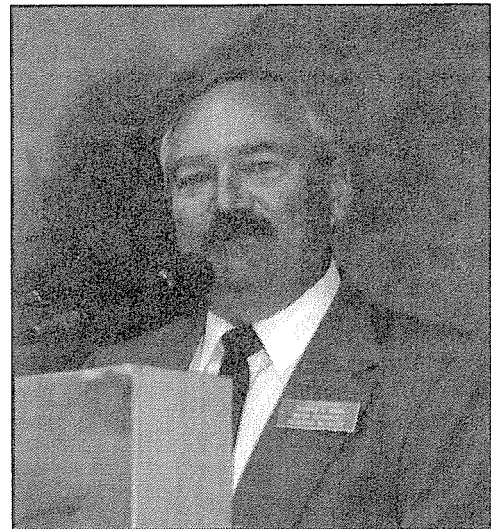
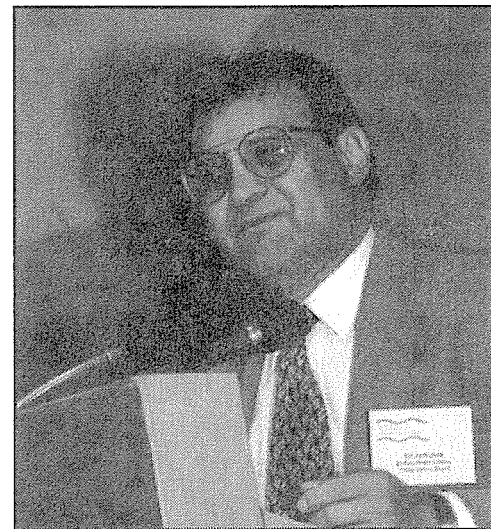


*Tom Bahr has been director of the New Mexico Water Resources Research Institute since 1978. He served as the secretary of the New Mexico Energy, Minerals, and Natural Resources Department from January 1987 to July 1989. He also served as director of the Interior Department's Office of Water Policy under the first Reagan administration. He is a native of Wisconsin and received his undergraduate degree from the University of Idaho and a master's (limnology and biochemistry) and doctorate (limnology) from Michigan State University.*



*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. In 1984, Ed was recognized by the El Paso Chapter, Texas Society of Professional Engineers as Engineer of the Year.*



**NEW MEXICO/TEXAS WATER COMMISSION:  
WORKING TOGETHER TO SHARE THE RESOURCES**

## TOM BAHR

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Ed Archuleta and I will talk about ongoing activities concerning joint water resources planning between Texas and New Mexico. An historical perspective helps set the stage for our discussion.

### The El Paso Water Suit

A 1980 event triggered enormous interest in the water resources for our region. That event was the application by El Paso to appropriate and transport New Mexico groundwater into Texas. El Paso had requested permission to drill 266 wells in the Lower Rio Grande Basin to appropriate 246,000 acre-feet of water annually and for 60 wells in the Hueco Basin to appropriate 50,000 acre-feet. The cartoon shown in Figure 1 was published in the local student newspaper in 1980 and pretty much sums up the reaction of New Mexicans to this request.

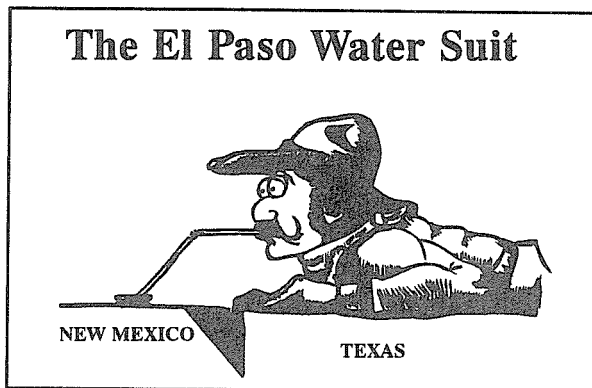


Figure 1.

The request was denied by the New Mexico State Engineer because of a New Mexico law which prohibited out-of-state export of New Mexico groundwater. Then in September 1980, the City of El Paso, through its Public Service Board, filed suit against certain State of New Mexico officials claiming the New Mexico law was unconstitutional. It turned out that the law was unconstitutional, but to make a long story short, New Mexico changed the law and then other issues were litigated.

After more than a decade of litigation costing both sides millions of dollars, the case was still pending in the New Mexico Court of Appeals. In early 1991, the

Court implemented a program of referring all pending cases to a facilitator to see if a settlement could be reached. After lengthy negotiations, El Paso, New Mexico State University (NMSU) and Elephant Butte Irrigation District (EBID) signed a settlement agreement on March 6, 1991 resolving the major issues of the 11-year litigation. Based on the settlement agreement, a motion by all parties to the litigation, including the New Mexico State Engineer, was made to the New Mexico Court of Appeals to dismiss the case. The Court approved the request and the order to dismiss was filed on May 8, 1991.

### The Settlement Agreement

El Paso agreed to withdraw all its applications without prejudice and committed that its first priority for meeting future water needs would be conservation, followed by surface water utilization, and as a last priority, use of groundwater. The EBID promised to work with the City of El Paso to facilitate the delivery of Rio Grande Project water from the Texas portion of the project. The parties also agreed to study the effect of the Canutillo well field located near the Texas/New Mexico state line and its effect on New Mexico water users. All agreed to support year-round delivery of surface water to El Paso and to exchange technical data.

Since the Rio Grande Project conveys both Texas and New Mexico water, the parties also agreed to study and support, where warranted, possible changes in conveyance facilities which benefit all parties. The parties agreed to work together to maximize the utilization of Rio Grande Project waters to meet everyone's long-term needs including ways to harmonize and integrate the elements of each party's water plans. The agreement also called for the formation of a "Joint Settlement Commission" to coordinate and promote the major items of the settlement, now called the New Mexico/Texas Water Commission.

### The Parties Involved

The New Mexico/Texas Water Commission includes representatives from EBID, NMSU, the City of Las Cruces and Doña Ana County. The Texas entities include El Paso Water Utilities, El Paso Water Improvement District #1, and the University of Texas at El Paso. Other participants in Commission activities include the Anthony Water Sanitation District, the New Mexico State Engineer Office, New Mexico Department of Game and Fish, New Mexico Environ-

ment Department, New Mexico State Parks, U.S. Fish and Wildlife Service, Texas Water Development Board, Rio Grande Compact Commission, Texas Natural Resources Conservation Commission, Texas State Parks, International Boundary and Water Commission, Bureau of Reclamation, Bureau of Land Management, and Environmental Protection Agency. Consultants include Boyle Engineering and Parsons Engineering Science. You can see that this group represents nearly every entity with policy or management authority over water resources in our region.

### Features of the Planning Region

Figure 2 illustrates our planning region, showing the location of the Mesilla and Hueco groundwater basins and the Rio Grande. As you have heard earlier in this conference, the Hueco Bolson is being mined—withdrawals far exceed what little recharge may occur. Another problem for the Hueco is that it is now experiencing saline water encroachment causing problems with existing El Paso wells. The Mesilla groundwater basin, as Dr. Tom Maddock pointed out earlier, is a stream-related basin. The significance of this is that large groundwater withdrawals, if located close to the river, could possibly reduce the flow of the Rio Grande. Thus, groundwater in our region is facing threats requiring careful stewardship of these important resources.

A number of unique features in our region dictate, to various degrees, how water can be managed. First, it is important to recognize that the Rio Grande in our region is typically dry below Caballo Dam from November through February when releases for irrigation cease. Downstream of Fort Quitman south of El Paso, the Rio Grande typically is dry year round. It is a dry channel that may not be fishable nor swimmable, but it is indeed driveable.

Another unique feature is that the irrigators of the Rio Grande Project, a federal reclamation project, have repaid their debt to the United States. The project thus does not have to comply with various provisions of reclamation law. This affords more flexibility and local control in water management.

River management in our region is governed by a complex array of policies. The two most important are the 1906 treaty with Mexico which guarantees Mexico 60,000 acre-feet of surface water per year

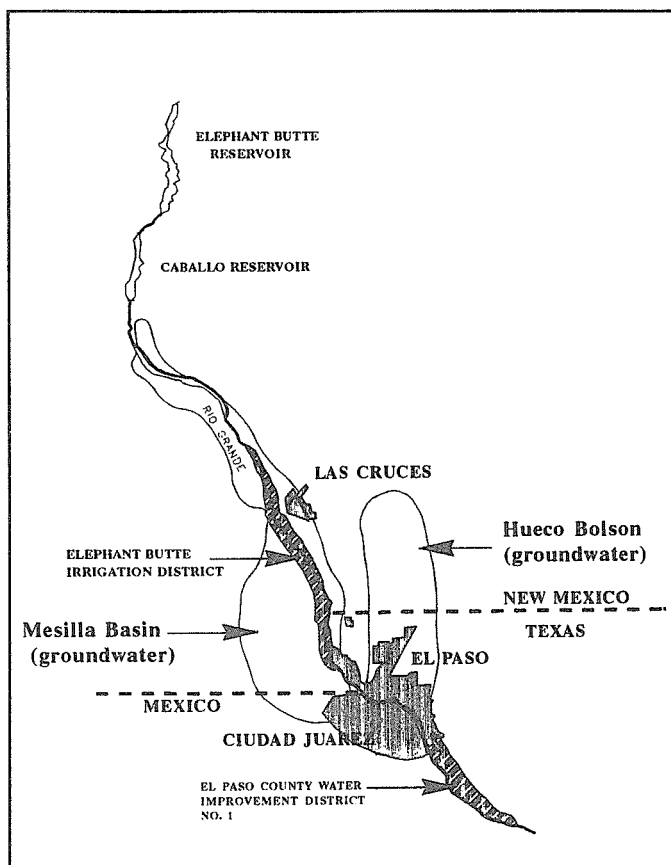


Figure 2. The planning region.

and the interstate compact with Colorado, New Mexico and Texas, which apportions flows among the three states. Other applicable water law varies depending on location and water source. In Texas, groundwater generally follows common law whereby the surface owner owns the underlying groundwater. In New Mexico, groundwater is a public resource subject to appropriation. In Mexico, water is governed by federal law.

Water use in the region also varies by source. El Paso obtains its municipal and industrial (M&I) water supply from the Hueco Bolson, the Mesilla Basin and the Rio Grande. Las Cruces relies exclusively on groundwater from the Mesilla Basin for its M&I supply. The M&I supply for Juárez depends exclusively on groundwater from the Hueco Bolson. The primary agricultural water supply for the region is surface water from the Rio Grande with supplemental pumping of groundwater.

### The Surface Water Option

As I mentioned earlier, parties to the settlement agreement agreed to look at the feasibility of using surface water for city supply. When I say “city” I am not referring to just El Paso, but to other municipalities as well. Figure 3 shows the apportionment of surface water in the region. There is a major misconception concerning New Mexico helping provide surface water to El Paso. We are not talking about giving New Mexico water to Texas but rather talking about helping to better deliver water to which Texas is already entitled.

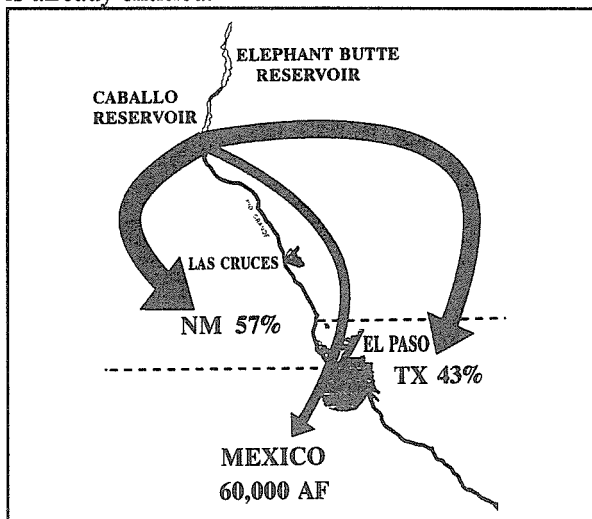


Figure 3. Distribution of Rio Grande Project water.

One must first understand how the Rio Grande Project works. In a normal year, about 790,000 acre-feet of project water is delivered to Elephant Butte reservoir. That delivery includes water for Mexico, Texas and southern New Mexico (EBID). Mexico gets the first 60,000 acre-feet because of our 1906 treaty obligations. Then 57 percent of the remaining project water goes to New Mexico irrigators in the EBID and 43 percent goes to the irrigation district in El Paso (El Paso County Water Improvement District No. 1 - EP#1). That amount is roughly equivalent to the irrigated acreage in each of the two irrigation districts. The water for year-round delivery to El Paso would come from the 43 percent share for Texas that is earmarked for the EP#1.

To get surface water to El Paso, the City of El Paso would have to contract or make other appropriate arrangements with EP#1 for some of its water. Mr. Archuleta will tell you about how that has been

done and how it is going right now. Secondly, EP#1 would place an order for water to the Bureau of Reclamation to satisfy its customer—in this case, the City of El Paso. The EBID would then allow that water to flow through its canal system during the winter months and deliver it downstream to the American Dam in the western part of El Paso. The river channel itself might be used for delivery depending on the flow of the river and its water quality.

### Current Focus of Commission Activities

The New Mexico/Texas Water Commission has concluded that further planning must wait on answers to a number of hydrologic questions. Of particular interest is the amount of infiltration from canals, laterals and the floodway channel, and changes in water quality under different flow regimes. Our attention is presently focused on the reach of the system below the Mesilla Dam (the last EBID diversion on their project) just south of Las Cruces. Figure 4 shows some of the more important features of the water conveyance in this area and down into El Paso.

Two major canals lie below Mesilla Dam in New Mexico: the westside canal and the eastside canal. An important question we are trying to answer is whether you can deliver enough water through various bottlenecks in this portion of the system and have it arrive at the American Dam in El Paso without significant deterioration in water quality. One water quality problem is that there are significant drain inflows to the river channel downstream of the Montoya Siphon which deteriorates water quality just upstream from American Dam diversion. With sufficient flows in the river, water quality may be acceptable for water treatment plants. At low flows, however, water quality may be too poor for conventional treatment processes. Apparently high levels of sulfates cause the problem. A much better understanding of the relationships between flow and water quality will be required before various conveyance alternatives can be evaluated.

### The Future Setting

During the years of litigation with El Paso, it became clear that the only renewable water supply to the region is the flow of the Rio Grande. Groundwater found in basin deposits under and adjacent to the Rio Grande is connected hydrologically to the

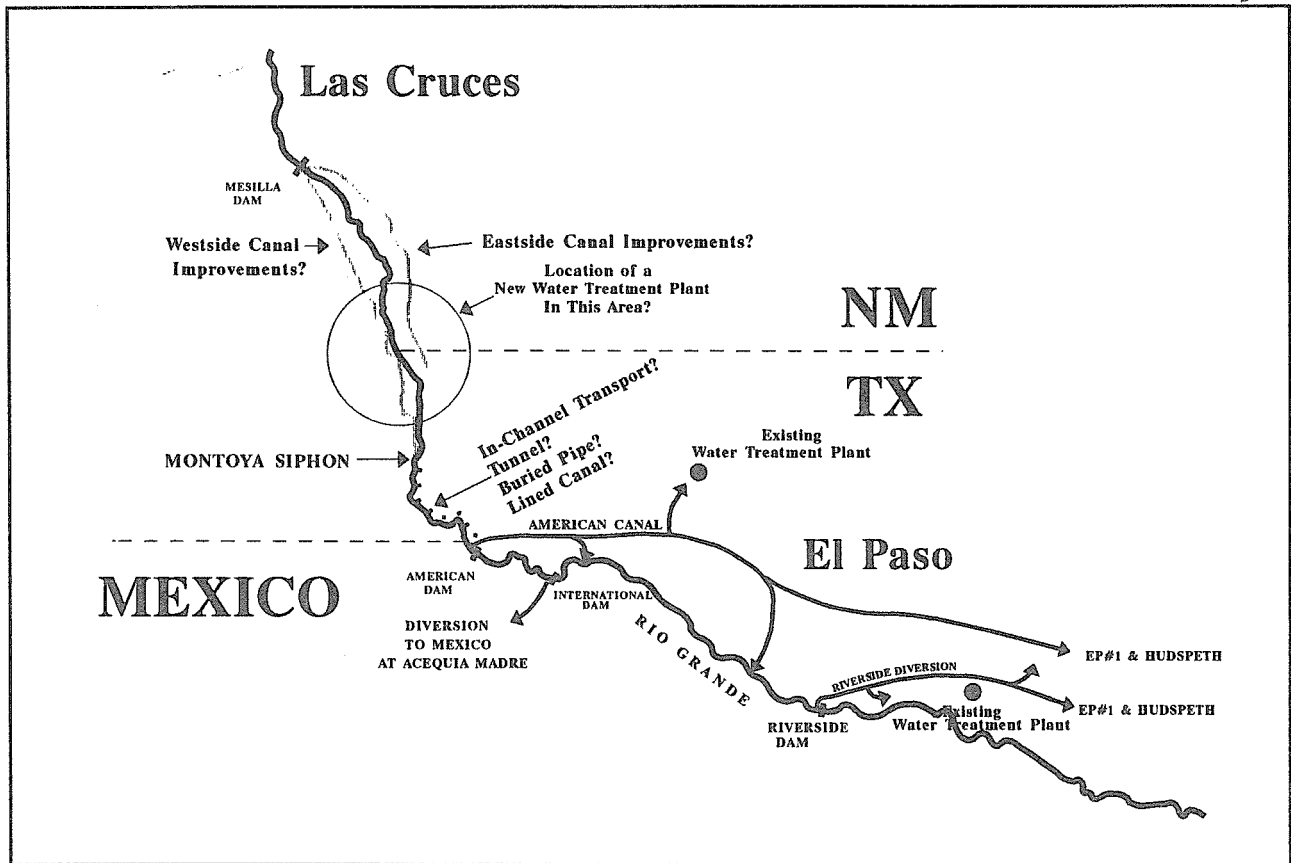


Figure 4. Water conveyance system below Mesilla Dam.

river such that given enough time, pumping of this groundwater will eventually diminish the flow of the river, something which cannot be allowed to happen. We view our groundwater as a valuable asset to bank and use only during those periods where climatic conditions result in insufficient river flows. This concept is easy for most to grasp but difficult to implement.

The transition away from dependence on groundwater will take time. Nonetheless, it will eventually happen and the planning currently underway by the New Mexico/Texas Water Commission is a vitally important step. Because of the technical complexity of the hydrology, the political and legal complexity of negotiating agreements between entities of differing jurisdictions and viewpoints, and the high cost of converting from groundwater usage to surface water, water resources planning is a major challenge in this region. It encompasses one of the fastest growing areas in the country and is located just across the border from the explosive growth of Cd. Juárez.

The bottom line is that if you want to engage in productive cooperative planning among entities with different interests, there must be something in it for everybody. We see a number of potential benefits. The southern part of Doña Ana County could get a supply of treated water, El Paso could get a supply of year-round surface water, improvements could be made to the EBID canal system, EP#1 conceivably could get higher quality water, and in its contracts with the City of El Paso, there could be a revenue stream for the irrigation district. And since the system could have year-round flows, some significant environmental benefits could occur.

One thing I think we all agree on is that there are better things to focus our resources on than litigation. Thank you for your attention.

**ED ARCHULETA**  
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**Public Service Board**  
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I appreciate the opportunity to address this group again this year. Last year I spoke in Albuquerque on El Paso's water planning efforts and today I will provide you with an update of those efforts although primarily I'll focus on the dialogue that Dr. Tom Bahr has just presented and expand on the work of the New Mexico/Texas Water Commission.

About two years ago, members of the New Mexico/Texas Water Commission went to Washington D.C. to meet with our congressional delegations to describe to them what the commission was doing and to lobby for resources and assistance. Those efforts are coming to fruition through a number of mechanisms.

El Paso currently has two water treatment plants. One was built in 1943 and designed to treat 20 million gallons per day. It was expanded in 1967 and has been well maintained and continues to do a very good job of treating 40 million gallons of water per day. Two years ago we opened the state-of-the-art Jonathan Rogers Plant, a very sophisticated plant. I know that when we look at the Rio water it often does not look very good, due mostly to the sand and the silt. But it is possible to treat the water. One of the things we want to do as a commission is to not only maximize the quantity of water for everybody and the quality, but to try to provide for watershed protection, because after all, if we do not protect the quality of the water, it will spoil the water for everybody—municipal as well as agricultural. Because of our two water plants, we are able to take about 45 percent of our annual requirements from the river, which is up significantly from the past when we took 80 percent from groundwater and about 20 percent from surface water. Now we take about 40 percent from the Hueco Bolson—where we have shutdown a number of wells—and about 15 percent from the Mesilla Basin. Through the expansion of our treatment plants and other efforts, we are seeing a difference. We can share our data with you if you would like to see it.

Let me now talk about the New Mexico/Texas Water Commission. The order of priorities estab-

lished by the settlement agreement were: first, conservation, second, surface water and last, groundwater. It is clear that El Paso cannot overnight, or perhaps ever, wean itself entirely from groundwater simply because of the demand generated by a growing population. We are trying to conserve water but how does one curtail population growth? That is a very difficult socioeconomic and political question. As you know, and as the governor of New Mexico said this morning, the NAFTA agreement will likely result in explosive growth. Las Cruces, El Paso, McAllen, Laredo, Brownsville and other cities are growing at a much faster rate than cities elsewhere. This steady growth has sent El Paso from ranking as the 25th largest city in the country in 1980 to the 19th largest city currently.

Boyle Engineering and Parsons Engineering-Science are consultants for the New Mexico/Texas Water Commission. The commission asked them to examine opportunities for conjunctive use of water and improving water quality. In December 1994, almost a year ago, they presented completed summary and technical reports for the project.

The project's study area is a 100-mile section from Elephant Butte and Caballo dams to the El Paso area and on down to Fort Quitman, downstream of El Paso. This area includes the Mesilla Diversion Dam near Las Cruces and the American Diversion Dam near the New Mexico/Mexico border. It was recognized that in time Las Cruces may have to build a water treatment plant perhaps north of Las Cruces. The first phase that we will work on is from the Mesilla Dam down to the American Dam and look at the opportunities there, including possibly a new water plant in the upper valley perhaps near Anthony or Canutillo.

The purpose of the technical data report was to look at the water supply needs of the study area's population. The report provides a 40-year study, 1995-2035, focused on improving the delivery of surface water. Gary Esslinger talked this morning about the history of the Elephant Butte irrigation project. There also is an interesting history behind the El Paso County Water Improvement District #1, the irrigation district in El Paso. These districts have served the area very well, but obviously improvements can be made in delivering the water more effi-

ciently, not only for agricultural use but also for municipal and industrial uses.

Another important concern is achieving year-round supply. When Gary Esslinger, Tom Bahr and I spoke here on Monday before an interim legislative committee that deals with issues of water and power statewide, Gary Esslinger pointed out that in the past there had been farming operations through the winter. There likely are farmers in this valley who have a desire to farm during the winter if in fact the water is available and can be released. Year-round supply is not just a municipal issue. We have two water plants operating today but probably sometime in the next couple of weeks they will cease to operate. When the Bureau of Reclamation, working with the districts, shuts the gates at Caballo, our treatment plants are out of business. It is not an issue relative to water rights necessarily, but it is an issue related to how the system was built to serve agriculture. However, now we have a major metropolitan area in this valley and we believe that to take the water more efficiently, it needs to be provided year-round. By using more surface water through appropriate contracts with the irrigation districts, we can minimize the amount and affects on our precious groundwater resources.

In El Paso, we have planned for the event of a drought on the river. When there is a drought, you must be able to rely on groundwater resources. If groundwater is not available, you are totally out of business. It is nice to pump groundwater because it's the cheapest method for suppling water, but it is best to use this finite resource only when there is no other alternative. Our model for dealing with drought is one that other cities are looking to follow on a similar basis.

We have had contracts with the El Paso water district since the 1940s, with a major modification in 1962. Other contracts were negotiated in the 1990s. Essentially we own about 2,000 acres of land bought in the 1950s. We have leases with owners of private property where we lease the water and pay the taxes. In many cases, these areas have been urbanized and the landowners cannot get water anyway because the tracts are so very small; there are thousands and thousands of small tracts in our urbanized area. Although the paperwork is extremely intensive—we now have it on computer—that process has yielded almost 8,000 acres. We have another contract with a district

in the lower valley for a few thousand acres, so we have about 11,000-12,000 acres of water rights. We are a major customer in the El Paso district in our pursuit to obtain water rights.

We also want to improve the water quality of our surface water resources. This would be to everyone's benefit. We want to protect the Hueco and the Mesilla from continued further overdraft.

The consultants' conclusion as stated in the technical data report is that the critical water supply shortfall must be addressed by surface water. Year-round surface water availability is necessary in this area. Water quality must be protected through watershed protection methods. Water quantity must be maximized through conservation. El Paso has a very stringent water conservation ordinance and we hope New Mexico follows suit. Albuquerque has a voluntary program and we hope that southern New Mexico plans for demand-side conservation. We also hope New Mexico institutes supply-side conservation as well, primarily in the agricultural areas. Any excess flow should be recharged.

Another study initiated by the commission concerns aquifer storage and recovery. For the last two years, there have been excess flows in the river system but no place to put it. So when there has to be a spill, whether it is a paper spill or a real spill, there is no place to put the water. Studies indicate we could, with the proper contracts, recharge the aquifers, the Mesilla and/or the Hueco. Two different locations for this possibility were looked at in New Mexico and two in Texas. It is certainly feasible to store the water so it is available for pumping when you need it. In El Paso we recharge water ourselves now—about 4,000 acre-feet per year at the Fred Hervey Plant. We treat wastewater to drinking water standards and recharge it in northeast El Paso. Although it is certainly feasible, it also is a matter of contracts and money to do it.

We expect a public-involvement process as specified by the commission. We want to make certain that there is knowledge and information transferred appropriately. We now are in the process of securing financing and developing contracts with the engineering consultants.

The state of Texas is very supportive of this process. The Texas Water Development Board is responsible for planning and funding water projects in Tex-

as. There are two major projects in Texas now that are funded by the Texas Water Development Board. One is a project in eastern Texas involving Houston, Corpus Christi, and San Antonio and deals with transferring water among those areas. The other is the New Mexico/Texas project. Earlier this summer, the Texas Water Development Board approved a grant to the El Paso Public Service Board on behalf of Texas for \$1.25 million to be used for public participation, to define feasibility, and to look at any environmental work that has to be undertaken as part of this process. We now are waiting for New Mexico to cost-share that work so we can begin.

The final feasibility portion will probably cost about \$600,000. If that cost can be split equally between Texas and New Mexico, we hope to start the study in January. We are a bit behind schedule as the report was prepared late last year but we are hoping to begin soon.

We also are working with Congress to secure from the President's monies for the border region—which is \$100 million—funding to allow us to begin the design of the priority project from this final feasibility study. We are working to secure the design money but it is a long, arduous process. Whatever comes out of that study, as a first priority we must have funds in place so we can design the appropriate initial component. Then begins the approval processes for the design. The goal is to have the first phase under construction by January 1999.

Data collection, hydrologic modeling and reporting have been identified as the first component of the first phase, task order #1. It will cost about \$600,000. We need better data or an agreed upon systematic method to collect data. Essentially, the established priorities are: to provide year-round surface water supply of suitable quality for both El Paso and the irrigation districts; to identify and analyze improvements needed in the existing regional conveyance system to remove any bottlenecks or reduce losses; to identify new conveyance facilities needed to deliver the water efficiently; and to identify and analyze the water treatment facilities and any aquifer storage and recovery facilities that can be planned, constructed and managed by these agencies. Please understand that there are no other contractual arrangements in place yet among the parties. We feel the first thing we must do is to identify more specifically the feasibility

of the associated costs, and only then get into discussions on the management opportunities and obligations, and how to finance, operate and maintain the program.

If funding is made available by New Mexico to match Texas' share, we could begin as early as January next year and the first phase would continue until next fall, and will involve data collection and analysis. The irrigation districts, the International Boundary and Water Commission, the Texas compact commissioner, the Bureau of Reclamation, as well as El Paso and Las Cruces have agreed to participate in data collection and laboratory work as defined in the scope of work. The hydrologic modeling will consist of stream-simulation model development (surface-water model and a groundwater model) by Dr. Tom Maddock and colleagues from the University of Arizona. But the first work will be done using the BESTSM Model, a Boyle Engineering stream simulation model developed about 20 years ago for the Rio Ruidoso in New Mexico. The model has been applied in other areas including San Diego and Denver and on the Arkansas and Colorado rivers. It is a good model and appears to be simple to use. It basically is a water accounting model; water coming in, water going out, and what kind of water quality we can expect. The models tell you what will happen in terms of groundwater issues and water quality issues if you line a particular piece of canal or lateral. Subsequently, we will couple the BESTSM model results with the groundwater simulation model to provide information from which to make appropriate further decisions.

For the second phase that begins perhaps next fall, we will review the resource assessment, geographic information system, and environmental requirements; evaluate delivery alternatives; look at the water treatment plant site evaluations; look at some of the geotechnical issues; look at refining alternative alignments, and review final operations and hydraulics as well as layouts and cost estimates of the final feasibility report. The final feasibility report would provide construction priorities and their associated costs.

The project will be managed by the New Mexico/Texas Water Commission, through its Management Advisory Committee. There are quality assurance and quality control processes and Dr. Conrad



Keyes is the project manager. A measurements team consisting of various federal agencies and irrigation districts in Las Cruces and El Paso will participate. Several consultants will work on the project including Dr. Tom Maddock and staff members from the Boyle Engineering and Parsons Engineering-Science team. There will be a good spectrum of talented professional people from academia and private consulting firms representing agricultural and municipal users.

There are ample benefits associated with conjunctive use of groundwater and surface water. Sound water planning and management will result in good area-wide economic development. I know that we often want to contain growth, but particularly on the border or close to the border, I think it is very difficult to control growth. What we need to do is to manage growth and provide the water resources in a responsible manner. But you must have those resources in order to provide for economic development. Also, proper joint project planning for a growing population will minimize conflicts and shortages in the future. If you look at this conference's agenda, you see most issues continue to be discussed year after year after year. Fifteen years from now I hope we are not talking about the same issues; hopefully we will have made some progress on resolving some of these issues. They are not going to go away on their own.

If Texans are looking over with a straw into New Mexico, New Mexico has a straw in Colorado. When you are at the downstream end of the ditch, you are in the worst possible situation, and I can assure you that Mexico has their straw in the United States. "It is part of the hydrologic cycle."

While attending business school at the University of New Mexico, I took macro and micro economics courses. After taking those courses on supply and demand and price elasticity and similar topics, a professor told me, "Ed, there are two things you really need to know out of both of these courses." He said, "Number one, you cannot have more than there is, and number two, you cannot have it both ways." I think that with transboundary issues we need to remember those two principles because for everyone downstream, there is somebody else downstream and there is somebody else upstream.

Funding opportunities now exist for bistate and binational operation of water projects along the bor-

der that may not be here a few years from now. I think the commission agrees that we need to take advantage of them—not by fighting with each other, but by working together to plan and execute these programs. As far as planning and subsequent design and construction of the joint approved plans, we think it would modernize the channel system, the existing system. The end result will be an improved delivery system and efficiencies not only for area farmers but also for municipal and industrial users.

I mentioned earlier that El Paso practices conjunctive use and we intend to increase that use. Last year we used 52,000 acre-feet of water and this year it will probably be closer to 56,000 acre-feet of water, and that is all the plant capacity we have. We need to treat water during the winter. Las Cruces will at some point, perhaps in 15-20 years, also use water conjunctively, and planning for that eventuality must occur now. You cannot wait until the decision has been made and then try to become part of a project. There are too many bad situations like that, for example, the drought in California. Some cities now say that they wish they had been part of the California water project. But you have to do it now in order to reap the benefits later. El Paso is committed to continued work with the New Mexico/Texas Water Commission. We hope New Mexico will be able to match resources from Texas so that we can proceed to build these projects and operate and maintain them.

Lastly, you can be sure if people do not agree on things, there will be arguments that turn to litigation. We have been through years of litigation that did not yield anything. Cooperative planning will be much more beneficial and productive than potential litigation.

On behalf of the New Mexico/Texas Water Commission, we thank you and we look forward to a continuing relationship with the New Mexico parties.