NEGOTIATING THE WATER FUTURE OF PIMA COUNTY, ARIZONA

by

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INTRODUCTION

Because current water consumption in the eastern Pima County region exceeds the average annual long-term natural supply by a rate of over 3 to 1, the region's major water users have come together to discuss the problem and develop possible solutions. With the support of the elected officials of the local governments, and the representatives of the interested Federal and State agencies; the major agricultural, mining, municipal, and tribal water users have requested that the U.S. Army Corps of Engineers provide technical advice and assistance in presenting the facts regarding the water needs facing the region over the next 50 years, and in preparing alternative solutions to the anticipated problems.

The Corps has designed the Eastern Pima County Regional Water Resources Study so that the major water users can make decisions regarding the wise use of water throughout the planning period. The objectives of the study are to assess and project current and future water demands and supplies, facilitate the major water users' negotiation process, and quantify and test an array of alternative solutions involving groundwater, wastewater, and Central Arizona Project water.

The major water users have organized themselves into a group called the Water Resources Coordination Committee, and the U.S. Army Corps of Engineers provides staff support to this committee. The Corps is assisted by a Multipurpose Technical Committee made up of representatives of Federal, State, and local agencies; a Citizen Advisory Committee; and consultants.

The Corps efforts have been integrated with those of the Arizona State Legislature's Groundwater Management Study Commission, the City of Tucson, and the U.S. Geological Survey and are being conducted over a 10-month period in three phases. Phase I is devoted to developing the facts associated with the problem and the possible solutions. In Phase II, the major water users use the results from Phase I to search for acceptable and feasible solutions, and in Phase III the data are refined so that a preferred plan may be selected. The total cost of this effort is $480,500.

PROBLEM DESCRIPTION

This all came about because the metropolitan area of Tucson, with its almost one-half million inhabitants, is one of the largest urban areas in the world totally dependent on groundwater for its water supply. It is also one of the fastest growing communities in the United States. Based on projections made by the Pima Association of Governments (1977) for the period 1975 to 2000:

1. Population is expected to increase from 475,000 to 760,000.
2. Agriculture is expected to either remain the same at 54,000 cropped acres or decline to about 10,000 cropped acres.
3. Manufacturing and mining employment is expected to increase from 21,000 to 38,000.

In 1975, these water consumers exceeded the natural average annual long-term water supplies by a rate of over 3 to 1. Approximately 340,000 acre-feet of water were consumed while nature provided only about 110,000 acre-feet of recharge. Consumption by these major water users in 1975 is estimated as follows (Thuss, 1978):

1. Agricultural irrigation -- 74%.
2. Industrial consumption, which includes manufacturing, mining, and electrical power generation -- 15%.
3. Municipal and recreation consumption -- 11%.

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The numbers shown here may differ slightly from those of other sources, but the difference is caused by definition rather than fact, and they are in complete agreement with and fully support the estimates of water use and supply presented by the Arizona State Water Commission in its state water plan.

This overdraft is confirmed in that groundwater tables in the region have dropped an average of two feet each year since 1930 according to Professor Sol Resnick of the University of Arizona. Even with the introduction of Central Arizona Project water in 1987, the overdraft is expected to continue. These facts mean that the natural legacy of groundwater saved over thousands of years is being used up.

The potential economic, social, and environmental costs of this overdraft are enormous. The economic costs are for the exploration, energy needs, and transportation requirements of getting water supplies from greater and greater depths as well as from distant basins and regions. Social costs take the form of increased hostility and conflicts between agricultural interests, municipalities, industrial and mining interests, recreational activities, and the Papago Indian Tribe. Environmental costs stem from the reduction of wildlife habitat and the threat of subsidence.

Currently, there is no single authority in the region which has control over water quality, water supply, and wastewater management systems. Current management practices call for separate control of small portions of the water supply, use, and wastewater generation systems in the region.

In the 1960's and 1970's, many of the region's major water users have been involved in legal actions against one another over rights to the groundwater supply. The Papago Indian Tribe has brought suit based on the Winters Doctrine and the Cappaert decision, against the non-Indian water users in the Tucson Basin.

COMMITTEE DEVELOPMENT

In January of 1978, Mr. William E. Strickland, representing the Papago Indian Tribe, invited the major water users of eastern Pima County to meet together to discuss means of resolving the various legal suits out of court. Representatives of the region's mining, agricultural, municipal, and other interested parties began to meet on a weekly basis. This group was known as the Negotiating Committee. The U.S. Army Corps of Engineers was invited by the City of Tucson and the Papago Indian Tribe to attend these meetings as an observer in late January 1978.

The initial task of this group was to prepare a scope of work directed towards evaluating the water needs and the sources of supplies available to eastern Pima County, and determine who should perform the scope of work. Mr. Will Worthington, the Chief of the Urban Study Section for the Los Angeles District, U.S. Army Corps of Engineers, gave approval for the internal development of a Corps of Engineers-sponsored proposal reflecting how a study might be conducted.

A draft proposal was prepared and circulated at the 8 March 1978 meeting of the Negotiating Committee. This proposal provided an overview of the work that needed to be done, how it would be done, what management arrangements would be required, how the Corps fits in, how much the study would cost, and how it could be funded. The Negotiating Committee reviewed the document and approved the concept. Their support for a Corps of Engineers managed program was transmitted to Brig. General Hugh G. Robinson (then Colonel), the District Engineer, who immediately recognized the importance and necessity of this effort, not only for the local residents, but also in carrying out the President's water resources policy guidelines. Although there was some initial reluctance on the part of some Corps officials to undertake this project, Gen. Robinson authorized the development of a detailed plan of study to accomplish the task.

The major advantage to the local water users for having the U.S. Army Corps of Engineers conduct this study was because the Corps is an outside agency. It had the confidence of all the interested parties to conduct an open and objective program, and it had the capabilities to bring together the necessary resources.

In the fall of 1978, the elected officials of the five local governments (Pima County, the cities of Tucson and South Tucson, and the towns of Marana and Oro Valley), as well as representatives of the interested Federal and State agencies, approved the concept. In December 1978, the Plan of Study was approved by the major water users and work began. The informal committee organized by Mr. Strickland formed itself into the Water Resources Coordination Committee. The members of the committee are shown on Figure 1.

CORPS AUTHORITY

The authority for the Corps to participate in this program is an Urban Study Resolution sponsored by Congressman Morris K. Udall and adopted by the Committee on Public Works and Transportation of the U.S. House of Representatives on 23 September 1976. It is the latest in a series of authorizations for studies of the Gila River and tributaries. This program is in keeping with President Carter's Water Resources Policy Reform Message of 6 June 1978 and his Memorandum to the Secretary of the Army on

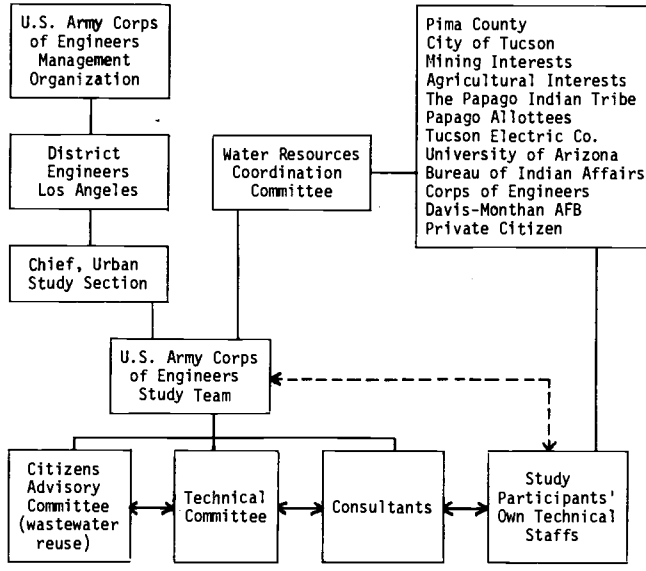

Figure 1. Management Organization.

12 July 1978 concerning Federal and Indian Reserved Water Rights, Environmental Quality, and Water Resources Management.

THE REGIONAL WATER RESOURCES STUDY

PURPOSE AND OBJECTIVES

The purpose of this program is to develop the facts regarding the water needs facing eastern Pima County for the next 50 years, and the facts associated with alternative water use patterns. Neither the determination of the legal right to a specific water resource nor the establishment of a water resource management organization is within the scope or purpose of this program. It is within the role of the U.S. Army Corps of Engineers to provide technical assistance and advice to the major water users in the region so that, collectively, they can make decisions regarding the wise use of water throughout the planning period.

The objectives of this program are to:

1. Inventory historical water use in eastern Pima County.

2. Project the water quality and quantity needs of eastern Pima County through the year 2030.

3. Inventory, assess, and project future water supplies for eastern Pima County through the year 2030.

4. Develop water budgets and other materials comparing supply to demand, indicating the nature of the problem (technical and economic) which faces all water users in eastern Pima County.

5. Provide a forum for open discussion and communication of needs and wants among water users regarding:

a. The nature of the water situation.

b. The goals of a program to provide alternative solutions.

c. The impacts of any proposed solutions on major water user groups and the groundwater supply.

6. Provide the facts associated with various water supply and conservation alternatives, and assist the group in selecting the most feasible and acceptable alternatives.

7. Determine capital and annual operation and maintenance costs of alternative delivery systems which meet the requirements of the supply scheme.

8. Investigate the environmental impacts and the institutional arrangements necessary for implementation of the alternative solutions.

9. Formulate recommendations for other necessary studies, design, and construction.

STUDY AREA

The political boundaries of the study area are defined by the limits of Pima County on the east, north, and south, and by the eastern boundary of the Papago Indian Reservation on the west. The hydrologic unit chosen as a basis for delineation of the working study area is the surface water drainage subunit as defined by the United States Geological Survey. These include those portions of the Altar Valley/Avra Valley subunit, the Santa Cruz subunit, and the San Pedro subunit within Pima County. This boundary indicates the physical area of intensive effort, but it does not limit the staff's ability to investigate alternative solutions both inside and outside the area described.

SCHEDULE

This program is being conducted over a 10-month period in three phases.

Phase I -- Problem identification. This phase includes the collection, assessment, and projection of water demand and water supply information. Water budgets and modeling results are used to depict the magnitude of the existing problem. During this phase, the goals of the remaining two phases will be established. This phase will be completed with the issuance of a Problem Identification Report which will include:

1. A report which shows depth to groundwater for the Avra/Altar basin and the Tucson Basin projected over the planning period. This includes reports describing the Arizona Water Commission's computer model which is utilized in the process, and the water use data of the participants. This will be done primarily by the Arizona Water Commission. The contract has been executed and the report will be available in May 1979.

2. A report considering the feasibility of exotic water supplies, including importation from the Yukon and the Columbia rivers system, weather manipulation, vegetation manipulation and soil conditioning, desalinization of sea water, and even icebergs. This is being done by the University of Arizona under contract to the Corps.

3. A report on the feasibility of utilizing wastewater as a water supply north of the treatment plants for agricultural irrigation in Marana and/or the Avra Valley area; and south of the treatment plants for agricultural irrigation and mining process water, and as one source of water for the Papago Indian Tribe.

4. A report on the projected unit costs of power.

5. A report on the preliminary feasibility of alternative alignment and termination sites for Central Arizona Project water. This will be done by the Bureau of Reclamation.

Phase II -- Alternative plan development. This phase includes the support of the Water Resources Coordination Committee's search for acceptable and feasible solutions to the problems defined in Phase I. Various solutions proposed by staff and other study participants, and approved by the Water Resources Coordination Committee, will be examined to determine their preliminary engineering, economic, and environmental feasibility; their impact on the existing problems; and their impact on each study participant. This phase will be completed with the Water Resources Coordination Committee's selection of the most viable solutions (2-3) for detailed analysis.

Phase III -- Plan selection. This phase takes the viable solutions (a small array) and develops the information necessary for selection and implementation of a preferred plan. Costs, benefits, environmental impacts, and engineering feasibility are considered. This information is provided to the Water Resources Coordination Committee for final plan selection. Once the decision is made, final

details are developed for the selected solution. This phase is completed with the issuance of a Preferred Plan Report.

MANAGEMENT ARRANGEMENTS

The District Engineer is charged with final authority for the administration and management of the study. He relies upon various committees and his staff to discharge these responsibilities. Figure 1 shows the structure through which the study will be conducted. Various responsibilities are outlined as follows.

The Water Resources Coordination Committee. The formation of this committee was explained earlier. Its purpose is to provide a forum for open discussion regarding water supply and use pattern problems and their possible solution. This committee has local review and approval authority over the study.

Voting by this group provides general policy guidance, approval of study methods, and approval of interim technical reports. This voting procedure will not necessarily apply to the negotiation process utilized during Phase II and III. The committee will determine the actual negotiation process. The Corps will facilitate the negotiation process, but recognizes that each study participant must develop an individual position or plan of action during negotiations.

Technical Committee. The Technical Committee is composed of representatives of Federal, State, and local agencies; private groups; and required experts. Members were selected by the U.S. Army Corps of Engineers so as to provide adequate technical expertise for the area of concern. This committee will not necessarily meet together at any single time, but is a more informal arrangement with continuous interaction between its members. The duties are to:

1. Identify specific planning problems and conflicts.
2. Recommend study methodologies.
3. Provide agency representation and agency policy.
4. Review, assess, and comment on program results.
5. Provide a communication link between the U.S. Army Corps of Engineers and the represented agency.
6. Provide access to technical information available within the respective agencies which may contribute to the study.

The U.S. Army Corps of Engineers Study Team. The day-to-day study management is carried out by the U.S. Army Corps of Engineers' Study Team. This staff is supplemented by specialists from within the Los Angeles District, other Corps agencies, and firms under contract. The Study Team is located in Tucson.

The Citizens Advisory Committee. The Citizens Advisory Committee is utilized as an advisory committee for wastewater reuse matters. Membership in this committee is open to everyone, and the committee has been asked to nominate a citizen to the Water Resources Coordination Committee.

OTHER PLANNING EFFORTS

There are several other ongoing planning efforts into which the results of this program should be integrated.

The Arizona State Legislature's Groundwater Management Study Commission will address water management options in the state's critical groundwater basins from the State Legislature's point of view. Their report is to be completed in June 1979, and the water management strategies developed as a result will be administrative in nature. The results of the Corps program will be the basis for the technical implementation of the Groundwater Management Study Commission's work.

The U.S. Geological Survey is conducting a regional basin study over a five-year period. The Corps' work will be of considerable value to the U.S. Geological Survey's study.

The City of Tucson and the U.S. Geological Survey are conducting a study of subsidence in the region. The work in the Corps' program will provide projection of groundwater depletion at a site-specific level for their use.

STUDY COSTS

The total cost of the study is $480,500. This estimate reflects a Federal effort amounting to $293,000 and a non-Federal effort of $187,500. Expected funding is as follows:

1.	Major water users (in-kind service contributions)	$187,500
2.	Environmental Protection Agency	$101,000
3.	Bureau of Indian Affairs	$ 87,000
4.	U.S. Army Corps of Engineers	$105,000

SUMMARY

In conclusion, the U.S. Army Corps of Engineers is working with private citizens, State and Federal agencies, local governments, and the major water users of eastern Pima County to develop acceptable and feasible solutions to the water supply problems of the region. This program is now in the middle of the problem identification phase, and should be completed this year. Almost 40% of the cost is being borne by the local study participants.

The results of this program are being coordinated with other Federal, State, and local planning efforts. A community has only so much energy and time to expend during any one period on any one problem. The Tucson region now has the resources available to address its water supply problems. Now is the time to resolve this issue so that in the near future the community can transfer its attention to the region's other pressing social and environmental needs.

REFERENCES CITED

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