945	1,323	1,700	2,077	2,330	2,584	2,838	3,091	3,345	3,599
Valley Utilities Water Company	1,093	1,229	1,366	1,503	1,640	1,801	1,963	2,124	2,286	2,447	2,609

Table C-5
CAP Allocation Draft EIS
M&I Entities - Comparison of Historic Water Use Rates

M & I Entity	1980 gpcd	1985 gpcd	1995 gpcd
Arizona Water Company - Apache Junction	-	141	206
AVRA Water Cooperative	108	111	113
Cave Creek Water Company	217	162	276
Chaparral City Water Company	617	302	284
City of Chandler	229	210	225
City of El Mirage	118	162	173
City of Glendale	212	221	210
City of Goodyear	361	349	269
City of Mesa	211	192	187
City of Peoria	311	198	196
City of Phoenix	267	251	226
City of Scottsdale	299	323	327
City of Surprise	-	-	-
City of Tucson	160	161	159
Community Water Company of Green Valley	181	132	140
H2O Water Company	173	162	-
Metropolitan Domestic Water Improvement District	208	199	182
Town of Superior/Arizona Water Company-Superior	-	104	115
Vail Water Company	110	-	154
Valley Utilities Water Company	144	117	118

Note: gpcd water use from ADWR First Management Plan, Second Management Plan and TMP
- no data

Table C-6
CAP Allocation Draft EIS
Preliminary Summary of M&I Entities at 2051

	TMP gpcd	DEMAND	SUPPLIES				DEMAND	SUPPLIES			DEMAND	SUPPLIES			DEMAND	SUPPLIES		
		2051 Total Demand	2051 Non-CAP Allocations Supplies ^a	Existing Allocation	Proposed Allocation	GRIC Lease	Settlement Alternative			Non-Settlement Alternatives 1 and 3B			Non-Settlement Alternatives 2, 3A, and No Action Alternative					
							Residual	Effluent	CAGR ^d	Residual	Effluent	CAGR ^d	Residual	Effluent	CAGR ^d	Residual	Effluent	CAGR ^d
Arizona Water Company -Apache Junction ^b	143	11,114	5,114	6,000	285	0	0	0	0	0	0	0	0 ^d	0	0	0		
AVRA Water Cooperative	120	2,634	0	0	808	0	1,826	0	1,826	1,826	0	1,826	2,634	0	2,634			
Cave Creek Water Company	163	6,411	65	1,600	806	0	3,941	2,973	968	3,941	2,973	968	4,746	2,973	1,774			
City of Chandler	198	75,483	60,972	3,668	4,986	5,857	0	0	0	5,857 ^h	5,857	0	10,843	10,843	0			
Chaparral City Water Company	270	16,641	546	6,978	1,931	0	7,186	1,686	5,500	7,186	1,686	5,500	9,117	1,686	7,431			
Community Water Company of Green Valley	140	4,439	0	1,337	1,521	0	1,581	0	1,581	1,581	0	1,581	3,102	0	3,102			
City of El Mirage	149	4,003	460	0	508	0	3,035	560	2,475	3,035	560	2,475	3,543	560	2,983			
City of Glendale	182	69,518	54,428	14,183	3,053	5,857	0	0	0	0	0	0	906 ^e	906	0			
City of Goodyear	232	76,218	23,656	3,381	7,211	5,857	36,113	3,360	32,753	41,970	3,360	38,610	49,181	3,360	45,821			
H2O Water Company	176	368	0	0	147	0	221	0	221	221	0	221	368	0	368			
City of Mesa	165	122,689	74,838	36,388	7,115	5,857	0	959	0	4,348	4,348	0	11,463 ^f	11,463	0			
Metropolitan Domestic Water Improvement District	168	19,467	0	8,858	4,602	0	6,007	0	6,007	6,007	0	6,007	10,609	0	10,609			
Town of Oro Valley	180	18,411	0	2,294	3,557	0	12,560	0	12,560	12,560	0	12,560	16,117	0	16,117			
City of Peoria	157	63,132	15,203	18,709	5,527	5,857	17,835	0	17,835	23,692	0	23,692	29,219	0	29,219			
City of Phoenix	202	577,341	391,461	113,914	8,206	5,857	57,903	41,541	16,362	63,760	41,541	22,219	71,966	41,541	30,425			
City of Scottsdale	249	104,135	48,574	49,029	2,981	5,857	0	1,000	0	0	2,247	0	6,532 ^g	6,532	0			
Town of Superior/Arizona Water Company-Superior	126	525	0	0	285	0	240	0	240	240	0	240	525	0	525			
City of Surprise	214	56,566	21,352	7,373	2,876	0	24,965	3,584	21,381	24,965	3,584	21,381	27,841	3,584	24,257			
City of Tucson	153	193,423	44,733	138,920	8,206	0	1,564	0	1,564	1,564	0	1,564	9,770	0	9,770			
Vail Water Company	164	3,598	0	786	1,071	0	1,741	0	1,741	1,741	0	1,741	2,812	0	2,812			
Valley Utilities Water Company	126	2,609	0	0	250	0	2,359	0	2,359	2,359	0	2,359	2,609	0	2,609			
TOTAL:		1,428,724	741,402	413,418	65,932^c	40,999	179,077	55,663	125,372	206,853	66,156	142,943	273,903	83,448	190,455			

NOTES:

^aIncludes SRP water, Gatewater, Indian settlement water Reclaimed Wastewater for Turf, Groundwater, Roosevelt Conservation Space, Salt River Pima-Maricopa Indian Community (SRPMIC)/Roosevelt Irrigation District Exchange, Hohokam Irrigation and Drainage District (HIDD) Buyout, and Poor Quality Groundwater.

^bApache Junction reallocated CAP supply would only be provided if Superior does not accept the offered allocation.

^cTotal proposed allocation volume includes Superior and Apache Junction, only one of these entities will receive an allocation, so that the total water available is 64,647 afa.

^dApache Junctions residual will be made up from additional groundwater pumping, from outside of the AMA.

^eGlendale has additional non-CAP supplies that may be applied if it does not receive additional CAP water including the use of effluent pledged in its AWS designation.

^fMesa has additional non-CAP supplies that may be applied if it does not receive additional CAP water including the use of effluent pledged in its AWS designation.

^gScottsdale has additional non-CAP supplies that may be applied if it does not receive additional CAP water including the use of effluent pledged in its AWS designation.

^hChandler has additional non-CAP supplies that may be applied if it does not receive additional CAP water including the use of effluent pledged in its AWS designation.

Table C-7
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
Arizona Water Company - Apache Junction
in Acre-Feet (af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	6,000	6,000	6,000	6,000	6,000	6,000
CAP Allocation - Additional	285	285	285	285	0	0
Groundwater	410	4,829	410	4,829	410	4,829
CAGR	0	0	0	0	285	285
TOTAL DIRECT USE	6,695	11,114	6,695	11,114	6,695	11,114

Table C-8
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
AVRA Water Cooperative
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	0	0	0	0	0	0
CAP Allocation - Additional	0	808	0	808	0	0
Groundwater ^(a)	755	0	755	0	0	0
CAGRD	0	1,826	0	1,826	755	2,634
TOTAL DIRECT USE	755	2,634	755	2,634	755	2,634

Notes:

(a) Year 2001 groundwater use reflects transition of using CAP supplies.

Table C-9
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
Cave Creek Water Company
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	1,600	1,600	1,600	1,600	1,600	1,600
CAP Allocation - Additional	806	806	806	806	0	0
Groundwater	65	65	65	65	65	65
Effluent - Direct Use	1,067	2,973	1,067	2,973	1,873	2,973
Effluent - Recharged ^(a)	806	0	806	0	0	0
CAGR D	0	968	0	968	0	1,774
TOTAL USE ^(b)	4,344	6,411	4,344	6,411	3,538	6,411
TOTAL DIRECT USE	3,538	6,411	3,538	6,411	3,538	6,411

Notes:

- (a) To complete the water balance, a certain quantity of water is shown to be recharged for this entity.
It is possible, however, that instead of recharging the water not needed for direct use (using this water use scenario), the entity would directly use the water and correspondingly offset their groundwater pumping.
In either case, the incremental impacts would be the same.
- (b) Total use includes direct use and recharge.

Table C-10
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of Chandler
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	998	3,668	998	3,668	933	3,668
CAP Existing - Other ^(a)	0	5,973	0	5,973	0	5,973
CAP Allocation - Additional	0	4,986	0	4,986	0	0
GRIC Settlement Lease	0	5,857	0	0	0	0
GRIC Exchange - Direct Use	0	0	0	0	0	0
GRIC Exchange - Recharged ^(b)	0	8,960	0	0	0	0
Groundwater	6,136	6,136	6,136	6,136	6,136	6,136
Other Surface Water ^(c)	0	2,110	0	2,110	0	2,110
SRP and or Other ID Water	36,781	46,753	36,781	46,753	36,781	46,753
Effluent - Direct Use	0	0	0	5,857	0	10,778
Effluent - Recharged ^(b)	0	10,778	0	4,921	65	65
TOTAL USE ^(d)	43,915	95,221	43,915	80,404	43,915	75,483
TOTAL DIRECT USE	43,915	75,483	43,915	75,483	43,915	75,483

Notes:

- (a) Includes SRPMIC Settlement water, HIDD water, and Indian leases.
- (b) To complete the water balance, a certain quantity of water is shown to be recharged for this entity. It is possible, however, that instead of recharging the water, the entity would directly use the water and correspondingly offset their groundwater pumping. In either case, the incremental impacts would be the same. Recharge could be accomplished using direct or in-lieu facilities. Specific types of water are shown as recharged for convenience in the draft EIS analysis. Actual recharge patterns may differ.
- (c) Includes Roosevelt Conservation Space water and Wellton-Mohawk exchange.
- (d) Total use includes direct use and recharge.

Table C-11
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
Chaparral City Water Company
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	6,141	6,978	6,141	6,978	6,141	6,978
CAP Allocation - Additional	0	1,931	0	1,931	0	0
Groundwater	546	546	546	546	546	546
Effluent	0	1,686	0	1,686	0	1,686
CAGRD	0	5,500	0	5,500	0	7,431
TOTAL DIRECT USE	6,687	16,641	6,687	16,641	6,687	16,641

Table C-12
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
Community Water Company of Green Valley
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	0	1,337	0	1,337	0	0
CAP Allocation - Additional	0	1,521	0	1,521	0	0
Groundwater ^(a)	2,244	0	2,244	0	1,337	1,337
CAGR	0	1,581	0	1,581	907	3,102
TOTAL DIRECT USE	2,244	4,439	2,244	4,439	2,244	4,439

Notes:

(a) Year 2001 groundwater use reflects transition of using CAP supplies.

Table C-13
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of El Mirage
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	0	508	0	508	0	0
Groundwater	460	460	460	460	460	460
Effluent	560	560	560	560	560	560
CAGR	0	2,475	0	2,475	0	2,983
TOTAL DIRECT USE	1,020	4,003	1,020	4,003	1,020	4,003

Table C-14
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of Glendale
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	7,138	14,183	7,138	14,183	7,138	14,183
CAP Existing - Other ^(a)	0	1,814	0	1,814	0	1,814
CAP Allocation - Additional Direct Use	0	629	0	629	0	0
CAP Allocation - Additional Recharged ^(b)	0	2,424	0	2,424	0	0
GRIC Settlement Lease - Direct Use	0	0	0	0	0	0
GRIC Settlement Lease - Recharged ^(b)	0	5,857	0	0	0	0
Groundwater	5,545	5,545	5,545	5,545	5,545	5,545
Other Surface Water ^(c)	325	401	325	401	325	401
SRP and or Other ID Water	31,173	46,668	31,173	46,668	31,173	46,668
Effluent - Direct Use	0	278	0	278	0	906
Effluent - Recharged ^(b)	0	629	0	629	0	0
TOTAL USE^(d)	44,182	78,428	44,182	72,571	44,182	69,518
TOTAL DIRECT USE	44,182	69,518	44,182	69,518	44,182	69,518

Notes:

- (a) Includes an Indian lease.
- (b) To complete the water balance, a certain quantity of water is shown to be recharged for this entity.
It is possible, however, that instead of recharging the water not needed for direct use (using this water use scenario), the entity would directly use the water and correspondingly offset their groundwater pumping.
In either case, the incremental impacts would be the same.
- (c) Includes Roosevelt Conservation Space water and Wellton-Mohawk exchange.
- (d) Total use includes direct use and recharge.

Table C-15
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of Goodyear
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	3,378	3,381	3,378	3,381	3,378	3,381
CAP Allocation - Additional	0	7,211	0	7,211	0	0
GRIC Settlement Lease	0	5,857	0	0	0	0
Groundwater	648	648	648	648	648	648
SRP and or Other ID Water	1,082	23,008	1,082	23,008	1,082	23,008
Effluent	0	3,360	0	3,360	0	3,360
CAGRD	0	32,753	0	38,610	0	45,821
TOTAL DIRECT USE	5,108	76,218	5,108	76,218	5,108	76,218

Table C-16
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
H2O Water Company
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Additional	147	147	147	147	0	0
CAGRD	10	221	10	221	157	368
TOTAL DIRECT USE	157	368	157	368	157	368

Table C-17
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of Mesa
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	19,067	36,388	19,067	36,388	18,977	36,388
CAP Existing - Other ^(a)	0	4,211	0	4,211	85	4,211
CAP Allocation - Additional Direct Use	0	7,115	0	6,933	0	0
CAP Allocation - Additional Recharged ^(b)	0	0	0	182	0	0
GRIC Settlement Lease - Direct Use	0	3,389	0	0	0	0
GRIC Settlement Lease - Recharged ^(b)	0	2,468	0	0	0	0
GRIC Exchange - Direct Use	0	0	0	0	0	0
GRIC Exchange - Recharged ^(b)	0	23,540	0	0	0	0
Groundwater	10,587	10,587	10,587	10,587	10,587	10,587
Other Surface Water ^(c)	3,272	5,040	3,272	5,040	3,272	5,040
SRP and or Other ID Water	44,605	55,000	44,605	55,000	44,605	55,000
Effluent - Direct Use	959	959	959	4,530	964	11,463
Effluent - Recharged ^(b)	0	10,504	0	6,933	0	0
TOTAL USE^(d)	78,490	159,201	78,490	129,804	78,490	122,689
TOTAL DIRECT USE	78,490	122,689	78,490	122,689	78,490	122,689

Notes:

- (a) Includes SRPMIC Settlement water, HIDD water, and Indian leases.
- (b) To complete the water balance, a certain quantity of water is shown to be recharged for this entity.
It is possible, however, that instead of recharging the water, the entity would directly use the water and correspondingly offset their groundwater pumping. In either case, the incremental impacts would be the same. Recharge could be accomplished using direct or in-lieu facilities. Specific types of water are shown as recharged for convenience in the draft EIS analysis. Actual recharge patterns may differ.
- (c) Includes Roosevelt Conservation Space water and Wellton-Mohawk exchange.
- (d) Total use included direct use and recharge.

Table C-18
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
Metropolitan Domestic Water Improvement District
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	0	8,858	0	8,858	0	0
CAP Allocation - Additional	0	4,602	0	4,602	0	0
Groundwater ^(a)	8,985	0	8,985	0	8,858	8,858
CAGR	0	6,007	0	6,007	127	10,609
TOTAL DIRECT USE	8,985	19,467	8,985	19,467	8,985	19,467

Notes:

(a) Year 2001 groundwater use reflects transition of using CAP supplies.

Table C-19
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
Town of Oro Valley
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	0	2,294	0	2,294	0	0
CAP Existing - Other ^(a)	0	3,557	0	3,557	0	0
Groundwater ^(a)	5,509	0	5,509	0	2,294	2,294
CAGRD	0	12,560	0	12,560	3,215	16,117
TOTAL DIRECT USE	5,509	18,411	5,509	18,411	5,509	18,411

Notes:

(a) Year 2001 groundwater use reflects transition of using CAP supplies.

Table C-20
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of Peoria
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	4,613	18,709	4,613	18,709	4,613	18,709
CAP Allocation - Additional	0	5,527	0	5,527	0	0
GRIC Settlement Lease	0	5,857	0	0	0	0
Groundwater	2,423	2,423	2,423	2,423	2,423	2,423
SRP and or Other ID Water	9,469	12,780	9,469	12,780	9,469	12,780
CAGRD	0	17,835	0	23,692	0	29,219
TOTAL DIRECT USE	16,505	63,132	16,505	63,132	16,505	63,132

Table C-21
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of Phoenix
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	98,976	113,914	98,976	113,914	98,976	113,914
CAP Existing - Other ^(a)	0	21,368	0	21,368	0	21,368
CAP Allocation - Additional	0	8,206	0	8,206	0	0
GRIC Settlement Lease	0	5,857	0	0	0	0
Groundwater	34,822	34,822	34,822	34,822	34,822	34,822
Other Surface Water ^(b)	0	78,619	0	78,619	0	78,619
SRP and Other ID Water	155,776	256,652	155,776	256,652	155,776	256,652
Effluent	0	41,541	0	41,541	0	41,541
CAGR D	0	16,362	0	22,219	0	30,425
TOTAL DIRECT USE	289,574	577,341	289,574	577,341	289,574	577,341

Notes:

(a) Includes SRPMIC Settlement water, HIDD water, and Indian leases.

(b) Includes Gateway, Roosevelt Conservation Space water and Wellton-Mohawk exchange.

Table C-22
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of Scottsdale
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	25,171	49,029	25,171	49,029	25,171	47,275
CAP Allocation - Existing Recharged ^(a)	0	0	0	0	0	1,754
CAP Existing - Other ^(b)	0	14,040	0	14,040	0	14,040
CAP Allocation - Additional Direct Use	0	2,981	0	2,530	0	0
CAP Allocation - Additional Recharged ^(a)	0	0	0	451	0	0
GRIC Settlement Lease	0	797	0	0	0	0
GRIC Settlement Lease - Recharged ^(a)	0	5,060	0	0	0	0
Groundwater	12,157	12,157	12,157	12,157	12,157	12,157
Other Surface Water ^(c)	0	0	0	0	0	0
SRP and Other ID Water	19,574	24,131	19,574	24,131	19,574	24,131
Effluent - Direct Use	0	1,000	0	2,247	0	6,532
Effluent - Recharged ^(a)	0	5,532	0	4,284	0	0
TOTAL USE ^(d)	56,903	114,727	56,903	108,870	56,903	105,889
TOTAL DIRECT USE	56,903	104,135	56,903	104,135	56,903	104,135

Notes:

- (a) To complete the water balance, a certain quantity of water is shown to be recharged for this entity.
It is possible, however, that instead of recharging the water not needed for direct use (using this water use scenario), the entity would directly use the water and correspondingly offset their groundwater pumping.
In either case, the incremental impacts would be the same.
- (b) Includes SRPMIC Settlement water, HIDD water, and Indian leases.
- (c) Includes Roosevelt Conservation Space water and Wellton-Mohawk exchange.
- (d) Total use includes direct use and recharge.

Table C-23
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
Town of Superior/Arizona Water Company - Superior
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	285	285	285	285	0	0
CAGRD	208	240	208	240	493	525
TOTAL DIRECT USE	493	525	493	525	493	525

Table C-24
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of Surprise
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	2,812	7,373	2,812	7,373	2,812	7,373
CAP Existing - Other ^(a)	0	738	0	738	0	738
CAP Allocation - Additional	0	2,876	0	2,876	0	0
Groundwater	791	791	791	791	791	791
SRP and Other ID Water	2,751	19,823	2,751	19,823	2,751	19,823
Effluent	0	3,584	0	3,584	0	3,584
CAGRD	0	21,381	0	21,381	0	24,257
TOTAL DIRECT USE	6,354	56,566	6,354	56,566	6,354	56,566

Notes:

(a) Includes SRPMIC Settlement water.

Table C-25
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
City of Tucson
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	0	138,920	0	138,920	0	138,920
CAP Allocation - Additional	0	8,206	0	8,206	0	0
Groundwater ^(a)	110,415	44,733	110,415	44,733	110,415	44,733
CAGR	0	1,564	0	1,564	0	9,770
TOTAL DIRECT USE	110,415	193,423	110,415	193,423	110,415	193,423

Notes:

(a) Year 2001 groundwater use reflects transition of using CAP supplies.

Table C-26
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
Vail Water Company
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Existing	0	786	0	786	0	786
CAP Allocation - Additional	0	1,071	0	1,071	0	0
Groundwater ^(a)	568	0	586	0	586	0
CAGR	0	1,741	0	1,741	0	2,812
TOTAL DIRECT USE	568	3,598	586	3,598	586	3,598

Notes:

(a) Year 2001 groundwater use reflects transition of using CAP supplies.

Table C-27
CAP Allocation Draft EIS
M&I Sector Water Uses

Summary of Projected Water Uses Per Alternative
Valley Utilities Water Company
(af)

Alternative Year	Settlement Alternative		Non-Settlement Alternatives 1 and 3B		No Action Alternative and Non-Settlement Alternatives 2 and 3A	
	2001	2051	2001	2051	2001	2051
CAP Allocation - Additional	250	250	250	250	0	0
CAGRD	843	2,359	843	2,359	1,093	2,609
TOTAL DIRECT USE	1,093	2,609	1,093	2,609	1,093	2,609

APPENDIX D

SOCIOECONOMIC ANALYSIS

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
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**Central Arizona Project Allocation
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D.I. PURPOSE AND OBJECTIVES OF SOCIOECONOMIC STUDY

The purpose of this study is to estimate the social and economic impacts of a reallocation of CAP water in accordance with a negotiated settlement and with other potential alternative allocations in the event a negotiated settlement is not achieved. Specifically, this appendix focuses on the incidence of these impacts on non-Indian and Indian agricultural production in Pinal, Maricopa, and Pima Counties from 2001 to 2051. In addition, this study examines the effect upon the entire economy of the three-County area and Pinal County alone, when changes in agricultural production occur. Impacts to agriculture and to the entire three-County economy are examined by observing changes in industry output, employment, and income for agriculture in the three-County economy and in the Pinal County economy.

The objectives of this study are:

- ◆ To quantify potential changes in agricultural production and associated changes in employment, income, and other economic measures under the allocation alternatives;
- ◆ To estimate the timing of potential changes in agricultural production;
- ◆ To identify the economic linkages between agriculture and other industrial sectors in the three-County area and within Pinal County;
- ◆ To quantify potential primary and secondary impacts to the three-County economy and Pinal County economy due to changes in agricultural production;
- ◆ To determine the economic importance of agriculture in the three-County economy and in the Pinal County economy in terms of output, employment, and income.

D.II. PLAN OF STUDY

To estimate the potential economic impacts to agriculture under each alternative, a model specific to the three-County economy and the Pinal County economy was created using an economic input-output model known as IMPLAN.¹ IMPLAN allows for the construction of a regional input-output model to assess the potential economic impacts of alternative resource management strategies.² Arizona State-and County-level data for agricultural output and prices were incorporated into the IMPLAN database to more accurately reflect the economy of central and southern Arizona. A model was created of the three-County economy and another model of the Pinal County economy, for 2001, to represent baseline conditions. Under each alternative water reallocation, six models were created to illustrate the condition of the economy at six points in time during the study period. These additional models were created to

¹ Minnesota IMPLAN Group, Inc., IMPLAN System (1997 data and software), 1940 South Greeley Street, Suite 101, Stillwater, MN 55082, www.implan.com, 1997.

² Ryan, Lisbeth A., The Economic Impacts of River Running in Northern New Mexico, Unpublished Master of Science Thesis, University of Arizona, Tucson, Arizona, 1994.

observe the timing of impacts on agriculture and the rest of the economy within the study area. Within each alternative, the models developed to represent economic conditions at specific points in time were adjusted with agricultural output data developed by the analysts. In addition, investment values for projected Federal construction expenditures on Indian lands were incorporated into the model.

In this study, non-Indian and Indian agriculture in the three-County area is composed of seven CAP IDs, two other IDs, and two Indian communities. By County, the CAP IDs and Indian communities are:

Pinal County - MSIDD, CAIDD, SCIDD, HIDD, NMIDD, TON Chuichu District, and the GRIC.

Maricopa County - QCIDD, HVDD, TIDD, and RID.

Pima County – TON, Schuk Toak, and San Xavier Districts.

The SC Apache Tribe is not included in this study, since the new agricultural development on the Reservation resulting from these CAP allocations would be outside the three-County area. A separate analysis for the social and economic impacts of new farm development on the SC Apache Tribe Reservation has been carried out, using data from Gila County. The economic and social impacts of delivering additional CAP water to the Navajo/Hopi Tribes for M&I use under Alternatives 2 and 3 are also described separately in Chapter 3 and in Appendix L.

RID and SCID are not analyzed because, over the study period, no change in output is projected to occur in these IDs due to water price. Groundwater pumping costs in RID and SCID are sufficiently low so that farmers' total water costs do not become too high for the cultivation of certain crops even when availability of CAP excess water declines.

CHCID and STIDD are not analyzed because those districts cultivate predominantly high value crops which are not sensitive to the range of water prices examined in this study. Therefore, no crop acreage is projected to go out of production in these districts due to increases in water price.

The crops to be covered in this study are cotton, food grains and feed grains (grains), hay and pasture (forage), vegetables and melons (vegetables), and trees and vines (trees). Partial farm budgets are developed for cotton, grains, and forage to determine the maximum water cost a farmer can pay and still produce a particular crop. When the price of water exceeds the maximum water cost a farmer can pay, a crop is taken out of production. Once crop acreage is assumed to go out of production, it is assumed to remain out of production for the remainder of the study period. The primary focus is on cotton, grains, and forage because these crops have lower earnings per af of water than fruit, vegetable, and nut crops and, therefore, are more vulnerable to changes in water costs. The decrease in production of a particular crop is reflected in the IMPLAN model by decreasing output in dollars in the appropriate sector equal to the value of the lost production. Employment, by number of jobs, and income decline accordingly. Similarly, in the case of increasing production on Indian Reservations, the gross output of particular crops is added to the appropriate sectors, and employment and income increase accordingly. The data from all of the model runs will be compared to the baseline conditions.

D.III. GENERAL ASSUMPTIONS AND DATA SOURCES

D.III.a. Crop Patterns, Yields, and Prices

Crop patterns, yield per acre, and prices are assumed to remain constant for non-Indian and Indian agricultural output for all alternatives during the study period.

Crop patterns for the CAP IDs in this study are based on historical crop patterns in central Arizona which were reported by IDs to Reclamation for the 1996, 1997, and 1998 crop census. Cropping patterns for Indian agriculture come from a variety of sources.³ Yield data are based on five-year average County level yields from 1993-1997. Prices are based on five-year average State-wide prices for Arizona for the period 1993-1997. The yield and price data are published in the 1999-2000 University of Arizona (UofA) Field Crop Budgets.

D.III.b. CAWCD Excess Water Pools and Pricing

The assumptions were based upon the January 14, 2000 CAWCD memorandum which provides advisory prices for CAP water from 2001 through 2010.

D.III.c. Groundwater Pumping Costs

Groundwater pumping costs, for 1994 through 1998, were published in UofA Field Crop Budgets in 1994, 1996, and 1998. The average of the UofA pumping cost estimates for five years was used to represent groundwater costs in each district. Assumptions for groundwater costs are further discussed in Section 5.

D.III.d. Input-Output Modeling Assumptions

- ◆ Constant returns to scale. Production functions for each industry are linear. All inputs increase proportionately if additional output is required.
- ◆ No supply constraints. Industries have unlimited access to raw materials for production.
- ◆ Fixed commodity input structure. Changes in the economy will affect the industry's output but not the mix of commodities and services it requires to make its products.
- ◆ Homogenous sector output. Proportions of all commodities produced by an industry remain the same, regardless of total output.

³ GRIC cropping patterns are based on enterprise crop budgets in, "Cash Flow Analysis Pima-Maricopa Irrigation Project, GRIC, U.S. Bureau of Reclamation, November 1997. San Xavier cropping pattern data are based on the San Xavier Development Plan, dated January 1989. Due to an absence of documentation, Chuichu cropping patterns reflect cropping patterns in the CAIDD. Cropping patterns for Schuk Toak are based on information in the Small Reclamation Project Act Loan Application Report for Distribution Systems for Schuk Toak District, dated March 1998.

- ◆ Industry technology assumption. An industry uses the same technology to produce all its products.

D.IV. INPUT-OUTPUT MODELS

D.IV.a. Purpose and Application

Input-output analysis attempts to quantify, at a point in time, the economic interdependencies of an economy.⁴ Input-output models are utilized to predict economic changes in a specified area or at the national level which arise due to industry relocation, military base closings, and implementation of new or modified natural resource policy. Input-output models may also be used to calculate the contributions of an industry to the local economy.

D.IV.b. Interpreting Economic Impacts with IMPLAN Data

As stated above, input-output models such as IMPLAN were developed to predict, in quantitative terms, how an economy may respond to exogenous changes in one or more economic activities. The IMPLAN model is also descriptive; it provides information about each industrial sector within an economy including the sector's size, behavior, and interaction with other industrial sectors in the economy. The relative importance of each industrial sector is generally reflected in terms of the dollar value of its sales and wages and in terms of number of jobs generated. At the State and County level, there are three types of data that are indicative of economic activity. In this study, we rely on these three data elements to reflect potential economic impacts associated with the reallocation of CAP water.

- ◆ Industry Output is defined as a single dollar value that represents each industry's total production. During the study period, depending upon water availability, pricing, and energy costs, we will estimate industry output for the relevant agricultural sectors and observe how increases or decreases in output in these agricultural sectors affect total output, employment, and income for Pinal County and Pinal, Maricopa, and Pima Counties combined.
- ◆ Employment is reflected as a single number of jobs for each industry.
- ◆ Income is defined as a dollar value that includes payroll costs and employee benefits; proprietary income received from self-employed workers; and other property income such as rents, royalties, and dividends.
- ◆ We will examine the data elements identified above in terms of direct, indirect, induced, and total effects to better understand the incidence of economic impacts. In the summary tables presented under Section 8, the sum of indirect and induced effects is referred to as secondary impacts.

⁴ Hastings, Steven E. and Sharon M. Brucker, "An Introduction to Regional Input-Output Analysis," Chapter One in Microcomputer-Based Input-Output Modeling Applications to Economic Development, Daniel M. Otto and Thomas G. Johnson, Editors, Westview Press, 1993.

- ◆ Direct Effects are the changes in the industries to which a final demand change was made, for example, the total revenues from cotton received by farmers.
- ◆ Indirect Effects are the changes in inter-industry purchases as they respond to the new demands of the directly affected industries, for example, the effects that result from businesses purchasing goods and services from other businesses to meet the demands of cotton farmers.
- ◆ Induced Effects reflect changes in spending from households as income increases or decreases due to the changes in production, for example, the effects resulting from the expenditures made by households receiving wages and salaries earned to meet the demands of cotton farmers.
- ◆ Total Effects are the sum of the direct, indirect, and induced effects.

The definitions of direct and indirect effects provided above are to be used only within the context of regional economic input-output analysis in this appendix. “Direct effects” and “indirect effects” are defined differently in other parts of this Draft EIS.

D.IV.c. Preparing the IMPLAN Model for this Study

The models were constructed with IMPLAN County-level databases for Pinal, Maricopa, and Pima Counties. One model is composed of the three-County-level databases. The second model is composed of the Pinal County database only. The Pinal County economy was modeled by itself because Pima and Maricopa Counties are larger, more urbanized economies whose results tend to overshadow the impacts occurring within the Pinal County economy. When the models were created, IMPLAN generated social accounts, which describe the transfers of money between industries and consumers, and multipliers which predict total regional activity based on a change in consumption. The models were then customized and edited for local output, value added components, and employment for the cotton, grains, forage, vegetable, and tree crop sectors. These adjustments were made with Arizona State- and County-level agricultural data published by the Arizona Agricultural Statistics Service and the UofA. The data represent a five-year average for yield and prices from 1993 to 1997.

D.IV.d. Points in Time for Observations

Six points in time were considered relevant for this analysis. These future dates represent the incidence of significant impacts associated with the water availability and pricing.

- ◆ 2001 is the beginning of the study period.
- ◆ 2004 is the beginning of CAWCD’s new agricultural water pricing and marketing program that is associated with the preferred alternative.
- ◆ 2017 represents the expected termination of the AWBA program and discontinuation of in-lieu water available to irrigators.

- ◆ 2030 marks the end of CAWCD's current /stated CAP agricultural water marketing and pricing program.
- ◆ 2043 is significant because, in this study, shortage conditions are assumed to exist on the Colorado River. Thus CAP water deliveries decrease from 1.4 mafa under normal conditions on the Colorado River to 925,000 afa under shortage conditions. Additional information is contained in Appendix A.
- ◆ 2051 is the end of the study period.

D.IV.e. An Example of IMPLAN Results

Utilization of IMPLAN to evaluate economic change results in a variety of economic impacts. Three indicators of economic impacts, output, employment, and income have been selected for this study. Typical results are provided on a series of four tables identified as Tables D-I, D-II, D-III, and D-IV. The tables reflect economic impacts for the three-County area in 2017 under the Settlement Alternative. Production and income data are presented at current price levels. The IMPLAN model was not adjusted for inflation.

Table D-I, the Output Impact Table, shows the direct, indirect, induced, and total effects, which were defined earlier. Changes in direct output drive the estimates of the secondary impacts which occur in more than 20 other sectors. On Table D-I, the total direct impacts are shown to be almost \$47 million. The total direct impacts are comprised of increased Indian agricultural output including \$29 million of cotton, \$3 million of food grains, \$41,000 of tree nuts, \$12.2 million for vegetables, and \$2.2 million for hay and pasture. The value of \$2.2 million for hay and pasture is a net gain value that is obtained after subtracting losses to non-Indians from gains generated on Indian lands. The increases in agricultural output generate over \$21.3 million of impacts in other sectors of the three-County economy.

The total effects of \$67.9 million of economic activity generate new employment. Table D-II, the Employment Impact Table, shows over 400 new jobs created directly by agricultural production. More than 300 jobs are created indirectly in sectors which serve agriculture in some capacity.

The values on Table D-III, the Indirect Business Taxes Impact Table, are subtracted from the values on Table D-IV, the Total Value Added Impact Table, to estimate income impacts generated by the change in agricultural production. Approximately \$29 million in additional income is generated directly by the additional agricultural production. Due to the change in agricultural production, another \$11.9 million in income is generated by economic sectors which serve agriculture. The economic impacts for all the alternatives in this Draft EIS are extracted, from IMPLAN results, in the manner described above.

D.V. ADDITIONAL SECONDARY DATA FOR REGIONAL IMPACT ANALYSIS**D.V.a. Pump Cost Projections for Irrigation Water in Central Arizona**

Table D-1, Historic Pumping Costs, shows actual pump cost data from 1963 to 1998. The pump cost data for the period 1992 through 1998 appear to be the most consistent data and were selected to be utilized as the base for estimating the future costs of pumping.⁵ From 1992 to 1998, the UofA assumed pump lifts to be constant. The average percent change in the data, from 1992 to 1998, was calculated. The average cost over the period, 1994 through 1998, was also calculated for each pumping area. Average costs ranged from \$27.11 to \$97.42 per af. For each area, across all IDs covered in this study, the values deemed most appropriate to represent future pumping costs are the average costs of pumping for the five-year period, 1994 through 1998. The five-year average cost will be held constant throughout the study period. The pump cost per af per foot of lift was also calculated for each pumping area. Average costs range from just over \$0.05 to more than \$0.16 per af per foot of lift. The pump cost values provided by Table D-1 are utilized in the analysis of impacts associated with reallocation of CAP water, given the pump lifts assumed in Appendix L and Chapter 3.

D.V.b. CAWCD Pricing and Policy for CAP Agricultural Water

CAWCD non-Indian agricultural water price for 2004, at \$35.00, is assumed to be held constant throughout the study period.

On Tables D-2 through D-7, an approximate average blended price for CAP water has been calculated based upon the water supply and pricing of the three CAP water pools. However, the percentage of in-lieu water taken by each ID differs. Therefore, the actual average blended price for water faced by each ID must be calculated individually. After 2004, only Pool One water is assumed to be available, except for limited amounts of Pool Three water during the early years of this analysis. Tables A-3 through A-8 of Appendix A provide annual projected amounts of water available to the NIA sector.

D.V.c. Partial Crop Budgeting and Impacts upon Crop Selection due to Water Cost

This analysis is referred to as partial crop budgeting for two reasons. The first reason is that only total costs and returns are presented for each crop, with essentially no detail regarding the composition of the values. Secondly, as explained below, not all costs of production are taken into consideration; the emphasis is primarily on variable or cash costs. Partial crop budget tables D-8 through D-20 are found at the back of this appendix.

Partial crop budgets were generated for upland cotton, alfalfa hay, and durum wheat. This analysis focuses on upland cotton, alfalfa hay, and durum wheat because these crops are historically the most sensitive to water costs. Such crops may be subject to elimination from a crop rotation as the cost of irrigation water becomes more expensive.

⁵ UofA Field Crop Budgets published in 1992, 1993, 1994, 1996, and 1998.

Theoretical economic production assumptions were applied in developing the partial budgets. The first assumption is that farmers will continue to produce a particular crop only as long as the returns from the crop cover all variable costs and contribute something toward fixed costs. For the partial crop budget analysis, the intent is to identify only the variable production costs or only those costs which a farmer, in central Arizona, is assumed to include when making the decision whether to continue to produce a particular crop in the face of declining profitability. The goal of the partial crop budget analysis is to estimate a set of cost and return values that represent a typical farm although it is recognized that each farmer is faced with unique production costs, realized yields, and crop prices. The partial crop budgets provide what is assumed to be the average costs and returns faced by a range of farmers in the various CAP IDs. The outcome provided by the partial budgets is identification of the cost of irrigation water at which farmers, on the average, would decide to terminate production of a particular crop because the returns failed to cover the variable costs of production. If each farmer's production costs and prices were used, on the average, the impacts would be similar to those resulting from this analysis.

UofA 1998 crop enterprise budgets were used as the starting point for the partial crop budget analysis. Average commodity prices and yields over a five-year period, from 1993 to 1997, were provided as the basis for gross revenues. The total cash cost for land preparation and growing expenses including irrigation water costs, and total harvest and post-harvest costs developed by the UofA, were used in this analysis. Costs which were specifically excluded from the analysis include farm pickup use costs for a particular crop, taxes, housing, insurance on farm equipment, capital replacement on machinery and vehicles, interest on equity in machinery and vehicles, property taxes, opportunity interest on land, water assessment, returns to management, and profit.

The values derived are not indicative of the profitability of a particular crop. The values are intended to represent a marginal analysis relative to farmers' growing decisions. For example, the crop profitability decision value for wheat in Pinal County is shown to be \$13.68 per acre. The \$13.68 represents the revenues above variable expenses that contribute to payment of fixed costs of the farming operation. To the \$13.68 is added the current estimated irrigation water cost. Total estimated irrigation water cost plus the profitability decision value is then divided by the af of water applied per acre to calculate the threshold value. The threshold value for wheat in Pinal County is \$41.13. The threshold value is the maximum amount a farmer would pay for water to irrigate wheat. In contrast, the 1998 UofA crop enterprise budget for wheat shows a loss of \$93.47 per acre when all economic costs are considered. In this study, a farmer is assumed not to consider all economic costs when deciding whether to grow a particular crop. In addition, the economic costs associated with total farm production are unique to each farm operation.

Tables D-8 through D-20 show the partial budgeting results. The estimated maximum average amount a farmer would pay for irrigation water per af is:

Wheat	Pinal County	\$41.13
	Maricopa County	\$59.77
Cotton	Pinal County	\$69.19
	Maricopa	\$64.46
Alfalfa Hay	Pinal County	\$52.12
	Maricopa County	\$43.08

The differences in the wheat estimates between Counties are due mainly to yield differences and required water assumptions. For cotton, the differences in estimates between Counties are also due to yield differences and required water assumptions. In Pinal County, the first crop projected to drop out of production is wheat, followed by alfalfa, and then cotton, given increasing irrigation water costs and assuming that all other variables remained equal. In Maricopa County, forage is projected to drop out of production first followed by grains.

Based upon the estimated incidence of crop elimination in different time periods, the change in total agricultural output is determined. The set of tables D-21 through D-26, Adjustments of Agricultural Output Due to Cropping Pattern Changes – Gross Output, shows estimated changes in total output for each CAP ID, under each alternative, within each time period. The changes in output are aggregated and become the input for IMPLAN which estimates the total economic changes in the economy brought about by changes in agricultural production. The reader should note that the estimated changes in output are due to economic factors that are mostly beyond the impact of CAP reallocation. These changes are included to present a more complete picture of agricultural production in central Arizona. Tables D-21 to D-26 are found at the back of this appendix, and are summarized in Table D-27.

D.VI. EXISTING CONDITIONS

Existing conditions for water availability, cost, and demand are assumed to be identical to conditions under the No Action Alternative for 2001.

D.VI.a. Total Water Availability and Cost

The availability and price of CAP excess water for non-Indian agricultural use in 2001 is shown below. After CAP IDs have utilized their apportionment, set by CAWCD, of CAP agricultural

water in Pools One and Two, they may purchase AWBA in-lieu water. No restrictions are placed on purchases of water from Pool Three. In 2001, the CAP Indian use water will cost \$58.00 per af. The amount of water available to Indians is 453,224 af.

CAP Excess Water Pools and Pricing – Existing Conditions			
	Quantity (af)	Price (\$)	Average Price (\$)
Pool One	200,000	34.00	
Pool Two	200,000	24.00	
Pool Three	129,989	33.00	
AWBA In Lieu	124,520	21.00	
Total Water	654,509		24.28

Groundwater pumping costs vary greatly even within IDs due to varying depths to the water table and the type, source, and cost of energy for pumping. Pumping costs per af are assumed to remain constant throughout the study period for all alternatives. Energy for pumping is electric except as noted.

Projected Cost of Pumping Irrigation Water in Central Arizona⁶
Price (\$)

Pinal County

Coolidge Area	30.40
Casa Grande Area	42.04
Eloy Area	42.08
Stanfield Area	34.62
Maricopa Area	27.11

Maricopa County

Harquahala Valley Area (natural gas)	57.91
Queen Creek Area (natural gas)	60.73
Tonopah Area	57.91
New Magma Area	60.73

⁶ Areas are as identified by the UofA in the annual crop budget publications.

D.VI.b. Total Water Demand

Below is a compilation of total water demand in af by all CAP IDs for 2001. Total CAP water available is 606,000 af.

Districts	Derivation of Water Demand for all CAP IDs (af)		
	Total Water Utilization	CAP Water Demand	Groundwater Demand
MSIDD	247,994	186,580	64,414
CAIDD	218,892	191,064	27,818
HIDD	84,447	70,005	14,442
NMIDD	86,583	86,583	0
QCIDD	84,447	52,321	32,126
HVIDD	98,264	34,499	63,765
TIDD	14,046	10,991	3,055

Indian water demand for CAP water in 2001 is 73,500 af. The Ak-Chin Indian Community has been utilizing its CAP water for agriculture since 1987. The additional 8,500 af supply of water is projected to be used by the TON. The Schuk Toak District is projected to use 7,500 af for cotton cultivation, and the San Xavier District is projected to use 1,000 af for forage production. This information is provided on Tables D-28 through D-33, Indian Agricultural Development and Production – 2001 through 2050, which may be found at the back of this appendix.

D.VI.c. Crop Patterns, Yields, and Prices

Yield per acre and prices are assumed to be constant throughout the study period for all alternatives. Crop patterns for 2001 are presented below.

	Acreage 2001				
	Cotton	Grains	Forage	Vegetables	Trees
MSIDD	27,862	18,154	8,711	3,106	3,886
CAIDD	28,546	22,823	2,957	3,116	2,281
HIDD	12,817	8,627	3,632	632	0
NMIDD	9,042	5,107	5,449	1,808	1,855
QCIDD	5,258	3,847	2,632	2,632	368
HVIDD	13,419	3,109	3,709	3,709	505
TIDD	2,463	22	546	0	0
GRIC	0	0	0	0	0
Schuk Toak	1,125	0	0	0	0
Chuichu	0	0	0	0	0
San Xavier	0	0	200	0	0

	Yield (per acre) ⁷		
	Pinal	Maricopa	Price (\$)
Cotton (lbs. lint)	1,154	1,227	\$ 0.678
Wheat (lbs.)	4,900	5,600	\$ 0.753
Alfalfa Hay (tons)	7.5	8.0	\$ 96.70

Vegetables and trees are used to the extent these crops come into agricultural production on Indian lands during the study period. Vegetable and tree production on non-Indian lands in the CAP IDs is assumed to continue throughout the study period regardless of the price of water. Output for vegetables and tree crops in the NIA sector is not examined since the amount of acreage in these crops is assumed to be unchanged throughout the study period. Pinal County prices and yields were used for TON agriculture because TON acreage is relatively small.

D.VI.d. Economic Snapshot at the County Level

Table D-34 shows industrial sectors, industry output, employment, and total value added broken down into employee compensation, proprietary income (owners' income), and other property income (capital income) and indirect business taxes for the three-County area. At the beginning of the study period, all agricultural output accounts for about 1.1 percent of the total industrial output of the three-County area. In the three-County economy, manufacturing, services, and FIRE are the big producers accounting for 21.4 percent, 20.75 percent, and 17.83 percent of the total output respectively. Agricultural employment and employee compensation account for 1.6 percent, and of the total number of jobs, 0.7 percent of the total employee compensation in the three-County economy. The services sector is the largest employer with 32.78 percent of the jobs and 26.75 percent of the employee compensation in the three-County area. The services sector is also the biggest contributor, attributing about 43.32 percent to proprietary income in the three-County area. Proprietary income consists of payments received by self-employed individuals as income. The trade and FIRE sectors are the largest contributors to indirect business taxes of about 41.97 and 35.35 percent respectively.

Table D-35 shows the same information as Table D-34 but for Pinal County. In Pinal County, total agricultural output accounts for 13.3 percent of total industrial output, 7.5 percent of total employment, and 3.56 percent of total employee compensation. Agriculture contributes the greatest share, 42.1 percent, of proprietary income in Pinal County. Approximately 8.2 percent of all indirect business taxes are collected on agricultural output. Of all the industrial sectors in Pinal County, mining is the most significant in terms of output. Mining contributes about 28.22 percent of all industrial output in Pinal County. Government and services are the biggest employers contributing 24.71 percent and 23.6 percent of the total jobs in Pinal County respectively. Government provides the largest percentage of employee compensation in Pinal County, about 28.88 percent. From a tax perspective, trade contributes a large share of indirect business taxes in Pinal County, amounting to about 29.3 percent.

⁷ Yields for Pima County are not used since none of the CAP IDs are located in Pima County.

D.VII. CONDITIONS ASSOCIATED WITH WATER AVAILABILITY, DEMAND, AND PRICE – ALL ALTERNATIVES**D.VII.a. Total Water Availability, Demand and Cost**

In Tables D-2 through D-7, Projections of CAWCD Excess Water Pools and Pricing – 2001 through 2051, estimated water prices and quantities for each alternative are shown for Pools One, Two, and Three and AWBA in-lieu water. The water supplies reflected in this table are for use by CAP IDs. The total water available in each year varies from year-to-year and is derived by summing across the water quantity columns under Pools One, Two, Three and AWBA in-lieu. The price of water listed to the far right-hand side of the table is derived by averaging the water prices estimated for each source of water in each year weighted by the associated annual water supply for each source of water. Among the categories of water, the availability, price, and duration of supply vary over the study period. Although use of AWBA and other in-lieu water is restricted, it is available in each alternative up to certain maximum amounts for \$21.00 per af from 2001 through 2017.

In summary, the supply of CAWCD excess water for NIA under each alternative is:

Alternative	CAWCD
	Excess Water 2001 – 2050 (af)
Settlement	14,543,977
No Action	13,176,193
Alternative 1	13,164,356
Alternative 2	12,258,221
Alternative 3A	13,671,231
Alternative 3B	10,966,861

The Settlement Alternative offers the maximum annual amount of Pool One water (400,000 af) for the longer period of time (2004 – 2018) compared to 2004 – 2010, for Alternatives 1, 2, and the No Action Alternative, and 2004 – 2008, for Alternatives 3a and 3b. Pool Two water and AWBA in-lieu water supplies are the same for all alternatives. Pool Three water supplies vary as reflected on Tables D-2 through D-7. Water costs also vary as reflected on the tables.

Indian agricultural water varies under each alternative and is reflected below:

Alternative	Water Supply (af)
Settlement	16,421,616
No Action	14,374,216
Alternative 1	15,866,415
Alternative 2	17,824,740
Alternative 3A	18,788,259
Alternative 3B	18,788,259

In Tables D-36 through D-77, District Analysis and Summary 2001 through 2051, in back of this appendix, demand for CAP water and pumped groundwater and total water utilization are

provided for each CAP ID for all alternatives throughout the study period. Table D-27 summarizes the crop acreage data from these tables.

Each CAP ID has two sources of water: the CAP and pumped groundwater. The proportion of use of each water source by individual districts varies based upon cost and availability of CAP supplies. CAP IDs are assumed to purchase the entire supply of CAP water available, as long as the price of CAP water is commensurate with groundwater pumping costs. Under the various alternatives in this Draft EIS, the availability of CAP water varies. Also, each district is assumed to have a quantified allocation set by CAWCD.

Groundwater pumping is effectively unrestricted. Although an upper limit exists on the amount of groundwater that can be pumped for individual lands, the limit is ineffective as long as the total water supply applied for irrigation includes excess CAP water.

Tables D-78 through D-83, Water Cost Function Frontier Groundwater Pumping and CAP Water Costs - IDs, in back of this appendix, provide the costs of CAP and pumped groundwater and the blended costs of the two water supplies under each alternative at six points in time during the study period. The blended or average price of irrigation water estimated to be faced by each ID becomes the value that is compared with farmers' ability to pay derived from the partial crop budgets. If the cost frontier value exceeds the farmers' ability to pay value in the partial crop budgets, then production of a particular crop is assumed to be terminated by all of the farmers in a CAP ID. If the analytical model results in particular crops going out of production through time, then total water demand by a particular district will decrease. The decrease in demand naturally follows because of the assumption that elimination of a particular crop from the production regime results in additional land being fallowed.

The blended average irrigation water costs are provided in a series of six tables with an indication of when certain crops are projected to drop out of production. Elimination of specific crops from production reduces the demand for irrigation water. The reduced demand causes the average cost of irrigation water to change. In some instances, the price changes may affect the timing of elimination of a crop from production. Thus, a problem of circular reference emerges. Circular reference is resolved by allowing only one additional iteration of crop elimination, decreasing water demand, and price changes. In this study, one additional iteration was found to capture the major changes in crop acreage and water price. Subsequent iterations may affect the incidence of land fallowing within a time period, but subsequent iterations do not move the incidence of land fallowing from one time period to another. For example, under the Settlement Alternative, grain production in CAIDD is projected to cease by 2043. Iterations for adjustments may cause changes in elimination of grain production to occur anytime in between 2030 and 2043. However, for the purposes of this study, evidence that grain production may terminate by 2043 is sufficient.

The Water Cost Function Frontier tables show that under all alternatives, grain and forage crops go out of production in the districts which have the highest costs of pumping groundwater. As CAP water supplies decrease during the study period, IDs rely more heavily on groundwater. Under all alternatives in this Draft EIS, districts such as CAIDD, NMIDD, QCIDD, HVIDD, and TIDD that have pumping costs ranging from about \$42.00 to \$61.00, cannot cover variable costs of grain and/or forage production. All alternatives are similar in that CAIDD, NMIDD,

QCIDD, HVIDD, and TIDD are projected to experience a loss in crop acreage and output because of water costs. The only difference among the alternatives is that the timing for some of the crops to drop out of production changes slightly by one time period. Under the Settlement Alternative, cotton is also projected to go out of production in QCIDD in 2051. Grain production is projected to end in HIDD in 2051, under all alternatives. Across all alternatives, no crops are projected to go out of production in SCIDD, MSIDD, and RID during the study period due to water costs. These districts have pump costs that are estimated to range from \$27.00 to just more than \$36.00 per af.

Table D-27, Composite District Analysis and Summary and Adjustments of Agricultural Output Due to Cropping Changes, reflects the acres in production and lost crop acres over the entire study period in each of the alternatives for the CAP IDs. In terms of lost crop acreage, the outcomes of the reallocation strategies in each of the alternatives are similar. District analysis and summary tables for each individual district, Tables D-36 to D-77, are found in back of this appendix.

Tables D-28 through D-33, Indian Agricultural Development and Production – 2001 through 2051, show the crops produced and estimated gross sales per acre on lands farmed by the GRIC and the Schuk Toak, Chuichu, and San Xavier Districts of the TON.

During the study period, it is assumed Indian lands will be developed resulting in increases in total agricultural production in the three-County area. Current Indian agricultural production is assumed to be unaffected by any reallocation of water. For this study, the following Indian agricultural production is assumed to occur with some variation among the action alternatives.

Newly developed acreage of the Schuk Toak and the San Xavier Districts of the TON is projected to range from a total of 9,600 acres under the No Action Alternative and Alternative 1 to 13,600 acres under the Settlement Alternative and Alternatives 2, 3a, and 3b in 2050. Newly developed GRIC acreage is projected to peak under Alternative 3 at 136,882 acres in 2050. Under the other alternatives, GRIC acreage varies from 85,801 acres under No Action to 118,000 acres under the Settlement Alternative by 2050. The least amount of new Indian agricultural acreage is developed under Non-Settlement Alternative 1 because of the smaller allocation of CAP water to the Indian sector relative to the other action alternatives.

Agricultural output from the new Indian developments represents positive economic gains or impacts which are multiplied throughout the entire economy of the three-County area. The gains from Indian agriculture offset portions of losses or negative economic impacts associated with non-Indian lands going out of production due to economic forces under the various reallocation alternatives. The itemization and summary of economic impacts are shown on Adjustments of Agricultural Output Due to Cropping Pattern Changes, Tables D-21 through D-26, at the back of this appendix.

D.VIII. CROP ACREAGE AND OUTPUT**D.VIII.a. All Alternatives**

Table D-27, Composite District Analysis and Summary and Adjustments of Agricultural Output Due to Cropping Changes, provides a composite of all non-Indian acreage and output for each alternative. Analysis and Summary tables for each district are located in Tables D-36 to D-77. Tables D-28 through D-33, Indian Agricultural Development and Production – 2001-2051, provide data for acres in production and sales for cotton, grain, forage, vegetables, and tree crops for the GRIC and TON.

On Table D-27, cotton acreage and sales remain constant throughout the study period for all alternatives, except cotton acreage is projected to decrease in QCID by 2051, under the Settlement Alternative. Vegetable and tree acreage remains constant throughout the study period for all alternatives. Among the alternatives, differences are reflected on Table D-27 in the timing of acreage/sales declines in grain and forage cultivation.

Tables D-28 to D-33, Indian Agricultural Development and Production 2001 – 2051, allow for comparison of acreage and sales of cotton, grains, forage, vegetables, and tree crops under all alternatives for Indian agriculture during the study period. Tables D-21 through D-26, Adjustments of Agricultural Output Due to Cropping Pattern Changes, show the net change in agricultural output in dollars under each alternative throughout the study period. These tables also show the magnitude, incidence, and timing of losses and gains in agricultural output per crop for each ID and TON and GRIC. Losses in output are attributed to the non-Indian IDs, and the gains in output are attributed to the GRIC and TON, indicating a shift in some production from the non-Indian to Indian agricultural sector. However, for most indicator years under all alternatives, the net changes in output are largely positive, signifying that more Indian land is coming into production than is going out of production in the NIA IDs. Therefore, in the three-County economy and the Pinal County economy, economic activity in agriculture is projected to increase overall. The increased economic activity stimulates increases in employment and income in the agricultural sector and other impacted sectors in the three-County economy and in Pinal County. The increased employment and income are not isolated to GRIC and TON but spill over into the surrounding community.

Changes in agricultural output, derived as discussed above, are input into the IMPLAN model which estimates the impact of such changes upon the three-County economy and the Pinal County economy. The reader should understand that the changes in output estimated for each indicator year in each alternative are not due solely to changes in water allocations. The projected changes are also a result of projected economic activity and various economic forces. The true impact of the change in water allocation is evident in the comparisons among the alternatives for corresponding years. These comparisons among alternatives are made on the set of tables titled, “Comparison of Agricultural Outputs,” which compare the outputs under each alternative for the indicator years. These tables are discussed below.

D.VIII.b. Settlement Alternative

During the study period, as water costs increase, 40,404 acres of grain, 11,166 acres of forage, and 5,258 acres of cotton are projected to drop out of production in the CAP IDs as shown on Table D-27. Grain acreage is projected to decrease from 61,689 acres in 2001 to 21,285 acres in 2050. Overall forage response to reallocation of CAP water is the same for all alternatives, but production levels do vary during intervening indicator years. Forage acres decrease throughout the study period from over 26,000 acres in 2001 to about 15,000 acres in 2050. Under the Settlement Alternative, cotton acreage is projected to decrease slightly between 2043 and 2050. In all the alternatives, vegetable and tree crop acres do not change in the CAP IDs. Acreage is estimated to remain steady at 15,003 acres for vegetables and 8,895 acres for trees.

During the study period, the GRIC and the TON will bring additional lands into agricultural production. In 2001, an estimated 1,325 acres come into production for cotton and forage on the Schuk Toak and San Xavier farms. By 2004, the TON has 2,420 acres of additional land in cultivation for cotton, grains, and forage. In 2017, 52,000 additional acres are cultivated by GRIC in cotton, grains, forage, and vegetables. The TON increases the number of additional acres in cultivation to 9,600 acres, including cotton, grains, forage, vegetables, and tree crops. In 2030, the TON is cultivating an additional 4,000 acres. No additional TON acreage is projected to be brought under cultivation after 2030. The GRIC continues to develop additional acreage up to 2030. In 2030, the GRIC's newly developed acreage is 118,000 acres including cotton, grains, forage, and vegetables. No more additional acreage dependent on CAP water is projected to be developed by GRIC between 2030 and 2050. Cotton is the primary crop on these additional GRIC acres, and it is estimated to cover 66,563 acres.

Tables D-21 through D-26, Adjustments of Agricultural Output due to Cropping Pattern Changes, show the total changes in output for each ID, the TON and GRIC. In the analysis of the Settlement Alternative, the change in agricultural output in 2001 is \$1,185,065 for the three-County area due to increases in production on San Xavier and Schuk Toak lands. No impacts occur in Pinal County alone. In 2004, the three-County economy would realize a net loss in agricultural output estimated to be \$2,533,249. A net loss is projected to occur because non-Indian agriculture in Maricopa County would lose about \$4.4 million in agricultural output. Indian agricultural development, still in the early stages, generates only about \$1.9 million in agricultural output. In 2004, the agricultural output in Pinal County economy still appears to be unchanged.

In 2017, for the Settlement Alternative, the GRIC is projected to produce \$47,298,775 of agricultural output. Agricultural output in NMIDD is projected to decrease by \$1,876,823. Total agricultural output in the Pinal County economy for the commodities and producers included in this study is \$46,818,368. Total change in output in the three-County economy is \$46,543,817. The total change in output for Pinal County is slightly greater than the change in output for the three-County area because of the value of GRIC production, \$47 million, in Pinal County and the loss of \$7.9 million of grain and forage sales in three IDs in Maricopa County. A pattern of overall net gains is evident for 2030, 2043, and 2050. By the end of the study period, the estimated net positive impacts for Pinal County are projected to be \$91,843,373. The total for the three-County area is projected to be \$89,206,724. In Pinal County, the losses in output to NIA are estimated to be \$17,563,678, and the gains in Indian agricultural output are

estimated to be \$109,407,051. For the three-County area, the estimated loss in NIA output of \$28,734,949 is offset by the gains in Indian agricultural output of \$117,941,673.

D.VIII.b.1. County-Level Economic Impacts – Settlement Alternative

Under the Settlement Alternative, NIA would receive substantial debt relief on its debt owed to the United States for construction of CAP distribution systems. In addition, non-Indian farmers would receive relief from RRA which limits the benefits of CAP water to individual farmers and incurs administrative costs for IDs. Additional irrigated land would be eligible to receive CAP water. In MSIDD and CAIDD, commingling fees would be eliminated for delivery of non-Project water through CAP distribution systems.

Indian agricultural water use increases as non-Indian agricultural water use decreases. In Pinal County, total agricultural production is projected to increase because of the GRIC lands coming into agricultural production. In Pinal County, the pattern of spending on factors of agricultural production (e.g., fertilizer, machinery, farm equipment, and chemicals) is projected to be essentially unchanged. The three-County model shows agricultural output increases as well.

The construction of the Indian agricultural water distribution systems, from 2001-2015, is expected to provide jobs to central Arizona as well as in the GRIC and TON. Given the high unemployment rate in the GRIC and TON, these new jobs would be a benefit. The projected build out for CAP Indian distribution systems under all alternatives is as follows:

Projected GRIC and SAWRSA Construction Expenditures (Units / \$1,000)		
Projected Construction Expenditures		
Year	GRIC	SAWRSA
2001	\$22,600	\$ 6,800
2002	\$36,800	\$ 8,427
2003	\$36,800	\$14,085
2004	\$36,800	\$ 9,759
2005	\$36,800	\$ 3,332
2006	\$36,800	\$ 1,152
2007	\$36,700	
2008	\$29,400	
2009	\$26,700	
2010	\$24,900	
Total	\$324,300	\$43,555

Under the Settlement Alternative, the GRIC would receive an additional \$200 million in annual increments of \$25 million, from 2001 to 2008, for agricultural development in the GRIC. The additional \$200 million is not reflected in the schedule above.

Construction of the distribution systems on the TON and the GRIC is expected to have positive economic impacts to the surrounding three-County area. The Federal construction expenditures would impact the entire three-County area off of Reservation lands because most of the services necessary to carry out the construction of the works, such as agricultural engineering and design, are not available on Reservation and must be obtained from the general

economy. Although the Settlement Alternative would stimulate greater economic activity in the three-County area due to the additional outlays than the other alternatives, central and southern Arizona would benefit economically whether or not a settlement is finalized. Construction of Indian distribution systems would occur even in the absence of a settlement.

Table D-84, Impacts on Output, Employment, and Income of Construction of Indian Distribution Systems – Anticipated Federal Outlays, reflects the impact of Federal construction expenditures for Indian distribution systems in 2001 and 2004. Federal construction expenditures are expected to occur from 2001 through 2012. The expenditures in 2001 and 2004, and the associated impacts, are analyzed because those years are the two indicator years over which the Federal expenditures are expected to occur. However, construction, employment, and income impacts over a 10-year period were also estimated on Table D-84. For impacts under the Settlement Alternative, Table D-84 includes the additional \$200 million to the GRIC.

On Table D-84, under Construction Expenditures Impacts (dollars per year), the columns labeled “Direct” reflect the actual expected amount of Federal expenditures to be made in 2001 and 2004, under the various alternatives. The column labeled “Total” reflects the direct, indirect, and induced effects from the Federal spending in the three-County area. The “Comparison of Settlement with No Action Alternative” column reflects the difference in Federal expenditures and associated impacts in central and southern Arizona between the Settlement Alternative and the No Action Alternative. The additional \$25 million outlay in 2001 and 2004 is estimated to result in positive economic impacts in the three-County area of more than \$40 million dollars in each of the indicator years.

The employment impacts from the Federal outlays, although temporary, are large. In 2001, under the Settlement Alternative, an estimated 475 jobs would be created in the construction sector alone. In addition, 429 more jobs (914 total jobs) are projected to be created to support the demand by the construction sector to complete the distribution systems. In 2004, the number of jobs created in the construction sector is projected to be 625 with an additional 578 jobs (1,203 total) projected to support demand by the construction sector. Comparison of the Settlement Alternative with the No Action Alternative in 2001 and 2004 shows that, in total, over 400 more jobs are projected to be created under the Settlement Alternative due to the additional \$25 million of Federal funding in 2001 and 2004. Over a 10-year period, about 3,300 more person-years of employment are projected to be generated under the Settlement Alternative than under the No Action Alternative.

Positive impacts to income are projected for the three-County area due to the increased employment in the construction sectors and in sectors which provide services and materials to the construction sector. Under the Settlement Alternative in 2001 and 2004, income in the construction sector is estimated to increase over \$19 million and \$25 million respectively. Total income is estimated to increase in excess of \$37 million in 2001 and almost \$49 million in 2004. Compared to the No Action Alternative, the Settlement Alternative is projected to stimulate a total of \$17 million more income in 2001 and 2004. Over a 10-year period, income impacts are well over \$100 million under all alternatives and exceed just over \$400 million under the Settlement Alternative.

Tables summarizing and comparing the impacts of changes in agricultural output and consequently in employment and income have been made to briefly show the total impact over the study period in the three-County and Pinal County economies. The summary and comparison of impact tables are based on output data developed in Tables D-21 through D-26, Adjustments of Agricultural Output due to Cropping Pattern Changes-Gross Output. The summary and comparison tables exclude the Federal expenditures made for construction of Indian distribution systems. The impacts to the three-County area associated with the Federal outlays are in addition to the impacts due to changes in agricultural output.

Table D-85, Summary of Impacts of Agricultural Output Changes – Settlement Alternative, shows that the total net direct and secondary impacts to the three-County area and Pinal County are positive in all the indicator years except 2004. The “Total Impacts” column represents the net change in the dollar value of agricultural output from Table D-21, Adjustments in Agricultural Output due to Cropping Pattern Changes – Settlement Alternative. The “Total Impacts” column is also the sum of the Non-Indian and Indian Impacts columns on Table D-85. “Total Secondary Impacts” are the sum of the indirect and induced effects caused by changes in agricultural activity in the three-County area and Pinal County generated by IMPLAN. As a general indicator of the magnitude of the total impacts of CAP water reallocation over the study period, an estimated summary is given for the entire 50-year period of the analysis. The 50-year indicators are derived by assuming that the value of the impacts reflected for each indicator year occurs annually during the intervening years. Table D-85 shows that in 2004, the three-County economy is projected to experience a loss because the loss in NIA is larger than the growth in Indian agriculture. However, in all the other indicator years, the total direct impacts are positive. The 50-year total direct impact estimate is about \$4 billion.

For Pinal County, Table D-85 shows that no change in agricultural output is projected, in 2001 and 2004, associated with a reallocation of CAP water under the Settlement Alternative. Total direct and secondary impacts are positive for indicator years 2017 through 2050, because gains in Indian agriculture are projected to be greater than losses in NIA. Total direct impacts over the 50-year period in Pinal County are projected to be more than \$3.9 billion.

A set of tables titled, “Comparison of Impacts of Agricultural Output Changes,” summarizes comparisons between each action alternative and the No Action Alternative. The estimated impact of any action alternative can only be understood by comparing that alternative with the No Action Alternative. Such comparisons provide reasonable estimates of economic impacts resulting from the reallocation of CAP water. Table D-87, Comparison of Impacts of Agricultural Output Changes – Settlement Versus No Action, shows that, in the three-County area, changes in agricultural output under the Settlement and No Action Alternatives are projected to be identical in 2001. In 2004 and 2017, estimated total direct and secondary impacts (losses) to the three-County area were greater under the Settlement Alternative than under the No Action Alternative. In indicator years 2030 through 2050, estimated gains in total direct impacts and secondary impacts in the three-County area are greater under the Settlement Alternative than the No Action Alternative. Over the 50-year period, total direct impacts are projected to be more than \$770 million under the Settlement Alternative than the No Action Alternative. Total secondary impacts under the Settlement Alternative are projected to exceed total secondary impacts under No Action by more than \$367 million over the 50-year period.

However, Table D-86 also shows that losses in the NIA sector are consistently projected to be greater under the Settlement Alternative than under the No Action Alternative. Under the Settlement Alternative, total 50-year NIA losses are projected to be about \$363 million greater than under the No Action Alternative. Thus, although under the Settlement Alternative the three-County area overall is projected to experience a larger expansion in agricultural production than under the No Action Alternative, the NIA sector experiences greater losses under the Settlement Alternative as compared to the No Action Alternative.

For Pinal County overall, Table D-86 shows greater gains in estimated total direct and secondary impacts under the Settlement Alternative over the 50-year period than under the No Action Alternative. For example, total direct impacts are projected to be about \$853 million greater under the Settlement Alternative than under the No Action Alternative. Total secondary impacts under Settlement are projected to exceed total secondary impacts under No Action by about \$377 million. However, NIA in Pinal County appears to experience greater losses under the Settlement Alternative than under No Action. Estimated losses in NIA under Settlement exceeds losses to NIA under No Action by about \$185 million over the 50-year period.

Table D-87, Summary of Employment Impacts – Settlement Alternative, shows the number of jobs directly created in the agricultural sector and in sectors that support production agriculture. These jobs are created by the net gains in agricultural output in the three-County area and Pinal County. The employment data include full-time, part-time, permanent, and seasonal jobs. By the end of the study period, an estimated 60,000 person-years of employment are projected to be created in the three-County economy. The only indicator year that shows a loss in jobs associated with agriculture is 2004. This result is consistent with Table D-85, Summary of Impacts of Agricultural Output Changes – Settlement Alternative, which projected a net loss in agricultural production in the three-County area in 2004.

In Pinal County, neither job creation nor job loss is projected to occur until after 2004. This result is consistent with Table D-85 which shows no changes in agricultural output in Pinal County until 2017. Gains in agricultural production under the Settlement Alternative are projected to generate about 58,000 person-years of employment over the 50-year period.

Table D-88, Comparison of Employment Impacts – Settlement Versus No Action, compares the Settlement and No Action Alternatives in terms of the number of jobs created. For the three-County area and Pinal County, the Settlement Alternative is projected to create more jobs than the No Action Alternative over the 50-year period. In Pinal County, between 2001 and 2017, differences in employment impacts between the Settlement and No Action Alternatives are not apparent because agricultural output changed little in Pinal County from 2001 to 2017 under both alternatives. Interestingly, over the 50-year period, Pinal County total employment impacts under the Settlement Alternative compare more favorably to the No Action Alternative than the three-County employment impacts. This result occurs because Pinal County is not projected to experience the net losses in agricultural output and consequent losses in jobs that the three-County area is projected to experience in 2004.

Table D-89, Summary of Income Impacts – Settlement Alternative, shows the total direct and secondary income estimated to be generated under the Settlement Alternative due to changes in

agricultural output. For the three-County area, a loss of income is projected for 2004. Total loss in income is about \$2.4 million. This result is consistent with Table D-85 which shows a net loss in agricultural output for the three-County area in 2004. However, from 2017 on, the three-County area is projected to experience gains in income due to expansion of agricultural production. Overall the estimated total income impacts show a net gain of approximately \$3.5 billion. In Pinal County, no impacts to income are projected to occur until 2017, because no changes in agricultural production are projected for the early part of the study period under the Settlement Alternative. All net income impacts are positive in Pinal County because of the large increase in agricultural production by the GRIC. By the end of the study period, total impacts to income in Pinal County are projected to be about \$2.4 billion.

In Table D-90, Comparison of Income Impacts – Settlement Versus No Action, the Settlement Alternative is projected to provide higher gains in total income compared to the No Action Alternative. Compared to the No Action Alternative, the Settlement Alternative is projected to stimulate about \$675 million more in income than the No Action Alternative. However, in the three-County area the Settlement Alternative lags behind the No Action Alternative in terms of income in 2004 and 2017. In Pinal County, the two alternatives show no apparent differences in income until after 2017, because agricultural production is projected to be unchanged in the early part of the study period under the Settlement Alternative. Projected income is higher under the Settlement Alternative because more lands are projected to be under cultivation under the Settlement Alternative than under the No Action Alternative. Total income impacts under the Settlement Alternative exceed total income impacts under No Action by about \$530 million.

D.VIII.c. No Action Alternative

Table D-27, Composite District Analysis and Summary and Adjustments of Agricultural Output Due to Cropping Changes, shows that NIA grain acreage and sales are not projected to decrease until 2043. Forage is projected to decline steadily between 2001 and 2017. However, in 2030, NIA forage acreage increases since 3,154 acres of forage are projected to come back into production in QCID after going out of production in 2017. QCID forage is the only instance where a crop production resumes. Between 2017 and 2030, water costs facing QCID farmers are projected to decrease, thus forage cultivation is feasible (see Table D-79, Water Cost Function Frontier – Groundwater Pumping Versus CAP Water Costs – No Action). QCID water costs are projected to decrease because groundwater demand is projected to decrease significantly due to cropping changes. Output levels in cotton, vegetables, and tree crops are projected to remain constant throughout the study period.

Table D-29, Indian Agricultural Development and Production – 2001 through 2050, No Action, shows that total new TON agricultural development is 9,600 acres in cotton, grain, vegetables, forage, and tree crops. Cotton is the predominant crop. Full development of the new acreage is projected to be completed by 2017. No new GRIC production is projected to occur until 2017. In 2017, the GRIC is projected to be cultivating cotton, grains, forage, and vegetables on 52,000 acres. By 2030, new GRIC acreage equal to 85,801 acres is projected to be under cultivation. No more additional acreage is projected to be under cultivation by the end of the study period. Total additional TON and GRIC agricultural acreage is estimated to be 95,401 acres.

D.VIII.c.1. County-Level Economic Impacts – No Action Alternative

Table D-91, Summary of Impacts of Agricultural Output Changes – No Action Alternative, shows that net total direct impacts over the 50-year period for the three-County area are projected to be about \$3.2 billion. Losses to NIA are projected to be about \$409 million over the study period. The estimated value of Indian agriculture is about \$3.6 billion, and secondary impacts are estimated to be about \$1.5 billion. Pinal County shows no impacts due to changes in output until 2017. The loss to Pinal County NIA is about \$250 million. Net total direct impacts are positive, about \$3.1 billion, because the value of Indian agricultural output is estimated to be about \$3.4 billion. Impacts to sectors supporting production agriculture are positive at about \$1.3 billion.

Table D-92, Summary of Employment Impacts – No Action Alternative, shows that over the study period, about 51,000 person-years of employment would be created under the No Action Alternative due to changes in agricultural production. The employment impact data in 2004 look peculiar with negative direct impacts and total impacts and positive secondary impacts. The agricultural data and IMPLAN output have been examined and no errors were discovered. In 2004, projected NIA losses, \$1.6 million, and Indian gains, \$1.9 million, are close, resulting in net gains of \$329,071. Total secondary output impacts are \$312,379. Employment impacts of such relatively small changes are difficult to estimate in IMPLAN. Secondary employment impacts are probably too small to measure accurately. Pinal County shows job growth from 2017 to the end of the study period. Over the 50-year period, about 47,000 person-years of employment are projected to be created. Much of this job growth would be attributed to the increase in GRIC production in Pinal County.

Table D-93, Summary of Income Impacts – No Action Alternative, shows the change in income over the study period in the three-County area and Pinal County. In the three-County area, income impacts are relatively low in 2001 and 2004 because little change in agricultural output is projected to occur. No losses in income are projected to occur under the No Action Alternative. Total income impacts in the three-County area are projected to be about \$2.8 billion. Pinal County appears to have no projected impacts to income before 2017 because minimal change in agricultural production is projected for that period. From 2017 until the end of the study period, the total impacts to income are positive and are estimated to be about \$1.9 billion.

D.VIII.d. Alternative 1

Table D-27, Composite District Analysis and Summary and Adjustments of Agricultural Output Due to Cropping Changes, reflects that in NIA, grain acreage is projected to decline from 61,689 acres to 25,132 acres over the 50-year period. Forage acreage is projected to decline from 26,466 acres to 15,300 acres over the same period.

Table D-30, Indian Agricultural Development and Production – 2001 through 2050, Alternative 1, shows that total additional TON development is 9,600 acres. TON acreage is projected to be fully developed by 2017. The predominant crops are grains, forage, and cotton, but vegetables and tree crops are also projected to be cultivated by the TON. No new production is projected on GRIC lands until 2017. By 2017, the GRIC is projected to have 52,000 additional lands under

cultivation. Cotton and grain are projected to be the predominant GRIC crops. Additional GRIC acreage is projected to peak by 2030 at 93,712 acres. Total Indian agricultural acreage is estimated to be 103,312 acres.

D.VIII.d.1. Economic Impacts at the County Level – Alternative 1

Table D-94, Summary of Impacts of Agricultural Output Changes – Alternative 1, shows that total direct and secondary output impacts are positive for all indicator years throughout the study period in the three-County area. The total direct impacts associated with agricultural output over the 50-year period are projected to be \$3.4 billion. Total secondary impacts over the 50-year period are projected to be about \$1.5 billion. Losses to NIA are about \$560 million. Indian impacts are approximately \$3.9 billion. In Pinal County, in 2001 and 2004, income impacts cannot be measured because changes in agricultural output in those years are projected to be minimal. Total direct and secondary impacts over the study period are positive for every indicator year. Over the 50-year period, total direct impacts are projected to be about \$3.2 billion. Total secondary impacts are estimated to be \$1.4 billion. NIA losses are projected to be just over \$376 million. Indian impacts are projected to be \$3.6 billion.

Table D-95, Comparison of Impacts of Agricultural Output Changes – Alternative 1 versus No Action, shows no differences in output impacts between Alternative 1 and No Action in the three-County area and Pinal County in 2001 and 2004. Overall, agricultural output is projected to be higher under Alternative 1 compared to No Action, except for total direct impacts in 2043 in the three-County area and total direct impacts in Pinal County in 2017. Over the 50-year period, estimated total direct impacts of agricultural output changes in Alternative 1 exceed the No Action Alternative by about \$116 million. Estimated total secondary impacts in Alternative 1 exceed total secondary impacts in the No Action Alternative by about \$67 million. Pinal County also exhibits higher projected agricultural output compared to the No Action Alternative. Estimated total direct impacts in Alternative 1 exceed total direct impacts in the No Action Alternative by about \$140 million. Under Alternative 1, estimated total secondary impacts exceed total secondary impacts under No Action by about \$79 million.

Table D-96, Summary of Employment Impacts – Alternative 1, reflects the estimated impacts to employment due to changes in agricultural output over the study period. Overall, in the three-County area, approximately 50,000 person-years of employment are projected to be created over the 50-year period. The employment impacts in 2004 are identical to those in the No Action Alternative for the same year. Employment impacts appear to be too small to be properly estimated. Net change in agricultural output, in 2004, is about \$329,000. Estimated total employment impacts for Pinal County show that about 48,000 person-years of employment would be created over the 50-year period due to agricultural production.

Table D-97, Comparison of Employment Impacts – Alternative One Versus No Action, reflects no difference between employment impacts between the two alternatives in 2001 and 2004. Over the 50-year period, agricultural production is projected to create slightly more jobs under the No Action Alternative than under Alternative 1 in the three-County area. The employment impacts in the three-County area under the two alternatives are close in magnitude because the change in agricultural output under each alternative is similar. In Pinal County in the early years of the study period, little change in agricultural output is projected to occur under No

Action and Alternative 1. No employment impacts are projected for either alternative in the early years. Like the three-County model, estimated employment impacts in Pinal County under Alternative 1 are similar to those under the No Action Alternative.

Table D-98, Summary of Income Impacts – Alternative 1, reflects income gains due to changes in agricultural output in the three-County area and Pinal County over the 50-year period. In the three-County area, estimated direct income impacts are over \$2 billion and estimated secondary impacts are over \$854,000 for the 50-year period. At the end of the study period in Pinal County, estimated direct income impacts are \$1.2 billion and estimated secondary impacts are over \$748,000.

Table D-99, Comparison of Income Impacts – Alternative 1 Versus No Action, reflects that estimated income impacts in the three-County area and Pinal County are greater under Alternative 1 than under the No Action Alternative over the 50-year period. For example, in the three-County area, estimated total direct impacts under Alternative 1 exceed those under No Action by about \$72 million. Projected secondary impacts under Alternative 1 are about \$29 million more than under No Action. In Pinal County, projected direct impacts under Alternative 1 are about \$59 million more than under No Action, and projected secondary impacts exceed those under No Action by about \$42 million.

D.VIII.e. Alternative 2

In the NIA sector, Table D-27, Composite District Analysis and Summary and Adjustments in Agricultural Output Due to Cropping Changes, shows that over the 50-year period an estimated 40,404 acres of grain go out of production in the IDs. Most of the loss in grain production, an estimated 35,297 acres, is projected to occur between 2030 and 2050. Over the 50-year period, forage acreage is projected to decline by 11,166 acres. The majority of losses in forage acreage are projected to occur between 2017 and 2030. Production of cotton, vegetable, and tree crops remains constant throughout the study period.

In Indian agriculture, Table D-31, Indian Agricultural Development and Production – 2001 through 2050, Alternative Two, reflects new TON and GRIC agricultural development to cover a maximum of 116,090 acres. Total TON acreage is projected to be 13,600 acres of cotton, vegetable, grain, forage, and tree crops. The TON acreage is projected to be fully developed by 2030. Total GRIC acreage is projected to cover 102,490 acres by 2030. Cotton and grain are projected to be cultivated on more than 85,000 acres of GRIC land.

D.VIII.e.1. Economic Impacts at the County Level – Alternative 2

Table D-101, Summary of Impacts of Agricultural Output Changes – Alternative 2, reflects that estimated net gains in agricultural output in the three-County area exceed \$3.6 billion. Estimated losses in NIA output are about \$681 million. In Pinal County, no impacts are projected until 2017. Overall, estimated net gains in output exceed \$3 billion. NIA losses in output are projected to be about \$434 million over the study period.

Compared to the No Action Alternative, Table D-101, Comparison of Impacts of Agricultural Output Changes-Alternative 2 Versus No Action, shows that positive impacts to output are

greater under Alternative 2 than under the No Action for the three-County and Pinal County areas except in 2017. In the three-County area, estimated total direct impacts are about \$369 million more under Alternative 2 than under No Action. Estimated total secondary impacts under Alternative 2 exceed those under No Action by about \$185.5 million. In Pinal County, estimated total direct output impacts are about \$359 million more under Alternative 2 than under No Action. Estimated total secondary impacts are about \$176 million greater under Alternative 2.

In terms of employment, Table D-102, Summary of Employment Impacts – Alternative 2, shows that positive job growth is projected to occur under this alternative in the three-County and Pinal County areas.

In the three-County area in 2004, the estimated direct employment impacts are negative with a loss of about 28 jobs. The estimated secondary employment impacts are positive but very small showing a gain in almost five jobs due to changes in agricultural output. In 2004, the losses and gains in agricultural output almost cancel each other out. An estimated 2,420 acres of TON cotton, grain, and forage lands are projected to come into production; 2,107 acres of forage in HVID are projected to go out of production. In the three-County area, the impacts to employment from these changes are minimal. At the end of the 50-year period, the estimated total employment impacts in Alternative 2 for the three-County area are about 54,000 person-years of employment. Approximately 24,000 person-years of employment are projected to be created in sectors that serve agricultural demand. Pinal County shows no projected change in employment until after 2017. The 50-year estimate for Pinal County employment impacts is over 50,000 person-years of employment created including about 31,000 person-years of employment created in economic sectors that support agriculture.

Compared to the No Action Alternative, Table D-103, Comparison of Employment Impacts – Alternative 2 Versus No Action, shows that, in the three-County area, estimated employment impacts under the two alternatives were identical for 2001 through 2017. After 2017, positive direct employment impacts are greater under the No Action Alternative than under Alternative 2. However, under Alternative 2, secondary employment impacts are slightly higher than under the No Action Alternative in the three-County area. Total 50-year estimated employment impacts for the three-County area under Alternative 2 are greater than the total estimated employment impacts under No Action by about 2,300 person-years of employment. In Pinal County there are no quantifiable differences in estimated employment impacts between the two alternatives from 2001 to 2017. Total estimated positive employment impacts in Pinal County are slightly higher under Alternative 2 than under the No Action Alternative by about 3,800 person-years of employment over the 50-year period.

Table D-104, Summary of Income Impacts – Alternative 2, reflects that the three-County area and Pinal County are projected to experience income growth under this alternative. No growth associated with changes in agricultural production is projected to occur in Pinal County until 2017. The total income impacts to the three-County area are projected to be \$3.1 billion and \$2.1 billion in Pinal County.

Table D-105, Comparison of Income Impacts – Alternative 2 Versus No Action, shows that Alternative 2 would have higher estimated positive impacts to income in both the three-County

area and Pinal County than the No Action Alternative over the 50-year period. The difference in estimated total income impacts for the three-County area is about \$320.6 million. In Pinal County the difference in estimated total income impacts between this alternative and the No Action Alternative is almost \$233 million.

D.VIII.f. Alternative 3a

Table D-27, Composite District Analysis and Summary and Adjustments of Agricultural Output Due to Cropping Changes, shows NIA grain acreage is projected to decline 40,404 acres over the 50-year period. The greatest decline in grain acreage, 22,823 acres, is projected to occur between 2030 and 2043. NIA forage production in Alternative 3a declines most rapidly between 2017 and 2030, when 5,449 acres are projected to go out of production. Over the 50-year period, 11,166 acres of forage are projected to go out of production.

Under Alternative 3a, Table D-32, Indian Agricultural Development and Production – 2001 through 2050, Alternative 3a, total new TON acreage is 13,600 acres. The TON is projected to develop all of the acreage by 2030. The GRIC are projected to develop 136,822 additional acres. All of the acreage is projected to be developed by 2030. Total additional GRIC and TON acreage under Alternative 3a is projected to be 150,422 acres.

D.VIII.f.1. Economic Impacts at the County Level – Alternative 3a

Table D-106, Summary of Impacts of Agricultural Output Changes – Alternative 3a, reflects that estimated net total direct output impacts and secondary output impacts are positive in the three-County area and in Pinal County. In the three-County area, at the end of the study period, net total direct impacts are projected to be \$4.7 billion. Estimated NIA impacts are a negative \$703 million. Estimated Indian impacts are \$4.2 billion. Total secondary impacts are almost \$2.2 billion. In Pinal County, net impacts to output are also positive and similar in magnitude to the three-County impacts. Net total direct impacts in Pinal County are projected to be almost \$4.6 billion. Losses to NIA are projected to be \$434 million. Impacts to Indian agriculture are projected to be \$5 billion. Total secondary impacts to output in Pinal County are estimated to be almost \$2 billion. In Pinal County, no output impacts are observed in 2001 and 2004 because no changes in agricultural production are projected to occur.

Table D-107, Comparison of Impacts of Agricultural Output Changes – Alternative 3a Versus No Action, compares the impacts from estimated output changes under Alternative 3a and the No Action Alternative. The net positive impacts from changes in output over the 50-year period are greater under Alternative 3a than under the No Action Alternative predominantly due to the greater number of additional Indian acres coming into production. Estimated total direct impacts under Alternative 3a are almost \$1.5 billion greater than under No Action. Estimated impacts from Indian output are about \$1.7 billion greater than Indian impacts under No Action. Estimated secondary impacts in the three-County area exceed secondary impacts under No Action by about \$676 million. However, NIA is projected to experience \$294 million more losses in output under Alternative 3a than under the No Action Alternative. Overall, Pinal County also compares favorably to the No Action Alternative. Total direct impacts are greater than under the No Action Alternative by almost \$1.5 billion. Impacts from Indian output are almost \$1 billion greater under Alternative 3a than under the No Action Alternative.

Secondary impacts due to changes in agricultural output under Alternative 3a are estimated to be \$373 million more than under the No Action Alternative. NIA losses, however, are higher under Alternative 3a than under No Action by about \$185 million over the 50-year period.

Table D-108, Summary of Employment Impacts – Alternative 3a, reflects that this alternative is characterized by job growth. Over the 50-year period, total employment impacts in the three-County area are projected to be over 71,000 person-years of employment. Estimated secondary employment impacts are almost 31,000 person-years of employment. In 2001 and 2004, no employment impacts are observed in Pinal County because agricultural output does not change. In Pinal County, almost 66,000 person-years of employment are also projected by the end of the study period. Estimated secondary employment impacts over the study period in Pinal County are almost 40,000 person-years of employment.

Compared to the No Action Alternative, Table D-109, Comparison of Employment Impacts – Alternative 3a Versus No Action, shows that overall, agricultural output under Alternative 3a is projected to generate more job growth than agricultural production under the No Action Alternative for the three-County area and Pinal County. In the three-County area, no differences in employment impacts are observed between the two alternatives in 2001 and 2004. In 2017, job growth is less in Alternative 3a than in the No Action Alternative. Over the 50-year period, estimated direct employment impacts are almost 11,000 person-years of employment. Estimated secondary impacts to employment are projected to be about 10,000 person-years of employment. In Pinal County, no differences in employment impacts are observed between Alternative 3a and the No Action Alternative. Over the 50-year period, estimated direct employment impacts are about 8,000 person-years of employment, and estimated secondary employment impacts approximately 13,000 person-years of employment.

Table D-110, Summary of Income Impacts – Alternative 3a, reflects positive income impacts in each indicator year of the study period for the three-County area. Total income impacts for the three-County area over the study period are estimated to be over \$2.8 billion. Estimated secondary impacts exceed \$1.2 billion. In Pinal County, in 2001 and 2004, no impacts to income are observed because no changes in agricultural production are projected to occur. Over the 50-year period, total income impacts are projected to be over \$1.7 billion, and secondary impacts are estimated to be more than \$1 billion.

Table D-111, Comparison of Income Impacts – Alternative 3a Versus No Action, reflects, in the three-County area, that Alternative 3a has greater positive impacts to income overall, though 2017 shows lower income in Alternative 3a. At the end of the 50-year period, estimated income impacts in the three-County area surpass those in the No Action Alternative by almost \$890 million. Estimated secondary income impacts in Alternative 3a surpass those of the No Action Alternative by almost \$378 million. In Pinal County, no differences in income impacts between Alternative 3a and the No Action Alternative are observed from 2001 through 2017. Estimated total direct income impacts over the study period exceed those under the No Action Alternative by more than \$557 million. Estimated total secondary impacts under Alternative 3a exceed estimated secondary impacts under No Action by more than \$347 million.

D.VIII.g. Alternative 3b

Under Alternative 3b, Table D-27, Composite District Analysis and Summary and Adjustments of Agricultural Output Due to Cropping Changes, shows that total decline in NIA grain acres over the 50-year period is projected to be 40,404 acres. The greatest loss in grain acres is projected to occur between 2017 and 2030, when 22,823 acres of grain go out of production. NIA forage acres decline from 26,466 in 2001, to 15,300 in 2030. After 2030, no more forage acreage is projected to go out of production.

Table D-33, Indian Agricultural Development and Production – 2001 through 2050, provides the projected cropping patterns for TON and GRIC. Under Alternative 3b, the TON are projected to develop 13,600 acres. The new TON acreage is projected to be fully developed and in production by 2030. The GRIC are projected to develop 136,822 acres under Alternative 3b. The new GRIC acres are fully developed and in production by 2030 as well. Total TON and GRIC acreage is projected to be 150,422 acres. The predominant crops are expected to be cotton, grains, and forage.

D.VIII.g.1. Economic Impacts at the County Level – Alternative 3b

Table D-112, Summary of Impacts of Agricultural Output Changes – Alternative 3b, shows that total net impacts over the 50-year period are estimated to be over \$4.6 billion. Total secondary impacts are projected to be \$2.1 billion. NIA losses of output are estimated to be \$768 million. Gains in Indian output are estimated to be \$5.4 billion. No agricultural output impacts are expected to occur in Pinal County in 2001 and 2004. Overall, estimated total direct impacts in Pinal County exceed \$4.46 billion for the 50-year period. NIA losses in output are projected to be over \$551 million. Indian gains in output are projected to be \$5 billion. Secondary impacts in Pinal County are projected to be \$1.9 billion.

Table D-113, Comparison of Impacts of Agricultural Output Changes – Alternative 3b Versus No Action, compares the impacts of changes in agricultural output in Alternative 3b and the No Action Alternative. Table D-113, shows that agricultural production in Alternative 3b is projected to provide higher estimated total net direct impacts in the three-County area than agricultural production under the No Action Alternative. Alternative 3b reflects greater direct impacts because gains in Indian agricultural output are higher under Alternative 3b than under the No Action Alternative. Under Alternative 3b, NIA is projected to experience greater losses than under the No Action Alternative by about \$389 million. Total secondary impacts are estimated to be \$639 million. Table D-113 shows that, in Pinal County, the estimated net direct impacts under Alternative 3b are \$1.3 billion greater than estimated net direct impacts under the No Action Alternative. NIA output losses in Pinal County are estimated to be about \$302 million higher than NIA losses under the No Action Alternative by the end of the study period. Estimated total secondary impacts in Pinal County are about \$603 million higher in Alternative 3b than those under the No Action Alternative.

Table D-114, Summary of Employment Impacts – Alternative 3b, shows that jobs increase overall in the three-County area and Pinal County due to agricultural production. At the end of the 50-year period, estimated total employment impacts in the three-County area are more than 69,000 person-years of employment. Estimated secondary employment impacts are more than

30,000 person-years of employment. Pinal County reflects no employment impacts in 2001 and 2004 due to the absence of projected changes in agricultural production. Estimated total direct employment impacts in Pinal County are more than 26,000 person-years of employment at the end of the study period. Estimated secondary employment impacts are more than 39,000 person-years of employment at the end of the study period.

Table D-115, Comparison of Employment Impacts – Alternative 3b Versus No Action, compares estimated employment impacts under Alternative 3b and the No Action Alternative over the study period. Table D-115 reflects that projected agricultural production under Alternative 3b would create more new jobs than agricultural production under the No Action Alternative in the three-County area and Pinal County. In the three-County area, total employment impacts under Alternative 3b are projected to create about 18,400 more person-years of employment than those under the No Action Alternative over the 50-year period. Secondary employment impacts are projected to exceed those under the No Action Alternative by about 9,200 person-years of employment over the 50-year period. In the early part of the study period, 2001 through 2004, no differences in employment impacts between the two alternatives are projected. In Pinal County, agricultural production under Alternative 3b is projected to create almost 19,000 more person-years of employment by the end of the study period. Estimated secondary impacts exceed estimated secondary impacts under the No Action Alternative by about 12,400 person-years of employment. From 2001 through 2017, there are no observable differences in employment impacts between the two alternatives.

Table D-116, Summary of Income Impacts – Alternative 3b, reflects positive direct and secondary income impact for the three-County area and Pinal County. Total projected income impacts in the three-County area are projected to be \$4 billion over the study period. Estimated secondary impacts are almost \$1.2 billion. In Pinal County, total income impacts are projected to be \$2.7 billion, with secondary impacts projected to exceed \$1 million over the study period. In Pinal County, no income impacts are projected from 2001 through 2004 because minimal change in agricultural production is projected to occur due to reallocation of CAP water.

Table D-117, Comparison of Income Impacts-Alternative 3b Versus No Action, reflects that the three-County area and Pinal County are projected to experience greater positive impacts to income under Alternative 3b than under the No Action Alternative over the 50-year period. For example, in the three-County area, estimated total income impacts in the three-County area exceed total income impacts under No Action by almost \$1.2 billion. Estimated secondary income impacts under Alternative 3b exceed estimated secondary income impacts under No Action by more than \$357 million. However, no differences in estimated income impacts are observed between the two alternatives in 2001 and 2004. In 2017, slightly more gains in income are projected under the No Action Alternative. From 2001 through 2017, in Pinal County, no differences in estimated income impacts are observed between the two alternatives. Over the study period, in Pinal County, estimated total income impacts exceed those under the No Action Alternative by more than \$837 million, and estimated secondary impacts exceed those under No Action by more than \$322 million.

D.IX. ESTIMATED IMPACTS ON GROUNDWATER PUMPING COSTS IN SELECTED IRRIGATION DISTRICTS – 2001 to 2050

A brief analysis was conducted to determine the impact on groundwater pumping costs over the study period given projected groundwater levels that may occur under each alternative. This analysis relies on information regarding the projected groundwater levels, and methodology to project the levels are in Chapter IIIB and Appendix I of this Draft EIS. The groundwater analysis determined the groundwater levels that would occur under the No Action Alternative and the other alternatives. Next the groundwater analysis calculated the difference in groundwater levels between the No Action Alternative and the other alternatives. Upon completion of the groundwater analysis, groundwater pumping cost data were applied to see the difference in cost between pumping groundwater under the No Action Alternative and pumping under the other alternatives at the end of the study period. Impacts on groundwater pumping costs were estimated for certain IDs under each alternative over the 50-year study period and compared to the No Action Alternative. Table D-118, Estimated Impacts on Groundwater Pumping Costs in Selected IDs- 2001 through 2050, reflects the increase or decrease in pumping costs for MSIDD, CAIDD, HIDD, NMIDD, and QCIDD under each alternative, compared to the No Action Alternative, between 2001 and 2050.

Table D-118 shows mixed results for the IDs. For example, QCID and NMIDD are projected to experience higher pumping costs under all alternatives compared to the No Action Alternative. Increases in pumping costs are considered equivalent to a loss, thus, the values are preceded by a negative sign. For MSIDD and CAIDD, pumping costs are projected to be higher under the Settlement Alternative and Alternatives 2 and 3b compared to the No Action Alternative. Under Alternatives 1 and 3a, MSIDD and CAIDD are projected to experience a cost savings because pumping costs are projected to be lower under these alternatives than under the No Action Alternative. For HIDD, pumping costs are projected to be higher under Alternatives 2, 3a, and 3b than under the No Action Alternative. Pumping costs are projected to be lower in the Settlement Alternative and Alternative 1 for HIDD. Over the 50-year period, the estimated cost increases are fairly large and range from about \$312,000 for HIDD in Alternative 2 to about \$16.7 million under the Settlement Alternative for QCID. Over the same period, the estimated cost savings ranges from almost \$34,000 for CAIDD under Alternative 1 to more than \$6 million for MSIDD under Alternative 3a.

APPENDIX D

TABLES



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Output Impact

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Table D-I

IMPACT NAME: Settlement 2017 MULTIPLIER: Type SAM

Aggregated Report

Industry	Direct*	Indirect*	Induced*	Total*	Deflator
1 Ag Other (AGG)	0	116,528	71,631	188,159	1.00
10 Cotton	29,026,936	100,080	141	29,127,158	1.00
11 Food Grains	3,016,774	11,353	81	3,028,208	1.00
12 Feed Grains	0	3,189	200	3,389	1.00
13 Hay and Pasture	2,221,963	7,255	454	2,229,672	1.00
17 Tree Nuts	41,041	392	87	41,520	1.00
18 Vegetables	12,237,104	21,995	10,125	12,269,224	1.00
26 Agricultural, Forestry, Fishery Servic	0	1,782,869	2,049	1,784,918	1.00
28 Mining (AGG)	0	6,807	5,310	12,117	1.00
48 Construction (AGG)	0	58,367	86,250	144,617	1.00
52 New Farm Structures	0	0	0	0	1.00
56 Maintenance and Repair Other Facilit	0	473,439	121,111	594,550	1.00
58 Other Manufacturing (AGG)	0	324,003	705,823	1,029,826	1.00
201 Gem and Wood Chemicals	0	0	0	0	1.00
202 Nitrogenous and Phosphoric Fertilizer	0	41,242	379	41,621	1.00
204 Agricultural Chemicals, N.E.C.	0	24,611	72	24,683	1.00
309 Farm Machinery and Equipment	0	119,359	511	119,870	1.00
379 Storage Batteries	0	6,418	831	7,250	1.00
433 Railroads and Related Services	0	44,861	13,938	58,799	1.00
434 Other Transportation, Communication	0	268,923	440,420	709,344	1.00
435 Motor Freight Transport and Warehouse	0	540,351	172,777	713,128	1.00
443 Electric Services	0	126,257	149,831	276,088	1.00
444 Gas Production and Distribution	0	48,930	54,234	103,164	1.00
447 Wholesale Trade	0	1,940,457	580,457	2,520,894	1.00
448 Retail and Other Trade (AGG)	0	44,523	2,152,583	2,197,105	1.00
456 Banking	0	169,718	413,746	583,463	1.00
457 Other Credit (AGG)	0	159,019	187,360	346,379	1.00
459 Insurance Carriers	0	96,825	308,765	405,590	1.00
460 Other Insurance (AGG)	0	15,998	1,232,532	1,248,530	1.00
462 Real Estate	0	1,982,363	628,994	2,611,357	1.00
463 Other Services (AGG)	0	1,018,954	3,887,993	4,906,947	1.00
510 Government (AGG)	0	169,735	330,082	499,818	1.00
517 Other (AGG)	0	0	29,383	29,383	1.00
10001 Institutions (AGG)	0	0	0	0	1.00
Total	46,543,818	9,724,421	11,588,128	67,856,367	



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Employment Impact

IMPACT NAME: Settlement 2017 MULTIPLIER: Type SAM
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Table D-II
Aggregated Report

Industry	Direct*	Indirect*	Induced*	Total*
1 Ag Other (AGG)	0.0	1.4	1.2	2.6
10 Cotton	163.6	0.6	0.0	164.2
11 Food Grains	55.8	0.2	0.0	56.0
12 Feed Grains	0.0	0.0	0.0	0.0
13 Hay and Pasture	86.0	0.3	0.0	86.3
17 Tree Nuts	0.4	0.0	0.0	0.4
18 Vegetables	94.2	0.2	0.1	94.5
26 Agricultural, Forestry, Fishery Service	0.0	68.9	0.1	69.0
28 Mining (AGG)	0.0	0.1	0.1	0.2
48 Construction (AGG)	0.0	0.7	1.0	1.7
52 New Farm Structures	0.0	0.0	0.0	0.0
56 Maintenance and Repair Other Facility	0.0	7.1	1.8	8.9
58 Other Manufacturing (AGG)	0.0	2.3	4.1	6.4
201 Gum and Wood Chemicals	0.0	0.0	0.0	0.0
202 Nitrogenous and Phosphatic Fertilizer	0.0	0.1	0.0	0.1
204 Agricultural Chemicals, N.E.C	0.0	0.0	0.0	0.0
309 Farm Machinery and Equipment	0.0	0.7	0.0	0.7
379 Storage Batteries	0.0	0.0	0.0	0.1
433 Railroads and Related Services	0.0	0.2	0.1	0.3
434 Other Transportation, Communication	0.0	2.2	3.8	6.0
435 Motor Freight, Transport and Warehouse	0.0	5.3	1.7	7.0
443 Electric Services	0.0	0.3	0.4	0.7
444 Gas Production and Distribution	0.0	0.1	0.1	0.2
447 Wholesale Trade	0.0	18.4	5.5	23.9
448 Retail and Other Trade (AGG)	0.0	1.2	55.1	56.3
456 Banking	0.0	1.1	2.7	3.9
457 Other Credit (AGG)	0.0	5.2	4.2	9.4
459 Insurance Carriers	0.0	0.7	2.3	3.1
460 Other Insurance (AGG)	0.0	0.3	1.0	1.4
462 Real Estate	0.0	6.7	2.1	8.9
463 Other Services (AGG)	0.0	16.5	70.3	86.8
510 Government (AGG)	0.0	0.6	1.5	2.1
517 Other (AGG)	0.0	0.0	3.2	3.2
0.001 Institutions (AGG)	0.0	0.0	0.0	0.0
	400.0	141.5	162.4	704.0

*Number of Jobs



Indirect Business Taxes Impact

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IMPACT NAME: Settlement 2017 MULTIPLIER: Type SAM

Table D-III
Aggregated Report

Industry	Direct*	Indirect*	Induced*	Total*	Deflator
1 Ag Other (AGG)	0	2,086	1,513	3,599	1.00
10 Cattle	1,140,739	3,964	6	1,153,709	1.00
11 Food Grains	171,736	646	5	172,387	1.00
12 Feed Grains	0	179	11	191	1.00
13 Hay and Pasture	179,592	586	37	180,215	1.00
17 Tree Nuts	691	7	1	700	1.00
18 Vegetables	375,696	663	311	376,670	1.00
26 Agricultural, Forestry, Fishery Service	0	46,457	53	46,510	1.00
28 Mining (AGG)	0	397	323	720	1.00
48 Construction (AGG)	0	257	380	637	1.00
52 New Farm Structures	0	0	0	0	1.00
56 Maintenance and Repair Other Facility	0	2,170	555	2,725	1.00
58 Other Manufacturing (AGG)	0	2,476	5,169	7,646	1.00
201 Gum and Wood Chemicals	0	0	0	0	1.00
202 Nitrogenous and Phosphatic Fertilizer	0	310	3	313	1.00
204 Agricultural Chemicals, N.E.C	0	446	1	448	1.00
309 Farm Machinery and Equipment	0	638	3	641	1.00
379 Storage Batteries	0	51	7	58	1.00
433 Railroads and Related Services	0	1,250	388	1,638	1.00
434 Other Transportation, Communication	0	22,590	24,548	47,137	1.00
435 Motor Freight Transport and Warehouse	0	7,866	2,515	10,382	1.00
443 Electric Services	0	17,379	20,623	38,002	1.00
444 Gas Production and Distribution	0	3,785	4,195	7,980	1.00
447 Wholesale Trade	0	294,616	88,127	382,743	1.00
448 Retail and Other Trade (AGG)	0	5,616	286,573	292,190	1.00
456 Banking	0	3,785	9,228	13,013	1.00
457 Other Credit (AGG)	0	5,653	7,201	12,854	1.00
459 Insurance Carriers	0	6,691	21,336	28,026	1.00
460 Other Insurance (AGG)	0	554	160,144	160,698	1.00
462 Real Estate	0	241,041	76,481	317,521	1.00
463 Other Services (AGG)	0	30,592	55,297	85,889	1.00
510 Government (AGG)	0	0	0	0	1.00
517 Other (AGG)	0	0	0	0	1.00
10001 Institutions (AGG)	0	0	0	0	1.00
Total	1,877,454	702,752	765,033	3,345,239	



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Total Value Added Impact

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IMPACT NAME: Settlement 2017 MULTIPLIER: Type SAM

Table D-IV

Aggregated Report

Industry	Direct*	Indirect*	Induced*	Total*	Deflator
1 Ag Outp (AGG)	0	64,258	34,018	98,276	1.00
10 Cotton	16,205,377	55,873	79	16,261,329	1.00
11 Food Grains	2,024,376	7,618	54	2,032,049	1.00
12 Feed Grains	0	1,644	103	1,746	1.00
13 Hay and Pasture	1,741,622	5,686	356	1,747,664	1.00
17 Tree Nuts	24,377	233	52	24,661	1.00
18 Vegetables	10,458,367	18,456	8,653	10,485,476	1.00
26 Agricultural, Forestry, Fishery Servic	0	1,000,126	1,149	1,001,276	1.00
28 Mining (AGG)	0	4,173	3,256	7,429	1.00
48 Construction (AGG)	0	24,845	36,820	61,665	1.00
52 New Farm Structures	0	0	0	0	1.00
56 Maintenance and Repair Other Facilit	0	287,090	73,441	360,531	1.00
58 Other Manufacturing (AGG)	0	120,313	237,388	357,701	1.00
201 Gum and Wood Chemicals	0	0	0	0	1.00
202 Nitrogenous and Phosphoric Fertilizer	0	7,771	71	7,842	1.00
204 Agricultural Chemicals, N.E.C	0	16,035	47	16,082	1.00
309 Farm Machinery and Equipment	0	38,350	164	38,514	1.00
370 Storage Batteries	0	2,708	351	3,058	1.00
433 Railroads and Related Services	0	27,704	8,607	36,311	1.00
434 Other Transportation, Communication	0	167,736	260,398	428,134	1.00
435 Motor Freight Transport and Warehou	0	208,091	66,537	274,628	1.00
443 Electric Services	0	114,129	135,439	249,568	1.00
444 Gas Production and Distribution	0	18,040	19,995	38,035	1.00
447 Wholesale Trade	0	1,358,642	406,402	1,765,044	1.00
448 Retail and Other Trade (AGG)	0	30,426	1,517,601	1,548,027	1.00
456 Banking	0	124,442	303,369	427,811	1.00
457 Other Credit (AGG)	0	126,942	134,873	261,815	1.00
459 Insurance Carriers	0	61,692	196,728	258,420	1.00
460 Other Insurance (AGG)	0	12,368	987,834	1,000,222	1.00
462 Real Estate	0	1,398,825	443,840	1,842,665	1.00
463 Other Services (AGG)	0	599,026	2,291,172	2,890,198	1.00
510 Government (AGG)	0	92,750	184,447	277,198	1.00
517 Other (AGG)	0	0	29,382	29,382	1.00
10001 Institutions (AGG)	0	0	0	0	1.00
Total	30,454,119	3,995,990	7,382,649	43,832,757	

Historic Cost of Pumping Irrigation Water in Central Arizona

Table D-1

Variable costs only. Energy is electric, except as noted.

Values in dollars per acre foot, unless noted otherwise

Area	Early 1980s			Year 1991 Wilson	Average Pump Lift (feet)	Year			Year 1996 U of A	Year 1997 U of A	Year 1998 U of A	1992-98 Avg. Yrly. Percent Change	Average 1984-88	Cost per acre foot per foot of lift
	Year 1963 Kleinman	Year 1976 U of A	Year 1985 U of A			Year 1982 U of A	Year 1983 U of A	Year 1984 U of A						
Pinal County														
Coolidge Area	\$9.34	\$11.96	\$24.86	\$28.82	410	\$28.82	\$32.92	\$31.38	\$28.74	\$29.75	\$29.75	0.46%	\$30.40	\$0.0741
Casa Grande Area	\$5.54	\$16.80	\$34.67	\$39.38	575	\$39.80	\$44.71	\$43.41	\$41.12	\$41.12	\$41.12	0.47%	\$42.04	\$0.0731
Eloy Area	\$5.54	\$17.74	\$29.11	\$39.38	620	\$30.80	\$44.16	\$44.17	\$41.87	\$41.87	\$38.34	3.81%	\$42.08	\$0.0679
Stanfield Area	\$7.60	\$20.37	\$52.49	\$27.24	840	\$27.24	\$27.50	\$34.19	\$35.02	\$35.02	\$34.88	3.90%	\$34.82	\$0.0541
Maricopa Area	\$7.60	\$15.89	\$40.70	\$21.38	495	\$21.38	\$22.09	\$28.52	\$27.16	\$27.16	\$28.18	4.54%	\$27.11	\$0.0548
Pima County														
Avra Valley Area		\$21.85	\$58.63		375		\$52.19		\$48.89	\$47.19	\$45.49	-1.83%	\$48.44	\$0.1292
Marana Area		\$18.53	\$50.33		320		\$42.29		\$42.18	\$40.73	\$39.28	-1.02%	\$41.12	\$0.1295
Maricopa County														
Harquahala Valley Area	\$4.51	\$33.21	\$73.06		600	\$87.90	\$100.29	\$100.36	\$89.31	\$89.31	\$87.25	-0.11%	\$84.36	\$0.1573
Queen Creek Area	\$8.19	\$33.19	\$73.74		600	\$81.81	\$89.60	\$57.35	\$58.27	\$58.27	\$57.40	-1.02%	\$57.91	\$0.0965
New Magma Area		\$19.81	\$81.52		600	\$61.90	\$74.88	\$103.37	\$92.30	\$92.30	\$90.00	0.34%	\$87.42	\$0.1824
Tonopah Area		\$31.00		\$41.00				\$80.19	\$81.10	\$81.10	\$60.15	-0.40%	\$80.73	\$0.1012
		\$38.00												

Notes: 1998 University of Arizona (U of A) pumping cost estimates for the Maricopa and Stanfield areas are adjusted. U of A utilized 4.6 cents per kwh in its estimates and historically the rates have been in the range of 2 to 2.3 cents per kwh. The 1996 U of A estimates utilized 2.1 cents per kwh. Telephone contact with MSIDD revealed that the current average power rates for MSIDD are about 1.9 cents to 2.1 cents per kwh. The U of A budget estimates were modified using 2.1 cents per kwh.

U of A refers to University of Arizona crop budget publications.

Kleinman refers to Kleinman, Alan P., "The Cost of Pumping Irrigation Water in Central Arizona," July 1984.

Wilson refers to Wilson, Paul N., "An Economic Assessment of Central Arizona Project Agriculture," November 1992.

Loan application reports refer to: Tonopah Irrigation and Drainage District, Distribution System Loan Application Report, September 1984;

Hohokam Irrigation and Drainage District, Distribution System Loan Application Report, May 1981;

New Magma Irrigation and Drainage District, Distribution System Loan Application Report, September 1982;

Maricopa-Stanfield Irrigation and Drainage District, Distribution System Loan Application Report, 1982.

Projections of CAWCD Excess Water Pools and Pricing -- 2001 through 2050
Assuming Negotiated Settlement

Pool quantity in acre-feet

Table D-2

Year	Pool One Quantity	Pool One Price	Pool Two Quantity	Pool Two Price	Pool Three Quantity	Pool Three Price	AWBA In-lieu	AWBA Price	Total Water Quantity	Average Price
2001	200,000	\$34.00	200,000	\$24.00	150,000	\$33.00	124,520	\$21.00	674,520	\$24.54
2002	200,000	\$35.00	200,000	\$25.00	147,000	\$34.00	124,520	\$21.00	671,520	\$25.31
2003	200,000	\$36.00	200,000	\$26.00	130,000	\$35.00	124,520	\$21.00	654,520	\$25.90
2004	400,000	\$35.00	0		113,000	\$36.00	124,520	\$21.00	637,520	\$28.34
2005	400,000	\$35.00			97,000	\$37.00	124,520	\$21.00	621,520	\$26.30
2006	400,000	\$35.00					124,520	\$21.00	524,520	\$26.69
2007	400,000	\$35.00					124,520	\$21.00	524,520	\$26.69
2008	400,000	\$35.00					124,520	\$21.00	524,520	\$26.69
2009	400,000	\$35.00					124,193	\$21.00	524,193	\$26.71
2010	400,000	\$35.00					118,080	\$21.00	518,080	\$27.02
2011	400,000	\$35.00					115,614	\$21.00	515,614	\$27.15
2012	400,000	\$35.00					115,614	\$21.00	515,614	\$27.15
2013	400,000	\$35.00					115,614	\$21.00	515,614	\$27.15
2014	400,000	\$35.00					115,614	\$21.00	515,614	\$27.15
2015	400,000	\$35.00					115,614	\$21.00	515,614	\$27.15
2016	400,000	\$35.00					115,614	\$21.00	515,614	\$27.15
2017	400,000	\$35.00							400,000	\$35.00
2018	400,000	\$35.00							400,000	\$35.00
2019	300,000	\$35.00							300,000	\$35.00
2020	300,000	\$35.00							300,000	\$35.00
2021	300,000	\$35.00							300,000	\$35.00
2022	300,000	\$35.00							300,000	\$35.00
2023	300,000	\$35.00							300,000	\$35.00
2024	300,000	\$35.00							300,000	\$35.00
2025	300,000	\$35.00							300,000	\$35.00
2026	225,000	\$35.00							225,000	\$35.00
2027	225,000	\$35.00							225,000	\$35.00
2028	225,000	\$35.00							225,000	\$35.00
2029	225,000	\$35.00							225,000	\$35.00
2030	225,000	\$35.00							225,000	\$35.00
2031	153,525	\$35.00							153,525	\$35.00
2032	148,220	\$35.00							148,220	\$35.00
2033	142,812	\$35.00							142,812	\$35.00
2034	137,404	\$35.00							137,404	\$35.00
2035	131,995	\$35.00							131,995	\$35.00
2036	126,587	\$35.00							126,587	\$35.00
2037	121,079	\$35.00							121,079	\$35.00
2038	115,517	\$35.00							115,517	\$35.00
2039	109,120	\$35.00							109,120	\$35.00
2040	102,418	\$35.00							102,418	\$35.00
2041	95,583	\$35.00							95,583	\$35.00
2042	88,332	\$35.00							88,332	\$35.00
2043	77,268	\$35.00							77,268	\$35.00
2044	0								0	
2045	0								0	
2046	0								0	
2047	0								0	
2048	0								0	
2049	0								0	
2050	0								0	
Totals	11,374,860		600,000		637,000		1,932,117		14,543,977	

Projections of CAWCD Excess Water Pools and Pricing – 2001 through 2050

No Action Alternative

Pool quantity in acre-feet

Table D-3

Year	Pool One Quantity	Pool One Price	Pool Two Quantity	Pool Two Price	Pool Three Quantity	Pool Three Price	AWBA In-lieu	AWBA Price	Total Water Quantity	Average Price
2001	200,000	\$34.00	200,000	\$24.00	129,989	\$33.00	124,520	\$21.00	654,509	\$24.28
2002	200,000	\$35.00	200,000	\$25.00	112,493	\$34.00	124,520	\$21.00	637,013	\$24.84
2003	200,000	\$36.00	200,000	\$26.00	105,628	\$35.00	124,520	\$21.00	630,148	\$25.54
2004	400,000	\$35.00	0		98,433	\$36.00	124,520	\$21.00	622,953	\$28.16
2005	400,000	\$35.00			95,190	\$37.00	124,520	\$21.00	619,710	\$28.27
2006	400,000	\$35.00			75,370	\$38.00	124,520	\$21.00	599,890	\$28.11
2007	400,000	\$35.00			60,180	\$39.00	124,520	\$21.00	584,700	\$27.96
2008	400,000	\$35.00			43,929	\$40.00	124,520	\$21.00	568,449	\$27.72
2009	400,000	\$35.00			23,427	\$41.00	124,193	\$21.00	547,620	\$27.32
2010	400,000	\$35.00			6,739	\$42.00	118,080	\$21.00	524,819	\$27.22
2011	381,803	\$35.00					115,614	\$21.00	497,417	\$26.86
2012	351,519	\$35.00					115,614	\$21.00	467,133	\$26.34
2013	322,734	\$35.00					115,614	\$21.00	438,348	\$25.77
2014	294,942	\$35.00					115,614	\$21.00	410,556	\$25.14
2015	269,088	\$35.00					115,614	\$21.00	384,702	\$24.48
2016	243,235	\$35.00					115,614	\$21.00	358,849	\$23.72
2017	310,768	\$35.00							310,768	\$35.00
2018	300,052	\$35.00							300,052	\$35.00
2019	289,336	\$35.00							289,336	\$35.00
2020	278,620	\$35.00							278,620	\$35.00
2021	267,904	\$35.00							267,904	\$35.00
2022	257,188	\$35.00							257,188	\$35.00
2023	246,471	\$35.00							246,471	\$35.00
2024	235,755	\$35.00							235,755	\$35.00
2025	225,039	\$35.00							225,039	\$35.00
2026	214,323	\$35.00							214,323	\$35.00
2027	203,607	\$35.00							203,607	\$35.00
2028	192,891	\$35.00							192,891	\$35.00
2029	182,175	\$35.00							182,175	\$35.00
2030	171,458	\$35.00							171,458	\$35.00
2031	160,742	\$35.00							160,742	\$35.00
2032	150,026	\$35.00							150,026	\$35.00
2033	139,310	\$35.00							139,310	\$35.00
2034	128,594	\$35.00							128,594	\$35.00
2035	117,878	\$35.00							117,878	\$35.00
2036	107,162	\$35.00							107,162	\$35.00
2037	96,445	\$35.00							96,445	\$35.00
2038	85,729	\$35.00							85,729	\$35.00
2039	75,013	\$35.00							75,013	\$35.00
2040	64,297	\$35.00							64,297	\$35.00
2041	53,581	\$35.00							53,581	\$35.00
2042	42,865	\$35.00							42,865	\$35.00
2043	32,148	\$35.00							32,148	\$35.00
2044	0								0	
2045	0								0	
2046	0								0	
2047	0								0	
2048	0								0	
2049	0								0	
2050	0								0	
Totals	9,892,698		600,000		751,378		1,932,117		13,176,193	

Projections of CAWCD Excess Water Pools and Pricing – 2001 through 2050

Alternative 1

Pool quantity in acre-feet

Table D-4

Year	Pool One Quantity	Pool One Price	Pool Two Quantity	Pool Two Price	Pool Three Quantity	Pool Three Price	AWBA In-lieu	AWBA Price	Total Water Quantity	Average Price
2001	200,000	\$34.00	200,000	\$24.00	132,833	\$33.00	124,520	\$21.00	657,353	\$24.31
2002	200,000	\$35.00	200,000	\$25.00	113,905	\$34.00	124,520	\$21.00	638,425	\$24.86
2003	200,000	\$36.00	200,000	\$26.00	107,207	\$35.00	124,520	\$21.00	631,727	\$25.57
2004	400,000	\$35.00	0		101,957	\$36.00	124,520	\$21.00	626,477	\$26.21
2005	400,000	\$35.00			97,095	\$37.00	124,520	\$21.00	621,615	\$26.30
2006	400,000	\$35.00			77,438	\$38.00	124,520	\$21.00	601,958	\$26.15
2007	400,000	\$35.00			62,650	\$39.00	124,520	\$21.00	587,170	\$26.00
2008	400,000	\$35.00			46,844	\$40.00	124,520	\$21.00	571,364	\$27.78
2009	400,000	\$35.00			26,824	\$41.00	124,193	\$21.00	551,017	\$27.40
2010	400,000	\$35.00			10,617	\$42.00	118,080	\$21.00	528,697	\$27.32
2011	390,070	\$35.00					115,614	\$21.00	505,684	\$27.00
2012	360,294	\$35.00					115,614	\$21.00	475,908	\$26.50
2013	331,972	\$35.00					115,614	\$21.00	447,586	\$25.96
2014	304,649	\$35.00					115,614	\$21.00	420,263	\$25.37
2015	279,327	\$35.00					115,614	\$21.00	394,941	\$24.75
2016	254,006	\$35.00					115,614	\$21.00	369,620	\$24.05
2017	304,406	\$35.00							304,406	\$35.00
2018	293,910	\$35.00							293,910	\$35.00
2019	283,413	\$35.00							283,413	\$35.00
2020	272,916	\$35.00							272,916	\$35.00
2021	262,419	\$35.00							262,419	\$35.00
2022	251,923	\$35.00							251,923	\$35.00
2023	241,426	\$35.00							241,426	\$35.00
2024	230,929	\$35.00							230,929	\$35.00
2025	220,432	\$35.00							220,432	\$35.00
2026	209,936	\$35.00							209,936	\$35.00
2027	199,439	\$35.00							199,439	\$35.00
2028	188,942	\$35.00							188,942	\$35.00
2029	178,445	\$35.00							178,445	\$35.00
2030	167,948	\$35.00							167,948	\$35.00
2031	157,452	\$35.00							157,452	\$35.00
2032	146,955	\$35.00							146,955	\$35.00
2033	136,458	\$35.00							136,458	\$35.00
2034	125,961	\$35.00							125,961	\$35.00
2035	115,465	\$35.00							115,465	\$35.00
2036	104,968	\$35.00							104,968	\$35.00
2037	94,471	\$35.00							94,471	\$35.00
2038	83,947	\$35.00							83,947	\$35.00
2039	73,477	\$35.00							73,477	\$35.00
2040	62,981	\$35.00							62,981	\$35.00
2041	52,484	\$35.00							52,484	\$35.00
2042	41,967	\$35.00							41,967	\$35.00
2043	31,490	\$35.00							31,490	\$35.00
2044	0								0	
2045	0								0	
2046	0								0	
2047	0								0	
2048	0								0	
2049	0								0	
2050	0								0	
Totals	9,854,878		600,000		777,370		1,932,117		13,164,385	

Projections of CAWCD Excess Water Pools and Pricing -- 2001 through 2050

Alternative 2

Pool quantity in acre-feet

Table D-5

Year	Pool One Quantity	Pool One Price	Pool Two Quantity	Pool Two Price	Pool Three Quantity	Pool Three Price	AWBA In-lieu	AWBA Price	Total Water Quantity	Average Price
2001	200,000	\$34.00	200,000	\$24.00	129,989	\$33.00	124,520	\$21.00	654,509	\$24.28
2002	200,000	\$35.00	200,000	\$25.00	112,493	\$34.00	124,520	\$21.00	637,013	\$24.84
2003	200,000	\$36.00	200,000	\$26.00	105,628	\$35.00	124,520	\$21.00	630,148	\$25.54
2004	400,000	\$35.00	0		98,433	\$36.00	124,520	\$21.00	622,953	\$28.16
2005	400,000	\$35.00			95,190	\$37.00	124,520	\$21.00	619,710	\$28.27
2006	400,000	\$35.00			75,370	\$38.00	124,520	\$21.00	599,890	\$28.11
2007	400,000	\$35.00			60,180	\$39.00	124,520	\$21.00	584,700	\$27.96
2008	400,000	\$35.00			43,929	\$40.00	124,520	\$21.00	568,449	\$27.72
2009	400,000	\$35.00			23,427	\$41.00	124,193	\$21.00	547,620	\$27.32
2010	400,000	\$35.00			13,478	\$42.00	118,080	\$21.00	531,558	\$27.40
2011	368,303	\$35.00					115,614	\$21.00	483,917	\$26.64
2012	338,019	\$35.00					115,614	\$21.00	453,633	\$26.08
2013	309,234	\$35.00					115,614	\$21.00	424,848	\$25.48
2014	281,442	\$35.00					115,614	\$21.00	397,056	\$24.81
2015	255,588	\$35.00					115,614	\$21.00	371,202	\$24.10
2016	229,735	\$35.00					115,614	\$21.00	345,349	\$23.28
2017	290,633	\$35.00							290,633	\$35.00
2018	280,611	\$35.00							280,611	\$35.00
2019	270,589	\$35.00							270,589	\$35.00
2020	260,568	\$35.00							260,568	\$35.00
2021	250,546	\$35.00							250,546	\$35.00
2022	240,524	\$35.00							240,524	\$35.00
2023	230,502	\$35.00							230,502	\$35.00
2024	220,480	\$35.00							220,480	\$35.00
2025	210,458	\$35.00							210,458	\$35.00
2026	200,437	\$35.00							200,437	\$35.00
2027	190,415	\$35.00							190,415	\$35.00
2028	180,393	\$35.00							180,393	\$35.00
2029	170,371	\$35.00							170,371	\$35.00
2030	160,349	\$35.00							160,349	\$35.00
2031	150,327	\$35.00							150,327	\$35.00
2032	122,938	\$35.00							122,938	\$35.00
2033	111,463	\$35.00							111,463	\$35.00
2034	97,141	\$35.00							97,141	\$35.00
2035	82,226	\$35.00							82,226	\$35.00
2036	48,750	\$35.00							48,750	\$35.00
2037	15,065	\$35.00							15,065	\$35.00
2038	880	\$35.00							880	\$0.00
2039	0	\$35.00							0	\$0.00
2040	0	\$35.00							0	\$0.00
2041	0	\$35.00							0	\$0.00
2042	0	\$35.00							0	\$0.00
2043	0	\$35.00							0	\$0.00
2044	0								0	
2045	0								0	
2046	0								0	
2047	0								0	
2048	0								0	
2049	0								0	
2050	0								0	
Totals	8,967,987		600,000		758,117		1,932,117		12,258,221	

Projections of CAWCD Excess Water Pools and Pricing – 2001 through 2050
Alternative 3a Pool quantity in acre-feet

Table D-6

Year	Pool One Quantity	Pool One Price	Pool Two Quantity	Pool Two Price	Pool Three Quantity	Pool Three Price	AWBA In-lieu	AWBA Price	Total Water Quantity	Average Price
2001	200,000	\$34.00	200,000	\$24.00	94,082	\$33.00	124,520	\$21.00	618,602	\$23.77
2002	200,000	\$35.00	200,000	\$25.00	76,586	\$34.00	124,520	\$21.00	601,106	\$24.30
2003	200,000	\$36.00	200,000	\$26.00	69,721	\$35.00	124,520	\$21.00	594,241	\$24.97
2004	400,000	\$35.00	0		62,525	\$36.00	124,520	\$21.00	587,045	\$27.68
2005	400,000	\$35.00			59,282	\$37.00	124,520	\$21.00	583,802	\$27.74
2006	400,000	\$35.00			39,463	\$38.00	124,520	\$21.00	563,983	\$27.48
2007	400,000	\$35.00			24,272	\$39.00	124,520	\$21.00	548,792	\$27.24
2008	400,000	\$35.00			8,012	\$40.00	124,520	\$21.00	532,532	\$28.89
2009	387,519	\$35.00					124,193	\$21.00	511,712	\$26.51
2010	341,663	\$35.00					118,080	\$21.00	459,743	\$28.01
2011	296,488	\$35.00					115,814	\$21.00	412,102	\$25.18
2012	266,204	\$35.00					115,614	\$21.00	381,818	\$24.40
2013	237,419	\$35.00					115,614	\$21.00	353,033	\$23.54
2014	209,627	\$35.00					115,614	\$21.00	325,241	\$22.56
2015	183,773	\$35.00					115,614	\$21.00	299,387	\$21.48
2016	157,920	\$35.00					115,614	\$21.00	273,534	\$20.21
2017	290,633	\$35.00							290,633	\$35.00
2018	280,811	\$35.00							280,611	\$35.00
2019	270,589	\$35.00							270,589	\$35.00
2020	260,568	\$35.00							260,568	\$35.00
2021	252,129	\$35.00							252,129	\$35.00
2022	239,869	\$35.00							239,869	\$35.00
2023	227,809	\$35.00							227,809	\$35.00
2024	215,349	\$35.00							215,349	\$35.00
2025	203,089	\$35.00							203,089	\$35.00
2026	144,829	\$35.00							144,829	\$35.00
2027	133,476	\$35.00							133,476	\$35.00
2028	122,123	\$35.00							122,123	\$35.00
2029	110,770	\$35.00							110,770	\$35.00
2030	83,136	\$35.00							83,136	\$35.00
2031	67,305	\$35.00							67,305	\$35.00
2032	21,123	\$35.00							21,123	\$35.00
2033	0								0	
2034	0								0	
2035	0								0	
2036	0								0	
2037	0								0	
2038	0								0	
2039	0								0	
2040	0								0	
2041	0								0	
2042	0								0	
2043	0								0	
2044	0								0	
2045	0								0	
2046	0								0	
2047	0								0	
2048	0								0	
2049	0								0	
2050	0								0	
Totals	7,603,821		600,000		433,943		1,932,117		10,569,881 3,101,350 13,671,231	

Projections of CAWCD Excess Water Pools and Pricing -- 2001 through 2050
Alternative 3b **Pool quantity in acre-feet**

Table D-7

Year	Pool One Quantity	Pool One Price	Pool Two Quantity	Pool Two Price	Pool Three Quantity	Pool Three Price	AWBA In-lieu	AWBA Price	Total Water Quantity	Average Price
2001	200,000	\$34.00	200,000	\$24.00	94,925	\$33.00	124,520	\$21.00	619,445	\$23.78
2002	200,000	\$35.00	200,000	\$25.00	77,998	\$34.00	124,520	\$21.00	602,518	\$24.32
2003	200,000	\$36.00	200,000	\$26.00	71,299	\$35.00	124,520	\$21.00	595,819	\$25.00
2004	400,000	\$35.00	0		66,050	\$36.00	124,520	\$21.00	590,570	\$27.73
2005	400,000	\$35.00			61,187	\$37.00	124,520	\$21.00	585,707	\$27.77
2006	400,000	\$35.00			41,531	\$38.00	124,520	\$21.00	566,051	\$27.52
2007	400,000	\$35.00			26,742	\$39.00	124,520	\$21.00	551,262	\$27.29
2008	400,000	\$35.00			10,936	\$40.00	124,520	\$21.00	535,456	\$26.96
2009	390,916	\$35.00					124,193	\$21.00	515,109	\$26.56
2010	349,420	\$35.00					118,080	\$21.00	467,500	\$26.16
2011	304,755	\$35.00					115,614	\$21.00	420,369	\$25.37
2012	274,979	\$35.00					115,614	\$21.00	390,593	\$24.64
2013	246,657	\$35.00					115,614	\$21.00	362,271	\$23.83
2014	219,334	\$35.00					115,614	\$21.00	334,948	\$22.92
2015	194,012	\$35.00					115,614	\$21.00	309,626	\$21.93
2016	168,691	\$35.00					115,614	\$21.00	284,305	\$20.77
2017	290,633	\$35.00							290,633	\$35.00
2018	280,611	\$35.00							280,611	\$35.00
2019	270,589	\$35.00							270,589	\$35.00
2020	260,568	\$35.00							260,568	\$35.00
2021	272,677	\$35.00							272,677	\$35.00
2022	262,511	\$35.00							262,511	\$35.00
2023	251,230	\$35.00							251,230	\$35.00
2024	239,760	\$35.00							239,760	\$35.00
2025	228,267	\$35.00							228,267	\$35.00
2026	170,757	\$35.00							170,757	\$35.00
2027	160,227	\$35.00							160,227	\$35.00
2028	149,663	\$35.00							149,663	\$35.00
2029	139,083	\$35.00							139,083	\$35.00
2030	109,813	\$35.00							109,813	\$35.00
2031	97,119	\$35.00							97,119	\$35.00
2032	51,804	\$35.00							51,804	\$35.00
2033	0								0	
2034	0								0	
2035	0								0	
2036	0								0	
2037	0								0	
2038	0								0	
2039	0								0	
2040	0								0	
2041	0								0	
2042	0								0	
2043	0								0	
2044	0								0	
2045	0								0	
2046	0								0	
2047	0								0	
2048	0								0	
2049	0								0	
2050	0								0	
Totals	7,984,076		600,000		450,668		1,932,117		10,966,861	

Table D-8

Upland Cotton Production Profitability in Maricopa County -- Partial Budget
 (dollar values on a per acre basis)

Crop sales revenues	yield in pds. cottonseed	1,227 1.08	price per pd price	0.678 133.6	\$831.91 \$144.29
Total cash growing costs (includes \$30 for irrigation water)					\$375.14
Cash harvest costs					\$234.38
Interest on operating costs @ 10 %					\$18.76
Total cash expenses					\$628.28
General and office overhead -- 5% of operating expense					\$31.41
General farm maintenance -- 3% of operating expense					\$18.85
Total variable costs					\$678.54
Crop profitability decision value					\$297.65
Annual crop water use -- 61 acre inches or				5.08 acre feet	
Profitability decision value plus present water cost					\$327.65
Maximum average amount a farmer would pay for irrigation water per acre foot					\$64.46

Table D-9

Upland Cotton Production Profitability in Harquahala Irrigation District -- Partial Budget

(dollar values on a per acre basis)

Crop sales revenues	yield in pds. cottonseed	1,227 price per pd 1.08 price	0.678 133.6	\$831.91 \$144.29
Total cash growing costs (includes \$30 for irrigation water)				\$375.14
Cash harvest costs				\$234.38
Interest on operating costs @ 10 %				\$18.76
Total cash expenses				\$628.28
General and office overhead -- 5% of operating expense				\$31.41
General farm maintenance -- 3% of operating expense				\$18.85
Total variable costs				\$678.54
Crop profitability decision value				\$297.65
Annual crop water use -- 61 acre inches or			5.08 acre feet	
Profitability decision value plus present water cost				\$327.65
Adjustment for Elimination of 9(d) Repayment Obligation -- 2001				
Maximum average amount a farmer would pay for irrigation water per acre foot				\$64.46

Table D-10

Upland Cotton Production Profitability in Tonopah Irrigation District -- Partial Budget
(dollar values on a per acre basis)

			Settlement Alternative
Crop sales revenues	yield in pds. cottonseed	1,227 price per pd 1.08 price	0.678 133.6
			\$831.91 \$144.29
Total cash growing costs (includes \$30 for irrigation water)			\$375.14
Cash harvest costs			\$234.38
Interest on operating costs @ 10 %			\$18.76
Total cash expenses			\$628.28
General and office overhead -- 5% of operating expense			\$31.41
General farm maintenance -- 3% of operating expense			\$18.85
Total variable costs			\$678.54
Crop profitability decision value			\$297.65
Annual crop water use -- 61 acre inches or		5.08 acre feet	
Profitability decision value plus present water cost			\$327.85
Adjustment for Elimination of 9(d) Repayment Obligation -- 2001			\$6.04
Maximum average amount a farmer would pay for irrigation water per acre foot			\$70.50
Maximum amount in 2004			\$75.69
Maximum amount in 2016			\$78.02
Maximum amount in 2030			\$84.46
Maximum amount in 2043			\$64.46
Maximum amount in 2050			\$64.46

Table D-11

Upland Cotton Production Profitability in Queen Creek Irrigation District -- Partial Budget
 (dollar values on a per acre basis) Settlement Alternative

Crop sales revenues	yield in pds. cottonseed	1,227 price per pd 1.08 price	0.678 133.6	\$831.91 \$144.29
Total cash growing costs (includes \$30 for irrigation water)				\$375.14
Cash harvest costs				\$234.38
Interest on operating costs @ 10 %				\$18.76
Total cash expenses				\$628.28
General and office overhead -- 5% of operating expense				\$31.41
General farm maintenance -- 3% of operating expense				\$18.65
Total variable costs				\$678.54
Crop profitability decision value				\$297.65
Annual crop water use -- 61 acre inches or			5.08 acre feet	
Profitability decision value plus present water cost				\$327.65
Adjustment for Elimination of 9(d) Repayment Obligation -- 2001				\$20.28
Maximum average amount a farmer would pay for irrigation water per acre foot				\$84.73
Maximum amount in 2004				\$85.30
Maximum amount in 2016				\$64.46
Maximum amount in 2030				\$64.46
Maximum amount in 2043				\$64.46
Maximum amount in 2050				\$64.46

Table D-12

Forage Production Profitability in Maricopa County -- Partial Budget
(dollar values on a per acre basis)

Crop sales revenues	yield in tons	8.0	price per ton	96.7	\$773.60
Total cash growing costs (includes \$112.50 for irrigation water)					
Cash harvest costs					\$281.48
Interest on operating costs @ 10 %					\$158.06
Total cash expenses					\$14.07
General and office overhead -- 5% of operating expense					
General farm maintenance -- 3% of operating expense					\$22.68
Share of stand establishment					\$13.61
Total variable costs					\$73.13
Crop profitability decision value					\$563.03
Annual crop water use -- 90 acre inches or			7.50	acre feet	\$210.57
Profitability decision value plus present water cost					\$323.07
Maximum average amount a farmer would pay for irrigation water per acre foot					\$43.08

Table D-13

Grain Production Profitability in Maricopa County -- Partial Budget
(dollar values on a per acre basis)

Crop sales revenues	yield in pds.	5,600 price per pd	0.075	\$420.00
Total cash growing costs (includes \$8.33 for irrigation water)				\$159.75
Cash harvest costs				\$72.06
Interest on operating costs @ 10 %				\$7.99
Total cash expenses				\$239.80
General and office overhead -- 5% of operating expense				\$11.99
General farm maintenance -- 3% of operating expense				\$7.19
Total variable costs				\$258.98
Crop profitability decision value				\$161.02
Annual crop water use -- 34 acre inches or		2.83 acre feet		
Profitability decision value plus present water cost				\$169.35
Maximum average amount a farmer would pay for irrigation water per acre foot				\$59.77

Table D-14

Upland Cotton Production Profitability in Pinal County -- Partial Budget
(dollar values on a per acre basis)

Crop sales revenues	yield in pds. cottonseed	1,154 1.02	price per pd price	0.678 133.6	\$782.41 \$136.27
Total cash growing costs (includes \$144 for irrigation water)					
Cash harvest costs					\$460.51
Interest on operating costs @ 10 %					\$238.85
Total cash expenses					\$23.03
					\$722.39
General and office overhead -- 5% of operating expense					\$36.12
General farm maintenance -- 3% of operating expense					\$21.67
Total variable costs					\$780.18
Crop profitability decision value					\$138.51
Annual crop water use -- 49 acre inches or				4.08 acre feet	
Profitability decision value plus present water cost					\$282.51
Maximum average amount a farmer would pay for irrigation water per acre foot					\$69.19

Table D-15

Upland Cotton Production Profitability in New Magma Irrigation District -- Partial Budget

(dollar values on a per acre basis)

Crop sales revenues	yield in pds. cottonseed	1,154 price per pd 1.02 price	0.678 133.6	\$782.41 \$136.27
Total cash growing costs (includes \$144 for irrigation water)				\$460.51
Cash harvest costs				\$238.85
Interest on operating costs @ 10 %				\$23.03
Total cash expenses				\$722.39
General and office overhead -- 5% of operating expense				\$36.12
General farm maintenance -- 3% of operating expense				\$21.67
Total variable costs				\$780.18
Crop profitability decision value				\$138.51
Annual crop water use -- 49 acre inches or		4.08 acre feet		
Profitability decision value plus present water cost				\$282.51
Adjustment for Elimination of 9(d) Repayment Obligation -- 2001				\$3.62
Maximum average amount a farmer would pay for irrigation water per acre foot				\$72.80
Maximum amount in 2004				\$85.07
Maximum amount in 2016				\$85.07
Maximum amount in 2030				\$75.30
Maximum amount in 2043				\$69.19
Maximum amount in 2050				\$69.19

Table D-16

Upland Cotton Production Profitability in Hohokam Irrigation District -- Partial Budget

(dollar values on a per acre basis)

Crop sales revenues	yield in pds. cottonseed	1,154 price per pd 1.02 price	0.678 133.6	\$782.41 \$136.27
Total cash growing costs (includes \$144 for irrigation water)				
Cash harvest costs				\$460.51
				\$238.85
Interest on operating costs @ 10 %				\$23.03
Total cash expenses				\$722.39
General and office overhead -- 5% of operating expense				
General farm maintenance -- 3% of operating expense				\$36.12 \$21.67
Total variable costs				\$780.18
Crop profitability decision value				\$138.51
Annual crop water use -- 49 acre inches or			4.08 acre feet	
Profitability decision value plus present water cost				\$282.51
Adjustment for Elimination of 9(d) Repayment Obligation -- 2001				
Maximum average amount a farmer would pay for irrigation water per acre foot				\$69.19
Maximum amount in 2004				
Maximum amount in 2016				
Maximum amount in 2030				
Maximum amount in 2043				
Maximum amount in 2050				

Table D-17

Upland Cotton Production Profitability in Central Arizona -- Partial Budget

(dollar values on a per acre basis)

Crop sales revenues	yield in pds. cottonseed	1,154 price per pd 1.02 price	0.678 133.6	\$782.41 \$136.27
Total cash growing costs (includes \$144 for irrigation water)				
Cash harvest costs				\$460.51
Interest on operating costs @ 10 %				\$238.85
Total cash expenses				\$23.03
				\$722.39
General and office overhead -- 5% of operating expense				
General farm maintenance -- 3% of operating expense				\$36.12
				\$21.67
Total variable costs				\$780.18
Crop profitability decision value				\$138.51
Annual crop water use -- 49 acre inches or			4.08 acre feet	
Profitability decision value plus present water cost				\$282.51
Adjustment for Elimination of 9(d) Repayment Obligation -- 2001				\$2.96
Maximum average amount a farmer would pay for irrigation water per acre foot				\$72.14
Maximum amount in 2004				\$72.14
Maximum amount in 2016				\$74.73
Maximum amount in 2030				\$87.67
Maximum amount in 2043				\$76.59
Maximum amount in 2050				\$69.19

Table D-18

Upland Cotton Production Profitability in Maricopa Stanfield -- Partial Budget
(dollar values on a per acre basis)

Upland Cotton Production Profitability in Mississippi (dollar values on a per acre basis)				Settlement Alternative
Crop sales revenues	yield in pds. cottonseed	1,154 price per pd 1.02 price	0.678 133.6	\$782.41 \$136.27
Total cash growing costs (includes \$144 for irrigation water)				\$460.51
Cash harvest costs				\$238.85
Interest on operating costs @ 10 %				\$23.03
Total cash expenses				\$722.39
General and office overhead -- 5% of operating expense				\$36.12
General farm maintenance -- 3% of operating expense				\$21.67
Total variable costs				\$780.18
Crop profitability decision value				\$138.51
Annual crop water use -- 49 acre inches or	4.08 acre feet			
Profitability decision value plus present water cost				\$282.51
Adjustment for Elimination of 9(d) Repayment Obligation -- 2001				\$2.28
Maximum average amount a farmer would pay for irrigation water per acre foot				\$71.47
Maximum amount in 2004				\$71.47
Maximum amount in 2016				\$91.99
Maximum amount in 2030				\$91.99
Maximum amount in 2043				\$69.19
Maximum amount in 2050				\$69.19

Table D-19

Forage Production Profitability in Pinal County -- Partial Budget

(dollar values on a per acre basis)

Crop sales revenues	yield in tons	7.5 price per tn	96.7	\$725.25
	grazing	250 cents per hd	0.13	\$32.50
Total cash growing costs (includes \$237 for irrigation water)				\$332.43
Cash harvest costs				\$176.31
Interest on operating costs @ 10 %				\$16.62
Total cash expenses				\$525.36
General and office overhead -- 5% of operating expense				\$26.27
General farm maintenance -- 3% of operating expense				\$15.76
Share of stand establishment				\$84.22
Total variable costs				\$651.61
Crop profitability decision value				\$106.14
Annual crop water use -- 79 acre inches or		6.58 acre feet		
Profitability decision value plus present water cost				\$343.14
Maximum average amount a farmer would pay for irrigation water per acre foot				\$52.12

Grain Production Profitability in Pinal County -- Partial Budget
(dollar values on a per acre basis)

Table D-20

Crop sales revenues	yield in pds.	4,900 price per pd	0.075	\$367.50
Total cash growing costs (includes \$96 for irrigation water)				\$247.84
Cash harvest costs				\$67.38
Interest on operating costs @ 10 %				\$12.39
Total cash expenses				\$327.61
General and office overhead -- 5% of operating expense				\$16.38
General farm maintenance -- 3% of operating expense				\$9.83
Total variable costs				\$353.82
Crop profitability decision value				\$13.68
Annual crop water use -- 32 acre inches or		2.67 acre feet		
Profitability decision value plus present water cost				\$109.68
Maximum average amount a farmer would pay for irrigation water per acre foot				\$41.13

Adjustments of Agricultural Output Due to Cropping Pattern Changes – Gross Output – Settlement Alternative

Table D-21

Year		Irrigation District	Cotton	Grain	Forage	Vegetables	Trees	Totals	
2001	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	0	0	0	0	\$0	
		Chuichu	0	0	0	0	0	\$0	
		Gila River	0	0	0	0	0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pma	Queen Creek	0	0	0	0	0	\$0	
		Harquahala	0	0	0	0	0	\$0	
		Tonopah	0	0	0	0	0	\$0	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,033,515	\$0	\$0	\$0	\$0	\$1,033,515	
		San Xavier	\$0	\$0	\$151,550	\$0	\$0	\$151,550	
		Total for Three County		\$1,033,515	\$0	\$151,550	\$0	\$0	\$1,185,065
2004	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	0	0	0	0	\$0	
		Chuichu	\$0	\$0	\$0	\$0	\$0	\$0	
		Gila River	\$0	\$0	\$0	\$0	\$0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pma	Queen Creek	0	0	(\$2,439,934)	0	0	(\$2,439,934)	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	0	0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$0	\$0	\$0	\$1,283,223	
		San Xavier	\$0	\$0	\$606,200	\$0	\$0	\$606,200	
		Total for Three County		\$1,146,513	\$136,710	(\$3,816,471)	\$0	\$0	(\$2,533,249)
2017	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	\$0	\$0	\$0	0	0	\$0	
		New Magma	\$0	(\$1,876,823)	\$0	0	0	(\$1,876,823)	
		Chuichu	\$1,102,418	\$294,000	\$0	\$0	\$0	\$1,396,418	
		Gila River	\$28,778,006	\$5,158,936	\$4,300,155	\$11,063,677	\$0	\$47,298,775	
	Total for Pinal County		\$27,880,422	\$3,574,114	\$4,300,155	\$11,063,677	\$0	\$46,818,368	(\$1,876,823)
	Two Co. Mar.&Pma	Queen Creek	0	(\$1,815,740)	(\$2,439,934)	0	0	(\$4,055,674)	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355	
		San Xavier	\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505	
		Total for Three County		\$29,026,935	\$3,016,774	\$2,221,963	\$12,237,104	\$41,041	\$46,543,817
									\$54,459,050

			Cotton	Grain	Forage	Vegetables	Trees	Totals	Table D-21
2030	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0	
		Central Arizona	\$0	\$0	\$0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	\$0	\$0	\$0	0	0	\$0	
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	0	0	(\$6,005,802)	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$61,149,775	\$11,776,288	\$9,819,758	\$25,264,814	\$0	\$108,010,635	
	Total for Pinal County		\$62,252,191	\$10,193,465	\$5,690,778	\$25,284,814	\$0	\$103,401,249	(\$6,005,802)
									\$109,407,051
	Two Co. Mar.&Pma	Queen Creek	\$0	(\$1,615,740)	(\$2,439,934)	0	0	(\$4,055,674)	
Harquahala		\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)		
Tonopah		\$0	\$0	(\$422,386)	0	0	(\$422,386)		
Roosevelt		0	0	\$0	0	0	\$0		
Schuk Toak		\$1,675,672	\$199,920	\$556,189	\$396,537	\$41,041	\$2,869,360		
San Xavier		\$0	\$1,433,250	\$3,220,438	\$1,011,575	\$0	\$5,665,263		
Total for Three County		\$63,927,864	\$10,210,895	\$5,044,733	\$26,672,926	\$41,041	\$105,897,460	(\$12,044,213)	
								\$117,941,673	
2043	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0	
		Central Arizona	\$0	(\$8,387,453)	\$0	0	0	(\$8,387,453)	
		San Carlos	0	\$0	\$0	0	0	\$0	
		Hohokam	\$0	\$0	\$0	0	0	\$0	
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	0	0	(\$6,005,802)	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$61,149,775	\$11,776,288	\$9,819,758	\$25,264,814	\$0	\$108,010,635	
	Total for Pinal County		\$62,252,191	\$1,806,013	\$5,690,778	\$25,264,814	\$0	\$95,013,796	(\$14,393,255)
									\$109,407,051
	Two Co. Mar.&Pma	Queen Creek	\$0	(\$1,615,740)	(\$2,439,934)	0	0	(\$4,055,674)	
Harquahala		\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)		
Tonopah		\$0	\$0	(\$422,386)	0	0	(\$422,386)		
Roosevelt		0	0	\$0	0	0	\$0		
Schuk Toak		\$1,675,672	\$199,920	\$556,189	\$396,537	\$41,041	\$2,869,360		
San Xavier		\$0	\$1,433,250	\$3,220,438	\$1,011,575	\$0	\$5,665,263		
Total for Three County		\$63,927,864	\$1,823,443	\$5,044,733	\$26,672,926	\$41,041	\$97,510,007	(\$20,431,666)	
								\$117,941,673	
2050	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0	
		Central Arizona	\$0	(\$8,387,453)	\$0	0	0	(\$8,387,453)	
		San Carlos	0	\$0	\$0	0	0	\$0	
		Hohokam	\$0	(\$3,170,423)	\$0	0	0	(\$3,170,423)	
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	0	0	(\$6,005,802)	
		Chulchu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$61,149,775	\$11,776,288	\$9,819,758	\$25,264,814	\$0	\$108,010,635	
	Total for Pinal County		\$82,252,191	(\$1,364,410)	\$5,690,778	\$25,264,814	\$0	\$91,843,373	(\$17,563,678)
									\$109,407,051
	Two Co. Mar.&Pma	Queen Creek	(\$5,132,860)	(\$1,615,740)	(\$2,439,934)	0	0	(\$9,188,534)	
Harquahala		\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)		
Tonopah		\$0	\$0	(\$422,386)	0	0	(\$422,386)		
Roosevelt		0	0	\$0	0	0	\$0		
Schuk Toak		\$1,675,672	\$199,920	\$556,189	\$396,537	\$41,041	\$2,869,360		
San Xavier		\$0	\$1,433,250	\$3,220,438	\$1,011,575	\$0	\$5,665,263		
Total for Three County		\$58,795,004	(\$1,346,980)	\$5,044,733	\$26,672,926	\$41,041	\$89,206,724	(\$28,734,949)	
								\$117,941,673	

Adjustments of Agricultural Output Due to Cropping Pattern Changes – Gross Output -- No Action Alternative

Table D-22

Year		Irrigation District	Cotton	Grain	Forage	Vegetables	Trees	Totals	
2001	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	0	0	0	0	\$0	
		Chuichu	0	0	0	0	0	\$0	
		Gila River	0	0	0	0	0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co.	Queen Creek	0	0	0	0	0	\$0	
	Mar.&Pma	Harquahala	0	0	0	0	0	\$0	
Tonopah		0	0	0	0	0	\$0		
Roosevelt		0	0	0	0	0	\$0		
Schuk Toak		\$1,033,515	\$0	\$0	\$0	\$0	\$1,033,515		
San Xavier		\$0	\$0	\$151,550	\$0	\$0	\$151,550		
Total for Three County		\$1,033,515	\$0	\$151,550	\$0	\$0	\$1,185,065	\$0	
									\$1,185,065
2004	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	0	0	0	0	\$0	
		Chuichu	\$0	\$0	\$0	\$0	\$0	\$0	
		Gila River	\$0	\$0	\$0	\$0	\$0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co.	Queen Creek	0	0	\$0	0	0	\$0	
	Mar.&Pma	Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
Tonopah		0	0	\$0	0	0	\$0		
Roosevelt		0	0	0	0	0	\$0		
Schuk Toak		\$1,146,513	\$136,710	\$0	\$0	\$0	\$1,283,223		
San Xavier		\$0	\$0	\$606,200	\$0	\$0	\$606,200		
Total for Three County		\$1,146,513	\$136,710	(\$954,151)	\$0	\$0	\$329,071	(\$1,560,351)	
									\$1,889,423
2017	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	\$0	\$0	\$0	0	0	\$0	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$26,778,006	\$5,156,936	\$4,300,155	\$11,063,677	\$0	\$47,298,775	
	Total for Pinal County		\$27,880,422	\$5,450,936	\$4,300,155	\$11,063,677	\$0	\$48,695,191	\$0
	Two Co.	Queen Creek	\$0	\$0	(\$2,439,934)	0	0	(\$2,439,934)	
	Mar.&Pma	Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
Tonopah		\$0	\$0	(\$422,386)	0	0	(\$422,386)		
Roosevelt		0	0	\$0	0	0	\$0		
Schuk Toak		\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355		
San Xavier		\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505		
Total for Three County		\$29,026,935	\$6,509,336	\$2,221,963	\$12,237,104	\$41,041	\$50,036,379	(\$4,422,671)	
									\$54,459,050

			Cotton	Grain	Forage	Vegetables	Trees	Totals	Table D-22
2030	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0	
		Central Arizona	\$0	\$0	\$0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	\$0	\$0	\$0	0	0	\$0	
		New Magma	\$0	\$0	\$0	0	0	\$0	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$44,363,562	\$8,543,581	\$7,124,138	\$18,329,375	\$0	\$78,360,657	
	Total for Pinal County		\$45,465,978	\$8,837,581	\$7,124,138	\$18,329,375	\$0	\$79,757,073	\$0
									\$79,757,073
	Two Co. Mar.&Pma	Queen Creek	\$0	\$0	\$0	0	0	\$0	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$138,710	\$298,554	\$396,537	\$41,041	\$2,019,355	
		San Xavier	\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505	
	Total for Three County		\$46,612,491	\$9,895,961	\$7,485,880	\$19,502,802	\$41,041	\$83,538,195	(\$1,982,737)
								\$85,520,932	
2043	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0	
		Central Arizona	\$0	(\$8,387,453)	\$0	0	0	(\$8,387,453)	
		San Carlos	0	\$0	\$0	0	0	\$0	
		Hohokam	\$0	\$0	\$0	0	0	\$0	
		New Magma	\$0	\$0	\$0	0	0	\$0	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$44,363,562	\$8,543,581	\$7,124,138	\$18,329,375	\$0	\$78,360,657	
	Total for Pinal County		\$45,465,978	\$450,129	\$7,124,138	\$18,329,375	\$0	\$71,369,620	(\$8,387,453)
									\$79,757,073
	Two Co. Mar.&Pma	Queen Creek	\$0	\$0	\$0	0	0	\$0	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355	
		San Xavier	\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505	
	Total for Three County		\$46,612,491	\$1,508,529	\$7,465,880	\$19,502,802	\$41,041	\$75,150,743	(\$10,370,189)
								\$85,520,932	
2050	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0	
		Central Arizona	\$0	(\$8,387,453)	\$0	0	0	(\$8,387,453)	
		San Carlos	0	\$0	\$0	0	0	\$0	
		Hohokam	\$0	(\$3,170,423)	\$0	0	0	(\$3,170,423)	
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	0	0	(\$8,005,802)	
		Chuichu	\$1,102,418	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$44,363,562	\$8,543,581	\$7,124,138	\$18,329,375	\$0	\$78,360,657	
	Total for Pinal County		\$45,465,978	(\$4,597,117)	\$2,995,158	\$18,329,375	\$0	\$62,193,395	(\$17,563,678)
									\$79,757,073
	Two Co. Mar.&Pma	Queen Creek	\$0	(\$1,615,740)	(\$2,439,934)	0	0	(\$4,055,674)	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355	
		San Xavier	\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505	
	Total for Three County		\$46,612,491	(\$5,154,457)	\$916,966	\$19,502,802	\$41,041	\$61,916,843	(\$23,602,089)
								\$85,520,932	

Adjustments of Agricultural Output Due to Cropping Pattern Changes – Gross Output – Alternative 1

Table D-23

Year		Irrigation District	Cotton	Grain	Forage	Vegetables	Trees	Totals	
2001	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	0	
		Central Arizona	0	0	0	0	0	0	
		San Carlos	0	0	0	0	0	0	
		Hohokam	0	0	0	0	0	0	
		New Magma	0	0	0	0	0	0	
		Chuichu	0	0	0	0	0	0	
		Gila River	0	0	0	0	0	0	
		Total for Pinal County	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pma	Queen Creek	0	0	0	0	0	\$0	
		Harquahala	0	0	0	0	0	\$0	
		Tonopah	0	0	0	0	0	\$0	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,033,515	\$0	\$0	\$0	\$0	\$1,033,515	
San Xavier		\$0	\$0	\$151,550	\$0	\$0	\$151,550		
		Total for Three County	\$1,033,515	\$0	\$151,550	\$0	\$0	\$1,185,065	\$0
								\$1,185,065	
2004	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	0	0	0	0	\$0	
		Chuichu	\$0	\$0	\$0	\$0	\$0	\$0	
		Gila River	\$0	\$0	\$0	\$0	\$0	\$0	
		Total for Pinal County	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pma	Queen Creek	0	0	\$0	0	0	\$0	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	0	0	\$0	0	0	\$0	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$0	\$0	\$0	\$1,283,223	
San Xavier		\$0	\$0	\$606,200	\$0	\$0	\$606,200		
		Total for Three County	\$1,146,513	\$136,710	(\$954,151)	\$0	\$0	\$329,071	(\$1,560,351)
								\$1,889,423	
2017	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	\$0	(\$1,876,823)	\$0	0	0	(\$1,876,823)	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$26,778,006	\$5,158,936	\$4,300,155	\$11,063,677	\$0	\$47,298,775	
		Total for Pinal County	\$27,880,422	\$3,574,114	\$4,300,155	\$11,063,677	\$0	\$48,818,368	(\$1,876,823)
									\$48,695,191
	Two Co. Mar.&Pma	Queen Creek	\$0	\$0	\$0	0	0	\$0	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	\$0	0	0	\$0	
Schuk Toak		\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355		
San Xavier		\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505		
		Total for Three County	\$29,026,935	\$4,632,514	\$4,681,897	\$12,237,104	\$41,041	\$50,599,491	(\$3,859,559)
								\$54,459,050	

			Cotton	Grain	Forage	Vegetable	Trees	Totals	Table D-23
2030	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	\$0	0	0	\$0
		Central Arizona	\$0	\$0	\$0	\$0	0	0	\$0
		San Carlos	0	0	0	0	0	0	\$0
		Hohokam	\$0	\$0	\$0	\$0	0	0	\$0
		New Magma	\$0	(\$1,876,823)	\$0	\$0	0	0	(\$1,876,823)
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$0	\$1,396,416
		Gila River	\$48,759,952	\$9,236,304	\$7,830,134	\$20,145,799	\$0	\$0	\$85,972,189
		Total for Pinal County	\$49,862,368	\$7,653,482	\$7,830,134	\$20,145,799	\$0	\$85,491,782	(\$1,876,823) \$87,368,605
	Two Co.	Queen Creek	\$0	\$0	(\$2,439,934)	\$0	0	0	(\$2,439,934)
	Mar.&Pma	Harquahala	\$0	\$0	(\$1,560,351)	\$0	0	0	(\$1,560,351)
		Tonopah	\$0	\$0	(\$422,386)	\$0	0	0	(\$422,386)
		Roosevelt	0	0	\$0	\$0	0	0	\$0
		Schuk Toak	\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355	
		San Xavier	\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505	
		Total for Three County	\$51,008,880	\$8,711,882	\$5,751,941	\$21,319,226	\$41,041	\$86,832,971	(\$6,299,494) \$93,132,464
2043	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	\$0	0	0	\$0
		Central Arizona	\$0	(\$8,387,453)	\$0	\$0	0	0	(\$8,387,453)
		San Carlos	0	\$0	\$0	\$0	0	0	\$0
		Hohokam	\$0	\$0	\$0	\$0	0	0	\$0
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	\$0	0	0	(\$6,005,802)
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$0	\$1,396,416
		Gila River	\$48,759,952	\$9,236,304	\$7,830,134	\$20,145,799	\$0	\$0	\$85,972,189
		Total for Pinal County	\$49,862,368	(\$733,971)	\$3,701,154	\$20,145,799	\$0	\$72,975,350	(\$14,393,255) \$87,368,605
	Two Co.	Queen Creek	\$0	\$0	(\$2,439,934)	\$0	0	0	(\$2,439,934)
	Mar.&Pma	Harquahala	\$0	\$0	(\$1,560,351)	\$0	0	0	(\$1,560,351)
		Tonopah	\$0	\$0	(\$422,386)	\$0	0	0	(\$422,386)
		Roosevelt	0	0	\$0	\$0	0	0	\$0
		Schuk Toak	\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355	
		San Xavier	\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505	
		Total for Three County	\$51,008,880	\$324,429	\$1,622,961	\$21,319,226	\$41,041	\$74,316,538	(\$18,815,926) \$93,132,464
2050	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	\$0	0	0	\$0
		Central Arizona	\$0	(\$8,387,453)	\$0	\$0	0	0	(\$8,387,453)
		San Carlos	0	\$0	\$0	\$0	0	0	\$0
		Hohokam	\$0	(\$3,170,423)	\$0	\$0	0	0	(\$3,170,423)
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	\$0	0	0	(\$6,005,802)
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$0	\$1,396,416
		Gila River	\$48,759,952	\$9,236,304	\$7,830,134	\$20,145,799	\$0	\$0	\$85,972,189
		Total for Pinal County	\$49,862,368	(\$3,904,394)	\$3,701,154	\$20,145,799	\$0	\$69,804,927	(\$17,563,678) \$87,368,605
	Two Co.	Queen Creek	\$0	\$0	(\$2,439,934)	\$0	0	0	(\$2,439,934)
	Mar.&Pma	Harquahala	\$0	\$0	(\$1,560,351)	\$0	0	0	(\$1,560,351)
		Tonopah	\$0	\$0	(\$422,386)	\$0	0	0	(\$422,386)
		Roosevelt	0	0	\$0	\$0	0	0	\$0
		Schuk Toak	\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355	
		San Xavier	\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505	
		Total for Three County	\$51,008,880	(\$2,845,994)	\$1,622,961	\$21,319,226	\$41,041	\$71,146,115	(\$21,986,349) \$93,132,464

Adjustments of Agricultural Output Due to Cropping Pattern Changes – Gross Output – Alternative 2

Table D-24

Year		Irrigation District	Cotton	Grain	Forage	Vegetables	Trees	Totals	
2001	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	0	0	0	0	\$0	
		Chuichu	0	0	0	0	0	\$0	
		Gila River	0	0	0	0	0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pima	Queen Creek	0	0	0	0	0	\$0	
		Harquahala	0	0	0	0	0	\$0	
		Tonopah	0	0	0	0	0	\$0	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,033,515	\$0	\$0	\$0	\$0	\$1,033,515	
		San Xavier	\$0	\$0	\$151,550	\$0	\$0	\$151,550	
Total for Three County		\$1,033,515	\$0	\$151,550	\$0	\$0	\$1,185,065	\$0	
								\$1,185,065	
2004	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	0	0	0	0	\$0	
		Chuichu	\$0	\$0	\$0	\$0	\$0	\$0	
		Gila River	\$0	\$0	\$0	\$0	\$0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pima	Queen Creek	0	0	0	0	0	\$0	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	0	0	\$0	0	0	\$0	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$0	\$0	\$0	\$1,283,223	
		San Xavier	\$0	\$0	\$606,200	\$0	\$0	\$606,200	
Total for Three County		\$1,146,513	\$136,710	(\$954,151)	\$0	\$0	\$329,071	(\$1,550,351)	
								\$1,889,423	
2017	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	\$0	(\$1,876,823)	\$0	0	0	(\$1,876,823)	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$26,778,006	\$5,156,936	\$4,300,155	\$11,063,677	\$0	\$47,298,775	
	Total for Pinal County		\$27,880,422	\$3,574,114	\$4,300,155	\$11,063,677	\$0	\$46,818,368	(\$1,876,823)
									\$48,695,191
	Two Co. Mar.&Pima	Queen Creek	\$0	\$0	(\$2,439,934)	0	0	(\$2,439,934)	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,366)	0	0	(\$422,366)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355	
San Xavier		\$0	\$821,690	\$2,045,925	\$776,890	\$0	\$3,744,505		
Total for Three County		\$29,026,935	\$4,632,514	\$2,221,963	\$12,237,104	\$41,041	\$48,159,557	(\$6,299,494)	
								\$54,459,050	

			Cotton	Grain	Forage	Vegetable	Trees	Totals	Table D-24
2030	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0	
		Central Arizona	\$0	\$0	\$0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	\$0	\$0	\$0	0	0	\$0	
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	0	0	(\$6,005,802)	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$53,156,341	\$10,236,904	\$6,536,130	\$21,962,224	\$0	\$93,891,598	
	Total for Pinal County		\$54,258,757	\$8,654,081	\$4,407,150	\$21,962,224	\$0	\$89,282,211	(\$6,005,802)
									\$95,288,014
	Two Co.	Queen Creek	\$0	\$0	(\$2,439,934)	0	0	(\$2,439,934)	
	Mar.&Pma	Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,675,672	\$199,920	\$556,189	\$396,537	\$41,041	\$2,869,360	
		San Xavier	\$0	\$1,433,250	\$3,220,438	\$1,011,575	\$0	\$5,665,263	
	Total for Three County		\$55,934,429	\$10,287,251	\$3,761,105	\$23,370,336	\$41,041	\$93,394,162	(\$10,428,473)
									\$103,822,636
2043	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0	
		Central Arizona	\$0	(\$8,387,453)	\$0	0	0	(\$8,387,453)	
		San Carlos	0	\$0	\$0	0	0	\$0	
		Hohokam	\$0	\$0	\$0	0	0	\$0	
		New Magma	\$0	(\$1,876,823)	(\$4,126,980)	0	0	(\$6,005,802)	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$53,156,341	\$10,236,904	\$6,536,130	\$21,962,224	\$0	\$93,891,598	
	Total for Pinal County		\$54,258,757	\$266,629	\$4,407,150	\$21,962,224	\$0	\$80,894,759	(\$14,393,255)
									\$95,288,014
	Two Co.	Queen Creek	\$0	(\$1,615,740)	(\$2,439,934)	0	0	(\$4,055,674)	
	Mar.&Pma	Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,675,672	\$199,920	\$556,189	\$396,537	\$41,041	\$2,869,360	
		San Xavier	\$0	\$1,433,250	\$3,220,438	\$1,011,575	\$0	\$5,665,263	
	Total for Three County		\$55,934,429	\$284,059	\$3,761,105	\$23,370,336	\$41,041	\$83,390,970	(\$20,431,666)
									\$103,822,636
2050	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0	
		Central Arizona	\$0	(\$8,387,453)	\$0	0	0	(\$8,387,453)	
		San Carlos	0	\$0	\$0	0	0	\$0	
		Hohokam	\$0	(\$3,170,423)	\$0	0	0	(\$3,170,423)	
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	0	0	(\$6,005,802)	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$53,156,341	\$10,236,904	\$8,536,130	\$21,962,224	\$0	\$93,891,598	
	Total for Pinal County		\$54,258,757	(\$2,903,794)	\$4,407,150	\$21,962,224	\$0	\$77,724,336	(\$17,563,678)
									\$95,288,014
	Two Co.	Queen Creek	\$0	(\$1,615,740)	(\$2,439,934)	0	0	(\$4,055,674)	
	Mar.&Pma	Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,675,672	\$199,920	\$556,189	\$396,537	\$41,041	\$2,869,360	
		San Xavier	\$0	\$1,433,250	\$3,220,438	\$1,011,575	\$0	\$5,665,263	
	Total for Three County		\$55,934,429	(\$2,886,364)	\$3,761,105	\$23,370,336	\$41,041	\$80,220,547	(\$23,602,089)
									\$103,822,636

Adjustments of Agricultural Output Due to Cropping Pattern Changes -- Gross Output -- Alternative 3a

Table D-25

Year		Irrigation District	Cotton	Grain	Forage	Vegetables	Trees	Totals	
2001	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	0	0	0	0	\$0	
		Chulchu	0	0	0	0	0	\$0	
		Gila River	0	0	0	0	0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pma	Queen Creek	0	0	0	0	0	\$0	
		Harquahala	0	0	0	0	0	\$0	
		Tonopah	0	0	0	0	0	\$0	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,033,515	\$0	\$0	\$0	\$0	\$1,033,515	
		San Xavier	\$0	\$0	\$151,550	\$0	\$0	\$151,550	
Total for Three County		\$1,033,515	\$0	\$151,550	\$0	\$0	\$1,185,065	\$0	
								\$1,185,065	
2004	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	\$0	0	0	0	\$0	
		Chuichu	\$0	\$0	\$0	\$0	\$0	\$0	
		Gila River	\$0	\$0	\$0	\$0	\$0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pma	Queen Creek	0	0	0	0	0	\$0	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	0	0	\$0	0	0	\$0	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$0	\$0	\$0	\$1,283,223	
		San Xavier	\$0	\$0	\$606,200	\$0	\$0	\$606,200	
Total for Three County		\$1,146,513	\$136,710	(\$954,151)	\$0	\$0	\$328,071	(\$1,560,351)	
								\$1,889,423	
2017	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	\$0	(\$1,876,823)	\$0	0	0	(\$1,876,823)	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$26,778,006	\$5,156,936	\$4,300,155	\$11,063,677	\$0	\$47,298,775	
	Total for Pinal County		\$27,880,422	\$3,574,114	\$4,300,155	\$11,063,677	\$0	\$46,818,368	(\$1,876,823)
									\$46,695,191
	Two Co. Mar.&Pma	Queen Creek	\$0	\$0	(\$2,439,934)	0	0	(\$2,439,934)	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,368)	0	0	(\$422,368)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$298,554	\$396,537	\$41,041	\$2,019,355	
San Xavier		\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505		
Total for Three County		\$29,026,935	\$4,632,514	\$2,221,963	\$12,237,104	\$41,041	\$48,159,557	(\$6,289,494)	
								\$54,459,051	

Adjustments of Agricultural Output Due to Cropping Pattern Changes – Gross Output – Alternative 3b

Table D-26

Year	Irrigation District		Cotton	Grain	Forage	Vegetables	Trees	Totals	
2001	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	0	0	0	0	\$0	
		Chuichu	0	0	0	0	0	\$0	
		Gila River	0	0	0	0	0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pima	Queen Creek	0	0	0	0	0	\$0	
		Harquahala	0	0	0	0	0	\$0	
		Tonopah	0	0	0	0	0	\$0	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,033,515	\$0	\$0	\$0	\$0	\$1,033,515	
		San Xavier	\$0	\$0	\$151,550	\$0	\$0	\$151,550	
Total for Three County		\$1,033,515	\$0	\$151,550	\$0	\$0	\$1,185,065	\$0	
2004	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	0	\$0	0	0	0	\$0	
		Chuichu	\$0	\$0	\$0	\$0	\$0	\$0	
		Gila River	\$0	\$0	\$0	\$0	\$0	\$0	
	Total for Pinal County		\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Two Co. Mar.&Pima	Queen Creek	0	0	0	0	0	\$0	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	0	0	\$0	0	0	\$0	
		Roosevelt	0	0	0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$0	\$0	\$0	\$1,283,223	
		San Xavier	\$0	\$0	\$606,200	\$0	\$0	\$606,200	
Total for Three County		\$1,146,513	\$136,710	(\$954,151)	\$0	\$0	\$329,072	(\$1,560,351)	
2017	Pinal Co.	Maricopa Stanfield	0	0	0	0	0	\$0	
		Central Arizona	0	0	0	0	0	\$0	
		San Carlos	0	0	0	0	0	\$0	
		Hohokam	0	0	0	0	0	\$0	
		New Magma	\$0	(\$1,876,823)	\$0	0	0	(\$1,876,823)	
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416	
		Gila River	\$26,776,008	\$5,156,936	\$4,300,155	\$11,063,677	\$0	\$47,298,775	
	Total for Pinal County		\$27,880,422	\$3,574,114	\$4,300,155	\$11,063,677	\$0	\$46,818,368	(\$1,876,823)
	Two Co. Mar.&Pima	Queen Creek	\$0	\$0	(\$2,439,934)	0	0	(\$2,439,934)	
		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)	
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)	
		Roosevelt	0	0	\$0	0	0	\$0	
		Schuk Toak	\$1,146,513	\$136,710	\$288,554	\$396,537	\$41,041	\$2,019,355	
		San Xavier	\$0	\$921,690	\$2,045,925	\$776,890	\$0	\$3,744,505	
Total for Three County		\$29,026,935	\$4,632,514	\$2,221,963	\$12,237,104	\$41,041	\$48,159,557	(\$6,299,494)	

		Cotton	Grain	Forage	Vegetable	Trees	Totals	Table D-26
2030	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0
		Central Arizona	\$0	(\$8,387,453)	\$0	0	0	(\$8,387,453)
		San Carlos	0	0	0	0	0	\$0
		Hohokam	\$0	\$0	\$0	0	0	\$0
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	0	0	(\$8,005,802)
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416
		Gila River	\$71,141,569	\$13,700,518	\$11,424,294	\$29,393,052	\$0	\$125,659,431
		Total for Pinal County	\$72,243,985	\$3,730,243	\$7,295,314	\$29,393,052	\$0	\$112,662,593 (\$14,393,255)
								\$127,055,847
		Two Co.	Queen Creek	\$0	\$0	(\$2,439,934)	0	0
Mar.&Pma		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)
		Roosevelt	0	0	\$0	0	0	\$0
		Schuk Toak	\$1,675,672	\$199,920	\$556,189	\$396,537	\$41,041	\$2,869,360
		San Xavier	\$0	\$1,433,250	\$3,220,438	\$1,011,575	\$0	\$5,665,263
		Total for Three County	\$73,919,657	\$5,363,413	\$8,649,269	\$30,801,184	\$41,041	\$116,774,544 (\$18,815,928)
							\$135,590,470	
2043	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0
		Central Arizona	\$0	(\$8,387,453)	\$0	0	0	(\$8,387,453)
		San Carlos	0	\$0	\$0	0	0	\$0
		Hohokam	\$0	\$0	\$0	0	0	\$0
		New Magma	\$0	(\$1,876,823)	(\$4,128,980)	0	0	(\$8,005,802)
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416
		Gila River	\$71,141,569	\$13,700,518	\$11,424,294	\$29,393,052	\$0	\$125,659,431
		Total for Pinal County	\$72,243,985	\$3,730,243	\$7,295,314	\$29,393,052	\$0	\$112,662,593 (\$14,393,255)
								\$127,055,847
		Two Co.	Queen Creek	\$0	(\$1,615,740)	(\$2,439,934)	0	0
Mar.&Pma		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)
		Roosevelt	0	0	\$0	0	0	\$0
		Schuk Toak	\$1,675,672	\$199,920	\$556,189	\$396,537	\$41,041	\$2,869,360
		San Xavier	\$0	\$1,433,250	\$3,220,438	\$1,011,575	\$0	\$5,665,263
		Total for Three County	\$73,919,657	\$3,747,673	\$8,649,269	\$30,801,164	\$41,041	\$115,158,804 (\$20,431,666)
							\$135,590,470	
2050	Pinal Co.	Maricopa Stanfield	\$0	\$0	\$0	0	0	\$0
		Central Arizona	\$0	(\$8,387,453)	\$0	0	0	(\$8,387,453)
		San Carlos	0	\$0	\$0	0	0	\$0
		Hohokam	\$0	(\$3,170,423)	\$0	0	0	(\$3,170,423)
		New Magma	\$0	(\$1,676,823)	(\$4,128,980)	0	0	(\$6,005,802)
		Chuichu	\$1,102,416	\$294,000	\$0	\$0	\$0	\$1,396,416
		Gila River	\$71,141,569	\$13,700,518	\$11,424,294	\$29,393,052	\$0	\$125,659,431
		Total for Pinal County	\$72,243,985	\$559,620	\$7,295,314	\$29,393,052	\$0	\$109,492,170 (\$17,563,676)
								\$127,055,847
		Two Co.	Queen Creek	\$0	(\$1,615,740)	(\$2,439,934)	0	0
Mar.&Pma		Harquahala	\$0	\$0	(\$1,560,351)	0	0	(\$1,560,351)
		Tonopah	\$0	\$0	(\$422,386)	0	0	(\$422,386)
		Roosevelt	0	0	\$0	0	0	\$0
		Schuk Toak	\$1,675,672	\$199,920	\$556,189	\$396,537	\$41,041	\$2,869,360
		San Xavier	\$0	\$1,433,250	\$3,220,438	\$1,011,575	\$0	\$5,665,263
		Total for Three County	\$73,919,657	\$577,260	\$8,649,269	\$30,801,164	\$41,041	\$111,988,381 (\$23,602,089)
							\$135,590,470	

Composite District Analysis and Summary and Adjustments of Agricultural Output Due to Cropping Changes
Crop Acreage and Output in Dollars

Table D-37

Settlement Alternative

Year	Cotton Acres	Cotton Sales	Grain Acres	Grain Sales	Forage Acres	Forage Sales	Vegetable Acres	Tree Acres	Total Acres	Total Sales
2001	99,407	\$92,539,197	61,689	\$23,037,054	26,466	\$20,145,226	15,003	8,895	211,460	\$135,721,477
2004	99,407	\$92,539,197	61,689	\$23,037,054	20,749	\$15,722,555	15,003	8,895	205,743	\$131,298,806
2017	99,407	\$92,539,197	52,735	\$19,544,491	20,749	\$15,722,555	15,003	8,895	196,789	\$127,806,243
2030	99,407	\$92,539,197	52,735	\$19,544,491	15,300	\$11,593,575	15,003	8,895	191,340	\$123,677,263
2043	99,407	\$92,539,197	29,912	\$11,157,038	15,300	\$11,593,575	15,003	8,895	168,517	\$115,289,810
2050	94,149	\$87,406,337	21,285	\$7,986,615	15,300	\$11,593,575	15,003	8,895	154,632	\$106,966,527

*Vegetable and tree sales are not provided because these crop are not vulnerable to water reallocation or water cost increases during the study period.

No Action Alternative

Year	Cotton Acres	Cotton Sales	Grain Acres	Grain Sales	Forage Acres	Forage Sales	Vegetable Acres	Tree Acres	Total Acres	Total Sales
2001	99,407	\$92,539,197	61,689	\$23,037,054	26,466	\$20,145,226	15,003	8,895	211,460	\$135,721,477
2004	99,407	\$92,539,197	61,689	\$23,037,054	24,449	\$18,584,875	15,003	8,895	209,443	\$134,161,126
2017	99,407	\$92,539,197	61,689	\$23,037,054	20,749	\$15,722,555	15,003	8,895	205,743	\$131,298,806
2030	99,407	\$92,539,197	61,689	\$23,037,054	23,903	\$18,162,489	15,003	8,895	208,897	\$133,736,740
2043	99,407	\$92,539,197	38,866	\$14,649,601	20,749	\$15,722,555	15,003	8,895	182,920	\$122,911,353
2050	99,407	\$92,539,197	21,285	\$7,986,615	15,300	\$11,593,575	15,003	8,895	159,890	\$112,118,387

*Vegetable and tree sales are not provided because these crop are not vulnerable to water reallocation or water cost increases during the study period.

Alternative 1

Year	Cotton Acres	Cotton Sales	Grain Acres	Grain Sales	Forage Acres	Forage Sales	Vegetable Acres	Tree Acres	Total Acres	Total Sales
2001	99,407	\$92,539,197	61,689	\$23,037,054	26,466	\$20,145,226	15,003	8,895	211,460	\$135,721,477
2004	99,407	\$92,539,197	61,689	\$23,037,054	24,449	\$18,584,875	15,003	8,895	209,443	\$134,161,126
2017	99,407	\$92,539,197	56,582	\$21,160,231	23,903	\$18,162,489	15,003	8,895	203,780	\$131,861,917
2030	99,407	\$92,539,197	56,582	\$21,160,231	20,749	\$15,722,555	15,003	8,895	200,636	\$128,421,983
2043	99,407	\$92,539,197	33,759	\$12,772,778	15,300	\$11,593,575	15,003	8,895	172,364	\$116,905,550
2050	99,407	\$92,539,197	25,132	\$9,602,355	15,300	\$11,593,575	15,003	8,895	163,737	\$113,735,127

*Vegetable and tree sales are not provided because these crop are not vulnerable to water reallocation or water cost increases during the study period.

Alternative 2

Year	Cotton Acres	Cotton Sales	Grain Acres	Grain Sales	Forage Acres	Forage Sales	Vegetable Acres	Tree Acres	Total Acres	Total Sales
2001	99,407	\$92,539,197	61,689	\$23,037,054	26,466	\$20,145,226	15,003	8,895	211,460	\$135,721,477
2004	99,407	\$92,539,197	61,689	\$23,037,054	23,925	\$18,584,875	15,003	8,895	208,919	\$134,161,126
2017	99,407	\$92,539,197	56,582	\$21,160,231	20,749	\$15,722,555	15,003	8,895	200,636	\$129,421,983
2030	99,407	\$92,539,197	56,582	\$21,160,231	15,300	\$11,593,575	15,003	8,895	195,187	\$125,293,003
2043	99,407	\$92,539,197	29,912	\$11,157,038	15,300	\$11,593,575	15,003	8,895	168,517	\$115,289,810
2050	99,407	\$92,539,197	21,285	\$7,986,615	15,300	\$11,593,575	15,003	8,895	159,890	\$112,118,387

*Vegetable and tree sales are not provided because these crop are not vulnerable to water reallocation or water cost increases during the study period.

Alternative 3a

Year	Cotton Acres	Cotton Sales	Grain Acres	Grain Sales	Forage Acres	Forage Sales	Vegetable Acres	Tree Acres	Total Acres	Total Sales
2001	99,407	\$92,539,197	61,689	\$23,037,054	26,466	\$20,145,226	15,003	8,895	211,460	\$135,721,477
2004	99,407	\$92,539,197	61,689	\$23,037,054	20,749	\$15,722,555	15,003	8,895	200,636	\$129,421,983
2017	99,407	\$92,539,197	56,582	\$21,160,231	20,749	\$15,722,555	15,003	8,895	191,340	\$123,677,263
2030	99,407	\$92,539,197	52,735	\$19,544,491	15,300	\$11,593,575	15,003	8,895	168,517	\$115,289,810
2043	99,407	\$92,539,197	29,912	\$11,157,038	15,300	\$11,593,575	15,003	8,895	159,890	\$112,118,387
2050	99,407	\$92,539,197	21,285	\$7,986,615	15,300	\$11,593,575	15,003	8,895	159,890	\$112,118,387

*Vegetable and tree sales are not provided because these crop are not vulnerable to water reallocation or water cost increases during the study period.

Alternative 3b

Year	Cotton Acres	Cotton Sales	Grain Acres	Grain Sales	Forage Acres	Forage Sales	Vegetable Acres	Tree Acres	Total Acres	Total Sales
2001	99,407	\$92,539,197	61,689	\$23,037,054	26,466	\$20,145,226	15,003	8,895	211,460	\$135,721,477
2004	99,407	\$92,539,197	61,689	\$23,037,054	24,449	\$18,584,875	15,003	8,895	209,443	\$134,161,126
2017	99,407	\$92,539,197	56,582	\$21,160,231	20,749	\$15,722,555	15,003	8,895	200,636	\$129,421,983
2030	99,407	\$92,539,197	33,759	\$12,772,778	15,300	\$11,593,575	15,003	8,895	172,364	\$118,905,550
2043	99,407	\$92,539,197	29,912	\$11,157,038	15,300	\$11,593,575	15,003	8,895	168,517	\$115,289,810
2050	99,407	\$92,539,197	21,285	\$7,986,615	15,300	\$11,593,575	15,003	8,895	159,890	\$112,118,387

*Vegetable and tree sales are not provided because these crop are not vulnerable to water reallocation or water cost increases during the study period.

Indian Agricultural Development and Production -- 2001 through 2050
Settlement Alternative

Table D-25

Gross Sales per Acre		\$918.65	\$367.50	\$757.75	\$4,049.30	\$468.35
Year -- 2001						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	0					
Tohono O'odham						
Schuk Toak	1,125	1,125	0	0	0	0
Chui chu	0					
San Xavier	200	0	0	200	0	0
Totals	1,325	1,125	0	200	0	0
Gross Sales		\$1,033,515	\$0	\$151,550	\$0	\$0
Year -- 2004						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	0					
Tohono O'odham						
Schuk Toak	1,620	1,248	372	0	0	0
Chui chu	0					
San Xavier	800	0	0	800	0	0
Totals	2,420	1,248	372	800	0	0
Gross Sales		\$1,148,513	\$136,710	\$600,200	\$0	\$0
Year -- 2017						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	52,000	28,148	14,032	5,675	2,734	0
Tohono O'odham						
Schuk Toak	2,200	1,248	372	384	98	88
Chui chu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	192	0
Totals	61,600	31,596	17,712	8,769	3,024	88
Gross Sales		\$29,026,513	\$8,509,336	\$8,644,634	\$12,195,546	\$41,041
Year -- 2030						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	118,000	68,563	32,044	12,959	6,244	0
Tohono O'odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chui chu	2,000	1,200	800	0	0	0
San Xavier	6,400	0	3900	4,250	250	0
Totals	131,600	69,587	37,288	17,943	6,592	88
Gross Sales		\$63,827,884	\$13,703,458	\$13,598,384	\$26,672,926	\$41,041
Year -- 2043						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	118,000	68,563	32,044	12,959	6,244	0
Tohono O'odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chui chu	2,000	1,200	800	0	0	0
San Xavier	6,400	0	3900	4,250	250	0
Totals	131,600	69,587	37,288	17,943	6,592	88
Gross Sales		\$63,827,884	\$13,703,458	\$13,598,384	\$26,672,926	\$41,041
Year -- 2050						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	118,000	68,563	32,044	12,959	6,244	0
Tohono O'odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chui chu	2,000	1,200	800	0	0	0
San Xavier	6,400	0	3900	4,250	250	0
Totals	131,600	69,587	37,288	17,943	6,592	88
Gross Sales		\$63,827,884	\$13,703,458	\$13,598,384	\$26,672,926	\$41,041

Indian Agricultural Development and Production -- 2001 through 2050
No Action Alternative

Table D-29

Gross Sales per Acre		\$918.58	\$367.50	\$757.75	\$4,046.30	\$466.38
Year -- 2001						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	0					
Tohono O'Odham						
Schuk Toak	1,125	1,125	0	0	0	0
Chulichu	0					
San Xavier	200	0	0	200	0	0
Totals	1,325	1,125	0	200	0	0
Gross Sales		\$1,033,515	\$0	\$151,550	\$0	\$0
Year -- 2004						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	0					
Tohono O'Odham						
Schuk Toak	1,620	1,248	372	0	0	0
Chulichu	0					
San Xavier	800	0	0	800	0	0
Totals	2,420	1,248	372	800	0	0
Gross Sales		\$1,146,513	\$136,710	\$606,200	\$0	\$0
Year -- 2017						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	52,000	29,148	14,032	5,675	2,734	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chulichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	182	0
Totals	61,800	31,596	17,712	8,769	3,024	88
Gross Sales		\$29,026,835	\$8,509,336	\$8,644,634	\$12,185,548	\$41,041
Year -- 2030						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	85,801	48,291	23,248	9,402	4,530	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chulichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	182	0
Totals	95,401	50,739	26,928	12,496	4,820	88
Gross Sales		\$46,612,491	\$9,895,981	\$9,468,617	\$19,502,802	\$41,041
Year -- 2043						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	85,801	48,291	23,248	9,402	4,530	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chulichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	182	0
Totals	95,401	50,739	26,928	12,496	4,820	88
Gross Sales		\$46,612,491	\$9,895,981	\$9,468,617	\$19,502,802	\$41,041
Year -- 2050						
Area	Total Acres	Cotton	Grains	Forage	Vegetable	Trees
Gila River Indian Community	85,801	48,291	23,248	9,402	4,530	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chulichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	182	0
Totals	95,401	50,739	26,928	12,496	4,820	88
Gross Sales		\$46,612,491	\$9,895,981	\$9,468,617	\$19,502,802	\$41,041

Indian Agricultural Development and Production -- 2001 through 2050

Alternative 1

Table D-30

Gross Sales per Acre		\$318.68	\$357.50	\$757.75	\$4,046.30	\$488.38
Year - 2001						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	0					
Tohono O'Odham						
Schuk Toak	1,125	1,125	0	0	0	0
Chuichu	0					
San Xavier	200	0	0	200	0	0
Totals	1,325	1,125	0	200	0	0
Gross Sales		\$1,033,515	\$0	\$151,550	\$0	\$0
Year - 2004						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	0					
Tohono O'Odham						
Schuk Toak	1,520	1,248	372	0	0	0
Chuichu	0					
San Xavier	800	0	0	800	0	0
Totals	2,420	1,248	372	800	0	0
Gross Sales		\$1,146,513	\$135,710	\$606,200	\$0	\$0
Year - 2017						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	52,000	29,148	14,032	5,675	2,734	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	192	0
Totals	61,600	31,596	17,712	8,769	3,024	88
Gross Sales		\$29,026,935	\$6,509,336	\$6,644,634	\$12,195,548	\$41,041
Year - 2030						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	93,712	53,076	25,133	10,333	4,979	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	192	0
Totals	103,312	55,524	28,813	13,427	5,269	88
Gross Sales		\$51,008,880	\$10,588,704	\$10,174,612	\$21,319,225	\$41,041
Year - 2043						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	93,712	53,076	25,133	10,333	4,979	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	192	0
Totals	103,312	55,524	28,813	13,427	5,269	88
Gross Sales		\$51,008,880	\$10,588,704	\$10,174,612	\$21,319,225	\$41,041
Year - 2050						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	93,712	53,076	25,133	10,333	4,979	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	192	0
Totals	103,312	55,524	28,813	13,427	5,269	88
Gross Sales		\$51,008,880	\$10,588,704	\$10,174,612	\$21,319,225	\$41,041

Indian Agricultural Development and Production -- 2001 through 2050
Alternative 2

Table D-31

Gross Sales per Acre		\$918.68	\$367.50	\$757.75	\$4,046.30	\$466.38
Year - 2001						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	0					
Tohono O'Odham						
Schuk Toak	1,125	1,125	0	0	0	0
Chui chu	0					
San Xavier	200	0	0	200	0	0
Totals	1,325	1,125	0	200	0	0
Gross Sales		\$1,033,515	\$0	\$151,550	\$0	\$0
Year - 2004						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	0					
Tohono O'Odham						
Schuk Toak	1,620	1,248	372	0	0	0
Chui chu	0					
San Xavier	800	0	0	800	0	0
Totals	2,420	1,248	372	800	0	0
Gross Sales		\$1,148,513	\$136,710	\$608,200	\$0	\$0
Year - 2017						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	52,000	29,148	14,032	5,675	2,734	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chui chu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	192	0
Totals	61,600	31,596	17,712	8,769	3,024	88
Gross Sales		\$29,026,613	\$8,509,335	\$8,644,634	\$12,195,548	\$41,041
Year - 2030						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	102,490	57,862	27,856	11,285	5,428	0
Tohono O'Odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chui chu	2,000	1,200	800	0	0	0
San Xavier	8,400	0	3900	4,250	250	0
Totals	116,090	60,886	33,100	16,249	5,776	88
Gross Sales		\$55,934,429	\$12,164,074	\$12,312,758	\$23,370,336	\$41,041
Year - 2043						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	102,490	57,862	27,856	11,285	5,428	0
Tohono O'Odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chui chu	2,000	1,200	800	0	0	0
San Xavier	8,400	0	3900	4,250	250	0
Totals	116,090	60,886	33,100	16,249	5,776	88
Gross Sales		\$55,934,429	\$12,164,074	\$12,312,758	\$23,370,336	\$41,041
Year - 2050						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	102,490	57,862	27,856	11,285	5,428	0
Tohono O'Odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chui chu	2,000	1,200	800	0	0	0
San Xavier	8,400	0	3900	4,250	250	0
Totals	116,090	60,886	33,100	16,249	5,776	88
Gross Sales		\$55,934,429	\$12,164,074	\$12,312,758	\$23,370,336	\$41,041

Indian Agricultural Development and Production -- 2001 through 2050

Alternative 3a

Table D-32

Gross Sales per Acre		\$918.68	\$367.50	\$757.75	\$4,046.30	\$466.38
Year - 2001						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	0					
Tohono O'Odham						
Schuk Toak	1,125	1,125	0	0	0	0
Chuichu	0					
San Xavier	200	0	0	200	0	0
Totals	1,325	1,125	0	200	0	0
Gross Sales		\$1,033,515	\$0	\$151,550	\$0	\$0
Year - 2004						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	0					
Tohono O'Odham						
Schuk Toak	1,620	1,248	372	0	0	0
Chuichu	0					
San Xavier	800	0	0	800	0	0
Totals	2,420	1,248	372	800	0	0
Gross Sales		\$1,146,513	\$136,710	\$606,200	\$0	\$0
Year - 2017						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	52,800	29,148	14,032	5,675	2,734	0
Tohono O'Odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	192	0
Totals	61,600	31,596	17,712	8,769	3,024	88
Gross Sales		\$29,026,613	\$6,509,336	\$6,844,634	\$12,195,548	\$41,041
Year - 2039						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	136,822	77,439	37,280	15,077	7,264	0
Tohono O'Odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chuichu	2,000	1,280	800	0	0	0
San Xavier	8,400	0	3900	4,250	250	0
Totals	150,422	80,463	42,524	20,061	7,612	88
Gross Sales		\$73,919,657	\$15,627,688	\$15,200,920	\$30,801,164	\$41,041
Year - 2043						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	136,822	77,439	37,280	15,077	7,264	0
Tohono O'Odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	8,400	0	3900	4,250	250	0
Totals	150,422	80,463	42,524	20,061	7,612	88
Gross Sales		\$73,919,657	\$15,627,688	\$15,200,920	\$30,801,164	\$41,041
Year - 2050						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	136,822	77,439	37,280	15,077	7,264	0
Tohono O'Odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	8,400	0	3900	4,250	250	0
Totals	150,422	80,463	42,524	20,061	7,612	88
Gross Sales		\$73,919,657	\$15,627,688	\$15,200,920	\$30,801,164	\$41,041

Indian Agricultural Development and Production -- 2001 through 2050
Alternative 3b

Table D-33

Gross Sales per Acre		\$918.68	\$367.50	\$757.75	\$4,046.30	\$466.38
Year - 2001						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	0					
Tohono O'odham						
Schuk Toak	1,125	1,125	0	0	0	0
Chuichu	0					
San Xavier	200	0	0	200	0	0
Totals	1,325	1,125	0	200	0	0
Gross Sales		\$1,033,515	\$0	\$151,550	\$0	\$0
Year - 2004						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	0					
Tohono O'odham						
Schuk Toak	1,620	1,248	372	0	0	0
Chuichu	0					
San Xavier	800	0	0	800	0	0
Totals	2,420	1,248	372	800	0	0
Gross Sales		\$1,146,513	\$136,710	\$606,200	\$0	\$0
Year - 2017						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	52,000	29,148	14,032	5,875	2,734	0
Tohono O'odham						
Schuk Toak	2,200	1,248	372	394	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	5,400	0	2508	2,700	182	0
Totals	61,800	31,596	17,712	8,769	3,024	88
Gross Sales		\$29,026,613	\$6,509,336	\$6,644,634	\$12,185,548	\$41,041
Year - 2030						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	136,822	77,439	37,280	15,077	7,264	0
Tohono O'odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	8,400	0	3900	4,250	250	0
Totals	150,422	80,463	42,524	20,061	7,612	88
Gross Sales		\$73,919,657	\$15,627,688	\$15,200,920	\$30,801,164	\$41,041
Year - 2043						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	136,822	77,439	37,280	15,077	7,264	0
Tohono O'odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	8,400	0	3900	4,250	250	0
Totals	150,422	80,463	42,524	20,061	7,612	88
Gross Sales		\$73,919,657	\$15,627,688	\$15,200,920	\$30,801,164	\$41,041
Year - 2050						
Area	Total Acres	Cotton	Grains	Forage	Vegetables	Trees
Gila River Indian Community	136,822	77,439	37,280	15,077	7,264	0
Tohono O'odham						
Schuk Toak	3,200	1,824	544	734	98	88
Chuichu	2,000	1,200	800	0	0	0
San Xavier	8,400	0	3900	4,250	250	0
Totals	150,422	80,463	42,524	20,061	7,612	88
Gross Sales		\$73,919,657	\$15,627,688	\$15,200,920	\$30,801,164	\$41,041

Table D-34

Output, Value Added and Employment

Base Year: 1997 Combined Maricopa, Pima and Pinal Counties

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Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
1 Agriculture	\$2,005	34,036	\$425	\$299	\$365	\$58	\$1,147
28 Mining	\$2,114	10,184	\$529	\$18	\$856	\$97	\$1,500
48 Construction	\$16,235	170,489	\$5,244	\$880	\$344	\$117	\$8,584
58 Manufacturing	\$38,275	199,328	\$9,510	\$445	\$4,688	\$317	\$14,941
433 TCPU	\$12,077	89,981	\$3,311	\$286	\$2,777	\$732	\$7,108
447 Trade	\$25,535	476,313	\$10,472	\$658	\$3,271	\$3,630	\$18,031
458 FIRE	\$31,905	175,728	\$4,875	\$936	\$14,436	\$3,058	\$23,305
463 Services	\$37,144	683,954	\$16,234	\$2,692	\$2,563	\$641	\$22,129
510 Government	\$13,536	252,071	\$9,941	\$0	\$2,212	\$0	\$12,153
516 Other	\$148	14,707	\$137	\$0	\$11	\$0	\$148
Totals	\$178,974	2,116,770	\$80,678	\$6,214	\$31,502	\$8,650	\$107,044

*Millions of dollars

Table D-35

Output, Value Added and Employment

Base Year: 1997 Pinal County

Copyright MIG 2000

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
1 Agriculture	\$611	4,154	\$50	\$66	\$62	\$15	\$183
28 Mining	\$1,298	5,986	\$320	\$9	\$544	\$59	\$933
48 Construction	\$277	2,924	\$94	\$9	\$6	\$2	\$111
56 Manufacturing	\$623	2,962	\$109	\$5	\$63	\$4	\$182
433 TCPU	\$156	1,097	\$41	\$4	\$34	\$9	\$88
447 Trade	\$365	9,446	\$151	\$14	\$46	\$53	\$263
456 FIRE	\$278	1,719	\$30	\$12	\$135	\$29	\$208
463 Services	\$503	13,048	\$209	\$37	\$37	\$9	\$292
510 Government	\$485	13,658	\$409	\$0	\$44	\$0	\$453
516 Other	\$3	275	\$2	\$0	\$0	\$0	\$3
Totals	\$4,598	55,270	\$1,417	\$156	\$971	\$179	\$2,723

*Millions of dollars

Table D-38

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acre were calculated as the average of the years 1996-98

Queen Creek Irrigation District Analysis and Summary -- 2001 through 2050
No Action Alternative

Table D-37

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	15,259	0	41,198	24,297	65,493	5,258	3,847	3,154	2,632	368		15,259
2004	15,259	0	38,743	5,998	44,739	5,258	3,847	3,154	2,632	368		15,259
2017	12,105	3,154	24,158	30,173	54,329	5,258	3,847	0	2,632	368		12,105
2030	12,105	0	13,327	7,746	21,074	5,258	3,847	0	2,632	368		12,105
2043	12,105	0	2,499	15,183	17,682	5,258	3,847	0	2,632	368		12,105
2050	8,258	3847	0	24,715	24,715	5,258	0	0	2,632	368		8,258
		7,001										
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						5,132,860	1,615,740	2,439,934				9,188,534
2004						5,132,860	1,615,740	2,439,934				9,188,534
2017						5,132,860	1,615,740	0				6,748,600
2030						5,132,860	1,615,740	0				6,748,600
2043						5,132,860	1,615,740	0				6,748,600
2050						5,132,860	0	0				5,132,860

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acre were calculated as the average of the years 1996-98

Queen Creek Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 1

Table D-38

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	15,259	0	41,417	24,076	65,493	5,258	3,847	3,154	2,632	368		15,259
2004	15,259	0	39,017	5,722	44,739	5,258	3,847	3,154	2,632	368		15,259
2017	12,105	3,154	23,661	849	24,310	5,258	3,847	0	2,632	368		12,105
2030	12,105	0	13,055	11,660	24,715	5,258	3,847	0	2,632	368		12,105
2043	12,105	0	2,446	20,599	23,047	5,258	3,847	0	2,632	368		12,105
2050	8,258	3847	0	24,715	24,715	5,258	0	0	2,632	368		8,258
		7,001										
2001						5,132,860	1,615,740	2,439,934				9,188,534
2004						5,132,860	1,615,740	2,439,934				9,188,534
2017						5,132,660	1,615,740	0				6,748,600
2030						5,132,860	1,615,740	0				6,748,600
2043						5,132,660	1,615,740	0				6,748,600
2050						5,132,660	0	0				5,132,660

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acre were calculated as the average of the years 1996-96

Queen Creek Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 2

Table D-39

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	15,259	0	41,196	24,297	65,493	5,258	3,847	3,154	2,632	368		15,259
2004	15,259	0	38,743	26,749	65,493	5,258	3,847	3,154	2,632	368		15,259
2017	12,105	3,154	22,591	32,721	55,312	5,258	3,847	0	2,632	368		12,105
2030	12,105	0	12,464	43,275	55,739	5,258	3,847	0	2,632	368		12,105
2043	12,105	3,847	0	55,739	55,739	5,258	3,847	0	2,632	368		12,105
2050	8,258	0	0	24,714	24,714	5,258	0	0	2,632	368		8,258
		7,001				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						5,132,860	1,615,740	2,439,934				9,188,534
2004						5,132,860	1,615,740	2,439,934				9,188,534
2017						5,132,860	1,615,740	0				6,748,600
2030						5,132,860	1,615,740	0				6,748,600
2043						5,132,860	1,615,740	0				6,748,600
2050						5,132,860	0	0				5,132,860

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acre were calculated as the average of the years 1996-98

Queen Creek Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 3a

Table D-40

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	15,259	0	38,405	27,088	85,493	5,258	3,847	3,154	2,632	368		15,259
2004	15,259	3154	35,952	29,541	85,493	5,258	3,847	3,154	2,632	368		15,259
2017	12,105	0	22,591	33,148	55,739	5,258	3,847	0	2,632	368		12,105
2030	12,105	3,847	6,462	49,277	55,739	5,258	3,847	0	2,632	368		12,105
2043	8,258	0	0	24,715	24,715	5,258	0	0	2,632	368		8,258
2050	8,258	0	0	24,715	24,715	5,258	0	0	2,632	368		8,258
		7,001				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						5,132,860	1,615,740	2,439,934				9,188,534
2004						5,132,860	1,615,740	2,439,934				9,188,534
2017						5,132,860	1,615,740	0				6,748,600
2030						5,132,860	1,615,740	0				6,748,600
2043						5,132,860	0	0				5,132,860
2050						5,132,860	0	0				5,132,860

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acre were calculated as the average of the years 1996-98

Queen Creek Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 3b

Table D-41

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Demands	Water Utilization	Total water	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	15,259	0	38,471	27,022	65,493		5,258	3,847	3,154	2,632	368		15,259
2004	15,259	0	36,226	29,267	65,493		5,258	3,847	3,154	2,632	368		15,259
2017	12,105	3,154	22,591	33,148	55,739		5,258	3,847	0	2,632	368		12,105
2030	12,105	3,847	8,536	47,204	55,739		5,258	3,847	0	2,632	368		12,105
2043	8,258	0	0	24,715	24,715		5,258	0	0	2,632	368		8,258
2050	8,258	0	0	24,715	24,715		5,258	0	0	2,632	368		8,258
		7,001					Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001							5,132,860	1,615,740	2,438,934				9,186,534
2004							5,132,860	1,615,740	2,438,934				9,186,534
2017							5,132,860	1,615,740	0				6,748,600
2030							5,132,860	1,615,740	0				6,748,600
2043							5,132,860	0	0				5,132,860
2050							5,132,860	0	0				5,132,860

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acre were calculated as the average of the years 1996-98

Harquahela Irrigation District Analysis and Summary – 2001 through 2050
Settlement Alternative

Table D-42

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres	Total Water Demand
2001	22,759	0	43,890	69,612	113,502	13,419	3,109	2,017	3,709	505		22,759	113,502
2004	20,742	2017	40,937	57,437	98,374	13,419	3,109	0	3,709	505		20,742	98,374
2017	20,742	0	31,920	68,454	98,374	13,419	3,109	0	3,709	505		20,742	98,374
2030	20,742	0	17,955	80,419	98,374	13,419	3,109	0	3,709	505		20,742	98,374
2043	20,742	0	6,166	92,208	98,374	13,419	3,109	0	3,709	505		20,742	98,374
2050	20,742	0	0	98,374	98,374	13,419	3,109	0	3,709	505		20,742	98,374
		2,017				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales	
2001						13,099,628	1,305,780	1,560,351				15,965,759	
2004						13,099,628	1,305,780	0				14,405,408	
2017						13,099,628	1,305,780	0				14,405,408	
2030						13,099,628	1,305,780	0				14,405,408	
2043						13,099,628	1,305,780	0				14,405,408	
2050						13,099,628	1,305,780	0				14,405,408	

Notes: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1999-98

Harquahela Irrigation District Analysis and Summary – 2001 through 2050
No Action Alternative

Table D-43

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	22,759	0	27,867	15,803	43,669	13,419	3,109	2,017	3,709	505		22,759
2004	20,742	2017	26,208	15,803	42,010	13,419	3,109	0	3,709	505		20,742
2017	20,742	0	16,340	15,803	32,143	13,419	3,109	0	3,709	505		20,742
2030	20,742	0	9,015	15,803	24,818	13,419	3,109	0	3,709	505		20,742
2043	20,742	0	1,690	15,803	17,493	13,419	3,109	0	3,709	505		20,742
2050	20,742	0	0	15,803	15,803	13,419	3,109	0	3,709	505		20,742
		2,017				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						13,099,628	1,305,780	1,580,351				15,965,759
2004						13,099,628	1,305,780	0				14,405,408
2017						13,099,628	1,305,780	0				14,405,408
2030						13,099,628	1,305,780	0				14,405,408
2043						13,099,628	1,305,780	0				14,405,408
2050						13,099,628	1,305,780	0				14,405,408

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1998-98

Hamquahala Irrigation District Analysis and Summary – 2001 through 2050
Alternative 1

Table D-44

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	22,759	0	28,016	85,485	113,502	13,419	3,109	2,017	3,709	505		22,759
2004	20,742	2017	28,393	71,306	97,699	13,419	3,109	0	3,709	505		20,742
2017	20,742	0	16,008	81,693	97,699	13,419	3,109	0	3,709	505		20,742
2030	20,742	0	8,831	88,868	97,699	13,419	3,109	0	3,709	505		20,742
2043	20,742	0	1,856	96,043	97,699	13,419	3,109	0	3,709	505		20,742
2050	20,742	0	0	97,699	97,699	13,419	3,109	0	3,709	505		20,742
		2,017				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						13,099,628	1,305,780	1,580,351				15,985,759
2004						13,099,628	1,305,780	0				14,405,408
2017						13,099,628	1,305,780	0				14,405,408
2030						13,099,628	1,305,780	0				14,405,408
2043						13,099,628	1,305,780	0				14,405,408
2050						13,099,628	1,305,780	0				14,405,408

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Harquahala Irrigation District Analysis and Summary – 2001 through 2050
Alternative 2

Table D-45

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	22,759	0	27,887	85,635	113,502	13,419	3,109	2,017	3,709	505		22,759
2004	20,742	2017	28,208	71,492	97,699	13,419	3,109	0	3,709	505		20,742
2017	20,742	0	15,281	82,416	97,699	13,419	3,109	0	3,709	505		20,742
2030	20,742	0	8,431	89,268	97,699	13,419	3,109	0	3,709	505		20,742
2043	20,742	0	0	97,699	97,699	13,419	3,109	0	3,709	505		20,742
2050	20,742	0	0	97,699	97,699	13,419	3,109	0	3,709	505		20,742
		2,017				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						13,089,628	1,305,780	1,560,351				15,965,759
2004						13,089,628	1,305,780	0				14,405,408
2017						13,089,628	1,305,780	0				14,405,408
2030						13,089,628	1,305,780	0				14,405,408
2043						13,089,628	1,305,780	0				14,405,408
2050						13,089,628	1,305,780	0				14,405,408

Notes: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1998-98

Harquehala Irrigation District Analysis and Summary – 2001 through 2050
Alternative 3a

Table D-46

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	22,759	0	25,979	87,523	113,502	13,419	3,109	2,017	3,709	505		22,759
2004	20,742	2017	24,320	73,380	97,699	13,419	3,109	0	3,709	505		20,742
2017	20,742	0	15,281	82,418	97,699	13,419	3,109	0	3,709	505		20,742
2030	20,742	0	4,371	93,328	97,699	13,419	3,109	0	3,709	505		20,742
2043	20,742	0	0	97,699	97,699	13,419	3,109	0	3,709	505		20,742
2050	20,742	0	0	97,699	97,699	13,419	3,109	0	3,709	505		20,742
		2,017				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						13,099,628	1,305,780	1,560,351				15,965,759
2004						13,099,628	1,305,780	0				14,405,408
2017						13,099,628	1,305,780	0				14,405,408
2030						13,099,628	1,305,780	0				14,405,408
2043						13,099,628	1,305,780	0				14,405,408
2050						13,099,628	1,305,780	0				14,405,408

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Harquahala Irrigation District Analysis and Summary – 2001 through 2050
Alternative 3b

Table D-47

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	22,759	0	26,023	67,478	113,502	13,419	3,109	2,017	3,709	505		22,759
2004	20,742	2017	24,505	73,194	97,699	13,419	3,109	0	3,709	505		20,742
2017	20,742	0	15,281	82,416	97,699	13,419	3,109	0	3,709	505		20,742
2030	20,742	0	5,774	91,925	97,699	13,419	3,109	0	3,709	505		20,742
2043	20,742	0	0	97,699	97,699	13,419	3,109	0	3,709	505		20,742
2050	20,742	0	0	97,699	97,699	13,419	3,109	0	3,709	505		20,742
		2,017				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						13,099,628	1,305,780	1,560,351				15,965,759
2004						13,099,628	1,305,780	0				14,405,408
2017						13,099,628	1,305,780	0				14,405,408
2030						13,099,628	1,305,780	0				14,405,408
2043						13,099,628	1,305,780	0				14,405,408
2050						13,099,628	1,305,780	0				14,405,408

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1998-98

Tonopah Irrigation District Analysis and Summary – 2001 through 2050
Settlement Alternative

Table D-48

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres	Total Water Demand
2001	3,031	0	8,310	10,359	16,669	2,463	22	546	0	0	0	3,031	16,669
2004	2,485	546	6,155	6,922	13,076	2,463	22	0	0	0	0	2,485	12,574
2017	2,485	0	1,680	11,396	13,076	2,463	22	0	0	0	0	2,485	12,574
2030	2,485	0	945	12,131	13,076	2,463	22	0	0	0	0	2,485	12,574
2043	2,485	0	325	12,752	13,076	2,463	22	0	0	0	0	2,485	12,574
2050	2,485	0	0	13,076	13,076	2,463	22	0	0	0	0	2,485	12,574
		546				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales	
2001						2,404,381	9,240	422,386				2,836,006	
2004						2,404,381	9,240	0				2,413,621	
2017						2,404,381	9,240	0				2,413,621	
2030						2,404,381	9,240	0				2,413,621	
2043						2,404,381	9,240	0				2,413,621	
2050						2,404,381	9,240	0				2,413,621	

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Tonopah Irrigation District Analysis and Summary -- 2001 through 2050
No Action Alternative

Table D-49

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	3,031	0	8,989	5,700	12,689	2,463	22	546	0	0		3,031
2004	3,031	0	8,554	2,522	9,077	2,463	22	546				3,031
2017	2,485	546	4,087	8,477	12,564	2,463	22	0	0			2,485
2030	2,485	0	2,255	9,498	11,753	2,463	22	0	0			2,485
2043	2,485	0	423	10,097	10,520	2,463	22	0	0			2,485
2050	2,485	0	0	3,593	3,593	2,463	22	0	0			2,485
		546				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						2,404,381	9,240	422,386				2,836,006
2004						2,404,381	9,240	422,386				2,836,006
2017						2,404,381	9,240	0	0			2,413,621
2030						2,404,381	9,240	0	0			2,413,621
2043						2,404,381	9,240	0	0			2,413,621
2050						2,404,381	9,240	0	0			2,413,621

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Tonopah Irrigation District Analysis and Summary – 2001 through 2050
Alternative 1

Table D-50

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	3,031	0	7,007	5,663	12,669	2,463	22	546	0	0		3,031
2004	3,031	0	6,601	2,476	9,077	2,463	22	546				3,031
2017	3,031	0	4,003	6,927	12,930	2,463	22	546				3,031
2030	2,485	546	2,208	10,868	13,077	2,463	22	0				2,485
2043	2,485	0	414	12,057	12,471	2,463	22	0				2,485
2050	2,485	0	0	13,077	13,077	2,463	22	0				2,485
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						2,404,381	9,240	422,386				2,836,008
2004						2,404,381	9,240	422,386				2,836,008
2017						2,404,381	9,240	422,386				2,836,008
2030						2,404,381	9,240	0				2,413,821
2043						2,404,381	9,240	0				2,413,821
2050						2,404,381	9,240	0				2,413,821

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Tonopah Irrigation District Analysis and Summary – 2001 through 2050
Alternative 2

Table D-51

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	3,031	0	6,989	5,700	12,689	2,463	22	548	0	0		3,031
2004	3,031	546	6,554	2,522	9,077	2,463	22	546				3,031
2017	2,465	546	3,822	9,100	12,922	2,463	22	0	0			2,465
2030	2,465	0	2,108	10,986	13,077	2,463	22	0	0			2,465
2043	2,465	0	0	13,077	13,077	2,463	22	0	0			2,465
2050	2,465	0	0	13,077	13,077	2,463	22	0	0			2,465
		1092				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						2,404,381	9,240	422,386				2,836,006
2004						2,404,381	9,240	422,386				2,836,006
2017						2,404,381	9,240	0	0			2,413,621
2030						2,404,381	9,240	0	0			2,413,621
2043						2,404,381	9,240	0	0			2,413,621
2050						2,404,381	9,240	0	0			2,413,621

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Tonopah Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 3a

Table D-52

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	3,031	0	6,497	6,172	12,669	2,463	22	546	0	0		3,031
2004	3,031	0	6,062	6,687	12,669	2,463	22	546				3,031
2017	3,031	0	3,822	9,254	13,076	2,463	22	546				3,031
2030	2,485	546	1,093	11,983	13,076	2,463	22	0				2,485
2043	2,485	0	0	13,076	13,076	2,463	22	0				2,485
2050	2,485	0	0	13,076	13,076	2,463	22	0				2,485
		546				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						2,404,381	9,240	422,388				2,836,008
2004						2,404,381	9,240	422,388				2,836,008
2017						2,404,381	9,240	422,388				2,836,008
2030						2,404,381	9,240	0				2,413,621
2043						2,404,381	9,240	0				2,413,621
2050						2,404,381	9,240	0				2,413,621

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Tonopah Irrigation District Analysis and Summary – 2001 through 2050
Alternative 3b

Table D-63

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	3,031	0	6,508	6,161	12,669	2,463	22	546	0	0		3,031
2004	3,031	546	6,129	2,946	9,077	2,463	22	546				3,031
2017	2,465	546	3,822	9,255	13,077	2,463	22	0	0			2,465
2030	2,465	0	1,444	11,633	13,077	2,463	22	0	0			2,465
2043	2,465	0	0	13,077	13,077	2,463	22	0	0			2,465
2050	2,465	0	0	13,077	13,077	2,463	22	0	0			2,465
		1092										
2001						2,404,381	9,240	422,386				2,836,006
2004						2,404,381	9,240	422,386				2,836,006
2017						2,404,381	9,240	0	0			2,413,621
2030						2,404,381	9,240	0	0			2,413,621
2043						2,404,381	9,240	0	0			2,413,621
2050						2,404,381	9,240	0	0			2,413,621

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1998-98

Maricopa Stanfield Irrigation District Analysis and Summary -- 2001 through 2050
Settlement Alternative

Table D-54

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres	Total Water Demand
2001	61,719	0	162,830	85,164	247,994	27,882	18,154	8,711	3,106	3,886		61,719	247,994
2004	61,719	0	152,833	95,161	247,994	27,882	18,154	8,711	3,106	3,886		61,719	247,994
2017	61,719	0	108,060	139,914	247,994	27,882	18,154	8,711	3,106	3,886		61,719	247,994
2030	61,719	0	60,795	187,199	247,994	27,882	18,154	8,711	3,106	3,886		61,719	247,994
2043	61,719	0	20,878	227,116	247,994	27,882	18,154	8,711	3,106	3,886		61,719	247,994
2050	61,719	0	0	247,994	247,994	27,882	18,154	8,711	3,106	3,886		61,719	247,994
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales	
2001						25,596,262	6,671,595	6,600,760				38,868,617	
2004						25,596,262	6,671,595	6,600,760				38,868,617	
2017						25,596,262	6,671,595	6,600,760				38,868,617	
2030						25,596,262	6,671,595	6,600,760				38,868,617	
2043						25,596,262	6,671,595	6,600,760				38,868,617	
2050						25,596,262	6,671,595	6,600,760				38,868,617	

Notes: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Maricopa Stanfield Irrigation District Analysis and Summary – 2001 through 2050
No Action Alternative

Table D-55

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	61,719	0	171,838	61,936	233,774	27,862	18,154	8,711	3,106	3,886		61,719
2004	61,719	0	161,807	72,167	233,774	27,862	18,154	8,711	3,106	3,886		61,719
2017	61,719	0	100,760	147,234	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2030	61,719	0	55,592	192,402	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2043	61,719	0	10,423	237,571	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2050	61,719	0	0	247,994	247,994	27,862	18,154	8,711	3,106	3,886		61,719
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						25,596,262	6,671,595	6,600,760				38,868,617
2004						25,596,262	6,671,595	6,600,760				38,868,617
2017						25,596,262	6,671,595	6,600,760				38,868,617
2030						25,596,262	6,671,595	6,600,760				38,868,617
2043						25,596,262	6,671,595	6,600,760				38,868,617
2050						25,596,262	6,671,595	6,600,760				38,868,617

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-99

Maricopa Stanfield Irrigation District Analysis and Summary – 2001 through 2050
Alternative 1

Table D-56

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	61,719	0	172,760	61,013	233,774	27,862	18,154	8,711	3,106	3,886		61,719
2004	61,719	0	182,750	71,024	233,774	27,862	18,154	8,711	3,106	3,886		61,719
2017	61,719	0	98,688	149,286	247,984	27,862	18,154	8,711	3,106	3,886		61,719
2030	61,719	0	54,454	193,540	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2043	61,719	0	10,210	237,784	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2050	61,719	0	0	247,994	247,994	27,862	18,154	8,711	3,106	3,886		61,719
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						25,596,262	6,671,595	6,600,760				38,868,617
2004						25,596,262	6,671,595	6,600,760				38,868,617
2017						25,596,262	6,671,595	6,600,760				38,868,617
2030						25,596,262	6,671,595	6,600,760				38,868,617
2043						25,596,262	6,671,595	6,600,760				38,868,617
2050						25,596,262	6,671,595	6,600,760				38,868,617

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Maricopa Stanfield Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 2

Table D-57

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	61,719	0	171,836	61,936	233,774	27,862	18,154	8,711	3,106	3,886		61,719
2004	61,719	0	161,607	72,167	233,774	27,862	18,154	8,711	3,106	3,886		61,719
2017	61,719	0	94,232	153,762	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2030	61,719	0	51,990	196,004	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2043	61,719	0	0	247,994	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2050	61,719	0	0	247,994	247,994	27,862	18,154	8,711	3,106	3,886		61,719
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						25,596,262	6,671,595	6,600,760				38,868,617
2004						25,596,262	6,671,595	6,600,760				38,868,617
2017						25,596,262	6,671,595	6,600,760				38,868,617
2030						25,596,262	6,671,595	6,600,760				38,868,617
2043						25,596,262	6,671,595	6,600,760				38,868,617
2050						25,596,262	6,671,595	6,600,760				38,868,617

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Maricopa Stanfield Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 3a

Table D-58

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	61,719	0	188,693	47,061	233,774	27,862	18,154	8,711	3,106	3,886		61,719
2004	61,719	0	176,461	57,312	233,774	27,862	18,154	8,711	3,106	3,886		61,719
2017	61,719	0	120,729	127,265	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2030	61,719	0	53,452	194,542	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2043	61,719	0	28,497	221,497	247,994	27,862	18,154	8,711	3,106	3,886		61,719
2050	61,719	0	0	247,994	247,994	27,862	18,154	8,711	3,106	3,886		61,719
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						25,596,262	6,671,595	6,600,760				38,868,617
2004						25,596,262	6,671,595	6,600,760				38,868,617
2017						25,596,262	6,671,595	6,600,760				38,868,617
2030						25,596,262	6,671,595	6,600,760				38,868,617
2043						25,596,262	6,671,595	6,600,760				38,868,617
2050						25,596,262	6,671,595	6,600,760				38,868,617

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Maricopa Stanfield Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 3b

Table D-59

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	61,719	0	160,470	73,304	233,774	27,862	18,154	6,711	3,106	3,886		61,719
2004	61,719	0	151,107	82,668	233,774	27,862	18,154	6,711	3,106	3,886		61,719
2017	61,719	0	94,232	153,762	247,994	27,862	18,154	6,711	3,106	3,886		61,719
2030	61,719	0	35,805	212,389	247,994	27,862	18,154	6,711	3,106	3,886		61,719
2043	61,719	0	0	247,994	247,994	27,862	18,154	6,711	3,106	3,886		61,719
2050	61,719	0	0	247,994	247,994	27,862	18,154	6,711	3,106	3,886		61,719
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						25,596,262	6,671,595	6,600,760				38,868,617
2004						25,596,262	6,671,595	6,600,760				38,868,617
2017						25,596,262	6,671,595	6,600,760				38,868,617
2030						25,596,262	6,671,595	6,600,760				38,868,617
2043						25,596,262	6,671,595	6,600,760				38,868,617
2050						25,596,262	6,671,595	6,600,760				38,868,617

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1998-98

Central Arizona Irrigation District Analysis and Summary -- 2001 through 2050
Settlement Alternative

Table D-60

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres	Total Water Demand
2001	59,723	0	183,710	55,172	218,882	28,548	22,823	2,957	3,116	2,281		59,723	218,882
2004	59,723	0	153,713	65,169	218,882	28,548	22,823	2,957	3,116	2,281		59,723	218,882
2017	59,723	0	108,080	110,802	218,882	28,548	22,823	2,957	3,116	2,281		59,723	218,882
2030	59,723	0	60,795	158,087	218,882	28,548	22,823	2,957	3,116	2,281		59,723	218,882
2043	36,900	22,823	20,878	137,087	157,945	28,548	0	2,957	3,116	2,281		36,900	157,945
2050	36,900	0	0	157,945	157,945	28,548	0	2,957	3,116	2,281		36,900	157,945
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales	
2001						28,224,639	8,387,453	2,240,667				36,852,759	
2004						28,224,639	8,387,453	2,240,667				36,852,759	
2017						28,224,639	8,387,453	2,240,667				36,852,759	
2030						28,224,639	8,387,453	2,240,667				36,852,759	
2043						28,224,639	0	2,240,667				28,465,308	
2050						28,224,639	0	2,240,667				28,465,308	

Notes: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1998-98

Central Arizona Irrigation District Analysis and Summary -- 2001 through 2050
No Action Alternative

Table D-61

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	59,723	0	175,432	28,350	203,782	28,546	22,823	2,957	3,116	2,281		59,723
2004	59,723	0	184,986	36,796	203,782	28,546	22,823	2,957	3,116	2,281		59,723
2017	59,723	0	102,867	116,015	218,882	28,546	22,823	2,957	3,116	2,281		59,723
2030	59,723	0	56,754	162,128	218,882	28,546	22,823	2,957	3,116	2,281		59,723
2043	36,900	22,823	10,641	147,303	157,945	28,546	0	2,957	3,116	2,281		36,900
2050	36,900	0	0	157,945	157,945	28,546	0	2,957	3,116	2,281		36,900
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						28,224,639	8,387,453	2,240,667				38,852,759
2004						26,224,639	8,387,453	2,240,667				36,852,759
2017						26,224,639	8,387,453	2,240,667				36,852,759
2030						26,224,639	8,387,453	2,240,667				36,852,759
2043						26,224,639	0	2,240,667				28,465,306
2050						26,224,639	0	2,240,667				28,465,306

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Central Arizona Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 1

Table D-62

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	59,723	0	176,373	27,409	203,782	28,546	22,823	2,957	3,116	2,281		59,723
2004	59,723	0	166,153	37,629	203,782	28,546	22,823	2,957	3,116	2,281		59,723
2017	59,723	0	100,761	118,120	218,882	28,546	22,823	2,957	3,116	2,281		59,723
2030	59,723	0	55,562	163,289	218,882	28,546	22,823	2,957	3,116	2,281		59,723
2043	36,900	22,823	10,424	147,521	157,945	28,546	0	2,957	3,116	2,281		36,900
2050	36,900	0	0	157,945	157,945	28,546	0	2,957	3,116	2,281		36,900
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						26,224,639	8,367,453	2,240,667				36,852,759
2004						26,224,639	8,367,453	2,240,667				36,852,759
2017						26,224,639	8,367,453	2,240,667				36,852,759
2030						26,224,639	8,367,453	2,240,667				36,852,759
2043						26,224,639	0	2,240,667				28,465,306
2050						26,224,639	0	2,240,667				28,465,306

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Central Arizona Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 2

Table D-63

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	59,723	0	175,432	28,350	203,782	28,546	22,823	2,957	3,116	2,281		59,723
2004	59,723	0	184,988	36,796	203,782	28,546	22,823	2,957	3,116	2,281		59,723
2017	59,723	0	96,202	122,679	218,882	28,546	22,823	2,957	3,116	2,281		59,723
2030	59,723	0	53,077	165,805	218,882	28,546	22,823	2,957	3,116	2,281		59,723
2043	36,900	22,823	0	157,945	157,945	28,546	0	2,957	3,116	2,281		36,900
2050	36,900	0	0	157,945	157,945	28,546	0	2,957	3,116	2,281		36,900
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						26,224,639	8,367,453	2,240,667				36,852,759
2004						26,224,639	8,367,453	2,240,667				36,852,759
2017						26,224,639	8,367,453	2,240,667				36,852,759
2030						26,224,639	8,367,453	2,240,667				36,852,759
2043						26,224,639	0	2,240,887				28,465,306
2050						26,224,639	0	2,240,887				28,465,306

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Central Arizona Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 3a

Table D-64

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	59,723	0	190,888	12,894	203,782	28,546	22,823	2,957	3,118	2,281		59,723
2004	59,723	0	180,442	23,340	203,782	28,546	22,823	2,957	3,116	2,281		59,723
2017	59,723	0	123,544	95,337	218,882	28,546	22,823	2,957	3,116	2,281		59,723
2030	36,900	22,823	54,861	164,021	218,882	28,546	22,823	2,957	3,116	2,281		59,723
2043	36,900	0	27,342	130,603	157,945	28,546	0	2,957	3,116	2,281		36,900
2050	36,900	0	0	157,945	157,945	28,546	0	2,957	3,116	2,281		36,900
		22,823				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						26,224,639	8,387,453	2,240,667				36,852,759
2004						26,224,639	8,387,453	2,240,667				36,852,759
2017						26,224,639	8,387,453	2,240,667				36,852,759
2030						26,224,639	8,387,453	2,240,667				36,852,759
2043						26,224,639	0	2,240,667				28,465,306
2050						26,224,639	0	2,240,667				28,465,306

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Table D-85

Nota: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Hohokam Irrigation District Analysis and Summary – 2001 through 2050
Settlement Alternative

Table D-86

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres	Total Water Demand
2001	25,708	0	91,740	10,065	101,805	12,817	8,627	3,632	632	0	0	25,708	101,805
2004	25,708	0	88,876	13,128	101,805	12,817	8,627	3,632	632	0	0	25,708	101,805
2017	25,708	0	33,120	68,685	101,805	12,817	8,627	3,632	632	0	0	25,708	101,805
2030	25,708	0	18,630	83,175	101,805	12,817	8,627	3,632	632	0	0	25,708	101,805
2043	25,708	0	8,398	95,407	101,805	12,817	8,627	3,632	632	0	0	25,708	101,805
2050	25,708	0	0	101,805	101,805	12,817	8,627	3,632	632	0	0	25,708	101,805
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales	
2001						11,774,722	3,170,423	2,752,148				17,697,292	
2004						11,774,722	3,170,423	2,752,148				17,697,292	
2017						11,774,722	3,170,423	2,752,148				17,697,292	
2030						11,774,722	3,170,423	2,752,148				17,697,292	
2043						11,774,722	3,170,423	2,752,148				17,697,292	
2050						11,774,722	3,170,423	2,752,148				17,697,292	

Notes: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1998-98

Honokam Irrigation District Analysis and Summary -- 2001 through 2050
No Action Alternative

Table D-67

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	25,708	0	23,733	31,872	55,605	12,817	8,627	3,632	632	0		25,708
2004	25,708	0	22,320	33,285	55,605	12,817	8,627	3,632	632	0		25,708
2017	25,708	0	13,916	87,888	101,805	12,817	8,627	3,632	632	0		25,708
2030	25,708	0	7,678	94,127	101,805	12,817	8,627	3,632	632	0		25,708
2043	25,708	0	1,440	100,365	101,805	12,817	8,627	3,632	632	0		25,708
2050	25,708	0	0	101,805	101,805	12,817	8,627	3,632	632	0		25,708
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						11,774,722	3,170,423	2,752,148				17,697,292
2004						11,774,722	3,170,423	2,752,148				17,697,292
2017						11,774,722	3,170,423	2,752,148				17,697,292
2030						11,774,722	3,170,423	2,752,148				17,697,292
2043						11,774,722	3,170,423	2,752,148				17,697,292
2050						11,774,722	3,170,423	2,752,148				17,697,292

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Hohokam Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 1

Table D-88

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	25,708	0	23,880	31,744	55,605	12,817	8,627	3,632	632	0		25,708
2004	25,708	0	22,478	33,127	55,605	12,817	8,627	3,632	632	0		25,708
2017	25,708	0	13,631	88,173	101,805	12,817	8,627	3,632	632	0		25,708
2030	25,708	0	7,521	94,284	101,805	12,817	8,627	3,632	632	0		25,708
2043	25,708	0	1,410	100,394	101,805	12,817	8,627	3,632	632	0		25,708
2050	25,708	0	0	101,805	101,805	12,817	8,627	3,632	632	0		25,708
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						11,774,722	3,170,423	2,752,148				17,697,292
2004						11,774,722	3,170,423	2,752,148				17,697,292
2017						11,774,722	3,170,423	2,752,148				17,697,292
2030						11,774,722	3,170,423	2,752,148				17,697,292
2043						11,774,722	3,170,423	2,752,148				17,697,292
2050						11,774,722	3,170,423	2,752,148				17,697,292

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Hohokam Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 2

Table D-89

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	25,708	0	23,733	31,872	55,605	12,817	8,627	3,632	632	0	0	25,708
2004	25,708	0	22,320	33,285	55,605	12,817	8,627	3,632	632	0	0	25,708
2017	25,708	0	13,015	88,780	101,805	12,817	8,627	3,632	632	0	0	25,708
2030	25,708	0	7,180	94,824	101,805	12,817	8,627	3,632	632	0	0	25,708
2043	25,708	0	0	101,805	101,805	12,817	8,627	3,632	632	0	0	25,708
2050	25,708	0	0	101,805	101,805	12,817	8,627	3,632	632	0	0	25,708
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						11,774,722	3,170,423	2,752,148				17,697,292
2004						11,774,722	3,170,423	2,752,148				17,697,292
2017						11,774,722	3,170,423	2,752,148				17,697,292
2030						11,774,722	3,170,423	2,752,148				17,697,292
2043						11,774,722	3,170,423	2,752,148				17,697,292
2050						11,774,722	3,170,423	2,752,148				17,697,292

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Hohokam Irrigation District Analysis and Summary — 2001 through 2050
Alternative 3a

Table D-70

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	25,708	0	22,125	33,480	55,605	12,817	8,627	3,632	632	0		25,708
2004	25,708	0	20,712	34,893	55,605	12,817	8,627	3,632	632	0		25,708
2017	25,708	0	13,015	88,790	101,805	12,817	8,627	3,632	632	0		25,708
2030	25,708	0	3,723	98,082	101,805	12,817	8,627	3,632	632	0		25,708
2043	25,708	0	0	101,805	101,805	12,817	8,627	3,632	632	0		25,708
2050	25,708	0	0	101,805	101,805	12,817	8,627	3,632	632	0		25,708
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						11,774,722	3,170,423	2,752,148				17,697,292
2004						11,774,722	3,170,423	2,752,148				17,697,292
2017						11,774,722	3,170,423	2,752,148				17,697,292
2030						11,774,722	3,170,423	2,752,148				17,697,292
2043						11,774,722	3,170,423	2,752,148				17,697,292
2050						11,774,722	3,170,423	2,752,148				17,697,292

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Hohokam Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 3b

Table D-71

Year	Acres in Production	Lost crop Acres	CAP water/ Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	25,708	0	22,163	33,442	55,605	12,817	8,627	3,632	632	0	0	25,708
2004	25,708	0	20,870	34,735	55,605	12,817	8,627	3,632	632	0	0	25,708
2017	25,708	0	13,015	88,790	101,805	12,817	8,627	3,632	632	0	0	25,708
2030	25,708	0	4,917	96,887	101,805	12,817	8,627	3,632	632	0	0	25,708
2043	25,708	0	0	101,805	101,805	12,817	8,627	3,632	632	0	0	25,708
2050	25,708	0	0	101,805	101,805	12,817	8,627	3,632	632	0	0	25,708
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						11,774,722	3,170,423	2,752,148				17,697,292
2004						11,774,722	3,170,423	2,752,148				17,697,292
2017						11,774,722	3,170,423	2,752,148				17,697,292
2030						11,774,722	3,170,423	2,752,148				17,697,292
2043						11,774,722	3,170,423	2,752,148				17,697,292
2050						11,774,722	3,170,423	2,752,148				17,697,292

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1966-88

Table D-72

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes. Present acres were calculated as the average of the years 1996-98

New Magma Irrigation District Analysis and Summary -- 2001 through 2050
No Action Alternative

Table D-73

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	23,281	0	54,538	12,791	67,327	9,042	5,107	5,449	1,808	1,855		23,281
2004	23,281	0	51,289	18,038	67,327	9,042	5,107	5,449	1,808	1,855		23,281
2017	18,154	5,107	31,978	15,499	47,478	9,042	0	5,449	1,808	1,855		18,154
2030	18,154	0	17,643	22,840	40,594	9,042	0	5,449	1,808	1,855		18,154
2043	12,705	5,449	3,308	28,790	30,099	9,042	0	0	1,808	1,855		12,705
2050	12,705	0	0	51,837	51,837	9,042	0	0	1,808	1,855		12,705
		10,558				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						8,308,705	1,878,823	4,128,980				14,312,507
2004						8,308,705	1,878,823	4,128,980				14,312,507
2017						8,308,705	0	4,128,980				12,435,684
2030						8,308,705	0	4,128,980				12,435,684
2043						8,308,705	0	0				8,306,705
2050						8,308,705	0	0				8,306,705

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

New Magma Irrigation District Analysis and Summary – 2001 through 2050
Alternative 1

Table D-74

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	23,261	0	54,829	12,498	67,327	9,042	5,107	5,449	1,808	1,855		23,261
2004	23,261	0	51,851	15,875	67,327	9,042	5,107	5,449	1,808	1,855		23,261
2017	18,154	5,107	31,323	55,118	86,442	9,042	0	5,449	1,808	1,855		18,154
2030	12,705	5,449	17,282	34,555	51,836	9,042	0	0	1,808	1,855		12,705
2043	12,705	0	3,240	43,441	46,681	9,042	0	0	1,808	1,855		12,705
2050	12,705	0	0	51,836	51,836	9,042	0	0	1,808	1,855		12,705
		10,558				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						8,306,705	1,876,823	4,128,980				14,312,507
2004						8,306,705	1,876,823	4,128,980				14,312,507
2017						8,306,705	0	4,128,980				12,435,684
2030						8,306,705	0	0				8,306,705
2043						8,306,705	0	0				8,306,705
2050						8,306,705	0	0				8,306,705

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1998-98

New Magma Irrigation District Analysis and Summary – 2001 through 2050
Alternative 2

Table D-7's

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	23,261	0	54,536	12,791	67,327	9,042	5,107	5,449	1,808	1,855		23,261
2004	23,261	0	51,289	16,038	67,327	9,042	5,107	5,449	1,808	1,855		23,261
2017	18,154	5,107	29,908	56,466	86,372	9,042	0	5,449	1,808	1,855		18,154
2030	12,705	5,449	16,500	35,336	51,836	9,042	0	0	1,808	1,855		12,705
2043	12,705	0	0	51,836	51,836	9,042	0	0	1,808	1,855		12,705
2050	12,705	0	0	51,836	51,836	9,042	0	0	1,808	1,855		12,705
		10,556										
						Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						8,306,705	1,876,823	4,128,980				14,312,507
2004						8,306,705	1,878,823	4,128,980				14,312,507
2017						8,306,705	0	4,128,980				12,435,684
2030						8,306,705	0	0				8,306,705
2043						8,306,705	0	0				8,306,705
2050						8,306,705	0	0				8,306,705

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1998-98

New Magma Irrigation District Analysis and Summary – 2001 through 2050
Alternative 3a

Table D-76

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	23,261	0	54,237	13,089	67,327	9,042	5,107	5,449	1,808	1,855		23,261
2004	23,261	0	50,990	16,337	67,327	9,042	5,107	5,449	1,808	1,855		23,261
2017	18,154	5,107	33,302	54,388	87,691	9,042	0	5,449	1,808	1,855		18,154
2030	12,705	5,449	11,951	39,885	51,836	9,042	0	0	1,808	1,855		12,705
2043	12,705	0	3,398	46,440	51,836	9,042	0	0	1,808	1,855		12,705
2050	12,705	0	0	51,836	51,836	9,042	0	0	1,808	1,855		12,705
		10,558				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						8,306,705	1,876,823	4,128,980				14,312,507
2004						8,306,705	1,876,823	4,128,980				14,312,507
2017						8,306,705	0	4,128,980				12,435,684
2030						8,306,705	0	0				8,306,705
2043						8,306,705	0	0				8,306,705
2050						8,306,705	0	0				8,306,705

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1988-98

New Magma Irrigation District Analysis and Summary -- 2001 through 2050
Alternative 3b

Table D-77

Year	Acres in Production	Lost crop Acres	CAP water Demands	Pump Water Demands	Total water Utilization	Cotton Acres	Small grain Acres	Forage Acres	Vegetable Acres	Fruit & nut Acres	Other Acres	Total Acres
2001	23,261	0	50,928	16,399	67,327	9,042	5,107	5,449	1,808	1,855		23,261
2004	23,261	0	47,957	19,370	67,327	9,042	5,107	5,449	1,808	1,855		23,261
2017	18,154	5,107	29,908	57,784	87,691	9,042	0	5,449	1,808	1,855		18,154
2030	12,705	5,449	11,300	40,536	51,836	9,042	0	0	1,808	1,855		12,705
2043	12,705	0	0	51,836	51,836	9,042	0	0	1,808	1,855		12,705
2050	12,705	0	0	51,836	51,836	9,042	0	0	1,808	1,855		12,705
		10,556				Cotton Sales	Small grain Sales	Forage Sales	Vegetable Sales	Fruit & nut Sales	Other Sales	Total Sales
2001						8,306,705	1,876,823	4,128,980				14,312,507
2004						8,306,705	1,876,823	4,128,980				14,312,507
2017						8,306,705	0	4,128,980				12,435,684
2030						8,306,705	0	0				8,306,705
2043						8,306,705	0	0				8,306,705
2050						8,306,705	0	0				8,306,705

Note: Present acres in production are assumed to be the beginning acres in 2001 for analysis purposes
Present acres were calculated as the average of the years 1996-98

Water Cost Function Frontier – Groundwater Pumping versus CAP Water Costs – Irrigation Districts
Settlement Alternative Table D-78

	Year	CAP H2O Cost	Pump H2O Cost	Cost Frontier	Crop Change
Hohokam Irrigation Dist. (50 % Coolidge and 50 % Casa Grande)	2001	\$24.97	\$36.22	\$26.08	
	2004	\$27.71	\$36.84	\$28.86	
	2017	\$35.00	\$35.29	\$35.20	
	2030	\$35.00	\$37.43	\$36.99	
	2043	\$35.00	\$39.70	\$39.40	
	2050		\$41.12	\$41.12	Grains out
San Carlos irrigation (50 % Coolidge and 50 % Casa Grande)	2001	\$24.54	\$36.22	\$28.39	
	2004	\$28.34	\$36.22	\$30.94	
	2017	\$27.15	\$36.22	\$30.14	
	2030	\$35.00	\$36.22	\$35.00	
	2043	\$35.00	\$36.22	\$35.00	
	2050		\$36.22	\$36.22	
Central Arizona Irr. Dist. (100 % Eloy)	2001	\$28.26	\$42.08	\$31.75	
	2004	\$33.62	\$41.84	\$36.07	
	2017	\$35.00	\$41.50	\$38.28	
	2030	\$35.00	\$43.36	\$41.04	
	2043	\$35.00	\$45.07	\$43.74	Grains out
	2050		\$46.45	\$46.45	
Maricopa Stanfield (30 % Maricopa and 70 % Stanfield)	2001	\$28.30	\$30.93	\$29.20	
	2004	\$33.70	\$30.08	\$32.30	
	2017	\$35.00	\$28.55	\$31.36	
	2030	\$35.00	\$29.79	\$31.07	
	2043	\$35.00	\$32.00	\$32.25	
	2050		\$33.58	\$33.58	
New Magma Irr. Dist.	2001	\$25.65	\$60.73	\$32.62	
	2004	\$28.90	\$59.79	\$36.01	
	2017	\$35.00	\$59.35	\$49.82	Grains out
	2030	\$35.00	\$62.11	\$52.01	Forage out
	2043	\$35.00	\$65.80	\$61.86	
	2050		\$68.03	\$68.03	
Queen Creek Irr. Dist.	2001	\$25.18	\$60.73	\$50.02	
	2004	\$28.07	\$63.27	\$48.23	Forage out
	2017	\$35.00	\$64.92	\$60.22	Grains out
	2030	\$35.00	\$66.56	\$63.77	
	2043	\$35.00	\$64.46	\$62.44	
	2050		\$64.76	\$64.76	Cotton out
Harquahala Valley Dist	2001	\$29.00	\$57.91	\$46.73	
	2004	\$35.00	\$57.91	\$46.38	Forage out
	2017	\$35.00	\$57.91	\$50.46	
	2030	\$35.00	\$57.91	\$53.73	
	2043	\$35.00	\$57.91	\$56.47	
	2050		\$57.91	\$57.91	
Tonopah Irrigation Dist.	2001	\$23.93	\$57.91	\$45.05	
	2004	\$25.90	\$57.91	\$42.84	Forage out
	2017	\$35.00	\$57.91	\$54.97	
	2030	\$35.00	\$57.91	\$56.25	
	2043	\$35.00	\$57.91	\$57.34	
	2050		\$57.91	\$57.91	
Roosevelt Irrigation Dist	2001	\$24.54	\$27.00	\$24.54	
	2004	\$28.34	\$27.54	\$27.54	
	2016	\$27.15	\$29.20	\$27.15	
	2030	\$35.00	\$31.38	\$31.36	
	2043	\$35.00	\$33.75	\$33.75	
	2050		\$35.44	\$35.44	

Water Cost Function Frontier -- Groundwater Pumping versus CAP Water Costs -- Irrigation Districts
No Action Alternative Table D-79

	Year	CAP H2O Cost	Pump H2O Cost	Cost Frontier	Crop Change
Hohokam Irrigation Dist. (50 % Coolidge and 50 % Casa Grande)	2001	\$23.71	\$36.22	\$27.63	
	2004	\$25.56	\$36.17	\$29.03	
	2017	\$35.00	\$36.17	\$36.01	
	2030	\$35.00	\$38.28	\$38.03	
	2043	\$35.00	\$40.33	\$40.25	
	2050		\$41.52	\$41.52	Grains out
San Carlos Irrigation (50 % Coolidge and 50 % Casa Grande)	2001	\$24.28	\$36.22	\$28.22	
	2004	\$28.16	\$36.22	\$30.82	
	2017	\$23.72	\$36.22	\$27.85	
	2030	\$35.00	\$36.22	\$35.00	
	2043	\$35.00	\$38.22	\$35.00	
	2050		\$36.22	\$36.22	
Central Arizona Irr. Dist. (100 % Eloy)	2001	\$28.37	\$42.08	\$30.14	
	2004	\$33.83	\$41.60	\$35.20	
	2017	\$35.00	\$40.82	\$38.08	
	2030	\$35.00	\$42.97	\$40.90	
	2043	\$35.00	\$45.06	\$44.38	Grains out
	2050		\$46.47	\$46.47	
Maricopa Stanfield (30 % Maricopa and 70 % Stanfield)	2001	\$28.39	\$30.93	\$29.02	
	2004	\$33.87	\$29.80	\$32.68	
	2017	\$35.00	\$27.77	\$30.71	
	2030	\$35.00	\$29.25	\$30.54	
	2043	\$35.00	\$31.74	\$31.88	
	2050		\$33.27	\$33.27	
New Magma Irr. Dist.	2001	\$25.93	\$60.73	\$30.32	
	2004	\$29.42	\$59.15	\$34.12	
	2017	\$33.32	\$58.67	\$40.30	
	2030	\$29.55	\$57.16	\$35.35	
	2043	\$22.85	\$57.73	\$31.29	
	2050		\$60.78	\$60.78	G&F out
Queen Creek Irr. Dist.	2001	\$27.31	\$60.73	\$37.93	
	2004	\$31.90	\$59.63	\$34.91	
	2017	\$34.23	\$56.21	\$46.13	Forage out
	2030	\$32.00	\$53.65	\$34.07	Forage in
	2043	\$24.67	\$53.92	\$35.62	
	2050		\$55.98	\$55.98	G&F out
Harquahala Valley Dist	2001	\$24.28	\$57.91	\$49.65	
	2004	\$28.16	\$57.91	\$49.93	Forage out
	2017	\$23.72	\$57.91	\$52.19	
	2030	\$35.00	\$57.91	\$55.80	
	2043	\$35.00	\$57.91	\$57.51	
	2050		\$57.91	\$57.91	
Tonopah Irrigation Dist.	2001	\$26.08	\$57.91	\$36.97	
	2004	\$29.69	\$57.91	\$35.14	
	2017	\$33.44	\$57.91	\$49.30	Forage out
	2030	\$29.82	\$57.91	\$47.20	
	2043	\$22.99	\$57.91	\$45.48	
	2050		\$57.91	\$57.91	
Roosevelt Irrigation Dist	2001	\$24.28	\$27.00	\$24.28	
	2004	\$28.16	\$27.54	\$27.54	
	2017	\$23.72	\$29.20	\$23.72	
	2030	\$35.00	\$31.38	\$31.38	
	2043	\$35.00	\$33.75	\$33.75	
	2050		\$35.44	\$35.44	

Water Cost Function Frontier – Groundwater Pumping versus CAP Water Costs – Irrigation Districts
Alternative 1
Table D-80

	Year	CAP H2O Cost	Pump H2O Cost	Cost Frontier	Crop Change
Hohokam Irrigation Dist. (50 % Coolidge and 50 % Casa Grande)	2001	\$23.72	\$36.22	\$27.62	
	2004	\$25.58	\$36.17	\$29.03	
	2017	\$35.00	\$36.16	\$36.00	
	2030	\$35.00	\$38.27	\$36.03	
	2043	\$35.00	\$40.31	\$40.24	
	2050		\$41.51	\$41.51	Grains out
San Carlos Irrigation (50 % Coolidge and 50 % Casa Grande)	2001	\$24.31	\$36.22	\$28.24	
	2004	\$28.21	\$36.22	\$30.85	
	2017	\$24.05	\$36.22	\$28.07	
	2030	\$35.00	\$36.22	\$35.00	
	2043	\$35.00	\$36.22	\$35.00	
	2050		\$36.22	\$36.22	
Central Arizona Irr. Dist. (100 % Eloy)	2001	\$28.37	\$42.08	\$30.09	
	2004	\$33.83	\$41.59	\$35.17	
	2017	\$35.00	\$40.79	\$38.12	
	2030	\$35.00	\$42.97	\$40.95	
	2043	\$35.00	\$45.06	\$44.40	Grains out
	2050		\$46.47	\$46.47	
Maricopa Stanfield (30 % Maricopa and 70 % Stanfield)	2001	\$28.39	\$30.93	\$29.02	
	2004	\$33.88	\$29.79	\$32.71	
	2017	\$35.00	\$27.73	\$30.62	
	2030	\$35.00	\$29.24	\$30.50	
	2043	\$35.00	\$31.73	\$31.86	
	2050		\$33.25	\$33.25	
New Magma Irr. Dist.	2001	\$25.94	\$60.73	\$30.23	
	2004	\$29.44	\$59.12	\$34.03	
	2017	\$34.46	\$57.07	\$46.67	Grains out
	2030	\$35.00	\$59.31	\$51.21	
	2043	\$26.40	\$61.97	\$53.58	Forage out
	2050		\$64.14	\$64.14	
Queen Creek Irr. Dist.	2001	\$27.32	\$60.73	\$37.84	
	2004	\$31.92	\$59.79	\$34.78	
	2017	\$34.76	\$55.73	\$35.32	
	2030	\$35.00	\$54.27	\$44.09	Forage out
	2043	\$29.33	\$55.99	\$49.57	
	2050		\$57.87	\$57.87	
Harquahala Valley Dist	2001	\$29.00	\$57.91	\$50.77	
	2004	\$35.00	\$57.91	\$51.72	Forage out
	2017	\$35.00	\$57.91	\$54.16	
	2030	\$35.00	\$57.91	\$55.84	
	2043	\$35.00	\$57.91	\$57.52	
	2050		\$57.91	\$57.91	
Tonopah Irrigation Dist.	2001	\$26.09	\$57.91	\$36.90	
	2004	\$29.72	\$57.91	\$35.06	
	2017	\$34.50	\$57.91	\$50.48	Forage out
	2030	\$35.00	\$57.91	\$54.04	
	2043	\$26.68	\$57.91	\$54.24	
	2050		\$57.91	\$57.91	
Roosevelt Irrigation Dist	2001	\$24.31	\$27.00	\$24.31	
	2004	\$28.21	\$27.54	\$27.54	
	2017	\$24.05	\$29.20	\$24.05	
	2030	\$35.00	\$31.36	\$31.38	
	2043	\$35.00	\$33.75	\$33.75	
	2050		\$35.44	\$35.44	

Water Cost Function Frontier – Groundwater Pumping versus CAP Water Costs – Irrigation Districts
Alternative 2

Table D-81

	Year	CAP H2O Cost	Pump H2O Cost	Cost Frontier	Crop Change
Hohokam Irrigation Dist. (50 % Coolidge and 50 % Casa Grande)	2001	\$23.71	\$36.22	\$27.63	
	2004	\$25.56	\$36.17	\$29.03	
	2017	\$35.00	\$36.18	\$36.03	
	2030	\$35.00	\$36.31	\$38.08	
	2043		\$40.45	\$40.45	
	2050		\$41.68	\$41.68	Grains out
San Carlos Irrigation (50 % Coolidge and 50 % Casa Grande)	2001	\$24.28	\$36.53	\$28.32	
	2004	\$28.16	\$35.76	\$30.67	
	2017	\$23.28	\$36.83	\$27.75	
	2030	\$35.00	\$37.96	\$35.00	
	2043	\$0.00	\$38.67	\$38.67	
	2050		\$0.00	\$0.00	
Central Arizona Irr. Dist. (100 % Eloy)	2001	\$28.37	\$42.08	\$30.14	
	2004	\$33.83	\$41.60	\$35.20	
	2017	\$35.00	\$40.83	\$36.27	
	2030	\$35.00	\$43.07	\$41.11	
	2043	\$0.00	\$45.39	\$45.39	Grains out
	2050		\$46.79	\$46.79	
Maricopa Stanfield (30 % Maricopa and 70 % Stanfield)	2001	\$28.39	\$30.93	\$29.02	
	2004	\$33.67	\$29.80	\$32.68	
	2017	\$35.00	\$27.78	\$30.52	
	2030	\$35.00	\$29.35	\$30.53	
	2043	\$0.00	\$32.11	\$32.11	
	2050		\$33.59	\$33.59	
New Magma Irr. Dist.	2001	\$25.93	\$60.73	\$30.32	
	2004	\$29.42	\$59.15	\$34.12	
	2017	\$34.41	\$57.50	\$49.28	Grains out
	2030	\$35.00	\$63.32	\$54.31	Forage out
	2043	\$0.00	\$66.96	\$66.96	
	2050		\$68.67	\$68.67	
Queen Creek Irr. Dist.	2001	\$27.31	\$60.73	\$37.93	
	2004	\$31.90	\$60.17	\$41.79	
	2017	\$34.74	\$59.49	\$49.27	Forage out
	2030	\$35.00	\$61.32	\$55.43	
	2043	\$0.00	\$63.08	\$63.08	Grains out
	2050		\$63.60	\$63.60	
Harquahala Valley Dist	2001	\$29.00	\$57.91	\$50.81	
	2004	\$35.00	\$57.91	\$51.76	Forage out
	2017	\$35.00	\$57.91	\$54.33	
	2030	\$35.00	\$57.91	\$55.93	
	2043	\$0.00	\$57.91	\$57.91	
	2050		\$57.91	\$57.91	
Tonopah Irrigation Dist.	2001	\$26.08	\$57.91	\$36.97	
	2004	\$29.69	\$57.91	\$35.14	
	2017	\$34.45	\$57.91	\$50.78	Forage out
	2030	\$35.00	\$57.91	\$54.22	
	2043	\$0.00	\$57.91	\$57.91	
	2050		\$57.91	\$57.91	
Roosevelt Irrigation Dist	2001	\$24.28	\$27.00	\$24.28	
	2004	\$28.16	\$27.54	\$27.54	
	2017	\$23.28	\$29.20	\$23.28	
	2030	\$35.00	\$31.36	\$31.38	
	2043	\$0.00	\$33.75	\$33.75	
	2050		\$35.44	\$35.44	

Water Cost Function Frontier – Groundwater Pumping versus CAP Water Costs – Irrigation Districts
Alternative 3a Table D-82

	Year	CAP H2O Cost	Pump H2O Cost	Cost Frontier	Crop Change
Hohokam Irrigation Dist. (50 % Coolidge and 50 % Casa Grande)	2001	\$23.59	\$36.22	\$27.74	
	2004	\$25.33	\$36.27	\$29.08	
	2017	\$35.00	\$36.39	\$36.21	
	2030	\$35.00	\$36.71	\$36.57	
	2043		\$40.85	\$40.85	
	2050		\$42.05	\$42.05	Grains out
San Carlos Irrigation (50 % Coolidge and 50 % Casa Grande)	2001	\$23.59	\$36.22	\$27.76	
	2004	\$25.33	\$36.22	\$28.93	
	2017	\$35.00	\$36.22	\$35.40	
	2030	\$35.00	\$36.22	\$35.00	
	2043		\$36.22	\$36.22	
	2050		\$36.22	\$36.22	
Central Arizona Irr. Dist. (100 % Eloy)	2001	\$28.41	\$42.08	\$29.22	
	2004	\$33.92	\$41.46	\$34.72	
	2017	\$35.00	\$40.35	\$37.33	
	2030	\$35.00	\$42.46	\$40.59	
	2043	\$35.00	\$44.45	\$42.81	Grains out
	2050		\$45.96	\$45.96	
Maricopa Stanfield (30 % Maricopa and 70 % Stanfield)	2001	\$28.43	\$30.93	\$28.91	
	2004	\$33.96	\$29.62	\$32.95	
	2017	\$35.00	\$27.19	\$30.99	
	2030	\$35.00	\$28.86	\$30.18	
	2043	\$35.00	\$31.00	\$31.43	
	2050		\$32.62	\$32.62	
New Magma Irr. Dist.	2001	\$25.92	\$60.73	\$30.41	
	2004	\$29.40	\$59.18	\$34.20	
	2017	\$35.00	\$57.63	\$49.04	Grains out
	2030	\$35.00	\$61.62	\$55.48	Forage out
	2043		\$65.51	\$61.22	
	2050		\$67.56	\$63.13	
Queen Creek Irr. Dist.	2001	\$27.22	\$60.73	\$39.09	
	2004	\$31.72	\$60.49	\$42.83	
	2017	\$35.00	\$60.43	\$50.12	Forage out
	2030	\$35.00	\$63.11	\$59.85	Grains out
	2043	\$35.00	\$62.60	\$62.60	
	2050		\$63.22	\$63.22	
Harquahala Valley Dist	2001	\$29.00	\$57.91	\$51.29	
	2004	\$35.00	\$57.91	\$52.21	Forage out
	2017	\$35.00	\$57.91	\$54.33	
	2030	\$35.00	\$57.91	\$56.88	
	2043		\$57.91	\$57.91	
	2050		\$57.91	\$57.91	
Tonopah Irrigation Dist.	2001	\$25.95	\$57.91	\$37.78	
	2004	\$29.45	\$57.91	\$40.69	
	2017	\$35.00	\$57.91	\$51.21	Forage out
	2030	\$35.00	\$57.91	\$55.99	
	2043		\$57.91	\$57.91	
	2050		\$57.91	\$57.91	
Roosevelt Irrigation Dist	2001	\$23.77	\$27.00	\$23.77	
	2004	\$27.68	\$27.54	\$27.54	
	2017	\$20.21	\$29.20	\$20.21	
	2030	\$35.00	\$31.36	\$31.36	
	2043		\$33.75	\$33.75	
	2050		\$35.44	\$35.44	

Water Cost Function Frontier – Groundwater Pumping versus CAP Water Costs – Irrigation Districts
Alternative 3b
Table D-83

	Year	CAP H2O Cost	Pump H2O Cost	Cost Frontier	Crop Change
Hohokam Irrigation Dist. (50 % Coolidge and 50 % Casa Grande)	2001	\$23.59	\$36.22	\$27.74	
	2004	\$25.36	\$36.20	\$29.06	
	2017	\$35.00	\$38.24	\$36.08	
	2030	\$35.00	\$38.52	\$36.35	
	2043		\$40.72	\$40.72	
	2050		\$41.96	\$41.96	Grains out
San Carlos Irrigation (50 % Coolidge and 50 % Casa Grande)	2001	\$23.59	\$36.20	\$27.75	
	2004	\$25.36	\$36.20	\$28.93	
	2017	\$35.00	\$37.25	\$35.74	
	2030	\$35.00	\$38.28	\$35.00	
	2043		\$38.87	\$38.87	
	2050		\$0.00	\$0.00	
Central Arizona Irr. Dist. (100 % Eloy)	2001	\$28.32	\$42.08	\$30.84	
	2004	\$33.75	\$41.63	\$35.53	
	2017	\$35.00	\$40.88	\$38.30	
	2030	\$35.00	\$43.31	\$41.93	Grains out
	2043	\$35.00	\$45.49	\$45.49	
	2050		\$46.81	\$46.81	
Maricopa Stanfield (30 % Maricopa and 70 % Stanfield)	2001	\$28.35	\$30.93	\$29.11	
	2004	\$33.80	\$29.82	\$32.47	
	2017	\$35.00	\$27.77	\$30.52	
	2030	\$35.00	\$29.61	\$30.38	
	2043		\$32.05	\$32.05	
	2050		\$33.53	\$33.53	
New Magma Irr. Dist.	2001	\$25.80	\$60.73	\$31.45	
	2004	\$29.19	\$59.42	\$34.97	
	2017	\$35.00	\$58.27	\$50.33	Grains out
	2030	\$35.00	\$62.08	\$56.18	Forage out
	2043		\$66.31	\$66.31	
	2050		\$68.14	\$68.14	
Queen Creek Irr. Dist.	2001	\$27.22	\$60.73	\$39.06	
	2004	\$31.74	\$60.49	\$42.74	
	2017	\$35.00	\$60.41	\$50.11	Forage out
	2030	\$35.00	\$62.66	\$58.42	
	2043		\$62.41	\$62.41	Grains out
	2050		\$63.13	\$63.13	
Harquahala Valley Dist	2001	\$29.00	\$57.91	\$51.28	
	2004	\$35.00	\$57.91	\$52.16	Forage out
	2017	\$35.00	\$57.91	\$54.33	
	2030	\$35.00	\$57.91	\$58.56	
	2043		\$57.91	\$57.91	
	2050		\$57.91	\$57.91	
Tonopah Irrigation Dist.	2001	\$25.95	\$57.91	\$37.77	
	2004	\$29.47	\$57.91	\$35.88	
	2017	\$35.00	\$57.91	\$51.21	Forage out
	2030	\$35.00	\$57.91	\$55.38	
	2043		\$57.91	\$57.91	
	2050		\$57.91	\$57.91	
Roosevelt Irrigation Dist	2001	\$23.78	\$27.00	\$23.78	
	2004	\$27.73	\$27.54	\$27.54	
	2017	\$20.77	\$29.20	\$20.77	
	2030	\$35.00	\$31.38	\$31.38	
	2043		\$33.75	\$33.75	
	2050		\$35.44	\$35.44	

Impacts on Output, Employment, and Income of Construction of Indian Distribution Systems -- Anticipated Federal Outlays
Table D-84

Construction Expenditure Impacts (dollars per year)

Year	Settlement Alternative		No Action Alternative		All Other Alternatives		Comparison of Settlement with No Action Alternative	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total
2001	\$54,400,000	\$87,600,000	\$29,400,000	\$47,300,000	\$29,400,000	\$47,300,000	\$25,000,000	\$40,300,000
2004	\$71,600,000	\$115,200,000	\$48,600,000	\$74,900,000	\$48,600,000	\$74,900,000	\$25,000,000	\$40,300,000
10-year totals	\$585,300,000	\$842,200,000	\$385,300,000	\$620,200,000	\$385,300,000	\$620,200,000	\$200,000,000	\$322,000,000

Employment Impacts from Construction (number of jobs annually)

Year	Settlement Alternative		No Action Alternative		All Other Alternatives		Comparison of Settlement with No Action Alternative	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total
2001	475	914	257	494	257	494	218	420
2004	625	1,203	406	782	406	782	219	421
10-year totals	5,114	9,836	3,367	6,475	3,367	6,475	1,747	3,361

Income Impacts from Construction (dollars per year)

Year	Settlement Alternative		No Action Alternative		All Other Alternatives		Comparison of Settlement with No Action Alternative	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total
2001	\$19,200,000	\$37,200,000	\$10,370,000	\$20,100,000	\$10,370,000	\$20,100,000	\$8,830,000	\$17,100,000
2004	\$25,200,000	\$48,900,000	\$16,380,000	\$31,800,000	\$16,380,000	\$31,800,000	\$8,820,000	\$17,100,000
10-year totals	\$208,100,000	\$400,100,000	\$135,700,000	\$263,400,000	\$135,700,000	\$263,400,000	\$70,400,000	\$136,700,000

Note: The Federal expenditures for Indian distribution systems are currently on-going and will continue through about 2012. Associated with the GRIC settlement is an additional total of \$200 million, disbursed at the rate of \$25 million annually, for 8 years from 2001 to 2008, occurring only with settlement.

Table D-85

Summary of Impacts of Agricultural Output Changes -- Settlement Alternative

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$1,185,065	\$0	\$1,185,065	\$571,867	\$0	\$0	\$0	\$0
2004	(\$2,533,249)	(\$4,422,671)	\$1,889,423	(\$642,625)	\$0	\$0	\$0	\$0
2017	\$46,543,817	(\$7,915,234)	\$54,459,050	\$21,312,549	\$46,818,368	(\$1,876,823)	\$48,695,191	\$19,703,383
2030	\$105,897,460	(\$12,044,213)	\$117,941,673	\$48,223,143	\$103,401,249	(\$6,005,802)	\$109,407,051	\$43,699,463
2043	\$87,510,007	(\$20,431,666)	\$117,941,673	\$45,006,512	\$95,013,796	(\$14,393,255)	\$109,407,051	\$41,139,128
2050	\$89,206,724	(\$28,734,949)	\$117,941,673	\$41,201,637	\$91,843,373	(\$17,563,678)	\$109,407,051	\$39,541,332
50 Year Total Estimate	\$4,014,774,373	(\$772,361,055)	\$4,787,135,429	\$1,843,644,467	\$3,979,364,235	(\$434,224,835)	\$4,413,589,070	\$1,699,372,398

Table D-88

Comparison of Impacts of Agricultural Output Changes -- Settlement Versus No Action

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2004	(\$2,862,320)	(\$2,862,320)	\$0	(\$955,004)	\$0	\$0	\$0	\$0
2017	(\$3,492,563)	(\$3,492,563)	\$0	(\$1,339,416)	(\$1,876,823)	(\$1,876,823)	\$0	\$0
2030	\$22,359,264	(\$10,061,477)	\$32,420,741	\$10,824,496	\$23,644,176	(\$6,005,802)	\$29,649,978	\$10,490,745
2043	\$22,359,264	(\$10,061,477)	\$32,420,741	\$10,824,497	\$23,644,176	(\$6,005,802)	\$29,649,976	\$10,490,742
2050	\$27,287,881	(\$5,132,660)	\$32,420,741	\$11,766,602	\$29,649,978	\$0	\$29,649,978	\$11,714,579
50 Year Total Estimate	\$771,505,468	(\$363,220,460)	\$1,134,725,927	\$387,456,217	\$853,070,706	(\$184,678,531)	\$1,037,749,237	\$376,966,708

Summary of Employment Impacts -- Settlement Alternative

Table D-87

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	11.7	8.1	19.8	0	0	0
2004	-138.7	-8.2	-146.9	0	0	0
2017	400	304	704.0	317.4	396.4	713.8
2030	950.2	684.3	1634.5	635.4	878.1	1,513.5
2043	795	646.1	1,441.1	528.5	842.1	1,370.6
2050	707.4	594.9	1,302.3	488.0	828.6	1,316.6
50 Year Total Estimate	33,681	26,362	60,043	23,479	34,626	58,105

Table D-89

Summary of Income Impacts -- Settlement Alternative

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	642,601	319,157	961,758	0	0	0
2004	(2,004,336)	(358,697)	(2,363,033)	0	0	0
2017	28,576,665	11,910,854	40,487,519	17,658,482	10,528,492	28,186,974
2030	64,975,701	26,950,457	91,926,158	38,858,625	23,354,396	62,213,021
2043	59,824,857	25,153,922	84,978,779	35,696,779	21,962,282	57,659,081
2050	55,215,557	23,070,301	78,285,858	34,501,615	21,436,065	55,937,680
50 Year Total Estimate	2,466,014,383	1,030,723,949	3,496,738,332	1,495,993,581	910,301,634	2,406,295,215

Comparison of Income Impacts -- Settlement Versus No Action Table D-90

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	0	0	0	0	0	0
2004	(2,012,199)	(533,024)	(2,545,223)	0	0	0
2017	(2,144,828)	(747,643)	(2,892,471)	0	0	0
2030	13,366,154	6,051,874	19,418,028	8,742,676	5,600,522	14,343,198
2043	13,366,154	6,050,815	19,416,969	8,742,676	5,600,523	14,343,199
2050	17,466,597	6,616,790	24,083,387	11,215,869	6,599,604	17,815,473
50 Year Total Estimate	468,844,401	205,750,363	674,594,764	325,779,204	204,010,939	529,790,143

Summary of Impacts of Agricultural Output Changes -- No Action Alternative

Table D-91

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$1,185,065	\$0	\$1,185,065	\$571,867	\$0	\$0	\$0	\$0
2004	\$329,071	(\$1,560,351)	\$1,889,423	\$312,379	\$0	\$0	\$0	\$0
2017	\$50,036,379	(\$4,422,671)	\$54,459,050	\$22,651,965	\$48,695,191	\$0	\$48,695,191	\$19,703,383
2030	\$83,538,195	(\$1,982,737)	\$85,520,932	\$37,398,647	\$79,757,073	\$0	\$79,757,073	\$33,208,718
2043	\$75,150,743	(\$10,370,189)	\$85,520,932	\$34,182,015	\$71,369,620	(\$8,387,453)	\$79,757,073	\$30,648,388
2050	\$61,918,843	(\$23,602,089)	\$85,520,932	\$29,435,035	\$62,193,395	(\$17,563,678)	\$79,757,073	\$27,826,753
50 Year Total	\$3,243,268,905	(\$408,140,596)	\$3,652,409,501	\$1,476,188,250	\$3,126,293,528	(\$249,546,305)	\$3,375,839,833	\$1,322,405,690

Summary of Employment Impacts -- No Action Alternative

Table D-92

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	11.7	8.1	19.8	0	0	0
2004	-27.9	4.6	-23.3	0	0	0
2017	464.6	319.8	784.4	317.4	396.4	713.8
2030	886.0	527.6	1,413.6	560.2	662.7	1,222.9
2043	730.8	489.6	1,220.4	453.3	626.8	1,080.1
2050	353.4	429.9	783.3	279.1	582.1	861.2
50 Year Total Estimate	30,223	21,042	51,265	19,777	26,840	46,617

Table D-93

Summary of Income Impacts -- No Action Alternative

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	642,601	319,157	961,758	0	0	0
2004	7,863	174,327	182,190	0	0	0
2017	30,721,493	12,658,497	43,379,990	17,658,482	10,528,492	28,186,974
2030	51,609,547	20,898,583	72,508,130	30,115,949	17,753,874	47,869,823
2043	46,458,703	19,103,107	65,561,810	26,954,103	16,361,759	43,315,862
2050	37,748,960	16,453,511	54,202,471	23,285,746	14,836,461	38,122,207
50 Year Total Estimate	1,997,169,982	824,973,586	2,822,143,568	1,170,214,377	706,290,695	1,876,505,072

Summary of Impacts of Agricultural Output Changes -- Alternative 1

Table D-94

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$1,185,085	\$0	\$1,185,085	\$571,867	\$0	\$0	\$0	\$0
2004	\$328,071	(\$1,560,351)	\$1,889,423	\$312,379	\$0	\$0	\$0	\$0
2017	\$50,599,491	(\$3,859,559)	\$54,459,050	\$22,746,270	\$46,818,388	(\$1,876,823)	\$48,695,191	\$19,703,383
2030	\$86,832,970	(\$6,299,494)	\$93,132,464	\$39,288,916	\$85,491,782	(\$1,876,823)	\$87,368,605	\$35,821,918
2043	\$74,316,538	(\$18,815,926)	\$93,132,464	\$34,694,659	\$72,975,350	(\$14,393,255)	\$87,368,605	\$31,980,659
2050	\$71,146,115	(\$21,986,349)	\$93,132,464	\$33,478,794	\$69,804,927	(\$17,563,876)	\$87,368,805	\$31,012,867
50 Year Total	\$3,359,126,614	(\$559,686,510)	\$3,918,813,124	\$1,542,798,120	\$3,265,824,337	(\$376,419,119)	\$3,642,243,456	\$1,401,798,951

Table D-95

Comparison of Impacts of Agricultural Output Changes -- Alternative 1 Versus No Action

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2004	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2017	\$563,112	\$583,112	\$0	\$94,305	(\$1,676,823)	(\$1,876,823)	\$0	\$0
2030	\$3,294,775	(\$4,316,757)	\$7,811,532	\$1,890,269	\$5,734,710	(\$1,876,823)	\$7,611,532	\$2,613,200
2043	(\$834,205)	(\$8,445,737)	\$7,611,532	\$512,644	\$1,805,730	(\$6,005,802)	\$7,611,532	\$1,332,273
2050	\$9,227,272	\$1,615,740	\$7,611,532	\$4,043,759	\$7,611,532	\$0	\$7,611,532	\$3,186,114
50 Year Total	\$115,857,708	(\$150,545,914)	\$266,403,823	\$66,809,670	\$139,530,808	(\$126,672,814)	\$266,403,623	\$79,393,261

Summary of Employment Impacts -- Alternative 1 Table D-96

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	11.7	8.1	19.8	0	0	0
2004	-27.9	4.6	-23.3	0	0	0
2017	524.3	322.3	846.6	317.4	396.4	713.8
2030	835.8	556.7	1,392.5	589.0	718.6	1,307.6
2043	520.8	500.1	1,020.9	372.3	659.5	1,031.8
2050	462.2	485.7	947.9	331.9	645.9	977.8
50 Year Total Estimate	28,377	22,062	50,439	19,550	28,558	48,108

Comparison of Employment Impacts -- Alternative 1 Versus No Action Table D-97

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	0	0	0	0	0	0
2004	0	0	0	0	0	0
2017	59.7	2.5	62.2	0	0	0
2030	-50.2	29.1	-21.1	28.8	55.9	84.7
2043	-210	10.5	-199.5	-81	32.7	-48.3
2050	108.8	55.8	164.6	52.8	63.8	116.6
50 Year Total Estimate	-1846	1,020	-825.7	-227.4	1,718	1,491

Table D-98

Summary of Income Impacts -- Alternative 1

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	642,601	319,157	961,758	0	0	0
2004	7,863	174,327	182,190	0	0	0
2017	31,284,174	12,711,100	43,995,274	17,658,482	10,528,492	28,186,974
2030	53,440,367	21,955,929	75,396,296	32,287,895	19,145,266	51,433,181
2043	45,386,868	19,391,547	64,778,415	27,360,369	17,065,592	44,425,961
2050	44,439,870	17,712,863	62,152,733	26,165,204	16,539,379	42,704,583
50 Year Total Estimate	2,069,147,059	854,232,202	2,923,379,261	1,228,938,743	748,543,636	1,977,482,379

Comparison of Income Impacts -- Alternative 1 Versus No Action Table D-99

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	0	0	0	0	0	0
2004	0	0	0	0	0	0
2017	562,681	52,603	615,284	0	0	0
2030	1,830,820	1,057,346	2,888,166	2,171,946	1,391,412	3,563,358
2043	(1,071,835)	288,440	(783,395)	406,266	703,833	1,110,099
2050	6,690,910	1,259,352	7,950,262	2,879,458	1,702,918	4,582,376
50 Year Total Estimate	71,977,077	29,258,616	101,235,693	58,724,366	42,252,941	100,977,307

Summary of Impacts of Agricultural Output Changes -- Alternative 2

Table D-100

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$1,185,065	\$0	\$1,185,065	\$571,867	\$0	\$0	\$0	\$0
2004	\$329,071	(\$1,560,351)	\$1,889,423	\$312,379	\$0	\$0	\$0	\$0
2017	\$48,159,557	(\$6,299,494)	\$54,459,050	\$21,932,194	\$46,818,368	(\$1,876,823)	\$48,695,191	\$18,703,383
2030	\$93,394,162	(\$10,428,473)	\$103,822,636	\$42,509,785	\$89,282,211	(\$6,005,802)	\$95,288,014	\$37,821,092
2043	\$83,390,970	(\$20,431,666)	\$103,822,636	\$38,673,509	\$80,894,759	(\$14,393,255)	\$95,288,014	\$35,280,758
2050	\$80,220,547	(\$23,602,089)	\$103,822,636	\$37,457,640	\$77,724,336	(\$17,563,678)	\$95,288,014	\$34,292,960
50 Year Total	\$3,612,267,150	(\$680,701,975)	\$4,292,969,125	\$1,661,677,192	\$3,485,197,931	(\$434,224,835)	\$3,919,422,787	\$1,498,669,418

Table D-101

Comparison of Impacts of Agricultural Output Changes -- Alternative 2 Versus No Action

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2004	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2017	(\$1,876,822)	(\$1,876,822)	\$0	(\$719,771)	(\$1,876,623)	(\$1,876,823)	\$0	\$0
2030	\$9,855,967	(\$8,445,737)	\$18,301,704	\$5,111,138	\$9,525,139	(\$8,005,802)	\$15,530,941	\$4,612,374
2043	\$8,240,227	(\$10,061,477)	\$18,301,704	\$4,491,494	\$9,525,139	(\$8,005,802)	\$15,530,941	\$4,612,372
2050	\$18,301,704	\$0	\$18,301,704	\$8,022,605	\$15,530,941	\$0	\$15,530,941	\$6,466,207
50 Year Total	\$368,998,244	(\$271,561,380)	\$640,559,624	\$185,488,942	\$358,904,403	(\$184,678,531)	\$543,582,934	\$176,263,728

Table D-102

Summary of Employment Impacts -- Alternative 2

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	11.7	8.1	19.8	0	0	0
2004	-27.9	4.6	-23.3	0	0	0
2017	429.9	311.3	741.2	317.4	396.4	713.8
2030	831.5	602.2	1,433.7	535.9	760.7	1,296.6
2043	646.4	556.9	1,203.3	429.0	724.7	1,153.7
2050	587.7	542.5	1,130.2	388.5	711.2	1,099.7
50 Year Total Estimate	29,821	23,760	53,581	19,996	30,517	50,514

Comparison of Employment Impacts -- Alternative 2 Versus No Action Table D-103

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	0	0	0	0	0	0
2004	0	0	0	0	0	0
2017	-34.7	-8.5	-43.2	0	0	0
2030	-54.5	74.6	20.1	-24.3	98.0	73.7
2043	-84.4	67.3	-17.1	-24.3	97.9	73.6
2050	234.3	112.6	346.9	109.4	129.1	238.5
50 Year Total Estimate	-402.2	2,718	2,316	219	3,677	3,897

Table D-104

Summary of Income Impacts -- Alternative 2

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	642,601	319,157	961,758	0	0	0
2004	7,863	174,327	182,190	0	0	0
2017	29,568,912	12,256,732	41,825,644	17,658,482	10,528,492	28,186,974
2030	57,253,043	23,756,282	81,009,325	33,517,735	20,211,728	53,729,463
2043	51,109,952	21,614,928	72,724,880	30,355,890	18,819,611	49,175,501
2050	49,162,954	20,936,244	70,099,198	29,160,725	18,293,397	47,454,122
50 Year Total Estimate	2,214,126,143	928,675,729	3,142,801,872	1,309,062,444	800,308,215	2,109,370,659

Comparison of Income Impacts -- Alternative 2 Versus No Action Table D-105

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	0	0	0	0	0	0
2004	0	0	0	0	0	0
2017	(1,152,581)	(401,765)	(1,554,346)	0	0	0
2030	5,643,496	2,857,699	8,501,195	3,401,786	2,457,854	5,859,640
2043	4,651,249	2,511,821	7,163,070	3,401,787	2,457,852	5,859,639
2050	11,413,994	4,482,733	15,896,727	5,874,979	3,456,936	9,331,915
50 Year Total Estimate	216,956,161	103,702,143	320,658,304	138,648,067	94,017,520	232,865,587

Table D-108

Summary of Impacts of Agricultural Output Changes -- Alternative 3a

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$1,185,065	\$0	\$1,185,065	\$571,867	\$0	\$0	\$0	\$0
2004	\$329,071	(\$1,560,351)	\$1,868,423	\$312,379	\$0	\$0	\$0	\$0
2017	\$48,159,557	(\$6,299,484)	\$54,458,050	\$21,832,194	\$48,818,368	(\$1,876,823)	\$48,895,191	\$19,703,383
2030	\$123,546,256	(\$12,044,213)	\$135,590,470	\$56,139,394	\$121,050,045	(\$6,005,802)	\$127,055,847	\$51,047,428
2043	\$115,158,804	(\$20,431,666)	\$135,590,470	\$52,922,765	\$112,662,593	(\$14,393,255)	\$127,055,847	\$48,487,089
2050	\$111,988,381	(\$23,602,068)	\$135,590,470	\$51,706,894	\$109,482,170	(\$17,563,678)	\$127,055,847	\$47,518,295
50 Year Total	\$4,701,520,973	(\$703,322,335)	\$5,404,843,308	\$2,151,726,078	\$4,597,072,114	(\$434,224,835)	\$5,031,296,949	\$1,981,591,077

Table D-107

Comparison of Impacts of Agricultural Output Changes -- Alternative 3a Versus No Action

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2004	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2017	(\$1,876,822)	(\$1,876,822)	\$0	(\$719,771)	(\$1,876,823)	(\$1,876,823)	\$0	\$0
2030	\$40,008,061	(\$10,061,477)	\$50,069,537	\$18,740,747	\$41,292,973	(\$6,005,802)	\$47,298,775	\$17,838,708
2043	\$40,008,061	(\$10,061,477)	\$50,069,537	\$18,740,750	\$41,292,973	(\$6,005,802)	\$47,298,775	\$17,838,703
2050	\$50,069,537	\$0	\$50,069,537	\$22,271,859	\$47,298,775	\$0	\$47,298,775	\$19,892,542
50 Year Total	\$1,458,252,067	(\$294,181,740)	\$1,752,433,807	\$675,537,828	\$1,470,778,586	(\$184,678,531)	\$1,655,457,116	\$639,185,387

Table D-108

Summary of Employment Impacts -- Alternative 3a

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	11.7	8.1	19.8	0	0	0
2004	-27.9	4.6	-23.3	0	0	0
2017	429.9	311.3	741.2	317.4	396.4	713.8
2030	1,136.0	796.2	1,932.2	759.7	1,024.9	1,784.6
2043	980.8	758.2	1,739.0	652.8	989.0	1,641.8
2050	922.2	743.8	1,666.0	612.4	975.4	1,587.8
50 Year Total Estimate	41,107	30,703	71,810	27,830	39,766	67,596

Comparison of Employment Impacts -- Alternative 3a Versus No Action Table D-109

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	0	0	0	0	0	0
2004	0	0	0	0	0	0
2017	-34.7	-8.5	-43.2	0	0	0
2030	250	268.6	518.6	199.5	362.2	561.7
2043	250	268.6	518.6	199.5	362.2	561.7
2050	568.8	313.9	882.7	333.3	393.3	726.6
50 Year Total Estimate	10,884	9,661	20,545	8,053	12,926	20,979

Summary of Income Impacts -- Alternative 3a

Table D-110

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	642,601	319,157	961,758	0	0	0
2004	7,863	174,327	182,190	0	0	0
2017	29,568,912	12,256,732	41,825,644	17,658,481	10,528,491	28,186,972
2030	75,869,332	31,373,073	107,242,405	45,534,736	27,282,732	72,817,468
2043	70,718,488	29,577,593	100,296,081	42,372,891	26,250,615	68,623,506
2050	68,771,490	28,898,912	97,670,402	40,977,726	25,564,402	66,542,128
50 Year Total Estimate	2,886,533,445	1,202,526,792	4,089,060,237	1,728,057,467	1,054,073,351	2,782,130,818

Comparison of Income Impacts -- Alternative 3a Versus No Action Table D-111

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	0	0	0	0	0	0
2004	0	0	0	0	0	0
2017	(1,152,581)	(401,765)	(1,554,346)	(1)	(1)	(2)
2030	24,259,785	10,474,490	34,734,275	15,418,787	9,528,858	24,947,645
2043	24,259,785	10,474,486	34,734,271	15,418,788	9,888,856	25,307,644
2050	31,022,530	12,445,401	43,467,931	17,691,980	10,727,941	28,419,921
50 Year Total Estimate	889,363,463	377,553,206	1,266,916,669	557,643,090	347,782,656	905,625,746

Table D-112

Summary of Impacts of Agricultural Output Changes -- Alternative 3b

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$1,185,065	\$0	\$1,185,065	\$571,867	\$0	\$0	\$0	\$0
2004	\$329,072	(\$1,560,351)	\$1,889,423	\$312,379	\$0	\$0	\$0	\$0
2017	\$48,159,557	(\$6,299,494)	\$54,459,050	\$21,932,194	\$46,818,388	(\$1,876,823)	\$48,695,191	\$19,703,382
2030	\$116,774,544	(\$18,815,926)	\$135,590,470	\$63,542,414	\$112,662,593	(\$14,393,255)	\$127,055,847	\$48,487,089
2043	\$115,158,804	(\$20,431,666)	\$135,590,470	\$52,922,765	\$112,662,593	(\$14,393,255)	\$127,055,847	\$48,487,089
2050	\$111,988,381	(\$23,602,089)	\$135,590,470	\$51,706,894	\$109,482,170	(\$17,563,678)	\$127,055,847	\$47,519,295
50 Year Total	\$4,606,717,008	(\$798,126,300)	\$5,404,843,308	\$2,115,368,358	\$4,479,647,779	(\$551,649,170)	\$5,031,296,949	\$1,925,746,347

Table D-113

Comparison of Impacts of Agricultural Output Changes -- Alternative 3b Versus No Action

Year	Three County Area				Pinal County			
	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts	Total Direct Impacts	Non- Indian Impacts	Indian Impacts	Total Secondary Impacts
2001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2004	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2017	(\$1,876,822)	(\$1,876,822)	\$0	(\$719,771)	(\$1,876,823)	(\$1,876,823)	\$0	(\$1)
2030	\$33,236,348	(\$16,833,189)	\$50,069,537	\$16,143,767	\$32,905,520	(\$14,393,255)	\$47,298,775	\$15,278,371
2043	\$40,008,081	(\$10,061,476)	\$50,069,537	\$18,740,750	\$41,282,973	(\$6,005,802)	\$47,298,775	\$17,838,703
2050	\$50,069,538	\$0	\$50,069,537	\$22,271,859	\$47,298,775	\$0	\$47,298,775	\$19,692,542
50 Year	\$1,363,448,102	(\$388,985,705)	\$1,752,433,807	\$639,180,108	\$1,353,354,251	(\$302,102,866)	\$1,655,457,116	\$603,340,657

Summary of Employment Impacts -- Alternative 3b

Table D-114

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	11.4	8.4	19.8	0	0	0
2004	-27.9	4.6	-23.3	0	0	0
2017	429.9	311.3	741.2	317.4	396.4	713.8
2030	1,010.7	765.5	1,776.2	652.8	989.0	1,641.8
2043	980.8	758.2	1,739.0	652.8	989.0	1,641.8
2050	922.2	743.8	1,666.0	612.4	975.4	1,587.8
50 Year Total Estimate	39,353	30,273	69,626	26,334	39,263	65,597

Comparison of Employment Impacts -- Alternative 3b Versus No Action Table D-115

(values are number of jobs)

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	0	0	0	0	0	0
2004	0	0	0	0	0	0
2017	-34.7	-8.5	-43.2	0	0	0
2030	124.7	237.9	362.6	92.6	326.3	418.9
2043	250	268.6	518.6	199.5	362.2	561.7
2050	568.8	313.9	882.7	333.3	393.3	726.6
50 Year Total Estimate	9,130	9,232	18,361	6,556	12,423	18,980

Summary of Income Impacts -- Alternative 3b

Table D-116

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	642,601	319,157	961,758	0	0	0
2004	7,863	174,327	182,190	0	0	0
2017	29,568,912	12,256,732	41,825,644	17,658,418	10,528,554	28,186,972
2030	71,710,736	29,923,474	101,634,210	42,372,891	25,890,615	68,263,506
2043	70,718,488	29,577,593	100,296,081	42,372,891	25,890,615	68,263,506
2050	68,771,490	28,898,912	97,670,402	41,177,726	25,364,402	66,542,128
50 Year Total Estimate	2,828,313,101	1,182,232,406	4,010,545,507	1,685,390,881	1,028,304,469	2,713,695,350

Comparison of Income Impacts -- Alternative 3b Versus No Action Table D-117

Year	Three County			Pinal County		
	Direct Impacts	Secondary Impacts	Total Impacts	Direct Impacts	Secondary Impacts	Total Impacts
2001	0	0	0	0	0	0
2004	0	0	0	0	0	0
2017	(1,152,581)	(401,765)	(1,554,346)	(64)	62	(2)
2030	20,101,169	9,024,891	29,126,080	12,256,942	8,136,741	20,393,683
2043	24,259,785	10,474,486	34,734,271	15,418,788	9,528,856	24,947,644
2050	31,022,530	12,445,401	43,467,931	17,891,980	10,527,941	28,419,921
50 Year Total Estimate	831,143,119	357,258,820	1,188,401,939	515,176,504	322,013,774	837,190,278

Estimated Impacts on Ground Water Pumping Costs In Selected Irrigation Districts - 2001 through 2050
 Alternatives Compared with the No Action Alternative -- values are aggregations over 50 years

Table D-118

	Settlement	Alternative 1	Alternative 2	Alternative 3a	Alternative 3b
Maricopa Stanfield I.D.D	-\$3,636,923	\$149,336	-\$2,061,275	\$6,023,920	-\$2,543,174
Central Arizona I.D.D.	-\$1,456,069	\$33,978	-\$1,285,362	\$3,558,717	-\$2,258,818
Hohokam I.D.D.	\$2,426,978	\$46,388	-\$312,220	-\$1,702,114	-\$1,200,715
New Magma I.D.D.	-\$10,066,060	-\$5,067,172	-\$15,519,821	-\$10,795,978	-\$11,898,430
Queen Creek I.D.D.	-\$16,780,829	-\$885,430	-\$14,384,171	-\$16,650,359	-\$15,867,103

Notes: Changes in depth to groundwater were not estimated for Harquahala and Tonopah
 CAP surface water projected to be delivered over the study period is as follows:
 No Action - 13,176,193 acre feet
 Settlement - 14,543,977 acre feet
 Alternative 1 - 13,164,356 acre feet
 Alternative 2 - 12,258,221 acre feet
 Alternative 3a - 13,671,231 acre feet
 Alternative 3b - 10,966,861 acre feet

APPENDIX E

BIOLOGICAL TECHNICAL INFORMATION AND DATA SUMMARIES

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
Central Arizona Project**

E.I. FIELD METHODOLOGY

Habitat type was assessed for over 1,600 square miles (over one million acres) within the municipal and industrial (M&I) service or municipal planning areas (MPAs). Areas were field surveyed at the rate of 50 square miles per day during December 1999 and January 2000.

To aid in the determination of association types, and to ascertain an estimate of important ecological parameters, a total of 169 sampling sites were established in what appeared to be habitat typical for each specific area. At each sampling site, an initial point was identified by randomly obtained compass bearings and distance units. The number of samples taken was in direct relationship to the size of the total area to be sampled. To estimate foliar height density (fhd) (fhd= horizontal and vertical density of vegetation) live plant material was identified and marked as present or absent within an imaginary vertical cylinder one decimeter in diameter at height intervals of 0-1.5 meters (m), 1.5-1m, 1-2m, 2-3m, 3-4m, and >4m. Secondly, all perennial species were identified within a radius of 3m, and then the distance (up to 500m) to the nearest tree (> 6inches diameter breast height) was estimated for each of four quads. Finally, any additional perennial species visible in the area were recorded. Saguaro density was calculated and ranked into the following categories: 1) **None** = none in sight of plot; 2) **low** = one saguaro per 50 acres or more; 3) **moderate** = one saguaro per 10-50 acres; and 4) **high** = one saguaro per 10 acres or less. The data were averaged within each sampling unit and a determination was done to establish which biotic association each site belonged to.

Habitats were typed at broad association levels as described by Brown (1982) (Table E-1) and with the aid of aerial photographic enlargements (1 inch = 1,200 feet) or with comparable contact prints, were delimited onto clear acetate overlays. Because of the broad area covered, closely related associations were not distinguished. Where possible, vegetation polygons were mapped to an accuracy of approximately 40 acres. In some areas, lines were drawn using best judgment where associations intergraded imperceptibly.

Table E-1 CAP Allocation Draft EIS Associations mapped within the M&I Service Areas or MPAs	
Association (common name)	Association (scientific name)
Bursage / Foothill Paloverde	<i>Ambrosia deltoidea/Cercidium microphyllum</i>
Velvet Mesquite	<i>Prosopis velutina</i>
Jojoba / Mixed Scrub	<i>Simmondsia chinensis/mixed scrub</i>
Creosote-bush	<i>Larrea tridentata</i>
Snakeweed / Velvet Mesquite	<i>Gutierrezia sarothrae/Prosopis velutina</i>
Blue Paloverde / Desert Ironwood	<i>Cercidium floridum/Olneya tesota</i>
Creosote-bush / Allthorn	<i>Larrea tridentata/Canotia holacantha</i>
Frémont Cottonwood / Goodding Willow	<i>Populus fremontii/Salix gooddingii</i>

Table E-2 is a summary of data from sites within the Bursage-Foothills Paloverde Association. The four parameters include those most important for the assessment of cactus ferruginous pygmy-owl habitat .

Table E-2 CAP Allocation Draft EIS Summary of habitat variables that may be important to the cactus ferruginous pygmy-owl within M&I entities					
M&I	Average FHD Per Site	Percent Frequency Bursage	Percent Frequency Creosote-Bush	Percent Frequency Foothills Paloverde	Average Tree Density Per Acre
City of Peoria	70	72	65	20	4.5
City of Surprise	67	79	47	29	0.8
City of Goodyear	53	20	94	20	2.8
Cave Creek Water Company	70	53	19	31	0.3
City of Phoenix	54	82	54	09	1.0
City of Scottsdale	59	86	30	17	1.3
Arizona Water Company-Apache Junction	53	90	73	18	2.6
Town of Superior / Arizona Water Company Superior	54	87	24	10	3.3
Town of Oro Valley	87	35	23	25	2.2
AVRA Water Cooperative	110	20	90	20	2.6
City of Tucson	98	75	45	21	1.2
Data are for the Bursage / Foothills Paloverde Association (Bureau of Land Management 1999)					

Table E-3 CAP Allocation Draft EIS List of plant species recorded during field surveys	
Scientific Name	Common Name
<i>Abutilon incanum</i>	Indian mallow
<i>Acacia constricta</i>	White thorn acacia
<i>Acacia greggii</i>	Catclaw acacia
<i>Acourtia nana</i>	desert holly
<i>Acourtia wrightii</i>	brown-foot, perezia
<i>Adenophyllum porophylloides</i>	San Felipe dyssodia
<i>Agave chrysantha</i>	golden-flowered century plant
<i>Agave toumeyana</i>	Toumey agave
<i>Aloysia wrightii</i>	Wright's lippia
<i>Ambrosia ambrosioides</i>	canyon ragweed
<i>Ambrosia deltoidea</i>	Bursage
<i>Ambrosia dumosa</i>	white bursage
<i>Argythamnia lanceolata</i> [<i>Ditaxis lanceolata</i>]	lance-leaf ditaxis
<i>Argythamnia neomexicana</i> [<i>Ditaxis neomexicana</i>]	New Mexican ditaxis
<i>Aristida divaricata</i>	poverty three-awn
<i>Aristida purpurea</i>	purple three-awn
<i>Aristida ternipes</i>	spider-grass
<i>Artemisia ludoviciana</i>	Sagebrush, silver wormwood
<i>Atriplex canescens</i>	four-wing saltbush
<i>Atriplex polycarpa</i>	littleleaf saltbush, desert saltbush
<i>Baccharis brachyphylla</i>	short-leaf baccharis
<i>Baccharis salicifolia</i>	Seepwillow
<i>Baccharis sarothroides</i>	desert-broom
<i>Bebbia juncea</i>	sweet-rush bebia, sweetbush
<i>Berberis haematocarpa</i>	red barberry
<i>Bothriochloa barbinodis</i>	cane bluestem
<i>Bouteloua chondrosioides</i>	Sprucetop grama
<i>Bouteloua curtipendula</i>	side-oats grama
<i>Brickellia californica</i>	California brickellbush, pachaba
<i>Brickellia coulteri</i>	Coulter's brickellia
<i>Calliandra eriophylla</i>	fairy-duster
<i>Canotia holocantha</i>	Crucifixion-thorn
<i>Carnegia gigantea</i>	Saguaro
<i>Castela emoryi</i>	Castela
<i>Celtis pallida</i>	desert hackberry
<i>Celtis reticulata</i>	net-leaf hackberry
<i>Cercidium floridum</i>	blue paloverde
<i>Cercidium microphyllum</i>	foothill paloverde
<i>Chilopsis linearis</i>	desert-willow
<i>Clematis drummondii</i>	Arizona virgin's bower
<i>Clematis ligusticifolia</i>	white virgin's bower, pepper-vine
<i>Condalia warnockii</i>	Squawbush
<i>Coryphantha vivipara</i>	Pincushion cactus

Table E-3 CAP Allocation Draft EIS List of plant species recorded during field surveys	
Scientific Name	Common Name
<i>Coursetia microphylla</i>	Rosemary baby bonnets
<i>Cylindropuntia acanthocarpa</i>	Buckhorn cholla
<i>Cylindropuntia arbuscula</i>	pencil cholla
<i>Cylindropuntia bigelovii</i>	teddy-bear cholla
<i>Cylindropuntia fulgida</i>	chain-fruit cholla
<i>Cylindropuntia leptocaulis</i>	desert Christmas cactus
<i>Cylindropuntia leptocaulis</i> x <i>C. spinosior</i>	hybrid cholla
<i>Cylindropuntia ramosissima</i>	diamond cholla
<i>Cylindropuntia spinosior</i>	cane cholla
<i>Cylindropuntia versicolor</i>	staghorn cholla
<i>Cynodon dactylon</i>	Bermuda grass
<i>Dasyilirion wheeleri</i>	desert spoon
<i>Dodonaea viscosa</i>	Hopbush
<i>Echinocereus engelmannii</i>	Engelmann hedge-hog cactus
<i>Echinocereus fasciculatus</i>	hedge-hog cactus
<i>Encelia farinosa</i>	Brittlebush
<i>Encelia frutescens</i>	rayless encelia, green brittlebush
<i>Ephedra fasciculata</i>	Mormon-tea
<i>Ephedra trifurca</i>	longleaf ephedra
<i>Eragrostis lehmanniana</i>	Lehmann lovegrass
<i>Ericameria laricifolia</i>	turpentine bush
<i>Ericameria linearifolia</i>	narrowleaf goldenweed
<i>Eriogonum fasciculatum</i>	California-buckwheat
<i>Eriogonum inflatum</i>	desert-trumpet, bladderstem
<i>Eriogonum wrightii</i>	shrubby-buckwheat, Wright's eriogonum
<i>Erioneuron pilosum</i> [<i>Tridens pilosa</i>]	hairy tridens
<i>Erioneuron pulchellum</i>	fluff grass
<i>Erioneuron pulchellum</i> [<i>Tridens pulchellum</i>]	fluff grass
<i>Eupatorium solidaginifolium</i>	Goldenrod Eupatorium
<i>Ferocactus acanthoides</i>	compass barrel
<i>Ferocactus wislizeni</i>	barrel cactus
<i>Fouquieria splendens</i>	Ocotillo
<i>Galium stellatum</i>	desert bedstraw
<i>Gutierrezia sarothrae</i>	Snakeweed
<i>Heteropogon contortus</i>	tangle-head
<i>Hibiscus denudatus</i>	paleface rosemallow
<i>Hilaria belangeri</i>	curly-mesquite
<i>Hilaria mutica</i>	Tobosa
<i>Hymenoclea monogyra</i>	Burrobush
<i>Hymenoclea salsola</i>	Burrobush, cheese-bush
<i>Hyptis emoryi</i>	desert lavender
<i>Isocoma acradenia</i>	
<i>Isocoma tenuisecta</i>	Burroweed
<i>Janusia gracilis</i>	slender janusia

Table E-3 CAP Allocation Draft EIS List of plant species recorded during field surveys	
Scientific Name	Common Name
<i>Jatropha cardiophylla</i>	Limberbush
<i>Juniperus coahuilensis</i>	Coahuila juniper
<i>Justicia californica</i>	Chuparosa, hummingbird bush
<i>Krameria erecta</i>	purple heather, Pima rhatany
<i>Krameria grayi</i>	white rhatany
<i>Larrea tridentata</i>	creosote-bush
<i>Leptochloa dubia</i>	green sprangletop
<i>Lotus rigidus</i>	wiry lotus, desert rock-pea
<i>Lycium andersonii</i>	Anderson wolfberry
<i>Lycium berlandieri</i>	Berlandier wolfberry
<i>Lycium fremontii</i>	Fremont thornbush
<i>Lycium pallidum</i>	Wolfberry, burial-bush
<i>Malva parviflora</i>	Cheeseweed, little-mallow
<i>Mammillaria microphylla</i>	fishhook cactus
<i>Mimosa biuncifera</i>	cat-claw mimosa
<i>Muhlenbergia porteri</i>	bush muhly
<i>Nicotiana trigonophylla</i>	desert tobacco
<i>Olneya tesota</i>	Ironwood
<i>Opuntia chlorotica</i>	pancake prickly-pear
<i>Opuntia engelmannii</i>	Engelmann prickly-pear
<i>Opuntia engelmannii</i> x <i>O. phaeacantha</i>	hybrid prickly-pear
<i>Opuntia macrorhiza</i>	plains prickly-pear
<i>Opuntia phaeacantha</i>	brown-spined prickly-pear
<i>Parthenium incanum</i>	Mariola
<i>Peniocereus greggii</i>	Arizona queen-of-the-night
<i>Pleuraphis rigida</i>	big galleta
<i>Populus fremontii</i>	Fremont cottonwood
<i>Porophyllum gracile</i>	slender-poreleaf
<i>Prosopis velutina</i>	Velvet mesquite
<i>Psilostrophe cooperi</i>	Paperflower
<i>Quercus turbinella</i>	Scrub oak
<i>Rhus ovata</i>	Sugar sumac, mountain laurel
<i>Salix gooddingii</i>	Goodding black willow
<i>Sarcostemma cynanchoides</i>	Climbing-milkweed
<i>Senna covesii</i>	Desert senna
<i>Setaria macrostachya</i>	Plains bristlegrass
<i>Simmondsia chinensis</i>	Joboba
<i>Solanum elaeagnifolium</i>	silver nightshade
<i>Sphaeralcea ambigua</i>	Globemallow
<i>Sporobolus contractus</i>	spike dropseed
<i>Stephanomeria pauciflora</i>	Desert-straw
<i>Tamarix chinensis</i>	Tamarisk, salt-cedar
<i>Thamnosma montana</i>	Turpentine broom
<i>Thymophylla acerosa</i>	
<i>Tiquilia canescens</i>	Spreading coldenia

Table E-3 CAP Allocation Draft EIS List of plant species recorded during field surveys	
Scientific Name	Common Name
<i>Tragia nepetifolia</i>	Noseburn, pussy-nettle
<i>Trixis californica</i>	Trixis
<i>Viguiera parishii</i>	Parish viguiera
<i>Yucca baccata</i>	Banana yucca
<i>Yucca elata</i>	soap-tree yucca
<i>Ziziphus obtusifolia</i>	Graythorn

Table E-4 CAP Allocation Draft EIS Common wildlife species associated with the Sonoran Desertscrub Biome¹⁾	
Common Name	Scientific Name
Reptiles	
Zebra-Tailed Lizard	<i>Callisaurus draconoides</i>
Western Collared Lizard	<i>Crotaphytus collaris baileyi</i>
Tree Lizard	<i>Urosaurus oranatus</i>
Desert Horned Lizard	<i>Phrynosoma platyrhinos calidiarum</i>
Western Whiptail	<i>Cnemidophorus tigris tigris</i>
Gila Monster	<i>Heloderma suspectum cinctum</i>
Coachwhip	<i>Masticophis flagellum picus</i>
Striped Whipsnake	<i>Masticophis taeniatus</i>
Western Patch-Nosed Snake	<i>Salvadora hexalepis hexalepis</i>
Gopher Snake	<i>Pituophis melanoleucus affinis</i>
Common Kingsnake	<i>Lampropeltis getulus californiae</i>
Night Snake	<i>Hypsiglena torquata</i>
Western Diamondback Rattlesnake	<i>Crotalus atrox</i>
Mammals	
Desert Cottontail	<i>Sylvilagus audubonii</i>
Black-tailed Jackrabbit	<i>Lepus californicus</i>
Harris' Antelope Squirrel	<i>Ammospermophilus harrisi</i>
Rock Squirrel	<i>Spermophilus variegatus</i>
Rock Pocket Mouse	<i>Perognathus intermedius</i>
Desert Pocket Mouse	<i>Perognathus penicillatus</i>
Cactus Mouse	<i>Peromyscus eremicus</i>
So. Grasshopper Mouse	<i>Onychomys torridus</i>
White-Throated Woodrat	<i>Neotoma albigula</i>
Coyote	<i>Canis latrans</i>

Table E-4 CAP Allocation Draft EIS Common wildlife species associated with the Sonoran Desertscrub Biome¹⁾	
Common Name	Scientific Name
Gray Fox	<i>Urocyon cinereoargenteus</i>
Ringtailed Cat	<i>Bassaricus astutus</i>
Badger	<i>Taxidea taxus</i>
Striped Skunk	<i>Mephitis mephitis</i>
Mountain Lion	<i>Felis concolor</i>
Bobcat	<i>Felis rufus</i>
Collard Pecarry	<i>Tayassu tajacu</i>
Desert Mule Deer	<i>Odocoileus hemionus crooki</i>
Sonoran Pronghorn	<i>Antilocapra americana sonorensis</i>
Birds	
Black-chinned Sparrow	<i>Amphispiza bilineata</i>
Burrowing Owl	<i>Athene cunicularia</i>
Cactus Wren	<i>Campylorhynchus brunneicapillus</i>
Costa's Hummingbird	<i>Calypte costae</i>
Curve-billed Thrasher	<i>Toxostoma curvirostra</i>
Elf Owl	<i>Micrathene whitneyi</i>
Gambel's Quail	<i>Lophortyx gambelii</i>
Gila Woodpecker	<i>Melanerpes uropygialis</i>
Harris' Hawk	<i>Parabuteo unicinctus</i>
LeConte's Thrasher	<i>Toxostoma lecontei</i>
Mourning Dove	<i>Zenaidura macroura</i>
Phainopepla	<i>Phainopepla nitens</i>
Roadrunner	<i>Geococcyx californianus</i>
Verdin	<i>Auriparus flaviceps</i>
White-winged Dove	<i>Zenaida asiatica</i>
¹ This table is to provide the reader with species that are <u>typically associated</u> with this Biome (Brown 1982),	

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The following pictures show representative vegetation for each habitat zone.



Figure E-1 Bursage / Palo Verde Association example.



Figure E-2 Bursage / Palo Verde Association example.



Figure E-3 Velvet Mesquite Association example.



Figure E-4 Jojoba / Mixed Scrub Association example.



Figure E-5 Jojoba / Mixed Scrub Association example.



Figure E-6 Washes example.



Figure E-7 Creosote-bush Association example.



Figure E-8 Snakeweed / Paloverde Association example.



Figure E-9 Blue Paloverde / Ironwood Association example.



Figure E-10 Creosote-bush / Allthorn Association example.



Figure E-11 Creosote-bush / Allthorn Association example.



Figure E-12 Fremont Cottonwood-Gooding Willow Association example.

APPENDIX F

SCOPING REPORT

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
Central Arizona Project**

SCOPING REPORT



**Allocation of Water Supply and
Expected Long-Term Contract Execution
Central Arizona Project
NEPA Process**



**Department of the Interior
Bureau of Reclamation
Lower Colorado Region
Phoenix Area Office**

NOVEMBER 1999

SCOPING REPORT

Allocation of Water Supply and Expected Long-Term Contract Execution Central Arizona Project NEPA Process

Prepared by

U.S. Bureau of Reclamation
Phoenix Area Office
P.O. Box 81169
Phoenix, AZ 85021-2801

Contact: Sandra Eto
(602) 216-3857

and

Navigant Consulting, Inc.
302 North First Avenue
Suite 810
Phoenix, AZ 85003

November 1999

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SCOPING REPORT

**ALLOCATION OF WATER SUPPLY AND EXPECTED LONG-TERM CONTRACT EXECUTION
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SCOPING REPORT

ALLOCATION OF WATER SUPPLY AND EXPECTED LONG-TERM CONTRACT EXECUTION
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SCOPING PROCESS

This scoping report has been prepared to provide a synopsis of the scoping process that has been conducted to date for the proposed allocation of Central Arizona Project (CAP) water and expected long-term contract execution. It will identify efforts made to notify interested agencies, organizations, and individuals about the proposed Federal action and to obtain input from those entities regarding the range of alternatives to be evaluated and the issues to be addressed in an environmental impact statement (EIS) being prepared by the United States Department of the Interior, Bureau of Reclamation (Reclamation). These efforts have been carried out pursuant to the “scoping process,” as defined by the Council on Environmental Quality’s (CEQ) regulations implementing the National Environmental Policy Act (NEPA).

The report summarizes the major points made in public comments received during the initial scoping process, both verbally at public scoping meetings held by Reclamation and in writing in response forms and/or letters written to Reclamation.¹ Reclamation has carefully considered each comment received; however, it is beyond the scope of this report to provide specific responses to all comments received.

This report identifies how Reclamation has revised or further developed alternatives to address concerns and issues brought up during the scoping process. The report also indicates how or whether impacts, identified during the scoping process, will be analyzed as part of the NEPA process and included in the EIS. The report also briefly addresses comments that were considered to be beyond the scope of, or not applicable to, this proposed action.

¹ All public comments received pursuant to the scoping process are available for public viewing between the hours of 8:00 a.m. and 4:00 p.m. at Reclamation’s Phoenix Area Office, 2222 West Dunlap Avenue, Suite 100, Phoenix, and Tucson Field Office, 300 W. Congress Street, FB-37, Room 1L, Tucson, Arizona. Please contact Ms. Janice Kjesbo at (602) 216-3864 (Phoenix) or Mr. Eric Holler at (520) 670-4825 (Tucson) to arrange an appointment to view the documents.

Purpose of the Report

Consistent with implementation of NEPA, Reclamation is preparing an EIS related to the proposed modifications to previous CAP water allocation decisions. The purpose and need of the Federal action is to allocate CAP water:

- pursuant to the Colorado River Basin Project Act of 1968; and
- in a manner that will facilitate the resolution of outstanding Indian water rights claims in the State of Arizona.

Reclamation has been negotiating a comprehensive settlement regarding operation of the CAP and water rights settlement negotiations. These negotiations have been conducted with representatives of the Central Arizona Water Conservation District (CAWCD), several Indian Tribes, Arizona Department of Water Resources (ADWR), non-Indian agricultural districts, and several municipalities. In the hope that a settlement is reached on a number of these issues, the proposed action in the EIS will be a reallocation of CAP water consistent with terms of the negotiated settlements currently under discussion with CAWCD and the Gila River Indian Community (GRIC). Environmental analysis of the proposed reallocation does not preclude additional adjustments to reallocations subject to the ongoing negotiations. Reclamation will analyze any adjustments as part of the NEPA compliance process as appropriate. In addition, Reclamation will analyze a range of potential alternative allocations of available CAP water consistent with the purpose and need of the Federal action, in the event a negotiated settlement is not forthcoming.

It is anticipated that at the conclusion of the NEPA process, the Secretary of the Interior (Secretary) will prepare a record of decision, and offer and execute contracts pursuant to that decision.

CAP Allocation Background

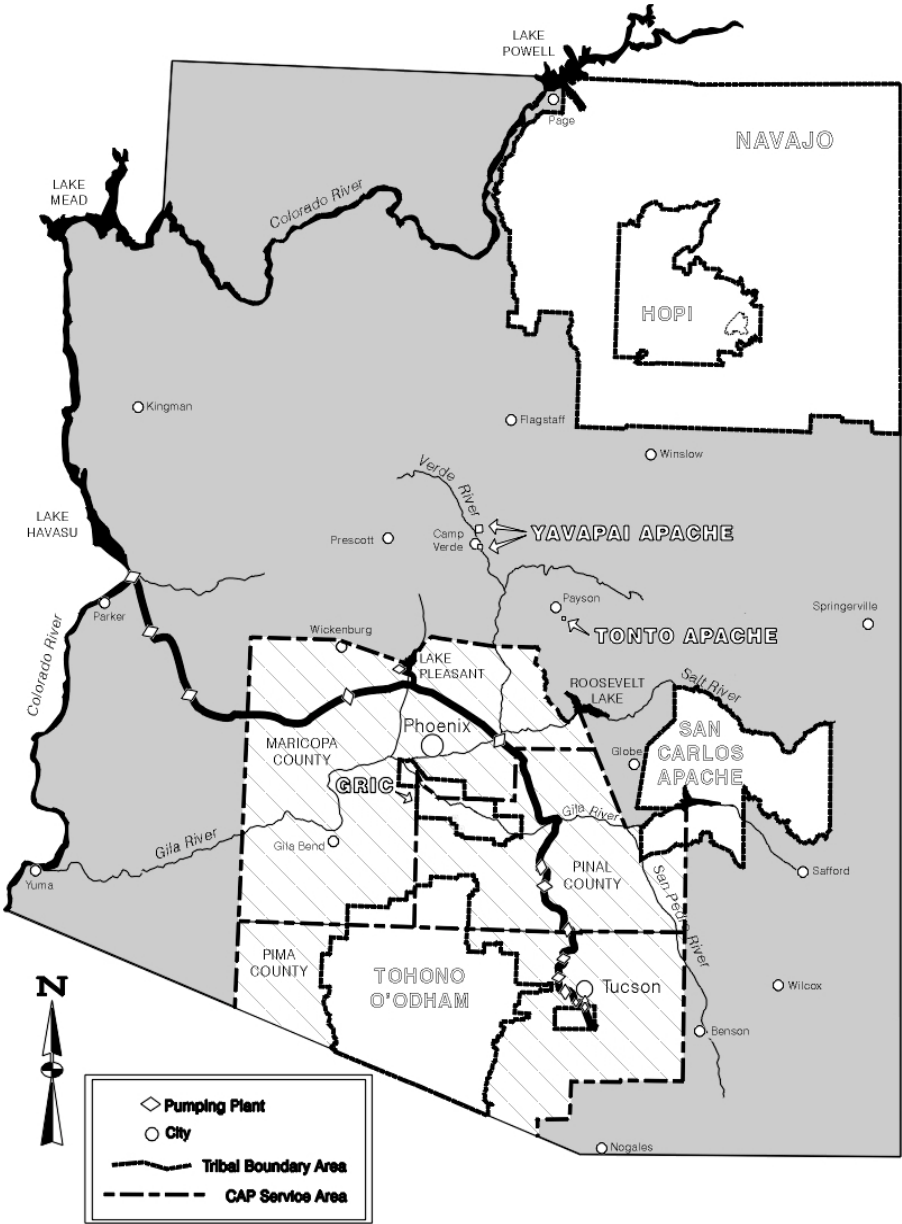
The CAP was authorized as part of the Colorado River Basin Project Act of 1968 (Public Law 90-537). The CAP's principal purposes are to furnish water for irrigation and municipal and industrial (M&I) uses in central and

southern Arizona and western New Mexico through the importation of Colorado River water and the conservation of local groundwater. The CAP delivers Colorado River water to Arizona water users through a system of pumping plants, aqueducts, dams and reservoirs. The CAP aqueduct system is operated and maintained by CAWCD under an agreement with Reclamation. The CAP service area and Indian lands addressed in the EIS are shown in Figure 1.

In 1983, Reclamation prepared an EIS to address the potential impacts associated with the allocation of CAP water to M&I water users, non-Indian agricultural (NIA) users, and Indian Tribes. The Secretary published the final decision in the Federal Register on March 24, 1983 (48 FR 12446). In that notice, the Secretary allocated 638,823 acre-feet per year (af per year) of CAP water to M&I users and 309,828 af per year to Indian users. The remaining CAP water was allocated to 23 NIA water users as a percentage of the remaining CAP water supply. The percentages were based upon CAP-eligible acres of the NIA users and adjusted to reflect any surface water supplies available to the users.

Since the 1983 allocation decision, several actions have been taken that changed the amounts allocated to both the M&I and Indian water use categories and the remaining NIA users. The amount of water allocated for Tribal use has increased due to several Indian water rights settlement acts and agreements. As a result, CAP water allocated for use by Indians is currently 453,224 af per year, and the amount of CAP water for M&I entities is 620,678 af per year.

As mentioned earlier, percentages allocated for use within the NIA water category are based upon the amount of the CAP water supply that remains after water orders from the other two categories have been satisfied. Calculations of the corresponding amounts of water available to the contractors within the NIA category, in terms of exact amounts in af per year, vary among the settlement parties. These variations are due to different assumptions used and the order of the calculations made. For purposes of quantifying the environmental consequences of the proposed action and the alternatives, we have assumed the total amount of CAP water available in a normal year, for diversion and use after deducting for estimated



CENTRAL ARIZONA PROJECT

Figure 1

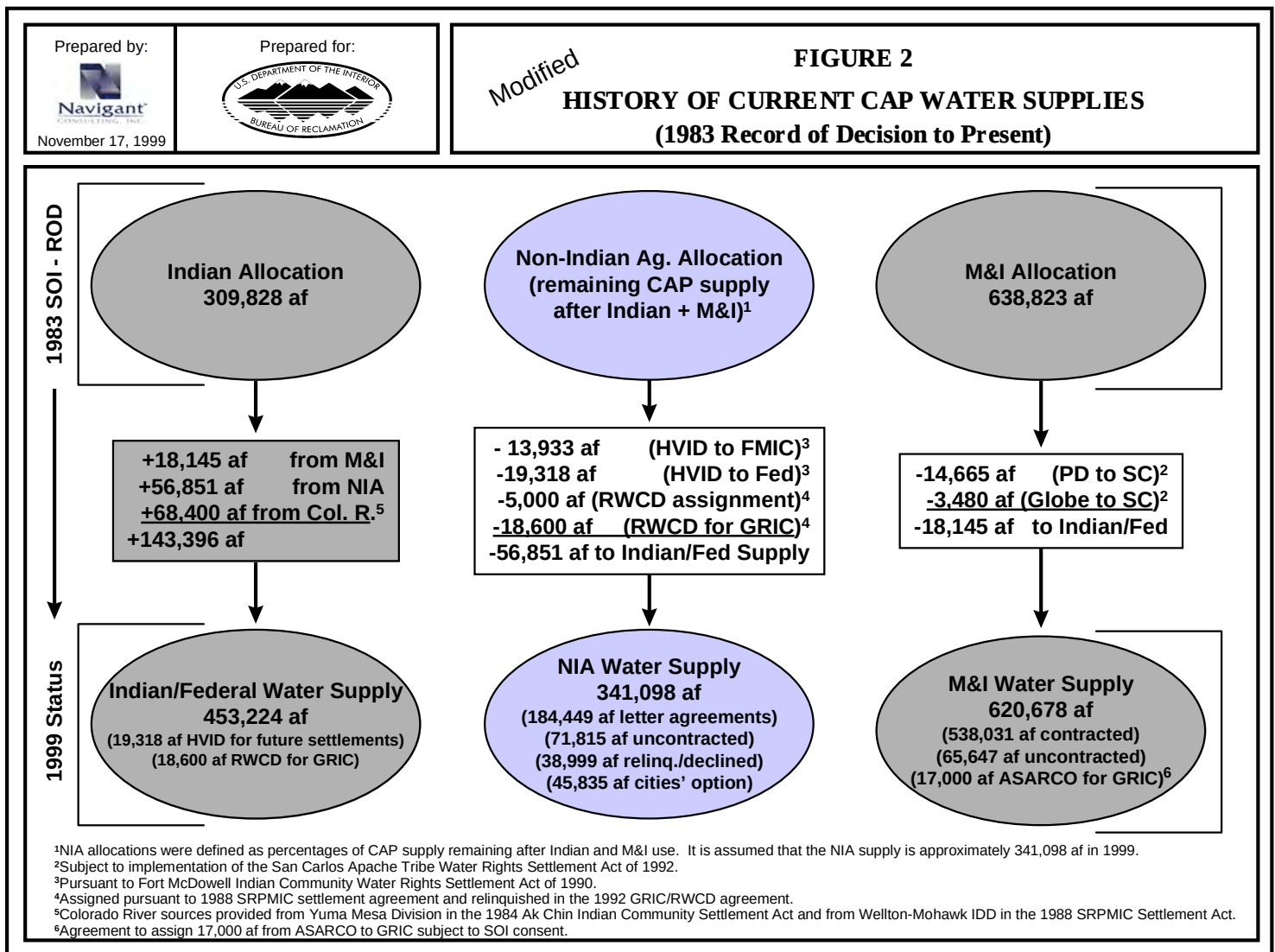
system losses, is 1,415,000 af per year.² This is an amount the various settlement parties have agreed upon for negotiation purposes. Therefore, for NEPA-related purposes, the amount of water currently available for NIA use is estimated to be 341,098 af per year (1,415,000 af per year less the sum of 620,678 acre-feet plus 453,224 af per year). Figure 2 provides additional detail regarding the changes that have occurred since the Secretary's original 1983 allocation.

National Environmental Policy Act and Other Applicable Laws and Statutes

NEPA establishes a general framework for evaluating environmental impacts prior to undertaking a Federal action. The Act requires public disclosure about the environmental impacts of, and alternatives to, discretionary major Federal actions significantly affecting the environment. Scoping is one of the first steps in the process, followed by issuance of a draft EIS and a 45-day minimum public review and comment period, including holding public hearings. All public comments are considered prior to issuance of a final EIS, which may be revised in response to those comments. A record of decision regarding the action cannot be made for at least 30 days after the issuance of the final EIS. Reclamation is the lead Federal agency for the CAP water reallocation EIS and will make the decisions regarding the project, pursuant to direction by the Secretary.

The allocation, diversion, and use of Colorado River water is governed by a series of laws, agreements, and court decisions, collectively termed the Law of the River. A review of the entire body of law is beyond the scope of this report. The allocation and use of CAP water must be consistent with the following laws:

²Use of specific numbers in this scoping report, and the EIS itself, is not meant to imply a degree of precision that does not exist, and it should be noted that the various amounts of water attributed to the NIA category are estimates for purposes of describing alternative reallocation scenarios. Amounts that include water from the NIA category should be considered as being an "estimate," with the exception of the 33,251 acre-foot amount of NIA water previously allocated for use by Harquahala Valley Irrigation District (HVID), which was converted to Indian priority water and identified as a specific amount pursuant to the 1990 Fort McDowell Indian Community Settlement Act.



Reclamation Act of 1902 as amended and supplemented - commonly referred to as Federal Reclamation Law. Included in this body of law and of particular importance for CAP are:

- 1) Boulder Canyon Project Act of 1928 - Public Law 70-642 - authorizes Hoover Dam and provides the Secretary authority to execute contracts for water made available under the project.
- 2) Colorado River Basin Project Act of 1968 - Public Law 90-537 - authorizes the planning, construction, and repayment of costs of the CAP and provides the Secretary authority to execute contracts for water made available under the project.

Southern Arizona Water Rights Settlement Act of 1982 - Public Law 97-293 - authorized settlement of water rights claims of the Tohono O'Odham Nation for the San Xavier and Schuk Toak Districts. The settlement provided 37,800 af per year of CAP water to the two Districts. In addition, the settlement authorized delivery of 23,000 af per year of additional water supplies for use in the San Xavier District and 5,200 af per year of additional water supplies for use in the Schuk Toak District; however, the source of this additional 28,200 af was not identified.

Ak-Chin Indian Community Water Rights Settlement Act of 1984 - Public Law 98-530 - provided settlement of water rights claims by the Ak-Chin Indian Community. The Community received 50,000 af per year of Colorado River water from the Yuma Mesa Division delivered by CAP in addition to CAP supplies. The Community received a supply of 75,000 acre-feet per year, and an additional 10,000 acre-feet when supplies are available.

Salt River Pima-Maricopa Indian Community Water Rights Settlement Act of 1988 - Public Law 100-512 - authorized settlement of water rights claims by the Salt River Pima-Maricopa Indian Community. The settlement provided 5,000 af per year of additional CAP supply and 22,000 af per year of Colorado River water from Wellton-Mohawk Irrigation and Drainage District lands to be delivered by CAP. The Act also addressed reallocation of uncontracted non-Indian agricultural water and provided authorization for the Roosevelt Water Conservation District (RWCD) to relinquish its NIA allocation.

Fort McDowell Indian Community Water Rights Settlement Act of 1990 - Public Law 101-628 - authorized settlement of water rights claims of the Fort McDowell Indian Community (FMIC). The settlement provided that the Community receive 13,933 af per year of CAP water which the U.S. later acquired from HVID. The remaining HVID water (19,318 af per year) is reserved for Federal use in the settlement of Indian water rights claims to the Salt and Verde River watershed.

San Carlos Apache Tribe Water Rights Settlement Act (as amended) of 1992 - Public Law 102-575 - authorized settlement of water rights claims to the Salt River watershed by the San Carlos Apache Indian Tribe. The Tribe received 33,300³ af per year of CAP water formerly contracted to the Ak-Chin Indian Community as well as 3,480 af per year of M&I water previously allocated to the City of Globe, and 14,665 af per year previously allocated to Phelps Dodge Corporation.

In addition, the assignments of NIA subcontracts pursuant to the following agreements impact the availability and allocation of CAP water:

Agreement among the United States, the CAWCD, the Hohokam Irrigation and Drainage District (HIDD), and the Arizona Cities of Chandler, Mesa, Scottsdale, and Phoenix of 1993 (HIDD Agreement) - provides for the assignment of HIDD's CAP NIA allocation to the cities (45,835 af per year). In addition, the agreement provides the cities an option for contracting up to five percent of the NIA pool, provided that five percent of the NIA pool is available as uncontracted water.

Agreement among the United States, GRIC, and Roosevelt Water Conservation District of 1992 - Relinquishes RWCD's CAP NIA water (18,600 af per year) to the Secretary to reserve for contracting to GRIC.

Agreement among the United States, GRIC and RWCD of 1999 – Settles pending GRIC water rights claims against RWCD by providing up to 4,500 af per year to GRIC in addition to the NIA CAP water relinquished by RWCD

³ The delivered amount is anticipated to be 30,800 af per year, due to system losses.

to the Secretary for contracting to GRIC in 1992. The agreement includes provisions for delivery of CAP water and RWCD water to GRIC through the RWCD canal system.

SCOPING ACTIVITIES AND ISSUES

This section documents the purpose and objectives of scoping, as well as the scoping meetings that were held for this project, and identifies issues that were frequently raised through scoping.

PURPOSE OF THE SCOPING PROCESS

"Scoping" is an integral part of the NEPA process. It provides *"an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action."* (40 CFR § 1501.7)

The objectives of scoping for this Federal action include the following:

- Identify significant issues related to the allocation of CAP water;
- Determine the range of alternatives to be evaluated;
- Identify environmental review and consultation requirements;
- Define the environmental analysis process and technical studies necessary to adequately address the impacts of the project;
- Identify the interested and affected public; and
- Provide information to the public regarding the project.

SCOPING ANNOUNCEMENTS

Two notices were published in the Federal Register regarding the proposed reallocation of CAP water. The first notice (64 FR 41456), published on July 30, 1999, indicated Reclamation's intent to initiate the NEPA process to assist in developing proposed modifications to previous CAP water allocations. A second notice (64 FR 46720), published on August 26, 1999, identified Reclamation's determination that an EIS would be prepared. This second notice also included information on three public scoping meetings scheduled to be held in mid-September 1999, to obtain public input and comments related to the scoping objectives identified above. The notices are shown in Appendix A.

In addition to the Federal Register notice informing the public about the scoping meetings, notices were placed in 16 newspapers around Arizona. The notice, and list of newspapers, in which the notice was published and dates of publication, is listed in Appendix A. Reclamation's Phoenix Area Office mailed out a memorandum regarding the public scoping meetings, including an information packet on the proposed action, to 190 Federal, State and local agencies, organizations and /or interested individuals. In addition, Reclamation's Lower Colorado Regional Office issued a press release on August 26, 1999, regarding the scoping meetings, that was made available through mailings to over 400 agencies, media contacts and interested organizations.

PUBLIC SCOPING MEETINGS

Three public meetings were held within the CAP service area of Maricopa, Pinal, and Pima Counties as part of the scoping process. The location, date, attendance, and number of oral comments received at each meeting are summarized in Table 1.

TABLE 1
Summary of Scoping Meetings

DATE	LOCATION	ATTENDANCE	SPEAKERS
September 14, 1999	Phoenix	47	8
September 15, 1999	Casa Grande	185	25
September 16, 1999	Tucson	29	9

At each meeting, Reclamation made a short presentation prior to receiving comments. The presentation slides and handouts are included in Appendix B. Oral comments were then received, and a court reporter prepared a written record of comments made. Reclamation and Navigant Consulting, Inc. staff were available at the conclusion of each meeting for informal discussions and to answer questions.

ISSUES RAISED THROUGH SCOPING

A number of comments were received, both in writing and orally, during the scoping process. A list of all commentors and their organizational affiliation, if any, are listed in Appendix C. A complete set of written comments that have been received and transcripts of oral comments presented at the three scoping meetings are available for review at the Phoenix Area Office.

Reclamation has reviewed and considered all the comments that have been received. Four fundamental issues were raised frequently during scoping. Within these four broad issues are several recurring themes. These issues and themes are outlined below, along with how they have been addressed by Reclamation. In response to many of the comments received, Reclamation determined that modifications to the alternatives under consideration were appropriate. This report also indicates issues and concerns raised during scoping that will be included in the impact analyses to be performed and described in the EIS.

I. THE NEPA PROCESS

- A. *Comment:* The NEPA process is premature and should not be initiated at this time.

Reclamation's response: The NEPA process regarding the proposed allocation of CAP water and execution of long-term contracts was initiated by the Secretary of the Interior on July 30, 1999, with publication of a notice in the Federal Register (64 FR 41456). This was appropriate in order to meet the goals and purposes of NEPA. One of the primary purposes of NEPA, and one that has already proved beneficial to this effort, is to provide a process to encourage and facilitate public involvement in decisions, such as allocation of CAP water, which affect the quality of the human environment (40 CFR § 1500.1(d)). Absent this process, the general public would not have an opportunity to analyze the prospective action under consideration.

NEPA also requires that "environmental information is available to public officials and citizens before decisions are made and before

actions are taken." (40 CFR §1500.1(b)). While a broad range of issues is still under consideration by Reclamation in relation to the potential CAP water allocations, timely initiation of the NEPA process helps to ensure the requirements of NEPA are integrated with the planning procedures under law and agency practice so that "all such procedures run concurrently rather than consecutively." (40 CFR § 1500.2(c)) (emphasis added). Integration of the NEPA process at an appropriate early stage in developing an agency action is a hallmark of NEPA law and Reclamation practice (40 CFR §§ 1500.2(c), 1500.5(a), (f)).

Delay of the NEPA process, until some unspecified future time, would not facilitate the maximum integration of the NEPA process, nor the consideration of environmental factors and/or meaningful public input into the agency's decisionmaking regarding allocations of CAP water. The CEQ's regulations are clear that "agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts." (40 CFR § 1501.2) (emphasis added). Additionally, CEQ's regulations encourage preparation of NEPA compliance documents "as close as possible to the time the agency is developing ... a proposal" so that preparation can be completed in time for the ultimate decisionmaking on the action (40 CFR § 1502.5) (emphasis added). Timely completion of the NEPA process will facilitate implementation of the proposed action or an appropriate alternative. Given the development of the proposed action and the range of other potential actions in this context, delay of the NEPA process would not be consistent with Reclamation's obligations under Federal law. CEQ's regulations specifically admonish agencies to avoid situations where the NEPA process is used to rationalize or justify decisions already made (40 CFR § 1502.5).

B. *Comment:* Only an EA is required.

Reclamation's response: Reclamation indicated it intended to prepare an EIS concerning proposed modifications to previous CAP water

allocation decisions with publication of a notice in the Federal Register on August 26, 1999 (64 FR 46720). This decision followed the earlier notice, which initiated the NEPA process on the proposed water allocation actions.

There are numerous reasons why Reclamation chose to prepare an EIS. Reclamation was subject to litigation previously regarding initial allocation of CAP water, which led to preparation of an EIS on water allocations in the early 1980s. Although many of the entities that would receive water under the current proposed action or action alternatives were included in studies conducted in conjunction with that EIS, conditions have changed substantially for certain aspects of the environment that could be impacted under the current proposal.

Further, Reclamation has determined that the change in use of up to 200,000 acre-feet of CAP NIA priority water, in addition to the allocation of 65,647 acre-feet of CAP M&I priority water, are significant actions requiring preparation of an EIS. Information provided by commentors during the scoping process supports this determination (see Section II at pages 2-5 through 2-7 of this report). An EA is prepared to determine whether a Finding of No Significant Impact is appropriate or whether an EIS should be prepared. Based upon the above and Reclamation's experience, we decided an EIS would be appropriate. Additionally, we felt it would be more cost effective and timely to initiate the EIS at this time.

Having decided that preparation of an EIS is the appropriate NEPA compliance document, NEPA regulations and Reclamation practice require that Reclamation provide a notice to the public of its intention to prepare an EIS (40 CFR §§ 1501.7, 1508.22). Reclamation met this requirement through the August 26, 1999 Federal Register publication.

II. PURPOSE AND NEED FOR THE FEDERAL ACTION

- A. *Comment:* Any CAP water provided to Indian Nations/Communities should be justified.

Reclamation's response: Reclamation believes that providing water to Indian people is both a legitimate and critical element of the purpose and need of this Federal action. The United States has a trust responsibility to Indian people. Accordingly, Reclamation is interested in allocating a portion of the available CAP water supply to Arizona Indian Tribes to provide them with a secure source of water consistent with those Tribes' water rights claims. In providing this supply of water, Reclamation is also seeking to facilitate the settlement of outstanding Indian water right claims because they pose a significant risk to water usage by non-Indian communities in Arizona. It is important to note, however, that it is not Interior's intent that CAP water be the sole source by which water can or should be made available to settle the remaining Indian water right claims in Arizona. Instead, Interior intends to use CAP water in concert with other supplies or appropriate arrangements to assist in resolving outstanding claims.

1. *Comment:* Indian users do not have Winters' Rights to CAP water.

Reclamation's response: Interior's consideration of allocating a portion of the available CAP water supply is not premised or founded on claims of Tribal rights to CAP water. Rather, CAP water has been allocated to Tribes to provide a replacement supply for local water supplies for which Tribes do have reserved water rights claims based on the *Winters* doctrine, first established by the U.S. Supreme Court in 1908. In recognition of CAP water as a replacement supply, CAP contracts with Indian Tribes include a provision indicating that project water will be credited against Tribal water rights based upon terms and conditions to be agreed upon with the Secretary.

2. *Comment:* Indian users do not need or have use for the additional CAP water.

Reclamation's response: In addition to water rights claims, Reclamation will consider the needs and potential uses for additional CAP water as part of this process. Reclamation received comments during the scoping process that indicate none of the alternatives provide sufficient water to meet Indian Tribes' / Nations' water rights claims.

3. *Comment:* Water should only be provided to Indian Tribes / Nations as a part of settlement of water rights claims.

Reclamation's response: Reclamation is considering providing allocations of CAP water to Indian Tribes / Nations as a part of settlement of outstanding water rights claims. As noted above, in providing this supply of water, Reclamation is seeking to facilitate the settlement of outstanding Indian water rights claims which pose a significant risk to water usage by non-Indian communities in Arizona. Reclamation does not believe that enactment of a final settlement of water rights claims should be considered a mandatory precondition to an allocation of CAP water.

- B. *Comment:* None of the alternatives provide sufficient water to meet Indian Tribes' / Nations' water rights claims.

Reclamation's response: As pointed out above, Interior does not anticipate that only CAP water will be used to meet the remaining water rights claims in Arizona. Instead, Interior intends to use CAP water in concert with other supplies or appropriate arrangements to assist in resolving outstanding claims.

- C. *Comment:* Water should also be provided for environmental uses including mainstem Colorado River uses, such as the Colorado River delta in Mexico.

Reclamation's response: In both the proposed action and Alternative 3, CAP water could possibly be available for environmental uses within Arizona (see Section 3, Table 3). Under the proposed action or alternatives, Reclamation does not intend to allocate CAP water for environmental uses on the mainstem of the Colorado River.

III. THE ALTERNATIVES—DEFINITION AND RANGE

A. *Comment:* The alternatives are not well defined.

1. *Comment:* Non-Indian agricultural water volumes are poorly defined

Reclamation's response: Reclamation has conducted comprehensive research to determine the current status of all NIA contracts and has revised the alternatives accordingly (see Section 3 and Appendix E).

2. *Comment:* Alternatives are poorly constructed.

Reclamation's response: Based upon the input provided during scoping and further internal discussions, we have more clearly identified what components are addressed in each of the alternatives (see Section 3 and Table 5).

B. *Comment:* Alternatives that take water away from existing contractors / subcontractor are illegal.

1. *Comment:* Reclamation must complete the NIA reallocation process required in the Salt River Pima-Maricopa Indian Water Rights Settlement of 1988, and the Secretary of the Interior's 1992 decision.

Reclamation's response: Reclamation intends to comply with the provisions of the Salt River Pima-Maricopa Indian Water Rights Settlement Act of 1988 and the conditions established in the Final Reallocation Decision issued by the Secretary on February 5, 1992 (57 FR 4470). Reclamation will analyze

various scenarios regarding the allocations of currently uncontracted water classified as non-Indian agricultural priority water. Certain reallocations of CAP water remain uncommitted pursuant to the Final Reallocation Decision. Consistent with the Secretary's Decision, the EIS will analyze certain alternatives in which water that has reverted to the Secretary for discretionary use is allocated for use in facilitating Indian water rights settlements and other purposes.

2. *Comment:* Taking water away from irrigation districts holding two-party letter agreements is illegal because the districts still hold a valid CAP subcontract.

Reclamation's response: The United States' position with respect to the status of irrigation districts that previously entered CAP water delivery subcontracts has been presented in various documents since the effective date of those contracts (October 1, 1993). The United States does not recognize the independent validity or enforceability of the provisions of "two-party letter agreements." When a user does not contract to receive all the water available to him under his allocation, or when a user breaches a contract that provides for delivery of water, his right to contract for that water devolves upon the Secretary. The Secretary may choose to terminate the contracts of those entities that have breached the provisions of existing water delivery subcontracts. In the event of such a termination, any CAP water allocation reverts to the Secretary for discretionary use in Indian water rights settlements and other purposes. This NEPA process will analyze reallocation of water under such a circumstance.

3. *Comment:* The allocation of water previously allocated to the HVID is improper.

Reclamation's response: The 1990 Fort McDowell Settlement Act requires the Secretary to use any remaining water acquired from the HVID in the settlement of Indian water rights claims

in the Salt and Verde River systems. Consistent with this legislation, Interior intends to reserve the remaining 19,318 acre-feet of HVID water for allocation to the Tonto Apache, Yavapai Apache, and the GRIC as part of future settlement agreements.

4. *Comment:* The decision in the Maricopa-Stanfield Irrigation & Drainage District (MSIDD) litigation upholding the validity of the non-Indian agricultural water service subcontracts precludes alternatives under consideration.

Reclamation's response: Comments during the scoping period indicated some members of the public believe the 9th Circuit Court of Appeals decision in the Maricopa-Stanfield Irrigation and Drainage District v. United States litigation (No. 97-16432) validated the non-Indian agricultural water service subcontracts and, accordingly, Reclamation cannot implement any of the action alternatives identified in the August 26th Federal Register notice that affect CAP water previously allocated to non-Indian agricultural subcontractors. The United States does not share that interpretation. The general issue of the validity of non-Indian agricultural water service subcontracts was addressed by the U.S. Court of Appeals for the 9th Judicial Circuit in Section II of the court's opinion which was issued on October 14, 1998 (published at 158 F.3d 428). In that section, the court found it appropriate to consider certain issues raised by an outside party to the litigation which had questioned whether the Arizona agricultural districts which initiated the case were authorized under Federal law to do so. Under a provision of Federal law, "contractors" of CAP water were authorized to bring certain claims in Federal Court. San Carlos Apache Tribe Water Rights Settlement Act of 1992, Pub. L. No. 102-575, title XXXVII, § 3709(f)(1), 106 Stat. 4740 (1992). The 9th Circuit provided that:

Although Congress did not define the term 'contractor' in the SCAT Act, a reasonable

construction of the term would include all entities that had contracted for residual CAP water at the time of the Act--even those who, like the Districts, subsequently amended their contracts.

Accordingly, the United States believes the determination made by the 9th Circuit with respect to the Districts' contractual rights in 1992 is not dispositive regarding the current rights of the Districts. The United States Supreme Court upheld the decision of the 9th Circuit in May, 1999 (published at 119 S. Ct. 1802).

The United States' position is that reallocation of the water identified in the July 30th Federal Register notice (see Appendix A), under the circumstances described, is within the legal authority of the Secretary given the facts and events that have transpired subsequent to 1992. However, even if this was not the position of the United States and Interior, consideration under a NEPA process of the alternatives identified in the August 26th notice is appropriate. CEQ's NEPA regulations are clear on this point: "[A]gencies shall ... include reasonable alternatives not within the jurisdiction of the lead agency." (40 CFR § 1502.14(c)).

5. *Comment:* Why did the public scoping documents published subsequent to the August 26th notice identify New Magma Irrigation & Drainage District (NMIDD) water as available for reallocation under one of the alternatives?

Reclamation's response: Based on legal proceedings in Federal Court, and after consultation with the U.S. Department of Justice, Reclamation included water previously allocated to NMIDD as available for reallocation in its description of Alternative 2. The United States' position is that the approval of the debtor's plan for reorganization in the NMIDD bankruptcy proceeding (No. B-94-00211-TUC-JMM) included Federal approval of NMIDD's relinquishment of the CAP

water previously allocated and contracted to the NMIDD. This position regarding water previously allocated to NMIDD was confirmed by NMIDD in comments presented to the Bureau of Reclamation on September 15, 1999 (Trans. at p.17).

- C. *Comment:* Alternatives that reallocate CAP water without consultation with the State of Arizona are illegal pursuant to the Boulder Canyon Project Act.

Reclamation's response: Reclamation intends to meet the consultation requirements of applicable Federal law and believes that such consultation should take place as part of this NEPA process. The State of Arizona will be provided, along with other members of the general public, copies of NEPA compliance documents. The State of Arizona will also be afforded an appropriate opportunity to comment and consult on the allocation alternatives and the NEPA compliance documents at the appropriate stages of the NEPA process. This approach will allow Reclamation to integrate NEPA requirements with other environmental review and consultation requirements, such as those identified under the Boulder Canyon Project Act. (40 CFR § 1500.5(g)).

IV. SCOPE OF ENVIRONMENTAL ANALYSIS

- A. *Comment:* The EIS should evaluate the following impacts.
1. *Comment:* Impacts to groundwater levels and groundwater management in central Arizona, including the ability of entities to comply with Arizona's Groundwater Management Act.

Reclamation's response: Such impacts will be evaluated and included in the EIS.

2. *Comment:* On-the-ground environmental impacts from taking water from non-Indian agriculture, including (but not limited to) air quality, weed control, subsidence, and abandonment of infrastructure.

Reclamation's response: Such impacts will be evaluated and included in the EIS.

3. *Comment:* Impacts to agriculture and its viability, as a result of changing from CAP water to groundwater pumping.

Reclamation's response: Such impacts will be evaluated and included in the EIS.

4. *Comment:* Socio-economic impacts in Pinal County from the loss of agriculture and the loss of CAP M&I conversion rights, including impacts due to the loss of the County's tax base, impacts to associated businesses, and impacts from loss of a rural lifestyle.

Reclamation's response: Such impacts will be evaluated and included in the EIS.

5. *Comment:* Impacts from developing additional irrigated acreage on Indian lands since there are no Reclamation Reform Act (RRA) restrictions on Indian lands.

Reclamation's response: Such impacts will be evaluated and included in the EIS.

6. *Comment:* Impacts on non-Indian agricultural districts under alternatives that lack debt and RRA relief.

Reclamation's response: Such impacts will be evaluated and included in the EIS.

7. *Comment:* Impacts on central Arizona municipal and industrial users under alternatives where uncontracted M&I priority water is used for Federal purposes.

Reclamation's response: Such impacts will be evaluated and included in the EIS.

8. *Comment:* Impacts to the Colorado River mainstem.

Reclamation's response: Such impacts will be evaluated and included in the EIS to the degree that the point of diversion is changed and the flow regime in the mainstem is affected.

9. *Comment:* Changes regarding distribution of CAP water shortages and surpluses under the various alternatives and the associated impacts on CAP water users.

Reclamation's response: Such impacts will be evaluated and included in the EIS.

- B. *Comment:* The assumptions used in conducting the analyses for the EIS should assume that various named Indian water rights claims, such as White Mountain Apache claims to flows in the Salt River system, are exercised.

Reclamation's response: Although resolution of these Indian water rights claims could occur at some point in the future, we do not believe specific settlements are reasonably foreseeable at this time. The resulting conditions and the effects of any of the EIS alternatives on these conditions would be so speculative, that no meaningful qualification or quantification of impacts would be possible.

INTEGRATION OF ISSUES WITH EIS

INCORPORATION OF ISSUES INTO THE EIS

Most of the issues raised through scoping will be integrated into the EIS through revision of the alternatives under consideration and the approach taken in analyzing impacts.

REVISION OF ALTERNATIVES UNDER CONSIDERATION

A no-action baseline, the Proposed Action, and three additional Action Alternatives were presented in the August 26, 1999 Federal Register notice (see Appendix A) and were further described in the information packets available at the scoping meetings (see Appendix B). Reclamation received extensive comments regarding the alternatives, especially with respect to the portrayal of the NIA-priority water. As a result of the comments received and comprehensive research and analysis, Reclamation redefined the four broad categories of NIA water as shown in Table 2 for the purposes of this EIS. Comments were also received regarding the derivation of the NIA numbers. Reclamation's worksheet for developing the NIA numbers used in the current alternatives under consideration are included in Appendix E.

While the numbers describing the classes of NIA water in the alternatives have been modified, the text in Appendix B is still generally applicable, and the reader is directed there for a narrative description of the alternatives. Figures 3 through 7 describe the alternatives as modified through the scoping process. In addition, Figure 8 summarizes additional CAP water made available to the various Indian Communities / Nations in each alternative.

As noted previously, the Proposed Action is the subject of current negotiations and, as such, may evolve while the EIS is still under preparation. Several important aspects of the Proposed Action that were not included in the public meetings are described in Table 3. It is important to note, however, that while

TABLE 2

SUMMARY OF MODIFICATIONS TO NON-INDIAN AGRICULTURE CATEGORY¹

	RELINQUISHED OR DECLINED	CITIES' ALLOCATIONS AND OPTION	LETTER AGREEMENTS	UNCONTRACTED
Pre-Scoping	44,493 afa Queen Creek ID Chandler Heights Citrus ID San Tan ID Tonopah ID New Magma IDD ('95 bankruptcy)	43,654 afa Cities of Chandler, Mesa, Phoenix and Scottsdale assigned HIDD allocation and option of 5% of NIA pool	140,373 afa Maricopa-Stanfield IDD Central Arizona IDD	112,578 afa <u>1992 NIA reallocation water</u> Maricopa-Stanfield IDD Central Arizona IDD New Magma IDD Chandler Heights Citrus ID San Carlos IDD Roosevelt ID ASLD Leases McMullen Valley WCD FICO
Total = 341,098 af				
Modification	Volume of pool reduced <u>Decreased by:</u> Queen Creek ID Chandler Heights Citrus ID San Tan ID Tonopah ID <u>Increased by:</u> ASLD Leases McMullen Valley WCD FICO	Volume increased Calculation of HIDD and 5% option based on interpretation of 1993 HIDD Agreement see Appendix E	Volume of pool increased <u>Increased by:</u> Chandler Heights Citrus ID Queen Creek ID San Tan ID Tonopah ID	Volume of pool reduced <u>Decreased by:</u> ASLD Leases McMullen Valley WCD FICO
Post-Scoping	38,999 afa New Magma IDD ('95 bankruptcy) ASLD Leases McMullen Valley WCD FICO	45,835 afa Cities of Chandler, Mesa, Phoenix and Scottsdale assigned HIDD allocation and option of 5% of NIA pool	184,449 afa Central Arizona IDD Maricopa-Stanfield IDD Chandler Heights Citrus ID Queen Creek ID San Tan ID Tonopah ID	71,815 afa <u>1992 NIA reallocation water</u> Maricopa-Stanfield IDD Central Arizona IDD New Magma IDD Chandler Heights Citrus ID San Carlos IDD Roosevelt ID
Total = 341,098 af				

¹ It should be noted that the allocation numbers have been refined compared to the numbers provided in the scoping materials; see Appendix E.

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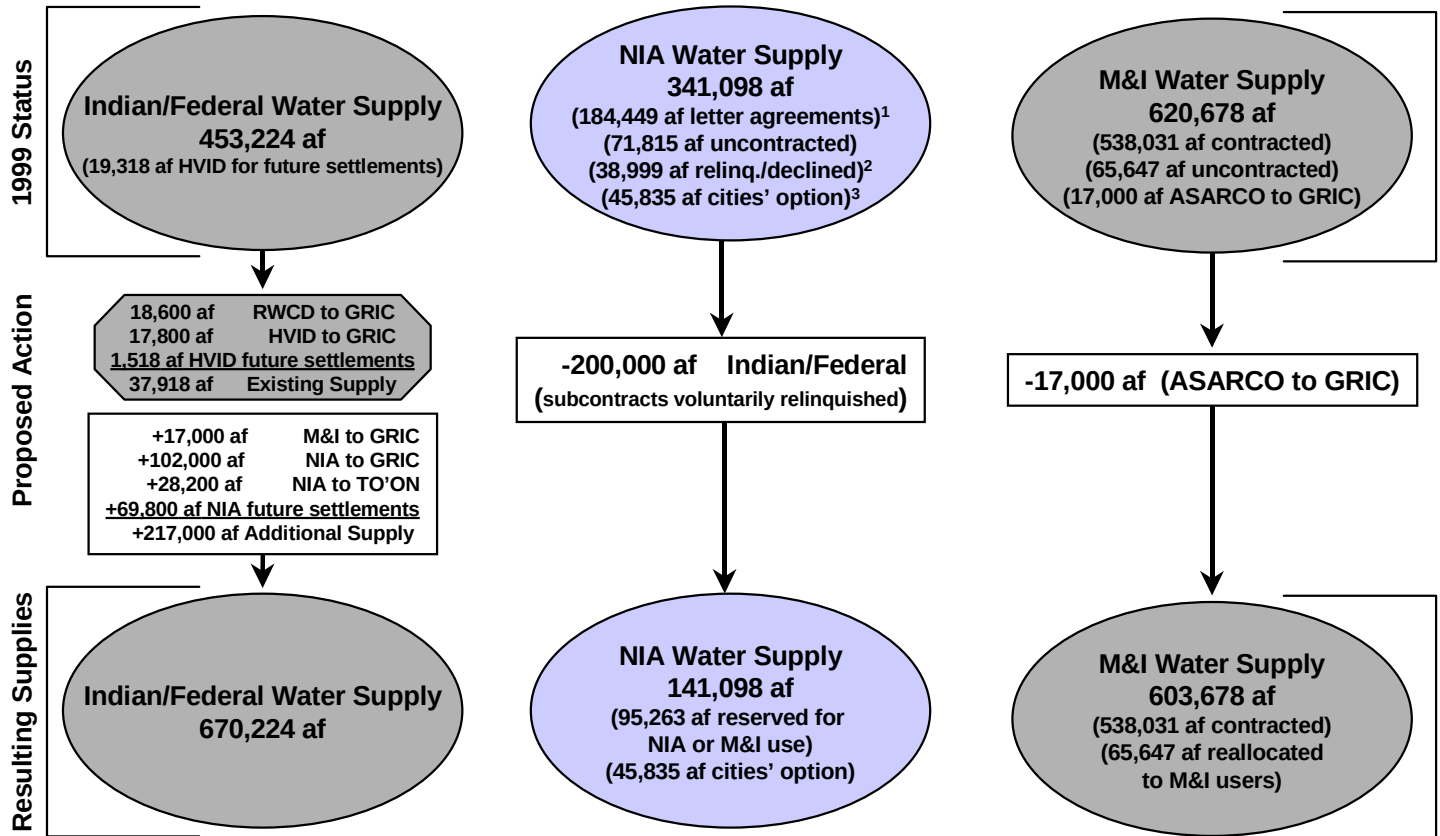
November 17, 1999

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FIGURE 3
PROPOSED ACTION ALTERNATIVE
Distribution of CAP Water Supplies

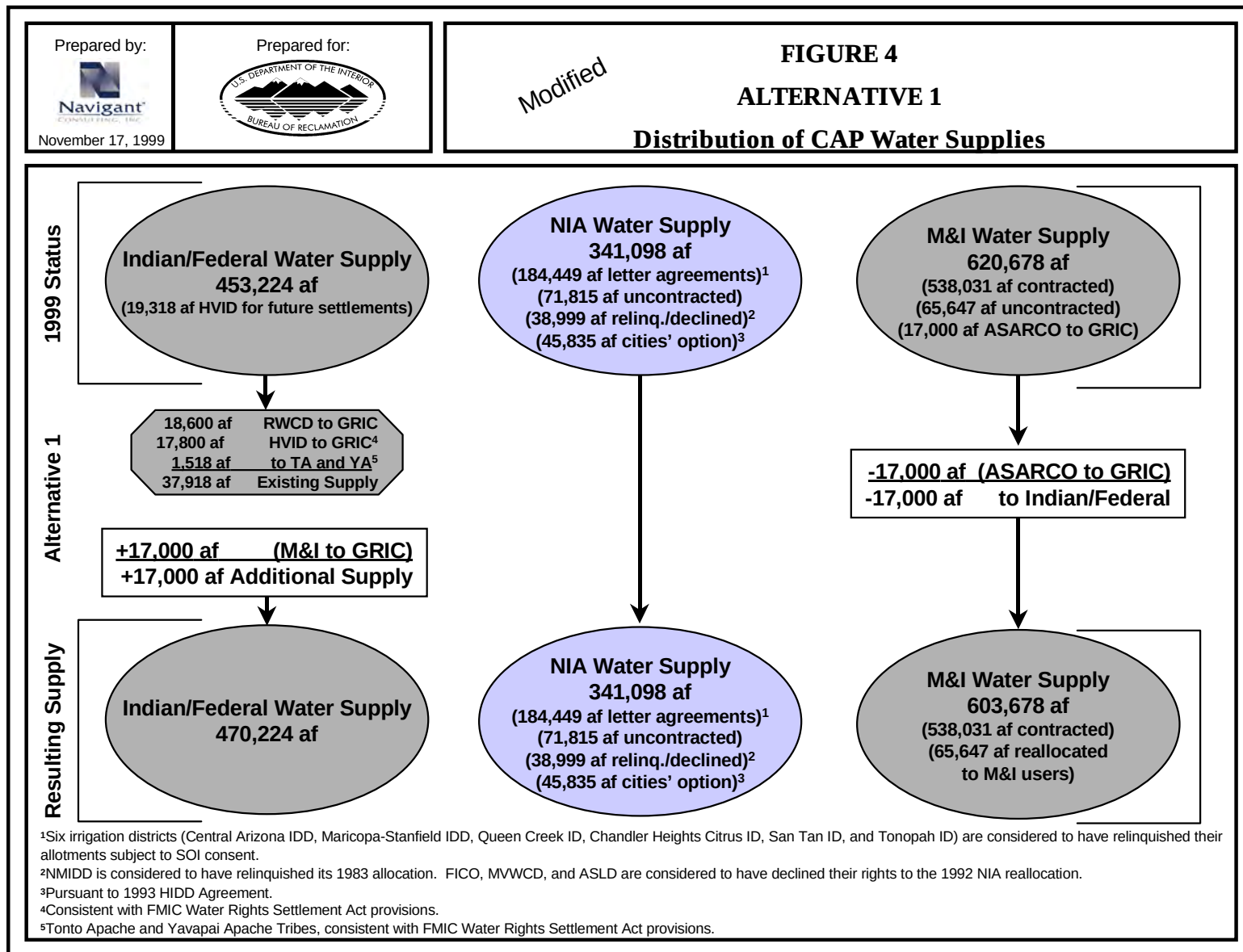


¹Six irrigation districts (Central Arizona IDD, Maricopa-Stanfield IDD, Queen Creek ID, Chandler Heights Citrus ID, San Tan ID, and Tonopah ID) are considered to have relinquished their allotments subject to SOI consent.

²NMIDD is considered to have relinquished its 1983 allocation. FICO, MVWCD, and ASLD are considered to have declined their rights to the 1992 NIA reallocation.

³Pursuant to 1993 HIDD Agreement.

SECTION 3
INTEGRATION OF ISSUES WITH EIS



SECTION 3
INTEGRATION OF ISSUES WITH EIS

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November 17, 1999

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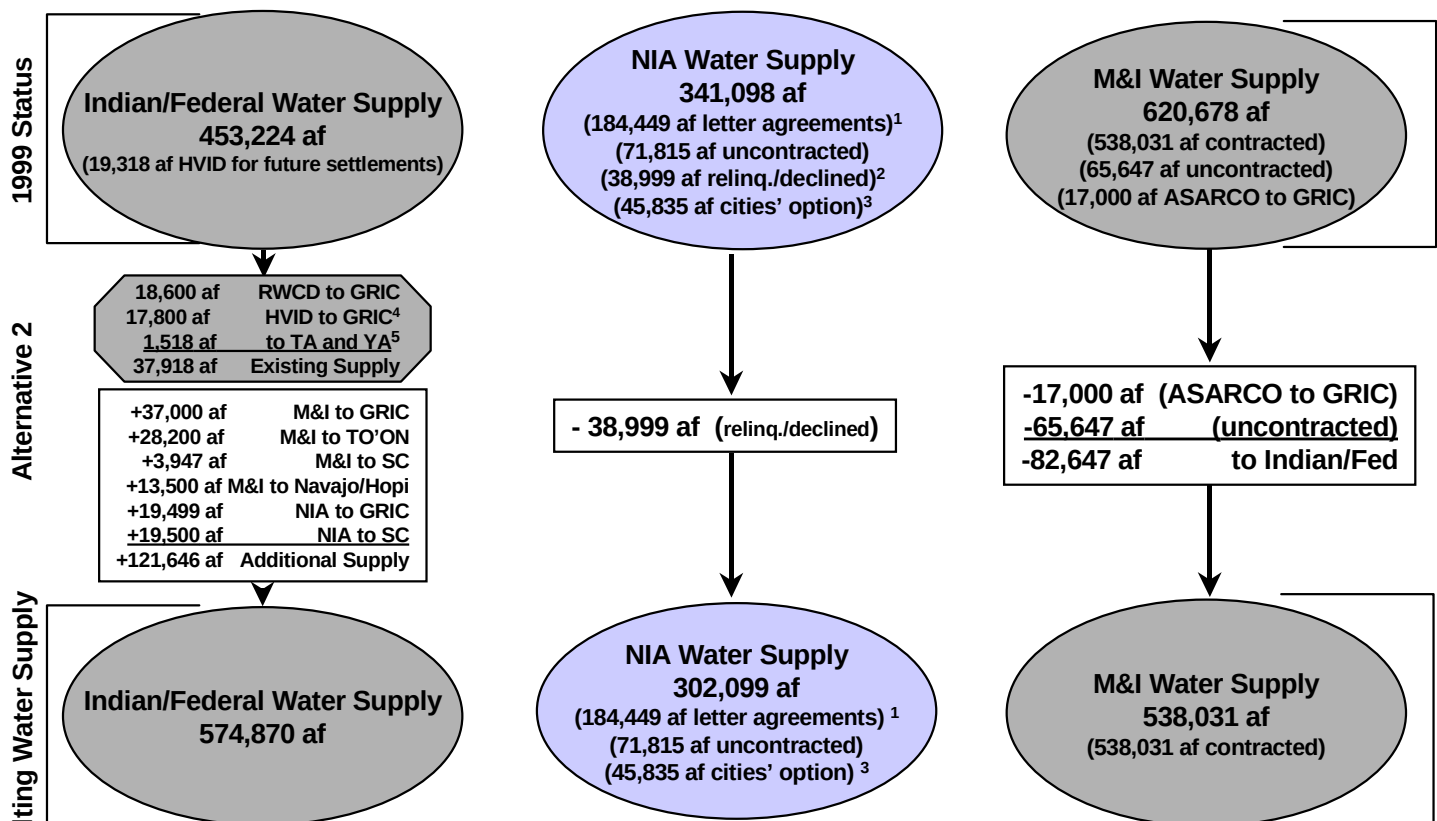


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FIGURE 5

ALTERNATIVE 2

Distribution of CAP Water Supplies



¹Six irrigation districts (CAIDD, MSIDD, Queen Creek ID, Chandler Heights Citrus ID, San Tan ID, and Tonopah ID) are considered to have relinquished their allotments subject to SOI consent.

²NMIDD is considered to have relinquished its 1983 allocation. FICO, MVWCD, and ASLD are considered to have declined their rights to the 1992 NIA reallocation.

³Pursuant to 1993 HIDD Agreement.

⁴Consistent with FMIC Water Rights Settlement Act provisions.

⁵Tonto Apache and Yavapai Apache Tribes, consistent with FMIC Water Rights Settlement Act provisions.

SECTION 3
INTEGRATION OF ISSUES WITH EIS

Prepared by:



November 17, 1999

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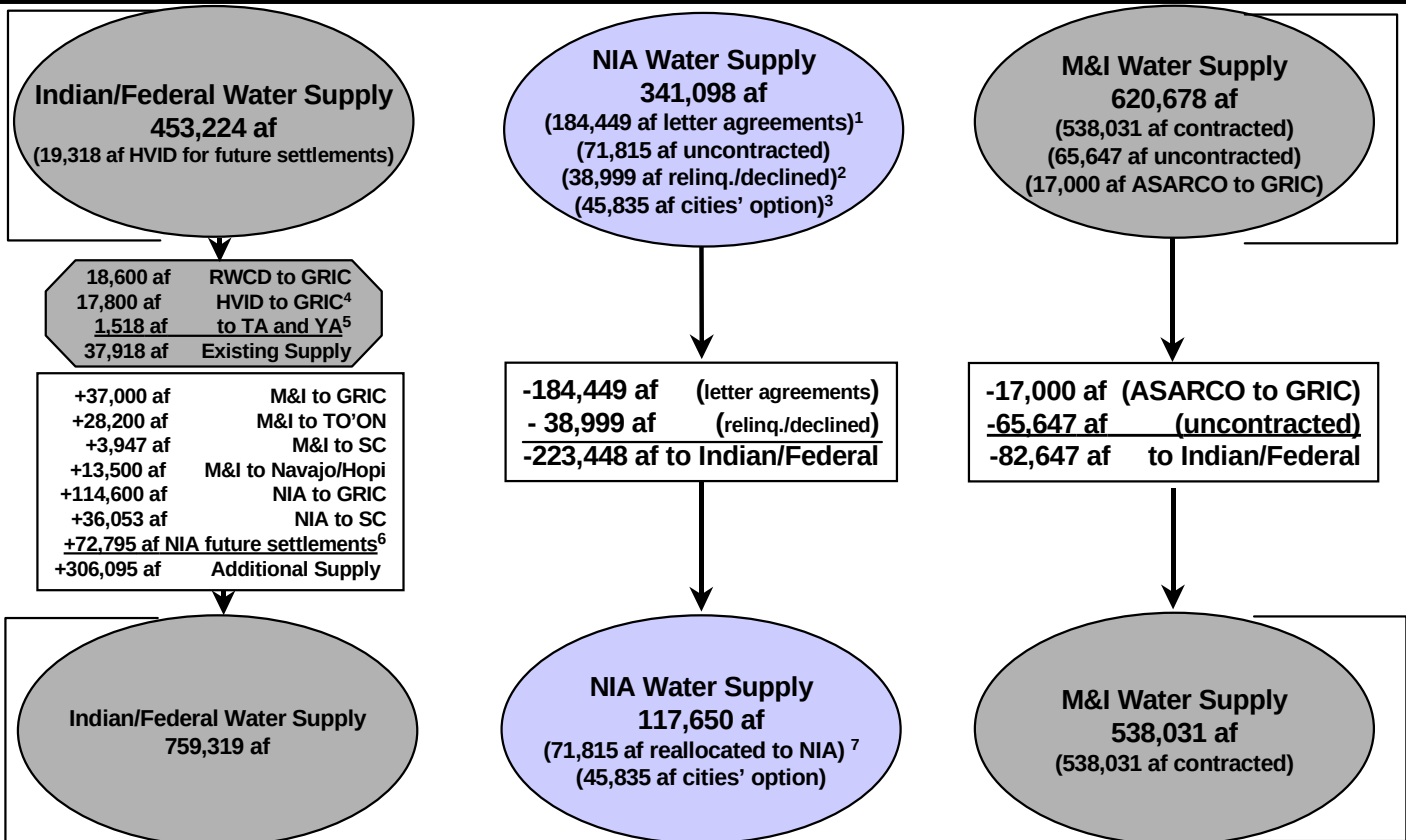
FIGURE 6
ALTERNATIVE 3

Distribution of CAP Water Supplies

1999 Status

Alternative 3

Resulting Supply



¹Six irrigation districts (CAIDD, MSIDD, Queen Creek ID, Chandler Heights Citrus ID, San Tan ID, and Tonopah ID) are considered to have relinquished their allotments subject to SOI consent.

²NMIDD is considered to have relinquished its 1983 allocation. FICO, MWCD, and ASLD are considered to have declined their rights to the 1992 NIA reallocation.

³Pursuant to 1993 HIDD Agreement.

⁴Consistent with FMIC Water Rights Settlement Act provisions.

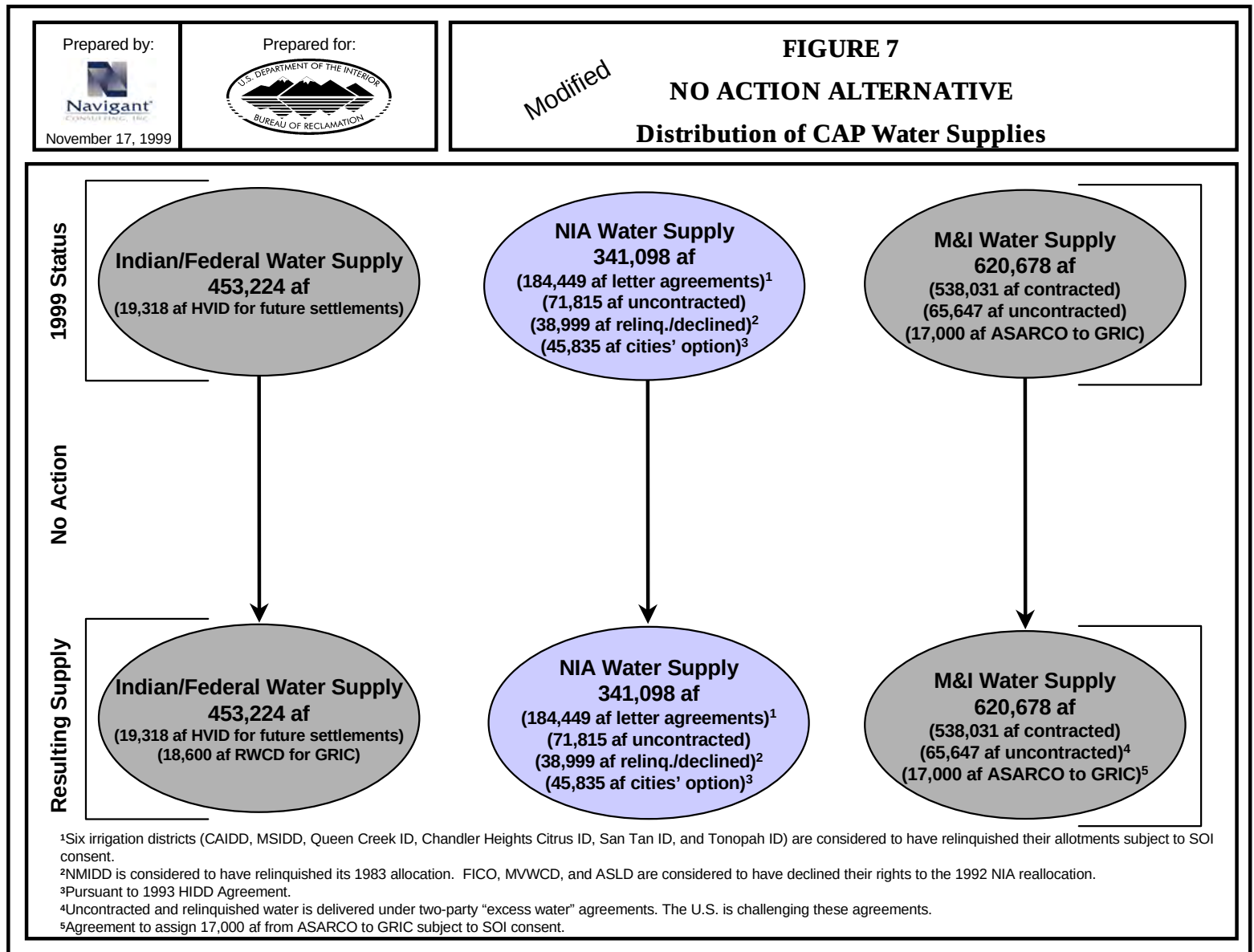
⁵Tonto Apache and Yavapai Apache Tribes, consistent with FMIC Water Rights Settlement Act provisions.

⁶Includes possible environmental uses.

⁷Two outcomes of reallocation will be evaluated in the EIS: reallocation to NIA use, and reallocation to M&I uses.

SECTION 3

INTEGRATION OF ISSUES WITH EIS



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November 17, 1999

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FIGURE 8

CAP SUPPLIES FOR INDIAN COMMUNITIES/NATIONS **Summary for Modified Alternatives (all quantities in af per year)**

INDIAN COMMUNITY OR NATION	CAP WATER SUPPLY UNDER ALTERNATIVE					
	1983 ROD	CURRENT NO ACTION	PROPOSED ACTION	ALT. 1	ALT. 2	ALT. 3
Gila River	173,100	173,100	328,500	226,500	265,999 ⁷	361,100 ⁷
Tohono O'odham ²	45,800	45,800 ³	74,000 ⁶	45,800	74,000 ⁶	74,000 ⁶
San Carlos Apache	12,700	61,645 ⁴	61,645	61,645	85,092	101,645
Navajo/Hopi	0	0	0	0	13,500	13,500
Yavapai and Tonto Apache	1,328	1,328	1,328	2,846 ⁷	2,846 ⁷	2,846 ⁷
Others ¹	76,900	133,433	133,433	133,433	133,433	133,433
Reserved for Future Settlements	0	37,918 ⁵	71,318	0 ⁸	0 ⁸	72,795
Total Indian CAP Supply	309,828	453,224	670,224	470,224	574,870	759,319

¹Includes Ak Chin, Fort McDowell, Pascua Yaqui, Salt River, and Yavapai Prescott Indian Communities.

²Includes 8,000 afa for Chui Chu District

³In addition to the 45,800 afa of CAP allocated to the Nation, the Nation is entitled to another 28,200 afa per SAWRSA, the source of which was not identified in SAWRSA.

⁴Subject to implementation of the San Carlos Apache Tribe Water Settlement Act of 1992.

⁵Includes water authorized by FMIC Water Rights Settlement Act (19,318 af of HVID water) and RWCD assignment (18,600 af).

⁶Under the Proposed Action and Alternatives 2 and 3, the 28,200 afa of additional water to the Nation per SAWRSA is identified as a CAP allocation.

⁷Consistent with FMIC Water Rights Settlement Act provisions (HVID water).

⁸Water currently reserved for future settlements would be allocated to Indian Communities/Nations in Alternatives 1 and 2.

TABLE 3
CAP ALLOCATION EIS
SUMMARY OF ALTERNATIVES

<i>Blocks of Water</i>	<i>Users</i>	Proposed Action (Settlement)	Alternative 1 -----	Alternative 2 (NO SETTLEMENT)	Alternative 3	No Action -----
M&I 65k Uncontracted	M&I	X	X			--
	Federal-Indians			X	X	
NIA 39k Relinq. or Declined	NIA	1	--			--
	Federal-Indians	1		X	X	
NIA 184k Letter Agreement	NIA	1	--	--		--
	Federal-Indians	1			X	
NIA 72k Uncontracted	NIA	1	--	--	X ²	--
	M&I	1			X ³	
<i>Other Components in Alternatives⁴</i>						
Water for Environmental Purposes ⁵		X ⁶			X ⁷	
Water for Indian Uses		X	X	X	X	
Leases of Indian Water to M&I Users		X				
Final Indian Water Rights Settlement		X				
Reclamation 9d Debt Relief for NIA		X				
Firming of NIA to M&I Priority for Indian Users		X ⁸				
RRA Relief for NIA		X				
Extended Availability of NIA Pool ⁹		X				
Resolution of CAP Shortage Administration		X				
Conversion of NIA Percentage to Volume		X ¹⁰				

Notes

- (1) Under the Proposed Action, all NIA water is voluntarily relinquished. Of the total 297k NIA water, 200k is reserved for Federal purposes and 97k is reserved for non-Indian use.
- (2) One scenario evaluated under Alternative 3 is contracts offered to, accepted, and used by NIA.
- (3) The other scenario evaluated under Alternative 3 is contracts offered to and declined by NIA, with subsequent offer to and use by M&I.
- (4) If marked, alternative includes a degree, but not necessarily all, of the component. For example, 9d debt and RRA relief are under negotiation.
- (5) Water for environmental purposes would be for in-state use only and would not be used on the Colorado River System.
- (6) Under the Proposed Action, water for environmental purposes could be available on an annual basis as excess water.
- (7) Alternative 3 contains a block of water reserved for Federal purposes, primarily for Indian uses and possibly environmental purposes.
- (8) Firming of some NIA to M&I priority for Indian use.
- (9) NIA Pool is excess water, pool extension is based on availability and CAWCD extending the ag pool pricing program.
- (10) As a result, a new method for distributing surplus will be established.

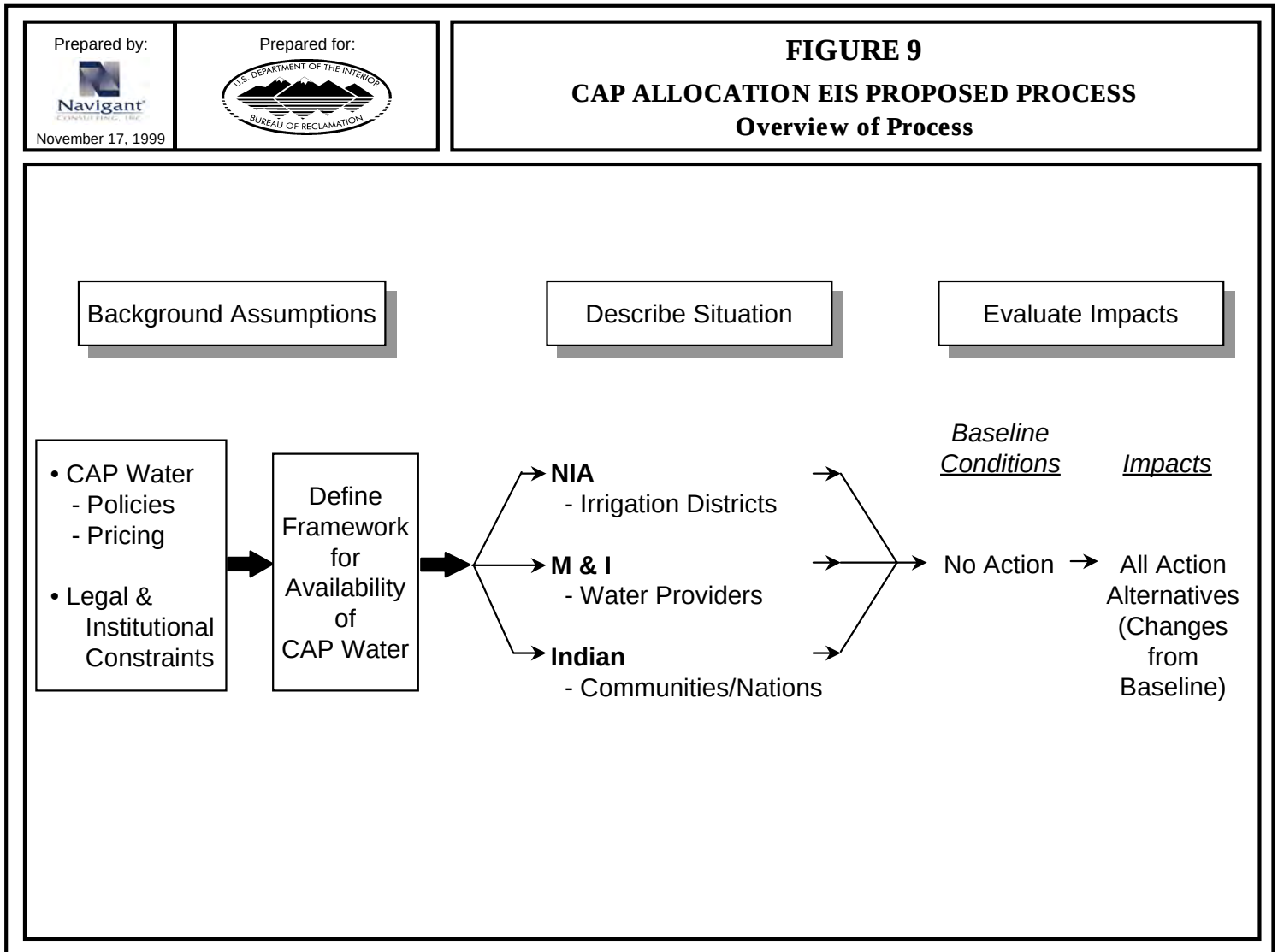
current negotiations include some form of Reclamation 9d debt relief, RRA relief, and an extension of CAWCD agricultural pool pricing for the NIA sector, the extent of these provisions may not be completely defined until settlement is reached.

For the Proposed Action, all allocations of NIA-priority water would be converted to fixed volumes. Contracts based on percentages would be voluntarily relinquished, and a new methodology for distribution would be established. However, in the absence of settlement, it is contemplated that contracts and subcontracts for NIA priority water would be offered on a percentage basis. For ease in comparing the alternatives in the EIS, the NIA allocations for the non-settlement alternatives have also been converted to volumes based on a normal year CAP delivery of 1,415,000 acre-feet (which is consistent with the volumes developed in the Proposed Action).

For all alternatives except the Proposed Action, the water which originated in the NIA category will keep its status with regard to surplus conditions. For example, in Alternative 3, a quantity of NIA water is transferred to the GRIC. The GRIC would then be entitled to whatever surplus water is associated with that portion of the NIA pool. The GRIC would also be liable to incur the shortages associated with the portion of its supply. The treatment of NIA water during shortage conditions would be the same for all alternatives including the No Action alternative. The treatment of NIA water during surplus conditions under the Proposed Action is subject to settlement negotiations; the resolution of this issue will be treated in the EIS accordingly.

GENERAL APPROACH TO ANALYSIS OF IMPACTS

The process for analyzing the environmental impacts will involve identifying and estimating certain background assumptions (related to water availability and pricing), describing the anticipated water use by sector, and then evaluating the impacts (for the action alternatives) or estimating the changes in conditions (for the no-action alternative) over the period of analysis (Figure 9). Where possible, impacts will be quantified; where not, they will be noted and discussed in the EIS text. The evaluation will be at the entity level.



The analysis will focus on deliveries and uses carried forward 50 years (i.e., the timeframe for the EIS will be 2001 to 2051). This is consistent with the water contracting period provided for in the CAP authorizing legislation and the period of analysis for the original EIS. In addition, the impacts of CAP shortages and surpluses will be evaluated. Projected changes over the period of analysis in the no-action alternative will provide a baseline against which impacts in the action alternatives will be measured.

Fundamental to the evaluation of potential impacts is an understanding of policies of CAWCD and Reclamation regarding operation of the CAP, pricing of CAP water, and development schedules for Indian and M&I users. Assumptions regarding these areas will be made for each alternative. These assumptions will serve to frame the availability and conditions for distribution of CAP water to the Indian, M&I, NIA and excess water classes. The distribution of water among the water classes can then be used to determine the CAP water available to each entity for use. Assumptions will be prepared based on existing laws, agreements, available information and discussions with representatives of appropriate institutions and entities.

The expected conditions/anticipated water use will be described on an entity-by-entity basis for the Indian Communities or Nations, irrigation districts, and M&I entities that may be offered a contract for CAP water through one of the alternatives. The description will be based on the development of a water budget that includes physical hydrologic parameters as well as water supply and groundwater withdrawal components within each entity's boundaries. Changes to the water budget over the project time frame will be calculated and analyzed.

Environmental impacts will be quantified or described based on changes from baseline conditions projected for the 50-year analysis period. It is anticipated that the analyses of environmental impacts will be focused on the following areas in addition to the impacts outlined by NEPA:

- Groundwater levels;
- Groundwater quality;
- Surface water resources including effluent-dominated streams;
- Air quality;
- Socioeconomic impacts including primary and secondary economic impacts to NIA areas;

- Impacts to biological and archeological resources; and
- Impacts due to non-resolution of water rights issues and uncertainties.

SCHEDULE FOR NEPA PROCESS MOVING FORWARD

Reclamation is proceeding to conduct the technical studies necessary to complete its analyses for the proposed action and alternatives, as revised as a result of the scoping process and described herein. We currently anticipate a draft EIS will be available for a 60-day public review and comment period during Summer 2000. A notice indicating the draft EIS' availability will be mailed to everyone on the mailing list and will be published in local newspapers.

To be placed on the mailing list for subsequent information, please write or telephone Ms. Janice Kjesbo, Environmental Resource Management Division, Phoenix Area Office, P.O. Box 81169, Phoenix, Arizona 85069-1169, telephone (602) 216-3864, or fax (602) 216-4006.

The draft EIS will be available on the internet at <http://www.apo.lc.usbr.gov/> and it can also be obtained by request. At this time, we anticipate three public hearings will be held to receive comments on the draft EIS.

APPENDIX A

Federal Register Notices and Newspaper Notice

SUMMARY: The Department of the Interior, Bureau of Reclamation (Reclamation), announces its intention to prepare environmental documents under section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969, as amended, to assist in developing proposed modifications to previous Central Arizona Project (CAP) water allocations.

We anticipate that we will reallocate and offer contracts with certain quantities of CAP water in connection with (1) settlement discussions arising out of operation of the CAP; (2) settlement discussions arising out of legal claims involving the Gila River Indian Community and the San Carlos Indian Community, and (3) negotiations regarding implementation of the 1982 Southern Arizona Water Rights Settlement Act.

At present it is not clear whether the scope of the action and anticipated project impacts will require preparation of an environmental impact statement (EIS) or an environmental assessment (EA). However, to ensure a timely and appropriate level of NEPA compliance and to limit potential future delays to the proposed reallocation and contract actions, Reclamation is proceeding, at this time, as if the project impacts would require preparation of an EIS. Reclamation will reevaluate the need for an EIS after obtaining comments on the proposed action and analysis of alternatives and impacts during the NEPA process. Reclamation will publish a notice of cancellation if, as a result of additional information or analysis, a decision is made to prepare an EA rather than an EIS.

DATES: Comments must be received August 30, 1999.

ADDRESSES: Send written comments concerning the proposal to Mr. Bruce Ellis, Environmental Program Manager, Bureau of Reclamation, PO Box 81169, Phoenix, Arizona, 85069-1169. Written comments received by the Bureau of Reclamation become part of the public record associated with this action. Accordingly, such comments will be available to requestors of information associated with this Notice pursuant to the Freedom of Information Act.

FOR FURTHER INFORMATION CONTACT: Mr. Bruce Ellis, at (602) 216-3854.

SUPPLEMENTARY INFORMATION:

Background

We have been engaged in active negotiations with a variety of parties in Arizona that have an interest in the CAP, including the operator of the CAP (the Central Arizona Water Conservation District), the Arizona Department of

Water Resources, Indian Tribes, and other water users. The current negotiations contemplate that the Secretary will undertake a reallocation of CAP water to assist in the resolution of outstanding Indian water rights claims, and to provide greater certainty to all users of CAP water. If the settlement goes forward, we anticipate that the proposed reallocation of CAP water would constitute a final allocation of water for the CAP system.

Purpose and Need for Action

The purpose and need of the proposed federal action is to implement settlement of ongoing litigation over the operation of the CAP, the status of CAP project water, and to assist in the resolution of outstanding Indian water rights claims. The United States intends that the final allocation of CAP water under the terms of the settlement will facilitate use of CAP water in satisfaction of the goals and purposes of the CAP authorizing legislation (i.e. the Colorado River Basin Project Act of 1968).

The Proposed Federal Action

Through the efforts of all parties to these negotiations, significant progress has been made on many matters involving operation and administration of the CAP and a general agreement on the details of the likely scenario regarding the reallocation of CAP water has emerged. Reclamation intends to undertake the environmental review that needs to be completed in order to facilitate the timely implementation of reallocations that are contemplated by the proposed settlement. Because of the lead time needed to complete the environmental review prior to reallocating, Reclamation is initiating the review at this time. In connection with the environmental analysis, Reclamation will analyze the proposed reallocation of CAP water that has been the subject of extensive discussion among the parties as the proposed federal action. This analysis does not preclude, of course, additional adjustments to the final reallocations depending upon the course of negotiations. Accordingly, pursuant to this notice, Reclamation is announcing its intention to undertake an environmental review of allocating and offering contracts for additional CAP water as follows:

1. Reallocation of an additional 200,000 acre feet of CAP water for Indian Water Rights Settlement Purposes. This water would retain its former priority status as "Non-Indian Agricultural" priority water. Of this amount, 102,000 acre feet of CAP water

DEPARTMENT OF THE INTERIOR

Office of the Secretary

Allocation of Water Supply and Expected Long-Term Contract Execution, Central Arizona Project, Arizona

AGENCY: Office of the Secretary, Interior.

ACTION: Notice.

would be allocated and contracted to the Gila River Indian Community; 78,200 acre feet of CAP water would be allocated and contracted to the Tohono O'odham Nation; and a residual amount of 69,800 would be available for allocation and contracting by the Secretary for use in facilitating additional, future Indian Water Rights Settlements.

2. 17,800 acre feet of the CAP water permanently relinquished by the Harquahala Valley Irrigation District (HVID) would be allocated and contracted to the Gila River Indian Community. This water has the priority of "Indian" priority CAP water.

3. All remaining, (approximately 18,600 acre feet) CAP water permanently relinquished by the Roosevelt Water Conservation District, would be allocated and contracted by the Gila River Indian Community. This water would retain its "Non-Indian Agricultural" CAP priority.

4. 17,000 AF of CAP water expected to be permanently relinquished by ASARCO Incorporated, would be allocated and contracted by the Gila River Indian Community. This water would retain its "M&I" CAP priority.

5. 65,647 acre feet of M&I priority water would be allocated and contracted to various municipalities and other entities within the CAP service area. This water would retain its "M&I" CAP priority. Identification of entities, and associated specific quantities for this water would be made after consultation between the Secretary and the State of Arizona (Arizona). It is anticipated that further, specific, NEPA compliance would be undertaken after Arizona has identified the entities it proposes should receive allocations of this "M&I" priority CAP water, and completion of the consultation between the Secretary and Arizona on this matter.

As part of the proposed action Reclamation will consider all provisions of the settlements currently under negotiation, including provisions under consideration in the potential settlement of the *Central Arizona Water Conservation District v. United States* litigation, in which, as noted above, settlement discussions are currently in progress.

Range of Alternatives

In addition to the above-described proposed action (i.e. the settlement approach), Reclamation will implement NEPA requirements by identifying, reviewing and evaluating additional alternatives as part of its NEPA analysis. These alternative analyses will include alternatives that would address alternative allocation and contracting

scenarios that could involve Non-Indian Agricultural priority water, Indian priority water, and M&I priority water. Reclamation will also include alternative allocation and contracting scenarios that could be undertaken in the absence of a settlement as part of its NEPA analysis.

Authority

The Secretary has the authority to contract for supplies of Central Arizona Project water under the Act of June 17, 1902, 32 Stat. 388, as amended and/or supplemented, including specifically the Colorado River Basin Project Act of September 30, 1968 (82 Stat. 885, 43 U.S.C. 1501 *et seq.*).

Prior Efforts

Allocation of CAP project water has been the subject of previous notices published in the *Federal Register* (See, e.g., 37 FR 28082, December 20, 1972; 40 FR 17297, April 18, 1975; 41 FR 45883, October 18, 1976; 45 FR 52938, August 8, 1980; 45 FR 81265, December 10, 1980; 48 FR 12446, March 24, 1983; 56 FR 29704, June 28, 1991; 57 FR 4470, February 5, 1992; and 57 FR 483884, October 23, 1992).

Bruce Babbitt,

Secretary of the Interior.

[FR Doc. 99-19558 Filed 7-29-99; 8:45 am]

BILLING CODE 4310-10-M

DEPARTMENT OF THE INTERIOR**Bureau of Reclamation****Allocation of Water Supply and
Expected Long-Term Contract
Execution, Central Arizona Project,
Arizona**

AGENCY: Bureau of Reclamation,
Interior.

ACTION: Notice of intent and public
scoping meetings.

SUMMARY: Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of NEPA, the Bureau of Reclamation (Reclamation) proposes to prepare an environmental impact statement (EIS) concerning proposed modifications to previous Central Arizona Project (CAP) water allocation decisions. Reclamation is initiating public scoping for the proposed NEPA document and will be conducting scoping meetings pursuant to section 102(2)(C) of NEPA.

The Department anticipates it will reallocate and offer contracts for certain quantities of CAP water in connection with (1) settlement discussions arising out of operation of the CAP; (2) settlement discussions arising from legal claims involving the Gila River Indian Community (GRIC) and the San Carlos Apache Tribe (San Carlos); and (3) negotiations regarding implementation of the 1982 Southern Arizona Water Rights Settlement Act.

DATES: Three scoping meetings will be held to solicit comments on issues that should be addressed in the EIS:

September 14, 1999, from 1:00–3:30
p.m.

National YWCA Leadership
Development Center, 9440 N. 25th
Avenue, Phoenix, Arizona 85021–
2789.

September 15, 1999 from 6:30–9:00 p.m.
Francisco Grande Resort Ballroom,
26000 Gila Bend Highway, Casa
Grande, Arizona 85222.

September 16, 1999, from 1:00–3:30
p.m.

Tucson Community Center, Maricopa-
Mojave Room, 260 S. Church,
Tucson, Arizona 85701.

At each meeting, Reclamation will make a short presentation. Oral comments from the audience will then be accepted. A court reporter will prepare a written record of all comments made.

Hearing impaired, visually impaired, and/or mobility impaired persons planning to attend the meeting(s) may arrange for necessary accommodations by calling Ms. Janice Kjesbo (602–216–3864; fax 602–216–4006) no later than August 30, 1999.

ADDRESSES: Send written comments concerning the proposal to Mr. Bruce Ellis, Environmental Program Manager, Phoenix Area Office, Bureau of Reclamation, P.O. Box 81169, Phoenix Arizona, 85069–1169. To be most helpful, comments should be received by September 27, 1999. Written comments received by Reclamation become part of the public record associated with this action. Accordingly, such comments (including name, address, or telephone information shown on written correspondence) will be available to requestors of information through the Freedom of Information Act.

FOR FURTHER INFORMATION CONTACT: Questions concerning the process, the proposed action or alternatives, or this notice should be directed to Ms. Sandra Eto, Environmental Resource Management Division, Phoenix Area Office, Bureau of Reclamation, P.O. Box 81169, Phoenix, Arizona 850689–1169; telephone (602) 216–3857. To be placed on a mailing list for any subsequent information, please write or telephone Ms. Janice Kjesbo, Environmental Resource Management Division, Phoenix Area Office (see address above), telephone (602) 216–3854 or fax (602) 216–4006.

SUPPLEMENTARY INFORMATION: Reclamation proposes to modify existing allocations of CAP water under terms consistent with ongoing settlement discussions regarding operation of the CAP, the status of CAP water, and resolution of outstanding Indian water rights claims. In connection with preparation of the EIS,

Reclamation will analyze the environmental consequences of a proposed action that allocates and offers contracts for CAP water. This action is consistent with contemplated reallocation of CAP water that has emerged from extensive discussions among settlement parties.

Environmental analysis of the proposed reallocation does not preclude additional adjustments being made to the final reallocations, depending upon the course of negotiations.

In addition to the proposed action (i.e. reallocation of CAP water based upon current settlement negotiations), Reclamation intends to develop and evaluate alternative allocation scenarios as part of its NEPA analysis. These "action" alternatives will identify other reallocation and contracting scenarios the Secretary of the Interior (Secretary) could implement in the absence of settlement. Thus far, three alternative reallocation scenarios are being considered for inclusion in the EIS. These alternatives could be modified, and/or other alternatives developed based upon input received during the scoping period.

CAP water, estimated for these purposes to be 1,415,000 acre-feet¹ (AF) of primarily Colorado River water available for use within the Project service area, is divided into three basic categories. The majority of the water in each of these categories has been allocated and contracted; however, some in each category remains unallocated and/or uncontracted. The categories can be described as follows: Water previously allocated for use by municipal and industrial (M&I) entities (620,678 AF); water allocated for "Federal purposes" (453,224 AF, the great majority of which is under contract to Indian tribes);² and water previously allocated for use by non-Indian agricultural (NIA) districts, consisting of the CAP water supply that remains after water in the other two categories has been contracted (for the purposes of this notice, the amount of water in this NIA category is estimated to be 341,098 AF³). The following are

assumed to occur or pertain to the proposed action and all three action alternatives currently under consideration:

a. 17,800 AF of Indian priority water would be allocated and contracted to GRIC. This represents CAP water that was previously allocated and contracted to the Harquahala Valley Irrigation District (HVID) but relinquished in 1992 to the Secretary for use in the settlement of water rights claims of Indian tribes having claims to the water in the Salt and Verde River system (which is already included in the "Federal purposes" category);

b. an estimated 18,600 AF of NIA priority water would be allocated and contracted to GRIC, in accordance with the "Settlement Agreement Among the Gila River Indian Community, Roosevelt Water Conservation District, and the United States of America (May 10, 1999)." This represents CAP water previously allocated and contracted to the Roosevelt Water Conservation District but relinquished in 1992 to the Secretary to hold for the use and benefit of GRIC (which is already included in the "Federal purposes" category);

c. 17,000 AF of M&I category water previously allocated to ASARCO, Inc., that is anticipated to be voluntarily assigned to GRIC as part of a settlement of GRIC water rights claims;

d. the NIA category includes an estimated 43,654 AF that has been or is anticipated to be assigned to several cities within Maricopa County through agreements with the Hohokam Irrigation and Drainage District (HIDD); and

e. with the exception of the water previously allocated to HVID, all CAP water would retain its current priority (which determines the order of priority in reducing deliveries during times of shortages on the Colorado River).

Proposed Action and Action Alternatives. Following are descriptions of actions—in addition to those identified above—that are contemplated to occur under the proposed action and the three alternatives currently being considered:

A. Proposed Action

1. Water allocated for M&I use would total 603,678 AF (which represents 620,678 AF less 17,000 AF of ASARCO water described in "c" above). An

settlement parties disagree on the exact numbers associated with water in this category. These differences are due to the order of the calculations made and other assumptions used. Use of specific numbers in this notice is not meant to imply a degree of precision that does not exist, and it should be noted the various amounts of water attributed to the NIA category in this notice are estimates for purposes of describing alternative reallocation scenarios.

amount of 65,647 AF within this category, that is currently uncontracted, would be reallocated to M&I entities after consultation with the State of Arizona, Department of Water Resources (ADWR). CAP M&I water service subcontracts would be offered to these allottees.

2. Water allocated for NIA use would be reduced by an estimated 200,000 AF. This water would be reallocated for Federal purposes. Of the estimated 141,098 AF remaining in the NIA category, 97,444 AF would be reserved for use by non-Indian agricultural or M&I entities under a process to be developed. The remaining 43,654 AF represents the water associated with HIDD that has been or is anticipated to be assigned to several Maricopa County cities (see "d" above).

3. Water allocated for Federal purposes would be increased by an estimated 200,000 AF from reallocation of water from the NIA category described in A.2. above. This water would be contracted as follows: 102,000 AF to GRIC; 28,200 AF to the Tohono O'odham Nation; and 69,800 AF reserved by the Secretary for use in facilitating future Indian water rights settlements.

B. Alternative #1

1. Water in the M&I category would be handled the same as under the Proposed Action. The 65,647 AF that is currently uncontracted would be reallocated and contracted as described under the Proposed Action.

2. The amount of water in the NIA category would not change from present conditions (estimated for purposes of this action to be 341,098 AF); however, an estimated 112,578 AF of water in this category would be made available for use by non-Indian agricultural and/or M&I entities under a process to be developed. This amount is an estimate of that portion of water within the NIA category for which allocations were made in 1983, but for which no contracts were executed. No change in status would occur to the remaining estimated 228,520 AF in the NIA category.

3. An estimated amount of 1,518 AF of Indian priority water already held for Federal purposes (originally allocated to HVID) would be allocated and contracted to the Tonto Apache and Camp Verde Apache tribes.

C. Alternative #2

1. Water allocated for M&I use would be reduced by 65,647 AF, the amount within this category that is currently uncontracted. This water would be reallocated for Federal purposes (see

¹ The 1,415,000 acre-foot amount is an agreed to approximation of the number of acre-feet of Colorado River water available in a normal year for diversion and use by the CAP, after deducting estimated system losses.

² In a Federal Register notice (48 FR 12446, March 24, 1983), the Secretary allocated 638,823 AF of CAP water for M&I purposes, and 309,828 AF of CAP water to Indian tribes in central Arizona. Subsequent settlements of Indian water rights and reallocations of CAP water increased the total water for "Federal purposes" to 453,224 AF—18,145 AF of which came from the M&I category.

³ The calculation of amounts of water with regard to the NIA category varies; analysts among the

C.3. below). The water remaining in this category would be 538,031 AF (which includes a reduction of 17,000 acre-feet of ASARCO water; see "c" above).

2. Water allocated for NIA use would be reduced by an estimated 28,665 AF. This estimate represents NIA water previously allocated to Queen Creek Irrigation District (ID), Chandler Heights Citrus ID, San Tan ID and Tonopah ID. In addition, as in Alternative #1, an estimated 112,578 AF of water would be made available for use by non-Indian agricultural and/or M&I entities under a process to be developed. No change in status would occur to the remaining estimated 199,855 AF in this category.

3. The amount of CAP water available for Federal purposes would be increased by an estimated 94,312 AF as a result of the reallocations described in C.1 and C.2 above. The 65,647 AF from the M&I category would be contracted as follows: 20,000 AF to GRIC; 28,200 AF to Tohono O'odham Nation; 3,947 AF to

San Carlos; and 13,500 AF to the Navajo and Hopi tribes. The estimated 28,665 AF from the NIA category would be contracted as follows: 9,000 AF to GRIC; and an additional 19,665 AF to San Carlos. In addition, as in Alternative #1, an estimated amount of 1,518 AF already held for Federal purposes would be allocated and contracted to the Tonto Apache and Camp Verde Apache tribes.

D. Alternative #3

1. Changes to amounts of water in the M&I category would be as described in Alternative #2.

2. Water allocated for NIA use would be reduced by an estimated 297,444 AF. An estimated 43,654 AF associated with HIDD would remain in this category (see "d" above).

3. The amount of water available for Federal uses would be increased by an estimated 272,091 AF as a result of the reallocations described in D.1 and D.2 above. The 65,647 AF from the M&I

category would be contracted as under Alternative #2 (20,000 AF to GRIC; 28,200 AF to Tohono O'odham Nation; 3,947 AF to San Carlos; and 13,500 AF to the Navajo and Hopi tribes). An estimated 206,444 AF reallocated from the NIA category would be distributed as follows: 82,000 AF would be contracted to GRIC, and 124,444 AF would be reserved by the Secretary for future Federal purposes. As in Alternatives #1 and #2, an estimated 1,518 AF would be allocated and contracted to the Tonto Apache and Camp Verde Apache tribes.

4. The remaining 91,000 AF of water reallocated from the NIA category described in D.2 above would be reserved by the Secretary for as yet to be determined non-Federal users.

Following is a table that summarizes the estimated total number of AF that would comprise each pool of CAP water, by alternative:

Cap water category	Current condition	Proposed action	Alternative #1	Alternative #2	Alternative #3
M&I category	620,678	603,678	603,678	538,031	538,031
NIA category	341,098	141,098	341,098	312,433	43,654
Held for "Federal purposes"	453,224	670,224	470,224	564,536	742,315
Held for "non-Federal purposes"					91,000
Total (in AF):	1,415,000	1,415,000 AF	1,415,000	1,415,000	1,415,000

In addition to the proposed action and the three action alternatives, Reclamation will also evaluate environmental consequences that are anticipated to occur in the absence of the proposed action (the no Federal action). By definition, the no Federal action alternative means that no water would be reallocated and no new contracts would be signed. Currently, uncontracted water from the previous CAP allocations, including 65,647 AF of M&I category water, and that portion of the NIA pool which has either been declined (about 112,578 AF) or considered to be relinquished (subject to Secretarial consent) from four non-Indian irrigation districts (about 28,665 AF), is delivered by the Central Arizona Water Conservation District to entities through two-party excess water agreements. The United States is challenging these agreements in ongoing litigation regarding operation of the CAP. For purposes of this analysis it is assumed that under the no Federal action scenario, this practice would continue pending resolution of the ongoing litigation.

Reclamation is circulating this notice in anticipation of considerable public interest and the need to ensure that all

relevant issues are evaluated in the EIS. Reclamation will consult other Federal, State, and local agencies with specific expertise regarding environmental impacts related to the project.

Dated: August 20, 1999.

Robert Johnson,

Regional Director.

[FR Doc. 99-22195 Filed 8-25-99; 8:45 am]

BILLING CODE 4310-04-P

CENTRAL ARIZONA PROJECT WATER REALLOCATION PUBLIC SCOPING MEETINGS

PURPOSE

Reclamation will prepare an environmental impact statement (EIS) covering proposed modifications to previous allocations of CAP water to municipalities, agricultural districts and Indian tribes. Reclamation will hold three meetings to obtain public input regarding alternatives to be considered, issues to be addressed, and resource impacts to be evaluated in the EIS. You are invited to attend these meetings, which will be held September 14-16, 1999 (see below).

Under the proposed action, Reclamation would implement final allocation of CAP water consistent with terms of a settlement currently being considered by Reclamation, Central Arizona Water Conservation District, Arizona Department of Water Resources, non-Indian irrigation districts, and several Indian tribes. The EIS will also include alternative allocation scenarios that could be undertaken in the absence of settlement. Pursuant to the National Environmental Policy Act, as amended, Reclamation requests public input regarding the range of alternatives being considered and scope of issues and impacts that should be addressed in the EIS. An information packet containing additional information on the allocation alternatives currently being considered may be obtained by contacting Ms. Janice Kjesbo at Reclamation's Phoenix Area Office, PO Box 81169, Phoenix, AZ 85069-1169 (602-216-3864; or fax 602-216-4006).

WHEN & WHERE

<u>PHOENIX AREA</u>	<u>CASA GRANDE AREA</u>	<u>TUCSON AREA</u>
September 14, 1999 1:00-3:30 p.m. National YWCA Leadership Development Center 9440 N. 25th Avenue Phoenix, Arizona	September 15, 1999 6:30-9:00 p.m. Francisco Grande Resort Ballroom 26000 Gila Bend Highway Casa Grande, Arizona	September 16, 1999 1:00-3:30 p.m. Tucson Community Center Maricopa-Mojave Room 260 S. Church Tucson, Arizona

At each meeting, Reclamation will make a short presentation. Oral comments from the audience will then be accepted. A court reporter will prepare a written record of all comments made.

Hearing impaired, visually impaired, and/or mobility impaired persons planning to attend this meeting may arrange for necessary accommodations by calling Ms. Kjesbo (602-216-3864; fax 602-216-4006) no later than August 30, 1999.

Written comments will also be accepted. To ensure consideration, please send them by September 24, 1999, to Mr. Bruce Ellis, Chief, Environmental Resource Management Division, Reclamation Phoenix Area Office, PO Box 81169, Phoenix AZ 85069-1169. Written comments received by Reclamation become part of the public record associated with this action, and will be available to requestors of information through the Freedom of Information Act.

Table 1. Newspapers in which notice of the public scoping meetings was published

NEWSPAPER	Date Published
Arizona Daily Star, Tucson	08/26/99
Arizona Daily Sun, Flagstaff	08/27/99
Arizona Republic, Phoenix	08/26/99
Arizona Silver Belt, Globe/Miami	09/01/99
Casa Grande Dispatch, Casa Grande	08/26/99
Coolidge Examiner, Coolidge	09/01/99
Copper Country News, Globe/Miami	08/31/99
Green Valley News & Sun, Green Valley	08/27/99
Navajo Times, Window Rock/Navajo Nation	08/26/99
Navajo-Hopi Observer, Flagstaff/Navajo-Hopi	09/01/99
Payson Roundup, Payson	08/31/99
San Carlos Moccasin, Globe/Miami	09/01/99
Sierra Vista Herald, Sierra Vista	08/27/99
Tribune Newspapers, East Maricopa County	08/26/99
Tucson Citizen, Tucson	08/26/99
Verde Independent, Cottonwood/Camp Verde	08/27/99

APPENDIX B

Scoping Meeting Presentation and Handouts

**PUBLIC SCOPING FOR PROPOSED ALLOCATION OF
WATER SUPPLY AND EXPECTED LONG-TERM CONTRACT EXECUTION,
CENTRAL ARIZONA PROJECT**

REVISED 9/8/99¹ (see bolded italicized print)

INTRODUCTION. Consistent with Council on Environmental Quality regulations implementing the National Environmental Policy Act of 1969, as amended (**NEPA**), Bureau of Reclamation (Reclamation), intends to prepare an environmental impact statement (EIS) related to proposed modification of existing **allocations** of Central Arizona Project (CAP) water. We are requesting public input regarding the range of alternatives being considered and scope of issues and impacts that should be addressed in the **EIS**. This information sheet has been prepared to provide background information regarding the proposed action and alternatives that are currently being considered for inclusion in the **EIS**.

BACKGROUND. The **CAP** was authorized as part of the Colorado River Basin Project Act of 1968 (Public Law 90-537). The CAP is a multi-purpose water project which develops water for municipal and industrial (M&I) use, as well as non-Indian agricultural (**NIA**) and Indian uses, in **central** and southern Arizona. The CAP delivers Arizona's Colorado River water through a system of pumping plants, aqueducts, dams and reservoirs.

In 1982, the Department of the Interior, through Reclamation, prepared an EIS to address the potential impacts associated with the allocation of CAP water for use by M&I water users, NIA users, and Indian tribes (Water Allocations and Water Service Contracting EIS, INT FES-82-7, filed March 19, 1982/**Record** of Decision, dated February 10, 1983). The Secretary of the Interior (Secretary) published his final decision regarding CAP water allocations² on March 24, 1983 (48 FR 12446). In that notice, the Secretary allocated 638,823 acre-feet (AF) of CAP water per year for use by M&I users, and 309,828 AF of CAP water per year for use by Indian users. The CAP water supplies remaining after the M&I and Indian entities used their entitlements were allocated for use by NIA users on a percentage basis. Each of 23 NIA water users' CAP water allotment was stated as a percentage of the total available NIA supply, based upon CAP eligible acres of the agricultural users after adjusting to reflect any available surface water supplies.

Several actions have been taken since 1983 that changed the amounts allocated to both the M&I and Indian water use categories. The amount of water allocated for tribal use has increased as a result of several water settlements. In 1985, the United States secured Colorado River water entitlement from the Yuma Mesa Division of the Gila Project, in the Yuma area, for use in a

'Due to an oversight, CAP water allocated for use by New Magma Irrigation and Drainage District, considered to be relinquished through bankruptcy proceedings, was not characterized as such in the original information packet. This revised version corrects that oversight.'

²All allocations are annual quantities.

water rights settlement with the Ak Chin Indian Community. This resulted in a net increase to the water available for Federal purposes (after deducting estimated system losses) of 47,500 AF.

In 1988, the Roosevelt Water Conservation District (RWCD) in Phoenix, Arizona, relinquished 5,000 AF of its CAP NIA allocation for use in a water rights settlement with the Salt River Pima Maricopa Indian Community (SRPMIC), adding 5,000 AF to the category of water available for Federal purposes. Then, in 1992, RWCD assigned its remaining allotment to the Secretary for use and benefit of the Gila River Indian Community (GRIC). (For settlement negotiations and NEPA purposes, this amount is assumed to be 18,600 AF.) These two relinquishments by RWCD resulted in an increase of 23,600 AF of CAP water available for Federal purposes.

In 1990, the United States secured additional Colorado River water entitlement from the Wellton Mohawk Irrigation and Drainage District in Yuma, Arizona, for use in a water rights settlement with SRPMIC. This added an additional net amount of 20,900 AF (after deducting estimated system losses) for Federal purposes.

In 1992, the Harquahala Valley Irrigation District (HVID) relinquished its CAP allotment to the Secretary for use in the Fort McDowell Indian Community Water Rights Settlement Act of 1990 (Title IV of Public Law 101-628), and for use "in the settlement of water rights claims of other Indian tribes having claims to the water in the Salt and Verde River system." HVID's allotment was determined to be equivalent to 33,251 AF, of which an amount of 13,933 AF was converted to Indian priority water³ and assigned to FMIC in 1992; the remaining 19,318 AF continues to be held by the Secretary for use in settlement of water rights claims. (For settlement negotiation and NEPA purposes, it is assumed this amount will be converted to Indian priority water.)

The San Carlos Apache Tribe Water Rights Settlement Act of 1992 (Title XXXVII of Public Law 102-575), as amended, reallocated CAP M&I water previously allocated for use by the City of Globe and Phelps Dodge Corporation (3,480 AF and 14,665 AF, respectively) to the San Carlos Apache Tribe. Subject to final implementation of the Settlement Act, this will add an additional 18,145 AF to the category of water available for Federal purposes.

The result of the above mentioned actions is the addition of 143,396 AF to the "water held for Federal purposes" category, for a current total of 453,224 AF. In addition, with final implementation of the San Carlos Apache Tribe Water Rights Settlement Act, the amount of

³Under the terms of all CAP water service contracts, no user is guaranteed water deliveries or water quality. All contracts provide for reductions in deliveries of CAP water; these reductions are based upon the "priority" assigned to the CAP water allocations. The actual method for reducing deliveries during periods of declared shortages on the Colorado River is more complex; however, generally speaking, during years of water supply shortages, water allocated and contracted for use by Indian tribes and M&I entities would share a first, or highest, priority for Project water supplies. NIA water users have a lower priority and would experience a reduction in deliveries before the higher priority Indian and M&I water (see 48 FR 12446 for a complete description of how shortages are to be handled).

water allocated for use by M&I entities will be reduced by 18,145 AF. Of the 620,678 AF remaining in the M&I water category, there are 65,647 AF for which contracts were offered but not signed.

As mentioned earlier, amounts allocated for use within the NIA water category are based upon percentages of the CAP water supply that remains after water from the other two categories has been contracted. Calculations of the corresponding amounts of water available to the contractors within the NIA category, in terms of exact amounts in AF, vary among the settlement parties. These variations are due to differences in assumptions used and the order of the calculations made. For purposes of quantifying and qualifying the environmental consequences of the proposed action and the alternatives, we are assuming the total amount of CAP water available in a normal year, for diversion and use after deducting for estimated system losses, is 1,415,000 AF. This is an amount the various settlement parties have agreed upon for negotiation purposes. Therefore, for NEPA related purposes, the amount of water currently available for NIA use is estimated to be 341,098 AF (1,415,000 AF less the sum of 620,678 AF plus 453,224 AF). Use of specific numbers in this information sheet, and the EIS itself, is not meant to imply a degree of precision that does not exist, and it should be noted the various amounts of water attributed to the NIA category are estimates for purposes of describing alternative reallocation scenarios. Amounts that include water from the NIA category will be designated as being an "estimate," with the exception of the 33,251 acre- foot amount of NIA water previously allocated for use by HVID, which was solidified as an exact amount.

Within the NIA category, there are an estimated 112,578 AF for which allocations were declined or contracts were originally offered but not signed. There are an additional estimated **44,493** AF that are considered to have been relinquished (subject to consent of the Secretary) by *five* non-Indian irrigation districts: Queen Creek Irrigation District (ID), Chandler Heights Citrus ID, San Tan ID, Tonopah ID, and *New Magma Irrigation and Drainage District*. In addition, there are an estimated 43,654 AF that have been or are anticipated to be assigned to several cities within Maricopa County through agreements with the Hohokam Irrigation and Drainage District (HIDD).

PROPOSED ACTION and ACTION ALTERNATIVES - The following alternatives have been developed by Reclamation staff, and should be considered preliminary in nature. The alternatives are intended to "bracket" the range of reasonable options that could be undertaken by the Secretary (or his designee), either pursuant to or outside of a negotiated settlement agreement.

There are certain actions that are assumed to occur under the proposed action and all "action" alternatives that are currently being considered for inclusion in the EIS. They are as follows:

- a. An amount of 17,800 AF of CAP water formerly allocated to HVID, now with an Indian priority, would be allocated and contracted to GRIC. As mentioned above, this represents CAP water that was previously allocated and contracted to the Harquahala Valley Irrigation District

(HVID) but relinquished in 1992 to the Secretary for use in the settlement of water rights claims of Indian tribes having claims to the water in the Salt and Verde River system;

b. The estimated 18,600 AF of NIA priority water previously allocated to RWCD and held by the United States for use and benefit of GRIC would be allocated and contracted to GRIC, in accordance with the "Settlement Agreement Among the Gila River Indian Community, Roosevelt Water Conservation District, and the United States of America (May 10, 1999)";

c. M&I category water previously allocated for use by ASARCO, Inc., in the amount of 17,000 AF, is anticipated to be voluntarily assigned to GRIC as part of a settlement of GRIC water rights claims; and

d. It is assumed the water previously allocated for use by HVID that continues to be held by the Secretary for use "in the settlement of water rights claims of other Indian tribes having claims to the water in the Salt and Verde River system" will be converted to Indian priority water. All other CAP water would retain its current priority (which determines the order of priority in reducing deliveries during times of shortages on the Colorado River).

A. PROPOSED ACTION. Under the proposed action in the EIS, Reclamation would modify existing allocations of CAP water under terms consistent with extensive ongoing settlement discussions that are occurring regarding operation of the CAP, the status of CAP water, and resolution of outstanding Indian water rights claims. These settlement discussions involve Reclamation, Central Arizona Water Conservation District (CAWCD), State of Arizona, Arizona Department of Water Resources (ADWR), NIA irrigation districts, and several Indian tribes. Environmental analysis of the proposed reallocation does not preclude additional adjustments being made to the final reallocations, depending upon the course of negotiations. Reclamation would analyze any adjustments as part of the NEPA compliance process, as appropriate.

Modifications to existing allocations under the proposed action would be as follows (in addition to those already identified as occurring under all action alternatives):

1. The 65,647 AF that is currently uncontracted within the M&I category would be reallocated to M&I entities after consultation with ADWR. CAP M&I water service subcontracts would be offered to these allottees. (The 17,000 AF of ASARCO water would be voluntarily assigned to GRIC, as described in "a" above.)

2. Water allocated for NIA use would be reduced by an estimated 200,000 AF, which would be reallocated for Federal purposes. Of the estimated 141,098 AF remaining in the NIA category, 97,444 AF would be reserved for use by non-Indian agricultural or M&I entities under a process to be developed. The remaining 43,654 AF represents the water associated with HIDD that has been or is anticipated to be assigned to several Maricopa County cities (as described above).

3. Water allocated for Federal purposes would be increased by an estimated 200,000 AF from reallocation of water from the NIA category described in A.2. above. This water would be contracted as follows: 102,000 AF to GRIC; 28,200 AF to the Tohono O'odham Nation; and 69,800 AF reserved by the Secretary for use in facilitating future Indian water rights settlements.

B. ACTION ALTERNATIVE #1. This alternative would result in a minimal amount of change to the existing allocations, as follows:

1. Water in the M&I category would be handled the same as described for the Proposed Action;
2. The amount of water in the NIA category would remain at an estimated 341,098; however, an estimated 112,578 AF of water in this category would be made available for use by non-Indian agricultural and/or M&I entities under a process to be developed (this amount represents that portion of water within the NIA category for which allocations were made in 1983, but for which no contracts were executed);
3. An estimated amount of 1,518 AF of Indian priority water already held for Federal purposes (originally allocated to HVID) would be allocated and contracted to the Tonto Apache and Yavapai Apache tribes.

C. ACTION ALTERNATIVE #2. This alternative would result in reductions to the existing M&I and NIA categories, as follows:

1. 65,647 AF of M&I category water would be reallocated for Federal purposes (as described in C.3. below). This 65,647 AF represents the currently uncontracted water previously allocated for M&I use;
2. An estimated **44,493** AF (representing NIA water previously allocated to Queen Creek ID, Chandler Heights Citrus ID, San Tan ID, Tonopah ID *and New Magma Irrigation and Drainage District*) would be reallocated for Federal purposes (as described in C.3 below). In addition, as in Alternative #1, an estimated 112,578 AF of water would be made available for use by non-Indian agricultural and/or M&I entities under a process to be developed;
3. The amount of CAP water available for Federal purposes would be increased by an estimated **110,140** AF as a result of the reallocations described in C.1 and C.2 above. The 65,647 AF from the M&I category would be contracted as follows: 20,000 AF to GRIC; 28,200 AF to Tohono O'odham Nation; 3,947 AF to San Carlos Apache Tribe; and 13,500 AF to the Navajo Nation and Hopi Tribe. The estimated **44,493** AF from the NIA category would be contracted as follows: **24,828** AF to GRIC; and an additional 19,665 AF to San Carlos Apache Tribe. In addition, as in Alternative #1, an estimated amount of 1,518 AF already held for Federal purposes would be allocated and contracted to the Tonto Apache and Yavapai Apache tribes.

D. ACTION ALTERNATIVE #3. This alternative would affect the M&I category to the same degree as under Alternative #2, but there would be a greater reduction to the existing NIA category. This alternative results in the greatest degree of change from the existing conditions, as follows:

1. Changes to amounts of water in the M&I category would be as described in Alternative #2.
2. An estimated 297,444 AF of water previously allocated for NIA use would be reallocated and held by the Secretary (as described in D.3 and D.4 below). The amount remaining in this category would represent the estimated 43,654 AF associated with HIDD;
3. The amount of water available for Federal uses would be increased by an estimated 272,091 AF as a result of the reallocations described in D.1 and D.2 above. The 65,647 AF from the M&I category would be contracted as under Alternative #2 (20,000 AF to GRIC; 28,200 AF to Tohono O'odham Nation; 3,947 AF to San Carlos Apache Tribe; and 13,500 AF to the Navajo Nation and Hopi Tribe). An estimated 206,444 AF reallocated from the NIA category would be distributed as follows: 82,000 AF would be contracted to GRIC, and 124,444 AF would be reserved by the Secretary for future Federal purposes. As in Alternatives #1 and #2, an estimated 1,518 AF would be allocated and contracted to the Tonto Apache and Yavapai Apache tribes.
4. The remaining 91,000 AF of water reallocated from the NIA category described in D.2 above would be reserved by the Secretary for as yet to be determined non-Federal users.

Following is a table that summarizes the estimated total number of AF that would comprise each pool of CAP water, by alternative:

CAP WATER CATEGORY	CURRENT CONDITION/ NO ACTION	PROPOSED ACTION	ALTERNATIVE #1	ALTERNATIVE #2	ALTERNATIVE #3
M&I category	620,678	603,678	603,678	538,031	538,031
NIA category	341,098	141,098	341,098	296,605	43,654
Federal (Indian) category	453,224	670,224	470,224	580,364	742,315
held for "non-Federal purposes"	0	0	0	0	91,000
Total (in AF):	1,415,000	1,415,000	1,415,000	1,415,000	1,415,000

E. NO FEDERAL ACTION. In addition to the proposed action and the three action alternatives, Reclamation will also evaluate environmental consequences that are anticipated to

occur in the absence of the proposed action (the no Federal action). By definition, the no Federal action alternative means that no water would be reallocated and no new contracts would be signed. Currently, uncontracted water from the previous CAP allocations, including 65,647 AF of M&I category water, and that portion of the NIA pool which has either been declined (about 112,578 AF) or considered to be relinquished (subject to Secretarial consent) from *five* non-Indian irrigation districts (about **44,493** AF), is available for delivery by CAWCD to entities through two-party excess water agreements. The United States is challenging these agreements in ongoing litigation regarding operation of the CAP. For purposes of this analysis it is assumed that under the no Federal action scenario, this practice would continue pending resolution of the ongoing litigation.

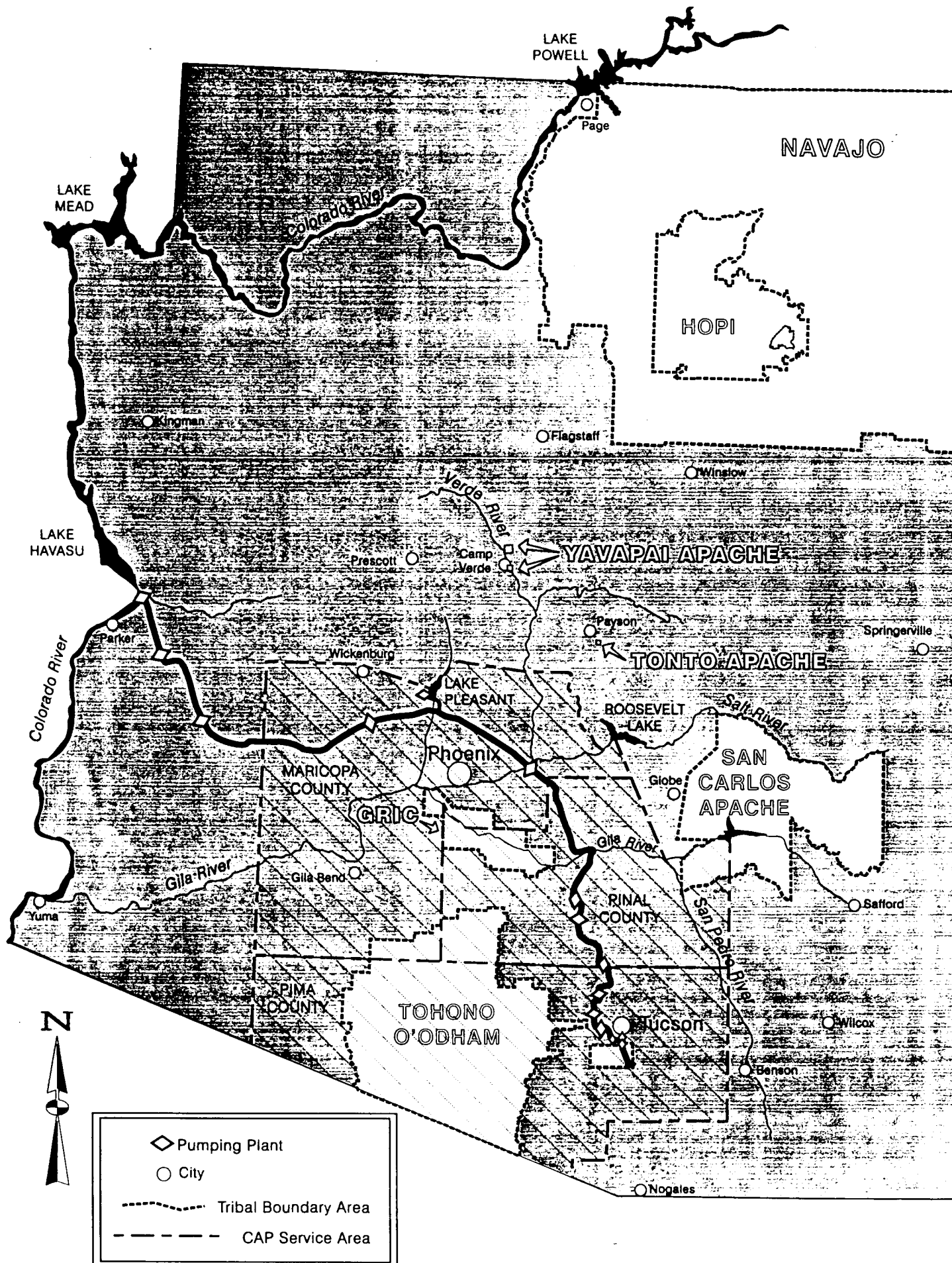
ENVIRONMENTAL ISSUES - Thus far, following are environmental issues and concerns that are anticipated to be evaluated in the draft EIS: Potential impacts to biological and cultural resources, evaluated at a regional level; potential impacts to surface- and ground-water quality and quantity within the 3-county service area; potential impacts to the agricultural economy of the 3-county area; potential impacts to urban growth on a regional basis within the 3-county area; and potential impacts from delivery and use of water by Indian tribes and communities.

PUBLIC INPUT REQUESTED - Interested persons, organizations and agencies are encouraged to attend any of the public scoping meetings, or submit written comments regarding the proposed action, alternatives being considered, and the environmental issues to be addressed in the draft EIS. The three scoping meetings will be held at the following locations and times:

<u>PHOENIX AREA</u>	<u>CASA GRANDE AREA</u>	<u>TUCSON AREA</u>
September 14, 1999 1:00-3:30 p.m. National YWCA Leadership Development Center 9440 N. 25th Avenue Phoenix, Arizona	September 15, 1999 6:30-9:00 p.m. Francisco Grande Resort Ballroom 26000 Gila Bend Highway Casa Grande, Arizona	September 16, 1999 1:00-3:30 p.m. Tucson Community Center Maricopa-Mojave Room 260 S. Church Tucson, Arizona

Send written scoping comments to Mr. Bruce Ellis, Environmental Program Manager, Phoenix Area Office, Bureau of Reclamation, P.O. Box 81169, Phoenix Arizona, 85069-1169. To be most helpful, comments should be received by September 27, 1999. Written comments received by Reclamation become part of the public record associated with this action. Accordingly, such comments (including name, address, or telephone information shown on written correspondence) will be available to requestors of information through the Freedom of Information Act.

Questions concerning the information provided in this packet should be directed to Ms. Sandra Eto at Reclamation's Phoenix Area Office, P.O. Box 81169, Phoenix AZ 85069-1169, telephone (602) 216-3857.



CENTRAL ARIZONA PROJECT

BUREAU OF RECLAMATION - ENVIRONMENTAL IMPACT STATEMENT
SCOPING COMMENT SHEET

ALLOCATION OF WATER SUPPLY and EXPECTED LONG-TERM CONTRACT EXECUTION,
CENTRAL ARIZONA PROJECT, ARIZONA



Changes/additions that should be made to the alternatives being considered, and why:



Issues or concerns that should be included in the environmental impact statement, and why:



Other comments or questions:

Written comments will be accepted until September 27, 1999. Please mail in your comments to the Phoenix Area Office, ATTN: PXAO-1500, Bureau of Reclamation, P.O. Box 81169, Phoenix AZ 85069-1169. All comments received by Reclamation become part of the public record associated with this action. Accordingly, your comments (including name, address, or telephone information shown on written correspondence) will be available to requestors of information through the Freedom of Information Act.

(Please check all appropriate boxes)

- ☐ Please send me a copy of the draft environmental impact statement when it becomes available (please print):

Name: _____

Street Address: _____

City, State & Zip: _____

- ☐ Please put me on your mailing list (please print):

Name: _____

Street Address: _____

City, State & Zip: _____

- ☐ Please take me OFF your mailing list (please print):

Name: _____

Street Address: _____

City, State & Zip: _____

For more information, please contact Ms. Sandra Eto, at the Bureau of Reclamation address above, (602) 216-3857

Prepared by:



September 14, 1999

Prepared for:

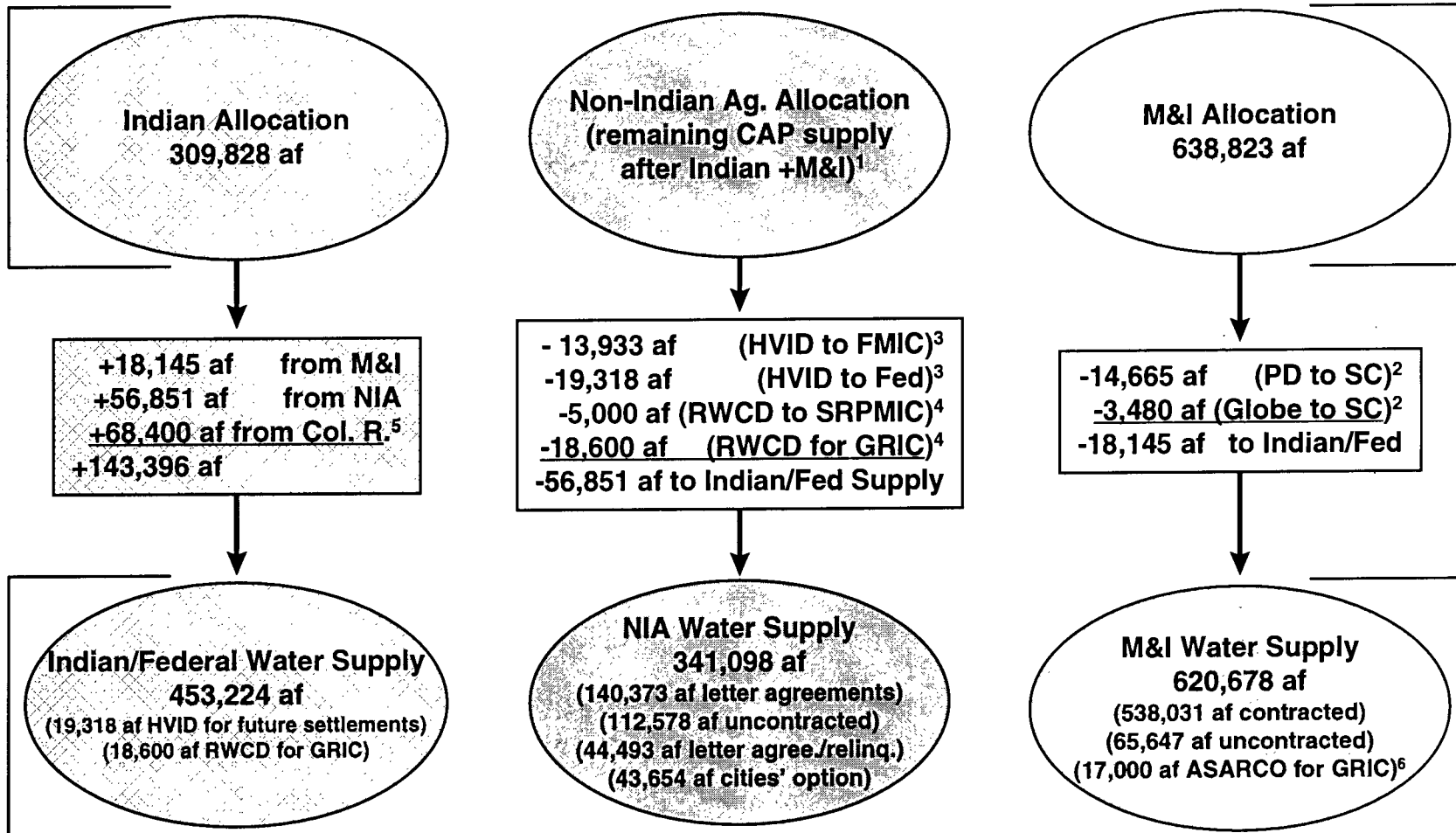


FIGURE 1

HISTORY OF CURRENT CAP WATER SUPPLIES (1983 Record of Decision to Present)

1983 SOI - ROD

1999 Status



¹NIA allocations were defined as percentages of CAP supply remaining after Indian and M&I allocation. It is assumed that the NIA supply is approximately 341,098 af in 1999.

²Subject to implementation of the San Carlos Apache Tribe Water Rights Settlement Act of 1992.

³Pursuant to Fort McDowell Indian Community Water Rights Settlement Act of 1990.

⁴Assigned pursuant to 1988 Salt River Pima Maricopa Indian Community settlement agreement and 1992 GRIC/RWCD agreement.

⁵Colorado River sources provided from Yuma Mesa Division in the 1985 Ak Chin Indian Community settlement and from Wellton-Mohawk IDD in the 1990 SRPMIC settlement.

⁶Agreement to assign 17,000 af from ASARCO to GRIC subject to SOI consent.

Prepared by:



September 14, 1999

Prepared for:



FIGURE 2

PROPOSED ACTION ALTERNATIVE

Distribution of CAP Water Supplies

1999 Status

Indian/Federal Water Supply
453,224 af
(19,318 af HVID for future settlements)

NIA Water Supply
341,098 af
(140,373 af letter agreements)
(112,578 af uncontracted)
(44,493 af letter agree./relinq.)¹
(43,654 af cities' option)²

M&I Water Supply
620,678 af
(538,031 af contracted)
(65,647 af uncontracted)
(17,000 af ASARCO to GRIC)

Proposed Action

18,600 af RWCD to GRIC
17,800 af HVID to GRIC
1,518 af HVID future settlements
37,918 af Existing Supply

+17,000 af M&I to GRIC
+102,000 af NIA to GRIC
+28,200 af NIA to TO'ON
+69,800 af NIA future settlements
+217,000 af Additional Supply

- 44,493 af (letter agree./relinq.)
-112,578 af (uncontracted)
-42,929 af (letter agreements)
-200,000 af Indian/Federal

-17,000 af (ASARCO to GRIC)

Resulting Supplies

Indian/Federal Water Supply
670,224 af

NIA Water Supply
141,098 af
(97,444 af reserved for
NIA or M&I use)
(43,654 af cities' option)

M&I Water Supply
603,678 af
(538,031 af contracted)
(65,647 af uncontracted,
reallocated to M&I users)

¹Four irrigation districts (Queen Creek, Chandler Heights Citrus, San Tan, and Tonopah) are considered to have relinquished their allotments subject to SOI consent.

¹New Magma IDD relinquished through judicial proceedings in 1995.

²Pursuant to 1993 Hohokam ID Agreement.

Prepared by:



September 14, 1999

Prepared for:



FIGURE 3

ALTERNATIVE 1

Distribution of CAP Water Supplies

1999 Status

Indian/Federal Water Supply
453,224 af
(19,318 af HVID for future settlements)

NIA Water Supply
341,098 af
(140,373 af letter agreements)
(112,578 af uncontracted)
(44,493 af letter agree./relinq.)¹
(43,654 af cities' option)²

M&I Water Supply
620,678 af
(538,031 af contracted)
(65,647 af uncontracted)
(17,000 af ASARCO to GRIC)

Alternative 1

18,600 af RWCD to GRIC
17,800 af HVID to GRIC
1,518 af to TA and YA³
37,918 af Existing Supply

+17,000 af M&I to GRIC)
+17,000 af Additional Supply

-17,000 af (ASARCO to GRIC)
-17,000 af to Indian/Federal

Resulting Supply

Indian/Federal Water Supply
470,224 af

NIA Water Supply
341,098 af
(140,373 af letter agreements)
(112,578 af uncontracted)
(44,493 af letter agree./relinq.)¹
(43,654 af cities' option)²

M&I Water Supply
603,678 af
(538,031 af contracted)
(65,647 af uncontracted,
reallocated to M&I users)

¹Four irrigation districts (Queen Creek, Chandler Heights Citrus, San Tan, and Tonopah) are considered to have relinquished their allotments subject to SOI consent.

²New Magma IDD relinquished through judicial proceedings in 1995.

³Pursuant to 1993 Hohokam ID Agreement.

⁴Tonto Apache and Yavapai Apache Tribes.

Prepared by:



September 14, 1999

Prepared for:



FIGURE 4

ALTERNATIVE 2

Distribution of CAP Water Supplies

1999 Status

Indian/Federal Water Supply
453,224 af
(19,318 af HVID for future settlements)

NIA Water Supply
341,098 af
(140,373 af letter agreements)
(112,578 af uncontracted)
(44,493 af letter agree./relinq.)¹
(43,654 af cities' option)²

M&I Water Supply
620,678 af
(538,031 af contracted)
(65,647 af uncontracted)
(17,000 af ASARCO to GRIC)

Alternative 2

18,600 af RWCD to GRIC
17,800 af HVID to GRIC
1,518 af to TA and YA³
37,918 af Existing Supply

+37,000 af M&I to GRIC
+28,200 af M&I to TO'ON
+3,947 af M&I to SC
+13,500 af M&I to Navajo/Hopi
+24,828 af NIA to GRIC
+19,665 af NIA to SC
+127,140 af Additional Supply

- 44,493 af (letter agree./relinq.)

-17,000 af (ASARCO to GRIC)
-65,647 af (uncontracted)
-82,647 af to Indian/Fed

Resulting Water Supply

Indian/Federal Water Supply
580,364 af

NIA Water Supply
296,605 af
(140,373 af letter agreements)
(112,578 af reserved for
future NIA and M&I use)
(43,654 af cities' option)

M&I Water Supply
538,031 af
(538,031 af contracted)

¹Four irrigation districts (Queen Creek, Chandler Heights Citrus, San Tan, and Tonopah) are considered to have relinquished their allotments subject to SOI consent.

²New Magma IDD relinquished through judicial proceedings in 1995.

³Pursuant to 1993 Hohokam ID Agreement.

⁴Tonto Apache and Yavapai Apache Tribes.

Prepared by:



September 14, 1999

Prepared for:



FIGURE 5

ALTERNATIVE 3

Distribution of CAP Water Supplies

1999 Status

Indian/Federal Water Supply
453,224 af
(19,318 af for future settlements)

NIA Water Supply
341,098 af
(140,373 af letter agreements)
(112,578 af uncontracted)
(44,493 af letter agree./relinq.)¹
(43,654 af cities' option)²

M&I Water Supply
620,678 af
(538,031 af contracted)
(65,647 af uncontracted)
(17,000 af ASARCO to GRIC)

Alternative 3

18,600 af RWCD to GRIC
17,800 af HVID to GRIC
1,518 af to TA and YA³
37,918 af Existing Supply

+37,000 af M&I to GRIC
+28,200 af M&I to TO'ON
+3,947 af M&I to SC
+13,500 af M&I to Navajo/Hopi
+82,000 af NIA to GRIC
+124,444 af NIA future settlements
+289,091 af Additional Supply

-140,373 af (letter agreements)
-112,578 af (uncontracted)
- 44,493 af (letter agree./relinq.)
-297,444 af to Indian/Federal

-17,000 af (ASARCO to GRIC)
-65,647 af (uncontracted)
-82,647 af to Indian/Federal

Resulting Supply

+91,000 af NIA for Non-Federal Uses

Indian/Federal Water Supply
742,315 af

NIA Water Supply
43,654 af
(43,654 af cities' option)

M&I Water Supply
538,031 af
(538,031 af contracted)

¹Four irrigation districts (Queen Creek, Chandler Heights Citrus, San Tan, and Tonopah) are considered to have relinquished their allotments subject to SOI consent.

²New Magma IDD relinquished through judicial proceedings in 1995.

³Pursuant to 1993 Hohokam ID Agreement.

⁴Tonto Apache and Yavapai Apache Tribes.

Prepared by:



September 14, 1999

Prepared for:



FIGURE 6

NO ACTION ALTERNATIVE Distribution of CAP Water Supplies

1999 Status

Indian/Federal Water Supply
453,224 af
(19,318 af HVID for future settlements)

NIA Water Supply
341,098 af
(140,373 af letter agreements)
(112,578 af uncontracted)
(44,493 af letter agree./relinq.)¹
(43,654 af cities' option)²

M&I Water Supply
620,678 af
(538,031 af contracted)
(65,647 af uncontracted)
(17,000 af ASARCO to GRIC)

No Action

Resulting Supply

Indian/Federal Water Supply
453,224 af
(19,318 af HVID for future settlements)
(18,600 af RWCD for GRIC)

NIA Water Supply
341,098 af
(140,373 af letter agreements)
(43,654 af cities' option)
(157,071 af "excess water")³

M&I Water Supply
620,678 af
(538,031 af contracted)
(65,647 af "excess water")⁴
(17,000 af ASARCO to GRIC)⁵

¹Four irrigation districts (Queen Creek, Chandler Heights Citrus, San Tan, and Tonopah) are considered to have relinquished their allotments subject to SOI consent.

²New Magma IDD relinquished through judicial proceedings in 1995.

³Pursuant to 1993 Hohokam ID Agreement.

⁴Uncontracted water NIA (44,493 af relinquished and 112,578 af uncontracted) is delivered under two-party "excess water" agreements. The U.S. is challenging these agreements.

⁵Uncontracted M&I water (65,647 af) is delivered under two-party "excess water" agreements. The U.S. is challenging these agreements.

⁶Agreement to assign 17,000 af from ASARCO to GRIC subject to SOI consent.

Prepared by:



September 14, 1999

Prepared for:



FIGURE 7

ARIZONA INDIAN COMMUNITIES Summary for Alternatives (All Quantities in AFA)

INDIAN COMMUNITY OR NATION	CHANGES TO CAP WATER UNDER ALTERNATIVE					
	1983 ROD	CURRENT NO ACTION	PROPOSED ACTION	ALT. #1	ALT. #2	ALT. #3
Gila River	173,100	173,100	155,400	53,400	98,228	155,400
Tohono O'odham	45,800	45,800	28,200	0	28,200	28,200
San Carlos	12,700	30,845 ³	0	0	23,612	3,947
Navajo/Hopi	0	0	0	0	13,500	13,500
Yavapai and Tonto Apache	1,328	1,328	0	1,518	1,518	1,518
Others ¹	76,900	164,233	0	0	0	0
Reserved for Future Settlements	0	37,918	33,400	-37,918 ²	-37,918 ²	86,526
Addition to Indians	-	-	+217,000	+17,000	+127,140	+289,091
Indian Total	309,828	453,224	670,224	470,224	580,364	742,315

1. Includes Ak Chin, Fort McDowell, Pascua Yaqui, Salt River, and Yavapai Prescott Indian Communities.

2. Water reserved for future settlements is allocated to Indian communities or nations in Alternatives 1 and 2.

3. Subject to implementation of the San Carlos Apache Tribe Water Settlement Act of 1992.

DEPARTMENT OF INTERIOR
Bureau of Reclamation

Allocation of Water Supply and Expected Long-Term
Contract Execution
Central Arizona Project

Environmental Impact Statement
SCOPING MEETINGS
Sept. 14, 15, 16, 1999



Schedule (To Date)

- ◆ **Notice in Federal Register**
 - July 30, 1999
- ◆ **Notice of Intent and Scoping Meetings in Federal Register**
 - August 26, 1999
- ◆ **Scoping Meetings**
 - September 14, 15, and 16, 1999
- ◆ **End of Public Scoping Comment Period**
 - September 27, 1999



Background

◆ CAP Water Allocations were made in 1983

- 309,828 af allocated to 12 Indian Tribes/Communities
- 638,823 af allocated to 85 M&I entities
- Remaining supply to 23 irrigation districts

3



Current Distribution of CAP Water

FEDERAL WATER	1983 ROD for Arizona Indians	309,828
	Ak Chin (YMIDD Water Less Losses)	47,500
	SRPMIC (WMIDD Water Less Losses)	20,900
	PD/Globe to SC Apache Tribe (M&I)	18,145
	HVID to Fort McDowell Indian Community	13,933
	HVID Relinquished	19,318
	RWCD to SRPMIC	5,000
	RWCD to Gila River Indian Community	18,600
	Federal Total	453,224
M&I	Existing M&I Contracts	538,031
	ASARCO M&I (1)	12,000
	ASARCO M&I (2)	5,000
	Uncontracted, M&I Priority	65,647
	M&I Total	620,678
NI AG	1992 Reallocation, Uncontracted	112,578
	Irrigation Districts: QC, CHC, ST, T, & NM	44,493
	To Cities (HID)	43,654
	All Other Irrigation Districts	140,373
	Non-Indian Agricultural Total	341,098
Grand Total		1,415,000

4



Purpose

◆ Proposed modifications to previous CAP water allocation decisions based on

- Settlement discussions regarding operation of CAP
- Settlement discussions regarding water rights claims of Gila River Indian Community and San Carlos Apache Tribe
- Negotiations regarding implementation of the 1982 SAWRSA

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Proposed Action

◆ Settlement

- 65,647 af reallocated to M&I users
- 200,000 af transferred from NIA to federal use
 - 102,000 af - GRIC
 - 28,200 af - Tohono O'odham Nation
 - 69,800 af - reserved by the Secretary for future Indian water rights settlements
- 97,444 af NIA priority reserved for non-Indian use

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Alternatives

◆ No Action

- Current situation projected into the future without resolution

◆ Three Action Alternatives with varying amounts of water being reserved for federal purposes

- Alternative #1
- Alternative #2
- Alternative #3

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Summary of Alternatives

CAP WATER CATEGORY	NO ACTION	PROPOSED ACTION	ALT. #1	ALT. #2	ALT. #3
M&I	620,678	603,678	603,678	538,031	538,031
NIA	341,098	141,098	341,098	296,605	43,654
Federal	453,224	670,224	470,224	580,364	742,315
Held for "non-Fed. purposes"	0	0	0	0	91,000
Total (AF)	1,415,000	1,415,000	1,415,000	1,415,000	1,415,000

8

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Public Input

◆ Alternatives Under Consideration

◆ Impacts

- Type of impacts to evaluate
- Level of analysis necessary
- Assumptions

9

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What Will Not Be Analyzed

◆ Actions Not Yet Able to Describe

- Distribution Systems
- Exchanges

◆ These will be evaluated through a separate NEPA process when plans of sufficient detail are available

10

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Schedule (Moving Forward)

- ◆ **Draft EIS Comment Period**
 - June - July 2000
- ◆ **Draft EIS Public Hearings**
 - June 2000
- ◆ **Final EIS**
 - November 2000
- ◆ **Record of Decision in Federal Register**
 - January 2001
- ◆ **Execute Contracts**
 - January 2001

11

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What's Next

- ◆ **Scoping Comment Period**
 - Ends September 27, 1999
- ◆ **Scoping Report**
 - Available in late October
 - On the USBR Phoenix Area Office (PXA) homepage:
<http://www.apo.lc.usbr.gov/>
 - By request
- ◆ **Draft EIS**
 - Available June 2000
 - On the USBR PXAO homepage: <http://www.apo.lc.usbr.gov/>
 - By request
 - 60-day comment period
 - Public hearings - June 2000

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APPENDIX C

Catalogue of Comments

Received through Scoping

Catalogue of Comments

DATE	NAME	ENTITY	TYPE
8/26/99	DeWitt Weddle	Central Arizona Irrigation and Drainage District (CAIDD), President	Written - First FR Notice
8/26/99	William Baker	On behalf of New Magma Irrigation & Drainage District (NMIDD)	Written - First FR Notice
8/26/99	Dan Walker	Maricopa - Stanfield Irrigation & Drainage District (MSIDD), President	Written - First FR Notice
8/27/99	William H. Swan	William H. Swan	Written - First FR Notice
8/27/99	Norman Pretzer	Pretzer Land & Cattle Company, Secretary-Treasurer	Written - First FR Notice
8/27/99	David Farrel	U.S. Environmental Protection Agency, Chief Federal Activities Office, Region 9	Written - First FR Notice
8/29/99	William Chase, Jr.	City of Phoenix, Water Advisor	Written - First FR Notice
8/29/99	Marvin Cohen	City of Tucson, Legal Counsel	Written - First FR Notice
8/29/99	William Anger	Cities of Chandler, Glendale, Goodyear, Mesa, Peoria, and Scottsdale; Co-counsel	Written - First FR Notice
8/30/99	Rita Pearson	Arizona Department of Water Resources (ADWR), Director	Written - First FR Notice
8/30/99	Robert Lynch	Central Arizona Project Association (CAPA), Chairman of the Board	Written - First FR Notice
8/30/99	David (Sid) Wilson, Jr.	Central Arizona Water Conservation District (CAWCD), General Manager	Written - First FR Notice
8/30/99	R. Gale Pearce	Irrigation & Electrical Districts Association of Arizona, President	Written - First FR Notice
8/30/99	Margaret Vick	Havasupai Tribe	Written - First FR Notice
9/12/99	Jay Simon	Sun Valley Farms - Unit 5, President	Written - Second FR Notice
9/13/99	Nancy Roberts	Pinal County farmer	Written - Second FR Notice
9/14/99	Herb Dishlip	ADWR, Assistant Director for Statewide Planning	Oral - Phoenix Scoping Mtg.
9/14/99	Larry Dozier	CAWCD, Deputy General Manager	Oral - Phoenix Scoping Mtg.
9/14/99	Robert Lynch	CAPA, Chairman of the Board	Oral - Phoenix Scoping Mtg.
9/14/99	William Anger	Goodyear, Peoria, Chandler, Glendale, Scottsdale, Mesa	Oral - Phoenix Scoping Mtg.
9/14/99	Stanley Pollack	Navajo Nation, Water Rights Counsel	Oral and Written - Phoenix
9/14/99	William Baker	On behalf of NMIDD	Oral - Phoenix Scoping Mtg.
9/14/99	Joe Sparks	On behalf of San Carlos Apache Tribe, Tonto Apache Tribe, Yavapai Apache Nation, and Kaibab Band of Paiute Indians	Oral - Phoenix Scoping Mtg.
9/14/99	Elizabeth Story	Tonopah Irrigation District (TID), Administrator	Oral - Phoenix Scoping Mtg.
9/14/99	John Nevitt	none listed	Written - Phoenix Scoping Mtg.
9/14/99	James H. Peterson	none listed	Written - Phoenix Scoping Mtg.
9/14/99	none listed	none listed	Written - Phoenix Scoping Mtg.
9/15/99	Robert Barcello	NMIDD, President	Oral - Casa Grande Scoping Mtg.

Catalogue of Comments

DATE	NAME	ENTITY	TYPE
9/15/99	Russ Schlittenhart	Pinal County farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Jack Dixon	Pinal County farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Grant Ward	MSIDD, General Manager	Oral - Casa Grande Scoping Mtg.
9/15/99	Paul Orme	CAIDD, General Counsel	Oral - Casa Grande Scoping Mtg.
9/15/99	Gale Pearce	Pinal County farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Cecil Antone	Gila River Indian Community (GRIC), Lieutenant Governor	Oral - Casa Grande Scoping Mtg.
9/15/99	John Smith	MSIDD farmer and previous President	Oral - Casa Grande Scoping Mtg.
9/15/99	Mike Urton	San Carlos Irrigation and Drainage District (SCIDD), President	Oral - Casa Grande Scoping Mtg.
9/15/99	Norm Pretzer	Pinal County farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Rod Lewis	GRIC, General Counsel	Oral - Casa Grande Scoping Mtg.
9/15/99	Vince Dobson	Pinal County farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Bob Roth	University of Arizona Maricopa Agricultural Center, Resident Director	Oral - Casa Grande Scoping Mtg.
9/15/99	Mary Ann Antone	Tohono O'odham Nation (TO'ON), Water Resource Committee Chair	Oral - Casa Grande Scoping Mtg.
9/15/99	Mr. Koepnick	Pinal County farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Jim Hartegen	Pinal County farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Ardell Ruiz	GRIC farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Max Nichols	Pinal County farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Lee Smith	NMIDD farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Albert Soatikee	GRIC member	Oral - Casa Grande Scoping Mtg.
9/15/99	John Kai	Kai Farms	Oral - Casa Grande Scoping Mtg.
9/15/99	Miguel Olivas	Congressman J.D. Hayworth's office	Oral - Casa Grande Scoping Mtg.
9/15/99	Rick Aguirre	Former Pinal County farmer	Oral - Casa Grande Scoping Mtg.
9/15/99	Mary Thomas	GRIC, Governor	Oral - Casa Grande Scoping Mtg.
9/15/99	Arthur Batala	Hopi Tribe	Oral - Casa Grande Scoping Mtg.
9/15/99	none listed	none listed	Oral - Casa Grande Scoping Mtg.
9/15/99	Cliff Harleg	none listed	Written - Scoping Meetings
9/15/99	none listed	none listed	Written - Scoping Meetings
9/15/99	none listed	none listed	Written - Scoping Meetings
9/15/99	none listed	none listed	Written - Scoping Meetings

Catalogue of Comments

DATE	NAME	ENTITY	TYPE
9/15/99	none listed	none listed	Written - Scoping Meetings
9/15/99	none listed	none listed	Written - Scoping Meetings
9/15/99	none listed	none listed	Written - Scoping Meetings
9/15/99	Elizabeth Story	TID, Administrator	Written - Second FR Notice
9/16/99	Tony Burrell	TO'ON, San Xavier District, Legislative Representative	Oral - Tucson Scoping Meeting
9/16/99	Robert Brauchli	On behalf of the White Mountain Apache Tribe	Oral - Tucson Scoping Meeting
9/16/99	Dennis Rule	City of Tucson, Tucson Water Department	Oral - Tucson Scoping Meeting
9/16/99	Austin Nunez	TO'ON, San Xavier District, Chairman	Oral - Tucson Scoping Meeting
9/16/99	John Kai	Kai Farms	Oral - Tucson Scoping Meeting
9/16/99	Vic Currier	Pinal County farmer	Oral - Tucson Scoping Meeting
9/16/99	Ardell Ruiz	GRIC farmer	Oral - Tucson Scoping Meeting
9/16/99	Robin Fohrencamp	GRIC resident	Oral - Tucson Scoping Meeting
9/16/99	Albert Soatikee	GRIC resident	Oral - Tucson Scoping Meeting
9/17/99	Reid Peyton Chambers	Sonosky, Chambers, Sachse & Enderson, Special Counsel to the Hopi Tribe	Written - Second FR Notice
9/20/99	Jack Long	Hohokam Irrigation District, Manager	Written - Second FR Notice
9/20/99	Joyce Baker	La Paz County Board of Supervisors, Chairman	Written - Second FR Notice
9/20/99	William Isom	Pinal County farmer	Written - Second FR Notice
9/21/99	Laurence Lusson, Sr.	Maricopa County farmer	Written - Second FR Notice
9/21/99	Colette Lusson	Maricopa County farmer	Written - Second FR Notice
9/21/99	David Harlow	U.S. Fish and Wildlife Service, Field Supervisor	Written - Second FR Notice
9/22/99	Jim McCarthy	Sierra Club - Grand Canyon Chapter, Chapter Secretary	Written - Second FR Notice
9/24/99	Robert Brauchli	On behalf of the White Mountain Apache Tribe	Written - Second FR Notice
9/24/99	Robert Lynch	CAPA, Chairman of the Board	Written - Second FR Notice
9/24/99	Robert Mitchell	City of Casa Grande, Mayor	Written - Second FR Notice
9/24/99	R. Gale Pearce	Irrigation & Electrical Districts Association of Arizona, President	Written - Second FR Notice
9/24/99	Robert Barcello	NMIDD, President	Written - Second FR Notice
9/26/99	Carl Ortiz	Protect Land and Neighborhoods, Water Research Committee Chairman	Written - Second FR Notice
9/27/99	Rita Pearson	ADWR, Director	Written - Second FR Notice
9/27/99	Ron McEachern	CAIDD, District Manager	Written - Second FR Notice

Catalogue of Comments

DATE	NAME	ENTITY	TYPE
9/27/99	David (Sid) Wilson, Jr.	CAWCD, General Manager	Written - Second FR Notice
9/27/99	William Chase	City of Phoenix, Water Advisor	Written - Second FR Notice
9/27/99	Annette Morgan	Hualapai Department of Natural Resources/ Water Resources Program	Written - Second FR Notice
9/27/99	William Baker	On behalf of NMIDD	Written - Second FR Notice
9/27/99	Margaret Vick	Havasupai Tribe	Written - Second FR Notice
9/27/99	Kathy Herseth	Herseth Feedlots Inc., Vice President	Written - Second FR Notice
9/27/99	Lynn Pate	Inca Contracting Co.	Written - Second FR Notice
9/27/99	Stanley Pollack	Navajo Nation Department of Justice, Water Rights Counsel	Written - Second FR Notice
9/27/99	Marvin Cohen	City of Tucson, Attorney	Written - Second FR Notice
9/27/99	Douglas Mason	SCIDD, General Manager	Written - Second FR Notice
9/27/99	Daniel Cracchiolo	The Steele Foundation, Inc., President	Written - Second FR Notice
9/27/99	William Anger	Cities of Chandler, Glendale, Goodyear, Mesa, Peoria, and Scottsdale; Co-counse	Written - Second FR Notice
9/28/99	John Sullivan	Salt River Project, Associate General Manager	Written - Second FR Notice

APPENDIX D

Newspaper Articles

Related to Scoping

NewsBank InfoWeb
The Arizona Republic

THE ARIZONA REPUBLIC

July 21, 1999

BABBITT'S ROLE KEY IN BID TO SOLVE WATER ISSUES

Author: ROBERT ROBB, The Arizona Republic

Section: Opinions

Edition: Final Chaser

Page: B9

Estimated Printed Pages: 3

Index Terms:

COMMENTARY

Article Type: Column

Article Text:

As governor, Bruce Babbitt showed remarkable leadership and perseverance in forging a comprehensive groundwater management act that yet today governs much of the way Arizona grows and develops.

As secretary of the Interior, Babbitt is about to take action that many fear will at least unduly complicate the most important state water-policy negotiations since the groundwater management act, if not blow them up altogether.

Comprehensive negotiations are under way addressing three broad issues: what the state has to pay to reimburse the federal government for the construction of the Central Arizona Project, surface water claims by various Indian tribes and funding Indian water costs.

Settling these issues is a daunting task, requiring agreement by all the parties, both federal and state legislation, and the approval of three courts. But failure means protracted litigation with an uncertain outcome.

As a result, all parties have a strong interest in making the settlement a success -- the Department of Interior, the Arizona Department of Water Resources, the Central Arizona Water Conservation District (which manages the CAP), state water users, the tribes, and U.S. Sen. Jon Kyl, who is playing a key role in facilitating the negotiations.

Although success remains a rocky path, the outlines of a settlement are beginning to take shape, and the parties are cautiously optimistic. Basically, it involves using CAP water to resolve Indian water claims, and somehow using CAP water sales and repayments to reduce what Congress has to fund for Indian water costs.

The key is the use of CAP water to satisfy Indian water claims, and therein lies the problem with Babbitt's proposed action.

Babbitt asserts the right to reallocate approximately 340,000 acre-feet of CAP water to the Indians. State water interests dispute, with varying degrees of confidence, the secretary's right, without a settlement, to reallocate a single drop. At present, settlement discussions include using about 200,000 acre-feet to resolve Indian claims.

Babbitt has told state water leaders that he plans on publishing a notice initiating the environmental studies that reallocation requires. Interior says the environmental studies need to get started so they can be completed prior to congressional action on the settlement.

Many state water leaders see the proposed action as a threat, a not-so-subtle reminder of the power Babbitt asserts and which they dispute, and an attempt to gain leverage in the negotiations.

The action, which may come early next week, is sure to complicate already fragile negotiations. It opens up another front in

an already excessively complicated battlefield.

Exactly why Babbitt is proceeding to the obvious discomfort of Arizona water interests is unclear. The public rationale, the need to get started with environmental studies to facilitate a settlement, is thin.

Everyone agrees that a global settlement needs to be reached by September, or the opportunity likely will be lost in the grinding momentum of existing litigation and the difficulty of getting on Congress' agenda next year. A two- or three-month delay in starting environmental studies would not appear to cause any irremediable harm.

Nor does Babbitt need to do anything to make his threat of a unilateral reallocation real. No one doubts that if settlement fails, Babbitt will act.

Some have suggested that Babbitt's action is ego-driven, that he wants to be the one who actually signs the allocation order conveying water to the Indians, and fears that if he doesn't begin the process now, time may run out before his term ends.

But it would be unlike Babbitt to let his ego get in the way of a substantive accomplishment he cares about. Besides, if the reallocation comes from a settlement he negotiates, or from executive action he initiates, he will get ample credit.

Perhaps Babbitt remembers how useful the threat to the CAP from the Carter administration was in making the groundwater act happen. But then you had parties who didn't really want to settle, and needed an outside threat to come together. Today, you have parties who want to settle, but aren't yet certain that it can be done.

Let's hope Babbitt doesn't overplay his hand.

Memo: Robert Robb can be reached at (602) 444-8472 or at bob.robbs@pni.com via e-mail. His column generally appears on Sundays, Wednesdays and Fridays.

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Record Number: 9907210368

Proposal would take farms' water

Federal plan to
settle Indian claims;
CG meeting set

By LOUIS PORTER
Staff Writer

The U.S. Bureau of Reclamation will hold a "scoping meeting" Wednesday near Casa Grande to solicit comments on a proposal that would reallocate 200,000 acre-feet of Central Arizona Project water.

The Federal Register of Aug. 26 outlines the proposal and three alternatives that aim to settle litigation by the Gila River Indian Community dating back, in some cases, to 1972.

In a major change for the use of Colorado River water that has flowed into Pinal County, the proposed action would take 200,000 acre-feet that is currently allocated for non-Indian agriculture and reallocate it for "federal purposes." It would also take 17,000 acre-feet from the municipal and industrial use category "previously allocated to Asarco Inc. that is anticipated to be voluntarily assigned to GRIC..."

Under present conditions, 341,098 acre-feet is allocated to non-Indian agriculture. This would be reduced to 141,098 by the proposed action.

"Of the estimated 141,098 acre-feet remaining in the NIA category, 97,444 acre-feet would be reserved for use by non-Indian agriculture or

M&I (municipal and industrial) entities under a process to be developed. The remaining 43,654 acre-feet represents the water associated with HIDD (Hohokam Irrigation and Drainage District) that has been or is anticipated to be assigned to several Maricopa County cities."

The 200,000 acre-feet would be added to the "held for federal purposes" category along with the 17,000 now allotted to Asarco. The Gila River tribe would get 102,000 acre-feet, the Tohono O'odham Nation 28,200, and 69,800 would be "reserved by the secretary (of Interior) for use in facilitating future Indian water rights settlements."

Alternative No. 1 makes small changes to the current allocation. The 17,000 acre-feet in the municipal and industrial category now allocated to Asarco would be placed into the "held for federal purposes" category. The rest of the water in the M&I category would be managed the same as in the main proposal. The amount of water in the NIA category would remain the same, but an estimated 112,578 acre-feet, an amount allocated in 1983 under this category but never contracted, would be "made available for use by non-Indian agricultural and/or M&I entities under a process to be developed." An estimated 1,518 acre-feet in the "held for federal purposes" category would be allocated and contracted to the Tonto Apache and Camp Verde Apache tribes.

Alternative No. 2 would take 65,647 acre-feet that is currently uncontracted from the M&I category and put it into the "held for federal purposes" category. Water allocated for NIA use would be reduced by 28,665 acre-feet, an amount currently allocated to Queen Creek Irrigation District, Chandler Heights Citrus ID, San Tan ID and Tonopah ID.

This alternative would do the same as Alternative No. 1 with the uncontracted 112,578 acre-feet of NIA water. The "held for federal purposes" category would increase by an estimated 94,312 acre-feet. The register says "the 65,647 acre-feet from the M&I category would be contracted as follows: 20,000 to the Gila River tribe; 28,200 to Tohono O'odham Nation; 3,947 to the San Carlos tribe; and 13,500 to the Navajo and Hopi tribes.

The estimated 28,665 acre-feet from the NIA category would be contracted as follows: 9,000 to Gila River; 19,665 to San Carlos. This alternative would also allocate, as would Alternative No. 1, 1,518 to the Tonto Apache and Camp Verde Apache tribes.

Under Alternative No. 3, non-Indian agricultural water would be reduced by an estimated 297,444 acre-feet. This is by far the most drastic change of the four proposals to allocation in the NIA category.

Alternative No. 3 would make the same changes to water in the M&I category as Alternative No. 2. Water "held for federal purposes" would increase by 289,091. This includes the 17,000 acre-feet predicted to be voluntarily reallocated from Asarco to Gila River. The 65,647 acre-feet from the M&I category would be contracted as under Alternative No. 2. An estimated 82,000 acre-feet from the NIA category would be contracted to Gila River. An estimated 124,444 acre-feet would be "reserved by the secretary for future federal purposes."

The Tonto Apache and Camp Verde Apache tribes would get 1,518 acre-feet. The remaining 91,000 "would be reserved by the secretary for as yet to be determined non-federal users."

The meeting will begin at 6:30 p.m. Wednesday at Francisco Grande Resort & Golf Club.

Turn Out to Protect Your Water Rights

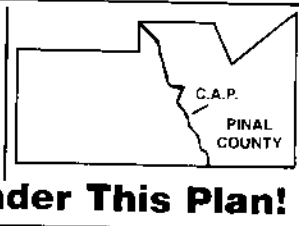
**Wednesday, Sept. 15 - 6:30 p.m.
Francisco Grande Resort & Golf Club Ballroom**

the United States Department of the Interior is holding a public comment meeting. The purpose of the meeting, as published in the Federal Register on Aug. 26 is the

proposed taking of our Central Arizona Project water supply that we now have as a right and under contract.

They propose the transferring of that right and that contract to the various Indian Tribes in Central Arizona.

**Farmland That Has
Been In Production
For Generations
And Generations
Could Disappear Under This Plan!**



Editorial

Drying up Pinal: a crucial decision

The complex set of laws and regulations involving the Central Arizona Project face a new twist as an effort is made to use Colorado River water to settle federal water-rights claims by the Gila River Indian Community and other tribes. The U.S. government obviously has a substantial obligation there, but Pinal County should not bear the brunt of rectifying the situation.

The tribe initially received a substantial CAP entitlement and always has had half of the San Carlos Project water. Yet rights to more water are apparent under federal law, and thus the recent plan to take it from contracted CAP users.

Pinal and other Arizona residents had hoped for year to gain a share of the Colorado River, which the U.S. Supreme Court ruled rightfully belongs to the state. When Congress authorized the huge reclamation project, farmers, many of them in Pinal County, committed to repay a substantial part of the cost and borrowed millions of dollars to build distribution systems. They and all Pinal County property owners have paid taxes for many years toward repayment of the CAP cost.

Water has been flowing into Pinal County for more than 10 years and its full cost is well above what agricultural markets can support. A plan has been devised to sell water at more affordable rates, and this - temporarily at least - has allowed the state to use all its allocation.

Meanwhile, two major issues have gone unresolved. One is the Gila River tribe's water claims. The other is that the federal government has not reached a settlement with the state for the final cost of the CAP to be repaid. An understanding on the latter issue was ignored at the last minute by Interior Secretary Bruce Babbitt, a former Arizona governor, who wanted further negotiations.

Now a plan has been hatched that would reduce farmers' cost of water and debt in return for a dear price: giving up rights to CAP water so that Gila River claims can be settled. The water would stay in Pinal County temporarily and the exact time frame would be unknown. Two hundred thousand acre-feet would be held for tribal use, most of it taken from Pinal County. The water, probably more than the tribes could ever use, might very well be sold to non-Indian users inside or outside Arizona.

The big beneficiaries would be Maricopa County interests, including the Salt River Project, who would like to get the claims off their backs. The losers would be not only Pinal County farmers but all residents with a stake in the county's economy, because of the importance of agriculture and also the need for the water to support future development.

A meeting will be held by the Interior Department at 6:30 p.m. Wednesday of this week at Francisco Grande Resort & Golf Club's ballroom. The purpose of the meeting is to gather views on the proposed "taking" of the water from contracted users, as published in the Federal Register on Aug. 26.

Anyone with an interest in preventing this proposed dry-up of a large part of Pinal County should attend and write to U.S. senators, congressmen and the governor. The contracted water should not be stolen from Pinal County landowners and residents.

(Reprinted with permission from Casa Grande Valley Newspapers Inc.)

Statement from John C. Smith, farmer since 1951 in Maricopa and former president of the Maricopa-Stanfield Irrigation District.

In 1983, the Districts entered into a 50-year water supply contract with Central Arizona Water Conservation District and the United States. Under the terms of that contract, Maricopa-Stanfield Irrigation & Drainage District was to receive 20.5% of the non-Indian agriculture pool which at that time was 550,000 acre feet. Based on that contract, we then entered into a contract with the United States for construction of a distribution system at a cost of \$97 million of which we were required to contribute 20% or \$26.5 million up front - the sole purpose of which was the delivery of C.A.P. water to the lands of Pinal County.

In reliance on this contracted right and the re-affirmation of the law, as well as the contract with the U.S., landowners in the Maricopa-Stanfield District expended additional tens of millions of dollars in irrigation district taxes, conservation practices, Hoover energy surcharges and the great cost of planting permanent crops. We leased our wells and water rights to the district and built an economy based on Central Arizona Project Water. Every phase of that economy will be adversely affected or destroyed on the taking of this water and ultimately, most of Pinal County will return to desert.

The transfer of this water to solve Maricopa County's water rights problems and other social problems is a violation of our sub-contract as well as the C.A.P. Act itself. No Central Arizona Indian Tribe has "Winter's Rights" to the waters of the Colorado River.

The landowners have honored their contracts with the U.S. Bureau of Reclamation, the State of Arizona and with the bond holders. We have put to beneficial use, and paid our share and more, of the C.A.P. Most of us expect the United States to honor their contract with us.

Non-Indian agriculture has saved the United States and the State of Arizona from national embarrassment by using over 900,000 acre feet of C.A.P. water in 1998. Had we not stepped up to the plate, the majority of Central Arizona's Colorado River entitlement would have flowed into California, into Mexico or into the Gulf of California.

The following page is a continuation of this page.

Silence Will Be Considered by the Bureau as Constituting Your Consent to This
Raid on the Non-Indian Agriculture Water Supply.

**For the Future Assured Growth of Pinal County,
Let's Keep Our Contracted Water Supply -
For the Benefit of All Central Pinal Citizens.**

**Attend the Only Meeting in Pinal County on
Wednesday, Sept. 15 - 6:30 p.m.**

PLUS CALL OR WRITE THESE ELECTED OFFICIALS NOW!

REP. J.D. HAYWORTH, R-6th District

Casa Grande:
408 N. Sacaton St., Suite DD
Casa Grande, Ariz. 85222
520-876-4095
fax: 876-4096

REP. ED PASTOR, D-2nd District

2465 Rayburn House Office Building
Washington, D.C. 20515
602-256-0551

SEN. JON KYL, R-Ariz.

Tucson:
7315 N. Oracle Road, Suite 2200
Tucson, Ariz. 85704
520-575-8633

SEN. JOHN MCCAIN, R-Ariz.

Mesa:
1839 S. Alma School Road, Suite 375
Mesa, Ariz. 85210
480-491-4300

GOV. JANE HULL

1700 W. Washington
Phoenix, Ariz. 85007
1-800-253-0883

Join Us As Well As Other Concerned Citizens And Organizations

New Magma Irrigation & Drainage District

Kathy Aleman
Bob Barcello
Vince Dobson

Max Koepnick
Ed Nevitt
Le Smith

Jim Wales

Electrical District #5

Sam Smith, president
Gale Pearce
Norm Pretzer

Gill Worhekke
Darvin Rogers

NewsBank InfoWeb
The Arizona Republic

THE ARIZONA REPUBLIC

September 15, 1999

CAP TO OFFER PLAN TO PAY FEDERAL BILL

WOULD CUT DEBT BY \$700 MILLION

Author: Shaun McKinnon, The Arizona Republic

Section: Front

Edition: Final Chaser

Page: A1

Estimated Printed Pages: 5

Article Text:

Arizona taxpayers would owe about \$700 million less on the massive Central Arizona Project Canal, but would give up almost half the project's water under a proposed agreement to be announced today.

The Central Arizona Water Conservation District, which runs the 336-mile canal, will propose a settlement today that would reduce the amount of money the state must repay the U.S. Bureau of Reclamation for building the \$4.7 billion water-delivery system.

In return, the state would hand over enough water to federal officials, perhaps 200,000 acre-feet a year, to help settle claims by Indian tribes that they are entitled to a larger share of the Colorado River.

"We've been going back and forth on this for almost five years now," district board President George Renner said Tuesday. "It's probably time to stop."

The deal needs approval from the Central Arizona Project's locally elected 15-member governing board. It would have to get approval from two federal agencies before it was submitted to a federal judge in Phoenix for final review.

Even then, because the repayment agreement hinges both on settlement of Indian water claims and a final plan to divide the state's share of the Colorado River, a snag in those talks could halt the whole process.

Still, this is the closest the state and federal governments have come to ending the dispute.

For taxpayers in Maricopa, Pinal and Pima counties, the agreement could mean lower property taxes. The water district collects 10 cents per \$100 valuation in those three counties to help pay Arizona's share of the project cost.

District Manager Sid Wilson said the board would decide later how the lower repayment would affect tax rates and whether the state would try to pay off the debt sooner or spread it over 50 years.

What the water district will propose today would directly settle only the financial issues surrounding the CAP, which carries water from Parker Dam on the Colorado River to central and southern Arizona. The canal is why the Phoenix and Tucson areas can continue to grow in a desert environment without the threat of imminent drought.

Under the proposal, Arizona would repay \$1.65 billion of the nearly \$4.7 billion the Bureau of Reclamation spent on the project. Federal officials had claimed that Arizona owed about \$2.33 billion, but the state argued that it was not obligated for federal cost overruns that occurred after the repayment contract was signed.

A federal judge already has ruled that Arizona would not have to pay more than \$1.78 billion.

The state also would receive a \$300 million credit for delivering water to Indian reservations without charging the federal

government for its operating and maintenance costs.

In return, the state would agree to let the federal government take about 200,000 acre-feet a year in water that has been set aside for agricultural uses but not yet claimed by anyone. That water would be used to settle claims by the Gila River Indian Community, the Tohono O'odham Nation and several other tribes.

Renner and Wilson emphasized that the water district is not attempting to settle the Indian claims, which are under review by the federal government and the state Department of Water Resources.

As it happens, the Bureau of Reclamation is holding public hearings this week in Arizona on its proposal to reallocate CAP water for tribal water claims. Interior Secretary Bruce Babbitt pressed ahead with the hearings in an attempt, agency officials said, to speed the process once a settlement is reached.

Some state officials saw Babbitt's move as a not-so-veiled threat to make good on his authority to reallocate CAP water without seeking approval from the water conservation district.

Renner said the pending settlement gives the state its own bargaining position.

"This will put additional pressure on the U.S. to negotiate in good faith on the Indian claims," he said. "They're going to have a chance to get water, to settle the claims and to settle a financial dispute that frankly they're losing in court."

David Hayes, the Interior Department's chief water negotiator, declined Tuesday to comment on the specifics of the proposed settlement, but said there appeared to be a potential framework for a deal.

"There is a lot of effort going into this," he said, "but there is not going to be a deal unless it's in the best interest of state parties and the best interest of the tribes and the other parties involved."

One issue that could get sticky on the federal side is the state's demand that the federal government take no more than 665,224 acre-feet of water from the CAP Canal. That amount is about 44 percent of the 1.5 million acre-feet maximum that runs through the system each year.

Federal officials say they don't anticipate needing more than the extra 200,000 acre-feet included in the district's proposal, but negotiators also don't want their hands tied.

Arizona officials, however, don't want the federal government to keep an open tap on CAP water.

Rita Pearson, director of the state Department of Water Resources, said she wasn't prepared to comment on the proposal, but said a repayment settlement could help build a bridge to a final resolution of the tribal disputes.

"It's definitely an encouraging sign," she said. "I'm looking forward to what the (water district) board's reaction is to the proposal. There may yet be issues we don't anticipate."

The board will hear public comment on the proposal Sept. 23, and could vote on it as early as Oct. 7. From there, the district would file the proposal with U.S. District Judge Earl Carroll, who is presiding over the state's suit against the federal government in the repayment issue.

Although the district's settlement would not directly address the allocation of CAP water, one of its key conditions would allow the federal government to take an additional 200,000 acre-feet a year of unclaimed water.

Farmers and developers in Pinal County already are lining up to oppose any efforts to give away water set aside for agriculture. Both groups fear they could wind up paying premiums to the tribes for water they once could have used at bargain rates.

Queen Creek Mayor Mark Schnepf, who is also a farmer in Pinal County, said taking water from farmers could depress an already troubled industry.

"To give away available water is going to create an even greater hardship, which in turn will cause problems for (the) farming economy," he said. "Queen Creek is becoming more of a bedroom community, but agriculture is still a very important part of our local economy."

Graphic:
Color map by The Arizona Republic
Chart

Caption:
CAP Canal
FYI

Key points of proposal in CAP repayment

Highlights of a proposal by the Central Arizona Water Conservation District to settle a dispute over payments to the federal government for the Central Arizona Project Canal:

- * Over time, Arizona would repay the federal government \$1.65 billion, a reduction from the \$2.33 billion federal officials sought and the state's initial estimate of \$1.78 billion.

- * The state would receive a \$300 million credit in exchange for delivering water to Indian tribes without charging the federal government any operating and maintenance costs.

- * The state would receive credit for payments already made on the project. The settlement would include several major conditions: * Arizona would agree to a division of CAP water providing federal officials with a total of 665,224 acre-feet per year, an increase of 200,000 acre-feet that had been set aside for agricultural use. An acre-foot is 326,000 gallons. * Federal and state officials would settle the remaining Indian water disputes within one year, or the water district would have the right to back out of the agreement.

The district board will hear public comment on the proposal Sept. 23 and could vote on it as soon as Oct. 7.

Memo: Shaun McKinnon can be reached at (602) 444-7116 or atshaun.mckinnon@pni.com.

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Record Number: 9909170212

Big division over water proposals

Gila River tribe in favor; farmers take other side

By LOUIS PORTER
Staff Writer

More than 150 people packed the ballroom of Francisco Grande Resort Wednesday night as some expressed their concerns regarding a U.S. Bureau of Reclamation proposal that could reallocate 200,000 acre-feet of Central Arizona Project water.

About 20 people spoke to three bureau administrators, drawing applause and occasional laughter from the standing-room-only crowd. Farmers, irrigation district managers and members of the Gila River Indian Community and Tohono O'odham Nation spoke.

The main purpose of the proposal is to settle a water rights dispute that has been running since 1972, when the Gila River tribe

• District manager outlines views on various proposals, P. 4

sued users of irrigated land in Central Arizona over loss of Salt and Gila River water. Those rivers had traditionally supplied their home-

land with irrigation waters but were dammed up and diverted into irrigation systems outside the reservation. Meanwhile, various water interests have been seeking a negotiated settlement (related story).

Robert Barcello, president of New Magma Irrigation and Drainage District, said the district had been recovering from a bankruptcy filing caused by bank foreclosures on its farms. He said the district restructured its debt, now \$18,224,000 on its distribution system, which was built specifically to carry CAP water from the Colorado River.

He said that if the proposal passed, in 20 or 30 years "farmers would have the choice of using groundwater or going out of business and going out of business would mean going back to tumbleweeds." He said the scheduling of the scoping meetings was premature because there has been no settlement on the agricultural side and that the proposal was illegal according to the Colorado Basin Act.

Grant Ward, general manager for Maricopa-Stanfield Irrigation and Drainage District, read a prepared statement, outlining positions on the various proposals. He said that his district's landowners have a right to decide on any changes in water allocations for which they have contracted. MSIDD used about 160,000 acre feet of CAP water in 1998.

Paul Orme, general counsel for MSIDD and for the Central Arizona Irrigation and Drainage District, echoed Ward's sentiment and said, "Alternative No. 3 constitutes an entirely illegal and unconstitutional taking and merits no serious consideration. Alternative No. 3 would render the CAIDD subcontract completely illusory..." That alternative would reallocate almost 300,000 acre feet, removing it from the non-Indian agriculture category and placing it under federal control.

CAIDD used about 130,000 acre feet of CAP water in 1998.

Cecil Antone, lieutenant governor of the Gila River community, said he supported the Proposed Action and Alternative 3, which would transfer rights to a large amount of CAP water for tribal use. He said Pinal County water users should support the proposal in order to avoid "continued and protracted extensive litigation for all parties."

Rod Lewis, general council for the tribe, said Alternative No. 3 is "both legal and constitutional."

He said the proposal "legally is in the best interest of both Indians and non-Indians alike. It is a fair and reasonable allocation of water. It will resolve disputes and litigation that could linger on for years, costing all of us great amounts of money in attorneys' fees and court costs."

Norman Pretzer said, "I'm a farmer; I've lived south of Eloy on the family farm since 1936. I think that the reason for all of us being here is that this is one of the most outrageous miscarriages of justice that we've ever seen. I'm almost ashamed to have to stand here and talk to the citizens of Pinal County when myself and other people have worked so hard, for so many years, to get CAP water into this area. It's a damned shame that we're even here tonight."

"What we're talking about tonight is a giant shell game. If you take the water from Pinal County, it dries up — that's the EIS (environmental impact statement). You give it to the Gila River Indians, they in turn lease it to Maricopa County cities for money. I guarantee you that within ten or 15 years, if this thing goes forward, the Indians will be leasing water to Nevada and California. Water will go to the highest bidder. People that have depended on this water for generations will lose it."

Albert Soatkee said, "I'm a member of the Gila River Indian Community, and my family has been here for 4,500 years, farming. I'm also a member of Pinal County. I graduated from Casa Grande Union High School, participated in sports events, participated in social activities, yet I come here and I'm an Indian. What is all this divisiveness about? You don't want Nevada to have the water, you don't want Mexico to have the water, you don't want California to have the water, you don't want the feds to have the water, yet you have no solutions, nothing. I don't hear any positive solutions. We have talks about bloody wars and 'over my dead body.' You've been here 62 years. We've been here over 62 generations. And we're willing to work with you. We are proposing solutions. We are willing to work within the system.

"We didn't create the situation, we didn't dam up the Gila River. There was a time when the Gila River Indian Community used to ship 4,500 tons of agricultural products to Phoenix every year. And through short sightedness, maybe even ethnic cleansing, we decided to dam up the river. All I know is that if we are not going to work together we will all go down."

Mary Thomas, Gila River tribal governor said, "We were a dry nation when our water was cut. So we know how it feels when it goes away. Our lands virtually became dust bowls. We still eke out a living. We need your support and you need ours. I think I was portrayed tonight as a heartless person, that we will not help you, not help our county. On the contrary, we've been there, and I don't think we're going to let it happen. I'm sure as long as I breathe and my heart beats I would never let that happen."

Bruce Ellis of the Bureau of Reclamation said a scoping report would be available in late October. A draft EIS will be available in June 2000, and the final EIS should come out in November 2000, he said.

State urges settlement to long feud

By MICHELLE RUSHLO
Associated Press Writer

PHOENIX — The Central Arizona Project offered to give the federal government some of its water in exchange for a reduction in taxpayer debt.

The offer is aimed at resolving a web of long-running water disputes across Arizona.

Three southern Arizona counties owe the federal government for construction of the 336-mile canal system that channels Colorado River water to the desert region. Property owners in those counties are repaying the debt through taxes.

Under the proposal announced Wednesday, those taxes and water rates could be reduced, provided that farmers are willing to give up some of their water to help settle claims by American Indian tribes.

For five years, the Central Arizona Project Conservation District, which governs CAP, has been locked in a dispute with the federal government over how much of the construction costs it has responsibility to repay.

The federal government said CAP owed \$2.3 billion when the project was completed in 1993, but the CAP district — which overlaps Maricopa, Pinal and Pima counties — argued it owed only \$1.78 billion.

Much of the dispute centered on whether the CAP district was responsible for cost overruns the Bureau of Reclamation incurred during construction. The bureau never asked Arizona officials whether they were willing to help foot the bill, said Robert Barrett, CAP district spokesman.

To resolve the repayment argument and other smaller issues, CAP officials sued the federal government. In November, U.S. District Judge Earl Carroll sided with CAP on the debt size, but other issues, such as toward how many related projects CAP is responsible to contribute money, remain in court.

To resolve them, the CAP conservation district has proposed that taxpayers be forced to repay only \$1.65 billion.

In exchange, up to 200,000 acre-feet of water a year — roughly the amount of CAP water used by Phoenix, Mesa and Scottsdale combined — would be given to federal officials to resolve separate water claims by Indian tribes.

The largest is by the Gila River Indian Community, which claims it should receive the water that upstream dams now capture and prevent from reaching it.

Rita Pearson, director of the Arizona Department of Water Resources, said that under current negotiations, officials believe the 200,000 acre-feet could settle the tribal claims.

The water allocation would be a combination of farm water and water that is currently not allotted for any use, she said.

Two-thirds of the pool would have to come from irrigation districts, primarily in Pinal County. The state is proposing the districts be compensated for their rights and any extra available water be sold to affected farmers at a discount.

Water should be available for the next 25 to 30 years, Pearson said, though farmers wouldn't have the guarantees the firm allotments offer.

Dave Iwanski, executive vice president of the Agri-Business Council of Arizona, said the irrigation districts he represents are willing to give up some water rights but want to be sure that they will be compensated.

If an agreement can be reached among the farmers, tribes and government agencies involved in the disputes, the debt repayment agreement could mean savings for taxpayers.

George Renner, president of the CAP board, said what those savings would amount to and how taxpayers

would see them are details that haven't been resolved.

But reaching an agreement would give the CAP district a clear idea what it must pay and allow it to plan for the future, he said.

Property owners now pay roughly 10 cents per \$100 of assessed values toward the CAP debt or \$10 a year for a \$100,000 house.

That rate could be reduced or the debt repaid faster once a settlement is reached, Renner said.

CAP could also reduce what it charges individual utilities for water, though that makes up just a fraction of an average water bill and there is no guarantee it would be passed on.

Renner said he is optimistic that a deal can be reached soon.

Still, David J. Hayes, acting deputy director of the Department of Interior, said significant issues remain. The large Indian claims and other issues, such as the federal government's right to buy water on the open market, need to be resolved.

"If the state departments really want to do a deal, we should be able to work this out," he said.

Comments on water proposals

CASA GRANDE DISPATCH September 16, 1999

page 1 of 2

Editor's note: The following comments were prepared for delivery by Grant Ward, general manager of the Maricopa-Stanfield Irrigation and Drainage District, at a U.S. Bureau of Reclamation "scoping meeting" regarding water rights and the Central Arizona Project, which was held Wednesday night at Francisco Grande Resort & Golf Club.

Maricopa-Stanfield Irrigation and Drainage District consists of approximately 87,000 acres of irrigable lands and has historically been the largest user of Central Arizona Project water. MSIDD is a party to a water supply subcontract with the United States and the Central Arizona Water Conservation District, which contract implemented the previous and original CAP Secretarial Allocation Decision of March 24, 1983. In that decision, the secretary allocated 20.48 percent of the non-Indian CAP agricultural water supply to MSIDD. This contract remains in effect today but could be substantially modified by several of the alternatives contemplated in the notice of scoping process recently published at 64 Fed. Reg. 46720-22.

The Proposed Action is presumably based on those settlement discussions which revolve around the current litigation between CAWCD and the United States over CAP operation and repayment issues and Indian water rights claims. ...

— Irrigation district General Manager Grant Ward

It should also be noted that the secretary has never completed the required reallocation of uncontracted non-Indian agricultural water as mandated under Section 4.13 of the above referenced water supply subcontract, and by Congress, in Section 11 (b) of the Salt River Pima Maricopa Indian Community Water Rights Settlement Act of 1988. While several of the proposed alternatives in the Scoping Notice contemplate the completion of this

process it is important to note that any reallocation efforts contrary to existing NIA subcontracts are in violation of existing contract and law. The scoping process must identify the rights of MSIDD and properly analyze the impacts on such rights of the proposed alternatives.

The Proposed Action is presumably based on those settlement discussions which revolve around the current litigation between CAWCD and the United States over CAP operation and repayment issues and Indian water rights claims. MSIDD has been an active participant in these discussions and has set forth certain minimum conditions to a final settlement which would have to be in place before the MSIDD Board of Directors would refer the final settlement proposal to its landowners for an advisory election. The MSIDD Board of Directors believes such an election is necessary to in

any way modify or alter its rights and obligations under its subcontract since this same subcontract was entered into on the basis of an authorizing landowner election. However, the MSIDD Board of Directors will only submit a settlement proposal to its landowners which it believes is in the best interest of its landowners and water users.

The secretary of Interior believes he has the authority to reallocate CAP water without the consent of the district and its landowners. The district has vehemently disputed this position and has participated in these discussions in order to determine if an ultimate resolution could be developed which would benefit all district landowners and water users. Consequently the Proposed Action cannot be adequately evaluated since it does not address the key issues set forth by the MSIDD representatives in the settlement discussion.

Alternative No. 1 would reallocate the 65,647 acre-feet of uncontracted municipal and industrial CAP water to Arizona municipalities based on the Arizona Department of Water Resource's recommendation. MSIDD strongly believes this is the only appropriate approach for dealing with this water supply. This alternative would also reallocate 112,578 acre-feet of non-Indian agricultural CAP water that is currently not under contract to existing non-Indian contractors or to certain municipalities based upon an undeveloped process.

It should be pointed out that Section 4.13 of the MSIDD subcontract and Section 11 (b) of the Salt River Pima Maricopa Indian Community Water Rights Settlement Act of 1988, only authorized such reallocation to existing non-Indian agricultural subcontractors. This may not preclude an agreement between those subcontractors and other state parties on a substitute reallocation recommendation but absent such an alternative recommendation, the secretary must comply with existing contractual and statutory requirements.

Alternative No. 2 would violate existing law. It would inappropriately reallocate the 65,647 acre-feet of municipal and industrial water to the United States for federal purposes contrary to the clear intent of the CAP enabling legislation and the well being of the state of Arizona. Additionally, the reallocation of 28,665 acre-feet of non-Indian agricultural water currently held under contract by four small irrigation districts, may not be reallocated for federal purposes unless that is the intended disposition of such water by the districts and they receive adequate compensation from the United States for such reallocations. Otherwise, any water currently under contract which is released must be reallocated to the non-Indian agricultural water users pursuant to Section 4.13 of the subcontract. Those portions of Alternative No. 2 which would reallocate the 112,578 acre-feet of currently uncontracted water to the existing non-Indian subcontractors, and retain the 199,855 acre-feet of water under the existing agricultural contracts, would comply with existing contract requirements and law.

Alternative No. 3 constitutes an entirely illegal and unconstitutional taking and merits no serious consid-

... Alternative No. 3 constitutes an entirely illegal and unconstitutional taking and merits no serious consideration.

eration. Alternative No. 3 would render the MSIDD subcontract completely illusory if the secretary could unilaterally reallocate the water which was the underlying basis of the subcontract and the MSIDD federal repayment contract with the United States (contract No. 4-07-30-W0040). Such efforts would be contradictory of court decisions and fundamental provisions of general contract law. Any effort to implement Alternative No. 3 will be met with considerable opposition by MSIDD and many other parties in the state of Arizona and would result in years of expensive litigation for all parties concerned. Alternative No. 3 would deprive MSIDD of all value under its original CAP allocation which was the basis for its \$78 million repayment contract with the United States and its remaining \$13,500,000 private bondholder obligation. It would result in substantially more groundwater pumping within MSIDD boundaries and throughout the CAP service area. Local economies which have become dependent on this CAP supply for non-Indian users will suffer irreparably, and the entire purpose of the CAP will be undercut.

The secretary should also recognize his inherent conflict of interest

should he seek to abrogate contract rights of one group of federal contractors such as MSIDD, to further his trust responsibility to another group of federal contractors. He should consider the ruling in cases such as *United States vs. Windstar Corp.*, and *Orange Cove Irrigation District vs. United States* before doing so.

The No Action Alternative contemplates maintaining the status quo, presumably until such time as the CAP repayment litigation is resolved. Any effort to resolve or settle this litigation must be done in such a way as not to impair existing contract rights absent the agreement of the impacted parties.

Finally, these comments in no way reflect the concurrence of MSIDD that the water supply numbers for the non-Indian agricultural category, i.e. 341,098 acre-feet, are correct or that the 43,654 acre-feet attributable to assignment from Hohokam Irrigation and Drainage District to several Maricopa County cities is an accurate reflection of the amount of water which could legally be part of this transaction. A final resolution of these numbers may or may not be required depending on the ultimate disposition of this process.

Thank you for this opportunity to make these comments on behalf of the Board of Directors of the Maricopa-Staofield Irrigation and Drainage District. We would reserve the right to submit additional comments prior to the closing date. Additionally, please include the district on the mailing list for all subsequent information pertaining to this process as provided for in the scoping notice.

Where to write

Federal

Sen. John McCain, R-Ariz.

Mesa:

1839 S. Alma School Road, Suite 375

Mesa, Ariz. 85210

480-491-4300

Washington:

111 Russell Senate Office Building

Washington, D.C. 20510

Sen. Jon Kyl, R-Ariz.

Tucson:

7315 N. Oracle Road, Suite 2200

Tucson, Ariz. 85704

520-575-8633

Washington:

702 Hart Senate Office Building

Washington, D.C. 20510

Rep. Jim Kolbe, R-Ariz. (part of Casa Grande, Arizona City)

Tucson:

1661 N. Swan Road, Suite 112

Tucson, Ariz. 85712

520-881-3588

Washington:

205 Cannon House Office Building

Washington, D.C. 20515

Rep. J.D. Hayworth, R-Ariz. (part of Casa Grande, Coolidge, Eloy, Florence, Stanfield, Maricopa)

Casa Grande:

408 N. Sacaton St., Suite DD

Casa Grande, Ariz. 85222

876-4095

fax: 876-4096

Washington:

1023 Longworth House Office Building

Washington, D.C. 20515

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THE ARIZONA REPUBLIC

September 16, 1999

COMPENSATION TO FARMS URGED IN CAP DEAL

MONEY FOR WATER, GROUP SAYS

Author: Shaun McKinnon, The Arizona Republic

Section: Valley And State

Edition: Final Chaser

Page: B1

Estimated Printed Pages: 3

Index Terms:

WATER

Article Text:

Debt-laden farmers and irrigation districts should be compensated if they are forced to give up water from the Central Arizona Project to help settle disputes among the state, the federal government and Indian tribes, farming advocates said Wednesday.

Agricultural users would take the biggest hit under a proposal by the Central Arizona Water Conservation District to give federal officials more CAP water in return for reducing what the state owes the U.S. Bureau of Reclamation for building the 336-mile canal.

David Iwanski, executive vice president of the Agri-Business Council of Arizona, said farmers need a reliable and affordable source of water for at least 30 years. That way they can repay the money they borrowed to replace dwindling groundwater supplies with water from the CAP system.

"That water is absolutely critical for them so they can continue to farm and pay off their CAP debt," Iwanski said. "We think if there are accommodations made for water and debt relief, we can be a player in the settlement. But this is their livelihood we're talking about."

The water district proposed a settlement Wednesday to end a long and costly battle with the federal government over how much money taxpayers in three Arizona counties should pay toward the \$4.7 billion it cost to build the CAP.

Under the proposal, the state would contribute \$1.65 billion, about \$700 million less than what the federal government originally demanded. In exchange for accepting the lower amount, federal officials could take up to 200,000 acre-feet of water from the CAP to help settle claims by several Arizona Indian tribes.

Much of that water is now set aside for agricultural use. Although most of it hasn't yet been claimed, Iwanski said, giving it up would leave farmers and irrigation companies without a firm and affordable supply for growth or for dry years.

Many of those farmers went deep into debt to build systems that could handle CAP water, he said, complying with demands by the state that they curb their use of a dwindling groundwater supply.

The CAP system, which carries Colorado River water from the Parker Dam south to Maricopa, Pinal and Pima counties, was intended, in part, to reduce the state's dependence on groundwater and allow urban areas to grow without fear of long droughts. at debt."

The issue of how the CAP water is reallocated and how tribal claims are settled isn't actually a part of the water district proposal, which addresses only the repayment amount. But the deal would hinge on the government's ability to settle the

other issues and would include the provision to give up the water.

"It would let us all lay to rest issues that have been on the table for decades," said George Renner, president of the water district's 15-member elected governing board.

That board will get its first real look at the settlement and hear public comment next week in a hearing that could reopen some of the same issues that have killed similar agreements in the past.

George Campbell, a board member and a critic of previous settlement plans, said the public should understand that this proposal is not the final word. He isn't happy with the idea that the federal government could end up with almost half the 1.5 million acre-feet of water that the CAP delivers each year.

"The future of Arizona really is on the line," he said. "Look at the amount of water being taken from agriculture to the Indian column. How is this state going to survive?"

Campbell, a former Maricopa County Supervisor, said his anger is directed not toward the tribes, who say they are entitled to a bigger share of the water, but toward Interior Secretary Bruce Babbitt.

"Two other secretaries said they wouldn't take any more water from Arizona, and then this one comes in and does a complete flip-flop," he said. "All that water set aside for Arizona's future is being taken away."

Babbitt, a former Arizona governor, has repeatedly said he has the authority to reallocate CAP water without approval from the state Department of Water Resources. He has begun the process of settling Indian claims with public hearings this week on environmental issues.

Water district officials say by including the Indian claims in the repayment deal, Arizona not only would reduce its debt on the CAP, but would retain some control over water reallocation. The proposal would limit the federal government to no more than 665,224 acre-feet.

An acre-foot is about 326,000 gallons, enough to meet the annual needs of a family of five.

If the deal is accepted, the board would then turn its attention to such details as how to pass on the lower repayment costs to taxpayers. The district could lower its tax rate -- now 10 cents per \$100 valuation -- or could cut costs to water users.

The deal also faces scrutiny of the U.S. Interior and Justice departments and would have to be approved by a federal judge.

Any Indian water deals would need approval from Congress.

The Gila River Indian Community, which holds the rights to 173,100 acre-feet of water, would be first in line, along with the Tohono O'Odham Nation. Water left after those claims are settled would be used in talks with other tribes.

Graphic:

Map by The Arizona Republic (see microfilm)

Caption:

CAP canal

Memo: Shaun McKinnon can be reached at (602) 444-7116 or atshaun.mckinnon@pni.com.

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Record Number: 9909190041

Tucson, Thursday, September 16, 1999

Deal could swap water for lower CAP taxes

Wire and staff reports

The Central Arizona Project's operators want to give the federal government a portion of its water in exchange for a drop in taxpayer debt - and possibly an end to long-running water fights.

Pima, Maricopa and Pinal counties owe the federal government for construction of the 336-mile canal system that funnels Colorado River water to the desert. Property owners in those counties are repaying the debt through taxes.

But under a proposal announced yesterday, those taxes and water rates could be reduced, provided that farmers are willing to give up some of their water to help settle claims by Indian tribes.

For five years, the Central Arizona Water Conservation District, which manages distribution of CAP water to about 80 municipal, industrial, agricultural and Indian tribe customers in Southern Arizona, has been locked in a dispute with the federal government over how much of the construction costs it must repay.

The federal government said the CAP district owed \$2.3 billion when the project was completed in 1993, but the CAP district argued it owed \$1.78 billion.

Much of the dispute hinged on whether the CAP district was responsible for cost overruns the Bureau of Reclamation incurred during construction. Federal officials never asked Arizona officials whether they were willing to help, said Robert Barrett, CAP district spokesman.

To resolve the repayment argument and other

See **WATER**, Page 3B

Water

Continued from Page 1B

smaller issues, CAP officials sued the federal government. In November, U.S. District Judge Earl Carroll sided with CAP officials on the debt. But other issues, such as how many related projects the CAP district must help pay for, remain tied up in court.

To resolve them, the CAP district proposed that taxpayers be forced to repay only \$1.65 billion. In exchange, up to 200,000 acre-feet of water a year would be given to federal officials to resolve separate water claims by Indian tribes. The 630,000 area residents Tucson Water serves wash through about 110,000 acre-feet a year.

The CAP district is currently entitled to 1.5 million acre-feet of Colorado River water a year. An acre-foot is 325,851 gallons - the equivalent of covering 1 acre in water 1 foot deep.

Tucson's current share is 138,920 acre feet a year.

The largest of the tribal water claims involves the Gila River Indian Community, which says it should receive water now captured by dams up stream.

A smaller claim involves the Tohono O'odham tribe, which sued Tucson, area mines and other water users in 1975, charging that ground water pumping near the reservation caused water levels under tribal land to drop.

A settlement was reached in 1982 to provide the tribe with CAP water by 1992. But new issues arose and the tribe has yet to receive any water.

In another lawsuit against Tucson, 157 tribal landowners at San Xavier maintain the 1982 settlement failed to recognize their water rights. Both suits are pending in U.S. District Court.

Rita Pearson, director of the Arizona Department of Water Resources, said officials believe the 200,000 acre-feet could settle the tribal claims.

IF YOU GO

Concerns about the environmental effects of proposed changes in CAP water allocation may be aired at a public hearing today.

The federal Bureau of Reclamation is holding a meeting from 1 p.m. to 3:30 p.m., in the Tucson Convention Center's Maricopa-Mojave room, 260 S. Church.

The National Environmental Policy Act of 1969 requires the agency to prepare a study detailing environmental impacts of proposed changes in existing allocations of CAP water.

The water allocation would be a combination of farm water and water that is currently not allotted for any use, she said.

Two-thirds of the pool would come from irrigation districts, primarily in Pinal County. The state is proposing that the districts be compensated for their rights and that any extra available water be sold to affected farmers at a discount.

Dave Iwanski, executive vice president of the Agri-Business Council of Arizona, said the irrigation districts he represents are willing to give up some water rights but want to be sure that they will be compensated.

If an agreement can be reached, the larger debt repayment could mean savings for taxpayers.

What those savings would amount to and how taxpayers would see them are details that haven't been resolved. But reaching an agreement would give the CAP district a clear idea what it must pay and allow it to plan.

Property owners now pay roughly 10 cents per \$100 of assessed values toward the CAP debt or \$10 a year for a \$100,000 house.

The proposed deal needs approval from the Central Arizona Conservation District's board - 15 elected members from Maricopa, Pima and Pinal counties - as well as two federal agencies and a federal judge.

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THE ARIZONA REPUBLIC

September 20, 1999

FEDS ALL WET ON THIS ISSUE

U.S. HAS NO RIGHT TO CLAIM ARIZONA'S SURPLUS WATER

Section: Opinions

Edition: Final Chaser

Page: B6

Estimated Printed Pages: 3

Article Type: EDITORIAL: OUR VIEW

Article Text:

Picture the federal government with its big paws wrapped around a straw, sucking more and more water out of the Colorado River. Think of it as Arizona's water. Our entitlement. Our lifeblood, granted to us by congressional action, interstate compacts and U.S. Supreme Court decisions.

It seems to be a point lost upon the U.S. Department of Interior and Secretary Bruce Babbitt, a former Arizona governor.

Interior is suggesting a water grab that would jeopardize years of ongoing and delicate negotiations between various parties, including Arizona, the federal government and Indian tribes. At stake is 47 percent of the unused Central Arizona Project water that Arizona now banks in underground aquifers or is sold on a spot basis.

The amount of water varies from year to year, but typically the total is 500,000 acre-feet, and the **feds** want nearly half for reasons they don't say. That's over and above the 200,000 acre-foot pool of additional CAP water that is on the table to settle Indian water claims. One acre-foot is about 326,000 gallons, or enough water to meet the needs of a family of five for a year.

This is a critical **issue** for Arizona, says Rita Pearson, director of the Arizona Department of Water Resources. "If the secretary pursues it, Indian settlement discussions would be derailed," she notes. It's a view shared by a multitude of water users -- Valley cities, irrigation districts, the Central Arizona Water Conservation District board and others.

Taking this water away would put Arizona's cities in peril. Surplus CAP water is used to reduce the risk of drought, and the **feds** should not be going down this path.

For their **part**, federal officials say only that they want access to the water pool, to bid on amounts in the marketplace like everybody else. Not to allow the government this opportunity, they say, would be discriminatory.

If this is their game -- to be treated like everybody else and not establishing a preferential right -- the **feds** certainly aren't communicating well.

To put this latest ploy in context, some background is in order.

Arizona has been working hard on settlements over two daunting problems at once: The amount of money it must reimburse for building the CAP and the historical and legitimate claims of Indian tribes.

There have been two tracks. Reimbursement is a matter in federal court, and decisions so far have sided with Arizona's contention that it owes less than the **feds** demand. Meanwhile, teams of negotiators have been trying to close the books on Indian water claims.

On both fronts significant progress has been made. That's the good news. Last week, the Central Arizona Water Conservation District released a proposed agreement to end the reimbursement litigation, pegging Arizona's reimbursable cost at \$1.65 billion, far less than the \$2.33 billion sought by the **feds**.

The district also said it was willing to hand over an additional 200,000 acre-feet of CAP water to help settle Indian claims. Not coincidentally, this is the amount that negotiators in the Indian claims talks have cited as crucial.

Regrettably, Potomac greed seems to have surfaced just when it looked like the final pieces were falling into place.

The **feds** always have linked the two issues, whereas state water interests have not. The core **issue** for Arizona has been whether the state will have exclusive control over its entitlement of 2.8 million acre-feet of Colorado River water annually. That's important because once the pending deals are wrapped up, Arizona must have iron-clad assurances that the **feds** won't come back demanding more CAP water. Certainty about supply gives Arizona the stability that it covets.

Arizona is entitled to all unused CAP water, according to terms of the master repayment contract. Pearson says the **feds'** new demand, delivered by David Hayes, Babbitt's deputy and chief negotiator, "clouds the title of that water." She says Hayes has been vague about anticipated uses, but it could be left in the Colorado River and used for in-stream habitat restoration or assist California with its water woes.

Financing a project ought not to be confused with ownership of the water. Picking up 47 percent of the construction tab, as the **feds** are, doesn't entitle them to a proportionate amount of surplus CAP water. It just doesn't wash. No other Western water project is structured like that.

Arizona and its water users have worked tirelessly on these complex and important issues. Hayes has told Pearson that from the federal point of view, the surplus water **issue** is "a deal breaker."

He's right. From Arizona's perspective it most certainly will be. As is, the federal position is unjustified, and Babbitt ought to take it off the table.

Graphic:
Chart

Caption:
Web Links

For more information, visit these Web sites:

* Central Arizona Project

www.cap-az.com

* Arizona Department of Water Resources

www.adwr.state.az.us

* U.S. Department of Interior

www.doi.gov

* U.S. Bureau of Reclamation

www.usbr.gov

Visit the Opinions section online at www.azcentral.com/opinions for this editorial and others, as well links to the above sites.

Memo: Editorials represent the position of The Arizona Republic, whose editorial board consists of Keven Ann Willey, Phil Boas, Jennifer Dokes, Doug MacEachern, Joel Nilsson, Robert Robb, Laurie Roberts, Linda Valdez, Ken Western and Steve Benson.

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Record Number: 9909230047

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Rift in CAP claims debate broadens

Feds up ante, demand piece of excess water

BY GUY WEBSTER
THE TRIBUNE

New conditions sought by the U.S. Department of Interior have set back chances for a comprehensive settlement of major Arizona water issues, state and city officials said Thursday.

Negotiations had been closing in on an agreement for reallocating water from the Central Arizona Project, but Interior has demand water to meet federal uses other than satisfying Indian tribes' claims, said Rita Pearson, director of the Arizona Department of Water Resources.

The most likely use for that water would be in environmental protection projects, such as sustaining riverbed habitats. Any water for specific environmental projects should come from agreements among water users, not from a federal water grab, Pearson said.

"I don't understand how a federal administration that's running out of time and losing a lawsuit ups the ante at the last minute. They've done it in a way that's a show stopper," said Bob Lynch, chairman of the CAP Association, a support group for the project.

The Central Arizona Water Conservation District, which operates the CAP, held a hearing Thursday for public comment on a proposed settlement of a federal lawsuit. The suit involves how much the taxpayers and water users in the three-county district must pay the federal government for the CAP.

CAP is a 336-mile-long aqueduct and pumping system delivering Colorado River water to Maricopa, Pinal and Pima counties.

The allocation talks seek a way that will settle large water-rights claims of Indian tribes, especially the Gila River Indian Community and Tohono O'odham Nation.

Highlights

Highlights of the proposed settlement between the Central Arizona Water Conservation District and U.S. Department of Interior:

■ The conservation district, which includes all of Maricopa, Pinal and Pima counties, will repay the federal government \$1.65 billion for building the Central Arizona Project, not \$2.32 billion sought by the government.

■ CAP water for Indian tribes will be delivered at a discounted price, in exchange for an additional \$300 million reduction in the repayment debt.

■ The conservation district will have the right to sell any excess CAP water not taken by contracted water users.

■ The financial settlement is contingent on successful completion within one year of agreements to settle water claims of the Gila River Indian Community and Tohono O'odham Nation.

The additional water that the Interior Department now eyes is "excess" CAP water, such as water contracted to Indian tribes that they can't use yet for lack of adequate irrigation systems.

The state and cities fear setting a precedent for federal use of CAP water other than for Indian settlements.

Mesa assistant utilities manager Karl Kohlhoff said settling the Gila River Indian Community's claims is crucial for taking a major uncertainty out of Valley cities' plans for future water supplies.

But he said the allocation talks now seem unlikely to produce a settlement during the Clinton Administration.

"I'd be happy if I'm wrong, but I just don't think it's possible," Kohlhoff said.

Bill Angier, a water attorney representing Scottsdale, Chandler and some other Valley cities, said "we're a long way" from a settlement with Interior.

CAP talks hit rough water

By GUY WEBSTER
DAILY NEWS-SUN

New conditions sought by the U.S. Department of Interior have set back chances for a comprehensive settlement of major Arizona water issues, state and city officials said Thursday.

Negotiations had been closing in on an agreement for reallocating water from the Central Arizona Project, but Interior has demand water to meet federal uses other than satisfying Indian tribes' claims, said Rita Pearson, director of the Arizona Department of Water Resources.

The most likely use for that water would be in environmental protection projects, such as sustaining riverbed habitats. Any water for specific environmental projects should come from agreements among water users, not from a federal water grab, Pearson said.

"I don't understand how a federal administration that's running out of time and losing a lawsuit ups the ante at the last minute. They've done it in a way that's a show stopper," said Bob Lynch, chairman of

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chairman
CAP Association

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The Central Arizona Water Conservation District, which operates the CAP, held a hearing Thursday for public comment on a proposed settlement of a federal lawsuit. The suit involves how much the taxpayers and water users in the three-county district must pay the federal government for the CAP.

CAP is a 336-mile-long aqueduct and pumping system delivering Colorado River water to Maricopa, Pinal and Pima counties.

The allocation talks seek a way to divvy up CAP water in

a way that will settle large water-rights claims of Indian tribes, especially the Gila River Indian Community and Tohono O'odham Nation.

The additional water that the Interior Department now eyes is "excess" CAP water, such as water contracted to Indian tribes that they can't use yet for lack of adequate irrigation systems.

The state and cities fear setting a precedent for federal use of CAP water other than for Indian settlements.

Mesa assistant utilities manager Karl Kohlhoff said settling the Gila River Indian Community's claims is crucial for taking a major uncertainty out of Valley cities' plans for future water supplies.

But he said the allocation talks now seem unlikely to produce a settlement during the Clinton Administration.

"I'd be happy if I'm wrong, but I just don't think it's possible," Kohlhoff said.

Bill Angier, a water attorney representing Scottsdale, Chandler and some other Valley cities, said "we're a long way" from a settlement with Interior.

Rift widens to resolve CAP claims

Feds up ante, demand piece of excess water

BY GUY WEBSTER
THE TRIBUNE

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Many commented at the hearing on water-allocation issues.

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Highlights

Highlights of the proposed settlement between the Central Arizona Water Conservation District and U.S. Department of Interior:

■ The conservation district, which includes all of Maricopa, Pinal and Pima counties, will repay the federal government \$1.65 billion for building the Central Arizona Project, not \$2.32 billion sought by the government.

■ CAP water for Indian tribes will be delivered at a discounted price, in exchange for an additional \$300 million reduction in the repayment debt.

■ The conservation district will have the right to sell any excess CAP water not taken by contracted water users.

■ The financial settlement is contingent on successful completion within one year of agreements to settle water claims of the Gila River Indian Community and Tohono O'odham Nation.

FROM THE DIRECTOR'S DESK

CAP deal may seem like good idea, except for ag



By **SHELDON R. JONES**
Arizona Agriculture Department Director

There is hardly a more valuable commodity in the Southwest. Men have fought over it and companies have gone broke without it. Water in Arizona is literally as valuable as liquid gold.

Last month, public hearings revealed that a deal was being proposed by the Central Arizona Water Conservation District to reallocate 200,000 acre-feet of Arizona's Central Arizona Project water to several of the state's Indian tribes. In return, Arizona would save \$700 million in what it owes for construction of the 136-mile canal.

While Arizona gets a break on what it owes and long-standing water rights claims by Indian tribes can be settled, non-Indian agriculture may be adversely impacted.

Each year, Arizona receives 1.5 million-acre feet of water from CAP. Arizona's agricultural industries and irrigation districts have invested heavily, in most cases incurring a large amount of debt, in building the infrastructure necessary to receive CAP water.

The reality for today's Arizona farmer and rancher is this: Increase the cost of production inputs such as water and they lose the ability to deliver to market a competitively priced product.

Arizona is facing a serious population crunch. Maricopa County has the fastest growing population in the United States. Meanwhile, areas such

as Sierra Vista and Flagstaff are growing at a rate that could outstrip their groundwater availability. Prescott, Payson and other rural areas have faced the same challenges for several years.

As the urban boundaries have spread, Arizona agriculture has simply moved to more rural areas. Arizona agriculture today is about products (not just commodities), innovation, niche production, vertical marketing alliances and conservation.

In 1997, the state's agricultural industries, not counting the Arizona nursery and greenhouse industries, earned nearly \$2.2 billion in cash receipts. The ultimate economic impact for Arizona's rural communities, from fuel and farm equipment sales to fast food restaurant purchases, is much greater.

A 1993 University of Arizona College of Agriculture study estimated the total agribusiness impact on Arizona's economy to be more than \$6.3 billion, approximately the equivalent of the state's tourism industry.

Reallocating 200,000 acre-feet a year of Arizona's CAP allotment, most of which is targeted for agricultural uses in Pinal and Pima counties, would have long-term ramifications for Arizona agriculture.

Given the economic importance of agribusiness to the state, it is critical that agricultural concerns be addressed before any final agreement is implemented.

NewsBank InfoWeb
The Arizona Republic

THE ARIZONA REPUBLIC

October 8, 1999

**PACT APPROVED TO CUT FEDERAL CAP BILL
BOARD'S DEAL ALSO WOULD GIVE MORE WATER TO INDIANS**

Author: Shaun McKinnon, The Arizona Republic

Section: Valley And State

Edition: Final Chaser

Page: B1

Estimated Printed Pages: 2

Article Text:

A plan to reduce Arizona's bill for the \$4.7 billion Central Arizona Project Canal in exchange for water to help federal officials settle Indian water disputes won easy approval Thursday from the CAP governing board.

Under the proposal, which would end Arizona's 5-year-old lawsuit against the federal government, the state would repay the U.S. Bureau of Reclamation \$1.65 billion for building the canal, about \$700 million less than the bureau wanted.

And Arizona would give the federal government nearly half the Colorado River water delivered by the canal; enough, state officials hope, to satisfy ancestral claims by the Gila River Indian Community, the Tohono O'odham Nation and other tribes.

The Central Arizona Water Conservation District, run by 15 elected Arizonans, voted to approve the deal, 13-1. The district now will file the proposal with a federal judge in Phoenix, where the lawsuit is pending. Some response is then anticipated from the federal government, which still opposes some details, including a limit on the amount of water available to the federal government.

Mark Lewis of Maricopa County opposed the deal, and several other board members voiced concerns.

"I consider this a weasel trap," said Jim Hartdegen, Pinal County's representative. "We're putting our chips on the table so we can see the feds' hand and then see how fast they can weasel out of it."

The proposal would settle the issue of how much Arizona owes the federal government for building the CAP Canal. Federal officials wanted Arizona to repay \$2.33 billion of the \$4.7 billion cost. Arizona sued over the amount, claiming the state should not be responsible for federal cost overruns. A federal judge has already ruled that Arizona shouldn't have to pay more than \$1.78 billion.

The proposed settlement could turn into a windfall for taxpayers in the three counties served by the CAP. Currently, property owners in those counties pay 10 cents per \$100 valuation for CAP repayment costs.

Although the proposed agreement does not directly address Indian water claims, one key condition is settlement of the disputes. To help that process, the CAP would support giving federal officials an additional 200,000 acre-feet a year of water. An acre-foot is about 326,000 gallons.

Indian tribes and the federal government now control more than 400,000 acre-feet.

Graphic:

Color map by The Arizona Republic (see microfilm)

Caption:

CAP canal and pumping plants in Arizona

Memo: Shaun McKinnon can be reached at (602) 444-7116 or at shaun.mckinnon@pni.com.

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Record Number: 9910110046

**NewsBank InfoWeb
The Arizona Republic**

THE ARIZONA REPUBLIC

October 11, 1999

**STRUGGLE FOR CONTROL OF WATER
PACT COULD GIVE TRIBES HALF OF COLORADO RIVER RESOURCE**

Author: Shaun McKinnon, The Arizona Republic

Section: Front
Edition: Final Chaser
Page: A1
Estimated Printed Pages: 6

Article Text:

If water is power - and in the arid West, water is everything - the balance of power in Arizona is about to shift.

State and federal negotiators are working on an agreement that could leave 10 Indian tribes in control of nearly half the Colorado River water that flows through the Central Arizona Project Canal.

It's enough water to serve an urban population of more than 3 million, and someday it just might.

The Clinton administration is determined to see that the tribes get water. Interior Secretary Bruce Babbitt has made it clear that he will use his authority to take the water from the state if talks fail. State officials believe some sort of agreement is in everyone's best interest.

The tribes, which want the water to settle decades-old claims against the federal government, likely would lease some of their bounty back to farmers, who stand to lose the most in the deal, or to cities thirsty to accommodate new growth.

What worries some CAP users is the prospect of an open water market that could someday force farmers to compete with cities, or even pit Arizona against neighboring states.

"What we're doing here long-term is drying up Pinal County," Eloy farmer Norm Pretzer warned state officials. "It's going to be pumped dry, and that's going to be it for us. That's going to be one hell of a drive to Tucson."

Indian water claims against the federal government have bubbled beneath the surface for years with only scattered success.

BABBITT PUSHES ISSUE

The issue took on a new urgency recently. Babbitt, a former Arizona governor, began pushing for a final agreement. And Arizona officials formally linked the tribal claims to a plan that would end a long-standing dispute over financing the \$4.7 billion Central Arizona Project.

The 336-mile canal each year carries 1.5 million acre-feet of Colorado River water, potentially enough for more than 7 million urban residents, to Maricopa, Pinal and Pima counties. It supplies ever-greater portions of the drinking water used by the rapidly growing populations in Phoenix and Tucson.

UNRESOLVED ISSUES

Tribal water rights are part of three unresolved issues involving the project:

/ How should as yet unused and excess portions of the CAP water be divided, and who should control those amounts?

/ How much CAP water should be used to help the federal government settle ancestral water claims among the state's Indian

tribes?

How much of the CAP's cost should Arizona repay to the federal government? The state sued the U.S. Bureau of Reclamation to avoid paying what it claimed were cost overruns. A judge sided with the state on key issues, and Arizona last month proposed its repayment settlement.

Federal officials have long sought to connect all three questions. The state has objected, saying that the issues are separate. But in its proposal to settle the CAP repayment costs, the Central Arizona Water Conservation District, run by 15 elected Arizonans, included a resolution that could help settle the Indian claims.

Rita Pearson, director of the Arizona Department of Water Resources, said linking all the CAP disputes may ultimately speed final agreements, though she cautioned against piling on too much at once.

"What we've got is a delicate balance," she said. "The momentum of tying these things together is bringing momentum for closure on all three. But on the other hand, too many issues can weigh it down. It's like riding a bicycle downhill. More weight will make it go faster, but too much and you crash and burn."

'FAIR AND REASONABLE'

Although more than a half-dozen Arizona tribes are pursuing water claims, the most critical negotiations surround the Gila River Indian Community, which already controls the biggest share of CAP water among the state's tribes.

Gila River spokesman Gary Bohnce said the community is seeking only a fair and reasonable settlement, one that addresses the tribe's ancestral claims. He said tribal officials are pleased that the negotiations seem to be moving forward again.

But Cecil Antone, the tribe's lieutenant governor, leaves no room for confusion about what will happen if those talks fail.

"The community will have to continue litigation that we anticipate may last many more decades and continue to cost all parties literally tens or hundreds of millions of dollars," Antone said.

State and federal officials are close to a deal that would give the Gila River Community nearly 150,000 acre-feet of additional CAP water. On paper, the two sides are about 5,000 acre-feet apart, but it's not as simple as meeting halfway. An acre-foot equals 326,000 gallons.

STATE SEEKS CEILING

Arizona wants to set a ceiling on how much CAP water the federal government can take for tribal claims. Federal negotiators don't want their hands tied. Arizona farmers want to be compensated for the water they will give up to settle the claim. Federal officials are not eager to wade into non-federal water use.

Many CAP users also want restrictions that say no water given up by the state in any of the negotiations can be sold or leased beyond Arizona's borders. Some fear the large pools of unused water could find its way into negotiations with water-starved California and Nevada.

"That should be absolute, in indelible ink," said George Campbell, a member of the CAP board of directors. "We have to say there is not and will not be any condition that would allow water to leave the state of Arizona."

No Arizona tribal official has publicly suggested marketing the water out of state, but the issue festers elsewhere. Just across the Colorado River in California, the Chemehuevi Tribe has tried to lease some of its unused water to needy urban users in Los Angeles and San Diego.

LOT AT STAKE FOR TRIBES

Matthew Leivas, the tribe's former chairman, said leasing the water would infuse badly needed cash into the tribe's agricultural program and could help tribal members become more self-sufficient.

"The tribes have a lot at stake," Leivas said. "I think it's time we came together. People have to show more respect for the river. We need to protect it, but we need to get our fair share, too."

Behind most of the uneasiness in Arizona is a giant pool of water, which in the West might as well be another Comstock

Lode. If all the settlements now on the table are approved, 10 tribes will share control of more than 600,000 acre-feet.

To put that in perspective, Nevada's entire share of the Colorado is 300,000 acre-feet, an allotment that serves an urban valley of about 1.3 million people surrounding Las Vegas. All 10 tribes combined number barely 100,000 people.

Pearson said it's important to remember that many of the tribes need water for farming operations, which consume more water than urban use. The Gila River Community produces cotton, wheat, alfalfa, barley and other crops on about 12,000 acres.

Agriculture, in fact, is the very reason the tribes have claimed so much water. A 1908 U.S. Supreme Court decision awarded tribes enough water to meet the purpose of the reservation. For many of the Arizona tribes, that purpose is agriculture.

FARMERS PAYING PRICE

But non-Indian farmers say they're the ones paying the highest price. Under Babbitt's proposed settlement, as much as 200,000 acre-feet now set aside for agricultural use would be taken to settle the tribal claims.

David Iwanski, executive vice president of the Arizona Agri-Business Council, said farmers understand they were never to have a permanent share of CAP water. But they aren't prepared to give up what they have without compensation, whether it's money or an assured water supply for at least 30 years.

"Agriculture continues to be the largest user of CAP water," Iwanski said. "We need to respect the fact that debt was incurred by the farmers and the irrigation districts, and they need that water to repay that debt. It will take some time before Indian communities have the infrastructure in place to use their share."

Paul Orme, an attorney representing the Central Arizona Irrigation and Drainage District, said the settlement as proposed would hit not only farmers, but in Pinal County, it would end growth.

"There is no question this settlement is being made on the backs of the people who use water in Pinal County," he said. "Our growth has to be protected. We need some assurance for future water."

URBAN AREAS AFFECTED

Maricopa County cities also are concerned about the effect of the deal on growth, though many are already talking to tribes about leasing water. Scottsdale, Peoria, Goodyear, Mesa and other communities need more CAP water if they are to grow.

Karl Kohlhoff, assistant utilities manager for Mesa, said the outcome of the tribal settlements are important to help preserve an assured water supply for cities.

"This Arizona water needs to be used in Arizona for Arizonans," Kohlhoff said. If current talks fail, he added, "the losers will be the tribes and everyone in Arizona."

State negotiators want to keep the talks on track if only to avoid something much worse. In laying out his latest proposal, Babbitt also spelled out the alternatives. Without a negotiated agreement, the Interior secretary indicated he is prepared to take whatever water he thinks necessary. That includes nearly 66,000 acre-feet of still unallocated municipal water that has become a holy grail for Arizona water officials.

David Hayes, Babbitt's chief deputy and lead water negotiator, said the secretary isn't trying to use the other proposals as a club against Arizona, but he wants everyone to understand that settling tribal claims is a priority.

"Our goal is to have a mutually agreeable settlement," Hayes said. By negotiating, he said, the state not only creates a future water source, it avoids a costly and drawn-out court battle that the tribes could well win.

Graphic:

Chart

Color photo by Suzanne Starr/The Arizona Republic

Color charts (2) by The Arizona Republic (see microfilm)

Caption:

AT A GLANCE

Water for Arizona

Indian tribes

Tribes with Central Arizona Project allocations and water rights settlements:

- * Ak Chin
- * Fort McDowell
- * Salt River-Pima Maricopa
- * Yavapai-Prescott

Tribes with CAP allocations and partial settlements:

- * San Carlos Apache Tribe
- * Tohono O'Odham

Tribes with CAP allocations and no final settlements:

- * Gila River Indian Community
- * Pascua Yaqui
- * Tonto Apache
- * Yavapai Apache

Tribes with water rights but no CAP allocations:

- * Cocopah
- * Colorado River Indian Tribes
- * Fort Mohave Indian Tribe
- * Fort Yuma-Qucchan

Tribes without adjudicated rights, settlements or CAP allocations:

- * Havasupai
- * Hopi
- * Hualapai
- * Kaibab-Paiute
- * Navajo
- * San Juan Southern Paiute
- * White Mountain Apache
- * Zuni Pueblo

Source: Arizona Department of Water Resources.

1) The Gila River Indian Community, which already controls the biggest share of CAP water among the state's tribes, is seeking only a fair settlement of ancestral claims, a Gila River spokesman says.

2) The Gila River Indian Community uses a great part of its share of water for its farming operations. Sacaton Ranch Manager Everett P. Stone Sr. watches Lance Williams install an irrigation portal to a field.

- 1) Arizona's tribes get more water
- 2) Indian water

Memo: Shaun McKinnon can be reached at (602) 444-7116 or at shaun.mckinnon@pni.com.

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Record Number: 9910140005

Arizona water project settlement not close

Associated Press

PHOENIX — Don't hold your breath waiting for settlement of the high-stakes lawsuit between the state and the federal government over Central Arizona Project money and water issues, lawyers for the two sides told a judge Tuesday.

Progress has been made in negotiations. But so far all there is to show for it is a settlement offer from one side and number of unresolved issues, the lawyers said during a U.S. District Court hearing before Judge Earl Carroll.

While the board that oversees the CAP hopes to hold a December formal vote on a final settlement, "I'm afraid that that date may be overly optimistic," said Stuart Somach, a lawyer representing the Central Arizona Water Conservation District.

The state and federal officials have been locked in a long-running dispute over how much taxpayers are obligated to repay for the CAP, a canal system that channels Colorado River water to central and southern Arizona. The dispute has been complicated by water claims from American Indian tribes.

John Stemplewicz, a U.S. Justice Department attorney representing the Interior Department, said a settlement is within reach if pending issues on water allocation and electricity revenue can

be negotiated successfully.

"We will have quite a ways to go until they are resolved," he said.

Tuesday's hearing was held 12 days after the CAWCD board approved a "framework" for a proposed settlement. Terms would include shaving Arizona taxpayers' debt for CAP construction costs by nearly \$700 million in exchange for giving up 200,000 acre-feet of CAP water to the federal government to use to settle Indian tribes' water-rights lawsuits.

"That wasn't an agreement that they voted on," Stemplewicz said after the hearing. "It was an agreement to make an offer."

The settlement proposal has been criticized by some Pinal County residents as jeopardizing the future of agriculture with its surrender of permanent rights to the 200,000 acre feet now allocated but unused by farmers because of its price. Backers of the proposal contend that other provisions would give farmers a decades-long temporary right to CAP water at prices they can afford.

Contrary to Carroll's desire to keep the negotiations "in the courtroom," Stemplewicz said some parties in the case apparently are trying to stir up a public sensation that could ultimately make it harder to negotiate a settlement, he said during the hearing.

**NewsBank InfoWeb
The Arizona Republic**

THE ARIZONA REPUBLIC

October 27, 1999

**GLOBE, SAN CARLOS APACHES STRIKE DEAL TO SETTLE WATER-RIGHTS
DISPUTE
TO SWAP CAP SUPPLY FOR GROUND ALLOTMENT**

Author: Shaun McKinnon, The Arizona Republic

Section: Valley And State

Edition: Final Chaser

Page: B4

Estimated Printed Pages: 2

Article Text:

Adding another key piece to Arizona's water picture, Globe and the San Carlos Apache Tribe have settled a long-simmering water-rights dispute, state officials said Tuesday.

Under the deal, Globe will give the tribe the city's 3,500 acre-foot share of Central Arizona Project water in exchange for the right to pump up to 2,500 acre-feet a year of groundwater from Cutter Basin, along the San Carlos Reservation border in Gila County.

The city also will earn first dibs on about 1,000 acre-feet of CAP water should the tribe decide to sell or lease it. An acre-foot is about 326,000 gallons, enough to serve an urban family of five for a year.

In a joint statement, Velasquez W. Sneezy, vice chairman of the San Carlos Tribe, and Globe Mayor David Franquero, said the agreement "marks the dawn of an era of good feeling between the city and the tribe."

They credited Gov. Jane Hull with shepherding the negotiations after the two sides hit a snag earlier this year.

The San Carlos-Globe deal is part of a larger Indian water-rights settlement process that involves the San Carlos Apaches, seven cities, the Salt River Project, the Roosevelt Water Conservation District and the Central Arizona Water Conservation District.

Interior Secretary Bruce Babbitt announced a partial agreement in late March, but some elements, including the dispute with Globe, remained unsettled.

Negotiators still must reach terms with the Central Arizona Water Conservation District, which manages the CAP canal. The district wants the cost of delivering water in the San Carlos settlement deducted from what the state owes the federal government for building the 336-mile CAP canal, which carries Colorado River water to Phoenix and Tucson.

When the agreement is final, the 12,000-member San Carlos tribe will hold the rights to more than 71,000 acre-feet of water from various sources, enough to serve a population of 355,000. Tribal officials have already discussed leasing some of the water to Scottsdale and other thirsty cities.

The tribe will also gain access to a \$50 million development fund that could help pay for several environmental restoration projects.

Memo: Shaun McKinnon can be reached at (602) 444-7116 or at shaun.mckinnon@pni.com via e-mail.

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Record Number: 9910300060

APPENDIX E

Worksheet of NIA

Number Calculations

APPENDIX E

NON-INDIAN ALLOCATION WORKSHEET

The calculation of non-Indian agriculture (NIA) allocations was the subject of many comments received through the scoping process. The comments focused primarily on the process used to convert the percentage of NIA allocated to individual entities into volumes in the definition of alternatives identified for evaluation in this EIS. It should be noted that with the exception of the proposed action, it is anticipated that NIA contracts and subcontracts will continue to be based on the allocation of a percentage of NIA priority water available. The conversion of percentage allocations to volumes is for the purpose of providing consistent definition of alternatives in the scoping process only.

The attached worksheet documents the process used to convert NIA percentage allocations to volumes for individual entities for the purposes of this EIS. The steps below outline the process used in the calculations shown on the attached worksheet.

1. **Determine normal year deliveries** - The normal year supply of 1,490,000 af per year, is based on a normal supply from the Colorado River for the purposes of this EIS. The normal year delivery is the normal year supply less estimated losses of 75,000 af per year. The normal year delivery is 1,415,000 af per year.
2. **Calculate the Initial NIA Pool**– The NIA supply is the CAP water available after the Indian and M&I uses are delivered. The NIA supply is defined as normal year delivery minus Indian and M&I uses. Assuming full use of the 1983 contracts in the 1983 ROD, the NIA supply is 466,394 af per year.
3. **Determine NIA Pool after 1984 Ak Chin Settlement Act and 1988 SRPMIC Settlement Act** – The addition of Colorado River water supplies in the CAP system reduced the NIA supply. The NIA supply was reduced to 397,949 af per year based on normal year deliveries minus full use of Indian and M&I allocations and the addition of Colorado River water into the system.
4. **Convert the NIA percentage allocation to volumes per entity based on the 1988 starting line** – Using the NIA supply calculated in step 3, multiply the allocation percentage per entity by the 1988 NIA supply of 397,949 af per year. The results of the conversion are shown in the attached worksheet. In addition, the 1992 ROD provided additional percentages of NIA supply to each entity. Conversion of the 1992 reallocation are shown in the attached worksheet.
5. **Calculate the NIA supply at its current level** – The current NIA supply has been reduced by the relinquishment and conversion of HVID water to Indian priority for federal use, and for the sake of this analysis, the definition of RWCD's assignment as part of SRPMIC and relinquishment to the Secretary of 23,600 af per year. These actions reduce the NIA supply available for NIA use to 341,098 af per year.

6. **Determine the water reserved for the Cities pursuant to the HIDD Agreement** – In the HIDD Agreement, several Plan 6 Cities received the assignment of NIA water from HIDD as well as an option to contract for 5% of the NIA supply. The assignment and option combine for approximately 11.97% of the NIA supply. The agreement includes a formula for calculation of the NIA supply that reflects the inclusion of a portion of the HVID water as Indian water and Wellton-Mohawk IDD (WMIDD) water as M&I water, while the Yuma Mesa Division (YMD) water reduces the normal year delivery by 47,500 af per year. In addition, the formula includes provisions for providing conversion of the CAP water associated with up to 7,077 acres of land in HIDD to M&I uses. The formula is based on $11.97\% \times \text{NIA}$, where $\text{NIA} = 1,415,000 - 47,500 \text{ YMD} - (309,828 + 13,933 \text{ HVID}) - (638,823 + 22,000 \text{ WMIDD})$. The resulting volume of NIA water reserved for the Cities is 45,835 af per year for the purposes of this EIS.
7. **Calculate the NIA uncontracted supply** – The NIA uncontracted supply is the residual of the currently available NIA supply less the water reserved for the Cities, 2-Party Agreements, relinquished water (exclusive of RWCD which was removed from the available NIA supply), and declined water. The uncontracted supply is 71,815 af per year and includes supplies allocated in the 1992 ROD for entities that have not relinquished or declined their allocations under the 1992 ROD.

STEP 1 - Determine Normal Year Delivery as Normal Year Supply - losses

	VOLUME
NORMAL YEAR SUPPLY	1,490,000
LOSSES	-75,000
DELIVERY	1,415,000

STEP 2 - Calculate Initial NIA Pool as Delivery - (M&I + Indian)

DELIVERY	1,415,000
INDIAN	-309,828
M&I	-638,823
NIA (residual after Ind+M&I)	466,349

STEP 3 - Determine NIA Pool reduction as 83 NIA - (YMD + WMID)

1983 ROD ALLOCATION	466,349	
Yuma Mesa Div (50k w / o losses)	-47,500	(Ak-Chin Settlement 1984)
WMID / SRPMIC (22k w / o losses)	-20,900	(SRPMIC Settlement 1988)
1988 NIA POOL	397,949	<i>1988 STARTING LINE</i>

STEP 4 - Convert NIA percentage allocations to volumes based on 1988 STARTING LINE
as 1988 NIA POOL * Allocation Percentage

ORIGINAL IDS

ENTITY	Allocation % 1983	VOLUME	Allocation % 1992	VOLUME	CURRENT STATUS
CAIDD	18.01	71,671	22.74	90,494	To Cities
CHCID	0.28	1,114	0.3	1,194	
HVID	7.67	30,523	8.73	34,741	
HID	6.36	25,310	6.97	27,737	
MSIDD	20.48	81,500	22.75	90,533	Relinquished (1983%)
NMIDD	4.34	17,271	7.23	28,772	
QCID	4.83	19,221	4.83	19,221	Relinquished Federal Uses
RWCD	5.98	23,797	6.33	25,190	
STID	0.77	3,064	0.77	3,064	
TID	1.98	7,879	1.98	7,879	
TOTAL	70.7	281,350	82.63	328,825	

DECLINED IDS

ENTITY	Allocation % 1983	VOLUME	Allocation % 1992	VOLUME	CURRENT STATUS
FICO	1.39	5,531	1.64	6,526	Declined
SCIDD	4.09	16,276	6.84	27,220	
TOTAL	5.48	21,808	8.48	33,746	

NEW ENTITIES

ENTITY	Allocation % 1983	VOLUME	Allocation % 1992	VOLUME	CURRENT STATUS
ASLD LEASE - PP	-	-	0.54	2,149	Declined
ASLD LEASE - AGUIR	-	-	0.11	438	Declined
MVWCDD	-	-	3.17	12,615	Declined
RID	-	-	5.07	20,176	
TOTAL			8.89	35,378	
NIA 1992 TOTAL	70.70	281,350	100.00	397,949	

STEP 5 - Calculate Current NIA Pool at its current level

1988 STARTING LINE	397,949	
HVID (fixed)	-33,251	1990 FMIC Settlement
RWCD (fixed)	-23,600	1992 Agreement
CURRENT NIA POOL	341,098	

STEP 6 - Determine NIA water reserved for Cities pursuant to HIDD Agreement

HIDD (assigned to cities)	26,689	HIDD Agreement Calculation
5% NIA OPTIONS	19,146	HIDD Agreement Calculation
NIA TO CITIES	45,835	

STEP 7 - Calculate NIA Uncontracted Pool

CURRENT NIA POOL	341,098	
RESERVED FOR CITIES	-45,835	
2-Party Agreements	-184,449	1983%(CAIDD, CHCID, MSIDD, QCID, STID, TID)
Relinquished	-17,271	1983% NMIDD per bankruptcy
Declined	-21,728	
UNCONTRACTED POOL	71,815	

APPENDIX G

CULTURAL RESOURCES OVERVIEW FOR THE PROPOSED CENTRAL ARIZONA PROJECT WATER REALLOCATION PLAN

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
Central Arizona Project**

**CULTURAL RESOURCES OVERVIEW FOR THE PROPOSED CENTRAL ARIZONA
PROJECT WATER REALLOCATION PLAN**

Reclamation Delivery Order No. 99B8322810

Contract No. 1425-7-CS-32-02810

Archaeological Consulting Services, Ltd.
ACS Project No. 99-370
May 1, 2000

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CULTURAL RESOURCES OVERVIEW FOR THE PROPOSED CENTRAL ARIZONA PROJECT WATER REALLOCATION PLAN

Introduction

Under contract to the United States Bureau of Reclamation (Reclamation), and at the request of Jon S. Czaplicki, Reclamation archaeologist and Contracting Officer's Technical Representative for Contract No. 1425-7-CS-32-02810, Archaeological Consulting Services, Ltd. (ACS) conducted a cultural resources overview of 35 entities—five tribal sectors, 21 water company service districts, and nine irrigation districts—that could receive new or additional water from a proposed reallocation of Central Arizona Project (CAP) water. The purpose of the overview was to provide Reclamation with an initial summary assessment of known and/or projected cultural resources in the entities that might be affected by the proposed reallocation.

Project Area

The project area consisted of 35 entities scattered throughout the state and encompassing a wide range of environmental and cultural characteristics. The tribal entities are herein collectively referred to as the Indian Sector, the water company service districts as the M&I Sector, and the irrigation districts as the NIA Sector. The affected environment of each entity—including land jurisdiction, known and projected cultural resources, applicable legislation, general assessment of impacts, mitigation measures, and recommendations—is discussed separately below.

Methodology

The first task was to prepare a summary culture history of the project areas to provide a historic context for the cultural resource data. As most of the entities are located within or near the Phoenix and Tucson metropolitan areas, the prehistory section emphasized the Hohokam; however, because the affected environment covers such a diverse area, brief discussions of the Anasazi (who occupied what is presently the Hopi and Navajo territory), and the Salado and Sinagua (whose material culture can be found throughout the northern Hohokam periphery) also were included. The protohistoric section contains brief ethnographic summaries of the relevant cultural groups that comprise the tribal entities. The historic section was structured so as to include as many potential historic contexts as are likely to be encountered in the various entities. It cannot be too strongly emphasized that the culture history section is intended to provide a background for the cultural resource information; in no sense should it be construed as all-inclusive of Arizona's rich and varied past.

Next, site and project maps on file at ACS, the State Historic Preservation Office (SHPO), and the Arizona State Museum (ASM) were checked to determine the extent of archaeological survey coverage and the location of known cultural resources for each entity, including the presence of archaeological and/or historic districts that are listed on the National and/or State Register of

Historic Places. It should be noted that other repositories throughout Arizona (e.g., the Bureau of Land Management (BLM), the Forest Service, Northern Arizona University) maintain their own site and project records, not all of which documentation is duplicated at ASM and SHPO. The cultural sensitivity designations derived from the map check must be understood as being not more than a starting point for estimating the magnitude of potential effects at this stage of the planning process.

The map check focused on non-urban areas, as defined by Reclamation. Information on specific site types and specific surveys were not desired at this stage of the planning process, nor did the limited time frame available to complete this overview allow for assembling data at such level of detail. Site locations were marked on USGS 7.5' topographic quadrangles. The classification system initially sought to identify areas of low (<2 sites per mi²), moderate (3 to 5 sites per mi²), or high (>6 sites per mi²) cultural resource density. However, the nature of human occupation in the project area is such that a single "site" might extend over an entire section; in such cases, the area was classified as having high or moderate cultural resource sensitivity based on the preparer's judgment. The cultural sensitivity data was then marked on entity maps provided by Navigant Consulting, Inc (Navigant).

Because of the highly sensitive nature of the information and confidentiality issues involving the various tribes, no attempt was made to obtain locational data regarding cultural resources or traditional cultural places on tribal lands. It should be noted that some USGS 7.5' topographic quadrangle maps on file at SHPO (e.g., Chuichu) are classified as restricted at the request of various Indian tribes whose lands might extend onto map boundaries; these maps could not be accessed without written permission from the tribes. Additionally, some maps were not on file at either ASM or SHPO (e.g., Arizona City); others were available only at one agency (e.g., Double Peak, available at ASM but not at SHPO). Data for the relevant portions of these entities that could not be found at either ASM or SHPO were derived solely from site and project information on file at ACS.

Surveyed areas were noted to estimate the current level of coverage for each entity. However, a comprehensive evaluation of the adequacy of survey coverage for each entity could not be addressed in the time allotted. Instead, representative examples of the types of archaeological work done in each entity were cited whenever possible. It should be noted that the presence of cultural resources in an area does not necessarily reflect extent of survey coverage; many sites that were mapped and recorded during the late 1800s and early 1900s are in areas that have not been systematically examined.

Planning department officials for each of the entities in the M&I Sector were contacted to ascertain the existence of local laws or regulations pertaining to the preservation of cultural resources. Some municipalities (e.g., Scottsdale, Mesa, Glendale, Tempe) have rules currently in place; others (e.g., Phoenix) are in the process of compiling written historic preservation plans to be implemented in cultural resource compliance projects. When available, this information was included in the entity descriptions.

Impacts were assessed based on known cultural resource density, extent of survey coverage, potential for buried deposits, and information regarding projected uses for the allocated water under each alternative that was provided to ACS. It was assumed that any change in land use (e.g., development of farmland), or ground-disturbing activity (e.g., pipeline construction), would potentially affect cultural resources. All relevant information for each entity is summarized in Table 1.

The overview was prepared by ACS project director Lourdes Aguila. ACS historic archaeologist Karolyn Jackman compiled the Historic period section. Research assistance was provided by ACS archaeologists Jerryll Moreno, Victoria Vargas, Beverly Goodman, and Lynn Scott. Maps were generated by ACS cartographer Christopher Brumfield using digital data supplied by Navigant and the Arizona Department of Water Resources (ADWR). Editorial and administrative supervision was provided by ACS principal investigator Margerie Green.

Culture History

Preceramic Period

The Paleoindian period (10,000–7,500 B.C.) represents the earliest known occupation of North America. Paleoindian lifeways were based on small, nomadic bands that followed megafauna and gathered wild plants. Sites from this period have been documented in southern Arizona (Cordell 1997; Haury 1950; Huckell 1982, 1984a; Mabry 1999). However, sediments dating to this period are generally not exposed in the Salt River Valley. No Paleoindian sites have been reported in the Tucson or Phoenix Basins, although isolated points have been found (Crownover 1994; Huckell 1984a).

The Archaic period (7,500 B.C.–A.D. 300/500) is divided into Early, Middle, and Late phases. Early Archaic (7,500–4,800 B.C.) people followed a generalized hunter-gatherer lifeway and a subsistence-settlement strategy involving high residential mobility, annual procurement rounds, and a wide interaction sphere. Sites of this period are characterized primarily by abundant concentrations of fire-cracked rock and diagnostic artifacts such as ground stone milling equipment—particularly one-hand manos and slab metates—and stemmed projectile points of the Jay, Ventana-Amargosa, San Dieguito, and Bajada types (Huckell 1996a; Mabry and Faught 1999). Few Early Archaic sites have been identified in the Tucson or Phoenix Basins.

The Middle Archaic period (4,800–1,500 B.C.) is perhaps the least understood period in Arizona prehistory (Huckell 1996a; Mabry 1999). In the Southwest, this time was characterized by alluvial cut-and-fill events (Waters 1986), lake desiccation (Waters 1989), hotter summers and cooler winters (Kutzbach et al. 1993), and perhaps lower effective moisture (Mabry 1999, although see Thompson et al. 1993). These processes have helped to destroy or deeply bury many Middle Archaic sites, hindering field identification and discovery. The traditional Chiricahua phase (Sayles and Antevs 1941; Sayles 1983) falls within the Middle Archaic period (Huckell 1996a). Only two sites—the

Arroyo Site and a 4,300 year-old site in the Tucson area—have produced radiocarbon dates associated with Chiricahua phase projectile point types (Bayham et al. 1986; Huckell 1996a, citing unpublished data). Other excavations of Middle Archaic sites in the Santa Cruz River Valley have yielded notched Elko and stemmed San Jose and “Pinto-like” projectile points (Mabry and Faught 1999). Recent ACS excavations of pit structures at AZ U:5:33(ASM) near Pima Freeway and Mayo Boulevard in north Phoenix yielded radiocarbon dates within the Middle Archaic period, the earliest occupation documented to date in the Salt River Valley (Berg et al., in preparation).

Middle Archaic sites include occupational surfaces, thermal or roasting pits, an abundance of fire-cracked rock, and sometimes middens (Bayham et al. 1986; Fish 1967). Only a few structures have been identified in the southwestern Basin and Range province (e.g., Huckell 1984b); several have been found in northern New Mexico. Structures are described as shallow and subcircular, measuring between 2.0 and 4.5 m in diameter, and sometimes containing ashy areas representing possible hearths (Berg et al., in preparation; Irwin-Williams 1973; O’Laughlin 1980). Although recent research has yielded new dates on maize, pushing its presence in the Southwest as early as 1,700–1,900 B.C. (Stevens 1999; Wills 1995), no evidence of corn horticulture has been found in Middle Archaic sites.

In the Late Archaic period (1,500 B.C.–A.D. 300)—also referred to as the Early Agricultural period (Huckell 1996b; Mabry et al. 1997; Mabry 1999)—populations began settling in semipermanent and/or permanent villages or circular pit houses where inhabitants focused on cultivating maize and foraging for wild plants (Fish et al. 1986; Huckell 1988, 1990; Mabry et al. 1997; Roth 1992; Wills and Huckell 1994). Diagnostic artifacts included corner-notched points and dart-point types with contracting stems, triangular knives, flake scrapers, and ground stone milling tools. Significant Late Archaic/Early Agricultural occupations have been reported from east-central and southern Arizona and in the Tucson Basin (Berry and Berry 1986; Clark, in preparation; Doyel 1993b; Haury 1957; Huckell 1984a, 1984b, 1990, 1996a, 1996b; Mabry et al. 1997; Matson 1991; Roth 1989, 1992; Whalen 1971). More recently, sites from this period have been reported along the Lower Salt, Middle Gila, and Lower Santa Cruz Rivers (e.g., Berg et al., in preparation; Hackbarth 1998).

Hohokam

Early Formative Period

The Early Formative period (A.D. 1–700) represents a pan-Southwest transitional stage characterized by a continuation of Late Archaic trends toward increasing sedentism and agricultural dependence, along with the introduction and widespread development of pottery (e.g., Berry 1982; Cable and Doyel 1987; Matson 1991; Wilson et al. 1993). From this basal culture, the distinctive cultural pattern known as Hohokam emerged on the Gila River around A.D. 300. Populations in the Tucson Basin maintained a local expression of this older tradition until about A.D. 700, when the Hohokam pattern flourished and spread its influence throughout most of central and southern Arizona (e.g., Deaver and Ciolek-Torrello 1993, 1995; Di Peso 1956, 1979; Hayden 1970). Because cultural development in

the two regions occurred at slightly different rates and bear different phase designations, they are discussed separately below.

Recent research has shed new light on Hohokam origins, chronology, and community organization (Crown and Judge 1991; Gumerman 1991; Noble 1991). Between 1930 and 1980, scientists hypothesized that the Hohokam immigrated from Mesoamerica and brought with them an economy based on irrigation agriculture (Gladwin 1948; Haury 1976; Schroeder 1966). However, although contacts with Mesoamerica were part of the Hohokam pattern—exemplified by red ware and red-on-buff ware ceramics, figurines, ball courts, mounds, and other objects—evidence now indicates that the Hohokam evolved in situ from the Archaic tradition.

Phoenix Basin

In the Salt River Valley, the transitional Red Mountain phase bridged the Late Archaic to the Vahki phase (Ackerly and Henderson 1989; Cable and Doyel 1987; Kenny 1987; Morris 1969). Cultural characteristics included flexed burials, basin metates, plain ware pottery, large corner-notched projectile points, and small square houses. Settlements were located near the rivers, and small sites occurred in the uplands. Subsistence included agriculture, hunting, and gathering (Doyel 1991a). Szuter and Bayham (1987) suggested that faunal assemblages from Early Formative sites were more similar to Archaic assemblages than those found at Hohokam sites.

Vahki phase traits included well-made plain wares; polished, slipped red wares; and clay figurines. Settlements consisted of large, segmented villages made up of small rectangular houses, square communal structures, and plazas. Both inhumations and cremations were represented. Sites were located near the river. Trough metates and an associated mano grinding complex appeared, suggesting increased reliance on corn agriculture (Cable et al. 1985; Doyel 1991a).

The Estrella and Sweetwater phases were characterized by pit house villages with plazas and red-on-gray, broad-line decorated and grooved ceramics. Use of crushed micaceous schist temper spread from the Gila River, overshadowing the earlier sand-tempered brown ware tradition. Because agricultural activities focused on floodplain farming—possibly incorporating ditch irrigation—riverine settings were favored (Cable and Doyel 1985:297–302). The Early Formative complex of pit house villages, grooved and decorated pottery, and floodplain agriculture was limited to the Phoenix Basin, although similar phases existed elsewhere (Doyel 1993a).

Tucson Basin

In the Tucson Basin, the Agua Caliente phase marked the beginning of the Late Archaic–Early Formative transition (Ciolek-Torrello 1995; Deaver and Ciolek-Torrello 1995; Whittlesey 1993). Emerging architectural and ceramic traditions showed a strong Mogollon-like character that contrasted sharply with later regional developments (Ciolek-Torrello 1995; Deaver and Ciolek-Torrello 1995; Huckell 1987; Whittlesey 1995). Pit houses were circular to oval in shape, with a wide range in size and formality of construction. Most houses had plastered hearths, well-defined

entryways with plastered pillars, and interior storage pits. Both inhumations and cremations occurred at some sites (Ciolek-Torrello 1995). Large communal houses also appeared at this time, suggesting increasing population and residential stability (Halbirt et al. 1993). Settlement patterns, however, continued to reflect the residential mobility characteristic of the Late Archaic period (Huckell 1990; Huckell and Huckell 1984).

Except for the introduction of sand-tempered plain ware ceramics, the material culture also remained very similar to that of Late Archaic farming villages (Chapman 1977; Halbirt 1987; Huckell 1993; Parry and Kelly 1986). Agua Caliente phase “incipient” ceramics were limited in size and form, suggesting a narrow functional range mostly concerned with storage of small quantities of dry seed (Deaver and Ciolek-Torrello 1995; Mabry 1998). Although corn was present in Tucson Basin Early Formative contexts, the continuity of Late Archaic material culture and settlement-subsistence strategies suggest Early Formative populations were not dependent on agriculture (e.g., Gish 1989; Miksicek 1989, 1992; Whittlesey 1995). Hunting and exploitation of a wide variety of wild plants—including agave, amaranth, and acorns—were emphasized (Cairns 1993; Cummings 1993; Huckell 1995; James 1989, 1992).

The subsequent Tortolita phase was characterized by the emergence of distinct regional trends. Slipped and polished red wares were added to the ceramic complex. New vessel forms also appeared, suggesting that ceramics were being adapted to a variety of functions besides grain storage. Hallmark Hohokam manufacturing techniques and forms such as flare-rimmed bowls were present at some sites. Larger, more formally constructed subrectangular houses-in-pits replaced earlier, Mogollon-like circular pit houses. Semi-flexed inhumations predominated. A more diverse ground stone assemblage included slab metates, mortars, pestles, axes, polishing stones, manos, and tabular knives, while the chipped lithic artifacts reflected the expedient technology characteristic of later Hohokam assemblages (Bernard-Shaw 1990; Deaver and Ciolek-Torrello 1995; Eppley 1990).

The end of the Tortolita phase is marked by the introduction of brown pottery with broad-line, geometric designs executed in red paint. Local plain and red wares were still primarily sand-tempered, but small-scale local production of wares tempered with crushed gneiss or mica also occurred. The presence of Gila Basin Hohokam types—such as Vahki Red, Estrella Red-on-gray, and Sweetwater Red-on-gray—indicates interregional contact. No substantiated occupations have so far been associated with this (as yet unnamed) phase (Deaver and Ciolek-Torrello 1995).

Late Formative Period

The Late Formative period (A.D. 700–1075) is marked by the appearance and initial expansion of the Hohokam regional system, which culminated in the Classic period complex of ball courts, cremation mortuary rituals, and associated distinct pottery styles (Deaver and Ciolek-Torrello 1995; Wilcox 1979a, 1988; Wilcox and Sternberg 1983). Prior to the Snaketown phase, the Tucson and Gila Basins

appear to have followed parallel but essentially independent trajectories; artifact associations dating to this time suggest reciprocal exchange. However, during the Late Formative period, the growing influence of the Gila Basin Hohokam dramatically altered the pottery traditions and regional cultural dynamics of Tucson Basin populations.

Phoenix Basin

The Snaketown phase was characterized by regional expansion and rapid cultural change (Doyel 1991a). Settlements grew and irrigation systems became more complex. Regional deployment of irrigation technology opened new agricultural lands on the lowlands as well as on the terraces away from the river floodplains. Rockpile sites may have appeared, indicating development of nonirrigated agriculture (Cable and Doyel 1985). Settlement patterns and ceramic types also changed. Trash mounds and capped mounds were established near houses clustered around courtyards (Haury 1976:81; Wilcox et al. 1981:204). Dull red-on-gray decorated pottery gave way to a light, lively red-on-buff ware, and vessel shapes and design styles diversified. Cremation became the dominant burial mode, and worked stone objects and clay figurines were associated with death rituals (Haury 1976).

By the Gila Butte phase, ceremonial ball courts were constructed at villages in southern and central Arizona. Eventually more than 200 ball courts were built, most dating to the Santa Cruz and Sacaton phases (Wilcox and Sternberg 1983). Settlement hierarchies were established along valley irrigation systems. Village structure became more formalized, consisting of central plazas surrounded by mounds, house clusters, and cemeteries (Gregory 1991; Haury 1976; Wilcox et al. 1981). Platform mounds, macaws, copper bells, mosaic mirrors, and shell trumpets, representing a Mesoamerican influence, have been found (Cable and Doyel 1987; Doyel 1991c; Wilcox 1979a).

Similar settlement patterns persisted into the Santa Cruz and Sacaton phases. Some villages grew; others were established. The culture spread into areas where canal irrigation was not possible, a process referred to as “niche packing” (Cordell et al. 1994). Public architecture included small, oval-shaped platform mounds surrounded by palisades (Gregory 1987) and plazas. Villages containing ball courts were found every 5–7 km along canal systems in the Phoenix Basin (Gregory 1991). The ball court system expanded beyond the Phoenix Basin in the Sacaton phase. By the end of the Late Formative period, however, some ancestral villages, including Snaketown, were abandoned and/or reorganized (Doyel 1980, 1981; Gregory and Huckleberry 1995).

Tucson Basin

In the Tucson Basin, the Snaketown phase was marked by the spread of hachure-decorated pottery and an increase in the use of crushed micaceous temper, reflecting increasing influence from the Gila Basin. Few changes were apparent in the flaked stone assemblage, but the ground stone tool kit

included trough metates, plain and carved effigy bowls, and three-quarter grooved axes. Structures ranged from semicircular to rectangular with long vestibule entryways. Standardized cremation rituals were common, with burials often located in special crematory areas (Deaver and Ciolek-Torrello 1995).

The Cañada del Oro and subsequent Rillito phases were characterized by a steady rise in population and increased residential stability. The frequency and diversity of agricultural features also increased (Doyel 1977a, 1977b; Masse 1979; Woosley 1980). Sites on the upper terraces of the Santa Cruz River, in bajadas, and in mountain areas depended on dry farming and other subsistence adaptations, while floodplain sites emphasized reliance on floodwater and irrigation agriculture, and exploitation of riparian resources (Masse 1980a, 1980b; Mayberry 1983; Wilcox et al. 1981). Ball courts—indicating social integration with the Gila Basin Hohokam—first appeared in the late Cañada del Oro and reached their maximum expansion in the Rillito phase. However, although imported red-on-buff wares were present at most sites, most ceramic assemblages were dominated by the local red-on-brown wares, suggesting much of the growth during this time was a result of local demographic processes rather than an influx of populations from the Salt-Gila area (e.g., Doyel 1977a, 1977b; Wasley and Doyel 1980). Intrusive ceramics also point to contacts with Sonora, the San Simon Valley, and the Mogollon culture areas.

The Rincon phase, viewed as the height of the Tucson Basin Hohokam occupation, was characterized by initial population expansion and residential stability accompanied by rapid culture change (Betancourt 1978; Doyel 1977b; Wallace 1986). Population was concentrated mainly on the west side of the Santa Cruz River. The number of sites increased, and many large sites had at least one ball court (Doelle and Wallace 1991). By the Middle Rincon phase, settlement was more dispersed, with many small hamlets replacing the earlier large villages. Increasing independence from the Gila Basin was reflected in decreased buff ware imports and the apparent collapse of the regional ball court system. Late Rincon developments included multi-dwelling walled compounds, a shift toward inhumation burials, production of local polychrome and red wares, and use of geometric motifs in ceramic decoration—yet another divergence from the traditional curvilinear designs of the Gila Basin Hohokam (Doyel 1979; Greenleaf 1975; Kelly 1978; Wallace 1986; Zaslow and Dittert 1977). Settlements spread to the east side of the river and onto the floodplain. Late Rincon phase ceramics have been firmly associated with *cerros de trincheras*, interpreted as possible defensive features.

Classic Period

Phoenix Basin

In the Classic period settlement patterns, site structure, architecture, and material culture changed. By A.D. 1300 many Hohokam characteristics disappeared or were significantly altered. Available data reveal demographic dominance shifted from the Middle Gila to the Lower Salt (Cordell et al. 1994; Wilcox and Sternberg 1983:239). More platform mound communities were constructed along the Lower Salt than the Middle Gila (Gregory 1987). Multivillage communities along irrigation systems were common. House clusters often were grouped within walled compounds. Building styles included aboveground and pit house structures that were post-reinforced, rock-reinforced, or solid caliche-adobe. Mounds, compounds, plazas, and house clusters comprised the large villages, whereas small settlements contained house clusters or compounds, trash mounds, and cemeteries. After A.D. 1300 contiguous room structures and multistoried great houses were built.

Clearly defined settlement hierarchies existed within the Lower Salt and Middle Gila Valleys. Site types included primary and secondary centers containing platform mounds, villages without mounds, hamlets, farmsteads, field houses, and special-function loci such as resource acquisition and processing sites. Public architecture shifted from ball courts to elevated platform mounds topped by structures (Doyel 1980, 1991a). Platform mound villages may have been administrative and ritual centers that also served as hubs for regional interaction (Doyel 1981, 1991c; Gregory 1987). By the late Classic some platform mounds became residential loci that may have housed elite groups; other mounds retained their ceremonial functions (Doyel 1974a, 1991b; Gregory 1987).

Regional interaction patterns altered in the Classic period. Procurement networks for exotic marine shell, pottery, and obsidian underwent restructuring (Doyel 1991c; McGuire and Howard 1987), and ceramic styles changed. Buff ware production dropped drastically, being replaced by polished red wares. Salado polychrome pottery was common after A.D. 1300. Burial patterns diversified and included both cremation and inhumation. Some villages used only one burial method, whereas others used both. These variable patterns may reflect divergent ideologies (Doyel 1981).

The late Classic period (A.D. 1350–1450) was marked by a collapse of the complex Civano phase social system and the abandonment of the extensive Phoenix Basin settlement system (Doyel 1981; Haury 1945). A Polvorón phase has been proposed for the period between A.D. 1350 and 1450 (Crown and Sires 1984; Sires 1984), which is characterized by solid adobe structures and shallow pit houses lacking enclosing compounds. The solid adobe houses might represent reuse of Civano phase structures. Polished red ware and Salado polychrome pottery were abundant, as was obsidian. The distribution of sites suggests varied subsistence strategies, which might have included irrigation. Polvorón components have been identified at many sites in the Lower Salt and the Middle Gila (Aguila, Larkin, and Giacobbe 1998; Andresen 1985; Doyel 1991b; Sires 1987).

Tucson Basin

The sweeping changes that marked the early Classic period in the Phoenix Basin were evident in the Tucson Basin during the Tanque Verde phase (Elson 1986; Fish et al. 1992; Wallace and Holmlund 1984). Many of the changes represented elaborations of earlier local trends, including continued divergence in ceramic decoration, increase in the use of smudging, proliferation of red wares, the spread of walled, multi-structure domestic compounds, the emergence of platform mounds, and variability in burial practices (Doelle and Wallace 1991; Greenleaf 1975; Kelly 1978; Mayberry 1983; Zaslow and Dittert 1977). Household size variation increased. Occupational as well as stylistic continuity are indicated by the presence of sites with both Rincon and Tanque Verde phase components. New sites proliferated on the east as well as the west side of the river, and large roasting pits—associated with agave processing—became a common feature of sites in nonriverine settings (Doelle and Wallace 1991). While the incidence of Gila Basin Hohokam ceramic types steadily decreased, intrusives from other areas increased, suggesting an apparent realignment of interregional exchange patterns.

The Tucson phase was characterized by population aggregation into a few large, integrated central communities with platform mounds. Use of large roasting pits and other nonriverine agricultural features declined. There was strong ceramic continuity; only relatively rare polychrome and intrusive types are diagnostic to this time (Doelle and Wallace 1991). It has been hypothesized that the combination of aggregation and continuity of local traditions were a result of increasing social differentiation—perhaps leading to warfare—both within individual settlements and between groups in different regions of the Hohokam area (e.g., Craig and Douglas 1984; Doelle and Wallace 1989, 1991; Downum 1986; Wilcox 1979b).

Salado

The concept of Salado as a distinct phenomenon was initially conceived by Emil Haury (1932) and Harold and Winifred Gladwin (1935) while conducting early archaeological research in the Tonto Basin—the heartland and “core” of the Salado horizon during the Classic period (Doyel 1976a). Over the next sixty years, the interpretation of *Salado* underwent repeated revisions (Clark 1998). It has been variously described as a local Hohokam derivative (Doyel 1976a; Steen 1962; Wood and MacAllister 1982), an introduction of a nonlocal Puebloan derivative (Gladwin and Gladwin 1935; Whittlesey and Reid 1982), a partial mixture Puebloan and Hohokam (Clark 1997; Haury 1945), an elite material culture overlay (Rice 1990), a mixture of Hohokam and Sinagua (Schroeder 1953), a corporate regional cult (Crown 1994), or a distribution of decorated ceramics (Nelson and LeBlanc 1986). As a phenomenon, Salado crosses and changes previous cultural boundaries (Clark 1998).

Early Classic period (A.D. 1150–1325) settlement in the Salado area is typified by aboveground masonry architecture in dispersed compounds with internally segmented, discrete layouts (Clark

1995:278-285). Sites of varying size and complexity have been recorded, such as farmsteads, hamlets, small villages, and platform mound sites. The latter appear abruptly in the region, overlaying existing settlement composition (Craig and Clark 1994:112-165; Doelle et al. 1995:439).

Late Classic period/Gila phase (A.D. 1325–1400) settlements exhibit marked changes from the Early Classic period. The number of sites decreases and settlement size increases, reflecting a level of aggregation previously unknown in this region (Clark 1998:11). Increased warfare is evidenced by major episodes of burning and hasty abandonment leaving large floor assemblages intact. Overall, settlement locations and site layouts indicate an increased need for defense (Clark 1998:11).

Sinagua

The name Sinagua is used to describe the prehistoric cultural tradition found in the Flagstaff vicinity (Colton 1946; Cordell 1997; Pilles and Stein 1981). Unlike the Hohokam, Anasazi, and Mogollon, the Sinagua tradition does not represent a new inventory of cultural traits but rather was a complex blending of elements that have been variously interpreted. While some Sinagua traits, such as rock-tempered, predominantly paddle-and-anvil finished plain brown pottery and masonry-lined pit houses, appear distinctive from those of their Anasazi, Hohokam, and Mogollon neighbors, others show significant similarities, including Anasazi-like black-on-white painted ceramics, Hohokam ball courts and canal irrigation, and late Mogollon-like pottery and architecture (Cordell 1997).

Colton (1946, 1968) divided the Sinagua into a northern and southern manifestation primarily on the basis of environment. The Northern Sinagua inhabited the area north of the Mogollon Rim; whereas the Southern Sinagua occupied the area south to the Verde Valley. The earliest agriculturalist adaptation of the area was characterized by isolated, small pit houses with plastered floors, formal hearths, and large, bell-shaped storage cists (Breternitz 1958, 1960; Fish and Fish 1977). Artifacts included oval manos, grinding slabs, and a paucity of pottery (Pilles and Stein 1981). Associated ceramic types include Snaketown Red-on-gray, Gila Butte Red-on-buff, Lino Gray, and Lino Black-on-gray (Breternitz 1960; Pilles and Stein 1981; Schroeder 1960).

By A.D. 800, Sinagua-style pit houses appear concurrently with house-in-a-pit structures similar to those of the Hohokam Santa Cruz and Sacaton phases (Breternitz 1960; Fish and Fish 1977; Pilles and Stein 1981; Schroeder 1960). Established agricultural villages—some very large—occur (Pilles and Stein 1981). The largest settlements had mounds, ball courts, and possibly communal structures (Pilles and Stein 1981). Canal irrigation, as well as dry-farming techniques, were used (Breternitz 1960; Pilles 1978; Pilles and Stein 1981). Hunting, and the collection of resources such as freshwater mussels and turtles, also were important activities. Decorated ceramics include Santa Cruz Red-on-buff and northern gray and white ware types. Plain wares include variants of Verde Brown (Breternitz 1960) and Rio de Flag Brown (James 1974).

Although canal irrigation continues, Hohokam-like traits disappear by A.D. 1125, replaced by a variety of traits representing a discontinuity with the previous century. Settlements were moved to elevations above riverine locales. In the uplands, cliff dwellings and large villages such as Hidden House, Honanki, and other sites in the Sedona area, suggest year-round residence in the canyons. Structures identified as "forts" and characterized by thick, sometimes rubble-filled perimeter walls with interior individual or contiguous rooms, often occurred on points at canyon intersections along the Mogollon Rim or on eminences near streams in the lowlands (Pilles and Stein 1981). After A.D. 1200 there is evidence of exploitation of a wider range of plant and animal species (Breternitz 1958, 1960; Shutler 1950), perhaps indicative of regional climatic change triggered by the series of volcanic upheavals, beginning in A.D. 1064, that resulted in Sunset Crater (Breternitz 1960; Colton 1960; Cordell 1997; Pilles 1979).

After A.D. 1300, populations apparently consolidated into a few large, often multi-storied, masonry pueblos—such as Tuzigoot, Montezuma Castle, Sacred Mountain, and Clear Creek Ruins—located primarily in the lowlands, close to rivers and streams (Pilles and Stein 1981). Most of these major pueblos had kivas and a large community room; some major pueblos also had defensive traits such as parapet walls, small doorways, and sealing of outside doors (Pilles and Stein 1981). Major pueblos continued to use irrigation ditches, and large agricultural systems have been documented in the vicinity of Clear Creek Ruins and Sacred Mountain (Midvale 1920-1971). Intrusive ceramics indicate active trade with people in the Hopi, Winslow, and Chavez Pass areas (Colton 1957; Pilles and Stein 1981). Fabric remains found in caves and cliff dwellings indicate the Southern Sinagua were master weavers and probably traded cotton or cloth to other groups (Pilles and Stein 1981).

Like other areas of the Southwest, the Verde Valley appears to have been virtually abandoned by A.D. 1425. Various causal factors have been proposed, including drought, water logging, or degradation of soil, disease, invasion, and the dissolution of established trade networks, but no direct explanatory evidence has been discovered. It seems most likely that a combination of some or all of these factors contributed to the eventual abandonment of the Sinagua region.

Anasazi

The Anasazi developed out of the Oshara Tradition (Irwin-Williams 1973) and other late Archaic groups that were practicing incipient agriculture in the northern Southwest. Although local phase sequences have been developed for many areas, the Pecos Classification—the first chronology devised for North America (Kidder 1927)—is still used for consistency.

Basketmaker II

The Basketmaker II period (600 B.C.–A.D. 400) marked the Late Archaic-Early Formative transition in the Anasazi area, characterized by permanent villages, the spread of agriculture, and the use of

ceramics. General traits of the period included the atlatl, one-hand manos and shallow grinding slabs, cists, corner- and side-notched projectile points, and hard cradleboard burials. Artifacts, known primarily from dry cave sites, included a great variety of basketry and textiles woven from various raw materials. Sites were located on terraces near major drainages and near arable land (Cordell 1979; Hooton 1930; Jennings 1978; Judd 1922; Judge 1982; Vivian 1970, 1984).

Basketmaker III

In the Basketmaker III period (A.D. 400–700) there is evidence of *in situ* continuity from Basketmaker II. Innovations included pit houses, the bow and arrow, two-hand manos and trough metates, gray and early red-slipped ceramics, and an increasing dependence on agriculture (Cordell 1997). Sites ranged from caves and alcoves to villages with multiple room blocks and specialized activity sites (Reed 1999). Pit houses were shallow, had antechambers, and often were located near deep, well-watered soils in alluvial valleys and uplands. Kivas, possibly even Great Kivas, appeared about this time (Cordell 1997; Jennings 1978). The spread of ceramics was accompanied by a decline in basketry manufacture, although twined bags and coiled basketry continued to be produced (Jennings 1978). Modest quantities of painted and unpainted gray ware ceramics, produced by the coil-and-scrape technique, were decorated with incising and corrugation to resemble basketry (Cordell 1979, 1997; Jennings 1978).

Pueblo I

The Pueblo I period (A.D. 700–900) was characterized by the extensive use of surface rooms and masonry pueblos. However, the number of sites remains stable, suggesting little population growth. Kivas became common, and production and use of neck-banded gray ware and early black-on-white painted ceramics – no longer mimicking basketry designs – became widespread (Cordell 1997). Most settlements were small, with large site clusters occurring at higher elevations and associated with large, alluvium-filled valleys (Cordell 1979, 1997; Hooton 1930; Jennings 1978; Judge 1982; Judd 1922; Vivian 1970). Towards the end of this period, the trend in settlement location shifts away from mesa pinnacles toward valley floors, possibly as a response to full-time reliance on domesticated crops (Baker 1991; Cordell 1997).

Pueblo II

The Pueblo II period (A.D. 900–1100) is understood as the peak of Anasazi cultural development; this was also the time of greatest population dispersal in the prehistoric Southwest. There is a dramatic increase in site frequency. General traits included large, complex sites composed of multiple-room masonry structures with associated kivas and formalized middens; elaborately decorated pottery;

and extensive exchange networks and the development of alliances (e.g., the Chacoan Regional System) (Cordell 1997; Judge 1991; Plog 1983). The introduction of a more productive strain of maize coupled with favorable climatic conditions led to more sophisticated agricultural adaptations, including water-control features (e.g., check dams, stone grids), canal irrigation, and reservoirs and ditches for household use (Cordell 1997; Jennings 1978; Judge 1982). Luxury trade items such as turquoise, macaw feathers, and conch shell (*Strombus* spp.) indicate far-reaching contacts and a vehicle for both the assimilation and distribution of new ideas (Cordell 1979, 1997; Jennings 1978).

Pueblo III

During Pueblo III times (A.D. 1100–1300) most of the Colorado Plateau saw the culmination and termination of its Anasazi occupation, marked by the collapse of the Chacoan system around A.D. 1175 (Cordell 1997; Judge 1989; Reed 1999). By A.D. 1250, the cultural continuity that characterized the early part of the Pueblo III period gave way to new trends. Population was consolidated and aggregated into fewer and larger sites. Defensible locations were preferred, suggesting warfare (Cordell 1997; Gumerman and Dean 1989; Haas 1986; Upham and Reed 1989). The end of the period saw widespread abandonment of habitation sites across the Colorado Plateau.

Pueblo IV and V

During the later Puebloan periods, western Anasazi populations concentrated into a few locations in the Hopi, Zuni, and Little Colorado areas (Cordell 1997; Upham 1982). Although the greater region continued to be used, it was not permanently reoccupied until the arrival of the Navajo in the Protohistoric period.

Protohistoric Period

The Protohistoric period (A.D. 1519–1692) is defined as the time between the conquest of Mexico, when European influences were first being felt in the Southwest, to the reconquest of New Mexico after the Pueblo Revolt, which signaled the establishment of a permanent European presence in the New World. The cultural parameters of this definition include the Spaniards and at least 20 Native American groups representing at least six language families. The cultural affiliations of the tribal groups, however, were not fixed entities but changed throughout the Protohistoric period as a result of biological and cultural exchange between groups (Brugge 1963, 1981; Carlson 1965; Gilpin and Phillips 1998).

Comprehensive coverage of the Protohistoric and Historic periods for all the native cultures represented in this project is beyond the scope of this overview. What follows are brief summaries of the early culture history of the major tribal groups relevant to this study, with emphasis on the types of archaeological and historic properties that might be encountered within the various entities.

After about A.D. 1300, prehistoric Arizona populations were affected by many fundamental changes. Many permanent villages were abandoned. Hohokam populations dispersed from nucleated villages to *ranchería*-style settlements. Immigrant groups—including Apaches, Navajos, Utes, Paiutes, and Spaniards—began to arrive and compete for territory and resources. When Spanish missionaries entered Pimería Alta, they encountered several distinct groups of O’odham people: the Sobaipuri, the Akimel O’odham (Pima), the Tohono O’odham (Papago), and the Hia Ced O’odham (Sand Papago). Various scholars (e.g., Crosswhite 1981; Fontana 1974; Hackenberg 1974) have concluded that the cultural variation and historic distribution of these groups was a result of differential adaptation to various ecological niches.

In Arizona, the ancestral Pima occupied the Salt, Gila, and lower Santa Cruz River Valleys. Although their origins are still the subject of debate (e.g., Hadley and Sheridan 1995:8-10), the Pima or Akimel O’odham are most likely descended from the Hohokam. However, in contrast to the Hohokam, early Piman settlements were characterized by a relatively simple system of nonirrigated agriculture, heavy dependence on hunting and gathering, and dispersed *ranchería* settlements. At least six Akimel O’odham villages were located along the Gila River west of Casa Grande ruins; another village was established along the Santa Cruz River near Picacho Peak. Villages were made up of a community house and various family compounds that included single-family homes, food storage structures, a ramada, a cooking windbreak, and a menstrual hut (Bahr 1971, 1983; Ezell 1961, 1963a, 1983; Gilpin and Phillips 1998; Gladwin et al. 1938). Early Piman material culture included pottery, basketry, and the weaving and trading of cotton blankets. Long-distance trade—as well as endemic warfare triggered by shifting alliances—was maintained with the Pueblos, the Pi-Posh (Maricopa), Cocopa, Quechan, and other groups (Doelle 1984; Ezell 1983; Kroeber and Fontana 1986; Riley 1987). After Spanish contact, wheat and other introduced elements, including horses, cattle, and other livestock; metal implements; irrigation farming; extensive trade; and slave raiding became common. Epidemics caused by European diseases combined with Apache raids resulted in the abandonment of settlements near Picacho Peak during the early 1700s; these groups appear to have relocated to the Gila and Lower Santa Cruz River areas (Doyel 1989).

An important aspect of Piman settlement was their close alliance with the Maricopa (Pi-Posh), an amalgam of Yuman-speakers from the lower Colorado and Gila River Valleys who moved into and shared a territory with the Pima (Ezell 1963b; Schroeder 1954, 1961). Maricopa villages consisted of loose household clusters. Most domestic activities were conducted under a ramada. Other features included large, central meeting houses; sweat lodges; small, oval pit structures for storage; basket-like granaries on raised platforms; and brush seclusion huts (Bartlett 1854; Spier 1933). Each household cluster was led by a headman; a chief and subchiefs also existed, but had limited authority. War leaders, curers, and historians, the latter keeping calendar sticks, provided additional leadership (Harwell and Kelly 1983). The Maricopa farmed, hunted, gathered wild seeds, especially mesquite, and fished the rivers from boats, using nets and traps. Material culture included cotton weaving, paddle-and-anvil pottery, slab or trough metates (sometimes recycled from prehistoric sites), and stone pestles with log mortars (Spier 1933). Baskets were woven or traded with the Pima (Gilpin and Phillips 1998; Harwell and Kelly 1983).

The Sobaipuri, Eastern and Sand Papago, and Upper Pima of Sonora were the ancestors of the Piman-speaking Tohono O'odham (formerly Papago) (Gilpin and Phillips 1998). The Sobaipuri likely descended from the Classic Hohokam of the Tucson Basin and lower San Pedro Valley (Di Peso 1953, 1956; Doyel 1977a; Seymour 1989, 1997). Early Sobaipuri lived in ranchería-style, year-round settlements, had principal chiefs, and practiced irrigation agriculture (Bolton 1948; Burrus 1971; Doelle 1984; Seymour 1993). Features included roasting pits, small rock rings, and flat cobble platforms. Material culture included plain and unslipped red wares; minimally shaped grinding tools; finely retouched unifacial flake tools; and triangular projectile points with concave bases and serrated edges. Specialized sites—such as roasting pit complexes, burials, and rockshelters—were common. Later developments included subrectangular houses with boulder foundations, adobe structures, and European artifacts such as majolica and metal (Seymour 1993). The Sobaipuri were hard hit by Apache encroachment and Spanish persecution; by 1770, they had disappeared as an identifiable group (Gilpin and Phillips 1998). The Upper Pima of Sonora were archaeologically indistinguishable from the Protohistoric Sobaipuri (Gilpin and Phillips 1998).

The Eastern Papago's material culture and subsistence-settlement system were similar to that of the Pima. Their economy depended on wild plant foods—particularly saguaro, cholla, prickly pear, and mesquite—augmented by ak-chin farming (Fontana 1983). Site types include rock circles, walled corrals, open pit features, and farmsteads or ranchería-style settlements. Most pottery was characterized by thin walls and muscovite temper; a few examples of decorated black-on-buff, white-on-cream, and stuccoed wares are known (Gilpin and Phillips 1998).

The Sand Papago (Hia Ced O'odham) were a small group that eked out a precarious semi-nomadic existence over a wide but mostly inhospitable terrain south and west of the Piman territory. They made use of scattered springs and bedrock tanks, took fish and shellfish from rivers or the Gulf of California, hunted, and gathered wild plants. They probably also relied on neighboring farmers, obtaining food and other supplies in exchange for farm labor (Fontana 1983; Hackenberg 1983). Their simple material culture included brush shelters and chipped lithic tools; pottery was acquired through trade with the Pimas (Bahr 1983; Fontana 1983). Because of the ephemeral nature of their activities, archaeological evidence of the Sand Papago is rare (Gilpin and Phillips 1998).

The Hopi are Puebloan farmers whose oral history traces their emergence to the Sipapu, a spring in the Grand Canyon. From this spring, various clans migrated to prehistoric pueblos throughout the Southwest, eventually settling on the Hopi Mesas around A.D. 1200 (Gilpin and Phillips 1998). Awatowi, the largest of the Hopi towns during the Protohistoric period, was occupied from about A.D. 1250 until its destruction in 1700 as a result of internal strife. The Hopi maintained agricultural fields where they grew maize, beans, squash, and cotton. They made pilgrimages to salt mines in the eastern Grand Canyon, and also mined coal, which they used to fire pottery and as a source of heat. After the establishment of the Spanish missions, they began to acquire livestock. Hopi sites include villages, farms, mines, trails, and shrines. Diagnostic artifacts include the highly distinctive Hopi Yellow Ware (e.g., Jeddito Black-on-yellow) pottery (Adams, Stark, and Dosh 1993; Baldwin 1944; Dobyys 1974a, 1974b; Euler 1958; Moffitt, Rayl, and Metcalf 1978; Mueller et al. 1968; Schaefer 1969), and flaked stone tools (Woodbury 1954).

Historical records indicate the Athapaskan-speaking Navajo were present in the Southwest since the late 1600s, but it is likely they arrived earlier (Begay and Roberts 1996). Most Navajo researchers agree that the Navajo were present in northwestern New Mexico by A.D. 1500 (Reed 1999). The earliest documented Navajo sites in northeastern Arizona—classified as pueblitos, defensive sites, habitations, and specialized sites—date to the mid 1700s (Gilpin 1996). The Navajo were for the most part sedentary agriculturalists and sheepherders. Sites were characterized by brush structures and/or forked-pole hogans, light ceramic and lithic scatters, and hearths (Brown and Hancock 1992). Habitation sites exhibit the prescribed spatial patterning of Navajo ritual, with dwellings open to the east or southeast, and trash and floor sweepings placed in ash piles northeast of the hogan entrance (Gilpin and Phillips 1998). Navajo material culture includes colorful woven rugs and silversmithing. Early diagnostic pottery types include Dinétah Gray and Gobernador Polychrome (Brugge 1963, 1981); trade wares from Zuni and Hopi suggest contact with Puebloan groups. It has been suggested (Reed and Reed 1992) that the early exchange relationships established between the Navajo and Puebloan groups provided a means for Puebloan people to seek refuge with the Navajo during the Pueblo Revolt and Spanish reconquest. This high degree of social and economic ties with Puebloan groups manifested itself in later Navajo ceramics (e.g., Gobernador Polychrome), construction of defensive structures, and the appearance of Puebloan-style masked dancers and kachina-like figures in Navajo rock art (Carlson 1965; Eddy 1966; Powers and Johnson 1987; Thiel 1995).

Historic Period

The National Park Service (1986) developed the concept of historic contexts to allow more effective application of the NRHP eligibility criteria to archaeological sites. Each historic context statement consists of a theme (e.g., irrigation agriculture), a place (e.g., the Salt River Valley), and a specific period of time (e.g., the early 1800s). Given the broad scope and limited time frame of the current study, it was impractical to prepare detailed histories for each specific entity. Therefore, the concept of historic contexts was applied to this section to facilitate a summary of the most significant patterns within the overview areas, and to provide examples of historic resource types that might be present in the various entities.

The historic use of the lands covered by this overview dates back to the earliest Spanish explorations. The contexts therefore extend from this early documented time period and on into the more recent historic years. The large number of potential contexts reflects the wide variety of geographic entities and their extensive period of use. Possible contexts include the Protohistoric and Historic period settlement by numerous Native American groups, Spanish exploration and settlement, Mexican settlement, homesteading, United States military activities, transportation, communication, mining, water development, agriculture, and Euroamerican settlement. Many of these early historic sites are traditional cultural places associated with Native American, Spanish, Mexican, and Mormon culture, and are still in use today.

Prior to 1600, Spanish exploration records document the presence of the Pima, Tohono O'odham, Sobaipuri, and Cocomaricopa in the southern portion of the project area (Gilpin and Phillips 1998; Sheridan 1993). The Hopi were living in the northeastern part of Arizona and the Zuni were living to the south of the Hopi settlements, near the New Mexico border (Sheridan 1995). Ranchería sites associated with those groups are expected in those areas. After 1775, much of the north-central area

was inhabited by the Navajo, and the Western Apache ranged throughout the entire west half of Arizona (Gilpin and Philips 1998; Sheridan 1995). Sites in the Hopi, Navajo, and Western Apache project areas relating to this early settlement period might include sheep camps and pueblo villages.

Spanish exploration began as early as 1528 and continued into the late 1770s (Officer 1987; Sheridan 1995). Sites of Spanish influence included presidios, missions, military forts, and communication corridors extending from the Mexican border along the Gila River, and into Hopi country (Gilpin and Philips 1998; Officer 1987; Stein 1994).

The Mexican occupation of southern Arizona continued until the Gadsden Purchase established the present Arizona-Mexico border in 1855 (Officer 1987; Sheridan 1995). Mexican land grants, settlements, missions, and ranches were common as far north as the Gila River (Officer 1987; Sheridan 1995). The cultural influence of this early part of Arizona history continues to the present day. Sites related to this context could reasonably be expected on the Tohono O'odham reservation.

Euroamerican settlement dates back to the mid 1800s when the military, miners, and explorers reported on the opportunities available in the open lands of Arizona (Collins 1997; Janus Associates, Inc. 1989a; Sheridan 1995). Many who came seeking economic opportunities stayed on as permanent settlers (Keane and Rogge 1992; Stein 1990). The Mormons established settlements in the greater Phoenix area, along the eastern Gila Valley, and along the Little Colorado River (Sheridan 1995). Mormon missions and small settlements also were built at Tuba City and Moenkopi in the northern portion of the project area. The Chinese, who came to Arizona in the late 1800s to work on the railroad, formed small enclaves in Tucson, Phoenix, and other cities (Keane et al. 1992). Sites reflecting these contexts should be expected throughout the entire project area.

The United States military entered the west in response to the danger posed by the some Native American populations to citizens journeying to the gold fields of California (Collins et al. 1993, 1997). Initially their presence was restricted to exploration of routes across the territory. Both the Kearny expedition of 1846 and the Mormon Battalion of 1846-47 crossed the project areas (Collins et al. 1993, 1997). Forts were later established at strategic points throughout the state. Sites along the Santa Cruz and Gila Rivers and north of the Little Colorado River could relate to this context.

Efficient transportation was vital from the earliest Euroamerican incursions into the territory. The military established some of the first official routes, often following trails earlier established by Mountain men and Spanish explorers (Collins et al. 1993, 1997; Stein 1994). Later the railroad established two transcontinental lines across Arizona, with branch lines extending into the major mining areas (Janus Associates, Inc. 1989b). Sites such as wagon roads, stagecoach routes and stops, construction camps, and abandoned railroad sidings and stations should be expected throughout the entire project area.

Mining was an especially strong lure that attracted both speculators and settlers. Silver, copper, and a little gold were mined in the San Carlos area (Keane and Rogge 1992). Copper was also common in the Tohono O'odham region. In addition, uranium has been mined on Navajo/Hopi lands (Sheridan 1995). Sites related to mining, including the mines themselves, smelters, communities that developed around the mines, and the roads that connected them should be expected in these areas. .

Communication between isolated settlements and the outside world was vitally important to the safety and welfare of the Euroamericans who came to Arizona to stay. Mail routes using the Butterfield and other stage routes, were improved by the construction of the first military telegraph in 1873 (Collins et al. 1993, 1997; Sheridan 1995). Lines linking San Francisco, Yuma, and Florence were among the first. Eventually all telegraph communication was a commercial enterprise of private companies. The military also established an extensive system of heliograph stations, extending from Fort Whipple to Fort Stanton in New Mexico (Collins et al. 1993, 1997). Intermediate stations were located at San Carlos, Fort Grant, Tubac, and Fort Lowell. Sites related to communication can be expected throughout the entire project area.

Agriculture—in conjunction with water development—has been practiced in the valleys of Arizona since prehistoric times (Dart 1989; Doyel 1993b). The earliest Euroamerican visitors to the Pima villages along the Gila River reported that the Pima were growing vast fields of wheat, melons, and cotton (Gilpin and Philips 1998). The Apache had small fields in the Globe area, and the Spanish encouraged agriculture among the Tohono O'odham (Officer 1987; Whittlesey et al. 1994). The Navajo and Hopi were both agricultural peoples. Agriculture brought the first Pima settlers to the Salt River, and the Apache were encouraged to develop their own fields immediately after their settlement on the San Carlos (Gilpin and Philips 1998). The Mormons established agricultural fields and built the necessary accouterments along the Little Colorado River in the mid-1800s (Sheridan 1995). Fields, irrigation canals, dams, and check dams, as well as traditional cultural places associated with Native American, Mexican, Mormon, and other groups who pioneered modern agriculture in Arizona, could be expected in all of the project areas.

Affected Environment

This section describes the cultural resources (affected environment) of each entity in terms of: 1) brief assessment of current survey coverage; 2) assessment of site density/distribution, including discussion of potential site types that might be present in each entity; 3) land ownership; 4) applicable local legislation regarding historic preservation; and 5) tribes claiming cultural affinity. These data are summarized in Table 1.

Land Jurisdiction and Applicable Legislation

Rights-of-way requirements are only generally known at this stage of the planning process; therefore, the relationship between impacts to cultural resources and land ownership within each entity can only be discussed in general terms. Federally funded undertakings that have the potential to affect historic properties are subject to Section 106 of the National Historic Preservation Act; however, other jurisdictions, including state, county, and municipal agencies, often have their own regulations pertaining to cultural resources and historic preservation. The Arizona State Land Department, for example, requires that archaeological surveys be completed under the Urban Lands Act as part of the planning process for projects that cross state land. While privately funded development that takes place on private land might be exempt from the Section 106 consultation process, such projects that take place in areas that could potentially contain human remains would still be subject to cultural resources compliance under the state's burial protection laws (i.e., A.R.S. 41-865 and the Arizona Antiquities Act, A.R.S. 41-841 through 41-847).

Entities in the Indian Sector include federal (Bureau of Indian Affairs) (BIA), reservation or tribal, and allotted lands. Pursuant to the Archaeological Resources Protection Act (ARPA), consultation with the BIA may be required prior to any archaeological field work on Indian lands. Additionally, rights-of-way crossing reservation lands (e.g., highways or utilities) might be administered by various agencies (e.g., Arizona Department of Transportation; Reclamation). Lands in the M&I and NIA Sectors might include portions of federal (BLM), state, county, city, and private property. Other jurisdictions (e.g., Tonto National Forest) might also apply to certain entities.

Entities

Indian Sector

For purposes of this overview, all Indian lands are considered areas of high cultural resource sensitivity. In general, the spatial boundaries of archaeological sites are defined by surface feature and artifact distribution. However, to Native American groups the land itself can be an important symbol of their shared heritage. The natural environment of specific geological landmarks, as well as larger landscapes, is an integral part of Native American lifeways. Many of these are traditional cultural places used for ceremonial as well as secular activities, and are still in use today. Some are tied to origin or creation myths, kinship, and clan affiliations. Others might serve as physical reference points associated with stories and songs used to convey traditional history and detail proper behavior. Thus, not only the preservation of cultural resources, but also the preservation of the natural landscape, plays a vital part in the preservation of traditional historical knowledge (36 CFR §60.4/National Register Bulletin 38).

Since many archaeological sites may be considered traditional cultural places for present-day Native American locational data regarding these properties are often confidential (see American Indian

Religious Freedom Act of 1978); permission to conduct a tribal records check for purposes of compiling such information must be requested from the individual tribes, and sufficient time must be allowed for tribal response. Given the limited time frame involved, this was beyond the scope of the present study. Therefore, no attempt was made to discover site density or degree of survey coverage within the tribal entities. Tribal consultation regarding location of sites, traditional cultural places, and other areas to be avoided should be implemented at a sufficiently early future stage of the planning process to allow adequate opportunity for the tribes to respond and ensure the undertaking meets cultural resource compliance guidelines within these entities.

Because of the complex nature of aboriginal settlement in the Southwest during the Prehistoric and Protohistoric periods (see Culture History section above), various tribes claim cultural affinity with areas outside their currently designated reservation boundaries. To assist the compliance process, maps showing the areas of cultural affinity claimed by the various Arizona tribes are included as Attachment A. It should be noted that these maps, prepared by ASM, do not include information for all tribes. The maps, and the accompanying list of tribal leadership and cultural resource division contacts (prepared by SHPO) should be considered a starting point for identifying all potential consulting parties in this undertaking.

Gila River

The Gila River Indian Community (GRIC) is located in the Middle Gila River Valley, within the heart of the Hohokam “core” area. It has long been the home of the Akimel O’odham (also known as the River Pima) and the Pi-Posh (Maricopa) tribes. Many prehistoric sites—including Snaketown—as well as protohistoric and historic Pima and Maricopa sites, are known to be present within GRIC boundaries. Recent surveys (e.g., Gregory and Huckleberry 1995) suggest a site density of four to five prehistoric and historic sites per m². Of particular importance are sites dating from the earliest phases of the Pima and Pi-Posh occupation, much of which remains undocumented archaeologically. Other prehistoric cultural resources that might be expected in this entity include trails, petroglyphs, artifact scatters, special-use sites, isolated features, and agricultural fields. Historic properties might include individual households, farmsteads, water-control features (e.g., the Hoover irrigation ditch in St. Johns), telegraph lines, and transportation-related sites such as stage stations, railroad features, and roads. The GRIC has a Cultural Resources Division. For more information, contact Dr. John Ravesloot, Cultural Resources Coordinator (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-3.

Tohono O’odham

Cultural resources in the Tohono O’odham Nation reflect the long history of human occupation in the Santa Cruz River Basin. Significant deposits dating to the Archaic (e.g., AZ AA:15:92(ASM)), and

possibly the Paleoindian periods (e.g., AZ AA:16:39(ASM) in the Schuk Toak Archaeological District), and Hohokam sites ranging from large villages with one or more ball courts (e.g., Punta de Agua, Martinez Hill) to small farmsteads and surface scatters associated with resource procurement and processing, have been documented within the reservation's boundaries (e.g., Marmaduke and Robinson 1983). Other prehistoric site types include trails, *cerros de trincheras*, and petroglyph loci. Protohistoric and early historic rancherías and other remains of native cultures—including Pima, Papago, Sobaipuri, and Yaqui—might be expected to occur throughout the entity, as are deposits associated with the area's Spanish occupation (e.g., Mission San Xavier del Bac, Garcia Ranch, Agua Caliente Ranch). Later historic sites related to ranching, agriculture, mining, and transportation also are known. The Tohono O'odham Nation has a Cultural Resources Division. For more information, contact Mr. Peter Steere, Program Manager (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-9.

San Carlos Apache

Known prehistoric site types within this entity include artifact scatters, agricultural features (e.g., canals, waffle gardens, rock alignments, and possible reservoirs), resource procurement/processing loci, small farming villages, and "composite rancherías" consisting of compounds with multistory room blocks, mounds, and ball courts (e.g., Rice Ruin, Epley Ruin, Buena Vista/Curtis Ruin) (e.g., Black and Green 1995). Cultural affiliation of sites range from the Archaic (e.g., Day Mine Rockshelter) to the Salado; the area's prehistoric resources have been particularly important in defining the origin and nature of the Salado culture (e.g., Brown 1973; Doyel 1978). Protohistoric and historic Apache sites include villages (e.g., Old San Carlos), small settlements, isolated wickiup rings, trash scatters, resource procurement/processing loci, burials, and other limited activity sites. Historic sites affiliated with other Native American, Euroamerican, and possibly Hispanic groups also are known. Historic contexts represented include commerce, transportation, mining, the lumber industry, the military, and water management (e.g., camps associated with the construction of Coolidge Dam) (Effland and Green 1985). The San Carlos Apache Tribe has a Cultural Resources Division. For more information, contact Ms. Vernelda Grant, Tribal Archeologist (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-7.

Navajo

The human occupation of northeastern Arizona dates to the Paleoindian period; Paleoindian and Archaic components and isolated finds have been documented throughout the Navajo territory (e.g., Ayres 1966; Nichols and Smiley 1985; Peckham and Wilson 1967; Vogler et al. 1993). Ceramic period sites are primarily affiliated with the Anasazi cultural tradition; resource types include Basketmaker cave and rockshelter sites, early pit house villages, and aggregated Puebloan communities characterized by great kivas, specialized activity areas, and associated agricultural features (e.g., Black Mesa). Important early Protohistoric site types include defensive pueblitos, dating to the

Pueblo Revolt of 1680, which document Navajo-Puebloan interaction; dwellings; trails; resource procurement and processing loci; and other limited activity sites. Historic resources include mining and herding camps, roads, and shrines. The Navajo Nation has an independently acting Tribal Historic Preservation Officer (THPO) who should be consulted regarding any proposed undertaking that could potentially affect cultural resources within Navajo lands. For more information contact Dr. Alan Downer, THPO, or Mr. Ron Maldonado, Program Manager, Cultural Resource Compliance Section (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-5.

Hopi

Cultural deposits dating to the Paleoindian and Archaic periods have been documented in the vicinity of the Hopi reservation (Gumerman 1966). Basketmaker and Puebloan occupations also are known; during the later Puebloan periods, Western Anasazi groups aggregated in a few locations—including Hopi—and large villages were established on the Hopi Mesas (e.g., Walpi, Awatovi, Kawaika'a, Kiskakovi, Sikiatki, Old Mishongnovi, Old Shongopovi, Oraibi, Chacpahu, Chuckovi, Kuchaptuvela) (Cordell 1997; Upham 1982). Although some of these sites had been abandoned by the mid 1500s, some are still in use. Other site types that might occur throughout the area's occupational sequence include artifact scatters, farms, trails, rockshelters, isolated features, petroglyphs, cairns, shrines, coal and salt mines, and agricultural fields (Adams 1981; Ahlstrom and Hays 1991). The Hopi Tribe has a Cultural Resource Division. For more information, contact Mr. Leigh Kuwanwisiwma (see Attachment A). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-IND-5.

M&I Sector

Arizona Water Company–Apache Junction

Survey coverage in the project area is generally characterized by long, linear projects and small (averaging 40 to 160 acres) noncontiguous block surveys. Exceptions include the Queen Creek portion of Reclamation's extensive Salt-Gila Aqueduct–CAP survey (e.g., Stein 1979; Teague and Crown 1984), and ACS's survey for the Superstition Mountain Development (Moreno and Macnider 1996). These projects yielded numerous prehistoric sites, including villages, artifact scatters, roasting pits, fire-cracked rock concentrations, bedrock mortars, petroglyphs, and lithic quarries. The majority of sites are affiliated with Archaic, Hohokam, and Salado occupations; protohistoric Yavapai sites also have been documented. Other significant cultural resources—including the Hieroglyphic Canyon Site, a National Register property—have been recorded in the Tonto National Forest, Hieroglyphic Mountains, and other adjacent areas. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-3.

Town of Superior/Arizona Water Company-Superior

Survey coverage of the project area is generally low. The easternmost parcel has been examined only via linear surveys; approximately 10 historic sites, including buildings, roads, trails, and sites related to mining, have been documented near Superior city limits. Camps, prospecting loci, shafts, and other sites associated with the area's gold and silver mines (e.g., Queen Creek, Belmont, Grand Pacific) are abundant in this area. In the high cultural sensitivity areas in the north-central and southeastern portions of the westernmost parcel, linear surveys and small block surveys have identified numerous prehistoric sites, including large Hohokam villages (e.g., Los Montículos), prehistoric agricultural features (e.g., field houses, check dams, terraces), artifact scatters, and special-use sites (e.g., lithic quarries). Historic resources include roads (e.g., AZ U:11:70(ASM), historic U.S. 60/70/80/89), railroads, and associated transportation-related features. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-51.

AVRA Water Cooperative

Only three surveys are documented for the project area, most notably portions of Reclamation's CAP survey (Teague and Crown 1984). No sites have been recorded within the entity's boundaries; however, some portions of the entity border areas of moderate cultural resource density (e. g., Camp Pima, a Civilian Conservation Corps installation) (Allen 1979; Wells 1984). Numerous prehistoric, protohistoric, and historic sites also have been documented to the south (Saguaro National Monument) and northeast (Safford Peak). Prehistoric manifestations consist primarily of lithic scatters and small, special-use sites, although trails, petroglyphs, and multicomponent habitation sites also are present. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-6.

Cave Creek Water Company

A representative sample of the entity has been surveyed (e.g., DeMaagd and Punzmann 1996; Holliday 1974; Madsen 1981; Wright 1993) and numerous sites have been documented, particularly along the banks of Cave Creek and adjacent terraces. The entity's southern boundary extends onto the Cave Creek Archaeological District, a National Register property. Prehistorically, the area was utilized for agriculture. Within areas of high and moderate cultural resource sensitivity, sites range from compound villages with multiple structures (e.g., Spur Cross Ranch) to small, isolated field houses and limited-activity artifact scatters; features include burials, middens, roasting pits, check dams, rock piles and alignments, and "waffle gardens." Other known prehistoric resources include petroglyphs, trails, and shrines. Historic sites are associated primarily with mining. The Cave Creek Mining District was formed in 1874 to represent not only the area's large mines—such as the Golden Star Mine and the Phoenix Mine—but also the hundreds of smaller placer mines in the vicinity that were exploited for a year or two before they were abandoned (RECON 1987). Resources associated with ranching, agriculture and water management (e.g., canals), transportation, and the military also

are present. Because of the nature of the depositional environment and the intensity of human occupation in the area through time, the potential for encountering additional surface and buried sites within this entity is very high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-9.

City of Chandler

Most of the projects that have taken place within this entity's boundaries have been linear, related to construction of local roads and utilities (e.g., Woodall 1994). The majority of the western portion of the entity was occupied prehistorically by the site complex known as Los Muertos, a series of Hohokam villages (e.g., Los Guanacos, Las Estufas) associated with an extensive irrigation system (Haury 1945; Howard and Huckleberry 1991; Midvale 1966; Turney 1929). Known and expected prehistoric resources in this area include artifact scatters, architectural features, canals, and burials. Protohistoric Pima and early historic Yaqui remains also are possible. Historic resources in this area include sites associated with agriculture, transportation, and the early Mexican settlement of Guadalupe (e.g., Corona Village). In the Chandler vicinity, known historic properties include the San Marcos Hotel, Chandler Park, and the Plaza Historic District. Water-control features significant to the development of modern irrigation agriculture (e.g., the Eastern, Consolidated, and Western Canals and laterals) also are present. Several historic roads (e.g., the wagon road from Sacaton to Tempe, ca. 1892) cross through the central portion of the entity; however, because of the area's urban development, surface evidence of these features is unlikely. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-12.

Chaparral City Water Company

Approximately one-third of the entity has been surveyed. Surveyed areas range from small (<40 acres) to large (>640 acres) noncontiguous blocks, principally for urban development projects, and linear surveys, primarily for road and utility rights-of-way. Sites ranging from Archaic lithic scatters to Hohokam villages have been documented in the entity's high and moderate cultural sensitivity areas. Other prehistoric site types known to occur within the project area include resource procurement loci (e.g., AZ U:5:177(ASM)), cleared circles, rock alignments, canals, and small habitation sites. The entity's proximity to the Salt River Pima-Maricopa Indian Community on the south and the Fort McDowell Indian Reservation on the north suggests protohistoric sites might be present. Known historic site types include settlements (e.g., Maryville), homesteads, roads (e.g., Phoenix to McDowell Road), isolated graves, trash dumps, and water-control features. Sites related to mining and ranching also could be present. A Mormon settlement is known to have been located to the west of the entity's boundaries; related deposits, possibly including traditional cultural places, might be expected near the southwest portion of the entity. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-15.

Community Water Company of Green Valley

A few block surveys have occurred within the northern half of the project area; the remainder of the entity has been sparsely surveyed, primarily by linear projects along road, railroad, and pipeline rights-of-way. Cultural resources in high to moderate densities occur along the banks of the Santa Cruz River near the entity's eastern boundary. Site types documented in this area include sherd and lithic scatters, and rock piles. Known historic sites include wells, roads, and early settlements such as Continental (AZ EE:1:82(ASM)), founded in 1914 by the Continental Rubber Co. No other sites are known in the vicinity, although historic sites associated with early commerce, farming, and/or mining are likely throughout the project area. Additionally, because of the nature of the depositional environment, the potential for buried sites is high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-18.

Vail Water Company

Survey coverage of this entity has been primarily linear, although a few small block surveys have taken place in the northwest portion of the project area, where numerous sites have been found. This area extends onto the Colossal Cave County Park, a National Register property consisting of more than 20 prehistoric, protohistoric, and historic activity loci; similar remains might be expected in adjacent, unsurveyed portions of the entity. Documented prehistoric resource types include undifferentiated lithic scatters, sherd scatters, and agricultural features (e.g., rock piles, clusters). The Vail Station (AZ BB:14:18(ASM)), a historic site associated with the Union Pacific/Southern Pacific Railroad is within the entity's boundaries. This site, which is characterized by artifacts and features of Anglo, Mexican, and Chinese affiliation, was the main depot for miners working in the Santa Rita Mountains; it is likely that other sites associated with mining and/or transportation might be present within entity boundaries. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-60.

City of El Mirage

Only a few surveys, mostly linear, have taken place within this entity. Two sites were identified northwest of Youngtown; no other cultural resources are known. However, prehistoric cultural deposits are likely in the Agua Fria River floodplain. Historic sites related to transportation, commerce, homesteading, agriculture, and ranching also might be expected. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-21.

City of Glendale

Most of the surveys that have occurred within this entity have been linear; very few moderate-sized (<640 acres) block surveys have taken place. Only one survey is recorded for the southwestern portion of the entity; although this area is currently being used for agriculture, intact subsurface remains are still possible, as suggested by the areas of moderate cultural resource sensitivity that have been identified in the vicinity (e.g., AZ T:7:68(ASM)). In the northeast portion of the entity is an area of high cultural resource sensitivity; numerous prehistoric sites ranging from Archaic lithic scatters to Classic period Hohokam settlements have been documented here, and might be expected to occur in the surrounding areas. The Glendale Townsite/Catlin Court Historic District has been listed on the National Register since 1992 (Graham, Kupel, and Keeling 1997). Other historic resources include roads, commercial and residential structures, farmsteads, and water control features (e.g., the Airline Canal). The City of Glendale has a Historic Preservation Commission. For more information, contact Mr. Larry Harmer, Planning Manager. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-24.

City of Goodyear

Only two small surveys are documented for the southernmost portion of the entity; linear (e.g., Tucson Gas & Electric's El Sol-Vail transmission line) and small block surveys characterize coverage of the remainder of the project area. Many sites have been found in the central portion of the entity between the Gila River and the Estrella Mountain Regional Park. This area of high cultural resource sensitivity has yielded evidence of human occupation from the Archaic to the Late Historic periods. Prehistoric site types include large Hohokam villages (e.g., Coldwater Ruin, Cashion Site, Alkali Ruin), small habitations, artifact scatters, resource procurement loci, bedrock mortars, trails, petroglyphs, and agricultural features. Protohistoric Pima deposits might also be present. Historic resource types include trash deposits, camp sites, farmsteads, water-control features, transportation-related sites, and features associated with ranching. The nature of the depositional environment indicates the potential for buried sites is high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-27

H2O Water Company

Only two projects have taken place within this entity's boundaries. These include a linear survey of the Southern Pacific Railroad right-of-way, and survey of various parcels for the Magma ID portion of Reclamation's Salt-Gila Aqueduct, Central Arizona Project (e.g., Bontrager 1986; Marmaduke et al. 1985; Stein 1979). No sites are recorded within the project area; however, the Massera Site, a large Hohokam village with multiple mounds and a probable ball court, was originally documented by Frank Midvale as extending onto the westernmost portion of the entity. Although most of this site has been obliterated by agricultural activities, it is possible that intact subsurface remains might be

present below the plowzone. A second small area to the east of the entity is surrounded by previously recorded prehistoric sites; similar resources might be expected within the entity's boundaries. Historic resources, particularly sites associated with farming and ranching, also are likely. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-30.

City of Mesa

Most of the previous survey coverage within this entity has been linear (e.g., Macnider et al. 1999), although many small block surveys have also occurred, primarily for urban development. This entity contains two major areas of high cultural resource sensitivity. The northernmost area, encompassing the banks and lower terraces of the Salt River, is characterized by many significant Hohokam remains, including Pueblo Ultimo, Mesa Grande, Crismon Pueblo, Casa del Omni, Pueblo Moroni, and Las Piedras. Many of these sites, which are associated with major irrigation systems, were documented during the late 1800s and early 1900s (e.g., Turney 1929). Although most have been completely obliterated by urban development, surface remains of these once-extensive sites can still be found; intact subsurface remains, including canals, also might be present (e.g., Dennis 1989). Numerous previously recorded sites also are known to have been present in the southeastern portion of the entity, including Rittenhouse Ruins, the Midvale Site, the Ordinance Site, and El Horno Grande. Prehistoric cultural resource types that might be expected in these areas include artifact scatters, agricultural features, burials, and canals. Protohistoric and early historic Pima farmsteads and artifact scatters also might be present. Areas of moderate cultural resource sensitivity elsewhere within the entity include prehistoric as well as historic sites. Known historic resources include trash scatters, roads, canals, orchards, and buildings associated with the early history of Mesa and the surrounding areas. The City of Mesa has a Historic Preservation Committee. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-33.

Metropolitan Domestic Water Improvement District

Much of this entity has been block-surveyed; numerous linear surveys also have taken place, particularly along Interstate 10 and west of the Santa Cruz River. In the easternmost portion of the entity, sites have been recorded along the banks of Tanque Verde Creek, Sabino Creek, and Ventana Canyon Wash. Fewer surface manifestations have been recorded to the west, probably as a result of urban development. Significant cultural resources—including Archaic and Hohokam artifact scatters, Hohokam villages, and resource-processing loci—also have been documented in the southwest portion of the entity. This landscape, dissected by numerous washes that drain out of the Tortolita Mountains, has a high potential for containing prehistoric sites. Protohistoric Papago and Pima sites also might be expected. Historic trails, roads, railroads, and other transportation-related features are common throughout the project area, as are sites related to commerce, mining, farming, ranching, and other historic activities. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-36.

Town of Oro Valley

This area of high-to-moderate cultural resource sensitivity has been extensively surveyed. On the southeast, it borders the Sutherland Wash Archaeological District, a National Register property containing more than 40 sites. Prehistoric sites also abound along Cañada del Oro, Sutherland Wash, Big Wash, Chalk Creek, and the numerous other arroyos that drain the region. Protohistoric and historic trails, roads, and sites associated with farming, ranching, and prospecting might also be present within this entity's boundaries. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-39.

City of Peoria

Few surveys have occurred in the northwest portion of the entity; elsewhere, survey coverage has been moderate, including both linear (e.g., Green 1984; Hoffman and Green 1988) and large block surveys (e.g., Green 1989; Greenwald and Keller 1988). Numerous sites have been documented along the Lake Pleasant-Agua Fria River portion of the entity, making this an area of high to moderate cultural resource sensitivity. High site density is also identified in a small area between State Route 74 and Saddleback Mountain. The east-central portion of the entity extends onto the New River Dam Archaeological District and the Calderwood Butte Archaeological District, both National Register properties. Documented prehistoric site types include artifact scatters of Hohokam and Sinagua affiliation, resource procurement and processing loci, field houses, petroglyphs, and rock features. Historic resources include water-control features (e.g., the Beardsley Canal), residential properties, transportation-related sites, and camps associated with sheep herding and other ranching activities. The City of Peoria has implemented a comprehensive master plan for future development that includes policies for conserving archaeological resources. For more information, contact Mr. Phil Gardner, Senior Planner. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-42.

City of Phoenix

Numerous surveys have occurred within the project area; however, much remains unexamined. Prehistorically, it was part of the Hohokam "core" area; identified loci of high and moderate cultural resource sensitivity—which extend onto the Cave Creek and the New River Dam Archaeological Districts, among others—reflect only a fraction of this entity's prehistoric occupation density. Many of the large agricultural village sites located in this entity (e.g., Pueblo Grande, Pueblo del Rio, Villa Buena, Las Canopas, Pueblo del Alamo, the Patrick Site, Dutch Canal Ruins, La Ciudad, Tres Aguas) were originally recorded in the late 1800s and the early 1900s by pioneers of Arizona archaeology such as Frank Cushing and Omar Turney; few surface remains are extant today. However, because the site's boundaries were carefully mapped and the material remains meticulously described, the projected location of buried features can be estimated. Significant, intact subsurface cultural deposits

are possible even in areas where all surface integrity has been destroyed by agriculture, urbanization, or other ground-disturbing activities (e.g., Aguila et al. 1999). As might be expected, the area's known prehistoric site types include material remains associated with a primarily agricultural economy (e.g., canals, rock features, ground stone artifacts, and specialized items such as tabular knives). Other items, including shell, turquoise, obsidian, and artifacts of Mesoamerican influence—such as palettes and copper bells—reflect the core area's participation in the Hohokam exchange system. Human remains, both inhumations and cremations, are likely in the vicinity of the major sites. Protohistoric Pima sites also might be expected, although some deposits, particularly agricultural sites and features, might be indistinguishable from those of the Hohokam. Historic resources reflect the area's rich and complex heritage, and include sites associated with early Mexican, Anglo, and Mormon settlements, irrigation agriculture, transportation, and commerce. The City of Phoenix has a Historic Preservation Commission. For more information contact Mr. Todd Bostwick, City Archaeologist. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-45.

City of Scottsdale

In general, the distribution of sites across the entity reflects the extent of survey coverage; however, much remains unexamined or has been inadequately covered for purposes of Section 106 compliance (e.g., RECON 1987). Areas of high and moderate cultural resource sensitivity in the northern portion of the entity consist primarily of prehistoric agricultural and habitation sites and historic mining sites such as are common along Cave Creek and surrounding areas. The central portion of the entity is characterized by numerous sites ranging from small undifferentiated lithic scatters of possible Archaic affiliation to extensive Hohokam villages (e.g., Pinnacle Peak Village/the Herberger Site) associated with trash mounds, agricultural features, trails, and petroglyph loci. Rockshelters, quarries, special-use areas, bedrock mortars, and other isolated features also have been identified (e.g., Atwell 1992). In the southern portion of the entity, from Taliesin West (AZ U:5:15(ASM)) to Gilbert Road are many prehistoric artifact scatters, some associated with surface features (e.g., Crownover 1996; Schroeder 1992). Protohistoric Pima sites, including camps and agricultural fields, are known to be present near the McDowell Mountains area; surface remains might be expected. Historic homesteads, wagon roads, corrals, camps, and related trash dumps also are present in this area (e.g., Crownover 1996; Schroeder 1992). Historic resources in urban areas include commercial and residential buildings, and transportation-related sites such as road and railroad features. The City of Scottsdale has a Historic Preservation Committee and has drafted its own Archaeological Resources Ordinance. For more information, contact Mr. Robert J. Cafarella, Director, Preservation Division. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-48.

City of Surprise

A few linear (e.g., Hathaway 1991; Jensen 1994; Kwiatkowski 1993) and block (e.g., Dosh 1988; Neily 1992b) surveys have taken place within this entity's boundaries; however, the majority of the project

area has not been examined. The vicinity of Morristown, in the northwest portion of the entity, is classified as an area of high cultural resource sensitivity. Numerous historic properties representing most identified historic contexts have been documented therein, including sites associated with homesteading, transportation, mining, ranching, and agriculture. Although the majority of the surface remains identified to date in this area have been historic, prehistoric and protohistoric resources also are known, including Archaic and Ceramic period artifact concentrations, agricultural features (e.g., AZ T:2:50(ASM)), roasting pits, cleared circles, and rock rings. Elsewhere within the entity, other small areas of high and moderate cultural resource sensitivity reflect the noncontiguous nature of the area's survey coverage. It should be noted that the entity's surveyed areas have tended to yield cultural resources, therefore, the potential for additional resources in unexamined areas is high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-54.

City of Tucson

Both linear (e.g., Hammack 1983; Rieder and Myers 1996; Slawson 1993; Stephen 1988) and block (e.g., Rozen 1985; Simpson and Wells 1984; Slawson 1994) surveys have yielded sites within this entity's boundaries. Areas of high and moderate cultural resource sensitivity are located primarily at lower elevations along the area's major drainages (e.g., the Santa Cruz Riverpark Archaeological District, a National Register property). Known prehistoric resource types include numerous aceramic artifact and fire-cracked rock concentrations of possible Archaic affiliation, as well as Hohokam sites ranging from small sherd and lithic scatters, to extensive agricultural systems (e.g., AZ BB:14:32(ASM)), to large villages with multiple house clusters, (e.g., the West Branch site, the Valencia Site, Julian Wash, St. Mary's, Punta de Agua, Los Morteros). At higher elevations, camp sites, trails, petroglyphs, and resource procurement and processing sites are common. Although no sites have been reported in the southwesternmost portion of this entity, this area borders the Gunsight Mountain Archaeological District, a National Register property which includes more than 40 sites; similar site types might be expected. Likewise, areas of low cultural resource sensitivity in the east and northeast portions of the entity are surrounded by areas of high site density (e.g., the Saguaro Wilderness area, Colossal Cave County Park, the Sutherland Wash Archaeological District, and the Rincon Foothills Archaeological District, all National Register properties). Protohistoric Pima, Papago, and Yaqui sites also are known; the entity's proximity to the Tohono O'odham and Pascua Yaqui Reservations suggests similar sites might be expected to occur in unsurveyed areas. Historic resources include properties from the area's early Native American, Spanish, Mexican, and Anglo occupations (e.g., San Xavier Mission, Agua Caliente Ranch), and represent every identified historic context, including farming, ranching, mining, commerce, and transportation. The nature of the depositional environment, particularly along the Santa Cruz River floodplain and lower terraces, indicates the potential for buried cultural deposits is high; finds in the nearby Schuk Toak Archaeological District include paleontological remains dating to the Pleistocene, raising the possibility that Paleoindian sites might be present within the entity. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-57.

Valley Utilities Water Company

The southernmost parcel within this entity was previously surveyed; no other projects have occurred within the entity. Although several sites have been documented to the west, none were recorded within the current project area. The Arizona Canal, a National Register-eligible property, borders the entity on the east (Aguila 1998). Historic sites associated with its construction might be expected. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-M&I-63.

NIA Sector*Central Arizona IDD*

Few block surveys have occurred in the project area, but linear surveys along major roads, railroads, and/or pipelines have yielded a few prehistoric sites ranging from small undifferentiated lithic scatters to extensive Hohokam villages dating to the Colonial and Sedentary periods. Protohistoric Pima and historic Anglo occupations also have been documented. South of the entity's boundaries lies the Los Robles Archaeological District, a National Register property. The proximity of this area of high cultural resource sensitivity suggests similar site types might be present within the entity's unsurveyed areas. A series of Reclamation's CAP surveys identified numerous sites just east of the entity's boundaries (e.g., Quillian 1985). Because some of these sites extend onto the entity's northeastern portion, this area's cultural resource sensitivity is classified as high. Additionally, because of the high potential for sediment deposition near the Santa Cruz River floodplain and adjacent terraces, the potential for buried sites in most of this entity is high. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-3.

Chandler Heights Citrus ID

Only one archaeological survey has taken place, and no previously recorded sites are located within this entity. Although herein classified as an area of low cultural resource sensitivity, it is worth noting that archaeological sites are known to be present in the surrounding areas. Pozos de Sonoqui, a major Hohokam village complex with a ball court and platform mound, is located to the east, suggesting the possibility of additional associated cultural deposits—such as artifact scatters, isolated features, and agricultural fields—within the entity's boundaries. Protohistoric and/or historic Pima and Pi-Posh remains also might be present. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-5.

Maricopa-Stanfield IDD

Very few surveys, most of them linear (e.g., Neily 1991), have been performed within this entity's boundaries. Areas of high and moderate cultural resource sensitivity are primarily associated with various tasks pertaining to Reclamation's Salt-Gila Aqueduct-CAP surveys (e.g., Teague and Crown 1984). Prehistoric sites are mainly related to non-irrigation agriculture and resource processing, and include rock features, roasting pits, fire-cracked rock concentrations, artifact scatters, and small farmsteads. There is evidence that sites to the south (e.g., Shelltown, the Hind Site) were involved in the Hohokam shell exchange system (Marmaduke and Martynec 1993); sites with evidence of shellcraft in this entity would be particularly important to answer questions about the nature of prehistoric trade networks. The entity's vicinity to the Ak-Chin Indian Community also suggests that protohistoric and historic Pima and Maricopa sites—including petroglyphs and pictographs—might be present (e.g., Berry and Marmaduke 1980; Marmaduke et al. 1983). Historic sites related to water control (e.g., canals) and transportation (i.e., roads, railroads, and associated features) also are likely. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-7.

New Magma IDD

Several projects have taken place in this entity's northern half, including most prominently Reclamation's CAP survey (Marmaduke et al. 1985); several isolated occurrences, mostly ceramic sherds, were noted, but no sites were found. No projects or sites have been documented in the southern half; however, numerous sites, ranging from Archaic scatters to Hohokam villages (e.g., Escalante Ruin), have been recorded between the entity's southern boundary and the Gila River. Additional prehistoric sites have been recorded to the northwest, within the Queen Creek Archaeological District. It is likely that similar cultural resource types might be present within this entity, particularly intact buried deposits below the existing plowzone. Historic resources, including National Register properties (e.g., the Florence Townsite Historic District), transportation routes, and commercial as well as residential structures, also are known. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-9.

Queen Creek IDD

Less than one-third of this entity has been surveyed, with linear surveys comprising approximately 75 percent of the area examined. Most surveys have been negative, although numerous sites were documented in the northern half of the entity by various surveys associated with Reclamation's Salt-Gila Aqueduct-CAP (e.g., Stein 1979; Marmaduke et al. 1985). This area of high cultural resource sensitivity includes Hohokam artifact scatters—some including mounds—ranging from the Sedentary to the Classic periods (e.g., the Southwest Germann Site; Las Ollas Oriente); as well as architectural sites recorded by Omar Turney, Frank Midvale, and others (e.g., Rittenhouse Ruins) during the 1930s and 1940s. Given the rate of development that has occurred in this area since then, it

is likely that some of these sites are no longer visible; however, intact subsurface deposits are still possible below the plowzone. It is also likely that surface remains—such as field houses, canals, and other agricultural features—associated with some of the larger sites might be present in the surrounding areas. A second, smaller parcel in the south half of the entity also is classified as an area of high cultural resource sensitivity, as it encompasses two large Hohokam architectural sites, Sonoqui Pueblo and Pozos de Sonoqui. Areas of moderate sensitivity contain small, dispersed artifact scatters or border areas of high sensitivity, such as the archaeology-rich landscape around the CAP canal. Historic resources that might be present throughout the entity include homesteads, orchards, roads, canals, and railroad features. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-11.

Roosevelt ID

No large block surveys have taken place, and very few sites have been recorded, within the project area. Given the sparse survey coverage, it is possible that undocumented sites could be present within the entity's boundaries. Site types known to occur within the surrounding WhiteTanks-Hassayampa region range from small lithic scatters of unknown affiliation to large Hohokam villages associated with canal irrigation systems (Gladwin and Gladwin 1929, 1930; Johnson 1963; Midvale 1920-1971; Turney 1929). Other possible site types include Patayan and Yavapai sherd scatters, rock rings, petroglyphs, and rockshelters. Historic roads, canals, and sites associated with mining also are possible. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-13.

San Carlos IDD

Much of the project area has been surveyed, and numerous sites are documented within entity boundaries. The Casa Grande Ruins National Monument, an area of high cultural resource sensitivity, extends onto the northwest portion of the entity just north of Coolidge city limits. This extensive Hohokam site complex—which includes the Casa Grande Site, the Grewe Site, and other National Register-eligible properties—contains habitations, mounds, canals, a ball court, and cremation areas. It is likely that associated cultural remains (e.g., artifact scatters, agricultural features) could be present in the surrounding moderate-sensitivity areas. Several additional prehistoric properties in the vicinity have been recommended for inclusion on the National or State Register, including Adamsville Ruin, Poston Butte, and the Blackwater Archaeological District. Other resource types that might be expected to occur within this entity's boundaries include protohistoric Pima sites, historic farmsteads, irrigation features, roads, and features associated with the Phoenix & Eastern, the Southern Pacific, and other early railroad routes. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-15.

San Tan ID

Four archaeological surveys have been conducted within this entity's boundaries; no sites have been recorded. However, the area's proximity to Pozos de Sonoqui, a major Hohokam village complex with a ball court and platform mound, suggests associated cultural resources—such as artifact scatters, rock piles, and agricultural fields—might be present. The area's western boundary borders the Roosevelt Canal, a historic canal that is presently in use. The Roosevelt Canal, part of the Roosevelt ID, has been in operation since 1926 and is eligible for inclusion on the NRHP. Although the Roosevelt Canal is not expected to be impacted by the proposed undertaking, it is possible that sites related to its construction might be present in the area. Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-17.

Tonopah ID

Only one linear survey (O'Brien et al. 1987) has taken place within this entity. The northeastern portion borders an area of moderate cultural resource sensitivity which includes agricultural rock features associated with artifact scatters (e.g., AZ T:5:13 and T:5:13(ASM)). Cultural resource sensitivity areas in this entity are shown in Appendix L Figure L-NIA-19.

Environmental Consequences*Assessment of Impacts*

At this stage of the planning process, only general information exists regarding the portions of each entity that might be affected by the proposed allocation and contract execution. Therefore, no entity-specific recommendations can be made. The following assessment of potential impacts to the cultural resources is by necessity expressed in general terms and might be applied to all entities.

Impacts to the cultural resources within the areas of individual entities are expected to be similar under all proposed alternatives, although the acreage of new agricultural lands on Indian Reservations varies among the alternatives. Since any ground-disturbing activities have the potential to impact known and/or as yet undiscovered cultural resources, cultural impacts can be anticipated in any undertaking involving 1) urbanization of farmland, an action which has the potential to adversely impact intact cultural deposits that might still exist below the plowzone; 2) subjugation of natural desert for agriculture, an action which has the potential to adversely impact intact cultural deposits presently on the surface and within the plowzone; and 3) any related ground-disturbing activity that might result from implementation of the proposed allocation.

As stated in the introduction to this chapter, direct impacts would be those impacts that would occur as a direct result of the proposed allocation and contract execution, an example being land-disturbing activities associated with the construction of facilities needed to take, treat, and deliver CAP water.

Construction-associated impacts to archaeological resources would result from such anticipated activities as excavation, temporary stockpiling, and disposal of earthen materials; manufacture or delivery of concrete; construction of concrete-lined canals, turnouts, siphons, flood protection berms, dikes, reservoirs, pipelines, water-treatment plants, wells, and pumping stations; and modifications to existing canals and equipment.

No additional adverse effect is anticipated to cultural resources located in currently agricultural acreage that is to remain under cultivation or allowed to go fallow and abandoned. An exception would involve the construction of new field irrigation features like laterals on sprinklers that would require excavation beneath the existing plowzone. However, subjugation of previously undisturbed (desert) land for agriculture would directly impact surface cultural remains and might impact buried deposits within the plowzone. Likewise, urbanization of land presently used for farming could potentially impact any intact cultural deposits that might be preserved below the plowzone.

Adverse effects are also expected to occur from activities that have the potential to alter the landscape, such as mineral extraction and the construction of permanent features such as recharge basins. Direct impacts to archaeological sites resulting from any of these activities would be long-term and permanent.

5. Indian Sector

a. No Action Alternative

No additional CAP water is provided to the tribal entities under the No Action Alternative. No additional impacts to the cultural resources would result.

b. Settlement and Non-Settlement Alternatives

The potential for delivery facilities and agricultural development on the reservations that could occur as a result of proposed allocations is summarized by Indian tribe as follows (see Appendices G and L for additional detail):

(1) GRIC

Under the Settlement Alternative, Non-Settlement Alternative 2, and Non-Settlement Alternative 3, the GRIC would receive additional CAP water. Under the Settlement Alternative, an estimated 20,800 acres would be used for subjugation of natural desert for agriculture. Under Non-Settlement Alternative 2, an estimated 16,700 acres would be used for subjugation of natural desert for agriculture. Under Non-Settlement Alternative 3, an estimated 38,000 acres would be used for subjugation of natural desert for agriculture. The lands to be developed, and the appurtenant

facilities to be constructed, are identified in the PMIP PEIS (US Department of the Interior, 1997). Under Non-Settlement Alternative 1, the GRIC is the only tribes to receive an allocation, and would receive an additional 17,000 AF of water, which would be used for irrigation as part of PMIP PEIS. Under Non-Settlement Alternative 1, an estimated 8,000 acres would be used for subjugation of natural desert for agriculture. Reclamation is directly involved, and National Historic Preservation Act (NHPA) Section 106 compliance is being carried out as part of the PMIP.

(2) TON

Under the Settlement Alternative, Non-Settlement Alternative 2 and Non-Settlement Alternative 3, the TON would receive additional CAP water. Under the Settlement Alternative, and estimated 4,000 acres would be used for agriculture. Under Non-Settlement Alternative 2, an estimated 4,000 acres would be used for agriculture. Under Non-Settlement Alternative 3, an estimated 4,000 acres would be used for agriculture. It is also anticipated that the balance would be made available for recharge on reservation; facilities associated with this use include infiltration basins, pipelines, and pumps. Other possible uses include growing mesquite, habitat enhancement, river restoration, recreation, and mining. Because Reclamation is directly involved in implementing the CAP distribution facilities (through funding) for both tribes, NHPA Section 106 consultations would be carried out, and mitigation plans developed.

(3) Navajo/Hopi

The Navajo/Hopi would receive additional CAP water only under Non-Settlement Alternatives 2 and Non-Settlement Alternative 3. CAP allocations would be diverted to users via the Western Pipeline or the Lake Powell Pipeline. It is estimated that construction of the necessary distribution lines to supply the water would impact between 1,100 acres (Western) and 2,000 acres (Lake Powell).

(4) SCAT

The SCAT would receive additional CAP allocation only under Non-Settlement Alternative 2 and Non-Settlement Alternative 3. Under Non-Settlement Alternative 2, an estimated 4,700 acres would be used for agriculture or developed. Under Non-Settlement Alternative 3, an estimated 8,000 acres would be used for agriculture or developed. Additionally, some of the allocated water could be used for aquaculture, fish hatchery, livestock grazing, mining of peridot and gypsum, and maintenance of a minimum pool within the San Carlos Reservoir; these uses would reduce the amount of agricultural acreage accordingly. Facilities would include construction of pump stations and pipelines, disturbing approximately 750 acres.

6. M&I Sector

a. No Action Alternative

Under the No Action Alternative, urban growth is expected to continue. An estimated 239,700 acres would be converted from desert to urban uses and 68,200 acres from agricultural to urban uses within the 21 M&I planning areas over the 50-year study period. Such growth would have impacts on the cultural resources, as outlined above. The level of growth is identical under all proposed alternatives, discussed below.

Reclamation would consult under NHPA Section 106 only for those actions that are directly related to taking CAP water deliveries (i.e., facilities necessary to tie into the CAP canal and take and treat the water). Impacts to the cultural resources resulting from urban growth are not a consequence of the proposed allocation. They would occur regardless of the allocation decision. Avoidance or mitigation of cultural resource impacts would be the responsibility of the local jurisdictions. Information on local ordinances with respect to the cultural resources is outlined in Appendix L.

b. Settlement and Non-Settlement Alternatives

Same as under the No Action Alternative.

7. NIA Sector

a. No Action Alternative

Under the No Action Alternative, an estimated 226,103 acres of farmland are expected to be urbanized within the nine NIA districts over the 50-year study period. An additional 40,926 acres are expected to be fallowed and left undeveloped as a result of economic conditions. Avoidance or mitigation of cultural resource impacts associated with urbanization would be the responsibility of the local jurisdictions. Information on local ordinances with respect to the cultural resources is outlined in Appendix L.

b. Settlement and Non-Settlement Alternatives

Same as under the No Action Alternative.

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ATTACHMENT "A"

ARIZONA STATE HISTORIC PRESERVATION OFFICE (SIPO)
LIST OF ARIZONA TRIBAL LEADERSHIP AND CULTURAL RESOURCE CONTACTS
 (Updated 11/02/1999)

TRIBE	CHAIR/PRESIDENT/GOVERNOR	CULTURAL RESOURCE DIVISION CONTACTS
Ak-Chin Indian Community	Leona M. Kakar, Chair Ak-Chin Indian Community Council 42507 W. Peters & Nall Rd. Maricopa, AZ 85239 Phone: 520/568-2618 or 602/254-3575 Fax: 520/568-4566	Elaine Peters, Director or Jon Shumaker, Archaeologist Ak-Chin Hlm Dak Eco Museum & Archives 47685 N. Eco Museum Rd. Maricopa, AZ 85239 Phone: 520/568-9480 Fax: 520/568-9557
Chemehuevi Indian Tribe	Girjle Dunlap, Chair Chemehuevi Tribal Council P.O. Box 1976 Havasu Lake, CA 92363 Phone: 760/858-4301 Fax: 760/858-5400	Lynn Petach, Head of NAGPRA Committee Chemehuevi Tribal Council P.O. Box 1976 Havasu Lake, CA 92363 Phone: 760/858-4301 Fax: 760/858-5400
Cocopah Tribe	Sherry Cordova, Chair Cocopah Tribal Council County 15th & Avenue G Somerton, AZ 85350 Phone: 520/627-2102 Fax: 520/627-3173	Lisa Wanstall, Museum Director Cocopah Museum County 15th & Avenue G Somerton, AZ 85350 Phone: 520/627-1992 Fax: 520/627-2280 E-mail: museum@cocopah.com
Colorado River Indian Tribes	Daniel Eddy, Jr., Chair Colorado River Tribal Council Route 1, Box 23-B Parker, AZ 85344 Phone: 520/669-1280 Fax: 520/669-1216	Betty Cornelius, Director Colorado River Indian Tribes Museum Route 1, Box 23-B Parker, AZ 85344 Phone: 520/669-1339 Fax: 520/669-1082

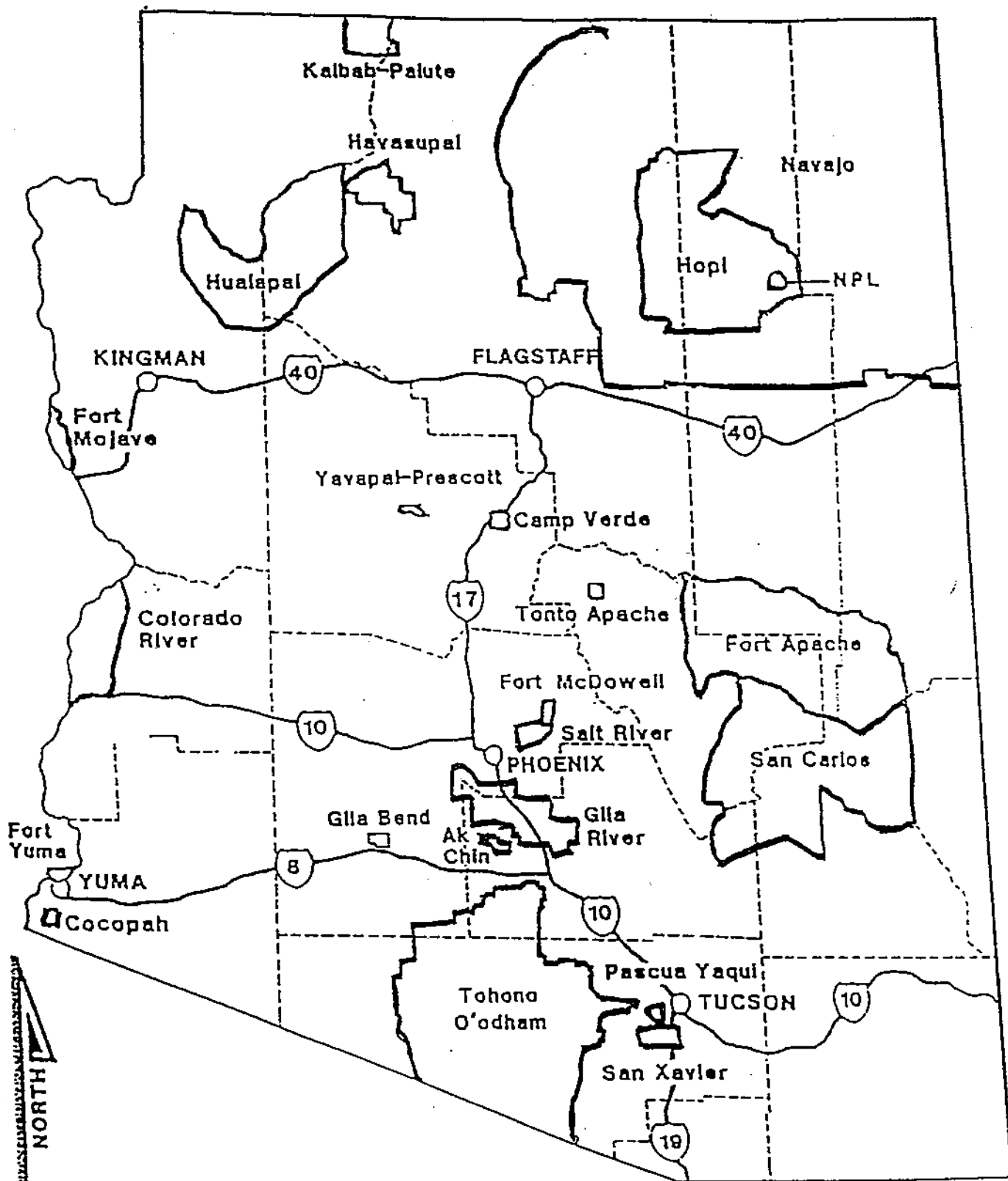
TRIBE	CHAIR/PRESIDENT/GOVERNOR	CULTURAL RESOURCE DIVISION CONTACTS
Fort McDowell Mohave-Apache Tribe	Bernadine Boyd, Chair Fort McDowell Mohave-Apache Tribe P.O. Box 17779 Fountain Hills, AZ 85269 Phone: 480/837-5121 Fax: 480/837-3978	Marcy Mattson, Director of Cultural Development Fort McDowell Mohave-Apache Tribe P.O. Box 17779 Fountain Hills, AZ 85269 Phone: 480/816-7143 Fax: 480/816-6089
Fort Mojave Indian Tribe	Nora Helton, Chair Fort Mojave Tribal Council 500 Merriman Avenue Needles, CA 92363 Phone: 760/629-4591 Fax: 760/629-2468	Clad A. Smith, Archeologist Director, Cultural Resource Management Alamogordo Cultural Society Fort Mojave Indian Tribe P.O. Box 5990 10225 S. Harbor Ave. Mojave Valley, AZ 86440 Phone: 520/768-4475 Fax: 520/768-7996
Fort Sill (Chiricahua) Apache Tribe	Ruey Darrow, Chairperson Fort Sill Apache Tribe Route 2, Box 121 Apache, OK 73006 Phone: 580/588-2298 Fax: 580/588-3133	Michael Darrow, Historian Fort Sill Apache Tribe Route 2, Box 121 Apache, OK 73006 Phone: 580/588-2298 Fax: 580/588-3133
Fort Yuma-Quechan Tribe	Mike Jackson, Sr., President Fort Yuma-Quechan Tribe P.O. Box 1899 Yuma, AZ 85366 Phone: 760/572-0213 Fax: 760/572-2102	Pauline Owl Quechan Cultural Committee Fort Yuma-Quechan Tribe P.O. Box 1899 Yuma, AZ 85366 Phone: 760/572-0213 Fax: 760/572-2102

TRIBE	CHAIR/PRESIDENT/GOVERNOR	CULTURAL RESOURCE DIVISION CONTACTS
Gila River Indian Community	Mary V. Thomas, Governor Gila River Indian Community P.O. Box 97 Sacaton, AZ 85247 Phone: 520/562-6000 Fax: 520/562-6010	John Ravesloot, Ph.D., Cultural Resources Coordinator Department of Land and Water Resources Gila River Indian Community P.O. Box E 192 S. Skill Center Road, Room 200 Sacaton, AZ 85247 Phone: 520/562-3301 Fax: 520/562-4008
Havasupai Tribe	Thomas Siyuja, Chair Havasupai Tribal Council P.O. Box 10 Supai, AZ 86435 Phone: 520/448-2731 Fax: 520/448-2551	Roland Manakaja Havasupai Tribe P.O. Box 10 Supai, AZ 86435 Phone: 520/448-2271 Fax: 520/448-2551
The Hopi Tribe	Wayne Taylor, Jr., Chair The Hopi Tribe P.O. Box 123 Kykotsmovi, AZ 86039 Phone: 520/734-2441 Fax: 520/734-6665	Leigh Kuwanwisiwma Hopi Cultural Preservation Office P.O. Box 123 Kykotsmovi, AZ 86039 Phone: 520/734-2441 Fax: 520/734-2331
Hualapai Tribe	Carrie Imus, Acting Chair (until 11/20/99) Hualapai Tribe P.O. Box 179 Peach Springs, AZ 86434 Phone: 520/769-2216 Fax: 520/769-2343	Monza Honga, Tribal Historic Preservation Officer Office of Cultural Resources Hualapai Tribe P.O. Box 310 878 W. Route 66 Peach Springs, AZ 86434 Phone: 520/769-2234 or 520/769-2223 Fax: 520/769-2235

TRIBE	CHAIR/PRESIDENT/GOVERNOR	CULTURAL RESOURCE DIVISION CONTACTS
Kaibab-Paiute Tribe	Carmen Bradley, Chair Kaibab-Paiute Tribe HC 65, Box 2 Tribal Affairs Building Fredonia, AZ 86022 Phone: 520/643-7245 Fax: 520/643-7260	Brenda Drye, Cultural Resources Director Kaibab-Paiute Tribe HC 65, Box 2 Tribal Affairs Building Fredonia, AZ 86022 Phone: 520/643-6014 Fax: 520/643-7260
Mescalero Apache Tribe	Sara Misquez, Chair Mescalero Apache Tribe P.O. Box 227 Mescalero, NM 88340 Phone: 505/671-4494 Fax: 505/671-9191	Ellen Bigrope, NAGPRA Coordinator Mescalero Apache Tribe P.O. Box 227 Mescalero, NM 88340 Phone: 505/671-4494 Fax: 505/671-9191
Navajo Nation	Kelsey Begay, President Navajo Nation P.O. Box 9000 Window Rock, AZ 86515 Phone: 520/871-6352 Fax: 520/871-4025	Alan Downer, Ph.D., Tribal Historic Preservation Officer or Ron Maldonado, Program Manager, Cultural Resource Compliance Section Navajo Nation Historic Preservation Office P.O. Box 4950 Window Rock, AZ 86515 Phone: 520/871-6437 (A. Downer), 520/871-7132 (R. Maldonado) Fax: 520/871-7886
Pascua Yaqui Tribe	Benito F. Valencia, Chair Pascua Yaqui Tribe 7474 S. Camino de Oeste Tucson, AZ 85746 Phone: 520/883-5000 ext. 5016 Fax: 520/883-5014	Benito F. Valencia, Chair Pascua Yaqui Tribe 7474 S. Camino de Oeste Tucson, AZ 85746 Phone: 520/883-5000 ext. 5016 Fax: 520/883-5014
Salt River Pima-Maricopa Indian Community	Ivan Makil, President Salt River Pima-Maricopa Indian Community 10005 E. Osborn Rd. Scottsdale, AZ 85256 Phone: 480/850-8001 Fax: 480/850-8014	Ron Chiago, Cultural Preservation Officer Cultural and Environmental Services Salt River Pima-Maricopa Indian Community 10005 E. Osborn Rd. Scottsdale, AZ 85256 Phone: 480/850-8045 Fax: 480/850-7366

TRIBE	CHAIR/PRESIDENT/GOVERNOR	CULTURAL RESOURCE DIVISION CONTACTS
San Carlos Apache Tribe	Harrison Talgo, Sr., Administrator San Carlos Apache Tribe P.O. Box 0 San Carlos, AZ 85550 Phone: 520/475-2361 Fax: 520/475-2567	Herb Stevens, Cultural Director San Carlos Apache Tribe, Cultural Center P.O. Box 760 Peridot, AZ 85542 Phone: 520/475-2894 Fax: 520/475-2894 (call first to indicate fax)
San Juan Southern Paiute Council	Johnny Murphy Lehi, Sr., President San Juan Southern Paiute Council P.O. Box 1989 Tuba City, AZ 86045 Phone: 520/283-4587 Fax: 520/283-5761	Johnny Murphy Lehi, Sr., President San Juan Southern Paiute Council P.O. Box 1989 Tuba City, AZ 86045 Phone: 520/283-4587 Fax: 520/283-5761
Tohono O'odham Nation	Edward Manuel, Chair Tohono O'odham Nation P.O. Box 837 Sells, AZ 85634 Phone: 520/383-2221 Fax: 520/383-3379	Peter Steere, Program Manager Cultural Affairs Department Tohono O'odham Nation P.O. Box 837 Sells, AZ 85634 Phone: 520/383-3622 Fax: 520/383-5255
Tonto Apache Tribe	Vivian L. Burdette, Chair Tonto Apache Tribe Tonto Apache Reservation #30 Payson, AZ 85541 Phone: 520/474-5000 Fax: 520/474-9125	Vivian L. Burdette, Chair Tonto Apache Tribe Tonto Apache Reservation #30 Payson, AZ 85541 Phone: 520/474-5000 Fax: 520/474-9125
White Mountain Apache Tribe	Dallas Massey, Sr., Chair White Mountain Apache Tribe P.O. Box 700 Whiteriver, AZ 85941 Phone: 520/338-4346 Fax: 520/338-1514	John Welch, Ph.D., Tribal Historic Preservation Officer White Mountain Apache Tribe Historic Preservation Office P.O. Box 507 Fort Apache, AZ 85926 Phone: 520/338-5430 Fax: 520/338-5488

TRIBE	CHAIR/PRESIDENT/GOVERNOR	CULTURAL RESOURCE DIVISION CONTACTS
Yavapai-Apache Indian Community	Vincent Randall, Chair Yavapai-Apache Indian Community 3434 Shaw Avenue P.O. Box 1188 Camp Verde, AZ 86322 Phone: 520/567-1000 Fax: 520/567-3994	Rebekah Smith, Director Apache Cultural Program Camp Verde Tribal Building P.O. Box 1188 Camp Verde, AZ 86322 Phone: 520/567-0594 ext. 27 Fax: 520/567-6485 Katherine Marquez, Director Yavapai Cultural Program Tribal Building P.O. Box 1143 Clarkdale, AZ 86324 Phone: 520/639-9517 Fax: 520/634-0661
Yavapai-Prescott Indian Tribe	Stan Rice, Jr., President Yavapai-Prescott Indian Tribe 530 E. Merritt St. Prescott, AZ 86301 Phone: 520/445-8790 Fax: 520/778-9445	Nancy Hayden, Director, Cultural Research Program Yavapai-Prescott Indian Tribe 530 E. Merritt St. Prescott, AZ 86301 Phone: 520/445-8790 Fax: 520/778-9445
Pueblo of Zuni	Malcolm Bowekaty, Governor Pueblo of Zuni P.O. Box 339 Zuni, NM 87327 Phone: 505/782-4481, ext. 111 Fax: 505/782-2700	Loren Panteah, Acting Director Zuni Heritage & Historic Preservation Office P.O. Box 339 Zuni, NM 87327 Jonathon Damp, Archaeologist Zuni Cultural Resources Enterprise P.O. Box 1149 Zuni, NM 87327 Phone: 505/782-4113 Fax: 505/782-4119 Phone: 502/782-4814 Fax: 502/782-2393



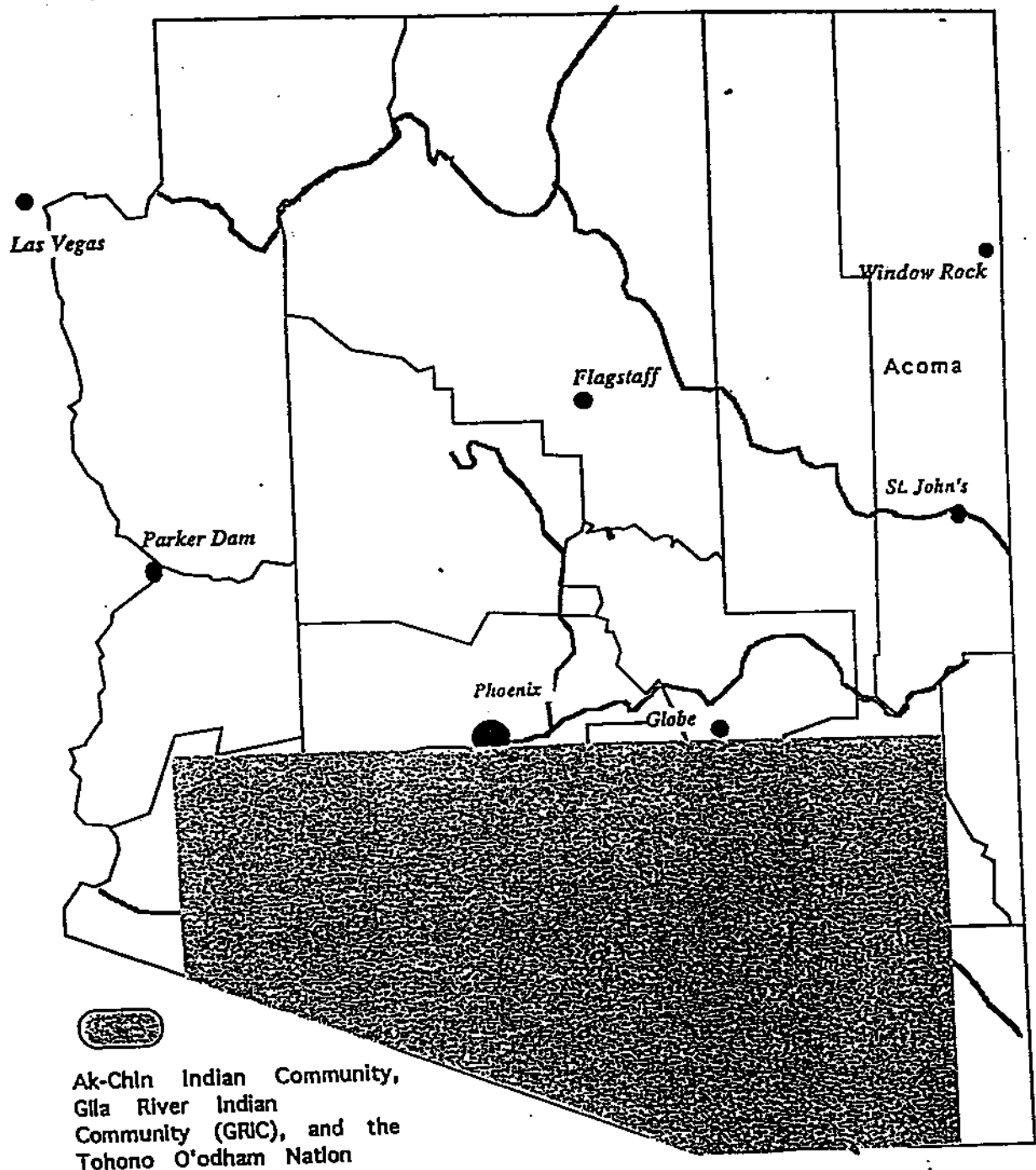
INDIAN RESERVATIONS IN ARIZONA

Arizona Commission of Indian Affairs Resource Directory 1997/98

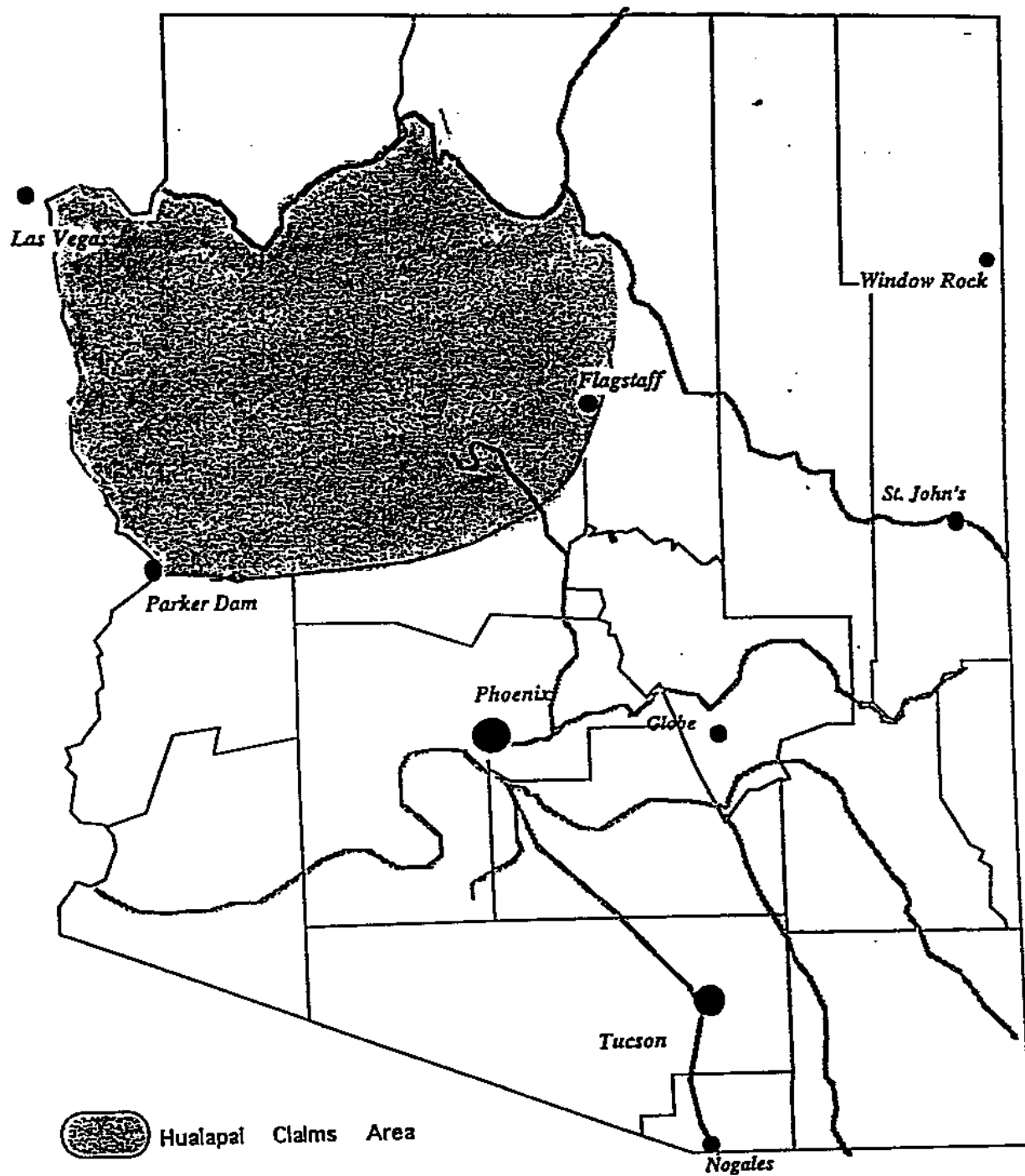
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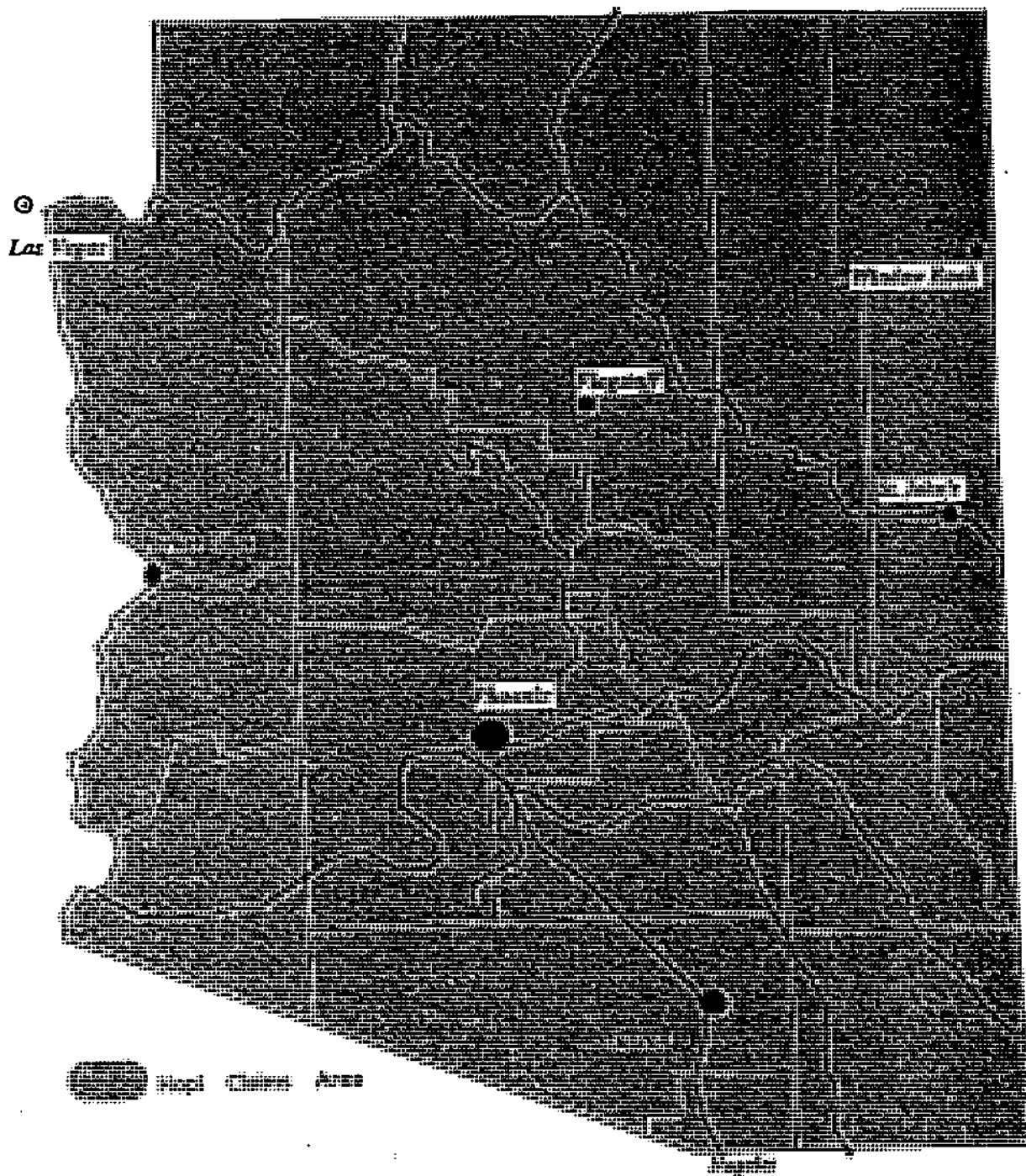
THE INDIAN DEVELOPMENT DISTRICT OF ARIZONA, INC.



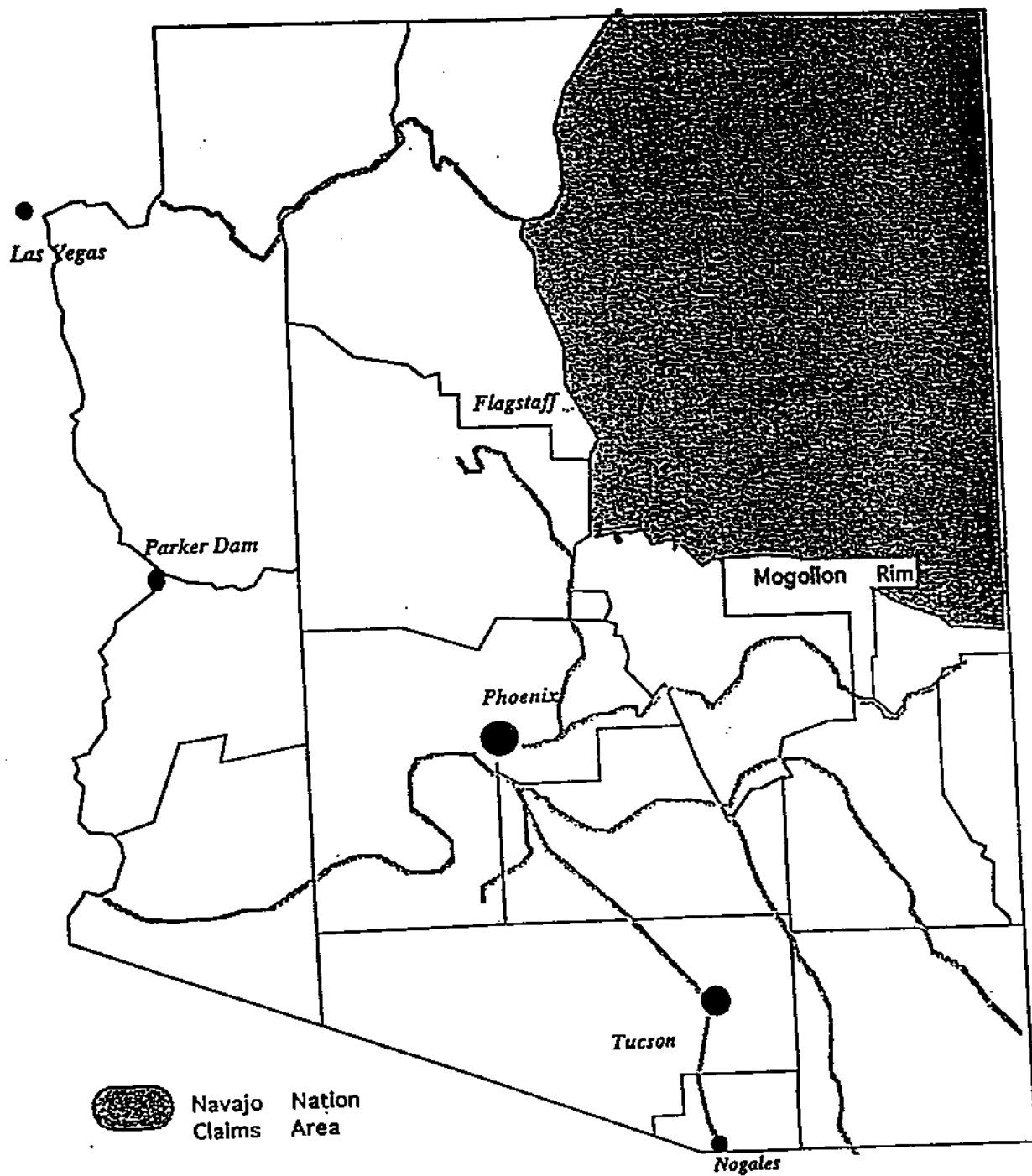
This claims area is a composite based upon information obtained orally since 1990, including a) the information that the Hohokam regional distribution should be included, b) land claims boundaries, and c) other information obtained during the course of individual cases. Within the area these O'odham tribes are interested specifically in Pima, Maricopa, Hohokam, and Salado, in all phases of their development. The four O'odham tribes (Salt River Pima-Maricopa Indian Community and these three tribes) agree that they share common ancestry in the prehistoric Hohokam culture and its predecessors in southern and central Arizona. Responsibility for individual State claims cases has been assigned by the tribes geographically, for administrative convenience. Cases involving sites south of Baseline Road in Phoenix have been handled by one or more of these three tribes, depending upon the location. South of Picacho Peak and west of Gila Bend, claims are normally handled by the Tohono O'odham.



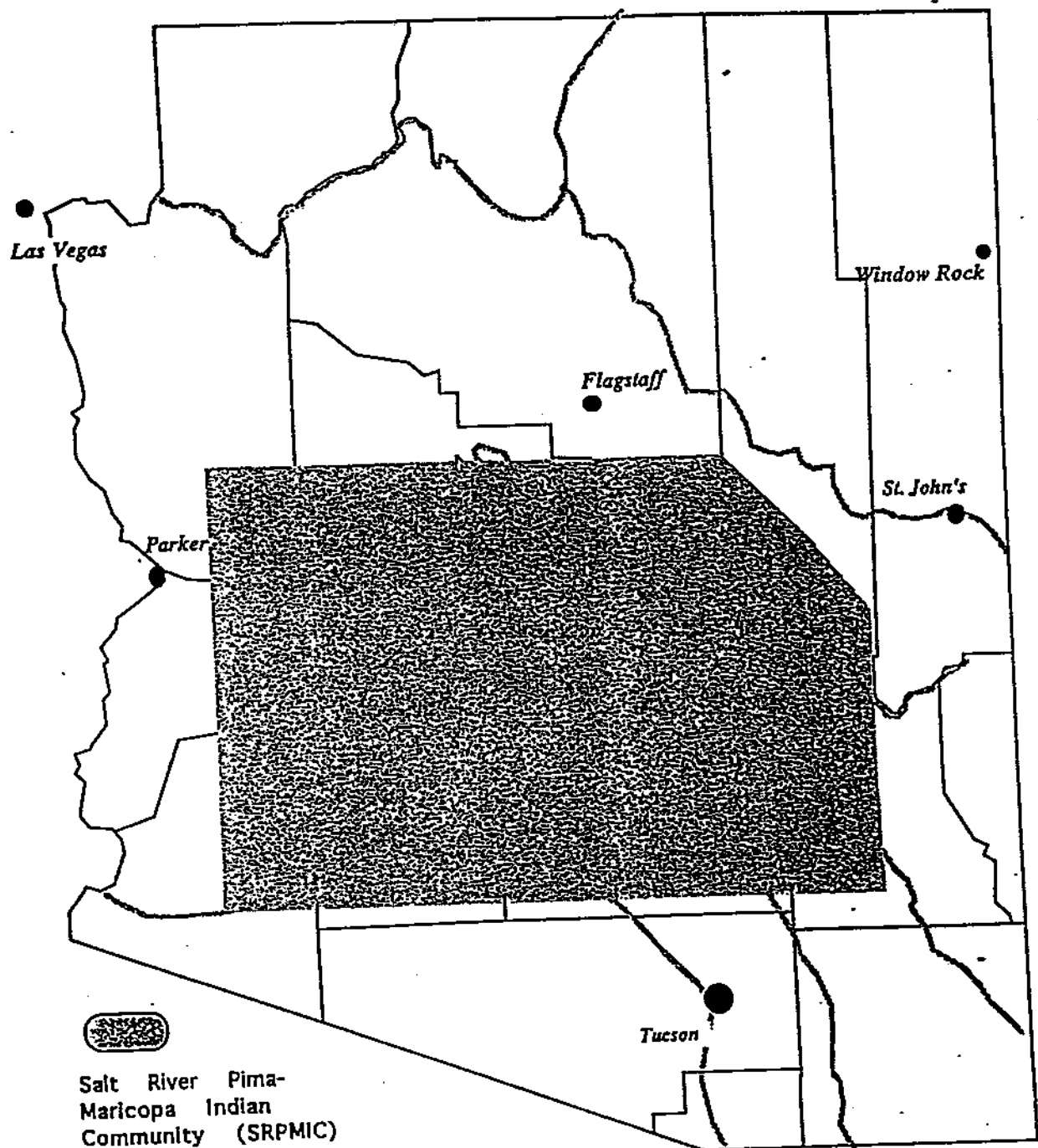
This claims area is based upon a map provided by the Hualapai Tribe in 1990, modified according to a map received in 1995.



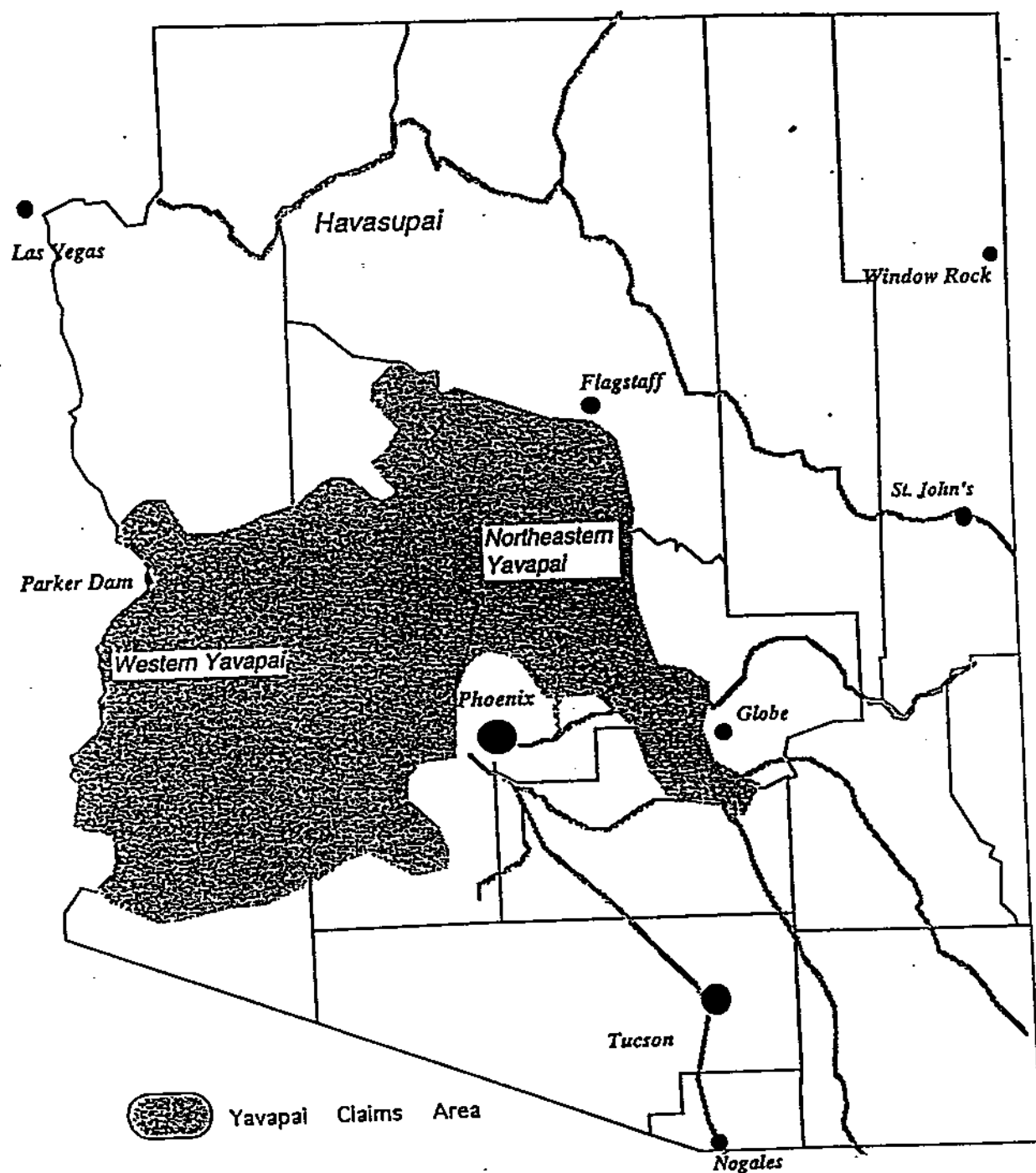
The clans of the Hopi Tribe claim affinity with prehistoric cultural traditions throughout Arizona, and with the historic Hopi tradition.



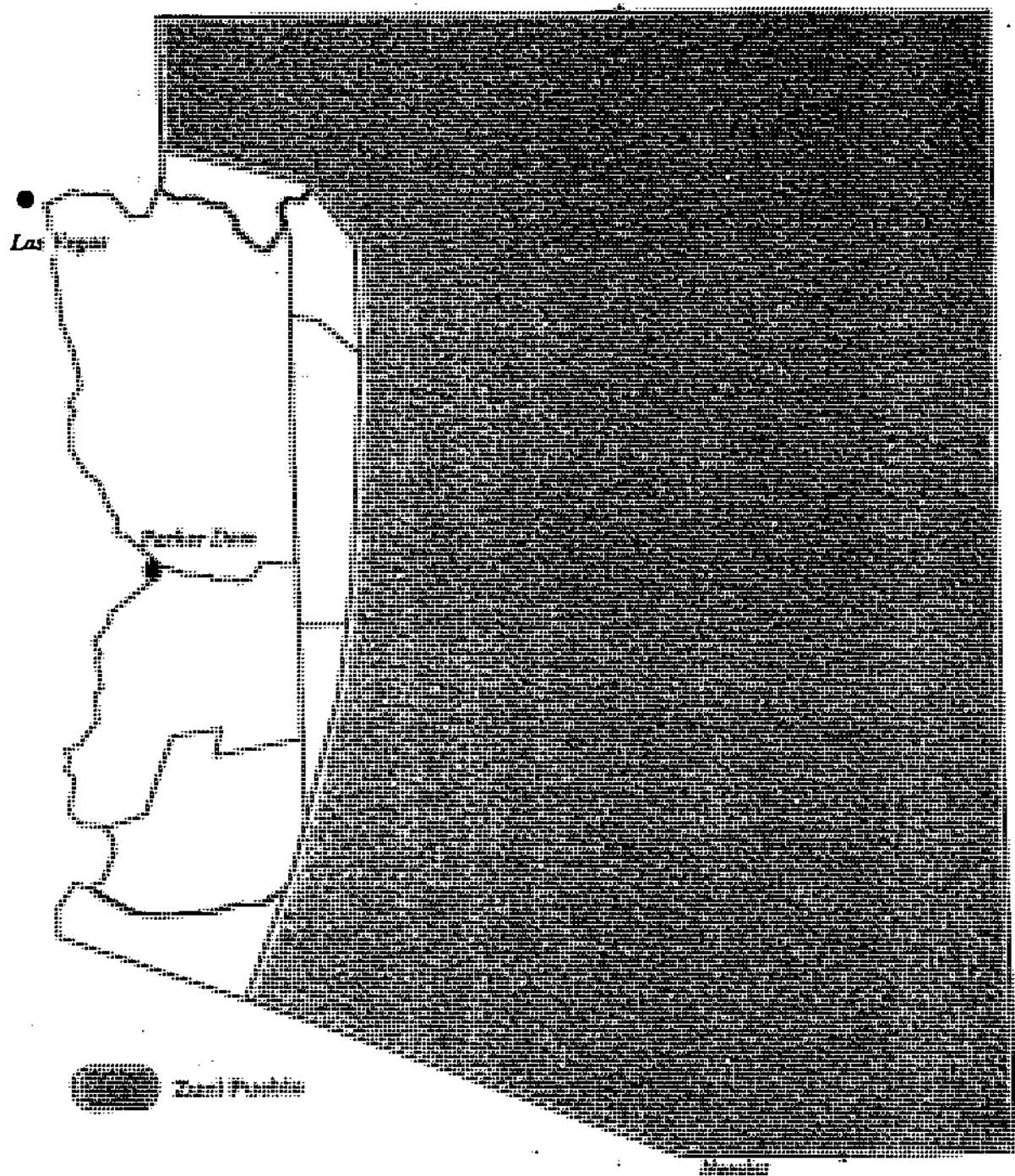
This claims area was established by a map provided by the Navajo Nation, and reflects the Navajo land claims boundaries.



This claims area is based upon written information received from the SRPMIC in 1991 and on information obtained orally since that time. Within the area SRPMIC is interested specifically in Pima, Maricopa, Hohokam, and Salado, in all phases of their development. The four O'odham tribes (SRPMIC, Gila River Indian Community, Ak-Chin Indian Community, and the Tohono O'odham Nation) agree that they share common ancestry in the prehistoric Hohokam culture and its predecessors in southern and central Arizona. Responsibility for individual State claims cases has been assigned geographically. For purposes of State claims, cases involving sites south of Baseline Road in Phoenix have been handled by Gila River Indian Community, Ak-Chin Indian Community, and the Tohono O'odham Nation, depending upon the location.



This claims area is taken from a map provided by the Yavapai-Prescott Tribe. They have indicated a specific interest in Paleo-Indian and Archaic, Basketmaker, Patayan, Hakataya, Cohonina, Sinagua, Prescott and Yavapai prehistoric and historic cultures.



This map is a composite of information from the Zuni Atlas, the general distribution of the cultures claimed by Zuni Pueblo, and information from specific cases. Zuni Pueblo claims cultural affinity with the Paleo-Indian, Archaic, Basketmaker, Puebloan, Fremont, Anasazi, Mogollon (including Mimbres and Jornada), Hohokam Sinagua, Western Pueblo, and Salado. In addition, Zuni claims affinity with the historically identified Zuni, Cibola, Shiwí, and Ashíwi cultures.

CULTURAL RESOURCES

TABLES

Table 1. Summary Cultural Resource Data By Entity.				
Entity	Assessment of Cultural Resource Sensitivity	Primary Land Ownership	Other Potentially Applicable Local Legislation	Tribes Claiming Cultural Affinity
<i>Indian Sector</i>				
Gila River	High	Tribal, allotment	N/A	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Tohono O'odham	High	Tribal, allotment	N/A	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
San Carlos Apache	High	Tribal, allotment	N/A	Hopi, Zuni
Navajo	High	Tribal, allotment	N/A	Hopi, Zuni
Hopi	High	Tribal, allotment	N/A	Navajo, Zuni
<i>M & I Sector</i>				
Arizona Water Co.- Apache Junction	Low-Moderate	Federal, State, County, City, Private, Other	No	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Arizona Water Co.- Superior	High-Moderate	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Avra Cooperative	Low	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Cave Creek Water Co.	High	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Chandler	Low-Moderate	Federal, State, County, City, Private, Other	No	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Chaparral Water	Low-Moderate	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC

Table 1. Summary Cultural Resource Data By Entity.				
Entity	Assessment of Cultural Resource Sensitivity	Primary Land Ownership	Other Potentially Applicable Local Legislation	Tribes Claiming Cultural Affinity
Community Water Co. of Green Valley	Low-Moderate	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Del Lago (Vail)	Moderate	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
El Mirage	Low	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Glendale	Low-Moderate	Federal, State, County, City, Private, Other	Yes	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Goodyear	Low-High	Federal, State, County, City, Private, Other	No	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
H2O Water Co.	Low	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Mesa	High-Moderate	Federal, State, County, City, Private, Other	Yes	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
MDWID	Low-Moderate	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Oro Valley	High	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC

Table 1. Summary Cultural Resource Data By Entity.				
Entity	Assessment of Cultural Resource Sensitivity	Primary Land Ownership	Other Potentially Applicable Local Legislation	Tribes Claiming Cultural Affinity
Peoria	Moderate-High	Federal, State, County, City, Private, Other	No	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Phoenix	High-Moderate	Federal, State, County, City, Private, Other	Yes	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Scottsdale	Moderate-High	Federal, State, County, City, Private, Other	Yes	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Surprise	Moderate	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Tucson	High-Moderate	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Valley Utilities	Low	Federal, State, County, City, Private, Other	No response	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
<i>NIA Sector</i>				
Central Arizona IDD	Low-Moderate	Federal, State, County, City, Private, Other	Unknown	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Chandler Heights ID	Low	Federal, State, County, City, Private, Other	Unknown	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Maricopa-Stanfield IDD	Low-Moderate	Federal, State, County, City, Private, Other	Unknown	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC

Table 1. Summary Cultural Resource Data By Entity.				
Entity	Assessment of Cultural Resource Sensitivity	Primary Land Ownership	Other Potentially Applicable Local Legislation	Tribes Claiming Cultural Affinity
New Magma IDD	Low	Federal, State, County, City, Private, Other	Unknown	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Queen Creek ID	High-Moderate	Federal, State, County, City, Private, Other	Unknown	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Roosevelt ID	Low	Federal, State, County, City, Private, Other	Unknown	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
San Carlos IDD	High-Moderate	Federal, State, County, City, Private, Other	Unknown	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
San Tan ID	Low	Federal, State, County, City, Private, Other	Unknown	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC
Tonopah ID	Low	Federal, State, County, City, Private, Other	Unknown	Ak-Chin Indian Community, GRIC, Tohono O'odham Nation, Hopi, Zuni, SRPMIC

Table 2. Summary of Cultural Resource Impacts by Alternative.

Entity	No Action Alternative	Settlement Alternative	Non Settlement Alternative 1	Non Settlement Alternative 2	Non Settlement Alternative 3a/3b
<i>Indian Sector</i>					
Gila River	No	Yes	Yes	Yes	Yes/Yes
Tohono O'Odham	No	Yes	Yes	Yes	Yes/Yes
San Carlos Apache	No	Yes	Yes	Yes	Yes/Yes
Navajo/Hopi	No	No	No	Yes	Yes/Yes
Tonto Apache/Yavapai Apache	No	Yes	Yes	Yes	Yes/Yes
<i>M&I Sector</i>					
Arizona Water Co.- Apache Junction	No	Yes	Yes	No	No/Yes
Arizona Water Co.- Superior	No	Yes	Yes	No	No/Yes
Avra Cooperative	No	Yes	Yes	No	No/Yes
Cave Creek Water Co.	No	Yes	Yes	No	No/Yes
Chandler	No	Yes	Yes	No	No/Yes
Chaparral Water	No	Yes	Yes	No	No/Yes
Community Water Co. of Green Valley	No	Yes	Yes	No	No/Yes
Del Lago (Vail)	No	Yes	Yes	No	No/Yes
El Mirage	No	Yes	Yes	No	No/Yes
Glendale	No	Yes	Yes	No	No/Yes
Goodyear	No	Yes	Yes	No	No/Yes
H2O Water Co.	No	Yes	Yes	No	No/Yes
Mesa	No	Yes	Yes	No	No/Yes
MDWID	No	Yes	Yes	No	No/Yes
Oro Valley	No	Yes	Yes	No	No/Yes
Peoria	No	Yes	Yes	No	No/Yes
Phoenix	No	Yes	Yes	No	No/Yes
Scottsdale	No	Yes	Yes	No	No/Yes
Superior	No	Yes	Yes	No	No/Yes
Surprise	No	Yes	Yes	No	No/Yes
Tucson	No	Yes	Yes	No	No/Yes
Valley Utilities	No	Yes	Yes	No	No/Yes
<i>NIA Sector</i>					
Central Arizona IDD	No	No	No	No	Yes/No
Chandler Heights ID	No	No	No	No	Yes/No
Maricopa-Stanfield IDD	No	No	No	No	Yes/No
New Magma IDD	No	No	No	No	Yes/No

Table 2. Summary of Cultural Resource Impacts by Alternative.					
Entity	No Action Alternative	Settlement Alternative	Non Settlement Alternative 1	Non Settlement Alternative 2	Non Settlement Alternative 3a/3b
Queen Creek ID	No	No	No	No	Yes/No
Roosevelt ID	No	No	No	No	Yes/No
San Carlos IDD	No	No	No	No	Yes/No
San Tan ID	No	No	No	No	Yes/No
Tonopah ID	No	No	No	No	Yes/No

APPENDIX H

AIR QUALITY CALCULATIONS

**Draft Environmental Impact Statement
Allocation of Water Supply and
Long-Term Contract Execution
Central Arizona Project**

H.1. Air Emissions Estimation Methodology

This air quality technical appendix describes the methodology used to estimate air emissions associated with the Allocation of Water Supply and Long-Term Contract Execution for the draft Environmental Impact Statement CAP NEPA Process. After an initial analysis of the elements of the proposed action and alternatives, it was determined that the focus of the quantitative assessment of air quality impacts would be those related to changes in agricultural production.

A socioeconomic analysis was prepared as part of the overall NEPA analysis (Appendix D). This study provided detailed information regarding the changes in agricultural production that are expected under each of the alternatives. The socioeconomic analysis provides data for each alternative for the years 2001, 2004, 2016, 2030, 2043, and 2051. Thus, the years analyzed for air quality are the same.

The first task was to organize the agricultural data by county, year, and crop type. The various entities were sorted by county because each affected county has a different status of attainment for the criteria pollutants in question. Crop types are important because there are different emissions rates associated with each type.

Non-Indian Agriculture (NIA) and Indian entities were sorted by county to match Federal attainment status boundaries as follows:

- ◆ Maricopa County: Queen Creek Irrigation District and Tonapah Irrigation District.
- ◆ Pinal County: Gila River Indian Community, Tohono O'odham Nation - Chuichu District, Maricopa-Stanfield Irrigation & Drainage District, Central Arizona Irrigation and Drainage District, and New Magma Irrigation and Drainage District.
- ◆ Pima County: Tohono O'odham Nation - Schuk Toak District and Tohono O'odham Nation - San Xavier District.
- ◆ Gila County: San Carlos Apache Tribe.

For each water user and for each of the six analysis years included in the socioeconomic analysis, agricultural acreage was estimated for each of five crop types: cotton, grains, vegetables, forage, trees/vines. The air quality analysis basically consists of calculating total emissions for each county for each analysis year and comparing it to the No Action Alternative.

Emissions associated with agricultural activities consist of two primary components: fugitive dust and exhaust emissions. Each of these components is discussed separately below.

H.2 PM₁₀ Fugitive Dust

Fugitive dust would be generated by two distinct activities: site preparation and harvesting.

H.2.a. Site Preparation

The estimated acreage for each crop type was used to estimate fugitive PM₁₀ dust emissions based on the following methodology. The number of acres for each crop type was multiplied by the number of acre-passes per crop type. The acre-passes per crop type, shown in Table H-1, are for site preparation and planting only and do not include dust emissions associated with harvesting.

Table H-1 CAP Allocation Draft EIS Site Preparation Acre-Passes per Acre Crop					
	Cotton	Grains	Forage	Vegetables	Trees/Vines
Acre-Passes	6.0	1.0	1.25	5.0	0.06
Source: California Air Resources Board 1994					

To estimate the total number of acre-passes for a crop, the total acreage for that crop type was multiplied by its respective acre-pass value shown in Table H-1. For example, for each acre of cotton, six acre-passes are made to prepare the soil and plant the crop. Multiplying the total cotton acreage by six gives the total number of cotton acre-passes. Once the total number of acre-passes was estimated for each crop type, the total acre-passes for all crops was summed and multiplied by the fugitive dust emission factor (pounds of PM₁₀ per acre-pass).

The PM₁₀ emission factor was calculated using the following equation:

$$\text{Pounds PM}_{10}/\text{acre-pass} = [k(4.8)(s)]^{0.6}$$

Where k is dependent on the particle size of interest and s is the percent soil silt content. For PM₁₀, the value of k used was 0.149. This value is based on the EPA's estimate that 33 percent of the total particulate entrained in the air during agricultural operations is 30 microns in diameter or less. Of this, analysis of soil samples indicates that 45 percent of the 30 micron or less sized particles are 10 microns or less in aerodynamic size (i.e., PM₁₀). Therefore, the PM₁₀ particle size multiplier is 0.149 ($0.33 \times 0.45 = 0.149$). For the percent silt value, the EPA default value of 18 percent was used. Inserting these values into the above equation results in a PM₁₀ emission factor of 4.6 pounds PM₁₀ per acre-pass.

H.2.b. Harvesting

Fugitive PM₁₀ dust emissions generated by harvesting operations were estimated by multiplying the harvesting emission rate (pounds of PM₁₀ per acre harvested) for each crop type by the total acreage to be harvested. Table H-2 shows the PM₁₀ emission rates used for the five crop types included in this analysis.

Table H-2 CAP Allocation Draft EIS Harvesting Emissions (pounds PM₁₀ per acre harvested)				
Cotton	Grains	Forage	Vegetables	Trees/Vines
1.12	1.12	1.12	1.12	34.2
Source: California Air Resources Board 1997.				

H.3 Exhaust Emissions

Exhaust emissions associated with agricultural operations were based on exhaust emission rates for agricultural equipment. The emission rates shown in Table H-3 are based on diesel-powered tractors.

Table H-3 CAP Allocation Draft EIS Exhaust Emissions (grams/hour)				
	ROG	NO_x	CO	PM₁₀
Diesel Tractor	77.8	452.0	161.0	61.8
Source: U.S. Environmental Protection Agency. 1985.				

The grams per hour emission rates shown in Table H-3 were multiplied by the total number of hours required for site preparation and harvesting. The total number of hours were estimated by multiplying the total number of acre-passes used in site preparation and harvesting by one half hour per acre-pass.

H.4 Air Quality Computations

Tables H-4 through H-8 (following the text of this appendix) show the acreage assumptions and calculations that were made for each of the alternatives.

H.5 References

California Air Resources Board. 1997. October. Emission Inventory Manual Volume III, Methods for Assessing Area Source Emissions. Sacramento, California.

United States Environmental Protection Agency. 1985. Compilation of air pollutant emission factors, volume II: mobile sources. 4th edition. Research Triangle Park, NC.

**Table H-4. Air Quality Calculations
Year 2004**

No-Action Alternative

Entity	Crop Acreages					Total
	Acreage Cotton	Acreage Grains	Acreage Forage	Acreage Vegetables	Acreage Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	3,847	3,154	2,632	368	15,259
Tonopah ID	2,463	22	546	0	0	3,031
County Totals	7,721	3,869	3,700	2,632	368	18,290
Pinal County						
GRIC	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	5,107	5,449	1,808	1,855	23,261
County Totals	65,450	46,084	17,117	8,030	8,022	144,703
Pima County						
TON (Schuk Toak District)	1,248	372	0	0	0	1,620
TON (San Xavier District)	0	0	800	0	0	800
County Totals	1,248	372	800	0	0	2,420

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	546	0	0	3,031
County Totals	7,721	3,869	546	2,632	368	15,136
Pinal County						
GRIC	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	5,107	5,449	1,808	1,855	23,261
County Totals	65,450	46,084	17,117	8,030	8,022	144,703
Pima County						
TON (Schuk Toak District)	1,248	372	0	0	0	1,620
TON (San Xavier District)	0	0	800	0	0	800
County Totals	1,248	372	800	0	0	2,420

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	3,154	2,632	368	15,259
Tonopah ID	2,463	22	546	0	0	3,031
County Totals	7,721	3,869	3,700	2,632	368	18,290
Pinal County						
GRIC	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	5,107	5,449	1,808	1,855	23,261
County Totals	65,450	46,084	17,117	8,030	8,022	144,703
Pima County						
TON (Schuk Toak District)	1,248	372	0	0	0	1,620
TON (San Xavier District)	0	0	800	0	0	800
County Totals	1,248	372	800	0	0	2,420

Table H-4. Air Quality Calculations (Continued)
Year 2004

Alternative 2

Entity	Crop Acreages					Total
	Acreage Cotton	Acreage Grains	Acreage Forage	Acreage Vegetables	Acreage Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	3,847	3,154	2,632	368	15,259
Tonopah ID	2,463	22	546	0	0	3,031
County Totals	7,721	3,869	3,700	2,632	368	18,290
Pinal County						
GRIC	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	5,107	5,449	1,808	1,855	23,261
County Totals	65,450	46,084	17,117	8,030	8,022	144,703
Pima County						
TON (Schuk Toak District)	1,248	372	0	0	0	1,620
TON (San Xavier District)	0	0	800	0	0	800
County Totals	1,248	372	800	0	0	2,420
Gila County						
San Carlos Apache	4,700	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	3,154	2,632	368	15,259
Tonopah ID	2,463	22	546	0	0	3,031
County Totals	7,721	3,869	3,700	2,632	368	18,290
Pinal County						
GRIC	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	5,107	5,449	1,808	1,855	23,261
County Totals	65,450	46,084	17,117	8,030	8,022	144,703
Pima County						
TON (Schuk Toak District)	1,248	372	0	0	0	1,620
TON (San Xavier District)	0	0	800	0	0	800
County Totals	1,248	372	800	0	0	2,420
Gila County						
San Carlos Apache	8,000	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	3,154	2,632	368	15,259
Tonopah ID	2,463	22	546	0	0	3,031
County Totals	7,721	3,869	3,700	2,632	368	18,290
Pinal County						
GRIC	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	5,107	5,449	1,808	1,855	23,261
County Totals	65,450	46,084	17,117	8,030	8,022	144,703
Pima County						
TON (Schuk Toak District)	1,248	372	0	0	0	1,620
TON (San Xavier District)	0	0	800	0	0	800
County Totals	1,248	372	800	0	0	2,420
Gila County						
San Carlos Apache	8,000	0	0	0	0	0

**Table H-4. Air Quality Calculations (Continued)
Year 2004**

Emission Factors
(grams/acre-hour)

ROG	NOx	CO	PM10-exhaust
38.90	226.00	80.50	30.90

No-Action Alternative

Entity	Site Preparation/Harvest Exhaust Emissions				
	Acre-Passes	tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	52,520	2	13	5	2
Tonopah ID	15,483	1	4	1	1
County Totals	68,002	3	17	6	2
Pinal County					
GRIC	0	0	0	0	0
TON Chuichu District	0	0	0	0	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	75,322	3	19	7	3
County Totals	500,812	21	125	44	17
Pima County					
TON (Schuk Toak District)	7,860	0	2	1	0
TON (San Xavier District)	1,000	0	0	0	0
County Totals	8,860	0	2	1	0

Settlement Alternative

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	15,483	1	4	1	1
County Totals	64,060	3	16	6	2
Pinal County					
GRIC	0	0	0	0	0
TON Chuichu District	0	0	0	0	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	75,322	3	19	7	3
County Totals	500,812	21	125	44	17
Pima County					
TON (Schuk Toak District)	7,860	0	2	1	0
TON (San Xavier District)	1,000	0	0	0	0
County Totals	8,860	0	2	1	0

Alternative 1

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	52,520	2	13	5	2
Tonopah ID	15,483	1	4	1	1
County Totals	68,002	3	17	6	2
Pinal County					
GRIC	0	0	0	0	0
TON Chuichu District	0	0	0	0	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	75,322	3	19	7	3
County Totals	500,812	21	125	44	17
Pima County					
TON (Schuk Toak District)	7,860	0	2	1	0
TON (San Xavier District)	1,000	0	0	0	0
County Totals	8,860	0	2	1	0

Table H-4. Air Quality Calculations (Continued)
Year 2004

Emission Factors
(grams/acre-hour)

ROG	NOx	CO	PM10-exhaust
38.90	226.00	80.50	30.90

Alternative 2

Site Preparation/Harvest Exhaust Emissions

Entity	Acre-Passes	tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	52,520	2	13	5	2
Tonopah ID	15,483	1	4	1	1
County Totals	68,002	3	17	6	2
Pinal County					
GRIC	0	0	0	0	0
TON Chuichu District	0	0	0	0	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	75,322	3	19	7	3
County Totals	500,812	21	125	44	17
Pima County					
TON (Schuk Toak District)	7,860	0	2	1	0
TON (San Xavier District)	1,000	0	0	0	0
County Totals	8,860	0	2	1	0
Gila County					
San Carlos Apache	28,200	1	7	3	1

Alternative 3a

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	52,520	2	13	5	2
Tonopah ID	15,483	1	4	1	1
County Totals	68,002	3	17	6	2
Pinal County					
GRIC	0	0	0	0	0
TON Chuichu District	0	0	0	0	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	75,322	3	19	7	3
County Totals	500,812	21	125	44	17
Pima County					
TON (Schuk Toak District)	7,860	0	2	1	0
TON (San Xavier District)	1,000	0	0	0	0
County Totals	8,860	0	2	1	0
Gila County					
San Carlos Apache	48,000	2	12	4	2

Alternative 3b

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	52,520	2	13	5	2
Tonopah ID	15,483	1	4	1	1
County Totals	68,002	3	17	6	2
Pinal County					
GRIC	0	0	0	0	0
TON Chuichu District	0	0	0	0	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	75,322	3	19	7	3
County Totals	500,812	21	125	44	17
Pima County					
TON (Schuk Toak District)	7,860	0	2	1	0
TON (San Xavier District)	1,000	0	0	0	0
County Totals	8,860	0	2	1	0
Gila County					
San Carlos Apache	48,000	2	12	4	2

Table H-4. Air Quality Calculations (Continued)
Year 2004

PM10 per	Acre - passes				
acre - pass	Cotton	Grains	Forage	Vegetables	Trees/Vines
4.64	6.00	1.00	1.25	5.00	0.06

No-Action Alternative

Site Preparation: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	18,293	61,062	102	243,691	122
Tonopah ID	68,570	102	3,167	0	0	71,839	36
County Totals	214,953	17,952	21,460	61,062	102	315,530	158
Pinal County							
GRIC	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	23,696	31,604	41,946	516	349,492	175
County Totals	1,822,128	213,830	99,279	186,296	2,233	2,323,766	1,162
Pima County							
TON (Schuk Toak District)	34,744	1,726	0	0	0	36,470	18
TON (San Xavier District)	0	0	4,640	0	0	4,640	2
County Totals	34,744	1,726	4,640	0	0	41,110	21

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	3,167	0	0	71,839	36
County Totals	214,953	17,952	3,167	61,062	102	297,236	149
Pinal County							
GRIC	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	23,696	31,604	41,946	516	349,492	175
County Totals	1,822,128	213,830	99,279	186,296	2,233	2,323,766	1,162
Pima County							
TON (Schuk Toak District)	34,744	1,726	0	0	0	36,470	18
TON (San Xavier District)	0	0	4,640	0	0	4,640	2
County Totals	34,744	1,726	4,640	0	0	41,110	21

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	18,293	61,062	102	243,691	122
Tonopah ID	68,570	102	3,167	0	0	71,839	36
County Totals	214,953	17,952	21,460	61,062	102	315,530	158
Pinal County							
GRIC	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	23,696	31,604	41,946	516	349,492	175
County Totals	1,822,128	213,830	99,279	186,296	2,233	2,323,766	1,162
Pima County							
TON (Schuk Toak District)	34,744	1,726	0	0	0	36,470	18
TON (San Xavier District)	0	0	4,640	0	0	4,640	2
County Totals	34,744	1,726	4,640	0	0	41,110	21

Table H-4. Air Quality Calculations (Continued)
Year 2004

PM10 per acre - pass 4.64	Acre - passes				
	Cotton	Grains	Forage	Vegetables	Trees/Vines
	6.00	1.00	1.25	5.00	0.06

Alternative 2

Site Preparation: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	18,293	61,062	102	243,691	122
Tonopah ID	68,570	102	3,167	0	0	71,839	36
County Totals	214,953	17,952	21,460	61,062	102	315,530	158
Pinal County							
GRIC	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	23,696	31,604	41,946	516	349,492	175
County Totals	1,822,128	213,830	99,279	186,296	2,233	2,323,766	1,162
Pima County							
TON (Schuk Toak District)	34,744	1,726	0	0	0	36,470	18
TON (San Xavier District)	0	0	4,640	0	0	4,640	2
County Totals	34,744	1,726	4,640	0	0	41,110	21
Gila County							
San Carlos Apache	130,848	0	0	0	0	130,848	65

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	18,293	61,062	102	243,691	122
Tonopah ID	68,570	102	3,167	0	0	71,839	36
County Totals	214,953	17,952	21,460	61,062	102	315,530	158
Pinal County							
GRIC	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	23,696	31,604	41,946	516	349,492	175
County Totals	1,822,128	213,830	99,279	186,296	2,233	2,323,766	1,162
Pima County							
TON (Schuk Toak District)	34,744	1,726	0	0	0	36,470	18
TON (San Xavier District)	0	0	4,640	0	0	4,640	2
County Totals	34,744	1,726	4,640	0	0	41,110	21
Gila County							
San Carlos Apache	222,720	0	0	0	0	222,720	111

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	18,293	61,062	102	243,691	122
Tonopah ID	68,570	102	3,167	0	0	71,839	36
County Totals	214,953	17,952	21,460	61,062	102	315,530	158
Pinal County							
GRIC	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	23,696	31,604	41,946	516	349,492	175
County Totals	1,822,128	213,830	99,279	186,296	2,233	2,323,766	1,162
Pima County							
TON (Schuk Toak District)	34,744	1,726	0	0	0	36,470	18
TON (San Xavier District)	0	0	4,640	0	0	4,640	2
County Totals	34,744	1,726	4,640	0	0	41,110	21
Gila County							
San Carlos Apache	222,720	0	0	0	0	222,720	111

**Table H-4. Air Quality Calculations (Continued)
Year 2004**

Harvesting (pounds per acre)				
Cotton	Grains	Forage	Vegetables	Trees/Vines
1.12	1.12	1.12	1.12	34.20

Total Emissions

No-Action Alternative

Harvest: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest Tons/year	Site Prep+Harvest Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	3,532	2,948	12,586	29,264	15	136
Tonopah ID	2,759	25	612	0	0	3,395	2	38
County Totals	8,648	4,333	4,144	2,948	12,586	32,658	16	174
Pinal County								
GRIC	0	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	5,720	6,103	2,025	63,441	87,416	44	218
County Totals	73,304	51,614	19,171	8,994	274,352	427,435	214	1,376
Pima County								
TON (Schuk Toak District)	1,398	417	0	0	0	1,814	1	19
TON (San Xavier District)	0	0	896	0	0	896	0	3
County Totals	1,398	417	896	0	0	2,710	1	22

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	612	0	0	3,395	2	38
County Totals	8,648	4,333	612	2,948	12,586	29,126	15	163
Pinal County								
GRIC	0	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	5,720	6,103	2,025	63,441	87,416	44	218
County Totals	73,304	51,614	19,171	8,994	274,352	427,435	214	1,376
Pima County								
TON (Schuk Toak District)	1,398	417	0	0	0	1,814	1	19
TON (San Xavier District)	0	0	896	0	0	896	0	3
County Totals	1,398	417	896	0	0	2,710	1	22

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest Tons/year	Site Prep+Harvest Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	3,532	2,948	12,586	29,264	15	136
Tonopah ID	2,759	25	612	0	0	3,395	2	38
County Totals	8,648	4,333	4,144	2,948	12,586	32,658	16	174
Pinal County								
GRIC	0	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	5,720	6,103	2,025	63,441	87,416	44	218
County Totals	73,304	51,614	19,171	8,994	274,352	427,435	214	1,376
Pima County								
TON (Schuk Toak District)	1,398	417	0	0	0	1,814	1	19
TON (San Xavier District)	0	0	896	0	0	896	0	3
County Totals	1,398	417	896	0	0	2,710	1	22

Table H-4. Air Quality Calculations (Continued)
Year 2004

Harvesting (pounds per acre)

Cotton	Grains	Forage	Vegetables	Trees/Vines
1.12	1.12	1.12	1.12	34.20

Total Emissions

Alternative 2

Harvest: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	3,532	2,948	12,586	29,264	15	136
Tonopah ID	2,759	25	612	0	0	3,395	2	38
County Totals	8,648	4,333	4,144	2,948	12,586	32,658	16	174
Pinal County								
GRIC	0	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	5,720	6,103	2,025	63,441	87,416	44	218
County Totals	73,304	51,614	19,171	8,994	274,352	427,435	214	1,376
Pima County								
TON (Schuk Toak District)	1,398	417	0	0	0	1,814	1	19
TON (San Xavier District)	0	0	896	0	0	896	0	3
County Totals	1,398	417	896	0	0	2,710	1	22
Gila County								
San Carlos Apache	5,264	0	0	0	0	5,264	3	68

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	3,532	2,948	12,586	29,264	15	136
Tonopah ID	2,759	25	612	0	0	3,395	2	38
County Totals	8,648	4,333	4,144	2,948	12,586	32,658	16	174
Pinal County								
GRIC	0	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	5,720	6,103	2,025	63,441	87,416	44	218
County Totals	73,304	51,614	19,171	8,994	274,352	427,435	214	1,376
Pima County								
TON (Schuk Toak District)	1,398	417	0	0	0	1,814	1	19
TON (San Xavier District)	0	0	896	0	0	896	0	3
County Totals	1,398	417	896	0	0	2,710	1	22
Gila County								
San Carlos Apache	8,960	0	0	0	0	8,960	4	116

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	3,532	2,948	12,586	29,264	15	136
Tonopah ID	2,759	25	612	0	0	3,395	2	38
County Totals	8,648	4,333	4,144	2,948	12,586	32,658	16	174
Pinal County								
GRIC	0	0	0	0	0	0	0	0
TON Chuichu District	0	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	5,720	6,103	2,025	63,441	87,416	44	218
County Totals	73,304	51,614	19,171	8,994	274,352	427,435	214	1,376
Pima County								
TON (Schuk Toak District)	1,398	417	0	0	0	1,814	1	19
TON (San Xavier District)	0	0	896	0	0	896	0	3
County Totals	1,398	417	896	0	0	2,710	1	22
Gila County								
San Carlos Apache	8,960	0	0	0	0	8,960	4	116

**Table H-5. Air Quality Calculations
Year 2017**

No-Action Alternative

Entity	Crop Acreages					Total
	Acreage	Acreage	Acreage	Acreage	Acreage	
	Cotton	Grains	Forage	Vegetables	Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	29,148	14,032	5,675	2,734	0	51,589
TON Chuichu District	0	0	0	0	0	0
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	5,449	1,808	1,855	18,154
County Totals	94,598	55,009	22,792	10,764	8,022	191,185
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	0	2,508	2,700	0	5,208
County Totals	1,248	372	2,902	2,798	88	7,408

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	29,148	14,032	5,675	2,734	0	51,589
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	5,449	1,808	1,855	18,154
County Totals	95,798	55,809	22,792	10,764	8,022	193,185
Pima County						
TON (Schuk Toak District)	1,248	372	394	88	88	2,190
TON (San Xavier District)	0	0	800	192	0	992
County Totals	1,248	372	1,194	280	88	3,182

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	546	0	0	3,031
County Totals	7,721	3,869	546	2,632	368	15,136
Pinal County						
GRIC	29,148	14,032	5,675	2,734	0	51,589
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	5,449	1,808	1,855	18,154
County Totals	95,798	55,809	22,792	10,764	8,022	193,185
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	290	88	7,600

**Table H-5. Air Quality Calculations [Continued]
Year 2017**

Alternative 2

Entity	Crop Acreages					Total
	Acreage	Acreage	Acreage	Acreage	Acreage	
	Cotton	Grains	Forage	Vegetables	Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	29,148	14,032	5,675	2,734	0	51,589
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	5,449	1,808	1,855	18,154
County Totals	95,798	55,809	22,792	10,764	8,022	193,185
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	290	88	7,600
Gila County						
San Carlos Apache	0	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	546	0	0	3,031
County Totals	7,721	3,869	546	2,632	368	15,136
Pinal County						
GRIC	29,148	14,032	5,675	2,734	0	51,589
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	5,449	1,808	1,855	18,154
County Totals	95,798	55,809	22,792	10,764	8,022	193,185
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	290	88	7,600
Gila County						
San Carlos Apache	0	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	29,148	14,032	5,675	2,734	0	51,589
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	5,449	1,808	1,855	18,154
County Totals	95,798	55,809	22,792	10,764	8,022	193,185
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	290	88	7,600
Gila County						
San Carlos Apache	0	0	0	0	0	0

Table H-5. Air Quality Calculations (Continued)
Year 2017

		Emission Factors (grams/acre-hour)			
		ROG	NOx	CO	PM10-exhaust
		38.90	226.00	80.50	30.90
No-Action Alternative					
Site Preparation/Harvest Exhaust Emissions					
Entity	Acre-Passes	grams/acre-hr tons/yr	grams/acre-hr tons/yr	grams/acre-hr tons/yr	grams/acre-hr tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	209,684	9	52	19	7
TON Chuichu District	0	0	0	0	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	70,215	3	17	6	2
County Totals	705,388	30	176	63	24
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	16,635	1	4	1	1
County Totals	25,483	1	6	2	1

Settlement Alternative

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	209,684	9	52	19	7
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	70,215	3	17	6	2
County Totals	713,388	31	178	63	24
Pima County					
TON (Schuk Toak District)	8,798	0	2	1	0
TON (San Xavier District)	1,960	0	0	0	0
County Totals	10,758	0	3	1	0

Alternative 1

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	15,483	1	4	1	1
County Totals	64,060	3	16	6	2
Pinal County					
GRIC	209,684	9	52	19	7
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	70,215	3	17	6	2
County Totals	713,388	31	178	63	24
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,691	1	4	1	1

**Table H-5. Air Quality Calculations [Continued]
Year 2017**

Emission Factors (grams/acre-hour)			
ROG	NOx	CO	PM10-exhaust
38.90	226.00	80.50	30.90

Alternative 2

Entity	Site Preparation/Harvest Exhaust Emissions				
	Acre-Passes	grams/acre-hr	grams/acre-hr	grams/acre-hr	grams/acre-hr
		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	209,684	9	52	19	7
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	70,215	3	17	6	2
County Totals	713,388	31	178	63	24
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,691	1	4	1	1
Gila County					
San Carlos Apache	0	0	0	0	0

Alternative 3a

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	15,483	1	4	1	1
County Totals	64,060	3	16	6	2
Pinal County					
GRIC	209,684	9	52	19	7
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	70,215	3	17	6	2
County Totals	713,388	31	178	63	24
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,691	1	4	1	1
Gila County					
San Carlos Apache	0	0	0	0	0

Alternative 3b

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	209,684	9	52	19	7
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	70,215	3	17	6	2
County Totals	713,388	31	178	63	24
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,691	1	4	1	1
Gila County					
San Carlos Apache	0	0	0	0	0

**Table H-5. Air Quality Calculations (Continued)
Year 2017**

No-Action Alternative	PM10 per	Acre - passes				
	acre - pass	Cotton	Grains	Forage	Vegetables	Trees/Vines
	4.64	6.00	1.00	1.25	5.00	0.06

Site Preparation: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	811,480	65,108	32,915	63,429	0	972,933	486
TON Chuichu District	0	0	0	0	0	0	0
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	0	31,604	41,946	516	325,796	163
County Totals	2,633,608	255,242	132,194	249,725	2,233	3,273,002	1,637
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	0	14,546	62,640	0	77,186	39
County Totals	34,744	1,726	16,832	64,914	24	118,240	59

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	811,480	65,108	32,915	63,429	0	972,933	486
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	0	31,604	41,946	516	325,796	163
County Totals	2,667,016	258,954	132,194	249,725	2,233	3,310,122	1,655
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,042	24	40,822	20
TON (San Xavier District)	0	0	4,640	4,454	0	9,094	5
County Totals	34,744	1,726	6,925	6,496	24	49,916	25

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	3,167	0	0	71,839	36
County Totals	214,953	17,952	3,167	61,062	102	297,236	149
Pinal County							
GRIC	811,480	65,108	32,915	63,429	0	972,933	486
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	0	31,604	41,946	516	325,796	163
County Totals	2,667,016	258,954	132,194	249,725	2,233	3,310,122	1,655
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,728	24	72,905	36

Table H-5. Air Quality Calculations (Continued)
Year 2017

PM10 per acre - pass 4.64	Acre - passes				
	Cotton	Grains	Forage	Vegetables	Trees/Vines
	6.00	1.00	1.25	5.00	0.06

Alternative 2

Site Preparation: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	811,480	65,108	32,915	63,429	0	972,933	486
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	0	31,604	41,946	516	325,796	163
County Totals	2,667,016	258,954	132,194	249,725	2,233	3,310,122	1,655
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,728	24	72,805	36
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	3,167	0	0	71,839	36
County Totals	214,953	17,952	3,167	61,062	102	297,236	149
Pinal County							
GRIC	811,480	65,108	32,915	63,429	0	972,933	486
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	0	31,604	41,946	516	325,796	163
County Totals	2,667,016	258,954	132,194	249,725	2,233	3,310,122	1,655
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,728	24	72,805	36
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	811,480	65,108	32,915	63,429	0	972,933	486
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	0	31,604	41,946	516	325,796	163
County Totals	2,667,016	258,954	132,194	249,725	2,233	3,310,122	1,655
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,728	24	72,805	36
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Table H-5. Air Quality Calculations (Continued)
Year 2017

No-Action Alternative	Harvesting (pounds per acre)					Total Emissions			
	Cotton	Grains	Forage	Vegetables	Trees/Vines				
	1.12	1.12	1.12	1.12	34.20				
Harvest: Fugitive Dust									
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest	Site Prep+Harvest	
							Tons/year	Tons/year	
Maricopa County									
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13		126
Tonopah ID	2,759	25	0	0	0	2,783	1		36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14		161
Pinal County									
GRIC	32,646	15,716	6,356	3,062	0	57,780	29		515
TON Chuichu District	0	0	0	0	0	0	0		0
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99		591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71		567
New Magma IDD	10,127	0	6,103	2,025	63,441	81,696	41		204
County Totals	105,950	61,610	25,527	12,056	274,352	479,495	240		1,876
Pima County									
TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3		23
TON (San Xavier District)	0	0	2,809	3,024	0	5,833	3		42
County Totals	1,398	417	3,250	3,134	3,010	11,208	6		65

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	32,646	15,716	6,356	3,062	0	57,780	29	515
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	0	6,103	2,025	63,441	81,696	41	204
County Totals	107,294	62,506	25,527	12,056	274,352	481,735	241	1,896
Pima County								
TON (Schuk Toak District)	1,398	417	441	99	3,010	5,364	3	23
TON (San Xavier District)	0	0	896	215	0	1,111	1	5
County Totals	1,398	417	1,337	314	3,010	6,475	3	28

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	612	0	0	3,395	2	38
County Totals	8,648	4,333	612	2,948	12,586	29,126	15	163
Pinal County								
GRIC	32,646	15,716	6,356	3,062	0	57,780	29	515
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	0	6,103	2,025	63,441	81,696	41	204
County Totals	107,294	62,506	25,527	12,056	274,352	481,735	241	1,896
Pima County								
TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3	23
TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
County Totals	1,398	3,226	3,465	325	3,010	11,423	6	42

Table H-5. Air Quality Calculations (Continued)
Year 2017

Harvesting (pounds per acre)				
Cotton	Grains	Forage	Vegetables	Trees/Vines
1.12	1.12	1.12	1.12	34.20

Total Emissions

Alternative 2

Entity	Harvest: Fugitive Dust					Harvest		Site Prep+Harvest
	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	32,646	15,716	6,356	3,062	0	57,780	29	515
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	0	6,103	2,025	63,441	81,696	41	204
County Totals	107,294	62,506	25,527	12,056	274,352	481,735	241	1,896
Pima County								
TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3	23
TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
County Totals	1,398	3,226	3,465	325	3,010	11,423	6	42
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	612	0	0	3,395	2	38
County Totals	8,648	4,333	612	2,948	12,586	29,126	15	163
Pinal County								
GRIC	32,646	15,716	6,356	3,062	0	57,780	29	515
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	0	6,103	2,025	63,441	81,696	41	204
County Totals	107,294	62,506	25,527	12,056	274,352	481,735	241	1,896
Pima County								
TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3	23
TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
County Totals	1,398	3,226	3,465	325	3,010	11,423	6	42
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	32,646	15,716	6,356	3,062	0	57,780	29	515
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	0	6,103	2,025	63,441	81,696	41	204
County Totals	107,294	62,506	25,527	12,056	274,352	481,735	241	1,896
Pima County								
TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3	23
TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
County Totals	1,398	3,226	3,465	325	3,010	11,423	6	42
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

**Table H-6. Air Quality Calculations
Year 2030**

No-Action Alternative

Entity	Crop Acreages					Total
	Acreage Cotton	Acreage Grains	Acreage Forage	Acreage Vegetables	Acreage Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	48,291	23,248	9,402	4,530	0	85,471
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	5,449	1,808	1,855	18,154
County Totals	114,941	65,025	26,519	12,560	8,022	227,067
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	290	88	7,600

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	66,583	32,044	12,959	6,244	0	117,830
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	133,233	73,821	24,627	14,274	8,022	253,977
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	53,076	25,133	10,333	4,979	0	93,521
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	119,726	66,910	22,001	13,009	8,022	229,668
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	290	88	7,600

**Table H-6. Air Quality Calculations [Continued]
Year 2030**

Alternative 2

Entity	Acreage Cotton	Acreage Grains	Acreage Forage	Acreage Vegetables	Acreage Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	57,862	27,856	11,285	5,428	0	102,431
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	124,512	69,633	22,953	13,458	8,022	238,578
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688
Gila County						
San Carlos Apache	0	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	77,439	37,280	15,077	7,264	0	137,060
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	144,089	79,057	26,745	15,294	8,022	273,207
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688
Gila County						
San Carlos Apache	0	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	77,439	37,280	15,077	7,264	0	137,060
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	22,823	2,957	3,116	2,281	59,723
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	144,089	79,057	26,745	15,294	8,022	273,207
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688
Gila County						
San Carlos Apache	0	0	0	0	0	0

Table H-6. Air Quality Calculations (Continued)
Year 2030

	Emission Factors (grams/ acre-hr)			
	ROG	NOx	CO	PM10-exhaust
No-Action Alternative	38.90	226.00	80.50	30.90

Site Preparation/Harvest Exhaust Emissions					
Entity	Acre-Passes	grams/acre-hr	grams/acre-hr	grams/acre-hr	grams/acre-hr
		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	347,397	15	86	31	12
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	70,215	3	17	6	2
County Totals	851,101	36	212	75	29
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,691	1	4	1	1

Settlement Alternative

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	478,961	21	119	42	16
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	63,403	3	16	6	2
County Totals	975,854	42	243	87	33
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1

Alternative 1

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	381,400	16	95	34	13
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	63,403	3	16	6	2
County Totals	878,294	38	219	78	30
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,691	1	4	1	1

**Table H-6. Air Quality Calculations [Continued]
Year 2030**

Emission Factors (grams/ acre-hr)			
ROG	NOx	CO	PM10-exhaust
38.90	226.00	80.50	30.90

Alternative 2

Entity	Site Preparation/Harvest Exhaust Emissions				
	Acre-Passes	grams/acre-hr	grams/acre-hr	grams/acre-hr	grams/acre-hr
Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	416,274	18	104	37	14
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	63,403	3	16	6	2
County Totals	913,168	39	227	81	31
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1
Gila County					
San Carlos Apache	0	0	0	0	0

Alternative 3a

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	557,080	24	139	49	19
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	63,403	3	16	6	2
County Totals	1,053,974	45	262	93	36
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1
Gila County					
San Carlos Apache	0	0	0	0	0

Alternative 3b

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	557,080	24	139	49	19
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	213,512	9	53	19	7
New Magma IDD	63,403	3	16	6	2
County Totals	1,053,974	45	262	93	36
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1
Gila County					
San Carlos Apache	0	0	0	0	0

Table H-6. Air Quality Calculations (Continued)
Year 2030

No-Action Alternative	PM10 per	Acre - passes				
	acre - pass	Cotton	Grains	Forage	Vegetables	Trees/Vines
	4.64	6.00	1.00	1.25	5.00	0.06

Site Preparation: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	1,344,421	107,871	54,532	105,096	0	1,611,920	806
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	0	31,604	41,946	516	325,796	163
County Totals	3,199,957	301,716	153,810	291,392	2,233	3,949,109	1,975
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,728	24	72,805	36

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	1,853,671	148,684	75,162	144,861	0	2,222,378	1,111
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,709,207	342,529	142,837	331,157	2,233	4,527,963	2,264
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24
County Totals	50,780	20,620	28,907	8,074	24	108,406	54

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	1,477,636	116,617	59,931	115,513	0	1,769,697	885
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,333,172	310,462	127,606	301,809	2,233	4,075,282	2,038
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,728	24	72,805	36

Table H-6. Air Quality Calculations [Continued]
Year 2030

	Acre - passes				
PM10 per acre - pass	Cotton	Grains	Forage	Vegetables	Trees/Vine
4.64	6.00	1.00	1.25	5.00	0.06

Alternative 2

Site Preparation: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113,497
Tonopah ID	68,570	102	0	0	0	68,672	34,336
County Totals	214,953	17,952	0	61,062	102	294,070	147,833
Pinal County							
GRIC	1,610,878	129,252	65,453	125,930	0	1,931,513	966,543
TON Chuichu District	33,408	3,712	0	0	0	37,120	18,560
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492,289
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495,348
New Magma IDD	251,729	0	0	41,946	516	294,191	147,096
County Totals	3,466,414	323,097	133,127	312,226	2,233	4,237,098	2,119,836
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30,439
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24,273
County Totals	50,780	20,620	28,907	8,074	24	108,406	54,712
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113,497
Tonopah ID	68,570	102	0	0	0	68,672	34,336
County Totals	214,953	17,952	0	61,062	102	294,070	147,833
Pinal County							
GRIC	2,155,902	172,979	87,447	168,525	0	2,584,852	1,292,454
TON Chuichu District	33,408	3,712	0	0	0	37,120	18,560
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	491,789
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495,348
New Magma IDD	251,729	0	0	41,946	516	294,191	147,096
County Totals	4,011,438	366,824	155,121	354,821	2,233	4,890,437	2,445,246
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30,439
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24,273
County Totals	50,780	20,620	28,907	8,074	24	108,406	54,712
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113,400
Tonopah ID	68,570	102	0	0	0	68,672	34,336
County Totals	214,953	17,952	0	61,062	102	294,070	147,736
Pinal County							
GRIC	2,155,902	172,979	87,447	168,525	0	2,584,852	1,292,426
TON Chuichu District	33,408	3,712	0	0	0	37,120	19,056
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	491,789
Central Arizona IDD	794,721	105,899	17,151	72,291	635	990,696	495,348
New Magma IDD	251,729	0	0	41,946	516	294,191	147,096
County Totals	4,011,438	366,824	155,121	354,821	2,233	4,890,437	2,445,715
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30,430
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24,273
County Totals	50,780	20,620	28,907	8,074	24	108,406	54,703
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Table H-6. Air Quality Calculations (Continued)
Year 2030

No-Action Alternative	Harvesting (pounds per acre)					Total Emissions		
	Cotton	Grains	Forage	Vegetables	Trees/Vines			
	1.12	1.12	1.12	1.12	34.20			
Harvest: Fugitive Dust								
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest Tons/year	Site Prep+Harvest Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	54,086	26,038	10,530	5,074	0	95,728	48	854
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	0	6,103	2,025	63,441	81,696	41	204
County Totals	128,734	72,828	29,701	14,067	274,352	519,683	260	2,234
Pima County								
TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3	23
TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
County Totals	1,398	3,226	3,465	325	3,010	11,423	6	42

Settlement Alternative

Entity		Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County									
	Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
	Tonopah ID	2,759	25	0	0	0	2,783	1	36
	County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County									
	GRIC	74,573	35,889	14,514	6,993	0	131,970	66	1,177
	TON Chuichu District	1,344	896	0	0	0	2,240	1	20
	Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
	Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
	New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
	County Totals	149,221	82,680	27,582	15,987	274,352	549,822	275	2,539
Pima County									
	TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
	TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
	County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62

Alternative 1

Entity		Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County									
	Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
	Tonopah ID	2,759	25	0	0	0	2,783	1	36
	County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County									
	GRIC	59,445	28,149	11,573	5,576	0	104,744	52	937
	TON Chuichu District	1,344	896	0	0	0	2,240	1	20
	Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
	Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
	New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
	County Totals	134,093	74,939	24,641	14,570	274,352	522,596	261	2,299
Pima County									
	TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3	23
	TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
	County Totals	1,398	3,226	3,465	325	3,010	11,423	6	42

**Table H-6. Air Quality Calculations [Continued]
Year 2030**

Harvesting (pounds per acre)

Cotton	Grains	Forage	Vegetables	Trees/Vines
1.12	1.12	1.12	1.12	34.20

Total Emissions

Alternative 2

Harvest: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest	Site Prep+Harvest
							Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	64,805	31,199	12,639	6,079	0	114,723	57	1,023
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	139,453	77,989	25,707	15,073	274,352	532,575	266	2,385
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	86,732	41,754	16,886	8,136	0	153,507	77	1,369
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	161,380	88,544	29,954	17,129	274,352	571,360	286	2,731
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	86,732	41,754	16,886	8,136	0	153,507	77	1,369
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	25,562	3,312	3,490	78,010	142,345	71	567
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	161,380	88,544	29,954	17,129	274,352	571,360	286	2,731
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

**Table H-7. Air Quality Calculations
Year 2043**

No-Action Alternative

Entity	Crop Acreages					Total
	Acreage Cotton	Acreage Grains	Acreage Forage	Acreage Vegetables	Acreage Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	48,291	23,248	9,402	4,530	0	85,471
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	114,941	42,202	21,070	12,560	8,022	198,795
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	290	88	7,600

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	0	0	2,632	368	8,258
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	22	0	2,632	368	10,743
Pinal County						
GRIC	66,563	32,044	12,959	6,244	0	117,810
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	133,213	50,998	24,627	14,274	8,022	231,134
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	53,076	25,133	10,333	4,979	0	93,521
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	119,726	44,087	22,001	13,009	8,022	206,845
Pima County						
TON (Schuk Toak District)	1,248	372	394	88	88	2,190
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	280	88	7,590

**Table H-7. Air Quality Calculations [Continued]
Year 2043**

Alternative 2

Entity	Crop Acreages					Total
	Acreage Cotton	Acreage Grains	Acreage Forage	Acreage Vegetables	Acreage Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	3,847	0	2,632	368	12,105
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	0	2,632	368	14,590
Pinal County						
GRIC	57,862	27,856	11,285	5,428	0	102,431
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	124,512	46,810	22,953	13,458	8,022	215,755
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688
Gila County						
San Carlos Apache	0	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	0	0	2,632	368	8,258
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	22	0	2,632	368	10,743
Pinal County						
GRIC	77,439	37,280	15,077	7,264	0	137,060
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	144,089	56,234	26,745	15,294	8,022	250,384
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688
Gila County						
San Carlos Apache	0	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total
Maricopa County						
Queen Creek ID	5,258	0	0	2,632	368	8,258
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	22	0	2,632	368	10,743
Pinal County						
GRIC	77,439	37,280	15,077	7,264	0	137,060
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stanfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	144,089	56,234	26,745	15,294	8,022	250,384
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688
Gila County						
San Carlos Apache	0	0	0	0	0	0

Table H-7. Air Quality Calculations (Continued)
Year 2043

	Emission Factors (grams/acre-hour)			
	ROG	NOx	CO	PM10-exhaust
No-Action Alternative	38.90	226.00	80.50	30.90

Entity	Acre-Passes	Site Preparation/Harvest Exhaust Emissions			
		grams/acre-hr tons/yr	grams/acre-hr tons/yr	grams/acre-hr tons/yr	grams/acre-hr tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	347,397	15	86	31	12
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	821,467	35	204	73	28
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,691	1	4	1	1

Settlement Alternative

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	44,730	2	11	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	59,530	3	15	5	2
Pinal County					
GRIC	478,841	21	119	42	16
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	952,911	41	237	84	32
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1

Alternative 1

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	381,400	16	95	34	13
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	855,471	37	213	76	29
Pima County					
TON (Schuk Toak District)	8,798	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,641	1	4	1	1

**Table H-7. Air Quality Calculations [Continued]
Year 2043**

Alternative 2	Emission Factors (grams/acre-hour)			
	ROG	NOx	CO	PM10-exhaust
	38.90	226.00	80.50	30.90

Site Preparation/Harvest Exhaust Emissions					
Entity	Acre-Passes	grams/acre-hr tons/yr	grams/acre-hr tons/yr	grams/acre-hr tons/yr	grams/acre-hr tons/yr
Maricopa County					
Queen Creek ID	48,577	2	12	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	63,377	3	16	6	2
Pinal County					
GRIC	416,274	18	104	37	14
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	890,345	38	222	79	30
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1
Gila County					
San Carlos Apache	0	0	0	0	0

Alternative 3a

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	44,730	2	11	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	59,530	3	15	5	2
Pinal County					
GRIC	557,080	24	139	49	19
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	1,031,151	44	257	91	35
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1
Gila County					
San Carlos Apache	0	0	0	0	0

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	44,730	2	11	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	59,530	3	15	5	2
Pinal County					
GRIC	557,080	24	139	49	19
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stanfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	1,031,151	44	257	91	35
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1
Gila County					
San Carlos Apache	0	0	0	0	0

Table H-7. Air Quality Calculations (Continued)
Year 2043

No-Action Alternative	PM10 per	Acre - passes					
	acre - pass	Cotton	Grains	Forage	Vegetables	Trees/Vines	
	4.64	6.00	1.00	1.25	5.00	0.06	

Site Preparation: Fugitive Dust							
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	1,344,421	107,871	54,532	105,096	0	1,611,920	806
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,199,957	195,817	122,206	291,392	2,233	3,811,606	1,906
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,728	24	72,805	36

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	0	0	61,062	102	207,548	104
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	102	0	61,062	102	276,220	138
Pinal County							
GRIC	1,853,114	148,684	75,162	144,861	0	2,221,821	1,111
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,708,650	236,631	142,837	331,157	2,233	4,421,507	2,211
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24
County Totals	50,780	20,620	28,907	8,074	24	108,406	54

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	1,477,636	116,617	59,931	115,513	0	1,769,697	885
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,333,172	204,564	127,606	301,809	2,233	3,969,383	1,985
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,042	24	40,822	20
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,496	24	72,573	36

**Table H-7. Air Quality Calculations [Continued]
Year 2043**

Alternative 2	PM10 per acre - pass	Acre - passes					
		Cotton	Grains	Forage	Vegetables	Trees/Vines	
	4.64	6.00	1.00	1.25	5.00	0.06	
Site Preparation: Fugitive Dust							
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	0	61,062	102	225,398	113
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	0	61,062	102	294,070	147
Pinal County							
GRIC	1,610,878	129,252	65,453	125,930	0	1,931,513	966
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,466,414	217,198	133,127	312,226	2,233	4,131,199	2,066
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24
County Totals	50,780	20,620	28,907	8,074	24	108,406	54
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Alternative 3a	PM10 per acre - pass	Acre - passes					
		Cotton	Grains	Forage	Vegetables	Trees/Vines	
	4.64	6.00	1.00	1.25	5.00	0.06	
Site Preparation: Fugitive Dust							
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	0	0	61,062	102	207,548	104
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	102	0	61,062	102	276,220	138
Pinal County							
GRIC	2,155,902	172,979	87,447	168,525	0	2,584,852	1,292
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	4,011,438	260,926	155,121	354,821	2,233	4,784,539	2,392
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24
County Totals	50,780	20,620	28,907	8,074	24	108,406	54
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Alternative 3b	PM10 per acre - pass	Acre - passes					
		Cotton	Grains	Forage	Vegetables	Trees/Vines	
	4.64	6.00	1.00	1.25	5.00	0.06	
Site Preparation: Fugitive Dust							
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	0	0	61,062	102	207,548	104
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	102	0	61,062	102	276,220	138
Pinal County							
GRIC	2,155,902	172,979	87,447	168,525	0	2,584,852	1,292
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stanfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	4,011,438	260,926	155,121	354,821	2,233	4,784,539	2,392
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24
County Totals	50,780	20,620	28,907	8,074	24	108,406	54
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Table H-7. Air Quality Calculations (Continued)
Year 2043

No-Action Alternative	Harvesting (pounds per acre)					Total Emissions		
	Cotton	Grains	Forage	Vegetables	Trees/Vines			
	1.12	1.12	1.12	1.12	34.20			
Harvest: Fugitive Dust								
						Harvest	Site Prep+Harvest	
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	54,086	26,038	10,530	5,074	0	95,728	48	854
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	128,734	47,266	23,598	14,067	274,352	488,018	244	2,150
Pima County								
TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3	23
TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
County Totals	1,398	3,226	3,465	325	3,010	11,423	6	42

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	0	0	2,948	12,586	21,422	11	114
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	25	0	2,948	12,586	24,206	12	150
Pinal County								
GRIC	74,551	35,889	14,514	6,993	0	131,947	66	1,177
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	149,199	57,118	27,582	15,987	274,352	524,238	262	2,473
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	59,445	28,149	11,573	5,576	0	104,744	52	937
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	134,093	49,377	24,641	14,570	274,352	497,034	249	2,233
Pima County								
TON (Schuk Toak District)	1,398	417	441	99	3,010	5,364	3	23
TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
County Totals	1,398	3,226	3,465	314	3,010	11,412	6	42

**Table H-7. Air Quality Calculations [Continued]
Year 2043**

Alternative 2	Harvesting (pounds per acre)					Total Emissions		
	Cotton	Grains	Forage	Vegetables	Trees/Vines			
	1.12	1.12	1.12	1.12	34.20			
Harvest: Fugitive Dust								
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest Tons/year	Site Prep+Harvest Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	0	2,948	12,586	25,731	13	126
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	0	2,948	12,586	28,514	14	161
Pinal County								
GRIC	64,805	31,199	12,639	6,079	0	114,723	57	1,023
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	139,453	52,427	25,707	15,073	274,352	507,013	254	2,319
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

Alternative 3a	Harvesting (pounds per acre)					Total Emissions		
	Cotton	Grains	Forage	Vegetables	Trees/Vines			
	1.12	1.12	1.12	1.12	34.20			
Harvest: Fugitive Dust								
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest Tons/year	Site Prep+Harvest Tons/year
Maricopa County								
Queen Creek ID	5,889	0	0	2,948	12,586	21,422	11	114
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	25	0	2,948	12,586	24,206	12	150
Pinal County								
GRIC	86,732	41,754	16,886	8,136	0	153,507	77	1,369
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	161,380	62,982	29,954	17,129	274,352	545,798	273	2,665
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

Alternative 3b	Harvesting (pounds per acre)					Total Emissions		
	Cotton	Grains	Forage	Vegetables	Trees/Vines			
	1.12	1.12	1.12	1.12	34.20			
Harvest: Fugitive Dust								
Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest Tons/year	Site Prep+Harvest Tons/year
Maricopa County								
Queen Creek ID	5,889	0	0	2,948	12,586	21,422	11	114
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	25	0	2,948	12,586	24,206	12	150
Pinal County								
GRIC	86,732	41,754	16,886	8,136	0	153,507	77	1,369
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stanfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	161,380	62,982	29,954	17,129	274,352	545,798	273	2,665
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

**Table H-8. Air Quality Calculations
Year 2050**

No-Action Alternative

Entity	Crop Acreages					Total
	Acreage Cotton	Acreage Grains	Acreage Forage	Acreage Vegetables	Acreage Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	3,847	3,154	2,632	368	15,259
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	3,869	3,154	2,632	368	17,744
Pinal County						
GRIC	48,291	23,248	9,402	4,530	0	85,471
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stansfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	114,941	42,202	21,070	12,560	8,022	198,795
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	290	88	7,600

Settlement Alternative

Entity	Acreage					Total
	Cotton	Grains	Forage	Vegetables	Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	0	0	2,632	368	8,258
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	22	0	2,632	368	10,743
Pinal County						
GRIC	66,563	32,044	12,959	6,244	0	117,810
TON Chuichu District	1,824	544	734	98	0	3,200
Maricopa-Stansfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	133,837	50,742	25,361	14,372	8,022	232,334
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688

Alternative 1

Entity						Total
	Cotton	Grains	Forage	Vegetables	Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	0	0	2,632	368	8,258
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	22	0	2,632	368	10,743
Pinal County						
GRIC	53,076	25,133	10,333	4,979	0	93,521
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stansfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	119,726	44,087	22,001	13,009	8,022	206,845
Pima County						
TON (Schuk Toak District)	1,248	372	394	98	88	2,200
TON (San Xavier District)	0	2,508	2,700	192	0	5,400
County Totals	1,248	2,880	3,094	290	88	7,600

**Table H-8. Air Quality Calculations [Continued]
Year 2050**

Alternative 2

Entity	Crop Acreages					Total
	Acreage Cotton	Acreage Grains	Acreage Forage	Acreage Vegetables	Acreage Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	0	0	2,632	368	8,258
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	22	0	2,632	368	10,743
Pinal County						
GRIC	57,862	27,856	11,285	5,428	0	102,431
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stansfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	124,512	46,810	22,953	13,458	8,022	215,755
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688
Gila County						
San Carlos Apache	0	0	0	0	0	0

Alternative 3a

Entity	Crop Acreages					Total
	Acreage Cotton	Acreage Grains	Acreage Forage	Acreage Vegetables	Acreage Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	0	0	2,632	368	8,258
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	22	0	2,632	368	10,743
Pinal County						
GRIC	77,439	37,280	15,077	7,264	0	137,060
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stansfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	144,089	56,234	26,745	15,294	8,022	250,384
Pima County						
TON (Schuk Toak District)	1,824	544	734	98	88	3,288
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	348	88	11,688
Gila County						
San Carlos Apache	0	0	0	0	0	0

Alternative 3b

Entity	Acreage					Total
	Cotton	Grains	Forage	Vegetables	Trees/Vines	
Maricopa County						
Queen Creek ID	5,258	0	0	2,632	368	8,258
Tonopah ID	2,463	22	0	0	0	2,485
County Totals	7,721	22	0	2,632	368	10,743
Pinal County						
GRIC	77,439	37,280	15,077	7,264	0	137,060
TON Chuichu District	1,200	800	0	0	0	2,000
Maricopa-Stansfield IDD	27,862	18,154	8,711	3,106	3,886	61,719
Central Arizona IDD	28,546	0	2,957	3,116	2,281	36,900
New Magma IDD	9,042	0	0	1,808	1,855	12,705
County Totals	144,089	56,234	26,745	15,294	8,022	250,384
Pima County						
TON (Schuk Toak District)	1,824	544	734	88	88	3,278
TON (San Xavier District)	0	3,900	4,250	250	0	8,400
County Totals	1,824	4,444	4,984	338	88	11,678
Gila County						
San Carlos Apache	0	0	0	0	0	0

**Table H-8. Air Quality Calculations
Year 2050**

Emission Factors (grams/acre-hour)			
ROG	NOx	CO	PM10-exhaust
38.90	226.00	80.50	30.90

No-Action Alternative

Entity	Acre-Passes	Site Preparation/Harvest Plant Emissions			
		grams/acre-hr	grams/acre-hr	grams/acre-hr	grams/acre-hr
		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	52,520	2	13	5	2
Tonopah ID	14,800	1	4	1	1
County Totals	67,320	3	17	6	2
Pinal County					
GRIC	347,397	15	86	31	12
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stansfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	821,467	35	204	73	28
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,691	1	4	1	1

Settlement Alternative

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	44,730	2	11	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	59,530	3	15	5	2
Pinal County					
GRIC	478,841	21	119	42	16
TON Chuichu District	12,896	1	3	1	0
Maricopa-Stansfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	957,807	41	238	85	33
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1

Alternative 1

Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	44,730	2	11	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	59,530	3	15	5	2
Pinal County					
GRIC	381,400	16	95	34	13
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stansfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	855,471	37	213	76	29
Pima County					
TON (Schuk Toak District)	8,848	0	2	1	0
TON (San Xavier District)	6,843	0	2	1	0
County Totals	15,691	1	4	1	1

**Table H-8. Air Quality Calculations [Continued]
Year 2050**

Emission Factors (grams/acre-hour)			
ROG	NOx	CO	PM10-exhaust
38.90	226.00	80.50	30.90

Alternative 2

Entity	Acre-Passes	Site Preparation/Harvest Plant Emissions			
		grams/acre-hr	grams/acre-hr	grams/acre-hr	grams/acre-hr
Entity		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	44,730	2	11	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	59,530	3	15	5	2
Pinal County					
GRIC	416,274	18	104	37	14
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stansfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	890,345	38	222	79	30
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1
Gila County					
San Carlos Apache	0	0	0	0	0

Alternative 3a

Entity					
		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	44,730	2	11	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	59,530	3	15	5	2
Pinal County					
GRIC	557,080	24	139	49	19
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stansfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	1,031,151	44	257	91	35
Pima County					
TON (Schuk Toak District)	12,901	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,363	1	6	2	1
Gila County					
San Carlos Apache	0	0	0	0	0

Alternative 3b

Entity					
		tons/yr	tons/yr	tons/yr	tons/yr
Maricopa County					
Queen Creek ID	44,730	2	11	4	2
Tonopah ID	14,800	1	4	1	1
County Totals	59,530	3	15	5	2
Pinal County					
GRIC	557,080	24	139	49	19
TON Chuichu District	8,000	0	2	1	0
Maricopa-Stansfield IDD	211,978	9	53	19	7
Central Arizona IDD	190,689	8	47	17	6
New Magma IDD	63,403	3	16	6	2
County Totals	1,031,151	44	257	91	35
Pima County					
TON (Schuk Toak District)	12,851	1	3	1	0
TON (San Xavier District)	10,463	0	3	1	0
County Totals	23,313	1	6	2	1
Gila County					
San Carlos Apache	0	0	0	0	0

**Table H-8. Air Quality Calculations
Year 2050**

PM10 per acre - pass 4.64	Acre - passes				
	Cotton	Grains	Forage	Vegetables	Trees/Vines
	6.00	1.00	1.25	5.00	0.06

No-Action Alternative

Site Preparation: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	17,850	18,293	61,062	102	243,691	122
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	17,952	18,293	61,062	102	312,363	156
Pinal County							
GRIC	1,344,421	107,871	54,532	105,096	0	1,611,920	806
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stansfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,199,957	195,817	122,206	291,392	2,233	3,811,606	1,906
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,728	24	72,805	36

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	0	0	61,062	102	207,548	104
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	102	0	61,062	102	276,220	138
Pinal County							
GRIC	1,853,114	148,684	75,162	144,861	0	2,221,821	1,111
TON Chuichu District	50,780	2,524	4,257	2,274	0	59,835	30
Maricopa-Stansfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,726,022	235,443	147,094	333,430	2,233	4,444,222	2,222
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24
County Totals	50,780	20,620	28,907	8,074	24	108,406	54

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	0	0	61,062	102	207,548	104
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	102	0	61,062	102	276,220	138
Pinal County							
GRIC	1,477,636	116,617	59,931	115,513	0	1,769,697	885
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stansfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,333,172	204,564	127,606	301,809	2,233	3,969,383	1,985
Pima County							
TON (Schuk Toak District)	34,744	1,726	2,285	2,274	24	41,054	21
TON (San Xavier District)	0	11,637	15,660	4,454	0	31,752	16
County Totals	34,744	13,363	17,945	6,728	24	72,805	36

**Table H-8. Air Quality Calculations [Continued]
Year 2050**

PM10 per acre - pass 4.64	Acre - passes				
	Cotton	Grains	Forage	Vegetables	Trees/Vines
	6.00	1.00	1.25	5.00	0.06

Alternative 2

Site Preparation: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	0	0	61,062	102	207,548	104
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	102	0	61,062	102	276,220	138
Pinal County							
GRIC	1,610,878	129,252	65,453	125,930	0	1,931,513	966
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stansfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	3,466,414	217,198	133,127	312,226	2,233	4,131,199	2,066
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24
County Totals	50,780	20,620	28,907	8,074	24	108,406	54
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	0	0	61,062	102	207,548	104
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	102	0	61,062	102	276,220	138
Pinal County							
GRIC	2,155,902	172,979	87,447	168,525	0	2,584,852	1,292
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stansfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	4,011,438	260,926	155,121	354,821	2,233	4,784,539	2,392
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,274	24	59,860	30
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24
County Totals	50,780	20,620	28,907	8,074	24	108,406	54
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	tons/year
Maricopa County							
Queen Creek ID	146,383	0	0	61,062	102	207,548	104
Tonopah ID	68,570	102	0	0	0	68,672	34
County Totals	214,953	102	0	61,062	102	276,220	138
Pinal County							
GRIC	2,155,902	172,979	87,447	168,525	0	2,584,852	1,292
TON Chuichu District	33,408	3,712	0	0	0	37,120	19
Maricopa-Stansfield IDD	775,678	84,235	50,524	72,059	1,082	983,578	492
Central Arizona IDD	794,721	0	17,151	72,291	635	884,797	442
New Magma IDD	251,729	0	0	41,946	516	294,191	147
County Totals	4,011,438	260,926	155,121	354,821	2,233	4,784,539	2,392
Pima County							
TON (Schuk Toak District)	50,780	2,524	4,257	2,042	24	59,628	30
TON (San Xavier District)	0	18,096	24,650	5,800	0	48,546	24
County Totals	50,780	20,620	28,907	7,842	24	108,174	54
Gila County							
San Carlos Apache	0	0	0	0	0	0	0

**Table H-8. Air Quality Calculations
Year 2050**

Harvesting (pounds per acre)				
Cotton	Grains	Forage	Vegetables	Trees/Vines
1.12	1.12	1.12	1.12	34.20

Total Emissions

No-Action Alternative

Harvest: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest	Site Prep+Harvest
							Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	4,309	3,532	2,948	12,586	29,264	15	136
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	4,333	3,532	2,948	12,586	32,047	16	172
Pinal County								
GRIC	54,086	26,038	10,530	5,074	0	95,728	48	854
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stansfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	128,734	47,266	23,598	14,067	274,352	488,018	244	2,150
Pima County								
TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3	23
TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
County Totals	1,398	3,226	3,465	325	3,010	11,423	6	42

Settlement Alternative

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	0	0	2,948	12,586	21,422	11	114
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	25	0	2,948	12,586	24,206	12	150
Pinal County								
GRIC	74,551	35,889	14,514	6,993	0	131,947	66	1,177
TON Chuichu District	2,043	609	822	110	0	3,584	2	32
Maricopa-Stansfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	149,897	56,831	28,404	16,097	274,352	525,582	263	2,485
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62

Alternative 1

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	0	0	2,948	12,586	21,422	11	114
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	25	0	2,948	12,586	24,206	12	150
Pinal County								
GRIC	59,445	28,149	11,573	5,576	0	104,744	52	937
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stansfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	134,093	49,377	24,641	14,570	274,352	497,034	249	2,233
Pima County								
TON (Schuk Toak District)	1,398	417	441	110	3,010	5,375	3	23
TON (San Xavier District)	0	2,809	3,024	215	0	6,048	3	19
County Totals	1,398	3,226	3,465	325	3,010	11,423	6	42

**Table H-8. Air Quality Calculations [Continued]
Year 2050**

Harvesting (pounds per acre)				
Cotton	Grains	Forage	Vegetables	Trees/Vines
1.12	1.12	1.12	1.12	34.20

Total Emissions

Alternative 2

Harvest: Fugitive Dust

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Harvest	Site Prep+Harvest
							Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	0	0	2,948	12,586	21,422	11	114
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	25	0	2,948	12,586	24,206	12	150
Pinal County								
GRIC	64,805	31,199	12,639	6,079	0	114,723	57	1,023
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stansfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	139,453	52,427	25,707	15,073	274,352	507,013	254	2,319
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

Alternative 3a

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	0	0	2,948	12,586	21,422	11	114
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	25	0	2,948	12,586	24,206	12	150
Pinal County								
GRIC	86,732	41,754	16,886	8,136	0	153,507	77	1,369
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stansfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	161,380	62,982	29,954	17,129	274,352	545,798	273	2,665
Pima County								
TON (Schuk Toak District)	2,043	609	822	110	3,010	6,594	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	390	3,010	16,002	8	62
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0

Alternative 3b

Entity	Cotton	Grains	Forage	Vegetables	Trees/Vines	Total	Tons/year	Tons/year
Maricopa County								
Queen Creek ID	5,889	0	0	2,948	12,586	21,422	11	114
Tonopah ID	2,759	25	0	0	0	2,783	1	36
County Totals	8,648	25	0	2,948	12,586	24,206	12	150
Pinal County								
GRIC	86,732	41,754	16,886	8,136	0	153,507	77	1,369
TON Chuichu District	1,344	896	0	0	0	2,240	1	20
Maricopa-Stansfield IDD	31,205	20,332	9,756	3,479	132,901	197,674	99	591
Central Arizona IDD	31,972	0	3,312	3,490	78,010	116,783	58	501
New Magma IDD	10,127	0	0	2,025	63,441	75,593	38	185
County Totals	161,380	62,982	29,954	17,129	274,352	545,798	273	2,665
Pima County								
TON (Schuk Toak District)	2,043	609	822	99	3,010	6,582	3	33
TON (San Xavier District)	0	4,368	4,760	280	0	9,408	5	29
County Totals	2,043	4,977	5,582	379	3,010	15,990	8	62
Gila County								
San Carlos Apache	0	0	0	0	0	0	0	0