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**BILL HUME\***

## **Water in the U.S.-Mexico Border Area\*\***

### **ABSTRACT**

*The hydrology of groundwater and the flow of surface water do not recognize the international boundary between the United States and Mexico. The jurisdictions of different bodies of law—both among the border states in the United States and between the United States and Mexico—further complicate the problem. Agreements between the United States and Mexico have not kept pace with changes in demand for water both for municipal-industrial use and agricultural use in the border areas. An international conference in La Paz, Mexico, examined some of the most pressing points of friction over water in the border area.*

### **BORDER GROUNDWATER CONFLICT LOOMS**

Disputes over control and use of groundwater beneath the U.S.-Mexico border constitute a heretofore obscure international issue that threatens to grow into a major problem between the two countries. Transboundary groundwater management was the subject of an international conference held in La Paz, sponsored by the Ford Foundation, the International Transboundary Resources Center of the University of New Mexico, and the School of Social Ecology at the University of California, Irvine. Water experts, including academics and water systems officials, met for three days of discussions. The meeting was the latest in a series on border water issues.

While surface water issues between the two countries are comprehensively covered in treaties and agreements, there are no such agreements on groundwater. Groundwater basins don't respect international borders, and where they cross, there is no mechanism for dividing up the water. But, water users in both countries ultimately share a common effect of the groundwater use on both sides.

"No subject seems to be surfacing more rapidly than groundwater," said John Bernal of El Paso, Texas, commissioner on the International Boundary and Water Commission. From the impending depletion of the Hueco Bolsón, an aquifer that serves municipal water use from Las Cruces to El Paso to Ciudad Juárez, Mexico, to a contentious

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dispute over the proposed lining of a major irrigation canal serving California's Imperial Valley, and many others in between, a proliferation of groundwater use issues span the border.

"The political will of the two governments is to remain free of any commitment," said Alberto Székely of Mexico City, who holds the rank of ambassador in the Mexican foreign service and is a specialist in environmental and natural resources matters. "They don't want precedent. So how are you going to build up a set of rules when everything is non-precedential? "If you leave it to the incremental approach, all we are going to have is crisis after crisis,...a legal vacuum."

Stephen P. Mumme, of Colorado State University in Fort Collins, who presented an overview of the groundwater situation, said he favored an incremental method to solving the problems, rather than the global treaty negotiation favored by Székely. "One cannot help but be struck by the complexity of this dispute when considered on a border-wide basis," Mumme said. "At least 18 different problem areas scattered across eight geographic zones could be identified in the general literature on groundwater conditions along the Mexico-U.S. border, and it is fair to say that this probably understates the number and particularity of the types of problems...."

Susan Liberman Goodman, U.S.-Mexico coordinator for the U.S. Department of the Interior, noted the fragmented nature of jurisdiction over groundwater matters in the United States. The states have authority over groundwater use, but the federal government has sole authority to enter into international agreements. And, among the states the rules on groundwater differ significantly. Arizona and New Mexico have rules that tie groundwater use to hydrology, while "in Texas, the landowners can pretty much pump whatever they want," Goodman said. She spoke in favor of tackling the problem on a basin-by-basin approach, because "politically, within the United States, it would be impossible to gain consensus" on a comprehensive U.S.-Mexico groundwater treaty.

The interests of the United States as a whole might clash with the interests of border region water users in particular instances. "The Department of the Interior should represent the interests of the entire country in water agreements with Mexico, even if the interests of the entire country are counter to those of the border states," said Helen Ingram of the School of Social Ecology at the University of California Irvine.

Just as there is no consensus on the U.S. side on international groundwater issues, the situation is worse on the Mexican side. "The voices of the users in Mexico should be heard," said Alfonzo Cortez-Lara, researcher at *El Colegio de la Frontera Norte* in Mexicali, Mexico. "Cultural differences among Mexicans should be overcome. They should be empowered to receive the information [about water issues] on the Mexican

side. We need to disseminate information among the Mexicans, then develop a common position for discussions with the United States."

On the U.S. side of the border, few other than groundwater users in the border area have any knowledge of, or interest in, transboundary groundwater issues—though the issues have the potential to force deep and comprehensive changes on human activities on both sides of the border. Székely isn't optimistic for progress in the near term. "I think the United States has lost respect for Mexico in international negotiations as a result of the NAFTA negotiations," he said. "As a result, we have seen a return of the foreign policy of the United States from the nineteenth century, where [Washington] either blames the courts or blames the states for not being able to do anything."

"We will get to the negotiating table sooner or later," Székely said. "Issues are piling up—and water, for me, is at the top of that agenda. The longer it waits, the more it piles up and the harder it will be."

### TIME IS RUNNING OUT FOR THE HUECO BOLSÓN: EL PASO-JUÁREZ RUNNING OUT OF WATER

*Cities never have enough water. They never want to have any limit to their growth.*

Helen Ingram, School of Social Ecology, University of California, Irvine

Perhaps the most ominous groundwater time bomb on the U.S.-Mexico border is the ravenous thirst of the twin cities of El Paso, Texas, and Ciudad Juárez, Chihuahua. Both are sucking water from a single underground pool. Juárez depends entirely on the Hueco Bolsón for its domestic water supply; El Paso depends significantly on it. At current rates of pumping, it is estimated that the economically recoverable freshwater supplies of the Hueco Bolsón will be exhausted by 2025. "We see our water table drop, we see everyone with their straw in the same glass, and we need to do something about that," said Octavio E. Chávez of the International City/County Management Association in El Paso, presenting an analysis of the Hueco Bolsón situation.

The implications of Hueco depletion reach up into New Mexico as well. The Hueco extends from the Tularosa Bolsón in the vicinity of Alamogordo, down across Doña Ana County and the Las Cruces area, through the El Paso corner of Texas and into Chihuahua State in Mexico. The Mesilla Bolsón, west of the Hueco, also crosses the border. The physical problem is simple; the geopolitical problem is incredibly complex. There is no treaty or international agreement allocating the use of water from the shared, international aquifer. On the U.S. side, the two states of Texas and New Mexico have different laws governing groundwater use, with no superintending federal authority. Still, the reality of the situation

makes the international water users inseparably connected. What happens in Juárez affects supply in El Paso and up into southern New Mexico. And, the reverse is also true.

Growth on both sides of the border brings exponential urgency to the problem. In 1940, the population of El Paso was 96,810; Juárez, 55,000. In 1960, the two cities were virtually equal in population, with El Paso at 276,687 and Juárez at 276,995. But then the population soared on the Mexican side. In 1995, El Paso had grown to 600,000; Juárez to 1,040,533.

"On the Juárez side, it is like the Mexican inflation: It is always going up," observed Chávez wryly. But, until recently, there was not even any exchange of information across the border on groundwater use—much less any cooperation. El Paso even sought to conceal from Juárez the amount of water it was withdrawing from the Hueco for its smaller population during the course of the New Mexico-El Paso water lawsuit of the 1980s (on which New Mexico spent some \$8 million and El Paso some \$11 million), Chávez said. One result of that lawsuit, which El Paso ultimately lost, was the international sharing of data, culminating in "Transboundary Aquifers and Binational Groundwater Data Base, City of El Paso/Ciudad Juárez, Final Report, January 1998."

While the exchange of information began in earnest in 1995, said Antonio Rascón, of the *Comision Internacional de Limites y Aguas*, in El Paso-Juárez, the report was the first report ever in which all the wells, hydrological information and pumping data from both sides of the border were compiled in a single document—even though both had been pumping from the same source from the beginning of their municipal water systems.

"The history of Juárez has always been a deficit in service," said Chávez. "In Juárez, not everyone has water, and those that are connected to the system don't always have access to water." Chávez reported that the groundwater level has fallen as much as 45 meters since 1940 on the Juárez side. One well in Juárez has dropped more than 30 meters in just 25 years. "In general, all Ciudad Juárez' wells evidence sharp rates of water level declines," Chávez reported. And, the water is projected to run out in about 25 years.

El Paso is increasing its use of processed surface water from the Rio Grande, and has ambitious plans to greatly increase its Rio Grande use through water rights purchases from Elephant Butte Irrigation Project users. The city of Las Cruces is pursuing similar plans. Long-term plans in Juárez also include use of surface water, but "there is not a plan" for implementation, Chávez said. The implications of Hueco Bolsón depletion cannot be overstated. It could cause loss of groundwater extending as far as the Alamogordo area in New Mexico. It could trigger a situation for border unrest of ominous proportions.

If the water runs out, "a national security problem" looms, warned Alberto Székely. But, the very urgency of the situation, coupled with its unavoidable international nature, combine to make an international solution desirable.

"The Hueco has many considerations which make it ripe for local settlement," observed Mumme. "The question is who takes the initiative to kind of husband this along?"

"There's hope," said Gustavo A. Moreno Martinez, chief of the geohydrology department of the *Junta Municipal de Agua y Saneamiento de Juárez*. "We are certainly engaged in cooperation."

But in the meantime, Juárez continues to grow, El Paso continues to grow, Las Cruces is one of New Mexico's fastest growing urban areas and the state is actively seeking to develop a major port of entry at Santa Teresa. Over it all hangs the time bomb of the rapidly draining regional mother aquifer, the Hueco Bolsón.

### **COLUMBUS, N.M. AND PALOMAS, CHIHUAHUA, JOINED ACROSS THE BORDER BY THE MIMBRES AQUIFER: BORDER TOWNS DEplete SHARED WATER**

The Mimbres River, which rises in the Black Range of southwestern New Mexico, used to resurface in a series of lakes in the vicinity of Columbus, New Mexico, and Palomas, Chihuahua, but the lakes disappeared during the 1960s due to groundwater use on both sides of the border. The two communities, and nearby agricultural areas in the two countries, depend upon a single water source: the Mimbres Basin. Though the flow of the groundwater is generally north to south, depletions in the Columbus area may be reversing that flow, resulting in a danger of surface pollution on the Mexican side being drawn back beneath the border into the aquifer on the U.S. side. And, like most transboundary aquifers, the long-term trend is toward running out of water.

Elaine Moore Hebard of Albuquerque, while a graduate student in the Department of Community and Regional Planning in the University of New Mexico School of Architecture, organized a "water festival" in 1997 for school children in the communities of Columbus and Palomas. It was a "bottom-up approach" to educating people on both sides of the border about the problem. She reported on the Mimbres Basin and on her education efforts to the international conference.

Lying under what was long a sparsely populated, arid border region, the Mimbres Basin includes portions of Grant County and most of Luna County in southwestern New Mexico and extends some 35 miles into Chihuahua State on the Mexican side, though its boundaries in Mexico are less precisely defined. The aquifer may have been in a state of equilibrium

between water use and surface recharge before the onset of electric turbine pumps enabled the economical extraction of groundwater for irrigation.

"Until pumps came along, agriculture was a minor part of the activity around Deming," said Hebard. Starting in the 1940s, agriculture grew on both sides of the border, and today, Luna County grows more chile than Doña Ana County, which is famous for its Hatch chile. Between the growth in agriculture and the attractiveness of the area as a retirement location, population gains have been steady. Deming grew 76 percent from 1970 to 1999, Hebard said, and similar growth has occurred on the Mexican side.

"It's interesting to note that when Tysseling wrote 'Projections of Water Availability in the Mimbres Drainage Basin to 2005,' the [Deming] population was projected to be 21,200 in 2005, a number already exceeded," Hebard noted. A 1978 report noted that between 1950 and 1960, water levels decreased about five feet in the area of the border. Between 1960 and 1970, depletion drew the water level down between three feet to four feet a year. One area just east of Columbus witnessed a dramatic 140-foot drop in the water table between 1950 and 1970, Hebard reported. The result is what hydrologists call a "cone of depression" in the Columbus area, Hebard said. The water levels in the cone are drawn down below the surrounding water level, causing groundwater to flow toward the cone of depression. That creates a groundwater pollution potential for the U.S. side.

On the Mexican side of the border, Palomas has an antiquated, leaky sewer system. "While there is a primary treatment facility, treatment is limited to separating out the solid waste from the liquid, which is discharged directly into an arroyo east of town, finally seeping into the ground," Hebard reported. "Both the treatment plant and the arroyo are only a few blocks from the international border." There is a danger that the south-to-north groundwater flow caused by the cone of depression will draw contaminants from the Palomas sewage treatment system into the groundwater on the U.S. side.

The communities of Columbus and Palomas are connected by historical, familial, and economic ties. They share a dependence on the Mimbres Basin's groundwater—but they have no shared system of allocation to preserve supplies for the future. The 1997 water festival taught children about the realities of water use in the border area. It was an outgrowth of a series of meetings on water quality in the Columbus-Palomas area. A second *Festival del Agua*, again involving children from both communities, was scheduled for March 20, 1999, Hebard said.

The objective is to increase public awareness about the facts of the dwindling water supply, in the hope that out of knowledge will come an effort to establish international efforts to conserve water. Like El

Paso-Juárez, Columbus-Palomas faces a danger of exhausting its shared groundwater supply if the two communities can't get together on planning.

"We should acknowledge the extreme backwardness of community participation in Mexico as the result of an authoritarian regime," said Alberto Székely. "It is not surprising, then, that there is so little social participation [in water issues] on the Mexican side."

In Palomas-Columbus, the seeds of mutual understanding of the shared water problems are being sowed by Hebard's international water festivals. It is a necessary prerequisite to reaching joint solutions.

### **INTERNATIONAL CONTROVERSY OVER GROUNDWATER SEEPAGE FROM THE ALL-AMERICAN CANAL: CANAL FIGHT SHOWS WATER CONSERVATION HAS CONSEQUENCES**

To U.S. water planners, the lining of California's All-American Canal from Imperial Dam to the agricultural areas of the Imperial Valley is a water conservation measure. To Mexicans in the Mexicali Valley, just across the border from the canal, it is an unjust taking of water that currently flows to Mexico. The two contrasting viewpoints highlight an immutable law of water use: Any "savings" of water always comes at the expense of some other use or destination of the precious commodity. The debate over the lining of the All-American Canal turns on the kind of issues that would be mirrored here if the Middle Rio Grande Conservancy District (MRGCD) in central New Mexico ever undertook to line its ditches to "save" water. Any resulting savings would be at the expense of groundwater in the district, and would result in water supply and ecological implications that would offset the water savings to the MRGCD.

The All-American canal runs from the Imperial Dam, on the Colorado River between Arizona and California, across the bottom of California along the international border, to the Imperial Valley near El Centro, California. The Metropolitan Water District, which serves the growing San Diego area west of the Imperial Valley, coveted the valley's agricultural water. Ultimately a deal was worked out whereby the canal would be lined, and the Metropolitan Water District would get the lion's share of the water savings. From the U.S. perspective, it was a win-win situation. Water that was being lost into the ground would instead be delivered to San Diego for beneficial use. As a concession to Mexico, the lined canal would be designed with increased capacity, with an additional 500 cubic-feet per second to be delivered to Mexican farmers in the Mexicali Valley, across the border from Calexico, California.

Discussions of the project were held with Mexico in the early 1990s. "The U.S. position is that Mexico agreed to this project in 1993," said Michael J. Clinton of El Centro, California, a former Bureau of Reclamation



engineer knowledgeable about the project. "I would expect construction to start on this lining project probably in the year 2000."

"No. The consultations with the government of Mexico are not closed, they are still going on," said Alfonso Herrera Solis, commissioner for the *Comision Internacional de Limites y Aguas*, in El Paso, Texas. Lining the canal would result in a "reduction of recharge to the aquifer of 70 million cubic meters per year" with serious consequences for the salinity of the groundwater in the Mexicali Valley in Mexico. "U.S. officials know this information, but they ignore it. More negotiations are needed, according to the Mexican government's view, of the negative consequences to Mexico."

The timing of the canal lining project's discussion posed a unique problem for Mexicali water users. "Another extra-legal element that makes this a different kind of dispute...is that it reached critical stage at the time of the discussion of NAFTA," said Alberto Székely. The blanket policy in Mexico City was that there would be *no* controversy with the United States while NAFTA was being finalized, consequently there was no advocacy for the Mexican interests in the All-American Canal discussions. "Regardless of whether Mexico has rights or not, there is harm being done," said Székely. "Once again, the lack of a legal framework [on international groundwater matters] works in the favor of the United States. It always has and it always will."

Alfonzo Cortez-Lara, a researcher with *El Colegio de la Frontera Norte* in Mexicali, stated that his organization's polling on the Mexican side indicated that 67 percent of Mexicans got water from the aquifer, 86 percent expected a loss of income if the canal is lined and 90 percent expected that costs of production would skyrocket. Cortez-Lara said the estimates of annual loss to seepage from the canal were about 64,000 acre-feet per year.

The result of all that seepage, according to Clinton, is a dome of groundwater that follows the route of the canal, offset by a cone of depression from excessive pumping across the border in Mexico. "Concern started to build by the middle sixties, particularly in Arizona, that this depression in groundwater would create a float, and that water would be lost by the United States to Mexico," Clinton said.

"We are in this mess because the Mexican government has not defended its position," said Székely. "That deal will have to be paid by someone sooner or later," if the canal is lined and the negative results come to pass in Mexico. "The bottom line is that the Mexican government needs to put this on the front of bilateral negotiations with the U.S. government."

So, what U.S. engineers view as a cut-and-dried water conservation project is viewed in Mexico as a confiscation of groundwater to which Mexico is entitled. Mexican officials feel the giant to the north is ignoring treaty obligations to consult with Mexico on border area projects that affect both countries. The United States takes the position the consultation is

already completed. For the people involved on both sides of the border, it is a live controversy over what is legal and equitable in a contentious international groundwater question.