



# The Good, the Bad, and the Arid

*Do the United States and Mexico need a new treaty to help them better manage the Rio Grande?*

**BY DAVID HURLBUT**

**N**obody needs to tell residents of southern Texas and northern Mexico that the last five years have been dry. They already know it's worse than even the so-called drought of record nearly half a century ago. The 1950s were just as dry, but back then there were only a third as many people in the region as there are today.<sup>1</sup> The economies of Texas and Mexico have become more integrated, and on both sides of the border urban infrastructure—especially for drinking water and sewage treatment—has often failed to keep up with industrial development and population growth.

Texas's most-populous border counties have been among the state's fastest-growing areas. Mexico's three most-populous northern states are growing faster than the Mexican national rate.<sup>2</sup> Juarez, across from El Paso, and Nuevo Laredo, across from Laredo, today are two of Mexico's most important employment centers. The additional municipal and industrial demand for water have come on top of the historical demand for irrigation near El Paso and Juarez, forcing farmers on both sides of the border to compete for water with economically stronger rivals.

Much has changed since the last drought. Two things that have not,

however, are the treaties that govern how much water each country gets.

Behind today's crisis of supply and demand lies a crisis of planning. On both sides of the river—known in the United States as the Rio Grande and in Mexico as the Río Bravo—water planning has traditionally been conducted with one hand tied behind the back. Neither side knew what was happening on the other—either in terms of water supplies or projected demand.

The political battle in the United States over the North American Free Trade Agreement in 1992, however, helped draw back the information curtain separating water planners in Texas and northern Mexico. New institutions were created to address natural resource and environmental issues along the border. In addition, state and national agencies concerned with water resources—aided by improved technology such as remote sensing and geographic information systems—have increased informational exchanges with their counterparts across the river.

Economic integration, technological advance, and a spirit of cooperation notwithstanding, the two governing international agreements—one of them almost a century old—constrain what can be done to address the current water crisis and avoid future ones. Experts have proposed alternative treaty models designed to help, rather than hinder, binational water planning.<sup>3</sup> Those ideas went nowhere when they were first mooted, but now that the recent drought has shown the day of hydrological reckoning to be clearer and nearer, perhaps it's time for the United States and Mexico to

consider negotiating a new water treaty better suited to addressing the problem as it exists today.

### One River, Two Treaties

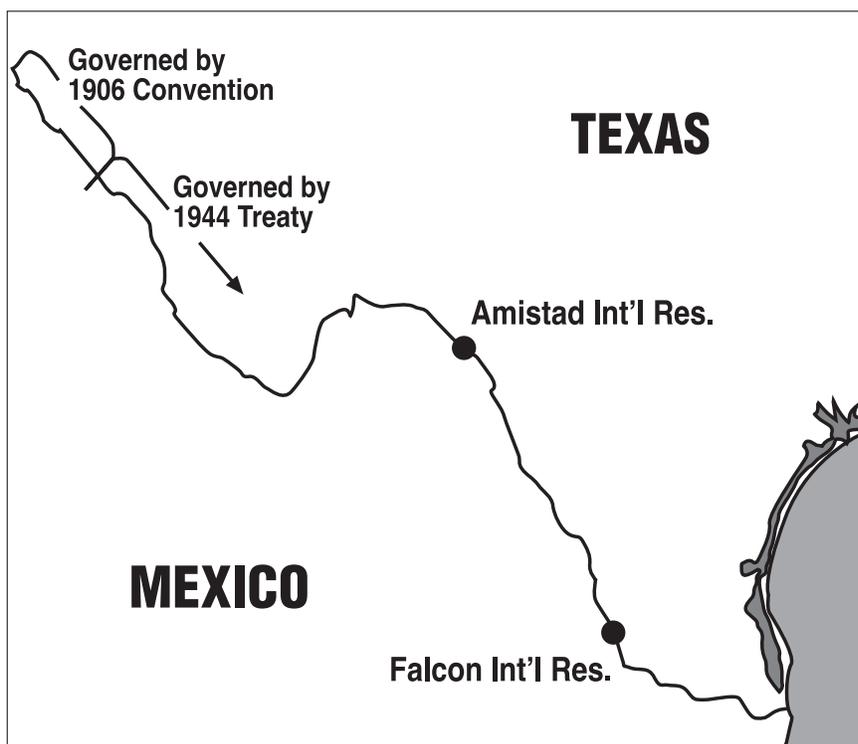
The stretch of the Rio Grande that separates the United States and Mexico comprises two segments that differ both legally and hydrologically. The sister cities of El Paso, Texas, and Ciudad Juarez, Chihuahua, constitute the economic hub of the upper segment. In this area, a 1906 agreement governs how much of the river the United States must deliver to Mexico each month; Texas gets the rest.

Immediately below El Paso/Juarez, the stream flow virtually disappears during all but the wettest years. Eventually, upstream from Amistad International Reservoir, the Rio Grande is created anew by such rivers as the Río Conchos from Mexico and the Pecos River from the United States. From Amistad International Dam and Reservoir to the Gulf of Mexico, the river is controlled, its channel essentially a conveyance for water stored in Amistad and Falcon International Reservoirs. Ownership of the water in this segment of the river is determined by a detailed water-accounting regime established by treaty in 1944.

### The Good: The 1944 Treaty

The treaty of 1944 accomplished several things. First, it called for the construction of three international dams and reservoirs along the Rio Grande/Río Bravo.<sup>4</sup> Second, it created the International Boundary and Water Commission (IBWC) and charged it with setting the location of the dams and reservoirs, overseeing their con-

Figure 1: The Rio Grande and its international reservoirs.



struction, and operating them for the benefit of both countries.

Third, the treaty apportioned the water in the 14 major tributaries that flow from Texas and Mexico into the Rio Grande/Río Bravo. Water from two Mexican tributaries is entirely Mexico's. Water from the six U.S. tributaries belongs entirely to the United States. Water from the other six Mexican tributaries is allocated between the two countries, two-to-one in favor of Mexico.

All other inflows are divided equally, as is the channel flow from the last downstream reservoir, Falcon Reservoir, which has been released specifically for the use of either country.<sup>5</sup> Finally, the treaty stipulates that during periods of low flow, the United States shall get at least 350,000 acre-feet (432 million cubic meters) per year from the six shared Mexican tribu-

taries. To make compliance feasible, the flows are averaged over a five-year period so that a shortfall in one year can be made up the next. The treaty worked reasonably well until the 1990s.

In 1995, drought hit northern Mexico hard. Many municipalities in the state of Chihuahua faced severe water shortages. In response, Texas agreed to loan Chihuahua 81,000 acre-feet of water to be taken from the U.S. share of the Conchos River flowing into the Rio Grande/Río Bravo from Mexico.<sup>6</sup> The IBWC implemented this historic agreement, as provided by the 1944 treaty. Although Mexico didn't draw on this hydrological line of credit, the agreement established a precedent for cooperation and quick response during a time of crisis.

A more serious problem was developing, however. From Novem-

ber 1992 to October 1997, Mexico fell short by some 1 million acre-feet of the 350,000 acre-feet per year it is obligated to provide Texas.<sup>7</sup> Because the latter part of this period coincided with the beginning of the drought, reservoirs in Mexico fell to critically low levels, and flows in the six tributaries that were to be shared fell far below what was necessary to deliver on Mexico's obligation.

In Texas, the water deficit hit the agricultural sector especially hard. The U.S. share of water in the international reservoirs is allocated to farmers only after all municipal water rights are secured.<sup>8</sup> Consequently, any reduction of inflows to the United States comes at the expense of Texas irrigators. The most serious effects occurred in 1998, when a number of major irrigation districts in Hidalgo and Cameron Counties ran out of water near the end of the peak irrigation cycle.

Mexico has been working to make good on the water deficit, and during the first half of 2000, it transferred 135,000 acre-feet to the United States.<sup>9</sup> That volume—equivalent to 13 percent of the accumulated deficit—was part of Mexico's share of water stored in Falcon and Amistad Reservoirs and was transferred early enough to provide additional peak-season irrigation to Texas farmers. The effect on Mexican farmers has yet to be tallied, however. The transfer exacerbated a sharp decline in the amount of water Mexico had in the two reservoirs, and by June 2000, the country's combined storage was under 220,000 acre-feet, less than 9 percent of its storage capacity.<sup>10</sup> Mexico's water in storage was still around that same level as of February 2001, compared with

43 percent for the United States.

To ensure that the same problem does not arise during the 1997-2002 period, the IBWC assigned to the United States a larger proportion of the water flowing into the Rio Grande/Río Bravo from Mexican tributaries for most of 2000. The goal was to deliver 400,000 acre-feet for the year, enough to satisfy the requirement of the treaty and to hedge against further water deficits.

### **The Bad: The 1906 Treaty**

Compared with the detailed treaty of 1944, the 1906 Convention for the Equitable Distribution of the Waters of the Rio Grande at El Paso and Ciudad Juarez is concise and simple. It grants Mexico 60,000 acre-feet of water per year except during drought, keeps the rest for Texas, and establishes absolute U.S. sovereignty over the upper Rio Grande, before the river becomes the international boundary.<sup>11</sup>

The 1906 agreement is most notable, however, for what it does *not* do. The century-old treaty says nothing at all about the aquifer system lying beneath El Paso and Juarez, which provides both cities with most of their domestic water. Nor does it provide any legal authority for officials from Juarez and El Paso, or from Chihuahua and Texas, to respond jointly to water crises that affect both sides. Consequently, the agreement is rather inflexible—the institutional boulder around which all other efforts must flow.

Historically, El Paso has relied on groundwater for most of its municipal supplies. As its population has grown and aquifer levels have fallen, however, the city has had to purchase a larger por-

tion of its water supply from the agricultural sector's main supplier of irrigation, El Paso County Water Irrigation District, whose members hold rights to the largest share of the surface water not given to Mexico. Purchased surface water from the Rio Grande/Río Bravo now constitutes more than 40 percent of the city's municipal water supplies, compared with 20 percent in the early 1980s.<sup>12</sup> And even though the city has been rather successful with water-conservation measures, reducing municipal consumption from approximately 200 gallons (760 liters) per capita per day in the late 1980s to fewer than 170 gallons (640 liters) in the late 1990s, population growth has outstripped its conservation efforts. Consequently, total municipal water use has grown from under 117,000 acre-feet in 1990 to more than 127,000 acre-feet in 1997.<sup>13</sup>

Groundwater is being used up much faster than it can be replenished. El Paso takes a considerable amount of water from the aquifer system—73,000 acre-feet in 1997—while on the Mexican side, authorities estimated a total annual extraction of 250,000 acre-feet in 1995.

Officials in Texas and Mexico differ widely in their estimates of the aquifer's annual recharge. The Texas Water Development Board estimates that 24,000 acre-feet of water replenish the aquifer each year. Mexico's Comisión Nacional del Agua, on the other hand, estimates the recharge to be 235,000 acre-feet.

Whatever the actual number, more is being pumped out than is going back in. And while the amount of freshwater stored in the aquifer is also unknown, the U.S.

Geological Survey concludes that, without effective management, the aquifer could be depleted in this century.

To complicate matters, the largest source of recharge for the aquifer is the Rio Grande/Río Bravo itself. Thus, farmers and city-dwellers on both sides continue to draw down the aquifer *and* use up the surface water that would otherwise help recharge it. Neither side has much choice. Both are caught in a dilemma of the commons; potential solutions exist, but they require cooperation, a measure of short-term abstinence and investment, and trust that the other side will carry its share of the burden. Without an institutional framework that puts both sides on equal footing and provides credible measures for joint monitoring and enforcement, the only alternative for either is to continue pumping.

### **Dealing with the Arid**

While not perfect, the 1944 treaty has set important precedents for binational management of a shared river. The foremost lesson is the value of ongoing diplomatic exchange. When supply issues became complicated, the IBWC provided a forum for discussing problems and exploring options. Mexico may not be eliminating its water deficit as quickly as farmers in Texas's Lower Rio Grande Valley would like, but resolution would, in all likelihood, be much slower in coming had the U.S. State Department been the only place Texas farmers could take their grievances.

Second, hydrological intelligence has been a key part of the IBWC's role. The detailed information it gathers on water flows

and storage form the basis of domestic surface-water management in the region. Little time was spent arguing over how much water Mexico owed the United States, leaving officials a clearer table to discuss options.

Third, the principle governing water allocation under the 1944 treaty is equitable apportionment of the amount of water the IBWC determines is available. Neither party has a priority interest.

Finally, and perhaps most significantly, the construction of dams and reservoirs ensured that more water would be available to apportion.

In stark contrast, the 1906 convention is doing nothing to help El Paso and Juarez deal with their shared water problems and forestall the threat of water bankruptcy. A new treaty—modeled after the 1944 agreement—for El Paso/Juarez is in order. The treaty should:

- Define the hydrological area comprising the Rio Grande/Río Bravo and the aquifer system underlying El Paso and Juarez, declaring it an international hydrological zone.
- Expand the IBWC's authority to include the El Paso/Juarez international hydrological zone.
- Give to the IBWC the task of deducing aquifer recharge on a regular basis.
- Apportion the deduced aquifer recharge between the United States and Mexico, crediting to each country the recharge occurring on its territory and dividing, on a pro rata basis, the recharge occurring from the stream bed of the Rio Grande/Río Bravo.
- Apportion surface water of the Rio Grande/Río Bravo between the United States and Mexico on a pro

rata basis. This measure would supercede the 1906 convention.

■ Establish a procedure to set aggregate groundwater withdrawal ceilings for each country, based on the volume of deduced recharge it owns.

■ Give the IBWC authority to limit total groundwater withdrawals to less than the recharge rate if the aquifer is in danger of permanent damage.

■ Give to the IBWC the task of monitoring groundwater withdrawals from all wells in the international hydrological zone.

■ Establish a procedure by which each country may exchange some of its surface-water credit for some of its groundwater credit; that is, either side would be allowed to use more groundwater if it used less surface water, and vice versa.

■ Provide for the construction of facilities to enhance aquifer recharge and meter all wells.

A treaty based on this model would not preclude the acquisition of water supplies from outside the hydrological region. For example, El Paso has purchased raw land in other parts of west Texas to acquire the rights to the underlying groundwater. If these aquifers are outside the international hydrological zone and water from them is piped to the city, El Paso's groundwater balance with the expanded IBWC would be unaffected. In fact, as this treaty is proposed, El Paso could even receive credit for any return flows that are pumped into the international aquifer.

The principles underlying this proposal are squarely at odds with Texas water law. Texas holds to the common-law rule of capture, in which groundwater is generally held to be the private property of whoever owns the land above it.

Nevertheless, the U.S. Constitution clearly establishes that an international treaty ratified by the Senate overrides any state law.<sup>14</sup>

Moreover, both the Texas legislature and the Texas Supreme Court have tacitly recognized that the rule of capture is untenable in areas where aquifers are the main source of water.<sup>15</sup> Thus, if the United States and Mexico both deem it in the public interest to create by treaty a special international hydrological zone around El Paso and Juarez, to be managed bilaterally, Texas's rule of capture would be rendered inapplicable in the zone defined by the treaty.

Changing treaties is an ambitious undertaking, however. Even though it is the hydrological debtor in the current crisis, the Mexican government has shown little interest in modifying the 1944 agreement. This is understandable; reopening the treaty threatens the status quo, raises uncertainty, and risks creating more problems than solutions. Still, as El Paso and Juarez move ever closer to hydrological bankruptcy, the risk of change may become less frightening than the risk of keeping things the same. ■

*David Hurlbut is a former water policy research associate at Lyndon B. Johnson School of Public Affairs, the University of Texas. He is currently a senior economic analyst at the Public Utility Commission of Texas, in Austin. Nothing in this article reflects the policies or the position of the commission.*<sup>16</sup>

## NOTES

1. U.S. Bureau of the Census, "Population of Counties by Decennial Census, 1900 to 1990" (Washington, DC, 1994); U.S. Census Bureau, "County Population Estimates for July 1, 1999 and Population Change: April 1, 1990 to July 1, 1999" <<http://www.census.gov/population/www/estimates/countypop.html>>.

2. Instituto Nacional de Estadística, Geografía e Informática, "Encuesta Nacional de la Dinámica Demográfica" (Mexico City, Mexico, 1997).

3. See, for example, Robert Hayton and Al Utton, "Transboundary Groundwaters: The Bellagio Draft Treaty," *Natural Resources Journal* 29 (1989), pp. 663-722.

4. Falcon Dam was completed in 1953; Amistad Dam was completed in 1969. The treaty also provides for a third dam and reservoir at a site to be recommended by the International Boundary and Water Commission and approved by the governments of Mexico and the United States.

5. Utilization of Waters Treaty of the Colorado and Tijuana Rivers and of the Rio Grande, Treaty between the United States of America and Mexico, 1944 Treaty, Article 4 <<http://www.ibwc.state.gov/FORAFFAI/1944.HTM>>.

6. International Boundary and Water Commission, Minutes No. 293 (El Paso, Texas, October 4, 1995).

7. John M. Bernal, Commissioner of the U.S. Section of the International Boundary and Water Commission, news release (El Paso, Texas, May 4, 2000). One acre-foot equals 1,233 cubic meters or 325,500 gallons.

8. Under the water-accounting procedures used by Texas water officials along the lower and middle Rio Grande, a certain amount of the U.S. allocation is always set aside to ensure municipal water rights are completely satisfied. Each month, new reservoir inflows are

used to replenish the reserves, and the residual is then allocated among holders of irrigation rights. See Texas Administrative Code, Title 30, Chapter 303, subchapter C.

9. Bernal, press release (May 4, 2000).

10. IBWC, current storage conditions (June 2000).

11. Since 1980, deliveries to Mexico have met treaty obligations. Nonetheless, the 60,000 acre-feet allotted to Mexico, which may have been sufficient in 1906, is far below irrigation demand. The 53,000 acres of Mexico's Juarez Valley Irrigation District use the 60,000 acre-feet Mexico receives under the 1906 agreement, about 88,000 acre-feet per year of groundwater, and another nearly 38,000 acre-feet of *aguas negras* (wastewater) from Juarez. Comisión Nacional del Agua, "Programa Hidráulico de Gran Vision del Estado de Chihuahua 1996-2020" (Mexico City, June 1997).

12. Texas Water Development Board, "Water Use by Municipal User for 1980-1996" <<http://www.twdb.state.tx.us/data/wiic/wiic-data.htm>> (Austin, Texas, April 27, 1999).

13. *Ibid.*

14. Article VI, clause 2. An important U.S. Supreme Court decision, *Sporhase v. Nebraska ex rel. Douglas*, 458 U.S. 941 (1982), also affirms groundwater's value as an article of commerce, thus making it subject to the Constitution's interstate commerce clause despite any state law to the contrary.

15. In recent years, the Texas legislature has expanded the powers of groundwater conservation districts, although it has stopped short of striking down the rule of capture completely. The state supreme court upheld the legislature's approach in 1999, but at the same time noted the inequities caused by the rule of capture. *Sipriano v. Great Springs Waters of America, Inc.*, 1 S.W.3d 75 (Texas, 1999).

16. This article was written while the author was at the Lyndon B. Johnson School of Public Affairs, the University of Texas.