

# **Navigating the Waters of the Texas-Mexico Border: Hydrological and Logistical Challenges of Operating Along an Asymmetrical Boundary**

Karen Manges Douglas, Sam Houston State University  
Holly Lyke-Ho-Gland, Sam Houston State University  
Rogelio Saenz, Texas A&M University

## **Introduction**

Like many places where hydrological and geopolitical boundaries are mismatched, the U.S.-Mexico border region has a long history of dispute over water. Indeed, depending upon the abundance or scarcity of water, the relationships along the border region between the United States and Mexico alternates between friendly or antagonistic. Conflicts are aggravated by the region's sustained population growth which has strained the area's water supplies. Juxtapose onto this a fragmented and contradictory water management system, which treats surface and groundwater as distinct entities and governs each accordingly, and the potential for additional conflict magnifies. While no doubt frequent droughts exacerbate the ambivalent relationship between the two nations so to do the asymmetrical relations that exist. And while information exchange between the United States and Mexico has improved considerably over the past twenty years, their footings are far from equal.

This chapter details the sometimes contentious debates surrounding water along the United States-Mexico border broadly and more narrowly the Texas-New Mexico- Mexico segment of the Rio Grande Basin with special attention to what is referred to as the Paso Del Norte segment which extends from Las Cruces, New Mexico to Fort Quitman, Texas and encompasses portions of the Mexican state of Chihuahua. This segment of the U.S.-Mexico border includes two of the largest and most dynamic twin cities -- Ciudad Juárez, Chihuahua and El Paso, Texas. The focus will be both on the hydrological dimensions which serve as natural

constraints and on the asymmetrical relations between the two nations that pose barriers to arriving at a long-term, workable solution regarding their shared resources. For example, decisions as to whether or not projects will be financed in pesos or dollars significantly impact their relative desirability and feasibility for each nation. U.S. agencies like the International Boundary and Water Commission (IBWC) have sizeable personnel and resource advantages over their Mexican counterparts (Comisión Internacional de Límites y Aguas or CILA). What, if any, are the discernible results of these resource and staffing imbalances? Further, constant personnel changes within Mexican agencies have made forging long-term and trusting relationships with their U.S. counterparts difficult. This asymmetry extends to more mundane decisions such as where bi-national conferences are to be hosted. U.S. hotel costs when translated into pesos prohibit attendance by Mexicans. After providing a brief description of the Rio Grande/Rio Bravo river basin, we then present a historical overview of the present-day conflicts before detailing some of the institutions and organizations that have formed to cope with the problems delineated. This chapter concludes with a brief look at the North American Free Trade Agreement (NAFTA) and what this agreement has meant for relationships between the two nations.

### **The Rio Grande/Rio Bravo River Basin**

The headwaters of the Rio Grande are in the San Juan Mountains of southern Colorado traversing some 1,885 miles, through New Mexico and Texas before emptying into the Gulf of Mexico. The Rio Grande is classified as an “exotic stream” because it tends to shrink in size as it flows downstream (Patino et al., 2003). On the U.S. side, the river basin spans three states: Colorado, New Mexico and Texas; and five Mexican states: Chihuahua, Durango, Coahuila, Nuevo Leon and Tamaulipas. The border region depends upon two main surface water

tributaries – the Colorado River and the Rio Grande (Rio Bravo) –both of which flow from north to south, and numerous smaller rivers that flow mostly from south to north.

Covering approximately 180,000 square miles, the basin region is fairly evenly divided over the United States and Mexico: slightly more than half of the basin (151,871 miles) resides within the United States while 140,863 miles is in Mexico. Over the years, surface water amounts have been highly variable depending both upon rain and snowfall amounts in faraway catchment regions. While these contributory catchment zones encompass a 335,000 square mile region, per Patino et al. (2003), only about half this area actually contributes water to the Rio Grande as runoff in the remaining region either evaporates or gets absorbed into the ground.

The basin has been divided into a variety of sub-basins. For example, Patino et al. (2003) divide the basin into two sub-basins – the Upper Rio Grande watersheds that include Colorado, New Mexico and part of Texas; and the Lower Rio Grande Basin that includes parts of Chihuahua, Durango, Coahuila, Nuevo Leon, Tamaulipas and Texas. Jurgen Schmandt (2002) divides the basin into four segments which include the Upper Rio Grande, the New Mexico segment, Paso del Norte and the Lower Basin. Our focus in this chapter is the Paso del Norte segment.

The Paso del Norte section of the Rio Grande Basin is bounded by the Elephant Butte Dam and Presidio, Texas. Cities in this segment include Las Cruces, New Mexico, and El Paso, Texas in the United States and Ciudad Juárez in Mexico. Of the total 1.5 million acre-feet of water which includes ground and surface sources, 71 percent goes towards agricultural uses. Las Cruces relies completely on groundwater for its drinking water, while as mentioned earlier, El Paso and Ciudad Juárez have been transitioning from groundwater reliance to surface water. El Paso has transitioned to surface water from the Rio Grande using groundwater to make-up its

shortfall, while Ciudad Juárez still remains heavily dependent upon the Hueco Bolson aquifer for its water supply. The Elephant Butte Dam which delineates the beginning point of this segment releases approximately 800,000 acre-feet of water per year for in-stream flows. Given the arid nature of this region, the dam also loses significant portions of its holdings to evaporation.

### **Historical Roots to the Present-Day Conflicts Dividing the Rio Grande**

The signing of the Treaty of Guadalupe Hidalgo in 1848 ceded more than half of what had been northern and western Mexico to the United States. Border conflicts between the two nations soon ensued (Acuña, 2006). Water and land jurisdictional issues arose as the boundary proved elusive with each flood event. According to David Lorey (1999), the dividing boundary between the two countries was both arbitrarily drawn and has periodically shifted, as floods have continually reshaped the natural terrain. Indeed, it was because of continued disputes over the borderlands and water dividing the two countries that the International Boundary Commission formed forty years later in 1889 (the name was formally changed to International Boundary and Water Commission in 1944) to administer and broker the numerous treaties and agreements between the two countries resulting from all-to-common border disputes (see IBWC website: [http://www.ibwc.gov/About\\_Us/history.html](http://www.ibwc.gov/About_Us/history.html)).

Also important to keep in mind is that water apportionments, especially in the west, whether by treaty or the U.S. Bureau of Reclamation or some other compact were primarily for irrigation and agricultural purposes. Municipalities were not the focus. Consequently, cities like El Paso despite its riparian location along the Rio Grande have no direct access to this water.

By the 1900s, upstream Rio Grande water diversions in Colorado and New Mexico had significantly and negatively altered the amounts of water reaching El Paso and Ciudad Juárez. Mexico was staking claim to its historical usage of the Rio Grande; the U.S. postured that

Mexico had no rights to the water. The ensuing legal and political battle led eventually to the Convention of 1906 – a water treaty between the United States and Mexico which allotted Mexico 60,000 acre-feet annually of Rio Grande water for irrigation purposes (Spener, 2007: <http://www.sarweb.org/home/images/whatsnew/9Spener.pdf>). To facilitate deliveries of negotiated water, the United States constructed Elephant Butte Dam in New Mexico which was to ensure water for Mexico and also to an irrigation system built by the Reclamation Bureau below Elephant Butte dam to supply enough water to New Mexico in which to irrigate some 88,000 acres (administered by the newly authorized Elephant Butte Irrigation District), and water to Texas (administered by the El Paso County Water Improvement District No. 1) in which to irrigate approximately 67,000 acres (Littlefield, 1991).

Even with the Treaty between the United States and Mexico in 1906 and the Rio Grande Compact of 1905 (also referred to this as the Rio Grande embargo), it was not long before the region was enmeshed in yet more conflict. This time the source of the conflict traced to upstream of Elephant Butte Dam where greater amounts of water were being diverted to the extent that downstream users began to complain that “insufficient supplies were reaching Elephant Butte Reservoir” (Littlefield, 1991: 5).

Eventually out of this dispute came the Rio Grande Compact of 1938 (began as a temporary accord in 1929 between Colorado, New Mexico and Texas) which divvied the waters of the Rio Grande from its headwaters in southern Colorado through New Mexico to Fort Quitman, Texas. Early debates prior to the adoption of this accord were whether or not Texas should even be included in the discussions at hand. Texas stakeholders, predictably, were lobbying hard for a seat at the table. And the eventual accord, after much heated debate and lengthy litigation, involved all three states: Colorado, New Mexico and Texas.

Historically, the Rio Grande via the Elephant Butte Irrigation District supplied an average of 280,000 acre-feet of water per year. Irrigated agriculture in west Texas has historically received approximately 200,000 acre-feet of Rio Grande water annually. Urban and domestic water has generally been fulfilled using groundwater sources (Earl and Czerniak, 1996). The city of El Paso, Las Cruces and Ciudad Juárez, for example, have depended upon groundwater as their primary sources of water.

### *El Paso's Thirst for Water*

As described earlier, growth within the Paso del Norte region has been quite dynamic. The border cities of Ciudad Juárez in Mexico and El Paso in the United States represent one of the largest regions along the entire 2000-plus mile stretch of the U.S.-Mexico border. On its own, El Paso is one of the largest U.S. border cities with more than a half a million residents. Once the economic driver of the region, El Paso now takes a back seat to sister city Ciudad Juárez whose growth has been spurred by the employment demands of the *maquiladora* industry. Government services and military are the leading economic drivers of the El Paso economy (Dallas Morning News, 2004).

Regardless of which side of the border one is referencing, Rio Grande waters are earmarked for agriculture. Both Ciudad Juárez and El Paso have relied exclusively on groundwater to slake their urban and industrial thirsts for water. Not surprising given the near exponential population growth the region has experienced, by the 1970s both the productive capacity and water quality of the primary groundwater source, the Hueco Bolson, began to significantly diminish to the point that engineers on both sides of the border began to sound the alarm bells regarding its life expectancy. Indeed, according to Liverman et al. (1999), the level of the Hueco Bolson has fallen approximately 150 feet since 1940. Heeding these warnings, the

city began efforts to shore up its water supply. The city of El Paso was able to negotiate access to a modest amount of surface water from the Rio Grande but by and large, the agricultural interests remained wary to the idea of El Paso tapping into “their” water. The city also began to inject treated sewage back into the Hueco Bolson as a means to bolster its dwindling supplies. However, with no forecasts calling for a diminishment to the population growth (indeed, El Paso’s forecasted 2030 population exceeds 1 million residents), the city of El Paso began casting about for new sources of water. The following summarization of El Paso’s hunt for new water draws from Richard Earl’s and Robert Czerniak’s (1996) article entitled “Sunbelt Water War: The El Paso-New Mexico Water Conflict” published in the *Social Science Journal*.

As historically many others have done before, El Paso turned its gazes westward. One particularly fertile and relatively inexpensive source that quickly came into view was Mesilla Bolson, the largest deposits of which are in New Mexico. With an estimated 30 million acre-feet of water, and much of the land above these deposits federally owned by the U.S. Bureau of Land Management, by locating its desired wells on this land, the city of El Paso would not have to undergo the tedious task of purchasing private water rights from landowners. Thus, the Mesilla was viewed as an ideal source of new water for the city of El Paso. As reported by Earl and Czerniak “...El Paso Water Utilities described the Mesilla and Hueco basin water as their ‘bridge to the future’” (1996: 367).

However, in New Mexico, unlike Texas, both surface and groundwater are under the jurisdiction of the state. Potential users must first request and receive a permit from the state before tapping into these resources. Further, New Mexico had a state law on its books dating to the 1950s that banned “any export of water from a declared basin because such water belonged to the state and to do so would entail giving away state property” (Earl and Czerniak, 1996: 367).

In September 1980, El Paso filed suit claiming that New Mexico's groundwater law was in violation of the interstate commerce clause of the U.S. Constitution. Days after filing their lawsuit and per the state of New Mexico's requirement, El Paso filed an application for 266 wells and 246,000 acre-feet per annum of groundwater from the Mesilla Basin and for 60 wells and 50,000 acre-feet per year from the Hueco. Round one of what would ultimately be a decade-long war had commenced.

Texas' lawsuit had been put on hold pending a decision in the *Sporhase v. Nebraska* case before the U.S. Supreme Court. Decided in 1982, the *Sporhase v. Nebraska* decision found that Nebraska water law "imposed an unreasonable burden on interstate commerce." With this decision, El Paso and the state of Texas pressed forward their lawsuit in U.S. District court claiming that New Mexico's 1953 water law banning the export of water was unconstitutional given the *Sporhase* decision. Also in light of this decision, the New Mexico legislature modified their water laws and passed the 1983 Water Export Act. Modified again in 1985, this new law included a provision that applicants for groundwater had to demonstrate a need for this water within a 40-year time frame. And on this basis, in 1987 New Mexico denied El Paso's application on the grounds that Texas had not established a legitimate need for New Mexico's water within the 40-year time period required by law. Thus began Round Two.

This conflict would embroil New Mexico and Texas in a water debate that lasted throughout the rest of 1980s and into the 1990s. The battle was being litigated on both state and federal levels as El Paso appealed New Mexico's decision before both the U.S. district court and the New Mexico district court. However, when the U.S. district court deferred to state courts (which El Paso would also appeal this decision before the U.S. Court of Appeals), Texas would have to argue its case first before the state of New Mexico before taking any grievances to the

federal level. In 1985, the New Mexico district court dismissed El Paso's appeal "on the ground that the city failed to give proper notice of the appeal to 288 individual members of the Elephant Butte Irrigation District who had protested the El Paso well applications in 1985" (Earl and Czeniak, 1996: 370). El Paso appealed. In 1989, the New Mexico Court of Appeals ordered both sides into arbitration. According to Earl and Czeniak (1996), little progress on negotiating an agreement between the two sides was being made until 1) the U.S. Court of Appeals rejected El Paso's appeal of the District court's decision that they pursue their claim in state court; and 2) Steve Reynold, New Mexico's water engineer, died. Following these events, concerted efforts were made on both sides resulting in a 15-item Settlement Agreement signed by all parties on March 6, 1991—thus officially ending the decade-long fight.

The settlement agreed to by El Paso, Elephant Butte Irrigation District and the Regents of New Mexico State University, holds that, among other things: El Paso agrees to end its litigation; El Paso agrees that water conservation measures should be explored first to meet its water demand followed by efforts to secure surface water before turning to groundwater options; all parties will work together to study, identify and address common concerns and objectives with respect to water resources in the region; and that conserved water is the property of those responsible for its conservation. The settlement also created a joint commission (which is now the New Mexico-Texas Water Commission) to oversee the provisions of the agreement. Having examined the historical record of conflict over water in the region, we now examine the contemporary situation.

### **Present-Day Context**

The challenge of finding enough water to sustain growing and thirsty populations has left many scrambling. This increasingly common scenario is compounded when the area is arid and

drought-prone. Throw in a shared border and a shared resource with another nation and the challenges compound almost exponentially. Thus is the case of El Paso and its border neighbor, Ciudad Juárez.

As we have shown above, tensions over water between the United States and Mexico are nothing new. Like most places where hydrological and geopolitical boundaries are mismatched, the border region has seen its share of conflicts dating to shortly after the signing of the Treaty of Guadalupe Hidalgo in 1848.

That both countries are presently bounded by treaties dating to the early part of the twentieth century (1906 and 1944) that has seen the border region's population more than quadruple over the past 100 years is seen by some as part of the problem. However, the agreement under which both countries currently operate was negotiated while the United States was actively seeking Mexico's support for war causes of the United States and its Allies during World War II and thus provided Mexico with some negotiating leverage (García-Acevedo and Ingram, 2004). However, per García-Acevedo and Ingram "such opportunities for leverage do not exist at this time" (2004: 24). Long-time border scholar Steven Mumme agrees: "...the political barriers to achieving such revisions [to the treaties] are sufficiently great as to justify the search for more achievable policy reforms" (1999: 151). Indeed, given the tremendous power and resource asymmetry between Mexico and United States, one can only assume that Mexico would not fare well in treaty negotiations at this juncture in time.

As alluded to earlier, population growth in the region has been tremendous. According to Lorey (1999), between 1950 and 1990, on the Mexican side of the border, the border population more than tripled itself (from 3,762,963 in 1950 to 13,246,991 in 1990) while that of the U.S. side expanded over two and half times (from 19,728,191 in 1950 to 51,926,828 in 1990). Growth

within the Paso del Norte region has been especially marked for the sister cities of Ciudad Juárez and El Paso. For example, Ciudad Juárez's population expanded 50 percent from approximately 0.8 million to about 1.2 million between 1990 and 2000. El Paso's growth, while not as great as that experienced by Juárez, still expanded 16 percent over the decade to more than half a million in 2000.

Further, this growing trend is expected to continue in the coming decades although at a slower rate than the previous decades. According to the Texas Water Development Board's (TWDB) State Water Plan, population growth for Planning Region E (96% of this region's population resides in El Paso County) is expected to increase 79 percent between 2010 and 2060 to 1,527,713. Correspondingly, municipal water demands are projected to increase 51 percent to 234,351 acre-feet from 155,375 acre-feet, respectively.

As a result of the tremendous population growth, the surface waters of the Rio Grande/Rio Bravo are tapped out. "The dispute [between the United States and Mexico] stems from the fact that people are legally entitled to more water from the Rio Grande than is actually in the river itself," explains the BBC News in a 2003 news report on the effects of a lingering drought that exacerbated tensions (BBC: 2003) The region has radically transformed socially, politically, economically and hydrologically since the 1940s.

Diminishing supplies of water and diminished water quality in a quickly growing but drought-plagued region add fuel to the continuing conflict. The U.S.-Mexico border region is hot and dry with annual rainfall averages of less than 8 inches. These factors contribute to high levels of surface water evaporation. The variable surface water supplies have fostered an increasing dependence upon groundwater sources of water. This increasing dependence upon groundwater for water has led to significant mining (water withdrawals exceeding deposits) of

the region's aquifers to the extent that they have become highly vulnerable to and indeed are experiencing diminishing water quality. Per one report, the Hueco Bolsón aquifer, which supplies water to the cities of El Paso and Ciudad Juárez, has only a 20-year usable supply remaining (García-Acevedo and Ingram, 2004). As a result, the city of El Paso has heavily transitioned to surface water supplies from the Rio Grande to fulfill its water needs with supplementation from the Hueco Bolsón to meet the shortfall. Nevertheless, with projected water demands totaling close to 600,000 acre-feet of water by 2050, El Paso still faces a future water shortfall (Kelly, 2002).

Although Mexico does not agree with the dates attached to U.S. predictions regarding the useable life of the Hueco Bolsón, it does not dispute the fact that this source over time will be mined to the point where it will no longer be financially feasible to continue to withdraw. And Mexico is taking steps to secure additional sources of water or bolster its existing source, Ciudad Juárez remains almost totally dependent upon the Hueco Bolsón for its water supply. Thus, Ciudad Juárez is facing acute water shortages in the very near future. With water use projections estimated to be about 300,000 acre-feet per year by the year 2020 (Kelly, 2002), Ciudad Juárez is facing a critical shortage.

That the city of El Paso has undertaken a variety of water sustaining efforts, however, cannot be viewed as unrelated to or isolated from what Ciudad Juárez is doing. Clearly, there is a looming environmental crisis with regards to Ciudad Juárez's water future if its main source of water remains the Hueco Bolsón. Ciudad Juárez continues to be a population magnet for maquiladora-related employment and border cities have traditionally been gateways for immigrants making their way to work in the United States. On the U.S. side, the growing

military and related personnel at Fort Bliss, through its increasing prominence as a military base in light of closures of other bases across the country, has increased water demands in the region.

Both cities have engaged in finger-pointing squabbles. For example, El Paso blames Ciudad Juárez for failing to construct water treatment plants to improve the water quality of the Rio Grande (Mexico discharges significant amounts of untreated wastewater directly into the Rio Grande) and for over-pumping their shared aquifer, the Hueco Bolsón, without having a long-term strategy for addressing their critical water needs (Garcia-Acevedo and Ingram, 2004). Residents and officials of Ciudad Juárez, on the other hand, point out that despite recent improvements in per capita water consumption among El Paso residents, El Pasoans still consume twice as much water as do their Ciudad Juárez cousins.

Further compounding the border region's woes is the fact that no single management authority exists to manage the water resources of the border region. Instead, management responsibility is fragmented and split between the governments of the United States and Mexico, the various states (Texas and New Mexico in the United States and Chihuahua in Mexico), and several districts and municipalities. And while the International Boundary Water Commission is in place, its responsibilities are more administrative rather than managerial – charged with administering the brokered agreements between the two countries, not managing the resources themselves. “Why this issue is difficult is because we don't have the rules for how to address this kind of scenario,” explained Arturo Herrera of the International Boundary and Water Commission concerning the most recent water dispute with Mexico (as quoted in BBC News: 2003).

Moreover, a legal system in the United States that governs separately groundwater and surface water adds yet another complicating dimension to the border water situation. Further

confusing matters are that each state within the United States has its own laws governing surface and groundwater. In Texas, for example, groundwater and surface waters are treated as separate entities despite their hydrologic connections. While surface water is under the jurisdiction of the state, which is responsible for its allocations and appropriations, groundwater regulation is only variably regulated—some under the limited control of groundwater districts and others operating under the longstanding “rule-of-capture” doctrine which allows a landowner to pump as much groundwater as he/she wants without liability so long as the damage inflicted upon a neighbor is not maliciously done. Note here that this does not protect the neighbor from the damage of over-pumping, simply from the damage of “malicious” over-pumping. Nicknamed “the law of the biggest pump,” Texas courts continue to uphold its principles, the most recent example of which occurred in 1999 when the Texas courts unanimously ruled in favor of Ozarka Natural Spring Water Company and against landowner, Bart Sipriano, who claimed a well drilled by Ozarka had caused his well to go dry. Texas is the only western state that continues to operate under this antiquated groundwater principle.

On the Mexican side, water regulation has undergone a tremendous shift. Once viewed as property of the state and a constitutional right of every citizen, Mexico has more recently begun reforms to reshape its policies to more closely resemble the United States shifting from a communal view towards one that promotes private water rights, privatization of the management of water supply and the conduct of cost-benefit analysis in the development of regulatory standards.

### **A Demographic and Economic Profile of the El Paso and Ciudad Juárez**

As we have mentioned earlier, the El Paso-Ciudad Juárez region has grown tremendously over the last several decades. The region has also experienced major changes in its economic

base as well. We provide here a demographic and economic profile of the two cities relative to each other and relative to their respective countries to better understand the links between demographic and economic changes and the demand for water.

### *Reversing Social and Economic Roles*

Interestingly, the social and economic roles of the border regions of Mexico and the United States have shifted significantly over the last several decades. We draw on data from *Fifty Years of Change on the U.S.-Mexico Border: Growth, Development, and Quality of Life* (Anderson and Gerber 2007) to illustrate the magnitude of these changes. We present data for four areas: Mexico, United States, Ciudad Juárez, and El Paso. This categorization allows us not only to compare Juárez and El Paso to each other but also to their respective nations as a whole.

One of the areas in which there has been agreement is the relative growth of the population. Over the last five decades, the population of Juárez has grown at a faster clip than that of El Paso as well as that of Mexico (Figure 1). For example, during the 1990-2000 period, Juárez's population grew 3.5 times faster than that of El Paso and 2.7 times more rapidly than that of Mexico. Furthermore, the gap in population growth favoring Juárez relative to El Paso has expanded over the last three decades.

--Figure 1 about here--

This pattern is mirrored in the growth of the labor force. During the 1990-2000 period, the labor force of Juárez grew nearly 6 times faster than that of El Paso and about 1.6 times more swiftly than the labor force of Mexico (Figure 2). In fact, the gap in the growth of the labor force between Juárez and El Paso is the greatest in the last decade brought on by the lowest rate of labor-force growth in El Paso over the past five decades.

--Figure 2 about here--

However, major shifts have occurred in the prevalence of workers involved in the manufacturing sector. In 1960 and 1970 manufacturing jobs accounted for about one-third of all jobs in the United States (Figure 3). By 2000 manufacturing jobs made up only 17 percent of all jobs in the United States, half of the level of the 1960s and 1970s. In contrast, the share of jobs in Juárez that are in the manufacturing sector has more than doubled from 22 percent in 1980 to 41 percent in 1990 and 46 percent in 2000.

--Figure 3 about here--

Furthermore, there has been a shift in manufacturing jobs between El Paso and Juárez over the last several decades. For example, from 1960 to 1980 El Paso boasted a somewhat greater share of manufacturing jobs among its workforce compared to Juárez. By 1990 and 2000, the situation changed dramatically with manufacturing accounting for nearly one of over two jobs in Juárez in 2000 compared to one of every six jobs in El Paso.

There are also shifting patterns associated with the production of goods and services. The per capita gross regional product (GRP) of Juárez rose by 83 percent between 1970 and 2000, outpacing the rate of growth in El Paso (54%) and Mexico (45%) (Figure 4). In fact, the growth in Juárez's GRP (83%) was comparable to that of the United States as a whole (87%) between 1970 and 2000.

--Figure 4 about here--

Finally, we can also assess the differences in the standing of each border community relative to their respective countries with respect to the GRP. This can be done by examining the ratios of the GRP of a given community to the GRP of its respective country. From the perspective of Mexico, Juárez represents a booming economy with Juárez holding an economic advantage ranging from 15 percent in 1980 to 55 percent in 2000 compared to Mexico as a

whole (Figure 5). Moreover, the economic advantage of Juárez relative to Mexico has grown since 1980. On the other hand, over the four decades from 1970 to 2000, on average the GRP of El Paso has been only about two-thirds as high as that of the United States. Furthermore, the economic disadvantage of El Paso relative to the United States has been slipping across the four decades.

--Figure 5 about here--

In sum, the region has experienced major growth in its population and economy. As the region has faced issues that accompany a rapidly expanding population in a desert, a variety of organizations have arisen to deal specifically with a host of the attendant problems. We summarize some of these major organizations next.

### **Border Environmental Institutions and Organizations**

Part and parcel of the tremendous growth along the United States-Mexico border region are a host of problems – social, economic and environmental in nature. Correspondingly, a number of organizations -- binational, national, regional and local; governmental and non-governmental -- have emerged to address these growing concerns.

Per Liverman et al. (1999) the groundswell of public concern regarding the environment dates back to the 1960s. In Mexico, this corresponds to the creation and implementation in 1965 of the Border Industrialization Program (BIP) which significantly reduced trade barriers and tariffs on foreign-owned manufacturing exports to the United States (the maquiladora program). In the United States, growing concerns regarding harm to the natural environment was spurred by the publication of Rachel Carson's (1962) widely read and discussed book *Silent Spring* on the harmful effects of DDT to the environment in the early 1960s and was elevated as part of the general protest and movement rallies of the 1960s. In short, environmental problems were

commanding important attention and concern so as to warrant institutional support.

Correspondingly, organizations were formed specifically to address these concerns. We briefly outline next the organizations that have played a significant role in the border region.

*International Boundary and Water Commission and Comisión Internacional de Límites y Aguas (1889)*

The earliest binational agreements between the United States and Mexico involved the issue of water. As discussed earlier, the first binational arrangement was the creation of the International Boundary Commission-Comisión Internacional de Límites y Aguas in the late 1880s to address the boundary disputes involving the Rio Grande/Rio Bravo. The Commission, currently the International Boundary and Water Commission, in keeping with boundary-related disputes and conveyance issues, was an engineering dominated commission charged with resolving binational boundary disputes and managing the conveyance of the waters of the Rio Grande. Environmental concerns were neither in their scope nor on the commission's radar screen.

*EPA and SEMERNAP (1970s)*

As a result of the important pressures to deal with environmental issues beginning in the 1960s, both the United States and Mexico created environmental ministries to address the growing public concerns regarding the environment. In July 1970, the United States established the Environmental Protection Agency (EPA); not long after, Mexico too created an environmental ministry. However, unlike the relative stability of the EPA, the Mexican ministry has transformed several times and is currently the Secretaría de Medio Ambiente, Recursos Naturales y Pesca (SEMERNAP). In English, this translates to the Ministry of Environment, Natural Resources and Fisheries (Liverman et.al., 1999).

### *La Paz Agreement (1983)*

With border population growth, industrial development, and pollution immune to the border boundaries, it was not long before Mexico and the United States would gather again to discuss ways in which to address their shared environmental problems. Spearheaded by the presidents of both nations in 1983 (Miguel de la Madrid in Mexico and Ronald Reagan in the United States), the product of these negotiations is the La Paz Agreement (for the location of the meetings) or, more formally, the Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area. These agreements established working groups to address “...sensitive transboundary issues as water quality, air quality, natural resources, and solid and hazardous waste” (Liverman et al., 1999: 623).

### *Integrated Border Environmental Plan (1992)*

In an effort to expand the scope of the La Paz Agreement, in 1992 EPA officials and officials from the Mexican environmental ministry (then called Secretaría de Desarrollo Urbano y Ecología or SEDUE) released the Integrated Border Environmental Plan (IBEP). Widely criticized for its characterizations of the border region as an arid wasteland; its lack of specificity; lack of public input and buy-in; and, probably most importantly, its lack of financing in which to accomplish its stated goals, the agreement received little traction in the border region (Liverman, et.al., 1999).

### *Border XXI Program (1996-2000)*

As a corrective measure to the failed 1991 IBEP plan, leaders of the EPA and SEDUE's successor, SEMERNAP, began drafting what would become the Border XXI Program. Per the EPA, Border XXI builds on the IBEP and expands its scope to include environmental health and natural resource issues (<http://www.epa.gov/usmexicoborder/docs/borderXXIprogram->

[archive.pdf](#)) and was implemented in 1996. The stated principle goal of the Border XXI program was “to promote sustainable development in the border region which “meets the needs of the present without compromising the ability of the future generations to meet their own needs” (as quoted within the Border XXI Program Framework Document: Executive Summary, <http://www.epa.gov/usmexicoborder/docs/borderXXIprogram-archive.pdf>: 2). The North American Free Trade Agreement (NAFTA) implemented in 1993 created the Commission for Environment Cooperation (CEC) and established the Border XXI Program as the coordinator. *Commission for Environmental Cooperation (1993)*

Per its website, the Commission for Environmental Cooperation (CEC) is an international agency created by Canada, the United States and Mexico under the North American Agreement on Environmental Cooperation (NAAEC). The CEC was established to address regional environmental concerns, to help prevent potential trade and environmental conflicts, and to promote the effective enforcement of environmental law. The Agreement complements the environmental provisions of the North American Free Trade Agreement (NAFTA) (CEC: [http://www.cec.org/who\\_we\\_are/index.cfm?varlan=english](http://www.cec.org/who_we_are/index.cfm?varlan=english)). According to Liverman et al. (1999) Articles 14 and 15 of the NAAEC have generated the most interest as these provisions allow a non-governmental organization (NGO) or individual to file a complaint against any of the three countries for failure to enforce their environmental laws. Per their website, the CEC has received sixty-five submissions by individuals pertaining to enforcement matters since 1995. Fifty-four cases have been closed; and eleven cases are still active. Of the eleven active cases, seven involve Mexico; three involve Canada; and one, the United States. Of the fifty-four closed cases, almost half (48% or 26 cases) involved Mexico; 20 involved Canada with the United

States the party in remaining eight cases

(<http://www.cec.org/citizen/status/index.cfm?varlan=english>; accessed on October 5, 2008)

*Border 2012: U.S.-Mexico Environmental Program (2002)*

Border 2012 is the successor to the Border XXI program. The program's mission is "to protect the environment and public health in the U.S.-Mexico border region, consistent with the principles of sustainable development" (Border 2012: U.S.-Mexico Environmental Program Brochure: EPA-160-R-03-001: 2003). Unlike many programs of the past which originated in locations far from the areas in question, from the beginning the Border 2012 Program efforts were designed to be locally led, bottom-up with local decision-making and project implementation.

The Border 2012 Program has six very specific goals:

1. Reduce water contamination
2. Reduce air pollution
3. Reduce land contamination
4. Improve environmental health
5. Emergency preparedness and response
6. Environmental stewardship

The Paso del Norte segment of the U.S.-Mexico border is encompassed within Region 6 (the Texas-New Mexico-Chihuahua Regional Workgroup) of the Border 2012 program. This workgroup includes the major sister cities of Palomas-Columbus (New Mexico-Chihuahua Rural Area), Las Cruces-El Paso-Ciudad Juárez (Paso del Norte Urban Area), and Presidio-Ojinaga (Texas-Chihuahua, Rural Area).

*Border Environment Cooperation Commission-Comisión de Cooperación Ecológica Fronteriza and the North American Development Bank*

The Border Environment Cooperation Commission (BECC)- *Comisión de Cooperación Ecológica Fronteriza (COCEF)* is an international organization created by the governments of the United States and Mexico as one of the NAFTA provisions. Per its website, the purpose of the BECC is to help conserve, protect and enhance the environment in the U.S.-Mexico border region, through the development and certification of environmental infrastructure projects that incorporate innovative sustainability and public participation concepts. In order that identified environmental infrastructure projects receive funding for their development, another side provision of NAFTA allowed for the creation of a funding mechanism for these projects – the North American Development Bank – or NADBank. Once a project is certified by the BECC, a project may qualify for funding from the North American Development Bank or from other sources requiring such certification (<http://www.cocef.org/background.htm>; accessed October 5, 2008).

According to the BECC website, the commission is authorized to work in an area covering 62 miles (100 km) on the U.S. side of the border, and 186 miles (300 km) on the Mexico side. Its mandate includes projects related to water pollution, wastewater treatment, municipal solid waste management and related matters, air quality, transportation, clean and efficient energy, and municipal planning and development, including water management (<http://www.cocef.org/background.htm>; accessed October 5, 2008).

As a binational entity, BECC's operating budget is funded by both Mexico and the United States. The BECC's operating budget is primarily funded by contributions from Mexico (SEMERNAP) and from the United States, via the Department of State and EPA. In addition to

its operating budget, the BECC receives funds via EPA's Project Development Assistance Program which allows the BECC to use grant funds to support border communities in the development of their water and wastewater projects (<http://www.cocef.org/background.htm>; accessed October 5, 2008).

The governance of the BECC is also binational. The BECC is governed by a binational Board of Directors composed of ten members -- five from each country. Per its website, day-to-day operations at BECC are overseen by a general manager and a deputy general manager, one from each country, with the support of a 45-member highly specialized binational staff who oversee the work of dozens of engineering consultants involved in the development of individual projects (<http://www.cocef.org/background.htm>; accessed October 5, 2008).

The financial arm of the BECC is the North American Development Bank or NADBank. Like the BECC, NADBank is also a side creation of a provision of NAFTA and is a binational institution governed equally by the United States and Mexico. According to the NADBank website, NADBank, in tandem with BECC works with communities and project sponsors in both the United States and Mexico to "develop and finance infrastructure necessary for a clean and health environment for border residents" (<http://www.nadb.org/>; accessed on October 5, 2008).

#### *Paso del Norte Water Task Force*

In addition to governmental organizations, the region is also home to a variety of non-governmental organizations (or NGOs) including the binational Paso del Norte Water Task Force. The Task Force has the stated purpose "...of conducting joint studies, organizing outreach activities, and preparing policy recommendations" (<http://www.sharedwater.org/en/organization.htm>; accessed on October 5, 2008). The organization is chaired by three co-chairs – one each from New Mexico and Texas in the United

States and one from the state of Chihuahua in Mexico. The Paso del Norte Task Force was formed in 1998 out of a grant prepared by representatives of New Mexico State University, Universidad Autónoma de Ciudad Juárez and the Houston Advanced Research Center and funded by the William and Flora Hewlett Foundation. With the William and Flora Hewlett Foundation decision to focus their funds in different directions, the future of this NGO is currently unresolved.

### **Recent Debates and Controversies**

Despite numerous international agreements and treaties, tensions between the United States and Mexico remain high with the most recent manifestation the filing of a multi-million dollar lawsuit by Texas farmers against the Mexican government in the spring of 2004 seeking damages related to Mexico's refusal to abide by a 1944 agreement in which Mexico agreed to send 350,000 acre-feet<sup>1</sup> of water annually to the United States. "Mexico by withholding this water has expropriated our property, namely water, and it was an illegal taking because they were under a mandated treaty to let the water pass and they didn't do it," explained Jo Jo White, the manager of the Mercedes Irrigation District, one of the 17 Texas Irrigation Districts, who along with 29 independent water rights holders and a water supply company filed a notice of intent to submit a claim to arbitration under the Chapter 11<sup>2</sup> provision of the North American Free Trade Agreement (NAFTA) (as quoted by the Washington Times; see <http://washingtontimes.com/upi-breaking/20040830-035824-1297r.htm>).

---

<sup>1</sup> An acre-foot of water is the volume of water necessary to cover one acre of surface area to a depth of one foot. It is equal to exactly 43,560 cubic feet, or to nearly 325,851 U.S. gallons.

<sup>2</sup> Chapter 11 requires that each party treat other parties' investors no worse than it treats investors and investments of its own or any other country.

From the U.S. perspective, this particular 12-year dispute was resolved with Mexico's agreement to repay its water debt. However, many Texans remained unhappy and pressed forward their arbitration case in January 2005 claiming that:

From 1992 to 2002, Mexico captured, seized, and diverted to the use of Mexican farmers, an investment (approximately 1,013,056 acre-feet of irrigation water) located in Mexico and owned by Claimants. By diverting Claimants' water to Mexican farmers, Mexico dramatically increased its irrigated agricultural production on the Mexican side of the Rio Grande, while the crops of United States farmers in the Rio Grande Valley shriveled. Mexico thus treated the investments of United States investors less favorably than it treated its own investors with respect to the establishment, acquisition, expansion, management, conduct, operation, and sale or other disposition of investments in violation of Article 1102 of NAFTA (p. 3-4:

<http://naftaclaims.com/Disputes/Mexico/Texas/TexasNoticeOfIntent.pdf>).

And while the irrigators' claims were ultimately dismissed by the assigned NAFTA tribunal in June 2007, it is unrealistic to expect that this will be the last of what has been almost 150 years of conflict and debate.

### **United States-Mexico Asymmetry**

One would expect that any dynamic border region that experiences tremendous urban growth like the Paso del Norte region has would have accompanying growing pains including strains on the physical and built environments as well as to the natural environment. And indeed, such growing pains are readily apparent in Ciudad Juárez. However, with the socio-economic

resources as unbalanced as they are between the United States and Mexico, different dimensions associated with these strains can be discerned.

Historically, there has been a lack of trust between Mexico and the United States dating to before the Mexican-American War (which interestingly, is referred to as the ‘American Invasion’ by many Mexicans). One manifestation of this distrust is the two separate water conveyance systems in place – one of which diverts water to El Paso; the second to Ciudad Juárez (Hamlyn, 2007). As detailed earlier, despite what many Americans both those near and far removed from the border region may believe, the economic driver of the Paso del Norte region is Ciudad Juárez. For example, when compared to cities located in the interior of Mexico, Ciudad Juárez and the other major border cities are doing much better socially and economically. In general, border cities including Ciudad Juárez have higher rates of employment, higher wages and more developed infrastructures than interior Mexican cities. While no doubt the infrastructure of Ciudad Juárez has been strained by the tremendous influx of people, still 98 percent of the population is hooked up to tap water and 80 percent is connected to the city’s main sewage system. In short, despite its deficiencies and environmental problems, as seen from Mexico City, Ciudad Juárez is booming.

However, when viewed from the northern vantage point in the United States looking south, border regions including many of the cities located in the United States, such as El Paso, are often poorer than non-border U.S. cities. U.S. border cities often have rates of unemployment and poverty that exceed non-border U.S. cities. Looking south into Mexico, many Americans see what they imagine to be a third-world country, crime and poverty-ridden, with unsanitary living conditions. Timothy Brown (1997) in his article entitled “The Fourth Member of NAFTA: The U.S.-Mexico Border” eloquently summarizes these clouded views from residents in both nations:

In central cities of Mexico and the United States as otherwise different as Puebla and Sacramento, or Mexico City and Washington, D.C., there exists one common thread, false perceptions of the border based on mythology. The images engraved on their popular minds are caricatures: the border is drowning in the filth of a putrescent Rio Grande aglow with toxic waste; it is terminally ill with a rampant pox of poverty known as *colonias*; it is a land of social injustices where evil foreign *maquiladoras* unmercifully exploit downtrodden workers for their cheap labor; swarms of huddling illegals poise nightly to pour northward across the border to overwhelm American social services and steal jobs from honest workers while free-loading on the largesse of hard-pressed American tax-payers (1997:107).

While not denying the many problems the border regions do face (although some of the problems are common to all urban areas and not just border cities), Brown nevertheless points out that solutions to these problems are compounded by two factors: “first, while the border problems run east-west, the political authority runs north-south; and second, there is a major disparity in incomes between the border’s Mexican and American halves” (1997: 107).

Among residents of the Paso del Norte region are shared feelings of “being abused and exploited by higher political authorities. The people of Juárez, the Juarenses, constantly decry insensitive meddling in their local affairs by distant politicians and bureaucrats of Mexico City...El Pasoans, too, feel they are victims, of Austin and of Washington” (Brown, 1997:111). There is evidence to support these residents’ claims of indifference and misunderstanding by their respective governments. Recall from earlier, the joint Mexico-U.S. developed Integrated

Border Environmental Plan was widely criticized for characterizing the border region as an “arid wasteland.”

Border growth has also been asymmetrical. As Brown (1997) details, between 1940 and 1980, El Paso’s population expanded five-fold; however, Ciudad Juárez’s grew 25-fold. This same pattern of asymmetrical growth repeated among all sister border cities. By 1990, “every Mexican border city was larger than its American twin” (1997: 111).

While Mexican-U.S. border cities have long served as population gateways for immigrants seeking employment opportunities in the United States such as *braceros* (a program that ran from the 1940s through the 1960s) or recruited by U.S. firms to work in agriculture or meat-processing, a more recent population magnet has been the increased manufacturing employment opportunities associated with the maquiladoras. Indeed, as Isidro Morales (1999) documents, Mexican manufacturing is now dominated by foreign multi-national corporations. As Morales describes, parts of Mexico, specifically those regions where capital is the most mobile, have benefited from the increased trade associated with NAFTA, inequalities in other sectors, particularly southern Mexico have widened considerably (Morales, 1999).

Yet, despite its status as an “equal trading partner” with the United States and Canada, in fact, in the negotiating abilities things are still far from equal. For example, Morales describes a trade dispute between Mexico and the United States regarding the United States’ claim that Mexico was taxing American steel products that was argued before the NAFTA’s dispute resolution panel. That Mexico lost the case mainly for legal reasons (as opposed to the merits of the case) leads Morales to opine that other panels could be lost for just these same reasons – a potentially major problem for Mexico. As Morales explains:

This highlights a major problem that could eventually rise in future U.S.-Mexico trade disputes. Because NAFTA did not establish any harmonization of commercial laws between countries, especially those referring to unfair practices, Mexican firms could eventually lose their claims due to their ignorance of the way commercial regulations work in the United States (1997: 142).

Additionally, Morales (1997) points out that many Mexican firms are small businesses that cannot afford to wage a panel dispute. These firms could neither survive the length of time needed to resolve these matters nor the financial costs of bringing the dispute before the NAFTA panel.

One final point regarding the impacts of NAFTA on manufacturing in Mexico: foreign-owned big industries dominate both the industrial output in Mexico and represent the core of foreign trade in Mexico which has major consequences of Mexico. The major trade boom between the United States and Mexico has involved intra-industry trade – that is to say, trade among U.S. or foreign-owned multi-national corporations and their subsidiaries located in Mexico. In fact, in the early 1990s, more than 90 percent of total Mexican exports to the United States were from intra-firm exports to the U.S. parent company. Mexican imports showed this same pattern with 85 percent of Mexican imports from the United States originating from intra-firm imports from the U.S. parent company. Morales details the consequences of this reliance by Mexico intra-firm exchanges: rather than reflect Mexico's comparative advantage in manufacturing, instead Mexico is exploited for international sourcing purposes.

First of all, the affiliates' export performance does not necessarily reflect Mexico's comparative advantage, say, in the manufacturing sector. These

exports...occur as a consequence of corporate strategy in which Mexico's locational advantages are exploited for international sourcing" (1997: 148).

Rather than create what Morales calls "arms-length markets," instead, hierarchical markets are created to "respond to a functional division of production between home-based firms and their affiliates" (1997: 148).

The banana republic is being replaced by a manufacturing one characterized by low-wage, monotonous, oftentimes dangerous work. That women represent a large percentage of the maquiladora work-force is no accident either. In Mexico, like the United States, women work for less money. Further, because of the emphasis on intra-industry trade among the maquiladoras, Mexico's manufacturing sector is closely tied to the United States. As detailed by Quintero,

The ups and downs of these companies are subordinated to the evolution of the companies in their country of origin, especially the United States. For example, from the end of 2000 to 2001 the crisis in the automobile sector in the U.S. resulted in the loss of 200,000 positions in Mexico, almost 14% of the total employment (2006: 4).

A recent Federal Reserve Bank of Dallas economic update of El Paso and Ciudad Juárez reinforces this highly correlated and dependent relationship between Mexican manufacturing and the United States. From November 2007 through April 2008, manufacturing in Ciudad Juárez has declined by -4.9 percent, -5.1 percent, -12.6 percent, -10.9 percent, -8.9 percent and -16 percent -- or, almost 10 percent over the six-month period. Per this report: "there is a close relationship between maquiladora employment and U.S. and Mexico manufacturing indices, which have posted sluggish growth rates in recent months; thus, it is likely that the maquiladora

industry in Ciudad Juárez will continue to follow suit in the next few months” (Federal Reserve Bank of Dallas, El Paso Branch, 2008).

### **Concluding Remarks**

One thing should be abundantly clear by now: Ciudad Juárez is highly dependent upon El Paso (and the United States). What might not be as clear is that El Paso is just as highly dependent upon Ciudad Juárez. Indeed, as Brown (1997) documents, border shopping is El Paso’s largest generator of business. As detailed by Brown, in 1995 alone:

- More than a million American workers owe their jobs to Mexico;
- An estimated 50% of all sales at two El Paso malls, Cielo Vista and the Bassett Center are to Mexican cross-border shoppers, as are the sales of El Paso’s Sam’s Club;
- An estimated 6,000 jobs in El Paso’s medical service industry were directly tied to the cash-paying Mexican patients;
- Retail sales by Mexican customers in El Paso totaled over \$5 billion resulting in \$412.5 million in sales tax.

As Brown says: “When the Mexican economy sneezes, El Paso catches pneumonia” (1997: 115).

Without question, the availability of water from the Hueco Bolson fueled the region’s growth. However, this source is growing increasingly unreliable and new water must be found if additional growth is to be sustained. Ciudad Juárez is facing acute water shortages in the very near future. Part of the water problems stem from the fact that agriculture uses of water have been historically privileged. However, agriculture has been declining in economic significance on both sides of the border. For example, agriculture and mining accounted for 45 percent of

economic activity in Mexico in 1960, but only 15 percent in 1990. The corresponding shift in the United States was a drop from 55 percent in 1960 to 20 percent in 1990. However, per treaty and other agreements binational and local, it is the agricultural sector in both the United States and Mexico that is legally allocated surface flows from the Rio Grande.

Highly cognizant of the increasing need for additional water supplies, city leaders have undertaken several projects to bolster their existing water supply. For example, leaders in Ciudad Juárez are presently building a conveyance in order to tap the Mesilla Bolsón (these groundwater deposits extend into Mexico as well); they are developing secondary wastewater treatment plants; and plans to trade non-potable water to Mexican farmers in exchange for their allotment of Rio Grande water. Conservation and reuse programs similar to those undertaken in El Paso are also being utilized. However, these steps still leave Ciudad Juárez far short of their projected need. As one of the leading water engineers in Ciudad Juárez, Dr. Rene Franco, explained:

We're anticipating the problems. We're facing them; we're dealing with them and we are finally taking steps in the right direction. We've got the tapping of the Mesilla Bolson underway; we've started on the secondary treatment. It's a process that is very complicated...we know we are going to get to the point where there is going to be no more; we are just extending the life a little bit. We don't have a sustainable method. We are taking out more than we are putting in (Franco: 2007).

The lack of discussion regarding Ciudad Juárez's water supplies puts all the U.S. regional water efforts in jeopardy. Clearly, there is a looming environmental crisis with regards to Ciudad Juárez's water future. Because they lack the resources of the United States, what might be viable options in the United States are instead variables in Mexico. For example, El Paso and Fort Bliss

have partnered in the financing and operation of what is billed as “the largest inland desalination plant in the world” (Anai Padilla personal interview, 2007). Ciudad Juárez is not a partner in this desalination plant. As Rene Franco explains:

We are pretty much in the same boat, we have the same problems as El Paso, with the increasing saline content of the aquifer water. The same technology is available to us, but we don't have the resources. We don't have the economic resources. The bottom line is that we have to use what we can afford. And right now, desalination, I'm not going to say is out of the question, but it is a little bit too expensive (Franco, 2007).

Gonzalo Bravo (2007), the Communications and Community Relations Manager for the Border Environmental Cooperation Commission (BECC) echoes some of these same points and elaborates on additional ones:

The population growth on the Mexican side of the border is the most pressing water problem; and we need money because if you don't have infrastructure on one side, then you don't have a good quality of life, you don't have development; you don't have investments; you don't have the generation of jobs. And then, the people that come here might want to cross to the U.S. (Bravo, 2007).

As for what is needed to assist Mexico in the infrastructure development, Gonzalo Bravo posits that programs similar to that followed by European countries when they were forming the European Union which invested heavily in weaker European countries like Spain and Portugal should work for Mexico as well.

Because we have the NAFTA treaty, with three partners, we are the weaker partner. What happened in Europe, where they helped develop Spain and

Portugal, now we have Spain which is very competitive, and it really was in a worse situation than we are in now – and now that is very different for Spain.

But that's not happening. So the weaker partner is Mexico but you don't have the care from the richest partner so then you will have these migration problems, the requirements of the infrastructure along the border, and the irrational policies without a national or regional perspectives (Bravo, 2007).

Border economies are inextricably intertwined. However, attitudes regarding the border and many border policies fail to fully recognize these ties that bind. As Brown explains, “today the border is like a schizoid set of Siamese twins physically joined at a hundred points and unable to survive apart, but with multiple personalities” (1997:119). Regarding water, Brown asks: “Does each nation hoard its own, or will neighbors share? How will Mexicans then react to profligate Americans who use 10 times more water per person than they do? What is to be done about potable water problems or with treated sewage?” (1997: 120).

Baby steps towards addressing these issues binationally have been taken. The organizations described earlier that have formed to deal with environmental issues including water are evidence that local leaders are fully aware that their long-term fate is the same as their cross-border sister's. However, a chasm remains. The Border and Environmental Reviews Manager for the State of New Mexico, Gedi Cibas (2007) provides an excellent summation of the complexities involved regarding water:

Anytime we talk about water, and especially water that crosses the administrative, artificially prefabricated border, you are confronted with these laws and two dozen lawyers believing in private property, and two dozens lawyers believing in public ways. So as I like to always say to the Mexicans and the Americans when

dealing with border stuff: Whenever a lawyer from Mexico and a lawyer from the U.S. get together, they're not talking about law. They're talking about the philosophy of law because the premises are so very, very, very different (Cibas, 2007).

### References

- Acuña, Rodolfo. 2006. *Occupied America: A History of Chicanos*. 6<sup>th</sup> ed. New York: Longman.
- Anderson, Joan B. and James B. Gerber. 2007. *Fifty Years of Change on the U.S.-Mexico Border: Growth, Development, and Quality of Life*. Austin: University of Texas Press.
- Environmental Protection Agency. Border 2012 Website. Accessed at: <http://www.epa.gov/usmexicoborder/index.html>. Accessed on: October 5, 2008.
- Bravo, Gonzalo. 2007. Personal Interview. El Paso, Texas, March.
- BBC News. 2003. "Drought threatens U.S.-Mexico Relations." May 28. Accessed at: <http://news.bbc.co.uk/2/hi/americas/2940876.stm>; Accessed on October 9, 2008.
- Brown, Timothy C. 1997. "The Fourth Member of NAFTA: The U.S.-Mexico Border," *Annals of the American Academy of Political and Social Science*. Vol. 550, NAFTA Revisited: Expectations and Realities. March: 105-121.
- Carson, Rachel. 1962. *Silent Spring*. New York, NY: Houghton Mifflin Company.
- Cibas, Gedi. 2007. Personal Interview. Sante Fe, NM., March.
- Commission for Environmental Cooperation Website. Accessed at: [http://www.cec.org/who\\_we\\_are/index.cfm?varlan=english](http://www.cec.org/who_we_are/index.cfm?varlan=english); Accessed on October 9, 2008.
- Dallas Morning News. 2004. *Texas Almanac 2004-2005*. Dallas, TX: Dallas Morning News, L.P.
- Earl, Richard and Robert J. Czerniak. 1996. "Sunbelt Water War: The El Paso-New Mexico Water Conflict." *The Social Science Journal*. Vol. 33, No. 4: 359-379.
- Environmental Protection Agency Border 2012 Website. Accessed at: <http://www.epa.gov/usmexicoborder/index.html>; Accessed on: October 5, 2008.
- Federal Reserve Bank of Dallas. 2008. "Economic Update: El Paso-Cd. Juarez." Research Department. El Paso Branch. August 26. Accessed at: <http://www.dallasfed.org/research/update-ep/epjupdate.pdf>; Accessed on October 9, 2008.

Franco, Rene. 2007. Personal Interview. Ciudad Juárez, Mexico, March.

García-Acevedo, Maria Rosa and Helen Ingram. 2004. "Conflict in the Borderlands." *NACLA Report on the Americas* (July/Aug. 2004):19-24.

Hamlyn, Ed. 2007. Personal Interview. El Paso, Texas, March.

International Boundary and Water Commission Website. Accessed:  
[http://www.ibwc.gov/About\\_Us/history.html](http://www.ibwc.gov/About_Us/history.html); accessed on October 5, 2008.

Kelly, Mary E. 2002. *Water Management in the Binational Texas/Mexico Rio Grande/Rio Bravo Basin*, 107 Yale F&ES Bulletin Series 115, 134.

Littlefield, Douglas R. 1991. "The Rio Grande Compact of 1929: A Truce in an Interstate River War." *The Pacific Historical Review*. Vol. 60 No. 4. 497-515.

Liverman, Diana, Robert G. Varady, Octavio Chavez, Roberto Sanchez. 1999. "Environmental Issues Along the United States-Mexico Border: Drivers of Change and Responses of Citizens and Institutions." *Annual Review Energy Environments*. 24: 607-643.

Lorey, David. 1999. *The U.S.-Mexican Border in the 20<sup>th</sup> Century*. Wilmington, DE: S.R. Books.

Morales, Isidro. 1997. "The Mexican Crisis and the Weakness of the NAFTA Consensus." *Annals of the American Academy of Political and Social Science*. Vol. 550, NAFTA Revisited: Expectations and Realities. March: 130-152.

Morales, Isidro. 1999. "NAFTA: The Institutionalisation of Economic Openness and the Configuration of Mexican Geo-Economic Spaces." *Third World Quarterly*. Vol. 20. No. 5. Oct.: 971-993.

Mumme, Stephen P. 1999. "Managing Acute Water Scarcity on the U.S.-Mexico Border: Institutional Issues Raised by the 1990's Drought." *Natural Resources Journal* 39:149-166.

North American Development Bank Webpage. Accessed at: <http://www.nadb.org/>; Accessed on October 5, 2008.

Padilla, Anai. 2007. Personal Interview. El Paso, Texas, March.

Paso del Norte Water Task Force Website. Accessed at:  
<http://www.sharedwater.org/en/organization.htm>; Accessed on October 5, 2008.

Patino, C., D. McKinney, and D. Maidment. 2003. "Water Availability Model and Geodatabase Development for the Rio Grande Basin." Pp. 155-162 in *First International Symposium on Transboundary Water Management*. Monterrey, Mexico.

Quintero Ramírez , Cirila. 2006. "Female Work in Mexican Maquiladoras: "Naturally" Unskilled Work or Creating Unskilled Work for Women Workers?" Paper prepared to the Panel of Gender Studies of XIV International Economic History Congress, Helsinki, Finland, August, 2006. Accessed online at: <http://www.helsinki.fi/iehc2006/papers1/Quintero.pdf>; Accessed: October 5, 2008.

Schmandt, Jurgen. 2002. "Bi-National Water Issues in the Rio Grande/ Río Bravo Basin." *Water Policy*. V. 4: 137-155.

Spener, Sally. 2007. "U.S.-Mexico Water Issues." Powerpoint presentation. Accessed online at: <http://www.sarweb.org/home/images/whatsnew/9Spener.pdf>; Accessed on October 5, 2008.

The river forms the natural boundary between Texas and the Mexican states of Tamaulipas, Nuevo Le3n, Coahuila, and Chihuahua. Next, the river flows east through deserts and then forms a small, sandy delta as it drains into the Gulf of Mexico. Border Crossings on the Rio Grande. The US and Mexico share the waters of the Rio Grande, which is defined through a series of agreements between the two countries. Additionally, the International Boundary and Water Commission (IBWC), created in 1889, administers the agreements and allocates the river's waters between the US and Mexico. Unfortunately, overuse of the waters of the Rio Grande has greatly decreased its volume.