

NEW MEXICO WATER SUPPLY

HEARING BEFORE THE COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE ONE HUNDRED SEVENTH CONGRESS

FIRST SESSION

TO IDENTIFY ISSUES RELATED TO THE WATER SUPPLY CHALLENGES
FACING THE SOUTHERN NEW MEXICO BORDER REGION, A REGION
INCLUDING THE EL PASO, TEXAS AND JUAREZ, MEXICO AREAS

AUGUST 14, 2001

LAS CRUCES, NEW MEXICO



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NEW MEXICO WATER SUPPLY

TUESDAY, AUGUST 14, 2001

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Las Cruces, NM.

The committee met, pursuant to notice, at 9:07 a.m. in the Corbett Center Auditorium, New Mexico State University, Las Cruces, New Mexico, Hon. Jeff Bingaman, chairman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. Let us get started. If anyone wants to hear the testimony, please come sit down where you can hear it. We have lots of room in the front row.

Let me thank you all for being here. This is a hearing of the Senate Energy and Natural Resources Committee to provide a forum for identifying issues and learning more about the various water supply challenges facing southern New Mexico's border region, including, of course, El Paso and the Juarez metropolitan areas.

Before we begin, let me just recognize some of the congressional staff who are here. First, Mary Catherine Zee and Don Manzanares, both from Senator Domenici's staff. We appreciate them being here very much. We understand that Representative Reyes, Congressman Reyes may have a representative here later on, and if so, we will certainly recognize him.

From the energy committee staff, Mike Connor, who is sitting beside me here, and Shelley Brown have come out to help organize this hearing. We appreciate that very much.

There has been an increasing amount of attention and scrutiny on water issues in the border region. Initially that attention was focused on the need to increase the environmental infrastructure in the area, particularly the wastewater treatment plants. Although more needs to be done in that area, progress is being made on these issues through the Border 21 Program, the ongoing partnerships between the United States and Mexico. Fernando Macias was here a few minutes ago, he is back towards the back, and we appreciate his good work on many of those issues.

The focus of today's hearing, however, concerns a separate and ongoing challenge facing the region, that is the issue of water supply. While the need to secure an adequate supply of fresh water is nothing new in the arid West, there are some unique aspects here which warrant special consideration. First, addressing water supply issues among several different governmental entities is a very

real challenge. We have two nations, and that complicates the issue even further.

Second, the region is experiencing growth at a rate significantly exceeding that of most other areas. The growth not only increases the demand for water, but also changes how and when the available water supply is used.

The goal of this hearing is to learn more about the current projections of available water supply, any plans to address increased and changing demands, and issues which need to be resolved as part of that process.

We have a distinguished group of witnesses here today who can give us their perspective on this subject from several different viewpoints. At the end of the day I hope we can have a better understanding of the challenges facing the region and the role that the Federal Government can play in helping meet those challenges.

We are going to start with Mr. Karl Wood, who is the director of the Water Resources Research Institute here at New Mexico State University, and following him, Professor James Peach, who is at the Department of Economics here at New Mexico State. We will hear from both of them, and then we may have an additional witness on this panel, and I will have questions of both of you.

But Karl, will you start and take 10 or 15 minutes, whatever you think is appropriate, to tell us your perspective.

[A prepared statement from Senator Domenici follows:]

PREPARED STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR
FROM NEW MEXICO

I want to thank all of you for attending today's hearing on water supply challenges facing the southern New Mexico border region. Of course, those of us from this area know what the problem is—increasing demands on a limited water supply. Of the issues facing New Mexico in the next decade, the greatest challenges will be water-related, in terms of both quantity and quality.

I have often reminded my colleagues in the Senate not to be fooled by the name "Rio Grande"—our great river is no Potomac. We all know that securing enough clean water for our needs is crucial for the future of New Mexico. As demand grows more intense between urban areas, industry, agriculture and others, we must work together to balance all interests.

Many of you may know that I have been very involved for years in working to improve the water situation in New Mexico. I am pleased to continue funding work to sustain the endangered Rio Grande silvery minnow, as well as provide enough water for human uses, through my position on the Senate Energy and Water Appropriations Subcommittee. The Energy and Water bill funds the Department of Energy, the Bureau of Reclamation, and the Corps of Engineers—all crucial agencies to water in our state, through research, development and delivery. I have helped fund activities supporting endangered species, as well as water development for agricultural and municipal users throughout the state.

Specific to the border area, colonias, the North American Development Bank (NADBank), Border Environmental Cooperation Commission (BECC) and the proposed El Paso-Las Cruces Regional Sustainable Water Project have all received funding over the years; however, permanent solutions to supply and demand issues are needed. The rest of the country is realizing what we have known for decades, namely that water has become the new liquid gold. Just this past Sunday, the *New York Times* published an article stating that water supply concerns threaten the entire country, not just the arid west. The *Times* predicts that El Paso and Albuquerque could "go dry" in 10 to 20 years. The recent emergencies in the Klamath Falls area of Oregon, which has pitted agricultural water needs against those of endangered species, is hopefully not a precursor for a similar crisis here in New Mexico.

We know that Las Cruces, Santa Teresa, Sunland Park and smaller communities in southern New Mexico need water to grow. The El Paso region and growing areas around Juarez have the same needs. We must find ways to ensure that people, endangered species, and agricultural land can strike a balance on water needs. These

challenges, along with water quality concerns, will define the next few years of effort along our water systems. We must also realize that the problems we face here in New Mexico are not unique.

The greatest water quality issue facing New Mexico today is the lowering of the arsenic drinking water standard. The compliance cost estimates associated with these new standards are staggering. I do believe that if the federal government is going to place this kind of cost on Americans, then it must also be willing to help foot the bill. Otherwise, we shouldn't be too surprised to see systems serving small, rural and largely low-income communities being shut down.

If you have not already read it in the newspapers, the House recently passed language prohibiting the use of appropriated funds to delay the 10 parts per billion arsenic standard published in the waning hours of the Clinton administration. Additionally, the language prohibits using FY 02 funds to increase the standard. The Senate passed language stating that the EPA administrator must immediately put a new standard into effect that should protect the population in general, while fully taking into account those at greater risk such as infants, children, the elderly and pregnant women.

The Senate language is more flexible and is not an outright prohibition on review or standard level. I am pleased that the Senate language, unlike the House, is not a strict prohibition and does not mandate the Clinton standard be immediately put into effect. I am not against a new standard, but want one that is based on sound science.

Based on the work being conducted by our National Laboratories, we feel more confident in affordable technologies that may soon be available to treat water. Additionally, on August 1, I introduced a bill authorizing \$1.9 billion for a grant program to help local communities pay for the cost of improving water treatment facilities to meet potentially stricter federal quality standards. Communities would apply directly to EPA for grants. Grants would be awarded based on financial need and per capita cost of complying with drinking water standards.

Our water issues will only continue to grow more challenging. We must be innovative thinkers and visionaries in the water world. We cannot delay facing these issues now. One way is to chart a broad new course aimed at channeling scientific innovation to ensure plentiful future water supplies through the desalination of brackish and sea water.

One major thrust of a bill I introduced this month, the Water Supply Security Act of 2001, authorizes the construction of a desalination test and evaluation facility over the Tularosa Basin in Otero County, New Mexico to improve existing technologies and develop new technologies to reduce costs. Although communities throughout the nation and the world have depleting stores of fresh water, they all have large deposits of brackish and sea water. Because brackish and sea water account for over 97 percent of the water on Earth, being able to cheaply convert this water into fresh water will play a key role in ensuring an adequate water supply in the future.

The bill would direct the Bureau of Reclamation and the Department of Energy to collaborate on evaluating current technology, advising on additional research, and building a facility to test and prepare desalination technologies for "real-world applications." In addition, this basin has the highest level of solar radiation in the world, which will allow us to evaluate a combination of renewable energy and desalination applications, an important area of future research. Although desalting technology has become significantly cheaper in recent years, the cost of desalting brackish and sea water is still substantially more expensive than treatment and delivery of other municipal water supplies.

The proposed desalination facility would be located near several research and development organizations including White Sands Missile Range, Fort Bliss, Holloman Air Force Base, New Mexico State University, and the University of Texas at El Paso. Evaluation of technologies in the Tularosa Basin would have direct applications to cities in southern New Mexico, West Texas, and northern Mexico, as well as inland applications throughout the United States. Revolutionary desalting technologies would provide significant relief to communities throughout the world, be they rich or poor, coastal or inland.

We are all neighbors; the city-dweller, the farmer, the fish, the American and the Mexican. Water sustains us all. For our future, we cannot wait to solve the crucial problem of finding enough water for all. "Agua es la vida de nuestra tierra."

**STATEMENT OF M. KARL WOOD, DIRECTOR, NEW MEXICO
WATER RESOURCES RESEARCH INSTITUTE**

Mr. WOOD. Thank you, Senator Bingaman. I wish to welcome you back to New Mexico, and especially welcome you to New Mexico State University, what we like to describe as the university of choice.

Today, I wish to talk briefly about the water resources in the border region. The binational border region, of which southern New Mexico is part, is generally defined as an area which extends from east of El Paso to west of Juarez, and extending north into New Mexico approximately 60 miles.

The water resources of this area consist of both surface and groundwater. The surface waters relate generally to the Rio Grande. Numerous other small streams, creeks, arroyos, and draws are typical of the arid southwest. The groundwater resources of the region consist of a number of alluvial and basin-fill aquifers. These groundwater aquifers include the Tularosa/Hueco, the Jornada del Muerto, and the Mesilla Bolsons.

The climate of the region is typical of that of the arid Southwest with mostly clear skies, abundant sunshine, limited rainfall, and limited humidity. Average annual precipitation of most of the area is less than 10 inches per year. In the last 100 years in Las Cruces, as an example, it has been about 8½ inches. The last 40 years in Las Cruces have been 9½ inches.

The Hueco/Tularosa aquifer extends from the north of Alamogordo south beyond El Paso and Juarez. Most of the water is found in the ground. Total surface area of the Hueco/Tularosa aquifer is 4,160 square miles, approximately 67 percent of it being in New Mexico, 22 percent in Texas, and 11 percent in Mexico. The aquifer is a primary source of water for the city of El Paso and Ciudad Juarez, and for military installations and smaller cities and towns in New Mexico, Texas, and Mexico.

Well yields in this aquifer vary greatly with yields between 1,800 gallons per minute to as low as 15 gallons per minute. Depth to the groundwater in the north is between 20 and 150 feet. Drawdowns in many municipal wells up to 100 feet have been recorded in this area.

Groundwater is at or near the surface near the White Sands National Monument. Current depth to groundwater beneath the city of El Paso is usually between 250 and 400 feet. That distance is away from the river.

Present depth to groundwater beneath Ciudad Juarez varies from about 100 to 250 feet, except near the Rio Grande where depths are less than 70 feet.

A bit on the water quality in this basin. The groundwater north of New Mexico/Texas State line is usually greater than 100 milligrams per liter of total dissolved solids, except around the mountains. The water along the interior of the basin has TDS greater than 10,000 milligrams per liter. 10,000 milligrams is quite salty. It is generally considered to be toxic even to most livestock.

Groundwaters along the Franklin Mountains are characteristically less than 700 milligrams per liter. Away from the recharge areas along the Franklin Mountains, water salinity increases to over 1,000 milligrams per liter in many wells, reaching concentra-

tions of over 1,500 in wells along the center of the basin. The salinity of groundwater underlying the Ciudad Juarez area is generally less than 1,000 milligrams.

Chloride and other dissolved ions have increased over time in many of the municipal wells in El Paso and Ciudad Juarez. Nitrate data collected between 1994 and 1995 indicate nitrate problems in some parts of El Paso County. In the Ciudad Juarez area, sampling in 1987 suggested that groundwater beneath Ciudad Juarez was contaminated by sewage.

The Hueco Bolson has served for many decades as the principal source of water for the city of El Paso and Ciudad Juarez, as well as communities in Dona Ana and Otero Counties of New Mexico. The city of El Paso has actively pursued development of alternative supplies, rigorous conservation programs and recharge programs to prolong the life of the aquifer.

In New Mexico, the community of Chaparral and small acreages of irrigated cropland in the area are principal uses of the Hueco basin water. In the Tularosa subbasin, a number of municipal systems, the White Sands Missile Range, as well as self-supplied uses depend on the resource for domestic supplies.

Now, to talk a minute about the Jornada del Muerto Bolson. It lies east of the Mesilla Bolson on what is characteristically called the east mesa. The basin covers approximately 3,344 square miles and is approximately 12 miles across at the widest section. The depth to the water table here is between 300 and 575 feet.

In the southern part of the basin, estimated volume of water in storage is over 100 million acre-feet. Groundwater in the southern section of the Jornada del Muerto Bolson is classified as fresh and water in the northern section is classified as slightly saline. Water use in this basin is limited to public, self-supplied domestic, industrial, commercial, and livestock uses. Currently no agriculture activities are present, but there have been limited acreages in the past.

The Mesilla Basin aquifer system consists of floodplain alluvium and the underlying Mesilla Bolson. It extends from southern New Mexico to West Texas and northern Mexico along the Rio Grande. The Rio Grande originates in northern New Mexico and southern Colorado Rocky Mountains, flows through New Mexico, and forms the boundary between Texas and Mexico on its way to the Gulf of Mexico. It is the dominant and limiting surface water resource throughout most of its watershed.

The surface drainage of the Mesilla Basin covers approximately 1,100 square miles. Historically, Rio Grande flows have been highly variable both between years and between seasons. Average annual flow above Elephant Butte Reservoir was 569,000 acre-feet from 1895 to 1969, with a standard deviation of nearly 400,000 acre-feet.

With this high a flow and this high a standard deviation, it is obvious to see that the variation is tremendous. This has led to floods and extended periods of no flow. These flows were stabilized by the Rio Grande Project, so that there is generally a consistent flow every year.

The Rio Grande floodplain between Leasburg Dam and the El Paso narrows is not a confined aquifer. The water table is approximately 10 to 25 feet below the land surface. Recharging to the aq-

uifer occurs primarily as vertical flow from the surface water system. These include the river, canals, laterals, and drains and irrigated cropland fields. The quality of the water generally reflects the quality of the surface water system, ranging from about 500 to over 1,000 milligrams per liter of TDS.

In conclusion, the flows of the Rio Grande are stored in Elephant Butte and Caballo Reservoirs. Elephant Butte Reservoir has a capacity of just over 2 million acre-feet. The capacity of Caballo is about 330,000 acre-feet. Ground and surface water is used below Caballo Reservoir by individual homes, municipalities, industry, and agriculture.

In 1906, a treaty was negotiated with Mexico for the delivery of 60,000 acre-feet of water annually at the Acequia Madre ditch that headed below the principal diversion in El Paso. The authorized acreage to be irrigated is 90,640 acres in New Mexico and 69,010 in Texas.

That describes the water resources of the region. It seems like there is a lot of water, but there is a lot of uses, also. Thank you. [The prepared statement of Mr. Wood follows:]

PREPARED STATEMENT OF M. KARL WOOD, DIRECTOR, AND DR. BOBBY J. CREEL,
ASSOCIATE DIRECTOR, NEW MEXICO WATER RESOURCES RESEARCH INSTITUTE

INTRODUCTION

The bi-national border region of New Mexico is generally defined as an area which extends from east of El Paso to west of Juarez, Mexico and extending north into New Mexico approximately 100 km (60 miles). It includes portions of Otero and Doña Ana counties. The water resources of this area consist of both surface and groundwater.

The surface water (rivers) in the area include the Rio Grande. Numerous other surface water courses (streams, creeks, arroyos and draws) which range from small perennial streams to ephemeral drainages are typical of the arid southwest. Because most of these smaller surface water courses typically terminate in playa-lake plains or floors of the basins they are only discussed with respect to their contribution to groundwater recharge.

The groundwater resources of the region consist of a number of alluvial and basin-fill aquifers. From east to west these groundwater aquifers (or Basins or Bolsos) include the Tularosa/Hueco, Jornada del Muerto, and Mesilla.

These water resources are described in the following sections first with a physical or structural description followed by a discussion of the water use of each. Before proceeding into these descriptions, some general discussion of the regional physiographic setting, climate, and hydrogeologic concepts are included.

PHYSIOGRAPHIC SETTING

Most of the area lies within the Mexican Highland section of the Basin and Range province. The dominant landforms are gently sloping to nearly level of the extensive intermontane basins. Basin floors merge mountainward with broad slopes (primarily "bajadas" formed by alluvial fans) that flank isolated mountain highlands and other upland areas.

HYDROLOGIC CONCEPTS

Some basins have floors containing ephemeral-lake plains (playas) and no surface outlets. Others contain drainageways which occasionally discharge to lower external areas. Others are "open" basins that have surface runoff to rivers. The Mesilla and Hueco Basins are "open" basins, and surface runoff is drained by the Rio Grande. The Tularosa and Jornada del Muerto are closed basins, having no exterior surface drainage.

CLIMATE

The area is typical of the arid southwest, with mostly clear skies and limited rainfall and humidity. Average annual precipitation of most of the area is less than 10

inches per year. As an example, the average for Las Cruces (at the New Mexico State University station, elevation 3,880 feet) averaged 9.47 inches over the period 1959-1996.

HUECO-TULAROSA AQUIFER

A surface divide near the New Mexico/Texas State line separates the Tularosa Basin (a closed basin) and the Hueco Basin (a through-flowing basin) topographically. The surface divide does not correspond to a structural or groundwater divide, and the two basins are connected by interbasin groundwater flow from New Mexico into Texas. Because of the interconnection, the Tularosa and Hueco Basins are considered as one aquifer; the Hueco-Tularosa aquifer.

Total surface area of the Hueco-Tularosa aquifer is 4,160 square miles. Approximately 67% of its land area is in New Mexico, 22% of its land area is in Texas, and 11% is in Mexico. The aquifer is a primary source of water for the City of El Paso and Ciudad Juarez, and for military installations and smaller cities in New Mexico, Texas, and Mexico.

Well yields in the New Mexico part of the Tularosa-Hueco aquifer vary greatly. Well yields of 1,400 gallons/minute are reported at elevations high on the fans decreasing to 300 to 700 gallons/minute at the lower edges of the fans. Well yields in the mud-rich sediments toward the center of the Tularosa Bolson are usually less than 100 gallons/minute and sometimes less than 15 gallons/minute. In the Hueco Bolson, just east of the Franklin Mountains, yields are as much as 1,800 gallons/minute. Wells underlying Ciudad Juarez yield from 300 to 1,500 gallons/minute.

Depth to groundwater in the Hueco-Tularosa aquifer is variable. Depth to groundwater near the Cities of Tularosa and Alamogordo at the flanks of the Sacramento Mountains is between 20 and 150 feet. Drawdowns in many municipal wells, up to 100 feet, have been recorded in this area. Groundwater is at or near ground surface near White Sands National Monument due to evaporative discharge from a wet gypsum playa. Depth to groundwater near the White Sands Missile Range Headquarters, at interior portions of the basin, is up to 400 feet. Little drawdown has been recorded there. Drawdowns in the Hueco Bolson near the New Mexico/Texas State line has been relatively small, not exceeding 30 feet. Current depth to groundwater beneath the City of El Paso is usually between 250 and 400 feet at distances from the Rio Grande. Present depth to groundwater beneath Ciudad Juarez varies from about 100 to 250 feet, except near the Rio Grande where depths are often less than 70 feet.

In heavily developed parts of the Hueco-Tularosa aquifer, drawdowns since 1940 are up to 150 feet. Pumping cones of depression in municipal wellfields are the focal points of drawdown. Most of the drawdowns near municipal wellfields vary between 50 and 100 feet.

Groundwater north of the New Mexico/Texas State line is usually greater than 1,000 mg/L Total Dissolved Solids (TDS) except in mountains and along mountain fronts, where groundwaters are dilute. Many samples along the interior of the basin at or just south of Alkali Flat have TDS greater than 10,000 mg/L. Near and extending across the state line to the Rio Grande, groundwaters along the Franklin Mountains are characteristically less than 700 mg/L TDS. Away from the recharge areas along the Franklin Mountains, water salinity increases to over 1,000 mg/L in many wells, reaching concentrations over 1,500 mg/L TDS in wells along the center of the basin. The salinity of groundwater underlying the Ciudad Juarez area are generally less than 1,000 mg/L TDS.

Chloride and other dissolved ions have increased over time in many of the municipal wells in El Paso and Ciudad Juarez. Chloride now exceeds 250 mg/L in several of the wells in the area. Mixing due to pumpage, leakage from mud interbeds and artesian confining beds, cascading waters along well casing and screens, lateral salt water encroachment, and potential upcoming have started to degrade the freshwater zone.

Nitrate data collected between 1994 and 1995 indicate nitrate problems in some parts of El Paso County. A cluster of wells in the vicinity of the Old Mesa Well Field in southwestern El Paso County exceed the 10 mg/L drinking water standard. Many of the samples in El Paso County tested between 5 and 10 mg/L. All of the wells in Ciudad Juarez and immediate vicinity are less than 5 mg/L.

In the Ciudad Juarez area, residential water supplies were tested in 1987 for possible contamination of groundwater by sewage. Fecal coliform was used as an indicator parameter. Forty-two samples were obtained; 30 from tap water and 12 from raw groundwater. Ninety-one percent of raw groundwater samples were fecal coliform positive. Sixty percent of tap water samples were fecal coliform positive. The

percentage of positive bacteria detections in these samples suggested that groundwater beneath Ciudad Juarez was contaminated by sewage.

WATER DEVELOPMENT AND WATER USE

Most groundwater discharge from the Hueco Bolson is due to pumping withdrawals for municipal and military water supply. Quantities of groundwater pumped from the Hueco Bolson from municipal and other sources have increased by a factor of almost 6 since 1950. Recent trends indicate that municipal pumpage in Mexico increased about 12.5% between 1990 and 1994. Municipal and military pumpage in the United States decreased 24.0% during the same time interval. Pumping trends reflect the increased dependence on groundwater in Mexico, and partial conversion from groundwater to surface-water use in the United States.

The Hueco Bolson has served for many decades as the principal source of public and self-supplied domestic water for the city of El Paso and Ciudad Juarez as well as communities in Doña Ana and Otero counties of New Mexico. The city of El Paso has actively pursued development of alternative supplies, rigorous conservation programs, and recharge programs to prolong the life of the aquifer. In New Mexico, the community of Chaparral and small acreages of irrigated cropland in the area are principal uses of the Hueco basin water. In the Tularosa subbasin a number of municipal systems, the White Sands Missile Range, as well as self-supplied uses depend on the resource for domestic supplies. Because the quality of the water in the Tularosa subbasin (at least in the central floor area) is extremely saline (exceeding 10,000 mg/L TDS) most systems attempt to capture groundwater near the mountain-front recharge areas.

Water depletions for Otero County, New Mexico for 1995 were 8,448 acre-feet from surface water sources and 27,444 acre-feet from groundwater sources. The surface water depletions were 3,860 acre-feet for public water supply, 3,603 acre-feet for irrigated agriculture, 885 acre-feet for commercial, and 100 acre-feet for livestock. Groundwater depletions were 23,767 acre-feet for irrigated agriculture, 2,639 acre-feet for public water supply, 507 acre-feet for self-supplied domestic, 287 acre-feet for commercial, 216 acre-feet for livestock, and 24 acre-feet for industrial uses.

JORNADA DEL MUERTO BOLSON

The Jornada del Muerto Bolson lies east of the Mesilla Bolson. It is a north-south trending valley. The basin covers approximately 3,344 square miles and is approximately 12 miles across at its widest section. The depth to the water table is between 300 to 575 feet and the thickness of the saturated sediment is between 400 to 500 feet. Recharge occurs primarily from precipitation and infiltration of mountain runoff through major arroyos.

In the southern part of the basin, the estimated volume of water in storage in the aquifer was 100,400,000 acre-feet prior to development, the amount that had been withdrawn (pumped) between 1962 and 1994 was about 39,850 acre-feet, and the amount remaining in storage is 100,360,000 acre-feet. Groundwater in the southern section of the Jornada del Muerto Bolson is classified as fresh and water in the northern section of the bolson is classified as slightly saline.

Water Development and Use

Water use in the basin is limited to public, self-supplied domestic, industrial, commercial, and livestock. Currently no agricultural activity is present, but there have been limited acreages irrigated in the past.

MESILLA BASIN

The Mesilla basin aquifer system consists of floodplain alluvium and the underlying Mesilla Bolson. It is an extensive intermontane aquifer system which extends from southern New Mexico to northern Mexico. It is surrounded by mountains which form the boundaries. The Rio Grande originates in the northern New Mexico and southern Colorado Rocky Mountains, flows through New Mexico, and forms the boundary between Texas and Mexico on its way to the Gulf of Mexico. It is the dominant and limiting surface water resource throughout most of its watershed. The surface water system is comprised of the Rio Grande and its tributaries and a network of canals, laterals and drainage ditches that discharge to the river. The surface drainage of the Mesilla basin covers approximately 1,100 square miles. Historically, Rio Grande flows have been highly variable both between years and between seasons. Average annual flow above Elephant Butte Reservoir was 569,063 acre-feet from 1895 to 1969 with a standard deviation of 398,868 acre-feet. This led to floods and extended periods of no flow. These flows were stabilized by the Rio Grande Project.

The Rio Grande Floodplain, between Leasburg dam and the El Paso narrows, is not a confined aquifer. The water table is approximately 10 to 25 feet below the land surface. Groundwater typically moves southeastward down the valley; however, the direction is influenced by nearby hydraulic structures such as the river, drains, canals, well pumpage and heavily irrigated fields. Recharge to the aquifer occurs primarily as vertical flow from the surface water system (river, canals, laterals, and drains) and irrigated cropland fields. The quality of the water generally reflects the quality of the surface water system, ranging from about 500 mg/L TDS to over 1,000 mg/L TDS. The majority of underground discharge occurs through evapotranspiration of irrigated crops, flow to drain systems, irrigation pumping, industrial pumping, and percolation to the underlying Mesilla Bolson.

The majority of recharge occurs through mountain front recharge and through vertical flow of groundwater from the floodplain surface. The quality of the groundwater varies both with depth and across the basin.

Water Development and Use

The principal source of surface water in the border region is the Rio Grande which flows from its headwaters in Colorado and northern New Mexico. The flows of the Rio Grande are stored in Elephant Butte and Caballo Reservoirs. These storage units were constructed as a part of the Rio Grande Project. The Project was authorized by Congress under the Reclamation Act of 1902 to provide irrigation water farms in Texas and New Mexico by capturing flood-flows and storing them in Elephant Butte Reservoir. Elephant Butte Reservoir, at the time of its construction, had a capacity of over 2.6 million acre-feet, but sediment from up-stream lands has reduced the effective storage to just over 2 million acre-feet in recent years. Caballo Reservoir (about 28 miles down-stream) was built in 1938 to hold waters released from Elephant Butte for power generation and to provide additional flood-storage capacity. The usable capacity of Caballo Reservoir, including 100,000 acre-feet of flood storage, is 331,500 acre-feet. The Project was to include diversion dams and a canal delivery system. The Project also provided supplemental water (Project return-flow) to about 18,000 acres in the Hudspeth County Conservation and Reclamation District No. 1 below El Paso.

At the time of the 1902 Reclamation Act, Texas was not eligible for participation as there were no public lands in Texas to help under-right the reclamation fund. Because farmers in the El Paso, Texas area claimed the right to use the flows of the Rio Grande for irrigation, as did farmers in New Mexico, some accommodation was necessary. A division of the anticipated supply from Elephant Butte, between the two states, was a necessity, if the Project was to go forward. In 1904 an agreement between business people from El Paso and Las Cruces formed the basis for a Congressional act in 1905. The 1905 Reclamation Extension Act was in fact a Congressional adjudication of the rights in each state and should be considered to be an equitable apportionment of the waters of the Lower Rio Grande. The 1905 law extended the benefits of the Reclamation Act of 1902 to include the El Paso area, provided that all irrigated lands in the Project would have the same standing with respect to priority dates and charges; and established the guidelines for the division of the water supply above and below El Paso on the basis that New Mexico would be allowed to irrigate 110,000 acres, and Texas would be allowed to irrigate 70,000 acres.

Another primary objective of the Project was to ensure that the United States could deliver water to Mexico under the provisions of the Treaty of 1906. For many years, Mexico had complained that excessive uses of Rio Grande water were depriving Juarez Valley farmers of their historic supply. In 1906 a treaty was negotiated with Mexico for the delivery of 60,000 acre-feet of water annually at the Acequia Madre ditch that headed below the principal diversion at El Paso. The U.S. has delivered the amount of water to Mexico in most years, but has reduced these deliveries during periods of short-supply. The concept behind this reduction is that all acreage under the Project would receive the same duty of water and the water delivered to Mexico is Project water.

The acreage to be irrigated in Texas and New Mexico under the Project and municipal water-uses were arrived at by means of contracts between the Bureau of Reclamation and each of the irrigation districts and by three party contracts that included the Bureau of Reclamation and both of the districts. The most important of these joint agreements was signed in September 1937 when the districts were allowed to increase their authorized acreage: 90,640 acres in New Mexico and 69,010 in Texas. This increased the authorized Project acreage to 159,650 acres. The 1937 contract is important as it provided for a proportional sharing of shortages (67/155 for the Texas district and 88/155 to the New Mexico district).

Colorado, Texas and New Mexico entered into an interstate compact that divided the supply of the Rio Grande between the three states by providing sliding-scale, delivery-tables. New Mexico's deliveries at Elephant Butte Dam were to "Texas", or in reality to the Project, as it was the "unit" beneficially using all of the surface water below that point. The Compact did not further divide the water supply between New Mexico users (Elephant Butte Irrigation District) and the Texas users (El Paso County Water Improvement District #1). The Compact did recognize the delivery requirement to Mexico. Article VIII of the Rio Grande Compact, defined the "normal release" of "usable water" for the Project from Elephant Butte Reservoir to be 790,000 acre-feet per year. This amount provided for the "full Project" allocation of 730,000 acre-feet per year plus 60,000 acre-feet for delivery to Mexico.

Total water use in 1995 for Doña Ana County was 250,785 acre-feet with 171,286 acre-feet from surface water and 79,500 acre-feet from groundwater. Surface water depletions were primarily used by irrigated agriculture (171,156 acre-feet) with a small amount (41 acre-feet and 89 acre-feet) for livestock and commercial uses, respectively. These depletions do not include all of the Elephant Butte Irrigation District which extends into Sierra County. Groundwater depletions were used by irrigated agriculture (49,150 acre-feet), public water supply (20,716 acre-feet), livestock (3,385 acre-feet), commercial (2,980 acre-feet), power (2,439 acre-feet), and self-supplied domestic uses (769 acre-feet).

The CHAIRMAN. Thank you very much. Professor Peach, will you go ahead with your testimony, and then I will have some questions.

STATEMENT OF JAMES PEACH, PROFESSOR, DEPARTMENT OF ECONOMICS, NEW MEXICO STATE UNIVERSITY

Mr. PEACH. Thank you very much, Senator Bingaman. It is always a pleasure to see you here, and I would like to echo Mr. Woods' welcome to New Mexico State University. As requested by Mr. Connor, my remarks will be brief. That is a hard job for an academic, but I will keep them brief. But I provided copies of some articles, and I have also provided Mr. Connor with 100 copies of some charts I am going to refer to. Can they be given to the audience? They have been?

The CHAIRMAN. Those are out on the table, I am told. Does everyone have a copy of those? If not, maybe we should just take a minute here and get copies. Shelley, you might see if there are some extra copies we can distribute.

This is a table on population projections?

Mr. PEACH. Yes, and also some charts that I am going to refer to. And I anticipated not having an overhead, so I can do it high-tech, low-tech or no-tech.

The CHAIRMAN. Okay.

Mr. PEACH. I will not say New Mexico Tech.

The CHAIRMAN. Please go ahead.

Mr. PEACH. You bet. My comments will be focused mainly on demographic trends in Dona Ana County, El Paso County, and Ciudad Juarez. And for brevity, I will simply prefer to those three areas as the region.

The regional demand for water depends, for the most part, on the size and characteristics of the population, income levels, the industrial structure of the region, and the price of water. The price of water is especially important. A few weeks ago at a conference in El Paso, I purchased a 20-ounce bottle of water for a dollar out of a machine. That is 5 cents an ounce, or \$2.1 million per acre-foot. And at that price, I would be happy to solve the water problems of southern New Mexico. A shortage has meaning only in relation to price.

All of these factors are important determinants of the demand for water, but it is safe to say that very few people would be interested in regional water issues if the regional population were declining instead of growing rapidly. Recent census data indicate that the population of the region is now just slightly over 2 million people, 1.2 million in Ciudad Juarez, right at 700,000 in El Paso, and 180,000 in Dona Ana County.

Consistent with historical trends, the region's population continues to grow rapidly. Chart 1 that you have in front of you has some population growth rates there.* At current growth rates, the region's population is increasing by about 75,000 people a year. In other words, this three-county area, if you like, is adding a city about the size of Las Cruces annually, and that is certainly going to be a big issue in water-related issues.

Detailed population projections based on the 2000 census data have not been completed yet. There are a variety of organizations that do that, including New Mexico State University, the University of New Mexico, the city of El Paso, Ciudad Juarez, but no one has completed the detailed projections yet. But if we take a very simple approach and use the growth rates of the 1990's, the population of the region would increase to about 4.5 million people by the year 2025. Four and a half million people in the area is going to change the way we look at water issues, I think.

Yet there is also a great deal of evidence that uncertainty is the key to looking at population growth in the region. There are several reasons for this uncertainty. First, population projections of a region are inherently more difficult than population projections of larger areas. At the world level, of the three components of demographic change, births, deaths, and migration, at the world level we do not have to worry about net migration. Given current technology, we are not exporting people to Mars yet. So that leaves births and deaths, and yet the best projections of the world population from the United Nations suggest a tremendous range of 7.3 billion to 10.7 billion by the year 2050.

Similar variation in the projections of the United States and Mexico appear in the projections of those two nations. The U.S. population projected from the U.S. Census Bureau, those population projections range from 280 million to almost 500 million by the year 2050. In Mexico, there is a similar broad range from about 135 million to nearly 275 million.

The difference in those projections, both in the United States and Mexico, is migration, migration, and migration. The fertility and mortality assumptions do not make a lot of difference to those projections.

At the regional level, we have inherently even more uncertainty about what the population will be. A range of somewhere between 3 and 6 million by the year 2025 in the three-county region is probably a pretty good guess.

A second reason for uncertainty is the aging of the population. People in this room, of course, are immune to that, but nationally in both Mexico and the United States, the population is aging. An older population will have fewer births and more deaths than a

*The charts have been retained in committee files.

younger population of similar size. So we are going to see a slow-down both nationally and within the region of population growth that is due to natural increase, the excess of births over deaths. That is almost inevitable.

If you look at the charts, I have given you two population pyramids there. The first one is from 1900 of the United States. And in 1900, nearly all populations had this classic pyramid shape. Most people were in the younger age groups. 50 percent were below the age of 20. In 1900, nearly all populations looked like that.

The next chart is one of my favorites and usually gets a little bit of a chuckle. That is Sun City, Arizona, in 1990, and that is sort of an exaggerated look at where we are all headed. Median age in Sun City is 74, and a place like that has very little demographic momentum, the tendency of the population to grow due to its age and sex structure.

Now, the point on the aging of the population, we are getting older in the region as well. In New Mexico we now have a median age of 34.6 years, very, very close to the national median of 35.3 years. Historically, we had a very young population. As we age, our population growth rate in New Mexico is going to slow down. In Dona Ana County, the median age is now 30 years. In El Paso it is 30 years. In Ciudad Juarez, the median age is 23 years. And so we are going to see this decline in natural increase of the population both from reduced crude birth rates and increased crude death rates.

A third source of demographic uncertainty is that regional migration patterns are highly sensitive to economic conditions. Economists always indicate that people move from areas of high unemployment and low income to areas of low unemployment and high income. Economic conditions matter.

But when it comes to projecting the population, we would have to project those economic variables at the regional level. We would have to predict employment growth, unemployment rates, income levels, the growth of income relative to other areas. That is a very difficult job. It is a difficult job even at the national level, and I am sure Mr. Greenspan would confirm that. So we have a great deal of uncertainty added by economic uncertainty in the future as well.

A fourth source of uncertainty regarding the future population of the area has to do with the national policy context. Unlike Mexico, the United States has no national population policy, but we have a lot of policies that do affect the growth of population and will affect the growth of population in the region. Immigration policy, currently being debated in Washington, is an obvious example. But there are many, many others. We have tax deductions for children in the income tax code. We have educational subsidies. Trade policy can even affect population growth in the region. NAFTA has certainly affected the region's population growth. The possibility of a North American common market would change that equation as well.

Transportation and land use policies at the local level and State level. Tax policies may change population growth. The list is a long one. But the key point is that the national, State, and local policy

context add even greater uncertainty to the demographic situation in the region.

I will conclude with some very brief comments. A reasonable range of population for the year 2025 for the region is somewhere between 3 and 6 million people. No one knows what that figure is going to be. Rational water planning in the region requires a recognition that we do not know what that figure will be. We should plan both for the high and the low figure.

Thank you very much. I will be happy to answer questions.

The CHAIRMAN. Thank you very much, both of you. Let me just ask a few questions here.

Karl, in your testimony you sort of gave us some of the facts on the water supply and quality in the various underground aquifers. I have read some of these reports, which I am sure you have read as well, about the rate at which the groundwater is being depleted, particularly in Juarez. And one projection was that Juarez groundwater could be depleted to a point where by the year 2005, they would no longer be able to get the water from the current sources.

What is your projection as to groundwater depletion in Juarez? Is that something that you are able to measure and monitor and make projections on or not?

Mr. WOOD. Well, the people and the authorities in Juarez are doing that. We feel that they are putting down more wells and they are doing a better job in collecting more data each year. 2005-06 is a number that comes up often. It is a scary number. It is not that they will be out of water. Their water would be more difficult to obtain and it will be of a lower quality to where by that time, they would like other sources.

The CHAIRMAN. To what extent is there binational cooperation? I gather there is dispute between our projections about water depletion and Mexico's projections about water depletion here in the same area. To what extent are we cooperating between the two countries in the testing and development of the information that goes into those projections?

Mr. WOOD. We are in the infancy in cooperation, cooperation, but we have several efforts that have been started. The BECC group, with Fernando Macias, is off and running in a project to do this. The Paso Del Norte Water Task Force, which is a group of academics with Mexico, west Texas, and southern New Mexico, also have efforts to look into this. The New Mexico/Texas Water Commission and its Watershed Council are looking into this.

They are efforts that are relatively new, relatively short in funds right now, but with much potential for the future. And I think we are off starting to do that, but we are a bit of a ways away from having a real good handle on what is available and where.

The CHAIRMAN. It would seem to me that a first obvious step in trying to get a better cross-border cooperation in dealing with potential water shortages would be a good sort of monitoring ongoing assessment effort that involved both countries. Am I right in thinking that way?

Mr. WOOD. You are absolutely right.

The CHAIRMAN. And if you do not have that in place, everything else will sort of falter because everyone has a different idea of where they are?

Mr. WOOD. That is right, exactly.

The CHAIRMAN. You say a lot more is needed in that regard?

Mr. WOOD. I feel that is correct.

The CHAIRMAN. Okay. Let me ask you about this map that you have here attached to your testimony. There is a map showing the Mesilla Basin, and I think you indicated in your testimony, as I understood it, that that is the main source of water for Las Cruces and for Dona Ana County. It also goes over into Mexico. To what extent is Mexico using water from the Mesilla Basin?

Mr. WOOD. I do not believe they are using much right now, but the potential is there to use quite a bit.

The CHAIRMAN. Do you know if they have plans to do that?

Mr. WOOD. Yes, they do.

The CHAIRMAN. Do you know anything more specific about their plans?

Mr. WOOD. I am sorry, I do not.

The CHAIRMAN. The water there in the Tularosa Basin, I have always thought that that was, at least up around Alamogordo and Tularosa and that area, the water was so saline, or brackish, that it really was not usable for any kind of municipal or industrial use. Am I wrong about that?

Mr. WOOD. Well, it can be used if it is diluted. And that is why water from the Bonito Lake is brought around the mountain and taken to Alamogordo and it is diluted with the local water. So it is somewhat usable. In its raw form, no, you would not want to drink it. You would chew it rather than drink it. But it can be diluted and used.

The CHAIRMAN. But I understand, from what you are saying, that the same aquifer is much less saline when you get further south?

Mr. WOOD. That is right.

The CHAIRMAN. And El Paso is able to use that water?

Mr. WOOD. Right. And also when you get towards the edges of the bolson, it is more usable.

The CHAIRMAN. One of the charts, Professor Peach, that you have here shows Las Cruces per capita income as a percentage of U.S. per capita income. That is not something you talked about, but you have got a chart here. And I was struck by how this has dropped over the years. I do not know, I cannot tell from this chart, my eyesight is not good enough to tell what years you are covering here. But it looks like you are starting—

Mr. PEACH. I have a larger copy if you would like.

The CHAIRMAN. You are starting up around 75 percent of U.S. per capita income, and then we are ending up at the end of the chart down close to 60 percent.

Mr. PEACH. I skipped that chart. It is a rather dramatic chart. It is a chart that looks similar if we look at almost any of the U.S./Mexico border counties. It is a chart that starts in 1969, which is the first year that the Bureau of Economic Analysis produced income figures at the county level. And it shows a steady deterioration of per capita income in Dona Ana County—El Paso County looks the same, so do the other border counties—since 1969, right up through 1999 relative to the Nation.

It does not mean that per capita income has been declining all those years. It simply means that relative to the national figure, we have been declining. And, you know, NAFTA did not interrupt that trend. Nothing—

Mr. BINGAMAN. Did it contribute to the trend?

Mr. PEACH. I do not think so. It is a trend that started long before NAFTA was implemented. I can remember providing testimony in Washington, D.C. almost 20 years ago in a committee saying that I suspected in 20 years, the trend would still be there. The border counties would have low per capita income relative to the Nation.

In the current context, that has a lot of importance, both in terms of attracting population from other areas, it will change water demand, but also because income level is a prime determinant of water demand.

The CHAIRMAN. You mean the higher a person's income, the more water they use?

Mr. PEACH. You bet.

The CHAIRMAN. So you are saying that if, in fact, we had not declined substantially in our per capita income relative to the rest of the country since 1967, we would be using a lot more water than we are today.

Mr. PEACH. I suspect so.

The CHAIRMAN. So as we make progress in improving the economy, we are going to dig ourselves into a deeper hole as far as water?

Mr. PEACH. We are going to consume more water. Poor people, generally speaking, do not build a lot of golf courses, and other high-use kinds of water things. If we had very high income in the area, we would use more water.

The CHAIRMAN. Do you see anything that is going to reverse or affect this trend of lower per capita income as a percent of U.S. per capita income?

Mr. PEACH. I do not.

The CHAIRMAN. You think it will continue to drop?

Mr. PEACH. Drop or remain about the same over the next decade or so. I have spent a long time studying the U.S./Mexico border economy, and as you know, the border economy is a very complex place. But I do not see anything on the horizon that is going to change those trends, either in Dona Ana County or in El Paso County.

It may level off a little bit simply due to the change of the age distribution of the population. Historically, we have had a very, very young population. Young people do not enter the labor force at the high end of the wage scale. They enter the labor force at the low end of the wage scale. So as we get older, we are going to perhaps improve a little bit. But we need much more than that to reverse this kind of a trend.

The CHAIRMAN. Let me ask you. I do not know if you have gotten down to this level of specificity, Professor Peach. Have you done any research into the trends with the agricultural economy in this part of the State, as to whether or not it has improved, declined, remained the same?

Mr. PEACH. No, I have not. The one minor exception, I do look at industrial structure up and down the border. Pretty generally, agricultural employment in the area, in Dona Ana County, has remained relatively constant. It has been declining somewhat in El Paso County. And I could get those figures for you easily enough because El Paso County, of course, now the urban area is absorbing most of the land area of El Paso.

But I am not an agricultural economist and have not really studied the agricultural sector.

The CHAIRMAN. Let me ask Karl just another question or two about your chart. When you look at this chart showing the various underground aquifers that are available for use by municipalities, industrial customers, agriculture here in this region, the only surface water is the Rio Grande, and you have these particular underground aquifers. Are there others in Mexico that are close enough to be useful to a metropolitan area like Juarez?

Mr. WOOD. Yes, there are other aquifers, specifically one called the Bismark aquifer, which is further away from—it is a ways away from Juarez, and they are exploring those presently as potential sources for the future.

The CHAIRMAN. But they do not currently obtain any of their water out of that aquifer?

Mr. WOOD. I do not believe so.

The CHAIRMAN. Well, this is useful. I appreciate the testimony by both of you. And we will go on to the second panel, then. Thank you very much.

Did Kevin Bixby show up here? He was going to be on the first panel. He has not, so we will go to the second panel. Mayor Smith, Ruben, come right ahead, Gary Esslinger, John Burkstaller and Edd Fifer.

Just so that everyone is clear, once we hear from this panel and ask questions, Tom Turney, who is the State engineer for New Mexico, I wish to go ahead with his testimony, and we'll do that as well this morning.

So let me just start. First let us hear from our good mayor, Mayor Ruben Smith, mayor of the city of Las Cruces, welcome. Thank you for being here.

**STATEMENT OF RUBEN A. SMITH, MAYOR,
CITY OF LAS CRUCES, NM**

Mr. SMITH. Thank you very much for the invitation and we thank you very much for coming to Las Cruces, as usual, and I will be looking forward to listening to you during the lunch today, also.

I wanted to make just a little apology. I was sitting next to Gary Esslinger and it looked like everyone was turning through copies. I said, Gary, were we supposed to have copies? He said, You are supposed to have 15 copies. And we did not get that memo, evidently, so we are preparing it to bring.

The CHAIRMAN. Not a problem.

Mr. SMITH. But my presentation, you do not even need copies, Senator. It is going to be at a level to where I think anybody walking in without any background in water could understand and hopefully appreciate the level that we are at right now.

Overall, I think it is important to note we are talking about the Rio Grande surface water, we are talking about groundwater, and everybody has talked very nicely about the different aquifers that we collectively pump from. I think it is important to understand that about 85 percent of the water that is used is from the river, most of it being for agricultural use. And these are round percentages. About 15 percent of the water used is groundwater.

Now, historically, the city of Las Cruces has always pumped from the ground. We have not used surface water up to this point. And I will get to that at the end of my presentation.

But several years ago, we realized that we, as a municipality, were facing challenges that many other municipalities in the southern part of the State were facing. We were not necessarily in crisis situation, but we realized that we were going to have to be taking some actions to face those challenges or problems.

And to put it in perspective, the city of Las Cruces has, to its credit right now—I am thankful that Tom Turney is here, because I am going to lobby him just a little bit more. Right now, presently, the city of Las Cruces has 22,000 acre-feet of water that we are utilizing, that we are able to utilize. We are pumping and using about 20,000 acre-feet. It does not take a mathematician or a brilliant mayor to tell you that that is only about a 10 percent cushion, and we are living kind of right on the edge.

So I cannot pick on Tom Turney today, because it would go back to 1981 that we made applications for an additional 14,000 acre-feet from one of the basins that was described earlier called the Jornada Basin. That is a basin that there is very little recharge. And this is something that we have changed the direction from our 40-year master plan as a city, where we were solely depending on groundwater. So temporarily, what I am telling you is that we have enough water. With the additional 14,000 acre-feet, that will get us into the future.

And what we have done in addition to that, to couple to that, is that we have taken some conservation steps. First of all, we have developed what they call an inclining block rate that truly just means the more water you use to water your lawns, the more you are going to pay for it, and you pay for it dearly. We have gone to the same system at that time the city of El Paso does, and I think the city of Albuquerque, alternating days. If you live on one side of the street, it is every other day of the week, and the same thing on the opposite side of the street.

We have also, by doing those conservation issues, we have cut down, a reduction by about 10 percent of the water that is being used. And after about 4 years, we are approaching the 1995 amount of water that we were using.

Along with that, the city has taken to replace most of the water meters so that we can reduce the unaccountable water that we have had over the years, and we are doing that every seven years. And this will save an additional 5 to 10 percent, we are computing, on that.

That is what we have done kind of in a reactive mode. In terms of a proactive stance, we have taken three different steps. First, we have lobbied the State engineer. And I spoke to Tom Turney as we came in this morning and he said the application for the 14,000

acre-feet looks very good. The numbers might not be what we would like—and he did not tell me exactly what that meant—but I am optimistic that we can resolve the 14,000 acre-feet.

I was hoping he would give us a gift by September. But for sure, it looks like it will be before the end of the year. And that is something very critical that we have been working on. That is the first thing that we have done.

The second thing that we have done is to establish a relationship, and we did receive the memo from your staff regarding a relationship between the agricultural community and the municipalities. What I can tell you without a doubt is that we have established a communication system, not only communication system, but a working system, with our neighbors to the south. Both municipalities belong to this organization, both universities, both irrigation districts.

And I can tell you that it has not been an easy step to take, because this has never been done in the past. But I can tell you that it has been one of the most positive challenges that I think all of us collectively have taken. And I can tell you it is been something that has been very, very fruitful to us.

One other thing that I would like to say is that we have formed a Lower Rio Grande Water Users Organization that is comprised of essentially everybody, including municipal water organizations, the university, different municipalities, so that we could have one unified voice when it comes to going to Santa Fe to lobby for funds, and that has proved to be very successful.

And I have got to thank Tom Turney, because it is actually through his, not insistence, but his encouragement. He threw out, said something, mayor, you need to speak with one voice as opposed to everybody going individually to lobby Santa Fe. And that has been very, very beneficial to all of us down here.

We have an agreement with EBID that I think Gary Esslinger will probably get more into detail, but it deals with transfers of agricultural use of water for municipal purposes. And the nice thing about this, it is the first of its kind in the State.

The third proactive step that we have taken is dealing with the transfer system to facilitate the water from the agricultural to municipal and industrial purposes. We have also been extremely active in the adjudication process, and this is so that—I think everybody will understand that the negotiation process is going to be a very, very difficult one, and the presence of a city is absolutely critical in the resolution of that.

The only thing, Senator, I would like to end in saying is I started out with telling you that the city of Las Cruces has essentially pumped water since the inception of our founding. What we have done over the years is collectively gone to Washington to lobby, in particular, the EPA. Do not hold me to the year, but about 4 or 5 years ago we went hand-in-hand and we lobbied along with the city of El Paso and irrigation district for, if I recall, it was a little bit over \$2 million so that El Paso could receive funds to build, if I recall, an additional surface water treatment plant.

We did that because we felt very strongly that the city of El Paso was at the position, a far more critical position than what the city of Las Cruces is. But when we did that, we had an agreement and

an understanding that approximately 10 years in the future, the city of Las Cruces will be in line to build our first surface water treatment plant. We feel very strongly about that because the question was asked about the water situation in El Paso and Juarez.

We do not feel we are as critical here, but we can no longer just sit back and hope that there is plenty of water to be pumped up. So what we are doing is doing a very visionary thing, and that is working with our colleagues to the south so that in 10 years, they will be supporting us when we go back for funding for our first water treatment plant.

And that is basically my comments.

[The prepared statement of Mr. Smith follows:]

PREPARED STATEMENT OF RUBEN A. SMITH, MAYOR, CITY OF LAS CRUCES, NM

Five years ago, the City of Las Cruces was in a situation that many municipalities in New Mexico are in at the present time. We are facing some major problems associated with water supply and did not realize the gravity of that situation. Do not misinterpret those statements. We were not in a crisis situation, but could have been had we not taken immediate action. The problems were:

1. We were utilizing 20,000 acre-feet of our 22,000 acre-feet water right, leaving one of the fastest growing cities in the State with only a 10% cushion for water supply.
2. Applications for an additional 14,000 acre-feet per year of water from the Jornada Basin had been sitting in a pile of paper on the State Engineer's desk since 1981.
3. The City's forty-year master plan relied solely on groundwater pumping with the increase coming from a mined basin (the Jornada) that has very little recharge. When Council became aware of these issues, action was taken immediately to remedy the problems.

- a. A conservation plan was developed and adopted. This plan included an inclining block rate for water consumption, lawn watering restrictions, and other conservation measures. This relieved the immediate crisis as water consumption was reduced by 10% almost immediately. After four years, the total consumption is now approaching that of 1995.

- b. Water meter replacement and line repairs have accelerated to reduce unaccounted for water. This will save an additional 5-10% in the future.

Those were reactionary measures to avert a crisis. We then became proactive to solve a problem and address future needs.

Proactive #1

We lobbied the State Engineer, the Governor, and the legislature for action on these pending applications. Those efforts have paid off. We have been promised a decision this fall (after 20 years).

Proactive #2

We evaluated our position on future supply and determined that we should maximize our groundwater right, but plan to utilize surface water to accommodate future growth.

1. We amended and enlarged our groundwater right declarations.
2. Most importantly, we began to develop a positive relationship and later a partnership with the irrigation district. We went to the legislature together, and initiated legislation to increase the lease term and later to form Municipal Water Users Organizations (MWUA) within irrigation districts. We have entered into agreements with the EBID that are the basis of transfers from agricultural use of water to municipal use of the same water, the first of its kind in the State. Only last week, the EBID board of directors approved a new policy for MWUA. This policy was the result of eight months of negotiations between the City and the District. (Steve Hernandez has or will address that policy).
3. We are now in the process of amending our forty-year plan to reflect this move to surface water and to determine when and how it will occur. (The action of the ongoing adjudication will have a large influence on timing).

Proactive #3

Water supply is an ongoing effort as is community growth and development. For those reasons, our efforts will continue. We are working to develop a transfer system that will not inhibit or delay the transfer of water from Agriculture to Municipal and Industrial purposes. This may be done through negotiations, or the courts, but it will be pursued by the City.

We are becoming very active in the adjudication process. As the second largest City in the State of New Mexico, we are responsible to provide water to 80,000 citizens.

The CHAIRMAN. Thank you very much. Appreciate those comments.

John Burkstaller, who is the chief technical officer with the El Paso Water Utilities. Thank you very much for coming.

STATEMENT OF JOHN BURKSTALLER, P.E., CHIEF TECHNICAL OFFICER, EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

Mr. BURKSTALLER. Thank you very much for inviting us. I am not going to be quite as extemporaneous as Mayor Smith was. He did an excellent job. But I want to go through some issues that we think are very important, and I have brought some written testimony with me.

El Paso Water Utilities is the regional planner and provider of water and wastewater services to over 700,000 people in the El Paso County area. Our combined regional population—and I missed Professor Peach's talk—but I am sure—

The CHAIRMAN. Pull that microphone a little closer.

Mr. BURKSTALLER. Our combined regional population, including the city of Juarez, is over 2 million now, and it is expected to grow substantially, as I am sure Professor Peach elaborated on earlier. Along with that, of course, is going to be the demand for additional water and wastewater service.

We face a very serious problem of increased demand for water service while our groundwater aquifers, that are the bulk of our supply, are being rapidly depleted. The aquifers, or bolsons, provide approximately 57 percent of the city's water needs and 100 percent of Juarez's water needs.

Juarez currently draws water from the southern end of the Hueco Bolson, while El Paso draws water from both the Hueco and the Mesilla. Southern Dona Ana County also relies heavily on water from the Mesilla, and Juarez plans to develop wells in the southern end of that aquifer in Mexico, which they call the Conejos Medanos.

The committee is familiar with the challenge that we face in extending the life of these aquifers by identifying and developing new replacement sources of supplies. We also need to conserve and make the best use of these resources, and we need to partner with other entities within the region to identify bistate and binational solutions.

The challenges are formidable given the complex political, jurisdictional, environmental, legal and technical issues. Sufficient water is available to sustain this expected population growth, but the costs of ensuring an adequate water supply are going to be high. Given the low per capita income of the region, we will need major Federal support to implement these solutions.

El Paso Water Utilities is actively engaged in a number of initiatives, including construction of a 20-million-gallon-per-day desalination plant. If we are able to team with Fort Bliss, it may start out at 29 MGD, which would be the largest inland facility in the nation.

We are also involved in expansion of the reclaimed water programs and joint water resource planning with Juarez and with southern New Mexico, southern Dona Ana County, supported by the Border Environment Cooperation Commission. We are also looking at the possible importation of ground and surface water from outlying areas.

Virtually all these initiatives require substantial investments in infrastructure. We estimate that El Paso Water Utilities, even with our new per capita consumption goal of 140 gallons per capita per day, which is probably the lowest in the United States, perhaps Tucson is quite close, but we are one of the lowest per capita consumption rates in the country.

Even with this conservation goal, we'll still have to spend approximately \$900 million over the next 10 years to address all of our water supply issues, as well as deal with water quality issues such as the new upcoming arsenic drinking water limit. Although we are proceeding rapidly—

The CHAIRMAN. What's the arsenic level in your drinking water?

Mr. BURKSTALLER. On the Hueco side, it runs slightly less than 10. On the Mesilla side, it averages 16, but some of the wells are up in the 20s. We have got a cost estimate right now of about \$90 million to comply with 10, maybe somewhat reduced by the new technologies.

Although we are proceeding rapidly ahead with desalination and reuse projects, the ultimate source of sustainable water for the region is obviously the Rio Grande. All other available supplies are both very expensive and exhaustible. These alternative supplies should be kept in reserve for drought and peak demands. Sensible regional water planning requires that the Rio Grande water be made available to meet municipal demands.

El Paso engaged in many years of litigation with entities in southern New Mexico over the right to export groundwater. In principle, we won. New Mexico cannot prohibit exportation. However, along with that decision, New Mexico has the right to impose conditions on export that led to continuing legal battles, or at least potential legal battles, and the parties involved ultimately agreed to a settlement. The settlement was based on optimizing the use of the Rio Grande Project surface water and developing mechanisms for transferring water rights, or rights to use water, to provide additional municipal supply.

As a result of this settlement, New Mexico State University, UTEP, the cities of El Paso and Las Cruces, Dona Ana County also was involved, both irrigation districts, the bureau, the International Boundary and Water Commission, and others were involved in probably 10 years and many million dollars' worth of water resources planning, which culminated with the recommendation of the El Paso-Las Cruces Regional Sustainable Water Project. The sustainable project developed a comprehensive plan for maximizing use of surface water during times of abundance, treating

and delivering it for current municipal needs, and banking the excess for times of shortage.

An approved environmental impact statement authorizes us to proceed with the project, but we cannot do that. Successful implementation of the project depends on the availability of Rio Grande water, and additional Rio Grande water is currently not available in the city of El Paso.

The problem is not insufficiency of supply. Records of the bureau show that in recent years, the Rio Grande water supply has exceeded the needs of the agricultural users, and water has gone unused while municipalities are forced to depend on shrinking groundwater sources. Since 1995, an average of almost 73,000 acre-feet has been left in the reservoir each year unused by the New Mexico or Texas districts after all irrigation demands have been met. Annually, the amount has ranged from 36,000 to over 100,000 acre-feet.

These surpluses, which occur in non-drought years, are partially available for reallocation in subsequent years. They are not totally lost for the system. But we believe that they are part of the potential solution for municipal use. With them, we can preserve the bolsons for future drought periods, which will surely occur.

There is more than enough water to supply the sustainable water project in full-allotment years without taking any water away from agricultural uses. But making it available requires the cooperation of two irrigation districts and the Bureau of Reclamation. Unfortunately, this cooperation has been lacking.

Instead, we see precisely the opposite pattern. The bureau has refused to honor water rights contracts between El Paso Water Utilities and El Paso County Improvement District Number 1, contracts that would have allowed El Paso to significantly reduce its dependence on the bolsons. Reclamation has also refused to approve water rights contracts between the district and our wholesale customer, the Lower Valley Water District.

In similar fashion, reclamation and EP-1 have chosen to pursue very strict interpretations of our existing water rights contracts. This resulted in El Paso losing over 13,000 acre-feet of water rights that the EP-1 had historically honored and credited for our use. We bought some of that back at a much higher rate, but did not recover all of it.

Although New Mexico statutes no longer prohibit the export of water, they continue to prevent us—let me—interstate cooperation is really no better. That is the point. Although the statutes no longer prohibit the export of water, they continue to present a severe obstacle to the sale of New Mexico water to El Paso, even water in excess of New Mexico's existing demand.

If our goal is to use available water resources for the maximum benefit of the citizens of the region, our current legal and political structure fails to achieve this goal. Available water from the Rio Grande is going unused while municipalities continue to deplete limited groundwater sources and contemplate development of costly alternative supplies. Farmers who might welcome the opportunity to periodically sell their irrigation water to the municipalities are prohibited from doing so by the Bureau of Reclamation and the districts.

We believe that good solutions exist and are achievable through regional cooperation. We believe that Rio Grande water can be made available through conservation and through establishing a voluntary water market that would allow irrigators to sell water to municipalities. This can be accomplished without disruption of the agricultural economy. Normal municipal development retires agricultural land make additional water available.

Conservation through lining of canals has already made thousands of acre-feet of conserved water available. Additional canal lining and other agricultural conservation practices can make more water available. A practical forbearance or water marketing program workable for both the city of El Paso as a dependable source of water and El Paso Water Improvement District Number 1, farmers, as a source of revenue should be implemented.

Political and institutional constraints, whether within the irrigation districts, across State lines or imposed by the Federal bureaucracy, should not be allowed to limit development of a market which puts water to the highest value beneficial use. The United States, both through its laws and agencies, should facilitate making Rio Grande water available.

The municipalities, the farmers, the irrigation districts, the Bureau of Reclamation, and most importantly the citizens of the region will all benefit from a system which allows the water to be marketed to its highest use. We solicit the committee's support in making this a reality. We are confident that the region's water and wastewater issues can be addressed to ensure both thriving municipal and agricultural communities.

That's it, and I expect it to generate quite a few questions.

[The prepared statement of Mr. Burkstaller follows:]

PREPARED STATEMENT OF JOHN BURKSTALLER, P.E., CHIEF TECHNICAL OFFICER,
EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

My name is John Burkstaller, and I am the Chief Technical Officer for the El Paso Water Utilities—Public Service Board. El Paso Water Utilities is the regional planner and provider of water and wastewater services to over 700,000 people in the greater metropolitan area of El Paso. Our combined regional population, including the City of Juarez, is over two million. The population within the region continues to grow and is expected to double in the next 20 years, as is the demand for water and wastewater service.

Our region faces a very real and very serious problem. Concurrent with the expected increase in population and increased demands for water service, our local groundwater aquifers are being rapidly depleted. The aquifers or bolsons provide approximately 57% of our City's water needs and 100% of the water needs for the City of Juarez, Chihuahua, Mexico. Juarez currently draws water from the southern end of the Hueco Bolson, while El Paso draws groundwater from both the Hueco and Mesilla Bolsons. Southern Dona Ana County also relies heavily on water from the Mesilla Bolson, and Juarez plans to develop wells in the southern end of this aquifer, which they call the Conejos Médanos, in the near future.

The Committee is familiar with the challenge we face of extending the life of these aquifers by identifying and developing new sources of supply, conserving and making the best use of our existing resources, and partnering with other entities within the region to identify bi-state and bi-national solutions to the region's water problems. The challenges are formidable given the complex political, jurisdictional, environmental, legal, and technical constraints in each area. Sufficient water is available to sustain the expected population growth, but the costs of ensuring an adequate water supply are going to be high. Given the low per capita income of the Region, we will need major federal support to implement these solutions.

El Paso Water Utilities is actively engaged in a number of initiatives including construction of a 20 million gallon per day desalination plant, continuing improvement of our conservation efforts, the planned expansion of reclaimed water pro-

grams, joint water resource planning with Juarez supported by the Border Environment Cooperation Commission (BECC), and the possible importation of ground and surface water from outlying areas. Virtually all of these initiatives require substantial investments in infrastructure. We estimate that El Paso Water Utilities, even with our new per capita consumption goal of 140 gallons per day, perhaps the lowest in the Southwestern United States, will have to expend approximately \$900 million dollars over the next ten years to address all of our water supply issues as well as deal with increased water quality regulation, such as implementation of the new arsenic drinking water limit.

Although we are proceeding rapidly ahead with desalination and reuse projects, the ultimate source of sustainable water for the region is the Rio Grande. All other available supplies are both very expensive and exhaustible. These alternative supplies should be kept in reserve for drought and peak demands. Sensible regional water planning requires that Rio Grande water be available to meet municipal demands.

El Paso engaged in many years of litigation with entities in Southern New Mexico over the right to acquire and export groundwater. In principal we won—New Mexico cannot prohibit the exportation of groundwater. However, New Mexico's right to impose conditions on the export lead to continuing legal battles, and the parties ultimately agreed to a settlement. This settlement was based on optimizing the use of Rio Grande Project surface water and developing mechanisms for transferring rights to use water to provide additional municipal supply. As a result of the settlement, New Mexico State University, the University of Texas at El Paso, the cities of El Paso and Las Cruces, both irrigation districts, the Bureau of Reclamation and the International Boundary and Water Commission and others were all involved in ten years and many millions of dollars worth of water resources planning which culminated with recommendation of the El Paso-Las Cruces Regional Sustainable Water Project. The Sustainable Water Project developed a comprehensive plan for maximizing use of surface water during times of abundance treating and delivering it for current municipal needs and banking the excess for times of shortage. An approved Environmental Impact Statement authorizes us to proceed with the project, but we cannot. Successful implementation of the project depends on the availability of Rio Grande water—and that water is not currently available to the City of El Paso.

The problem is not insufficiency of supply. Records of the Bureau of Reclamation show that in recent years the Rio Grande's water supply has exceeded the needs of agriculture and water has gone unused while municipalities are forced to depend on shrinking groundwater resources. Since 1995, an average of almost 73,000 acre-feet of water have been left in Elephant Butte Reservoir each year, unused by the New Mexico or Texas irrigation districts after all irrigation demands have been met. Annually the amount has ranged from 36,000 acre-feet to over 100,000 acre-feet. These surpluses, which occur in non-drought years, and are partially available for reallocation for use in subsequent years, should be available for municipal use. With them we can preserve the bolsons for future drought periods which will surely occur. There is more than enough water to supply the Sustainable Water Project in full allotment years without taking any water away from agricultural uses, but making it available requires the cooperation of two irrigation districts and the Bureau of Reclamation. Unfortunately, such cooperation has been lacking.

Instead, we see precisely the opposite pattern. The Bureau of Reclamation has refused to honor water rights contracts between El Paso Water Utilities and El Paso County Water Improvement District #1 (EP #1), contracts that would have allowed El Paso to significantly reduce its dependence on the bolsons. Reclamation has also refused to approve water rights contracts between the District and our wholesale customer, the Lower Valley Water District. In a similar fashion, Reclamation and EP#1 have chosen to pursue very strict interpretations of existing water rights contracts. This resulted in El Paso losing over 13,000 acre-feet of water rights that the EP #1 had historically honored and credited to either El Paso Water Utilities or the Lower Valley Water District. Interstate cooperation is no better. Although New Mexico statutes no longer prohibit the export of water, they continue to present a severe obstacle to the sale of New Mexico water to El Paso, even water that is in excess of New Mexico's existing demand.

If our goal is to use available water resources for the maximum benefit of the citizens of the region, our current legal and political structure fails to achieve this goal. Available water from the Rio Grande is going unused while municipalities continue to deplete limited groundwater resources and contemplate development of costly alternative supplies. Farmers who might welcome the opportunity to periodically sell their irrigation water to municipalities are prohibited from doing so by the Bureau of Reclamation and the irrigation districts.

We believe that good solutions exist and are achievable through regional cooperation. We believe that Rio Grande water can be made available through conservation and establishing a voluntary water market that would allow irrigators to sell water to municipalities. This can be accomplished without disruption of the agricultural economy. Normal municipal development retires agricultural land, making additional water available. Conservation through lining of canals has already made thousands of acre-feet of "conserved water" available. Additional canal lining and other agricultural conservation practices can make more water available. A practical "forbearance" or water marketing program, workable for both the City of El Paso as a dependable source of water and for the EP #1 farmers as a source of revenue, should be implemented. Political and institutional constraints—whether within the irrigation districts, across the state lines, or imposed by the federal bureaucracy—should not be allowed to inhibit development of a market which puts the water to its highest value beneficial use. The United States, both through its laws and its agencies, should facilitate making Rio Grande water available for municipal use. The municipalities, the farmers, the irrigation districts, the Bureau of Reclamation, and most importantly the citizens of the Region, will all benefit from a system which allows the water to be marketed to its highest use. We solicit the Committee's support in making this a reality. We are confident that the region's water and wastewater issues can be addressed to ensure both thriving municipal and agricultural communities.

The CHAIRMAN. Thank you very much. I appreciate the testimony, and I will have some questions. Let me move to our two other witnesses. First, Gary Esslinger here, who is representing the Elephant Butte Irrigation District.

**STATEMENT OF GARY ESSLINGER, TREASURER/MANAGER,
ELEPHANT BUTTE IRRIGATION DISTRICT**

Mr. ESSLINGER. Good morning, Senator. It is a pleasure to be here, and I am here representing the Elephant Butte Irrigation District as their treasurer/manager. Our district manages the New Mexico portion of the Rio Grande Project, a supply of water to some of the most productive farmland in the Nation. And certainly, I hope you get down to Chope's to try some of the local chile this year. It is pretty good.

In order to understand the water supply problems of the area, I think it is important to understand also the source of this renewable water supply that serves southern New Mexico. The Rio Grande Project was one of the first reclamation projects formed in 1905 under the Reclamation Act, and that project provided water for lands in west Texas and also in southern New Mexico. The El Paso Water Improvement District Number 1 manages that water for Texas and EBID, or Elephant Butte Irrigation District, manages it for New Mexico. The project also stores water for delivery to Mexico under the 1906 water treaty.

One important, unique aspect of our project, which I find difficult for some people to realize is that we are paid out. We do not owe the government anything, and we paid our construction debt. We are a single-purpose project and we were authorized for agricultural use only.

However, during the last 10 years, we have been thrown in a mix with multipurpose projects, it seems, and there is confusion as to whether or not contracts, which understandably, when you owe someone something, they can draw you to the table and make you sign contracts. However, we believe the opposite in some of the contract arrangements that are being made today with the United States and some of the irrigation districts in the west. We believe

because we are paid out, that those contracts do not necessarily apply. And I will touch briefly on that later on.

The other interesting thing is that we paid out in 1972 our obligation to the United States on the construction costs of Elephant Butte, and in 1978, we actually took over operation and maintenance of our system. Right then we realized that, you know, in order to take over, then we needed to actually own and be responsible for the facilities as well. So during the other Bush administration, we were able to get legislation passed, which, Senator, you helped us do so, which enabled us to get our facilities transferred as far as our drainage and canal system. And since that time, we have operated it and now we own those facilities.

Our project in New Mexico, the district in New Mexico under the Rio Grande Project manages over—at approximately 90,640 acres of water-righted land. And that portion of land is approximately 57 percent of the use of project supply, with 43 percent of that project water supply then being used by the El Paso area district. Our average annual releases from upstream project reservoirs are approximately 790,000 acre-feet, and that includes the 60,000 acre-feet that we deliver to Mexico.

What I would like to just talk to you briefly about today is how the New Mexico share of project supply will be used in the future to address future demands in southern New Mexico. I think probably the foremost, which has already been talked about earlier, is the New Mexico/Texas commission. I believe that is the instrument that has really brought everyone together to at least begin discussing regional water planning.

Unfortunately, there is a State line that crosses in that planning, and certainly State law in New Mexico and State law in Texas certainly cause a hurdle. However, I believe, though, that the attitude of the commission and certainly the progress of the commission has pointed towards looking at surface water as an alternative.

It became obvious to us in southern New Mexico that we could not rely totally on an unknown quantity of groundwater as our supply for the future. But we needed to look at a renewable water supply, and that, of course, is the Rio Grande. That put quite a bit of pressure on our district to begin, then, thinking of the possible solutions that we could provide to cities such as Las Cruces or other communities within the valley floor that would benefit from a surface water supply.

One of the uses that the municipal and industrial purpose is, is that they pull total, at this point, pull totally from the groundwater supply, whereas in agriculture, we try to use the renewable supply, which is the surface water, and then go to our savings account, which is our groundwater supply, in times of emergency or drought. Drought hasn't been spoken of, as far as I know, this morning, and it is certainly something that is here on the horizon. And we have been blessed with about 23 years of good, full water supply. But I believe this may be the winter that tells it all if a drought is inevitable.

However, the irrigation district feels that because we have a renewable supply that we can count on, we feel that there is an opportunity to work with the city of Las Cruces and other communities to provide surface water in the future. One of the obstacles,

which is a necessary obstacle, is the stream adjudication process, which we are working with the State engineer in trying to work through that difficult negotiation that everybody feels is compelled to address. And through that, it is very emotional because we are talking water and we are talking water rights, and water that has been used by farmers for years. And the fear that they may lose that is a constant reminder that certainly the process has its difficulties.

And so we understand, though, it has to be done, and in order for us to even think about transferring water or leasing water or selling water to a city, we have to know how much water we own. And that is an important factor that has not been established yet. And that has to be done in order for our district to go forward with any kind of a lease program or long-term program to supply a city with water. We need to know how much water we own.

The State of New Mexico has done a great job of developing a State regional water planning effort, and as the mayor mentioned earlier, we are part of this Lower Rio Grande Water Users organization that actually assists and participates in regional planning. And we have efforts underway right now to develop our regional plan for southern New Mexico, which includes utilizing surface water as a resource in the future, with projects and contracts out right now to select sites in southern New Mexico for potential surface water treatment plants.

The group consists of almost all the players in southern New Mexico, which I think is very important. I believe Sunland Park may be the only entity that was a part of the commission, or the Lower Rio Grande Water Users group, but elected to stay out of the group. And at the same time, though, Dona Ana County is a great player in this group.

I think one of the most important things that we have done to spell out exactly what we believe we could do to work as a partner with communities in southern New Mexico is what we have done with the city of Las Cruces. We have gone hand-in-hand to the New Mexico State legislature to get pieces of a puzzle, if you can imagine, that have to be put together in order to fit a regional surface water alternative.

And what we did was we developed some legislation that enabled our statutes, under which our irrigation district is governed, to be able to then form municipal water users associations, which, in turn, can then come and solicit from the district a supply of water in the future. And the city of Las Cruces is the first that has approached us and worked with us to get this transaction in place.

And so just 2 weeks ago at our board meeting, the board of the irrigation district passed an internal policy that will be what I believe is the genesis of the process in which we will be able to transfer water, surface water, to municipal water users associations in the future.

The one thing that I guess we have difficulty with is even though that we have paid out our allocated construction costs, the Bureau of Reclamation is attempting to claim that the Federal Government must also give its approval for transfers of water for municipal and industrial purposes under the 1920 Act. And EBID has filed a suit

in New Mexico Federal district court to determine whether or not such approval under that act is necessary.

We maintain that the appropriate provisions of State water law apply and no approval is needed by the Bureau of Reclamation. And more importantly, we believe that the cities and other major water users should not have to pay some tribute to the United States in order to get this water.

Local entities in southern New Mexico are addressing how the Rio Grande Project water managed by our district can be used to fuel future municipal and industrial growth, and we believe that the grass roots planning among these local entities is the way to address the local needs. Intervention by the Bureau of Reclamation only serves to delay the transition and add to the final cost to the consumer.

We hope that you and your committee will question the necessity of the Bureau of Reclamation inserting itself in a matter of State water law.

With that, thank you very much.

The CHAIRMAN. Okay. Thank you very much. Our final witness on this panel, Edd Fifer, is with the El Paso County Water Improvement District Number 1. Thank you very much for being here.

**STATEMENT OF EDD FIFER, GENERAL MANAGER, EL PASO
COUNTY WATER IMPROVEMENT DISTRICT #1**

Mr. FIFER. Senator, thank you very much for allowing us to be here with you today. And of course, this is a very entertaining subject as we go through this ordeal. I have been the manager of the El Paso district for 23 years and very proud of that time. Every day is a new learning experience.

Something that is real interesting about our area and our region, I think we can teach a lot of the world about things that we are all doing. You know, we are doing different things, and we try to work together. I can honestly say Gary Esslinger is my very good friend on a personal basis. John Burkstaller was, before today, a very close friend. I think he shot me in the back now, so we are going to have to go back to work on that relationship again.

Water is difficult, and the things that we do with water is extremely difficult. There are an awful lot of things that is going on. You know, you take our irrigation district, Senator. We have over 35,000 accounts. You do not see too many irrigation districts in this world that have 35,000 accounts. The reason for that is that we have a city that sits in the center of our irrigation district. We do not sit around the city. The city sits in the middle of our irrigation district.

And as it expands, yes, there are 100-acre parcels that go out and become subdivision, 23-hundredths of an acre subdivision parcels. And in the State of Texas, water rights are permanent easements and transfer with the title to the land. So, in turn, those lands retain those water rights. And so when they break down, at one time I have an account of 100 acres. The next day I have 400-plus because it was subdivided. And so that is where all the 35,000 come from. Kind of an interesting aspect about it, though, is out

of the 35,000 accounts, 31,500 of them are less than two acres in size.

But let us look at the land side of it. It only represents 19 percent of the 69,010 acres that we have. When I came to the district 23 years ago, in 1978 or way back there before Diane was ever born, I can assure you that there were—it represented 14 percent. And so you know, in listening to Mr. Peach a while ago, I am kind of shaking my head trying to figure out these numbers. Because if it took 23 years for 5 percent more of the land to become urbanized, how much longer will agriculture be there? According to those numbers, it is going to be there for a long time to come.

It is very interesting. I do not come from a background in engineering or a background in agriculture. I come from an educational background, and I can assure you that the 23 years that I have spent with the district have been very interesting and very educational. And I think we have done a good job. I think we have worked very hard.

I can go back to 1982 and remember as a rookie turning over a plan to the board, we called it a year 2000 plan, and what we were trying to do back in 1982 was to try to figure out what in the world was going to happen to the El Paso County Water Improvement District Number 1 by the year 2000. And of course, the main thing there was the population. You know, what's the population going to do?

Well, here we are, it is 2001. I go back and I take a look at that little plan and you know, the darn thing worked pretty good. It was not great, but it worked pretty good. And so one of the things that we realized back in 1982 was the fact that the population was growing, and that the city did sit in the center of the irrigation district, and what we were going to try to do?

We fumbled around and stammered around and kind of fell down a few times and got up a few times. As a matter of fact, in 1985 we tried to enlarge our district to take in Hudspeth County, which is a small irrigation district, 18,000 acres, small irrigation district south of us, realizing that, yes, there was going to be the need for water for municipal purposes, but it was going to be several decades to come.

Well, we got mashed pretty good in that election. Those elections are pretty difficult. We got beat 6 to 1. And what happened was the city of El Paso stood up and said, no, you are not going to send our irrigation water, or our future drinking water, to Hudspeth County for drinking—or for irrigation. And so, I mean, that was kind of the—the light kind of came on at that point in time, we said, well, you know, they have a point.

And from that point forward, I think that we started doing a lot of things realizing that we had to start developing some kind of a plan of action to involve the municipal use of water. You look back in history, 100 years ago there were a handful of people that went to the Federal Government and said we need to capture some water so we can farm these fertile grounds in southern New Mexico and west Texas. And that handful of people asked—I am sure they asked city of El Paso—I have not talked to any of them lately—but I am sure they asked the city of El Paso to be part of that. And

I am sure city of El Paso felt that they had enough groundwater to where they did not have to be a part of that.

These people agreed to have their lands taxed. I mean, that is a big step. But that is looking into the future and what your future is all about. As we progressed and moved along and became a part of the Rio Grande Project, there were numerous contracts. And every one of those contracts, if you take and sit down and look at every one of those contracts, it is for the betterment as we go along.

In 1941, there was a contract between the city of El Paso, El Paso County Water Improvement District, and the Bureau of Reclamation that allowed for the city of El Paso to purchase 2000 acres of water right land and to utilize that water for municipal purposes, knowing that the water was tied to the land and keeping some semblance of control over the water making sure that it was tied to the land. And so the allotment to that land would go to the city of El Paso for municipal purposes.

The city of El Paso built a water treatment plant in, I think, 1951, 1953 somewhere in there, and did utilize that water.

Again in 1962, there was another contract that allowed for the City of El Paso to lease the rights to water off of water right lands. So if someone like Edd Fifer, I have three acres in the lower valley, and I cannot receive irrigation water, because it would involve a bunch of legal action for me to make people open the ditch to get the water to me. In turn, what I do is I lease my rights to water to the Public Service Board. So Edd Fifer, as an individual, provides 4 million acre-feet of water a year to the Public Service Board. They, in turn, pay my taxes.

And so that was a way of working into that municipal thing. But if you will stop and think about that, that continues to be tied to the water right acre. I have the three acres. Everything is tied to that water right acre. So whatever that water right acre receives in an allotment is what the Public Service Board receives.

It has only been until recently that the city of El Paso and the Lower Valley Water District, two municipal users in our area, have decided that they need water in bulk, or in larger quantities, that they do not want to go to these individual landowners. The vehicle is still there. If they want to do it, they can still do it. But those small landowners, it takes some time to go there and sit down with them and convince them that they need to turn their water over to the city. So they wanted their water in bulk.

When we went back and took a look at how that was going to occur, we sat down and negotiated some contracts, and with the Bureau of Reclamation, we negotiated the first conversion contract. And of course, this is what Gary says. Gary's attitude towards this—or excuse me, Elephant Butte Irrigation District's attitude toward this and El Paso's are different. I mean, we are just as different as can be.

And we felt like we wanted to convert irrigation water to municipal, recreational, environmental, whatever other beneficial uses there were. So we negotiated the first of its kind conversion contract. And these are some of the things we have been doing in the background and trying to get accomplished, so that whenever it did come time for us to provide a bulk water supply, then perhaps we could do that.

That contract was completed in March 1996. After the conversion contract—the conversion contract was between the Federal Government, the Bureau of Reclamation, and the irrigation district, and it simply stated that you can convert irrigation water to municipal uses. After that, you have to go to your third-party contractors and do a third-party generic contract. And in that, we have those two contracts completed, one with the Public Service Board and one with the Lower Valley Water District. Those are both completed. They are the only ones of their kind in the Western United States.

And then following that you do the nuts-and-bolts thing, which is the third-party implementing contract, the nuts and bolts being the price and the term and all of these situations. And we now have that completed with the Public Service Board, and we are working on an implementing contract with the Lower Valley Water District right now. I think it will be finished hopefully by the end of the year.

So we have taken that route and we have gone that route as a way of providing water for municipal use. We have not sat on our hands. We have not gone out and hidden. We are not being negative. I think we are trying to get something done here. But there are so many rules and regulations, there are so many contracts, and there are so many ways that we have to do things, we are trying to work within the system and trying to get that accomplished.

We have taken some blasting by the Public Service Board in the newspapers, but that is not the place you negotiate is in the news media. You get down and you work hard and you negotiate contracts and you get the thing accomplished. Yes, we would like to start all over again.

I sometimes wish that we were in the shoes of Elephant Butte Irrigation District and the city of Las Cruces because they are kind of starting from the beginning here. It is kind of neat to see how it is all working out for them. If they have picked up anything from us whatsoever, I think that is terrific. If they have not, then I am sorry that they have not. But when you really get down to it, I think we have all worked very, very hard to get where we are at today.

The city of El Paso receives 48,000 under these 1941 and 1962 contracts, 48,000 acre-feet of water, and this newest contract, this implementing contract, approximately 28,000 acre-feet of water. So you can kind of see we are moving along.

What do we do from here on out? The El Paso County Water Improvement District really does not have any water. The only water that—every bit of the water that we get on allotment goes to our landowners. Our landowners are the beneficial owners of that water. The district does not have any water. The only time the district might have any water is when our landowners all are assured this they are going to receive their annual allotment.

Now, can we create new water sources above that? Yes, I think we can, and I think John hit it on the head a while ago when he talked in terms of concrete lining. That is something that we all need to do, we all need to take a look at. That conserves water in our region. I do not know about Elephant Butte Irrigation District. I only now know about El Paso County Water Improvement District.

If we were to go in and concrete line canals, yes, we can conserve water. The issue of who pays for those concrete canals comes up. We have very close to 600 linear miles of system within the County of El Paso. If you go in and you start concrete lining canals, your cost is going to be in the neighborhood of a million dollars a mile. How much water does that conserve? What you have to do is you have to turn around and say, okay, if it conserves X amount of water, divide the million by X amount of water, and whatever the number comes up is the price that has got to be paid.

That is what we have done recently on a contract that we have had with the Public Service Board. And it is very difficult for me to go to my constituency and say, you are going to pay for these concrete-lined canals and we are going to give the water to El Paso, because you know what the answer is there. The answer in Washington or New Mexico or Texas, it is all the same, go to hell. We are not going to do that. And so that is basically where it all comes from.

Now, terms and how long these contracts are, it is all, like I say, it is very interesting to negotiate these things. And we all have our story to tell. There is no doubt about that. I think the important thing, Senator, is that when you look at the people sitting in this room, the people sitting at this table, we all enjoy one another. We all will work together. We are not always going to hug and kiss, but I can assure you that we are going to work together. And I think we have done that in a big way and I think we are going to continue to do that in a big way.

The district that I work for wants to work with everybody else, but we just do not want to give the ship completely away. Thank you very much.

[The prepared statement of Mr. Fifer follows:]

PREPARED STATEMENT OF EDD FIFER, GENERAL MANAGER, EL PASO COUNTY WATER
IMPROVEMENT DISTRICT #1

INTRODUCTION

Hello. My name is Edd Fifer. I am proud to be the General Manager of the El Paso County Water Improvement District #1 and have been for the past 23 years. The El Paso County Water Improvement District #1 is unique in that it has 34,946 accounts representing 69,010 water right acres. In excess of 31,500 accounts are less than 2.00 acres in size but the total land represented by those 31,500 accounts is approximately 12,718 acres or 19% of the total 69,010 water right acres located inside the boundaries of the El Paso County Water Improvement District #1. The El Paso County Water Improvement District #1 has exercised strong conservation efforts over the 20 years of its operation and maintenance responsibilities by maintaining a 65 to 74% efficiency rate over the last 15 years. This is accomplished by metering of all farm tract irrigations (2.0 acres and above) every time the lands are irrigated, implementing of an annual water budget, and a support by the Board of Directors to conserve precious water supplies by stringent water operational policies practiced on a daily basis.

The El Paso County Water Improvement District #1 (EPCWID #1) is a political subdivision of the State of Texas established in 1917 under the Texas Constitution. EPCWID #1 is one of the three water users in the Rio Grande Federal Reclamation Project and receives its annual surface water allotment via the Rio Grande from Elephant Butte and Caballo Reservoirs as well as return flow entering the Rio Grande below Caballo Reservoir. Approximately 41% of EPCWID #1's annual allotment is return flow from New Mexico agriculture drains as well as discharges of sewage effluent from facilities along the Rio Grande north of the greater El Paso area.

The EPCWID #1 took over operations and maintenance of the irrigation drainage system in El Paso County from the Bureau of Reclamation in 1981 by Contract #0-

07-54-X0904. In 1996, after a long legislative effort and 21 years after the EPCWID #1 repaid the Bureau of Reclamation for construction of the irrigation distribution and drainage system, the Bureau conveyed to EPCWID #1 by special warranty deed the irrigation facilities in El Paso County.

The present and the future need for water was and is dependent on population growth and weather. The total dependence on surface water supplies could be a very dangerous municipal water path to take based on the historical water supply patterns in the Rio Grande Project over the existence of the Project. In 1982, EPCWID #1 prepared a Year 2000 Plan realizing that the municipal needs for water were growing due to the only factor which was certain to occur by the Year 2000: increased populations in the greater El Paso area. The same holds true for southern New Mexico and northern Mexico. With the increase in population, municipal water had to become more and more important. That is why we are here today.

ADDRESSING FUTURE WATER NEEDS

In the very early 1900's, the City of El Paso had the opportunity to become a water user in the Rio Grande Federal Reclamation Project. The City of El Paso chose not to subject their lands to water right taxation, believing they had sufficient groundwater supplies.

A handful of landowners in both southern New Mexico and far west Texas agreed to have their lands taxed and signed contracts with the Federal government for the development of the Rio Grande Federal Reclamation Project. The point being raised is that future water needs were addressed in the early 1900's, and today we see the results of that major effort on the part of landowners who wished to farm their land and address their future water needs by contracting with the Federal Government for an irrigation system and dam to collect the surface water flowing down the Rio Grande.

The EPCWID #1 and the Bureau of Reclamation addressed future water needs every time they entered into a contract. In 1941, the Bureau of Reclamation and EPCWID #1 signed a contract with the City of El Paso to provide for a municipal surface water supply by allowing the City of El Paso to purchase 2,000 acres of water right lands and use the annual allotment for those acreages up to 3.5 acre-feet per acre. Again, in 1962, the Bureau and EPCWID #1 signed another contract with the City of El Paso allowing the City to seek surface water assignments from owners of water right lands.

More recently, in 1988, EPCWID #1 and the Bureau of Reclamation signed a contract with the Lower Valley Water District allowing the LVWD to seek surface water assignments from the owners of water right lands located within the LVWD boundaries. This contract helped the fledgling municipal water district to attain much-needed water supplies for its constituents located outside the El Paso City limits on the east side of El Paso.

In the last four to five years, the fears of running out of water have haunted the municipal suppliers of water. The contracts which allowed for municipal water entities to seek surface water allotments from water right lands located in the boundaries of EPCWID #1 was not enough. Larger quantities of water became the desire of municipal entities. Prior to 1996, every drop of surface water secured by the municipal utilities was linked to a specific parcel of land. After 1996, municipal interests urged the EPCWID #1 to "sell" them larger quantities of surface water for municipal needs.

The EPCWID #1 had no surface water to sell in large quantities. The water right landowners are the beneficial owners of the surface water, and EPCWID #1 divided the annual allotment received from the Bureau of Reclamation among every landowner on a per-acre basis. If the EPCWID #1 were to ever have any surface irrigation water to sell it would have to come from conserved water remaining after each and every water right acre (69,010) inside EPCWID #1's boundaries received their fair and equitable annual allotment on a per-acre basis. The City of El Paso benefited from this allotment procedure because under its water supply contract, it also received an annual water allotment for lands it owned.

In March 1996, the EPCWID #1 signed a conversion contract—the first of its kind—with the Bureau of Reclamation. The conversion contract provided for the "conversion" of agricultural irrigation water to water for other beneficial uses such as municipal, industrial, recreational and environmental. After signing the conversion contract, the EPCWID #1 entered into two "third-party contracts," one with City of El Paso and the other with the Lower Valley Water District (LVWD). Those two contracts—the only contracts of their kind in the entire western United States—allow for the two entities to convert irrigation water to municipal purposes. But before they can purchase water for municipal purposes, each entity must enter into

an "implementing contract," which specifies the quantity, price and other terms of the sale. Each implementing contract is subject to satisfying the requirements of the National Environmental Policy Act (NEPA). Today, the EPCWID #1 has a third-party implementing contract with the City of El Paso and expects to negotiate an implementing contract with the LVWD in the very near future.

EPCWID #1 is attempting to address the future water needs of the surrounding area. Future surface water supplies will have to come from the concrete-lining of canals or from the water right landowners through forbearance contracts whereby the landowner sells his or her annual allotment of surface water to approved third-party contractor for an agreed price. The Board of Directors of EPCWID #1 have enacted a policy regarding Forbearance Contracts and a form forbearance contract will be provided for the EPCWID #1 landowners to negotiate price, term and quantities of water.

EPCWID #1 welcomes the importation of water for municipal needs. If the municipal needs exceed the sustainable supply provided by the Rio Grande, the EPCWID #1 supports the importation of water from other sources. If municipal interests in the greater El Paso area can contract for ground or surface water in New Mexico, EPCWID #1 supports those efforts.

ARISING ISSUES

EPCWID #1 will face numerous critical issues if municipal interests only wish to furnish large populations with an endless supply of water. Nevertheless, EPCWID #1 has moved in a positive direction in providing additional surface water for municipal use. The 1996 Conversion Contract allows for irrigation water to be converted not only for municipal needs, but also other beneficial needs such as recreation and environmental. If a recreational or environmental entity were to seek water supplies from the EPCWID #1 as an approved third party contractor, the EPCWID #1 would work to negotiate a third-party as well as a third-party implementing contract. Although a contract would reduce the amount of surface water available in the future for municipal interests.

Loss of water quality is a major disadvantage for EPCWID #1 to provide municipal interest with surface water supplies delivered at their water treatment plants. As more and more Rio Grande water goes toward municipal use, particularly in New Mexico, an increasing percentage of the water received by EPCWID #1 will consist of effluent discharges. Already a large portion of the Project water received by EPCWID #1 consists of agriculture return flows which is water that has been used to irrigate and is returned to the irrigation system through drainage. This return flow degrades the water quality, as does effluent discharged from water treatment plants operated along the Rio Grande. EPCWID #1 remains concerned that its water will be further degraded as the population of southern New Mexico grows.

Agriculture water efficiencies likely will be adversely affected when the water right landowners enter into forbearance agreements to sell their allotment water. This activity would reduce the number of water right acres irrigating in specific areas. Delivery efficiencies which are achieved today will not be operationally possible; therefore, overall less surface water will be available for water right landowners who do irrigate.

CONCLUSION

EPCWID #1 has always realized the need for water both agricultural as well as for municipal purposes. History shows that surface irrigation water has been made available to satisfy municipal needs. Numerous contracts have been negotiated and signed allowing for use of irrigation water for other beneficial uses. EPCWID #1 has for years strived to conserve this precious natural resource and will continue to do in the future so that a long range plan of action for all parties in need can be pursued.

In closing, I would like to thank the Chairman, Senator Bingaman, for holding this hearing. As you may know, Senator Bingaman was born in El Paso, and I have heard that he spent a fair amount of time attending movies at the old Plaza Theater. Many of us in my area of Texas consider you to be our Senator too.

Thanks again for allowing me to participate today and remember "Irrigation Water is not for Wasting!"

The CHAIRMAN. Thank you very much. Thanks to all of you. Let me ask a few questions here before we conclude this panel. Let me start, I guess I am just unclear. I am trying to understand all this.

John, you make some statements here in your testimony that I am just not clear on.

You say that the farmers who might welcome the opportunity to periodically sell their irrigation water to municipalities are prohibited from doing so by the Bureau of Reclamation and the irrigation districts. I assume you mean by "selling," you mean also leasing?

Mr. BURKSTALLER. I mean basically the big potential source of water at this point that I am sure Edd agrees with is forbearance. If they got a full allotment year, maybe they can sell a portion of their water to us and forbear using it.

The CHAIRMAN. How does that square with what Edd is just talking about there? Your statement is that the irrigation districts are prohibiting people like Edd from making their water available for municipal use.

Mr. BURKSTALLER. In our eyes, the Bureau and the irrigation districts are making it too complicated and putting too many restrictions on the process for us to use forbearance as a dependable supply. And we would like to be included in the process and have input to the program so that we can assure that whatever comes out of it is a usable water source.

The CHAIRMAN. So that what Edd has done with his three acres is not useful to you.

Mr. BURKSTALLER. Edd is just starting to be fair. And we need to work together and we feel like we are not working together.

The CHAIRMAN. But now, let me try to understand, also, and also in the New Mexico side in Elephant Butte Irrigation District. What are the obstacles that exist to an individual farmer who has certain water rights in this irrigation district? If that farmer would want to go ahead and provide those, lease on a temporary basis, on a year-by-year basis, make that available to the city, that is not permitted by the Elephant Butte Irrigation District. Is that correct?

Mr. ESSLINGER. Well, Senator, what the problem is, is the farmer is given an allotment every year based upon what is in storage. However, as far as determining what his water right is, that is a process that has to be perfected by the stream adjudication process. And that has to affect everyone, whether you are a groundwater pumper or a surface water user or both.

And so it is real difficult for a farmer at this point to, without some uncertainty, to establish a lease with a city supplier not knowing for sure if he can use his groundwater as a supplement to whatever he leases as a surface supply to sustain his crop. And all of that has to be worked out through the stream adjudication process.

We believe that through our municipal water users policy, that what we are envisioning is that as a city grows or our community grows and acquires irrigation land that had a water right on it, well, then that water right stays appurtenant to the land, and the land that is consumed by the city would then be able to acquire that surface water right in the future for its surface water treatment plant.

Right now, we just do not have the mechanism in place, and there is an uncertainty by every farmer and every groundwater user of what they own as a right to sell.

The CHAIRMAN. I can understand that they do not have an adjudication yet completed. But what if I am an irrigator, I have a farm, and I am advised by the Elephant Butte Irrigation District that I have a certain allotment for this year based on how much water is going to be released, and I decide I would just as soon go ahead and lease that water or provide it or sell it or do something with it this year instead of planting my crop, I do not have that option?

Mr. ESSLINGER. What you do have is an option within the irrigation district to allow another farmer to transfer your water to his land. Internally, we have been doing that since the inception of the State, transferring the water between agricultural users. And so if you, for whatever reason, did not want to farm, there are farmers waiting to acquire that water right. In fact, we have a waiting list of close to 500 acres of farmers who have perfected and have cleared land waiting to get water-righted land classified.

And so what has happened in the past is if the city acquired—or if a farmer sold a 20-acre parcel, we would transfer that 20-acre parcel to a farmer on the waiting list, because we have room within our district to grow as a farming community. We are not at the same position that El Paso is in, where they are squeezed between the river and their mountain range. We have in our project boundaries 133,000 acres of project land. We have 90,640 acres of irrigatable water-righted land. What we have been doing over the past is just transferring the water from a subdivision back to a farmer who needs it.

Now the point is as the city has approached us, they would like to acquire that water for future use. And what they are doing is they are putting it in our conservation pool for our farmers to continue to use the water as they acquire the land. And that is something that was a basis of these statutes that we got legislative action on.

The CHAIRMAN. Let me just understand. The distinction that I am hearing between what you are doing and what they are doing in El Paso is that in the case of El Paso, at least there is, although there are complaints about all the paperwork and obstacles that have been thrown up, at least there is the possibility of an individual water owner, water rights owner down there in El Paso, a person who has some rights, going ahead and transferring those to the city or leasing them to the city for municipal use.

And here in the Elephant Butte Irrigation District, that option does not exist for an individual because the individual's water rights have not yet been established. And the district will not allow the allocation of water to be transferred out of agricultural use by an individual.

Mr. ESSLINGER. That is correct, because at the present time, we still have all of our water being used for agricultural purposes.

The CHAIRMAN. But the district itself is entering into a contract with the city which will allow the district to transfer it out of agricultural use to municipal use, although the individuals who get the allotment would not have that option.

Mr. ESSLINGER. No, sir, Senator. What this water users policy does is it allows for, first of all, the city to be able to lease water from our district. But it also gives the opportunity for the city to

go outside and also have the opportunity to lease water from individual farmers. There is two components of the policy, and it is attached in my testimony, which allows for the city, as they acquire land, to actually receive that as part of their water-righted acreage.

And then the second component is for them to go out and by the forbearance, also be able to purchase or lease water on an annual basis from the farmers.

We believe that that process cannot happen yet because there is no surface water treatment plant in place for the water to go to. So the city is not interested in purchasing water or buying farms at this time because it would be a costly venture for them with no place to go. So all they are doing now is just grabbing what they are acquiring through their expansion of their city limits and allowing that water, the first set of water, it is kind of a base for them to go and bind for later on to establish a surface water treatment need. So they are trying to establish a base allotment right now of surface water right.

Have I confused you?

The CHAIRMAN. Yes, pretty much. Let me ask about the Bureau of Reclamation. John, in your testimony you cite the fact that the Bureau of Reclamation has prohibited this transfer or this use of irrigation water for municipalities. What is the Bureau's role? How do they accomplish that prohibition?

Mr. BURKSTALLER. I think, basically, we had a number of agreements with El Paso County Number 1 that the Bureau was not a party to. And when it came time to negotiate for more water at the new municipal price, the district went back and looked at all those and kind of wanted the Bureau of Reclamation on board to approve them. And technically, the Bureau feels that all agreements have to be co-signed by the Bureau. They have to be between the district, the bureau, and the other potential user.

In the process, we lost quite a bit of water by reinterpretation of what the contracts allowed. And when we negotiated our recent implementing agreement, we got it back again for \$200 an acre-foot as opposed to the 15 or so that we paid in the past. But we did not get all of it back. Some of it we have lost indefinitely. So we feel that there was kind of a severe pro-irrigation-district interpretation of all the issues that came up in the process of negotiating this implementation agreement.

The CHAIRMAN. And I can understand there is a disagreement there as to how it was done. But the Bureau of Reclamation does not have a policy of not approving these uses or these efforts to use irrigation water for municipal use. I mean, they have no reason to prohibit that that I am aware of.

Mr. BURKSTALLER. They have no formal policy, that is for sure, yes.

The CHAIRMAN. Let me ask, it strikes me we are having this whole discussion that we are having this morning and virtually nothing said about what is going on on the other side of the river, except that at one point there are 2 million people in Juarez and they are out of water, or nearly out of water. And they're taking into account the problems on one side versus the other or the actions on one side versus other in moving ahead.

Again, John, do you have any involvement with the city of Juarez as to their water needs or their projections for water needs, or is that just sort of in a different category that you do not have to concern yourself with?

Mr. BURKSTALLER. Until recently, we have kind of kept track of how much of the Hueco Bolson they are using because we naturally have an interest. And even though they have a lower per capita consumption, their population has grown so much that they withdraw quite a bit more from the aquifer now than we do.

Based on that and a number of issues, we realized the need to go into regional planning, and we do have a planning group now that includes representatives from Dona Ana County, El Paso, the Juntas, the utility in Juarez, and we have embarked on a program to identify options that might be beneficial collectively for water treatment and conversion of some of the Juarez ag water to M&I uses and so on.

So we are actively involved in that process. We do not really have a plan at this point, but we have embarked on trying to find one.

The CHAIRMAN. One of the points that we discussed with Mr. Wood in the previous panel was that there is no real joint effort to analyze the water resources and make projections as to future need and future uses. Is that your assessment as well, that we really do not have anything that both the Mexican officials and the folks on our side are involved in that people have confidence in?

Mr. BURKSTALLER. I think both sides have made their own projections, but we do not necessarily agree on all of the issues. One example is they dispute some of the claims we have made about how fast they will exhaust the potable water in the Hueco Bolson. They think it will last longer than we do, and so on. And there are a number of kind of political constraints and what their national government allows and so on.

But I think all the parties individually are projecting the water resource, just that we do not have any overarching—

The CHAIRMAN. There is no joint effort to project the water resource.

Mr. BURKSTALLER. To impose agreement to the various parties involved.

The CHAIRMAN. Or to even cooperate in the development of data and information with which to make projections.

Mr. BURKSTALLER. There has been some limited cooperation, I would say. The USGS has modeled the Hueco on both sides of the border, but there are disputes in Mexico about whether or not they did an accurate job in the Mexico portion. I think there is a level of mistrust in the numbers that come from various sources.

The CHAIRMAN. Edd, did you have any involvement in any of this cross-border?

Mr. FIFER. No, sir, we have not. There is a very interesting aspect to this whole thing, though. In the process of converting water from agriculture or irrigation to municipal, we are creating markets for that water. And at the present time, there has been no discussions about whether or not Mexico can participate in those markets or not.

This is going to become very interesting, and I think this is a decision that is going to have to be made perhaps by the Bureau of Reclamation, also, or by the U.S. Government, whether or not that can be done. That would really open things up for the landowner who owns the water and who has the right to forbear that water.

I know in our district, the owner has the right to forbear. That would create a tremendous market. But that would also create a water shortage, I think, on the U.S. side. Everything that I have looked at from a municipal standpoint, we feel like we can work very closely with the Public Service Board, El Paso Water Utilities, Lower Valley Water District, but we are a little bit concerned about going beyond those things.

We do not have a surplus amount of water. I know we exercise conservation continuously. We do a water budget every year. We set efficiency marks. My board of directors tells me that I have to attain a certain efficiency, and if I do not, I get my hand spanked pretty good over the deal. So I think there is just a lot of things that we do to conserve water. You really do not know how much water you have until the year ends for you because you have these thousands and thousands of irrigations that are going on.

I just think that there is an aspect there that maybe—I do not know, maybe somebody is hiding or whatever. But I think that there is a possible market in Mexico for water, for surface water.

The CHAIRMAN. Mayor Smith.

Mr. SMITH. Senator, just very quickly, I hear comments about Federal and irrigation districts trying to work together. As you can tell, it has taken us literally years to get to this point. And as mayor, I can tell you something that we have done within the region and I guess we can act a lot more spontaneously, much more quickly.

As you well know, there have been new elections in El Paso and Juarez and there are new mayors on the border. I have been able to—talking about sustainable projects—I have been able to sustain the mayorship here for about 10 years. But over the past 10 years, we have worked collaboratively as three communities, not—obviously, we cannot make decisions dealing with water. But what we have been able to do in several different areas is to bring together and take the initiative to essentially lead the people in the different communities to come together to understand the issue, first of all. And I think we went a long ways in the past several years with the previous two mayors in El Paso and Juarez.

And we have a meeting set up this coming week in El Paso. For the first time the two new elected mayors and myself will be getting together to talk about the issues paramount to the region. And we most definitely think Las Cruces is part of the major region. Water is one of those issues. Obviously, transportation issues is going to be a second issue. Border crossing issues always are on the front plate.

But I can tell you since it takes a Federal system quite some time to go through all of the hoops and whatnot to get the process moving, I think what we are attempting to do, and particularly with the three mayors, is to surface the issue, no pun intended, to surface the issue of the water as it relates to Juarez and maybe

to initiate some new processes that we have not even thought about.

But if anybody thinks that we can talk independently just as Texas and New Mexico and not bring in the Mexican connection, we are never going to be resolving the issue of water. Which in political elections, that is always the *prima donna*, that is the red flag, but after elections, it kind of wanes. The good news is I think that we have shown that if you continue to pursue the issues with some basis, scientific information with the quality of the water, the quantity of water, and if you plug in what Dr. Peach gave us, those wonderful statistics, then we begin to understand that we just cannot sit around and see which one of the entities is going to try to take the lead.

So we are going to continue to push that. And hopefully, once we have the ideas in place, we will be visiting with you. Because we have already spoken in general terms independently, not the three of us collectively, of bringing in the Federal delegation on the Mexican side truly to work hand-in-hand with the United States side to begin to resolve this issue, because we are not going to be able to do it on a local issue. We are clearly going to have to have the support and understanding on the Federal level, and I think that is precisely what this hearing you have called for should go a long way in doing.

The CHAIRMAN. Thank you all very much. I think it has been useful testimony and I appreciate it. We will try to follow up on some of these suggestions, and see if we can be of help.

Let us take about a 5-minute break and then we will hear from the State engineer.

[A short recess was had.]

The CHAIRMAN. Let us get started again here. Our final witness this morning is going to be Tom Turney, who is the New Mexico State engineer. He is going to give us his perspective on some of these same issues we have been talking about so far this morning. And we appreciate you being here very much. Go right ahead.

STATEMENT OF TOM TURNEY, STATE ENGINEER, STATE OF NEW MEXICO

Mr. TURNEY. Well, thank you. Senator Bingaman has asked me to speak today to discuss water supply issues facing the southern New Mexico border region. I am happy to do so.

The recent 2000 census confirmed that the State of New Mexico is growing. Among Western States, New Mexico now ranks eighth in growth. New Mexico is basically a desert. New Mexico water resources for people to use are finite. In a desert, not everyone can have all the water they want.

This basic principle was recognized 400 years ago when the Spanish government settled New Mexico. This concept is reflected in the State constitution, which embodies a prior appropriation system of water administration. As the State grows and water becomes more and more scarce, water availability will ultimately define the future of New Mexico.

New Mexico is experiencing a period of rapid growth. Its population over the past four decades has almost doubled. The *Denver Post* recently carried a projection on its front page that New Mexi-

co's population will grow by almost 85 percent over the next 50 years. Heavy growth is projected for the city of Las Cruces and Dona Ana County. These numbers paint a dramatic change in this area. It is important that the State understand that it needs to work with this area, and that there is something we can do while taking into consideration existing State water laws.

New Mexico is a rural State. There is much agriculture along its rivers. In the southern part of the State, water rights for the most part are attached to farmlands. Under State law, the owner of a land can sever the water right from his lands and transfer it to other lands or, alternately, the owner can transfer the rights for other purposes without losing the priority of that right.

Water right holders who wish to transfer their right to another parcel of irrigated land or who wish to transfer their water right to another such use, such as a municipal or industrial use, must apply to my office for approval of the transfer. We only transfer actual water rights, that is, water that is actually put to beneficial use. State engineer will not transfer a claim to water where there has not been water put to beneficial use.

State law allows water rights to be leased as well as purchased. A water right may be leased for 40 years to municipalities, counties, State universities, public utilities supplying water to municipalities and counties, and member-owned community water systems.

The rapid growth in this region will result in water supply pressures in the area. My office has taken major steps toward addressing the water supply in this area. 30 years ago the lands from Las Cruces to El Paso were basically rural. Now, there is an infill of homes and businesses almost continually along this corridor.

Because of this substantial growth, my office began a major adjudication of water rights along the Rio Grande south from Elephant Butte to the New Mexico-Texas State line. An adjudication is similar to what is called a quiet title suit for a piece of commercial or residential property. In an adjudication suit, a court defines the elements of a water right, who is the owner, what is the amount of the right, what is the priority of the right, and finally, what is the purpose, place of use, and the point of diversion of that right.

Adjudications are key to providing a viable water market in this area. An adjudication provides certainty about the nature and the extent of water rights because they are judicially determined.

As challenges to New Mexico's water supply increase and more and more demand for new water sources arise from entities such as municipalities and commercial interests, only those rights that have been adjudicated will be marketable at low risk to the purchaser. Adjudicating New Mexico's water rights is essential to protect New Mexico water and will allow for orderly development.

In 1997, we began to conduct a comprehensive hydrographic survey of the lower Rio Grande, an area that begins below Elephant Butte Reservoir. The hydrographic survey for the entire Rio Grande was completed earlier this year.

In late 1997, we began the adjudication of water rights in a State court proceeding. The first step is to serve what we call an offer of judgment on each water right claimant. The offer of judgment is a settlement offer that describes the State's position based on hy-

drographic survey of what the water rights claimant and entitlement is. The lower Rio Grande adjudication contains approximately 13,000 water right claims. This may grow up to about 25,000 claims as we work forward.

To date, about 3000 offers of judgment have been mailed. Many of these offers are being negotiated or litigated. The result is a water right that is defined by court order. The lower Rio Grande adjudication is necessary for the development of an efficient water market in this area. This market is essential to the economic future of the region. Every drop of water for new use has to come from existing uses or from water conservation. The days of free or cheap water are probably past. But with completion of the adjudication, there will be substantial water available in the marketplace.

My office is exploring ways to streamline the permit application process so that water rights can be moved more quickly or transferred to new uses. This includes ways to expedite transfer processes so that entities like the city of Las Cruces and Dona Ana County can more rapidly transfer agricultural water to municipal uses. We recognize what Mayor Ruben Smith was talking about this morning, of waiting almost 20 years for a decision is no longer acceptable. Cities do need certainty.

With respect to the city of Las Cruces's immediate water supply concerns, I did promise the mayor that I would have the decision made by the end of this year. He said this morning he would like to get that a little faster, and I hope we can accommodate that. My staff has completed a preliminary review and it looks like we can possibly approve for immediate use a substantial amount of water from the Jornada area.

There is a substantial amount of proposed industrial and residential development in the border region, in particular, in the city of Las Cruces, Dona Ana County, and in the areas around the Santa Teresa border crossing.

In order to present you a complete picture of groundwater supply issues in that region, it is necessary first to understand the relationships between surface and groundwater. There is a basic rule of Mother Nature relating to hydrologic reality in a basin that has a surface stream connected with an underground water basin. That is, for every gallon of water pumped from a well, ultimately, there is one less gallon of water flowing in a nearby river.

This reality directly impacts groundwater development in the reach from Elephant Butte Dam down to the Mexico-New Mexico border. Since no new appropriations of surface water are allowed on this stretch of the river, any new groundwater withdrawals that affect or deplete the surface flow of the Rio Grande must be fully offset by retiring surface water rights.

Because the primary aquifer in the region is hydrologically connected to the Rio Grande, groundwater pumping in this aquifer ultimately will result in diminishment of the surface flows of the Rio Grande. It is likely that surface water rights will have to be acquired to offset any new groundwater withdrawals in the Santa Teresa area.

The State of New Mexico, by necessity, must begin to actively manage its water resources. State law requires that I must admin-

ister water rights in accordance with the State's constitution, which says that a senior water right is a better right. In the lower Rio Grande, the State will have to curtail junior rights in times of shortage or as required to satisfy interstate obligations.

With few exceptions, the water rights with the earliest priority in the basin are the surface water rights of the irrigators within the Elephant Butte Irrigation District. New Mexico State University and the city of Las Cruces may further have valid senior water right claims. They may be senior water right holders.

Nearly all groundwater claims in the lower Rio Grande, including the claims in the immediate border area around Santa Teresa, are considerably junior to the senior water rights of these three entities. Even if the groundwater claimants in this border area obtain orders from the water right adjudication court recognizing water rights in the full amount of their claims, these priorities of these rights will, in all likelihood, be junior by decades to the more senior water rights in the basin. Such junior water rights will be subject to curtailment if administration of priorities is ever required in this basin. This hydrologic reality must be considered when policymakers assess the long-term dependability of the water supply in the border region.

In addition to internal challenges, New Mexico is facing a number of outside challenges to the region's water supply. In 1997 the United States filed a lawsuit in Federal district court claiming title to all the waters in the lower Rio Grande. My office vigorously fought the lawsuit, and in August 2000 the Federal district court dismissed this lawsuit. This dismissal is currently being appealed by the United States and the El Paso Public Service Board.

Additional challenges come from Texas entities and the State of Texas. Hunt Building Corporation, a Texas entity, recently declared an intent to divert up to 45,000 acre-feet of groundwater from the Salt Basin, which lies in New Mexico's southern Otero County just north of Dell City, Texas. Hunt Building Corporation stated that the water would be used, in part, for municipal purposes within El Paso County.

El Paso has on previous occasions made it clear that it intends to find ways to export water from New Mexico. I do want to be very clear that any exports by Texas entities can occur, but they must be through compliance with New Mexico's export statutes, which requires the State engineer to determine the withdrawal and transportation of water outside the State will not impair existing water rights and not be contrary to conservation or the public welfare of the State.

Additionally, the State engineer must consider if there are any shortages in New Mexico and whether any sources of water are available—any other sources of water are available to the applicant.

Some of the people in the Salt Basin have suggested the construction of a pipeline from the Salt Basin to Santa Teresa area. The cost of such a pipeline has been estimated to be in the neighborhood of \$60 million. Such a pipeline may, indeed, be possible, but would involve much more consideration. As such, recent actions by the State of Texas, the Texas legislature has appropriated in May of this year \$6.2 million for vigorously representing Texas in-

terests for water right litigation in the State of New Mexico in the lower Rio Grande. At issue will be the Rio Grande Compact.

It is clear that Texas wants additional quantities of water to provide for the growing needs of the El Paso region. El Paso further wants better quality water so it can more inexpensively treat Rio Grande surface water in its municipal water treatment plants. The State of New Mexico has entered into preliminary discussion with the State of Texas over this issue. Per the New Mexico attorney general, all these discussions will be held under an umbrella of confidentiality.

There are international threats to the waters of the Rio Grande. Mexico is in the process of developing a Conejo wellfield across the border from the Santa Teresa area to ultimately divert approximately 12,000 acre-feet per year of water from the Mesilla Bolson. This is the same aquifer that underlies the Mesilla Valley in New Mexico. It is likely that any withdrawals by Mexico from the Mesilla Bolson will directly affect the surface water supply of the Rio Grande Project and make it more difficult for New Mexico to meet its delivery obligations to Texas under the Rio Grande Compact. This pumping greatly concerns New Mexico.

Under the 1906 treaty with the United States, Mexico received 60,000 acre-feet of Rio Grande Project water each year. If Mexico's Conejo wellfield pumping draws on the Rio Grande, then New Mexico may have to demand that any depletions resulting from Mexico's pumping be appropriately addressed by the United States.

In summary, New Mexico is facing many challenges over the waters of the lower Rio Grande. These challenges occur on many fronts. The next decade will be crucial. In the meantime, the State is moving rapidly forward with the lower Rio Grande adjudication in an effort to provide greater certainty about the nature and extent of water rights to farmers and other water right claimants in the region. This adjudication is necessary to build the proper and necessary foundation for a future, efficient water market. Water markets are the key to meeting any future water supply needs of the region.

Until the adjudication is complete, my office will work with the city, the county, Elephant Butte Irrigation District, the State of Texas, and other entities in the region within the constraints of State water law to offer interim solutions for their near-term water supply needs.

Thank you, Senator, and I will be glad to take any questions.

The CHAIRMAN. Thank you very much for that excellent statement. Let me ask if there is any projection that you could give us as to the time frame for completing the adjudication here in the southern Rio Grande. Is this a several-year project or a decade-long project? Or can you give us any estimate as to when it might be done?

Mr. TURNEY. We would hope at the end of another decade, it is substantially moving along. The State legislature does have something to say about this. They have provided additional attorneys and engineers for us to begin to rapidly move through completion. This year it was a 1-year appropriation and they did give us a number of term employees, and we are hoping that they will continue this appropriation in upcoming years. And it is only if we

have additional staff can we complete this within a reasonable time frame.

Otherwise, if we go at our current staffing levels, unfortunately, it will be decades and decades long.

The CHAIRMAN. You said that the Conejo wellfield that Mexico is now developing will affect New Mexico's ability to meet its obligation to deliver water in compliance with our treaty with Mexico. Is that correct?

Mr. TURNEY. Yes.

The CHAIRMAN. This is the 60,000 acre-feet per year?

Mr. TURNEY. What it may impact more strongly is our ability to deliver water to the State of Texas. But I am sure that there will be an impact on this, on the 60,000 acre-feet.

The CHAIRMAN. And that is because the drawing down of water in the Mesilla Bolson would be expected to diminish the flow of surface water in the Rio Grande? Is that what I am understanding?

Mr. TURNEY. Yes, sir.

The CHAIRMAN. And you indicated that if that, in fact, occurs, you would then look to the United States for some adjustment to the New Mexico obligation? Is that what I understood?

Mr. TURNEY. It may be some sort of an adjustment to that 60,000 acre-feet of water, because they may be taking out the water out of the ground that they should have been receiving as a surface water diversion.

The CHAIRMAN. Would you also expect that this would require some renegotiation of the Texas-New Mexico compact, the Rio Grande Compact?

Mr. TURNEY. Senator, I have not given that any thought one way or another. I am sorry.

The CHAIRMAN. You heard the previous panel talk about some of the issues surrounding the transfer of water that is presently used for irrigation purposes over to municipal uses. Are you in agreement that as far as New Mexico is concerned and this Elephant Butte Irrigation District is concerned, that any such transfer by individual water rights owners has to await the final adjudication of this area?

Mr. TURNEY. No, sir. We are doing this adjudication in steps and phases. And we started at the lower Rio Grande—or excuse me, the upper portions of the basin and we are working down to the bottom. This is an ongoing process. There will be court orders that are currently coming out right now. We have adjudicated, basically completed all the Nutt-Hawkett Basin today.

There are adjudication orders coming out almost on a weekly basis. And it is true that these will ultimately be subject to interstate process, but certainly transfers can begin to occur way before completion of the last piece of the adjudication in 20 years.

As a matter of fact, in downtown Las Cruces, there is a number of small tracts of land. We have initiated a special hydrographic survey, put out to contract, and the contractors are starting to work on this as we speak. As soon as this is completed, we are hoping we can work closely with the city on how this process can be expedited quickly within my office.

The city needs additional water, and the idea of waiting for 20 years is just unacceptable. And what we want to do is establish

some sort of a process that when application is made to my office, that this kind of transfer can occur quickly. We will, of course, have to evaluate it on the standard things, of impairment of existing water rights, water conservation, and public welfare of the State.

The CHAIRMAN. Let me ask about this Hunt Building Corporation application. This is to take water out of the Tularosa Basin. Is that right?

Mr. TURNEY. Actually, it is out of a small basin that looks like about half a moon that exists below Alamogordo. It is a separate basin called the Salt Basin. They did not make an application yet. Instead what they made is they filed an amended declaration. And the amended declaration stated that they would be taking about 45,000 acre-feet of water for export out of the area.

Subsequently, I have met with some of the people from that area. Santa Teresa has very significant water supply problems in their future because of the priority date of their water rights. And it may be possible for the water to be pumped from the Salt Basin to supply water to the Santa Teresa area or to other areas in New Mexico.

The CHAIRMAN. So that would be a competing use that would have to be considered, potential?

Mr. TURNEY. Competing use, I am not sure with who.

The CHAIRMAN. Well, the Hunt Building Corporation is not expecting to use their 45,000 acre-feet to meet that need in Santa Teresa, are they?

Mr. TURNEY. I have not yet met with Hunt Building Corporation, so I do not know what their intentions are. I am sorry, Senator, I cannot answer that question.

The CHAIRMAN. Okay.

Mr. TURNEY. I can tell you, though, that because of New Mexico's export statutes, it will be a lengthy process for them to transfer water rights outside the State of New Mexico. It may or may not be possible. And at this point right now, it would be a lot easier to market those waters inside the State of New Mexico.

The CHAIRMAN. You indicated that a possible source of water for Las Cruces is the Jornada?

Mr. TURNEY. Yes, sir.

The CHAIRMAN. And is there water now being used out of the Jornada? Are there wells there that the city of Las Cruces is using?

Mr. TURNEY. The Jornada Basin, Senator, is located east of this building that we are in today. It is a basically, a separate, isolated basin. There is just a very, very tiny connection from it to the Rio Grande. There are some wells in the area, but we are talking about a major appropriation of water from this area.

And there are some water companies that have filed applications with our office, and we are in the process of processing those. And probably within the next week or two, we will be issuing final decisions on those as well. And these will impact the amount of water that is available for the city of Las Cruces.

But even considering what sizes of water claims that are being made by some of these other private utilities that are within the Jornada area, we anticipate we will be able to grant a substantial amount of water to the city of Las Cruces from this area.

The CHAIRMAN. Are there proposals that you know of for sort of a State-based water bank, or is there anything to that effect that has been floated as an idea to meet some of the water needs in this region or elsewhere in the State?

Mr. TURNEY. Senator, certainly the idea of a water bank has been heavily debated by the legislature. It is of interest because of a lot of concerns, especially from the northern parts of New Mexico, that this is just not an appropriate thing to be discussing at this time. A water bank makes a lot of sense once the adjudication is completed.

But I think that one major concern of a water bank is that there will be a large tendency to float or to push into these water banks a number of these claims for extraordinarily large amounts of water and people will try and market these claims. And in fact, these are simply claims, they are not a water right. And it is my opinion that before New Mexico really develops, gets actively involved in a water bank, it needs to complete adjudications throughout the State.

The CHAIRMAN. Tell me which adjudications have been completed in the State. Is there a group that has been completed and then others that are still in process?

Mr. TURNEY. Senator, in the last 100 years, the State of New Mexico has completed about 15 percent of its lands, adjudications. At the rate we are going right now, that is about 600 years to complete the entire State. Clearly, that is not acceptable for the State. And we have actually been working with the legislature. We are developing a 20-year plan to basically complete all the adjudications in the entire State. And the cost is going to be very expensive. I think about \$170 million is our preliminary projections. We will also be looking into——

The CHAIRMAN. \$170 million would be spent over the 20 years?

Mr. TURNEY. That is right, yes. And we are looking at the court process as well. We retained a retired supreme court justice as well as a retired appeals court justice to give us advice on how we can change the adjudication process to make it work more quickly. And some of the ideas that are being floated around right now are the establishment of a special water court just to work on these adjudications. But it is a very, very high priority throughout the State.

The CHAIRMAN. You have been very generous with your time, and thank you very much for your testimony. And we wish you well in these many challenges that you have. Thank you.

Mr. TURNEY. Thank you.

The CHAIRMAN. We will adjourn until 1:30. We will take the final panel in this hearing at 1:30.

[Lunch recess.]

The CHAIRMAN. We will go ahead and start the hearing again. We have a third panel that will address these issues from a somewhat different perspective. Rick Gold, who is the Regional Director with the Upper Colorado River Region for the U.S. Bureau of Reclamation is here. We appreciate you being here very much. Deborah Little is here, and she is the principal engineer with the International Boundary and Water Commission in the U.S. section. And then Antonio Rascon is here. He is the principal engineer with the

International and Boundary Water Commission in the Mexican section. Thank you all very much for being here.

We will go in that order. Rick, will you start and give us your thoughts, and then after all three of you have spoken, I will have a few questions.

STATEMENT OF RICK L. GOLD, REGIONAL DIRECTOR, UPPER COLORADO REGION, BUREAU OF RECLAMATION

Mr. GOLD. Thank you, Senator. Mr. Chairman, thanks for the opportunity to appear today to discuss reclamation's involvement in meeting the water supply challenges facing the southern New Mexico border region from Las Cruces to El Paso, Texas, and Juarez.

My remarks today will be primarily concerned with water contract conversions, which we have heard something about from previous panels, conversion from irrigation to municipal and industrial use, the proposed El Paso-Las Cruces Regional Sustainable Water Project, and finally with desalination.

Virtually since its inception in 1902, the Bureau of Reclamation has been involved in the management of water resources in this region, focusing initially on traditional irrigation water management and meeting the water delivery treaty and compact requirements. As the population growth rates have increased dramatically, the demand for safe drinking water has also increased in direct proportion.

The groundwater basins may run out of fresh water. Shifting from groundwater to surface water for drinking water supply in sufficient quantity and quality has by necessity focused on reclamation's Rio Grande Project. First let me touch on the water contract conversions.

In February 1905, Congress authorized the construction of the Rio Grande Project to supply irrigation water to lands in the Rincon and Mesilla Valleys in southern New Mexico and the El Paso Valley in west Texas. The project also supplies 60,000 acre-feet of water annually to Mexico under the 1906 treaty obligation.

Acting within the laws of the then Territory of New Mexico, Reclamation filed appropriations for water rights, which included an initial 730,000 acre-feet annually and subsequently all unappropriated water of the Rio Grande. Thus, all the water in the Rio Grande between Elephant Butte Dam and Fort Quitman, Texas, became Rio Grande Project water supply.

In February 1920, Congress passed the Sale of Water for Miscellaneous Purposes Act. We also refer to that as the 1920 Act. It authorized the Secretary of the Interior to enter into contracts to supply water from any reclamation irrigation project for other purposes. That act imposes very specific requirements designed to protect the integrity of those projects and the Federal investments in them. Those requirements include prior approval of the water users' organizations, no other practical source of water must be available, delivery must not be detrimental to the water service for the involved irrigation project, and monies derived must be placed into the reclamation fund and credited to the project from which that supply is made.

In 1940, as you heard from a previous panel, the city of El Paso approached Reclamation and El Paso County Water Improvement

District Number 1 to obtain surface water for a growing city. The result was a 1920 Act contract allowing the conversion of a portion of the irrigation water supply for municipal and industrial use by El Paso without congressional reauthorization. That is because of the content of the 1920 Act. Over the years a series of those conversion contracts followed, the most recent being signed in June of this year, 2001.

Even more recently, Reclamation met with representatives of the city of Las Cruces and the Elephant Butte Irrigation District to discuss the long-range plans to gradually convert project irrigation water to other uses. And although conversions in Las Cruces are still several years away, we look forward to working with Las Cruces and the Elephant Butte district on a 1920 Act contract when the time is right.

Congress clearly recognized that the needs may change in the areas served by reclamation irrigation projects. Reclamation has used the 1920 Act again and again in the Rio Grande Project to meet the changing needs of the project area. The strict requirements of the 1920 Act have protected and will continue to protect the rights and interests of everyone, the affected States, the irrigation districts, individual landowners and the Federal investment in the project. Reclamation remains committed to work with these and other interested parties in these conversions.

Second, let me shift to the El Paso-Las Cruces Regional Sustainable Water Project. In the early 1990's, water managers in the El Paso and Las Cruces area determined that some long-term planning was advisable. Reclamation provided a little over \$1.1 million for a study to evaluate the ability of the conveyance alternatives to deliver surface water of suitable quantity and quality to each irrigation district and the city of El Paso.

The most viable alternatives then underwent National Environmental Policy Act analysis, resulting in the preparation of the environmental impact statement (EIS) for the sustainable project. Reclamation served as a cooperating agency in that effort. Reclamation also participated as a member of the steering committee of the New Mexico-Texas Water Commission, whose role was to help guide the EIS process for the sustainable project.

We believe that while this EIS was of a programmatic nature, NEPA compliance will be required for future water conversions of the Rio Grande Project. Any water conversions must also be consistent with the statutes under which the Rio Grande Project was authorized and other applicable laws, especially the 1920 Act.

And finally, a few words about desalination. Desalination water reuse and water purification technologies are increasingly viable means to expand our fresh water supplies and maintain water quality. Reclamation has been making investments in developing and implementing these technologies to meet the growing demands for water and relieve stress on over-allocated rivers and ground-water systems. Our storage and delivery facilities and our water and infrastructure laboratories in Denver provide a unique and essential capability that supports and integrates our technical development and research efforts.

In addition to offering opportunities for expanding supplies and improving water quality, alternative—desalination and water puri-

fication technologies that are more energy-efficient can reduce the large power consumption associated with basin transfers and groundwater-pumped water supplies.

Reclamation has successfully implemented Public Law 104-298, the Water Desalinization Act of 1996, and a report to Congress on the findings of 5 years of research conducted under the act is currently undergoing review within the Department of the Interior.

Several of the advances achieved under the act could potentially be applied here. Among those different technologies addressed by the study, at least four appear particularly promising. One, combines wastewater reclamation technology with desalination techniques to purify wastewater to a level that meets or exceeds drinking water standards. Through the use of membrane bioreactors that use less space, equipment, chemicals, and energy, this method may be cost-competitive with conventional methods and have fewer environmental impacts.

Combining the research components of pretreatment intake, advanced membranes, and a high-pressure pumping system to facilitate continued development of acceptable concentrate disposal methods is also promising. Third, a process called dewvaporation, a humidification-dehumidification process that is energy efficient and which uses innovative technology and inexpensive materials. This could be a viable option for low-cost, low-maintenance treatment for small communities.

And fourth, clathrate desalinization is an improved freeze desalinization technique, which facilitates ice-like formation of crystals at higher temperatures using guest molecules. These are all sophisticated research ideas that are part of the report that we are bringing forth to the Congress.

The conversion of irrigation to municipal and industrial uses, the El Paso-Las Cruces Regional Sustainable Water Project, and desalinization are all viable solutions to providing safe drinking water for a growing population. The Bureau of Reclamation remains committed to working with all the stakeholders in the region to manage the water resources in an economically efficient and environmentally sound manner to address future water needs of the changing society and the economy.

Mr. Chairman, that concludes my remarks. Thank you.

[The prepared statement of Mr. Gold follows:]

PREPARED STATEMENT OF RICK L. GOLD, REGIONAL DIRECTOR, UPPER COLORADO
REGION, BUREAU OF RECLAMATION

Mr. Chairman and members of the Committee, thank you for the opportunity to appear today to discuss the Bureau of Reclamation's involvement in meeting the water supply challenges facing the southern New Mexico border region, from Las Cruces to El Paso, Texas and Juarez, Mexico. My remarks today will be primarily concerned with the water contract conversions from irrigation to municipal and industrial uses, the proposed El Paso-Las Cruces Regional Sustainable Water Project, and desalination.

Virtually since its inception in 1902, the Bureau of Reclamation has been involved in the management of water resources in this region, focusing initially on traditional irrigation water management and meeting water delivery, treaty, and compact requirements. As the population growth rates have increased dramatically, the demand for safe drinking water has also increased in direct proportion. The Texas portion of the Hueco Bolson groundwater basin may run out of fresh water by the year 2025 because water is being pumped out faster than it can be replenished. Shifting

from groundwater to surface water for drinking water supply in sufficient quantity and quality has by necessity focused on the Rio Grande Project.

WATER CONTRACT CONVERSIONS

On February 25, 1905, Congress authorized the construction of the Rio Grande Project to supply irrigation water to lands in the Roncon and Mesilla Valleys in southern New Mexico and the El Paso Valley in west Texas. The project also supplies 60,000 acre-feet of water annually to Mexico under the 1906 Treaty obligation. Acting within the laws of the then-Territory of New Mexico, Reclamation filed appropriations for water rights, which included an initial 730,000 acre-feet annually, and subsequently, all unappropriated water of the Rio Grande. Thus, all water in the Rio Grande between Elephant Butte Dam and Fort Quitman, Texas, became Rio Grande Project water supply.

On February 25, 1920, Congress passed the Sale of Water for Miscellaneous Purposes Act (also known as the 1920 Act), authorizing the Secretary of the Interior to enter into contracts to supply water from any Reclamation irrigation project for other purposes. This act grants the Secretary discretion as to the terms of such contracts, but also imposes very specific requirements designed to protect the integrity of those projects and the Federal investment in them:

- Prior approval of the water user organizations must be obtained;
- A showing must be made that no other practicable source of water supply is available;
- Delivery of water under such contracts must not be detrimental to water service for the involved irrigation project or the rights of any prior appropriators;
- Moneys derived from such contracts must be placed into the Reclamation fund and credited to the project from which such water is supplied.

The 1920 Act made it possible for Reclamation to utilize water supplies from irrigation-only projects for other purposes without Congressional re-authorization. This was an important development for projects where no other water supply was available, such as in the case of the Rio Grande Project where all water had been appropriated.

In 1940, the City of El Paso approached Reclamation and the El Paso County Water Improvement District No. 1 to obtain surface water for a growing city. The result was a 1920 Act contract allowing conversion of a portion of the irrigation water supply for municipal and industrial use by El Paso. Thus, a portion of a fully-appropriated water supply was converted without Congressional re-authorization. Over the years, a series of conversion contracts among these parties followed as El Paso continued to grow, along with its need for additional water. The most recent contract, signed in June 2001, will supply the expanded Jonathan Rogers Treatment Plant.

Even more recently, Reclamation met with representatives of the City of Las Cruces and Elephant Butte Irrigation District to discuss Las Cruces' long-range plans to gradually convert Project irrigation water to other uses. Although conversions in Las Cruces are still several years away, we look forward to working with Las Cruces and Elephant Butte Irrigation District on a 1920 Act contract when the time is right.

Congress clearly recognized that needs may change in the areas served by Reclamation irrigation projects. Since 1940, Reclamation has used the 1920 Act again and again on the Rio Grande Project to meet the changing needs of the Project area. During that time, the strict requirements of the 1920 Act have protected, and will continue to protect, the rights and interests of everyone—the affected states, the irrigation districts, individual landowners, and the Federal investment in the Project. Reclamation remains committed to working with these and other interested parties.

EL PASO-LAS CRUCES REGIONAL SUSTAINABLE WATER PROJECT

Beginning in 1997, Reclamation, the City of El Paso, and the El Paso County Water Improvement District No. 1 determined that long-term planning to meet the changing needs of the El Paso-Las Cruces area was advisable. Reclamation provided \$1,105,000 for a study to evaluate the ability of conveyance alternatives to deliver surface water of suitable quality and quantity to each irrigation district and the City of El Paso. A model was developed by the U.S. Geological Survey and a Boyle Engineering/Parsons private consultant to evaluate the interaction between the ground water systems and surface water flows in the Rio Grande. The most viable of the alternatives then underwent National Environmental Policy Act analysis resulting in the preparation of an Environmental Impact Statement (EIS) for the El Paso-Las Cruces Regional Sustainable Water Project (Sustainable Project). Reclama-

tion served as a cooperating agency while the International Boundary and Water Commission and City of El Paso Public Service Board were joint lead agencies for the EIS which evaluated long-range proposals for implementation. Reclamation participated as a member of the Steering Committee of the New Mexico-Texas Water Commission, whose role was to help guide the EIS process for the Sustainable Project. As part of our written comments during the NEPA process, Reclamation is on record that we believe the EIS to be programmatic in nature because the document did not identify specific future sources and amounts of water to be converted and that additional NEPA compliance will be required for future water conversions of Rio Grande Project water. Additionally, we reiterated that any water conversions must be consistent with the statutes under which the Rio Grande Project is authorized and other applicable laws especially the 1920 Act.

DESALINATION

Desalination, water reuse, and water purification technologies are increasingly viable means to expand our fresh water supplies and maintain water quality. Reclamation has been making investments in developing and implementing these technologies to meet the growing demand for water and to relieve stress on over-allocated rivers and groundwater systems. Our many water storage and delivery facilities, and our water and infrastructure laboratories in Denver, part of the Federal Laboratory Consortium, provide a unique and essential capability that supports and integrates our technical development and research efforts. Under Reclamation's Science and Technology Program, Reclamation has made many technological advances and continues to improve water management in New Mexico and Texas along the Rio Grande.

In addition to offering opportunities for expanding fresh water supplies and improving water quality, alternative, more energy-efficient desalination and water purification technologies can reduce the large power consumption associated with basin transfer and groundwater pumped water supplies. As part of a Federal effort to spur desalination research, Reclamation has successfully implemented Public Law 104-298, the Water Desalination Act of 1996 (the Act). A report to Congress on the findings of five years of research conducted under the Act is currently undergoing review within the Department of the Interior. Several of the advances achieved under the Act could potentially be applied to New Mexico to show how the quality of life in water-scarce regions could be improved by increasing water supplies through water desalination.

Among the different technologies addressed by the study and the report, at least four desalination technologies appear particularly promising:

1. Combining wastewater reclamation technology with desalination techniques to purify wastewater to a level that meets or exceeds drinking water standards. Through the use of membrane bioreactors that use less space, equipment, chemicals, and energy, this method may be cost competitive with conventional methods and have fewer environmental impacts.

2. Combining three research components (a pretreatment intake system, advanced membranes, and a high pressure pumping system) to facilitate continued development of acceptable concentrate disposal methods.

3. Devaporation, a humidification-dehumidification process that is energy efficient and which uses innovative technology and inexpensive materials. This could be a viable option for low cost, low maintenance treatment for small communities.

4. Clathrate desalination, an improved freeze desalination technique which facilitates ice formation at higher temperatures using guest molecules.

The conversion of irrigation to municipal and industrial uses, the El Paso-Las Cruces Regional Sustainable Water Project, and desalination are all viable solutions to the same problem, providing safe drinking water for a growing population. The Bureau of Reclamation remains committed to working with all stakeholders in the region to manage the water resources in an economically efficient and environmentally sound manner to address future water needs for a changing society and economy. Mr. Chairman, that concludes my remarks for today.

The CHAIRMAN. Thank you very much.

Ms. Little, go right ahead, please.

STATEMENT OF DEBRA J. LITTLE, PRINCIPAL ENGINEER, ENGINEERING DEPARTMENT, UNITED STATES SECTION OF THE INTERNATIONAL BOUNDARY AND WATER COMMISSION

Ms. LITTLE. Thank you. Mr. Chairman, I am pleased to discuss with you today the role of the International Boundary and Water Commission in working with U.S. and Mexican water users of southern New Mexico and a region that includes both El Paso, Texas, and Juarez, Mexico.

The IBWC was established by the 1889 convention between the United States and Mexico as an international commission composed of a U.S. section, headquartered in El Paso, Texas, and a Mexican section, headquartered in Ciudad Juarez, Chihuahua, Mexico. The IBWC applies the water and boundary treaties between the United States and Mexico and is tasked with resolving all differences that may arise in the application of those treaties.

The two major treaties that define the role of the IBWC in water supply issues of the southern New Mexico border region are the Convention of 1906, also known as the Treaty of 1906, it is entitled "Equitable Distribution of the Waters of the Rio Grande," and the 1944 treaty, known as the 1944 Water Treaty, and it is entitled "Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande."

The 1906 convention provides for the distribution between the United States and Mexico of the waters of the Rio Grande for irrigation purposes in the greater El Paso-Juarez area. Mexico receives 60,000 acre-feet annually at the Acequia Madre, or Old Mexico Canal, in Juarez, Mexico. In case of extraordinary drought, which is not defined by the treaty, the amount delivered to Mexico is reduced in the same proportion as water delivered to U.S. irrigators.

The 1944 treaty extended the terms of the 1889 convention and expanded the duties of the IBWC. In fact, the 1944 treaty is known as making the IBWC the IBWC of today. Decisions of the commission are executed in the form of minutes, and these minutes, when approved by the U.S. and Mexico governments, become legally binding agreements of the two countries.

In terms of the Rio Grande waters, the 1944 treaty provides for allocation between the two countries of these waters between Fort Quitman, Texas, and the Gulf of Mexico. Now, although this part of the river is downstream approximately 75 river miles from the El Paso-Juarez area, the significance of the 1944 treaty for the El Paso-Juarez region lies in several articles of that 1944 treaty.

Among them, Article 3 provides for the preference of joint international water use ranging from, first, domestic and municipal, through agricultural and stock raising, electric power, other industrial, navigation, fishing and hunting, to the last preference described as any other beneficial uses. All of these uses are subject to the preferential attention to be given to the solution of all border sanitation problems.

Article 24 extends to the IBWC the powers and duties to initiate and carry on investigations and develop plans for the works to be constructed or established in accordance with the treaty and other agreements enforced between the two governments dealing with boundaries and international waters.

The IBWC has historically played a major role in the distribution of Rio Grande waters as required by the two treaties mentioned. More recently, it has taken on a leadership of initiatives that stretch the boundaries of its traditional roles. This has resulted in a number of challenges for its century-old experience in international cooperation for the solution of boundary water issues.

These initiatives include the New Mexico-Texas Water Commission's El Paso-Las Cruces Regional Sustainable Water Project, the Paso Del Norte Watershed Council, regional groundwater studies, most specifically the Hueco Bolson, the Rio Grande Citizens Forum for the El Paso-Las Cruces Area, and the Paso Del Norte Water Task Force. These multijurisdictional initiatives all involve, as indicated this morning, layers of competing interests, two different countries, which there are many differing authorities, responsibilities, histories, and jurisdictions covering, in addition, numerous local authorities and two different, very different, U.S. States.

All involve technically complex situations for which there is not always complete or accurate information or data. All present the challenge of how to identify and provide full participation of all stakeholders. Also, all present the challenge of how to find water for the environment, to improve the health of that environment, and still adequately meet the needs of human beings. And finally, all pose the challenge of assuring what is very critical to the International Boundary and Water Commission, an international relationship that is based on parity and comity of both nations.

The El Paso-Las Cruces Regional Sustainable Water Project proposes to protect and maintain the sustainability of groundwater sources for the area by relying on year-round water supply from the Rio Grande. The U.S. section of the IBWC was asked, and agreed, to take on a leadership role for the environmental documentation for this project required by NEPA, the National Environmental Policy Act, for which the record of decision was signed on January 16 of this year.

In addition to this role as the Federal environmental lead, which involved the challenges of dealing with those competing interests, providing full stakeholder representation, and understanding the complexities of long-term effects of the project on the environment, the U.S. section of the IBWC has its traditional and mandated role to assure that treaty, compact, and contract requirements for water deliveries are met. And in regard to parity and comity with Mexico, there is the challenge of addressing varying viewpoints about the extent to which impacts in Mexico should be considered during project implementation.

The Paso Del Norte Watershed Council was formed as an environmental enhancement commitment of the project I just described. The U.S. section of the IBWC has co-chaired the formation of this council with the intent to utilize a watershed approach, the watershed being that of the Rio Grande sub-basin between Elephant Butte Dam, New Mexico, and Fort Quitman, Texas, and to improve the Rio Grande ecosystem while balancing the needs of all stakeholders and foster communication and collaboration among the binational stakeholders in the watershed.

Groundwater study and modeling of the transboundary aquifer, the Hueco Bolson, began in 1995 as an information exchange be-

tween the El Paso and Juarez municipal water utilities. The IBWC formed a binational technical group of local, State, and Federal representatives and produced a binational report blessed by both countries entitled "Transboundary Aquifers and Binational Groundwater Database, City of El Paso-Ciudad Juarez Area." This does consist of a database on ground waters in the area.

This same binational technical group is in the final stages of developing compatible mathematical groundwater models for the Hueco Bolson that will assist authorities in both countries with planning for optimum utilization and administration of groundwater resources of the region.

The challenges posed by this study and modeling effort include moving from data exchange to obtaining more complete information on the aquifer, producing modeling tools that truly are compatible in results, and providing due consideration to the master planning efforts of Juarez in view of decreasing groundwater supply in the minimal resources available to adequately study groundwater conditions.

The Rio Grande Canalization Project was constructed in 1938 and covers 105 miles of the Rio Grande from Percha Dam, New Mexico, to El Paso, Texas. The U.S. section built this project in order to assure the safe delivery of those 1906 convention waters to the El Paso-Juarez area. The project consists of maintenance of the river channel, flood control levies, and a vegetation-controlled floodway to assure the prevention of flooding by river waters.

The U.S. section is currently performing an environmental impact study of the project with the objective of preserving the integrity of the traditional flood protection aspects of the project to assure continued water deliveries of the 1906 convention waters, and to identify and consider environmental enhancement opportunities and nonstructural operational practices that support restoration of native riparian and aquatic habitats.

With the draft environmental impact statement scheduled for December of this year and the record of decision expected by April of next year, the U.S. section faces the challenges of reconciling that traditional role of providing necessary flood protection and safe delivery of joint waters with the interest of the stakeholders in providing water for the environment and utilizing a watershed approach the river management versus the jurisdictional approach.

Rehabilitation of the Rio Grande canalization project features, which consists of two irrigation water siphons and a flume, is needed to assure the structural integrity of these conveyance system for the agricultural community of southern New Mexico. The U.S. section has completed rehabilitation studies of those features, which indicate that river channel degradation has been a cause of the problem, with some field investigations still needed for the flume rehab. The designs for rehabilitation of siphons are complete and construction is planned to commence in the upcoming nonirrigation season.

And in response to community stakeholder interest in this canalization project, the U.S. section of the IBWC formed the Rio Grande Citizens Forum. This forum represents cross-sectional interests in the community, is chaired by a representative of the U.S. section of the IBWC and a community representative from the

Southwest Environmental Center here in Las Cruces, and facilitates dialogue about IBWC projects in the Rio Grande from Percha to Fort Quitman. The quarterly meetings are held alternately in Las Cruces and El Paso, and topics include proposed river parks, non-native species eradication, siphon and flume rehab, which I just spoke about, and upper Rio Grande water operations model.

In April 1999, the IBWC commissioners convened the Paso Del Norte Water Task Force, a regional organization of civic leaders, managers of municipal water utilities and irrigation districts, water users, and water experts from New Mexico, Texas, and Chihuahua, working toward a more sustainable water use in the region. Again, this region being from Elephant Butte Dam to Fort Quitman.

The task force functions as an apolitical advisory organization that bases its work on input from scientific analysis and community consultation.

The task force first study was that of water planning activities in the region. The results of this substitute study were disseminated in the March 2001 report entitled, "Water Planning in the Paso Del Norte Toward Regional Coordination."

Its three broad conclusions are: There are gaps in the information needed for planning. Water entities in this region face many common challenges and issues, and regional coordination in water planning is definitely needed. The major challenge facing this task force and the IBWC as the conveners of the task force is identifying the next steps that can be taken within the current institutional context—and I must stress, there is not a formal regional planning management entity in existence—to move the region towards a more sustainable water future.

This challenge is recognized in the context of the task force stated goals that include keeping abreast of progress being made by others, to avoid duplication of efforts, and submitting policy recommendations to appropriate authorities in Mexico and the United States for resolution of high priority water issues in the Paso Del Norte water region.

Mr. Chairman, as my report has made clear, hopefully, the IBWC's role in working with area water users, both in the United States and Mexico, is one that is based on over 100 years of experience in meeting treaty obligations on water issues between the two countries, and one that is responding to a call for the IBWC to take a stronger leadership role in addressing the challenge of providing a sustainable water resource for the southern New Mexico border region.

I want to thank you for the opportunity to testify on behalf of this agency. And I would like to conclude by inviting my counterpart, Principal Engineer Antonio Rascon of the Mexican section of the IBWC, to present some concluding observations on behalf of the Mexican section. Thank you.

The CHAIRMAN. Thank you very much.

Mr. Rascon, we are very pleased to have you here. Go right ahead.

**STATEMENT OF ANTONIO RASCON, PRINCIPAL ENGINEER,
MEXICAN SECTION OF THE INTERNATIONAL BOUNDARY
AND WATER COMMISSION**

Mr. RASCON. On behalf of the Mexican section of the International Boundary and Water Commission, I would like to stress some aspects that were mentioned by Ms. Little. I would like to point out the efforts that have taken place under the IBWC coordination regarding groundwater in the El Paso-Juarez area.

These efforts included the exchange of groundwater information and the development of a joint report in both English and Spanish as well as a joint development of groundwater flow model that is now next to be finished. This was done by a binational technical group under the IBWC coordination. We had to deal with different tools, criteria, resources and priorities on each side of the border. It has come to develop its own model but under a coordinated scheme.

What each country did was discussed by a binational group in such a way that the results obtained by each country were acceptable by the other. Once the full model is finished, a groundwater quality model could be the next step.

The CHAIRMAN. Could you say that once more? I was not able to hear that. Say that last thing once more.

Mr. RASCON. The groundwater quality model, the first one was a flow model, and the next step could be a water quality model. This would provide more precise information regarding to the water quality distribution in the aquifer, the volumes and location of the fresh groundwater bodies, and the time it will take to—not to deplete the aquifer, because it is quite a big one, but what time will it take for the water quality to decline.

On the other hand, I want to mention that a master plan was developed for Juarez city with the support of BECC, the Border Environmental Cooperation Commission. The master plan describes, among other aspects, which are the water sources for the city, how the water demand is going to grow in the future, which new sources are going to be developed to meet the demand, when the new sources need to be in operation, and what will be the cost to do it.

That master plan clearly indicates what where the water is going to come from to support the future growth and the development of the city, including the Conejos Medano and others that was mentioned this morning. We are talking about a project that is going to supply 12 cubic meters per second by the year 2020.

I also should mention that a regional plan is to be developed with the objective to identify water projects of common interest in the area of Ciudad Juarez-El Paso. The starting point for this regional planning is the master plan in Juarez and the sustainable water project developed for El Paso-Las Cruces.

As a first step, funds were provided through BECC to prepare the terms of reference to develop the regional plan. These are expected to be concluded within the next few months. Options like surface water, groundwater, desalination, or conservation will be evaluated.

The IBWC has supported the efforts of the local agencies. We know that it is very important that the local agencies take the

leadership in identifying the water problems and their solutions. We always offer the experience and support of the IBWC for the binational coordination of these kind of projects that involve international or transboundary waters. Of course, a closer and stronger binational leadership can be achieved by the IBWC when the resources are provided directly to the commission.

As a conclusion, I think that a lot of things have been done regarding cooperation on water issues and a lot need to be done, and I am sure we are going to find a way to do it. Thank you.

The CHAIRMAN. Thank you very much. Thank you for your testimony. Let me see if I could start with some questions for you, Mr. Gold. Have you done anything in the Bureau of Reclamation to determine the cost-effectiveness of any of these potential desalinization/desalination technologies? Is this something that would make sense from a cost perspective?

Mr. GOLD. Yes, Senator. Part of the previous research that was done, does, in fact, deal with how cost-effective some of these techniques might be. I think they still have a long ways to go in terms of being as cheap as some of the current water supplies. But significant improvements, particularly as an example I might give you, the average costs of seawater desalination have dropped from somewhere around \$14 per thousand gallons in the 1950's to between \$2 and \$3 per thousand gallons in the year 2000.

Now, obviously, that depends on power needs and costs, capital recovery and many other things. But it is becoming more attractive. To say it would be attractive enough at this point in time for cities or small entities to rely completely upon desalinization as a water supply is probably a stretch. But we have made great progress, and I think that is the principal reason that we support some continued research to reduce the risk. Let some of these new technologies ripen and get more and more competitive with the ever increasing costs of providing water supplies.

The CHAIRMAN. Let me ask about some of the statements that were made this morning by the representative from El Paso, the utility down there, that the process for water transfer is unnecessarily cumbersome, in his view. Is that something you agree with? Disagree with? Is there anything being done to address that? Or what is your perspective on that, Mr. Gold?

Mr. GOLD. I think it is understandable, John's perspective that it is cumbersome. Keep in mind we are dealing with a set of Federal laws imposed by the U.S. Congress starting in 1905. The most important legislative tool that we have to allow this conversion to take place is the 1920 Act. So a lot of things have changed, and yet we do not have a clear legislative tool that has improved upon that situation.

Now, in our own defense, I think that it is certainly possible, it has been demonstrated possible, to convert from agriculture supplies to municipal supplies. We have a long history of doing that with EP Number 1 going back as far as the 1940's. Mr. Fifer mentioned the several contracts that we have been through.

I think if you go back to the basic requirements that we have, things like being able to do this with the prior approval of the water district, with no other practical source available, cannot be detrimental to the water service of the involved irrigation districts,

and that monies derived have to be placed back to the Reclamation Fund. In the case of Rio Grande Project, it is also really important to keep in mind, it is not a one-district project. It was originally designed with three key participants, Elephant Butte Irrigation District, El Paso Number 1, and the country of Mexico.

So we need to take a position that whatever we do to modify and allow modification to occur to that project that was built in the 1900's, it has to protect all of the participants. Our concern is that the whole project must stay whole as opposed to granting the desires of any given participant. So we think it is important. I admit, certainly, to understanding John's frustration, but certainly it is a possibility. It has been worked through. There are mechanisms that make it work.

Probably the most frustrating part—and we could sort this out with John—but is that from our perspective, the irrigation district, in this case El Paso Number 1, has to agree, and I am sure that has been a very frustrating issue. It is not the Bureau of Reclamation that gets to decide. That water supply was originally intended for EP Number 1, and the law for conversion requires us to have their agreement.

The CHAIRMAN. How do you respond to the criticism that getting these transfers to occur provides an opportunity for the Bureau of Reclamation to essentially take its pound of flesh as part of the process? What is your response to that?

Mr. GOLD. My response would go like this. If you looked at the total cost that the United States invested in building the Rio Grande Project, certainly I think all would agree that a fairly substantial portion of those costs are not repaid. We have a situation where the local districts have repaid their irrigation obligations, as Gary Esslinger said this morning, and we agree with that.

The problem is there were other Federal investments that were not repaid. There are also the mechanism of whether or not the United States has a continuing interest, and we do not need to go there. That is part of litigation that is ongoing in this basin. But that is also one of the threshold issues. Even though the project has had its irrigation repayment repaid, is there a continuing interest in the project by the United States?

My answer would be yes, because, again, of the three entities who are the linchpins of the project, the two irrigation districts and Mexico.

To assume that the United States has no further interest just does not get there for us. So yes, it is a small amount, I think it is like a 5 percent or \$5 an acre-foot in a water supply that I do not know the most current exchange rate, but it is probably upwards of \$150 or \$200 an acre-foot, a fairly modest contribution to the United States.

The CHAIRMAN. Is it your thought that these laws, these old laws that you operate under here in approving these conversions, that those should be modernized and simplified? Is that what I heard you to say?

Mr. GOLD. I do not know that I would suggest that. I would simply say that they are the tools that we have. Could they simplify the life of some of the folks out there who are trying to convert from ag to M&I? Very possibly. I think the risk is that if you were

to open those laws and start to try to achieve what any given interest might want, many other interests might also come to that now legislative debate about how they would like to see the arrangements changed between the United States and its districts. So it is tender ground, from my perspective. It may, in fact, help the frustration, but it may, in fact, hinder it.

The CHAIRMAN. So you think that the political and institutional constraints imposed by the Federal bureaucracy, which John Burkstaller referred to, are not near as great as he was indicating?

Mr. GOLD. I think the demonstrated impact is that it works. We can get the job done. We can convert water from ag to M&I with the agreement among the local sponsors. If they can come to that agreement about what makes sense, we can get it done. And we have demonstrated that many times in the Rio Grande Basin.

The CHAIRMAN. Ms. Little, let me ask you about some of the testimony we had this morning. I thought it was interesting, particularly the State engineer's suggestion that if Mexico goes ahead with the development of this Conejo field of wells, that that would cause the State to believe that the Federal Government, perhaps, should revisit this obligation to provide 60,000 acre-feet of water each year.

Because as I understood his testimony, he was saying that development of that field will, in fact, reduce the flow of water in the Rio Grande, that is, that New Mexico is able to provide.

Ms. LITTLE. I think the first thing that would have to be established is that that is a fact, that the development of the Conejos Medanos would, in fact, reduce the river flow. That would be the first thing. But he was correct in stating that should that be an allegation on the part of the State of New Mexico, that it would be appropriate to take that to the national level, because it would be a dispute under the 1906 treaty, and the IBWC is tasked with resolving disputes under that treaty.

The CHAIRMAN. Has the IBWC looked into that question of whether or not the putting of those wells in this Conejos Medanos would, in fact, have that effect?

Ms. LITTLE. No, we have not. As a joint effort, we have not.

The CHAIRMAN. Is that something you intend to do or should do?

Ms. LITTLE. I would say, as you stated earlier this morning, that it is very appropriate to do joint monitoring and studies of what the actual physical conditions of transboundary aquifers are.

The CHAIRMAN. So you think it is an appropriate thing to look at jointly?

Ms. LITTLE. Yes, jointly.

The CHAIRMAN. What about this concern I raised this morning, if we do not have agreement on the two sides about what the current status of the water supply is in these various aquifers and, therefore, we do not have agreement on the projected depletion of the aquifers. It seems to me that is a sort of a real basic kind of a thing, which I would have thought that the IBWC would have been able to accomplish that.

I would have thought that would be one of the main purposes of the IBWC, would be to get this consensus developed about what the water availability and needs are along the border. Am I wrong in that?

Ms. LITTLE. Well, yes, I would address that. Let me first mention that groundwater is not something, as I mentioned, that was addressed in the 1906 or the 1944 treaties. It is implied that because we have the duty to conduct studies affecting boundary water issues, that, of course, we could and should play a role in transboundary aquifers or groundwater.

There is a more specific obligation under one of our minutes, Minute 242, that actually deals with the Colorado issue of groundwater. But from that, there is a basic, basic responsibility for a groundwater treaty to be developed between the two nations. That has not occurred, and it is something that the IBWC would be tasked with actually developing.

What has happened is that in various locations along the border, groundwater issues have been studied and in some places jointly studied—and I would say El Paso-Juarez is probably at the forefront of that—have been studied, but on an aquifer-by-aquifer basis. There is no agreement between the two nations on groundwater management, none whatsoever.

I do think it is appropriate that we work in that direction. The IBWC, both sections, believe it is appropriate. But I think you pointed out this morning something basic, that there is a tremendous resource investment in actually determining what are the conditions of the groundwaters. There are projections made. There is not agreement with the country of Mexico that those projections are made on accurate and correct information.

Regardless, it does not diminish the fact that it is a critical situation and that we need to move forward jointly, not unilaterally, jointly with the country of Mexico. And in doing so, major challenges are involved because of the resources available to actually study and get accurate information.

The CHAIRMAN. Well, bringing it down to sort of bedrock, from my perspective, if, in fact, you have these predictions being published in the literature that Juarez is going to run out of water by 2005—

Ms. LITTLE. A projection that is made by the United States.

The CHAIRMAN. Right.

Ms. LITTLE. Not by Mexico.

The CHAIRMAN. Not by Mexico. But that is 4 years down the road.

Ms. LITTLE. Yes.

The CHAIRMAN. Four and a half.

Ms. LITTLE. If it is correct. That is right.

The CHAIRMAN. Yes. It seems to me that it should be someone's priority to figure out if it is correct.

Ms. LITTLE. That is right.

The CHAIRMAN. What is happening that has not already happened to try to get a binational effort to figure out if that is correct?

Ms. LITTLE. Well, the effort that I talked about, which is the groundwater study of the Hueco Bolson, in which USGS participated, we are projecting by the end of this year to have a report on the model, which would show the actual flow characteristics of that. But it would be one that is produced—that would actually have binational agreement on what is happening in that aquifer.

As Engineer Rascon stated, though, it is not addressing water quality. We need to invest time and money and expertise in actually looking at the quality of the aquifer. Engineer Rascon mentioned there is probably adequate water. It is the quality of that water that is available. And I agree that that effort needs to go forward. And I do believe, as somebody mentioned this morning, that that needs Federal support dollars in order to advance that.

The CHAIRMAN. Federal support to determine the quality?

Ms. LITTLE. The quality as well as the other physical characteristics of that aquifer.

The CHAIRMAN. So the USGS work that has been done to date is not adequate to tell us what we need to know?

Ms. LITTLE. It is not complete.

The CHAIRMAN. And you agree with that, Mr. Rascon?

Mr. RASCON. Well, I think that a lot of things have been mentioned. Maybe I would like to start by the Conejo Medano development is a development that is going to take place quite south from the border. We are talking about some kilometers south of the border, and quite a big distance from the Rio Grande. And the 1906 treaty is regarding of surface water, so we need to decide whether we want a groundwater treaty—at this moment, we do not have a groundwater treaty—and make the necessary studies in order to define whether an impact, if there is an impact from the developments that are being planned in New Mexico. But the developments are taking place or are planned to take place quite south from the border.

Regarding the Hueco Bolson, the joint efforts that were taken were mostly exchange of information and not flow model. The flow model is providing some results, but not the distribution of the water quality in the aquifer. There is a lot of information that I am sure that could be used and maybe was used by the USGS and they could have obtained some figures on the Mexican side. But the results that have presented to the Mexican part were not well supported when they were presented.

The conclusion was that we need more detailed information regarding the characteristics of the aquifer in order to arrive to a more specific conclusion. And we can say that it can take 5 years or 20 years. It depends on some parameters that we input to the model.

The fact is that the water in the aquifer is being over-exploited very well within the aquifer. We are taking more water than it is being recharged. The water quality is declining. But we are not saying that we are going to get out of water. The water is there. The aquifer is quite big. We are going to have water of poorer quality. We are talking about water quality more than quantity.

The CHAIRMAN. So you think there is adequate water, it is just poor quality. The quality is going to continue to deteriorate as you drain the aquifer?

Mr. RASCON. Yes, it is being deteriorated. We know that there is a declining in the quality of water, and it is going to continue. As a matter of fact, there are some wells that need to be abandoned because of the quality, but there are other areas where the quality is still good.

So it is a matter of defining what are the areas where the quality is going to continue to be good. So we need more detailed studies in order to clearly identify where are different water bodies.

The CHAIRMAN. What is happening to bring about these more detailed studies that you seem to support and that the U.S. side seems to support? Is this strictly a matter of not having enough dollars to proceed? Is that where we are?

Mr. RASCON. Well, I think when we want to develop groundwater studies along the border, we need to—we have different priorities. We have different criteria. And in order to develop a joint study, we need to put together our interests on both sides of the border. And we understand that in the United States, there are a lot of resources, personnel, and capabilities to develop these studies.

We need to select specific areas to start this joint effort, because the capabilities on the Mexican side are more limited. So we identified some specific sites to develop these studies, and El Paso-Juarez was one of them so, we started to exchange information and all those kind of things.

The CHAIRMAN. Who are the primary—I mean, we have had a discussion here this morning and here again this afternoon about all of the different agencies, Federal, State, local, that have responsibilities here on the U.S. side. Who are the counterparts on the Mexican side, across on the Juarez side?

Mr. RASCON. Well, we have the Mexican section of the International Boundary and Water Commission.

The CHAIRMAN. Right.

Mr. RASCON. And then we have the National Water Commission. In general, the water is a Federal—is something that is managed federally. They give concessions to the States or the cities to develop some aquifers or some wells. So the coordination in this case in the Mexican section was with the Mexican section of the National Water Commission and the La Junta de Agua, the local utility.

The CHAIRMAN. Let me ask, Ms. Little, you refer in your testimony to the review that is now going on, and I guess you are coming, a NEPA study, I believe?

Ms. LITTLE. In connection with the canalization project?

The CHAIRMAN. Yes, in connection with the canalization. Is it your expectation that the end result of that will be a change in policy so that the clearing of vegetation along the Rio Grande will cease or be moderated?

Ms. LITTLE. I think moderated is probably an appropriate term. The alternatives that are being studied at this point, I believe there are four alternatives—I may be mixing that up with the lower Rio Grande EIS, so I better step back from that. But there are varying degrees to a complete outside the jurisdiction of the IBWC alternative, in other words, a true approach that would involve actions on the parts of jurisdictions that are not necessarily within IBWC authority. But I do think that we are looking at modifying, certainly modifying our traditional approach to the floodway.

The CHAIRMAN. And that can be done under your existing statutory authority, as you see it? I mean, there is no need for Congress to change the law in order to bring about that change in policy?

Ms. LITTLE. That is correct.

The CHAIRMAN. Well, I think this has all been useful. I think there are a lot of issues that have been raised and we will undoubtedly follow up on with some additional questions in the future. Thank you all very much. Appreciate it.

Ms. LITTLE. You are welcome.

Mr. GOLD. Thank you.

The CHAIRMAN. Well, thank you all very much for coming and thank the witnesses again for the testimony. I think this has been a useful airing of issues, and we will try to follow up on some of these suggestions. We will conclude the hearing.

[Whereupon, at 2:32 p.m., the hearing was adjourned.]

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