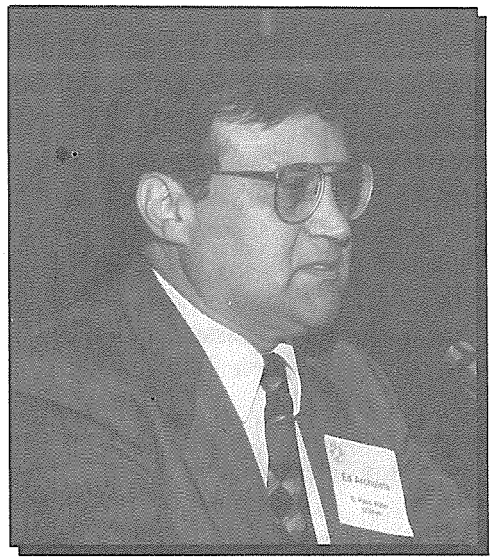
Ed Archuleta, since 1989, has been the General Manager of the El Paso Water Utilities Public Service Board and is responsible for all aspects of water and wastewater services to a population of 592,000. For 15 years previously, Ed worked for the City of Albuquerque in various positions with the City's water and wastewater department. He has B.S. and M.S. degrees in Civil Engineering from NMSU, and a Master of Management degree from UNM. He is a registered professional engineer in Texas, New Mexico and Iowa, belongs to many professional societies and is the author or co-author of a dozen papers, the most recent of which deals with water-supply alternatives for the City of El Paso.



EFFECTIVE WATER RESOURCE PLANNING FOR THE LAS CRUCES/EL PASO/JUAREZ AREA

Edmund G. Archuleta
El Paso Water Utilities
Public Service Board
PO Box 511
El Paso, TX 79961

INTRODUCTION

During the 1980s, there was serious litigation between New Mexico and El Paso in our (El Paso's) attempts to obtain groundwater from New Mexico. New Mexico filed a lawsuit against El Paso seeking to limit El Paso's pumpage from the Cañutillo well field in the Mesilla Basin. In 1989, the Public Service Board joined hands with the local irrigation district, the El Paso County Water Improvement District No. 1, and agreed to prepare a joint Water Resource Management Plan for El Paso. This report was prepared by the consulting engineering firm of Boyle Engineering Corporation in 1990 and early 1991. This document serves as a blueprint for water resource management in El Paso.

On March 6, 1991, New Mexico and El Paso entered into a Settlement Agreement which stated that the parties together would conduct regional water planning and that the priorities to meet demands would be first, water conservation, and second, surface water in lieu of groundwater supplies. El Paso's water plan served as a technical resource to explore options other than litigation. A Joint Settlement Commission, now called the New Mexico/Texas Water Commission, was established to effect this water resource planning. The parties of the Commission include the following.

New Mexico:

Elephant Butte Irrigation District
New Mexico State University
City of Las Cruces
Doña Ana County

Texas:
- El Paso Water Utilities Public Service Board
- El Paso County Water Improvement District No. 1
- University of Texas at El Paso

Other Participants:
- Anthony Water & Sanitation District
- New Mexico State Engineer Office
- International Boundary and Water Commission
- Texas Water Development Board
- Texas Compact Commissioner
- Bureau of Reclamation

Consultants:
- Boyle Engineering Corporation
- Engineering Science, Inc.

Since the formation of the Commission, the participants have met on a regular basis (at least once per month) and have established a Legal Advisory Committee (LAC) and a Management Advisory Committee (MAC) who provide input to the Commission.

The Commission, with financial assistance from the New Mexico Interstate Stream Commission and the Texas Water Development Board, has prepared regional plans aimed at conjunctive use of the region's water resources between agricultural and municipal users. The planning area includes the region from the Elephant Butte Reservoir in New Mexico to Fort Quitman, Texas (below El Paso). This is the region for which the Texas Compact Commissioner is responsible.

REGIONAL RAW WATER RESOURCES

The regional raw water resources are surface water from the Rio Grande River, the Mesilla Basin in New Mexico which extends into Texas and to a limited degree into Mexico, and the Hueco Basin which extends from New Mexico into Texas (on the east side of El Paso) and slightly into Mexico.

El Paso has practiced conjunctive use of water for many years and currently obtains approximately 40-45 percent of its municipal and industrial supply from the Hueco Basin, 15 percent from the Mesilla Basin, and the remaining from the Rio Grande. Las Cruces obtains all of its water supply from the Mesilla Basin. Ciudad Juarez, Mexico, gets its water supply from the Hueco Basin. Agriculture relies heavily on the Rio Grande and to a limited extent on groundwater.

REGIONAL WATER MANAGEMENT

There are many laws and policies effecting the management of water resource supplies in the region:

- 1906 Treaty with Mexico
- Rio Grande Compact
- Reclamation Law
- Commerce Law
- State Water Laws
- Clean Water Act
- Safe Drinking Water Act
- NAFTA and Regional Growth

The differences in surface water and groundwater laws governing the region are described in Table 1.

TABLE 1. COMPARISON OF LAWS GOVERNING SURFACE WATER AND GROUNDWATER FOR EL PASO, LAS CRUCES AND CD. JUAREZ

	Groundwater Law	Surface Water Law
El Paso, TX	Common Law	International Treaty Rio Grande Compact
Las Cruces, NM	Prior Appropriation	Prior Appropriation International Treaty Rio Grande Compact
Cd. Juarez, Mexico	Mexican Federal	International Treaty

It is these complex set of laws, policies, and regulations governing three states and two nations that make water resource management a challenge. It also is for these reasons that coordinated planning and management is imperative.

GROUNDWATER PROBLEMS

The Hueco Basin is a finite resource from which there have been huge drawdowns and minimal recharge over the years. It is the sole drinking water source for Juarez, Mexico. Also, water taken from the Hueco is becoming increasingly brackish. El Paso is beginning to lose some wells where blending and diverting of water is becoming necessary to meet Safe Drinking Water Act standards for

chlorides and total dissolved solids. Also, we anticipate future large population increases, particularly in east and west El Paso. El Paso currently is the largest city on the U.S.-Mexican border. Juarez, with its rapid growth includes an industrial sector of more than 300 major Fortune 500 companies which add to its water supply requirements.

Historic pumping from the Hueco Basin shows El Paso, until recently, relied heavily on the Hueco. However, because of its Water Resource Management Plan and the shift to utilize more surface water, pumpage from the Hueco has decreased. Juarez continues to withdraw heavily from the Hueco, particularly because of the maquiladoras that were established in the late 1970s and early 1980s. Without change, fresh water from the Hueco Basin is expected to be depleted sometime between the year 2025 and 2035.

The Mesilla Basin also is a finite resource and has localized drawdowns and minimal recharge. Again, large population increases in the area are anticipated. Furthermore, the Las Cruces and El Paso areas are growing along the I-10 corridor, which will contribute to future additional withdrawals.

The 50-year Water Resource Management Plan shows that population is growing dramatically and El Paso is projected to serve 1.4 million by year 2040; Doña Ana County, which is growing more rapidly than the City of El Paso, is projected to serve 0.6 million by the year 2030; and Juarez, based on an extrapolation of their population in 1990, shows their population could be 2.3 million by the year 2010.

The worst case scenario based on information in 1990 is that even if there is a continued and progressive drawdown from the Mesilla Basin, a small increase from the river, and heavy reliance on the Hueco, there will be a tremendous water shortage by the year 2025.

Thus, it is important that U.S. agricultural sectors work with the municipalities of Las Cruces and El Paso and also with Mexico on regional water resources planning.

EL PASO'S WATER RESOURCE PLANNING

Residential customers comprise 99.1 percent of El Paso's customers and 57.5 percent in terms of water consumption. Commercial and industrial customers utilize 35 percent. El Paso's water conservation plan has targeted ways and means to reduce residential use (indoors and outdoors) as well as industrial/commercial usage.

Water Conservation.

The following is the projected savings by the water conservation component of El Paso's Water Resource Management Plan from 1990-2000:

	Projected Savings
Rates	46 %
Plumbing	23 %
Landscaping	12 %
Audits	8 %
Enforcement	6 %
Education	5 %

In time, education will be a much larger percentage of the total, and to meet our goals, it will take continuing education of the public. Water rates will have the greatest impact on reducing consumption.

The goal for El Paso is to reduce water consumption to 160 gallons per capita per day by the year 2000 and to remain at that consumption throughout the life of the program. In 1990, El Paso's per capita consumption was 201 gallons per day and last year (1993), per capita consumption was 177 gallons per day.

El Paso's Water Conservation Programs have the following components and features:

- Restricts lawn watering to time of day and day of the week
- Restricts non-essential uses
- Prohibits water wasting
- Requires large water users (at least 10,000 gallons per day) to file Water Conservation Plans
- Requires Public Service Board approval for any very large water user (100,000 gallons per day), either new or expanding
- Restricts the amount of potable water furnished to very large water users after January 1, 1995, and requires mandatory recycling
- Revises the Plumbing Code Ordinance which requires low flow plumbing fixtures

- Continues the Toilet Rebate Program which has already replaced 10,000 toilets at a cost of $700,000
- Requires permits for watering of new landscapes
- Prohibits car washing without a shut-off nozzle on hose
- Promotes xeriscaping
- Establishes public awareness programs

The Water Conservation Department is staffed by nine personnel.

Rate Structure

A comprehensive water conservation program needs to include a rate structure that encourages water savings. El Paso's Excess Use Rate Structure (Table 2) was developed by Ernst & Young and approved by the Public Service Board in the spring of 1991. The cost of water is based on a fixed charge depending on size of meter and a commodity charge based on the customer's average winter consumption (months of December, January, and February). All customers pay the same rate and there is no differential between classes.

TABLE 2. EXCESS-USE RATE APPROACH

All Customers		3/1/91	3/1/92
Block 1	4 Ccf to 1.75 AWC	$0.76	$0.76
Block 2	1.76 AWC to 4 AWC	$1.41	$1.41
Block 3	over 4 AWC	$1.41	$1.76

AWC - Average Winter Consumption

Customers were given a grace period from March 1991 to March 1992 to adjust to the new rate structure. As a result, consumption has decreased while revenues have increased. Rates in El Paso are still among the lowest in the Southwest and will have to be progressively increased to pay for needed capital improvements and to further encourage conservation.

Water conservation and El Paso's Industrial Pretreatment Program also have led to a decrease in per capita wastewater treatment in the past four years. El Paso has four wastewater treatment plants and has maintained close to 23 billion gallons per year in wastewater discharge since the inception of the conservation program.

Water Supply and Surface Water

El Paso's Canal Street Plant was built in 1943 and is a 40 million gallon per day plant and takes water from the river through the Franklin Canal. In 1993, the new Jonathan W. Rogers Water Treatment Plant was brought on line and constructed as part of the Water Resource Management Plan. It also is a 40 million gallon per day plant. In 1993, El Paso used 46,000 acre-feet of surface water and this year it is estimated to use in excess of 50,000 acre-feet. This was accomplished through cooperative efforts with the El Paso County Water Improvement District No. 1, the Elephant Butte Irrigation District, and the Rio Grande Compact Commissioner.

Water Reuse

Reuse is a big program in El Paso. El Paso reclaims and reuses about 12 percent of the wastewater collected. The Fred Hervey Water Reclamation Plant treats water to drinking water quality and injects most of the reclaimed water back into the Hueco Basin. Also, reclaimed water from the Fred Hervey Plant is provided to the new Painted Dunes Golf Course and to the Newman Power Plant. Additionally, plans are underway to provide reclaimed water from the Northwest Wastewater Treatment Plant, which is in the process of being expanded, to large turf irrigators as well as for certain industrial uses on El Paso's westside. Reclaimed water also will be provided from the Bustamante Wastewater Treatment Plant located in the lower valley to the Public Service Board's planned Riverside International Industrial Park, an environmentally planned park where new or existing businesses will use reclaimed water. Also, the Haskell Street Wastewater Treatment Plant, located in central El Paso and the City's oldest wastewater plant, furnishes reuse water to the County's Ascarate Golf Course and has done so since the 1960s. By the year 2005, El Paso hopes to furnish 8.5 billion gallons of reclaimed water per year from its four wastewater treatment plants.

CONCLUSION

El Paso intends to use more surface water from the river through appropriate contracts with the irrigation districts, reclaim and reuse more water, and

conserve water to reach its goal of 160 gallons per capita per day usage.

We need to implement year-round delivery of surface water and make improvements to downstream water quality (as compared to quality at Elephant Butte Dam). El Paso's water plants have to shut down during the non-irrigation season because of a lack of river water. We need to increase surface water supplies, develop a more efficient delivery system, and conserve those supplies. Also, Mexico should be encouraged to use all or part of its treaty allotments as a drinking water source in lieu of carriage water for its wastewater.

The New Mexico/Texas Water Commission has completed two major reports on a proposed lined conveyance facility and treatment plants. The proposal is for a pipeline system to be built downstream from Caballo Dam, probably starting at Percha Dam, to El Paso's water treatment plants and for construction of two water treatments plants, one in Las Cruces and one in the upper valley of El Paso. The Commission currently is planning the project's phasing and is seeking funding from federal and state agencies to conduct the final engineering feasibility analysis, appropriate environmental assessments and public participation. If the project remains on schedule, construction of the first phase will begin in 1999.