

CENTRAL ARIZONA SALINITY STUDY – PHASE I

Technical Appendix I

CAP, SRP and SCIIP

Introduction

The CAP, SRP and SCIIP are irrigation projects which use and control the main surface water supplies for the primary study area which consists of the Phoenix Metro area and the Gila River Indian Community. The primary surface water sources are the Colorado River brought into central Arizona by the CAP, the Salt & Verde Rivers dammed, controlled and delivered to the Phoenix metro area by SRP and the Gila River, dammed and delivered to Gila River Indians and also Pinal County agriculture by SCIIP.

The Central Arizona Project

The Central Arizona Project (CAP) was designed by the Bureau of Reclamation and constructed in cooperation with the Central Arizona Water Conservation District, CAWCD. CAWCD, now referred to as CAP, was created to operate and maintain the CAP and to repay the federal treasury the reimbursable costs for building the project.

The CAP aqueduct is 336 miles long and was designed to deliver annually 1.5 million acre-feet of Colorado River water to central and southern Arizona. The aqueduct is expected to deliver an average of 1.5 million acre-feet but is capable of delivering up to 1.9 million acre-feet of Arizona's total annual entitlement of 2.8 million acre-feet of Colorado River water. The CAP's operating features—pumping plants, New Waddell Dam, check structures and turnouts are remotely controlled from the project headquarters located in north Phoenix via a computer assisted control and communications system. The operators monitor the systems performance and adjust it as necessary, correcting flow and other parameters. As the water flows through the aqueduct, it is controlled by check structures and carried under rivers and major washes by inverted siphons and through mountains via tunnels. Turnouts deliver water to agriculture and municipal distribution systems. Besides the major components, the CAP has many other associated features, these include: roads, bridges, wildlife crossings, over chutes, under chutes and recreational trails. Transmission lines and switchyards carry electric power to project features. Earthen dikes paralleling the aqueduct protect it from floods. The entire aqueduct is fenced for the protection of people and wildlife.

During the winter months when electricity is cheap, Colorado River water is pumped through the CAP aqueduct by four separate pumping plants from the river to near Phoenix. The water is diverted and is pumped into Lake Pleasant by the pump/generating station located at New Waddell Dam. During the summer months when electricity costs are higher, the water stored in Lake Pleasant is then released and electricity is generated at the pump/generating station, the released water supplies Phoenix and other down stream users. Maintenance can then be performed on the pump plants along the main CAP aqueduct between the Colorado River and Phoenix.

Figure 1 illustrates the CAP water service area and the aqueduct alignment that supplies water to that area.



Figure 1: Central Arizona Project

The Central Arizona Project water was allocated by the Arizona Department of Water Resources to 85 municipal and industrial users, 12 Indian communities, and 23 non-Indian agriculture districts. Currently the Central Arizona Project has subcontracts with 56 of the municipal and industrial users, 10 Indian communities, and 10 non-Indian agriculture districts.

CAP Subcontracts, Policies, Pricing & Strategies

There are three components of CAP water prices: capital, operation and maintenance (O&M), and energy. CAP subcontracts extend through the year 2050 and contain provisions which state that the capital component of the CAP water price must be paid whether the water is used or not. This provides considerable incentive to begin using the CAP water as soon as possible. The capital component is \$54 per acre-foot from the year 2000 on.

The energy component of CAP water prices covers the cost of energy required to pump the water from Lake Havasu on the Colorado River to the customer's turnout on the CAP aqueduct. CAP's pricing includes a "postage stamp" energy rate for CAP water use. This means that the energy component of the CAP price is the same for all customers regardless of their location on the system. The price of energy available to CAP is strongly based on energy contracts which are effective until the year 2011. Thus, the energy component of CAP water prices could change significantly in 2011.

In 1993, the CAP Board of Directors established the Forward Pricing Program which provided more stability and predictability for its customers regarding pricing of CAP water. Under this program, CAWCD reviews forward prices annually, formally establishes the current year's prices, and sets a schedule for the succeeding five years.

CAP has also established an incentive recharge program which provides excess CAP water to M&I subcontractors at a reduced rate. The water must be used to earn long-term storage credits at an underground storage facility.

CAP is currently working on establishing a policy for wheeling non-project water through the aqueduct system. The policy will undoubtedly include the requirement that non-project water maintains a lower priority than all project uses and that wheeling cannot negatively impact CAP users. Other provisions of the policy that are not so clear include: the source of energy which may be used to wheel non-project water, the price for wheeling, and the priority relating to other non-project uses of the CAP system.

State Demonstration Projects

1990 legislation gave CAWCD the responsibility of developing State Demonstration recharge projects and the authority to assess an ad Valorem tax to fund those projects. The tax (4 cents per \$100 assessed valuation) was assessed in Maricopa and Pima Counties from 1991 through 1996. Legislation dictated that the funds were to be used for the benefit of the county in which they were collected. Funds collected in Maricopa County totaled about \$28 million. About \$15 million still remains in the fund and CAWCD is actively pursuing development of direct recharge projects with those funds. CAWCD's primary focus in Maricopa County was development of the Agua Fria Recharge Project northwest of the Phoenix metropolitan area. This project has the capability of storing 100,000 acre-feet per year. Recharge operations began in 2001.

ADWR policies governing CAP water use

The State of Arizona has a policy to encourage the use of renewable water supplies such as CAP water. ADWR is relying upon the assured and adequate water supply rules to encourage M&I water providers to use their CAP allotments.

State law allows for the storage of surplus CAP water underground through either direct or indirect (groundwater savings) projects. The water, when recovered, retains its legal identity as CAP water. Long-term storage CAP credits may be used by water providers to demonstrate an

assured water supply. The ability to recharge CAP water provides an alternative to municipal water providers to store and deliver CAP water without developing water treatment facilities.

In the Assured Water Supply Rules adopted in 1995, water providers deemed to have an Assured Water Supply were given a three-year “grace period” during which time they could continue mining groundwater with no penalty. After the grace period, they must comply with the AWS Rules and begin making an effort to rely on renewable supplies, including their CAP allocations.

CAP water transfers & leases

ADWR is authorized to review proposed transfers of CAP water. A transfer is defined by ADWR to include the assignment, sale, lease or relinquishment of a CAP M&I subcontract for more than one year. After ADWR’s review, the recommendations are submitted to the Secretary of Interior for final decision. Due to the importance of CAP water to the future of Arizona, ADWR, in conjunction with the Central Arizona Water Conservation District have adopted policies and procedures on CAP transfers. The adopted state policies have also been approved by the U. S. Department of Interior.

In the case of a transfer of CAP water the first priority will be given to entities that succeed the interest to a water provider and which will provide water to the same service area. The second priority will go to entities (including the CAGR or county augmentation districts) which will use the CAP water to mitigate adverse impacts caused by future groundwater withdrawals by the transferring entity. The third priority goes to entities that can demonstrate future adverse impacts caused by the withdrawal of groundwater that resulted from the transfer of CAP water. Fourth priority goes to entities in the same AMA which demonstrate the need for additional assured water supplies to meet committed demand. Fifth priority goes to entities in the same AMA which demonstrate the need for additional assured water supplies up to the year 2035. The sixth priority goes to entities in the same AMA which demonstrate the need for additional water supplies for the period after 2035. Seventh priority goes to replenishment districts in the same AMA as the transferring entity to meet projected obligations in the year 2035. The final priority goes to entities in other AMA’s consistent with the aforementioned priorities.

According to policy passed by the CAWCD Board, any transfer of a CAP M&I subcontract allocation must be accomplished with no profit to the relinquishing entity. All financial transactions must be fully disclosed. The only payment to the relinquishing entity will be made by CAWCD and will consist of reimbursement of CAP capital charges that were paid by that entity plus 5% of that amount as compensation for costs associated with the CAP subcontract. [Reimbursement for the Arizona State Land Department will be as provided in A.R.S. § 37-106.01(c)]. A "cost of money" payment will also be made. Such payment will consist of interest beginning on the date the original payment was received by CAWCD using a simple annual interest rate equal to the weighted average rate earned by CAWCD for that calendar year less 1%. No payment will be made for capital payments associated with any water delivered from October 1, 1993 through the date of relinquishment.

The entity that receives the subcontract allocation will be required to pay CAWCD 1) the amount CAWCD paid to the relinquishing entity with interest from the date payment was made by CAWCD; 2) any outstanding payments due under the subcontract with interest from the due date; and 3) any charges paid by CAWCD to the United States associated with the transfer. Interest paid by the receiving entity will be simple annual interest at a rate equal to the weighted average rate earned by CAWCD for each calendar year or portion of a calendar year.

In those instances where the assignment and transfer is made to a successor-in-interest that will serve the original subcontract service area, payment for certain administrative, legal, or engineering fees may be permitted. CAWCD will review and approve these situations on a case by case basis and will facilitate those financial transactions directly between the involved entities.

Arizona Water Bank

The Arizona Water Banking Authority was created in 1996 to store unused CAP water for future use. The stored CAP water can be used as long-term storage credits to: 1) firm existing water supplies for municipal users during Colorado River shortages or CAP service interruptions; 2) help meet the water management objectives of the Arizona Groundwater Code; 3) assist in the settlement of American Indian water rights claims; and 4) exchange water to assist Colorado River communities.

Salt River Project

The Salt River Project (SRP), located near Phoenix, Arizona, includes a service area of about 240,000 acres spanning portions of Maricopa, Gila and Pinal Counties in central Arizona. The service area is furnished a full irrigation water supply from the Salt and Verde Rivers and from approximately 250 ground water wells. SRP surface water supplies originate from the 13,000 square mile Salt River and Verde River watersheds. SRP operates 4 dams and reservoirs along the Salt River and 2 dams and reservoirs along the Verde River. Theodore Roosevelt Dam, the first major structure constructed by Reclamation on the Salt River Project, is located 76 miles northeast of Phoenix and 30 miles northwest of Globe, Arizona. The dam, completed in 1911, was subsequently modified between 1989 and 1996. The modification raised the dam by 77 feet in elevation, increasing water storage capacity by 20 percent and adding flood control space. Other dams operated by SRP include Horse Mesa, Mormon Flat and Stewart Mountain Dam all located along the Salt River. Horseshoe and Bartlett Dams are located along the Verde River. Total storage capacity of the Salt River reservoirs is more than 2.4 million acre-feet. The storage capacity of the Verde River reservoirs is over 300 thousand acre-feet.

The power system includes five hydroelectric plants, three steam power plants and a combined-cycle plant. In addition, SRP has partial participation in other power plants including the Palo Verde Nuclear Generating Station.

Irrigation flow is regulated by Bartlett Dam on the Verde River and Stewart Mountain Dam on the Salt River. Water is released from the Verde River during the winter months in anticipation of the spring runoff. During the summer months water is released from the Salt River system. The logic behind this river operating method is that the Verde Dams do not have flood space or

the capacity as the dams on the Salt River and must make space available for the spring runoff. The Granite Reef Diversion Dam is located 3 miles down stream of the confluence of the 2 rivers and diverts water north into the Arizona Canal and South into the South Canal for delivery to the SRP water service area. SRP also relies on approximately 250 wells to augment surface water deliveries. SRP's water service area is approximately 250,000 acres and includes an extensive network of canals. Illustrated in Figure 2 is the SRP water service area.

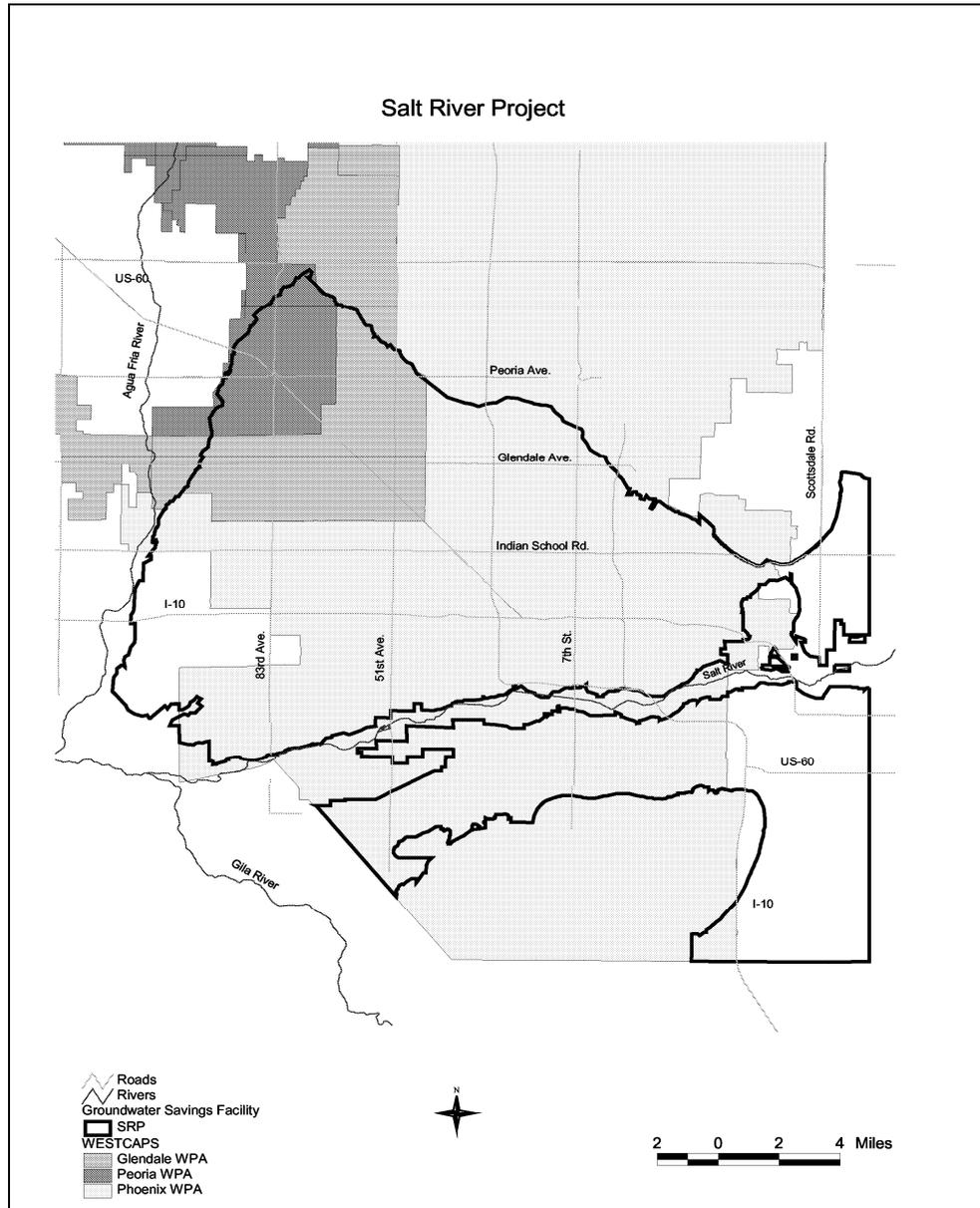


Figure 2: Salt River Project Water Service Area

The Kent Decree

The Kent Decree established the relative rights of Project lands to the water of the Salt and Verde rivers. The decree formally stated the principle of normal flow rights and reaffirmed the

long-standing legal principle of prior appropriation. The purpose of the Kent Decree was to establish which lands had normal flow rights prior to delivery of stored water from Roosevelt Dam.

In the Kent Decree, all local valley rights to the normal flow of the Salt and Verde were set chronologically from 1869 through 1909 based on continuous beneficial use of water. For example, land which used water in 1869 had the first right to water in the river, then land which used water in 1870, and so on up to 1909. Three classes of lands were established based on their initial date of appropriation and "reasonably constant" beneficial use thereafter: Class A lands included all lands under "reasonably constant" cultivation from their first year of use up to the year 1903. Class B lands included those which had been intermittently irrigated but which were not in cultivation in 1903. Class C lands specified those areas which had never been irrigated from the flow in the Salt River at or above Joint Head Dam.

Class A lands were decreed to have rights to normal flow. Their priority was based on their first year of cultivation. Normal flow water is in addition to rights to stored and developed water, which all Association members share equally. Class B lands were decreed to have no rights to normal flow but were entitled to stored and developed water. Class C lands are also not entitled to normal flow but are entitled to stored and developed water. The Kent Decree did make a distinction between Class B and Class C lands. For the period of one year, Class B lands along with Class A lands would be given preference over Class C lands in their claim for stored water. The significance of this stipulation was in 1903 (when the Association was formed) the anticipated available water supply from Roosevelt Dam could not supply all the lands applying for it. Once members of the Association, however, all three classes had equal rights to stored and developed water.

1929 and 1948 Pump Rights

In 1929 and 1948, the Association instituted programs that provided shareholders with the opportunity to augment their water supplies by investing in the construction of a total of seventy-nine deep wells within the Salt River Reservoir District (SRRD). These programs were offered primarily in response to: the need for additional water supplies for specific shareholders; and, the drought conditions of the late 1940's, where runoff in the Salt and Verde watersheds was significantly below average. Only those shareholders who invested in the programs were able to use this augmentation device.

Pump right water service is limited to one acre foot per acre per year per program (1929, 1948), and must be used within the SRRD boundaries. Although pump right water can be used on non-member land, ownership of such rights is tied to the member lands to which they were originally attached. As a result, as Association land urbanizes, and shareholder water entitlements are moved to on-Project municipality water accounts, such municipalities are given access to pump rights under the conditions described in the 1929 and 1948 contracts. Therefore, on-Project municipality access to pump right water is limited to the amount of member land within their respective water service areas. Currently, about 90,051 acres of pump right have been moved to on-Project municipality water accounts, while 84,324 acres remain in agricultural accounts.

Because pump right water is currently the most expensive type of water available to shareholders (currently \$35 per AF), it is the last water source called upon.

There are four factors which may impact the use of pump rights: drought, water quality, state and federal regulations, and operational needs. Drought continues to be the main factor in maintaining pump right wells. This supply offers shareholders who have such rights an alternate water supply should surface water supplies be affected by drought conditions. However, water quality and state and federal regulations, primarily the Groundwater Management Act and the Clean Water Act, may limit the use of this water supply in the future.

Those wells which were constructed pursuant to the 1929 and 1948 programs are also used to assist the Association with operational problems (i.e., canal capacity constraints), and notwithstanding the above mentioned limitations, it is envisioned that these wells will continue to be used in this capacity.

Pump right wells are maintained by SRP as part of SRP's overall groundwater management strategy. Since these contractual arrangements are in perpetuity, SRP will continue to maintain these wells for pump right lands, as required in the 1929 and 1948 contracts. However, SRP does not guarantee the quality or amount of water available from pump right wells, since those shareholders who invested in the programs agreed to share in the benefits and risks of the programs.

Water Transportation Agreement

The Water Transportation Agreement (WTA) provides for the wheeling of non-SRP water in SRP canals. Non-SRP water includes CAP water, modified Roosevelt Dam water (New Conservation Space, or NCS water), Cliff Dam replacement water, and others as agreed by the parties.

The major principles embodied in the WTA are (1) transportation priority (SRP entitlement water has higher priority), (2) fees (current fee is \$10 per acre foot plus annual administration fee of about \$2,000), and (3) water quality (SRP does not guarantee the quality of water delivered). The term of the WTAs is 50 years to coincide with CAP subcontract terms.

GRUSP/CSIF

In 1994, SRP, Chandler, Gilbert, Mesa, Phoenix, Scottsdale, and Tempe signed an intergovernmental agreement (IGA) for the construction and operation of the state's largest underground water storage facility. In May 1994, the Granite Reef Underground Storage Project (GRUSP) became operational. SRP is the operating agent for GRUSP. The current storage capacity of GRUSP is about 120,000 acre feet per year (subject to operational conditions). The permitted capacity is 200,000 acre feet per year.

In the IGA, each participant is provided the right to utilize its ownership entitlement in GRUSP for its own use (i.e., storage of water), use by other participants, or use by non-participants. For use by non-participants, the participants agreed to pool any unscheduled entitlement for leasing

purposes, and share in any costs and revenues associated with such leasing. The lease agreement, which was developed by SRP, was approved by the GRUSP participants. Any non-participant use of GRUSP must be approved by the GRUSP participants.

The major provisions of the lease agreement include (1) priority of use (GRUSP participants have first right of use on a monthly basis), (2) water quality, and (3) fees (currently \$8 per acre foot, plus \$5 per acre foot for use of the CAP/SRP Interconnection Facility [CSIF] by non-CSIF participants, and about \$2,700 annual administration fee). A WTA (or similar agreement) is also required.

In 1997, the Arizona Water Banking Authority (AWBA) signed a long-term lease agreement for use of GRUSP. The five-year agreement allows for the use of at least 50,000 acre feet of space per year (if operationally available).

San Carlos Indian Irrigation Project

Congress authorized the construction of the Coolidge Dam on the Gila River in Arizona in 1924 as part of the San Carlos Irrigation Project (SCIIP). The dam provides irrigation water to the Pima Indian Reservation as well as to the public and private lands in the area. The dam created a reservoir sufficient to irrigate 80 percent of the SCIIP lands with the balance receiving water from other sources, most notably ground water.

The 1928 Act authorized the Secretary of the Interior (Secretary) to construct a hydroelectric power plant at the dam. Construction costs for the power plant were to be repaid as part of SCIIP. The O& M costs for the power plant were to be paid through the sale of power. The Secretary was authorized to sell “surplus” power and apply the “net revenues” from such sales to reimbursement of the costs of developing power, reimbursement of the costs of SCIIP, and O&M costs of SCIIP.

The cost of operating and maintaining SCIIP, except for the electric generation plant and the transmission lines, was to be paid for by the SCIIPP land owners. The electric generation plant ended operation in 1983.