

## *Water Quantity and Quality Issues in El Paso Del Norte Region*

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### **ABSTRACT**

The El Paso del Norte Region faces challenges in the administration of its water resources in the way water is managed due to conflicts with different political jurisdictions and existing laws governing water management in Mexico and the U.S. (including the States of Texas and New Mexico). The region is in great need of legislation with regard to water allocation and quality rights, urged by the scarcity of fresh water, high salinity, and increased population demands.

The El Paso del Norte Region is located on the U.S./Mexico border, where the states of Texas and New Mexico meet the Mexican State of Chihuahua. Within this area, the Rio Grande/Rio Bravo and Hueco-Mesilla Bolsons (main aquifers), serve as surface and groundwater sources for municipal and agricultural use. Consequently these water sources are shared by two countries and three states, where numerous entities are involved in regional water management. Thus each community and entity works independently of one another, and true regional planning does not occur.

The management of groundwater as a source of water supply is a controversial issue.

This is due to the fact that its characterization and surface water management is concentrated on

water quantity and not on quality issues, thus affecting U.S. and Mexican water users.

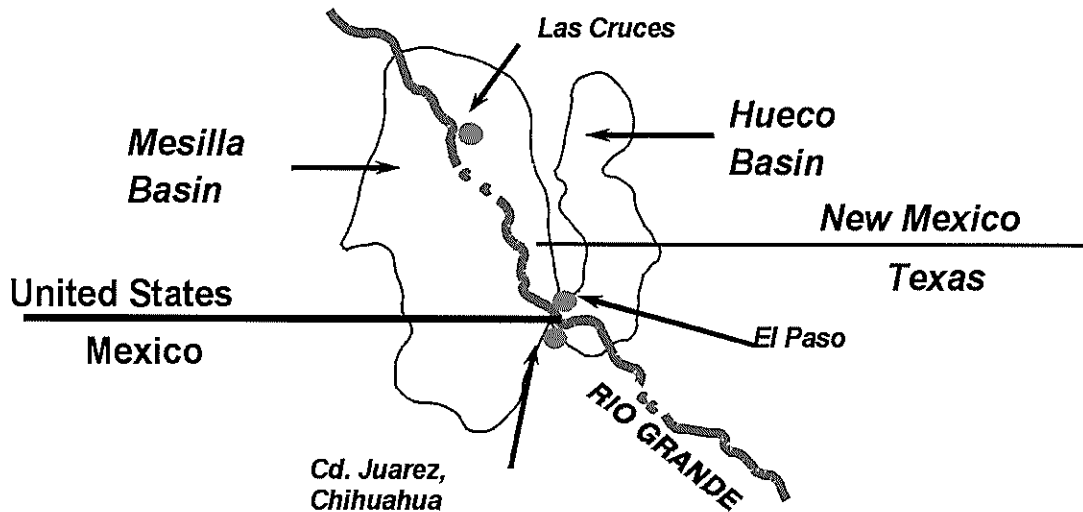
This paper analyzes the different entities involved, political jurisdictions, water regulations and their implications on regional water management.

### **SINOPSIS**

El Paso del Norte es una región que enfrenta retos en el manejo de sus recursos de agua debido a los diferentes conflictos políticos y las diferentes legislaciones que regulan el manejo del agua en México y los Estados Unidos (incluyendo los estados de Texas y Nuevo México). La escasez y problemas de calidad de agua, como también el incremento en la demanda de agua, ha hecho apremiante desarrollar legislaciones con respecto a la asignación y calidad del agua entre los diferentes usos.

El Paso del Norte está localizado en la frontera entre Estados Unidos y México, en la franja donde se encuentran los estados de Texas, Nuevo México y el estado Mexicano de Chihuahua. En esta área las principales fuentes de agua son el Río Grande/Río Bravo y los acuíferos de Hueco y Mesilla. Esos recursos de agua son compartidos por los dos países y los tres estados, por lo tanto, el agua es manejada a través de diversas entidades, las cuales trabajan

# Regional Raw Water Sources



Source: EPWU, 2003

Figure 1. El Paso del Norte Water Sources

independientemente, lo que dificulta la planeación regional.

El manejo del agua ha sido un asunto controversial, debido principalmente a que el manejo del agua está concentrado sobre las cantidades asignadas y no sobre los problemas de calidad, lo cual afecta a todos los usuarios de la región. Esta investigación analiza las diferentes entidades envueltas, las jurisdicciones, las regulaciones y sus implicaciones sobre el manejo regional del agua.

## I- OVERVIEW

According to the El Paso Chamber of Commerce, the El Paso - Juarez community is the largest international border community in the world. Paso del Norte is the name for a broad region that straddles portions of three states and two nations. El Paso, Texas and Ciudad Juarez, Mexico are the dominant cities in a larger metropolitan area that is not only binational, but also tri-state in that it encompasses portions of northern Chihuahua, Mexico, Far West Texas, and Southern New Mexico. Within this region, there are several cities and irrigation districts. As shown in Figure 1, this region

relies on shared surface and ground water from the Rio Grande/Rio Bravo Basin, as well as from the region's primary aquifer, the Hueco Bolson [1].

El Paso County has a population approaching 700,000. Immediately south of El Paso, and separated only by El Rio Grande, is Ciudad Juarez, a city with a population of approximately 1,300,000. To the North, Doña Ana County, New Mexico, has a population approaching 200,000. Collectively, the region houses nearly 2.1 million people, and the regional population is projected to double within the next 25 years.

In a region with less than 10 inches of annual rainfall, the provision of clean water in a sustainable manner proves to be a tremendous challenge. El Paso, Texas is amongst the five driest areas in the world [2], and it is located within the Chihuahuan Desert, which is considered the largest desert in North America and the 7th, worldwide [3]. The Rio Grande/Rio Bravo, the only river that provides water to the region, is the fifth longest river in the United States, and is listed as the second most endangered river in America due to water scarcity [4].

The El Paso del Norte region relies mostly on groundwater for Municipal and Industrial use. Both cities, Las Cruces in New Mexico and Ciudad Juarez, Mexico, rely one hundred percent on groundwater to meet their potable water demands. Depending on drought conditions and the availability of water, the City of El Paso has increased its dependence on surface water and has focused on increased conservation efforts, but still El Paso depends on more than sixty percent on groundwater during winter months, when surface water is not available [1].

## **II- GROUNDWATER AVAILABILTY**

Groundwater availability reports in the Paso del Norte region, specifically in regard to the Hueco Bolson, and from a purely regional perspective, show differences in the statistics and interpretation throughout time, affecting regional strategic planning. For instance, the Texas Water Development Board (TWDB, 1979) estimated "availability" of groundwater in the Hueco. Its projection was that fresh water would be depleted by 2030. The International Boundary and Water Commission (IBWC, 2004) states that forecasts predict the depletion of the recoverable freshwater reserves of these binationally shared aquifers by the middle half of the 21st century. IBWC officials discuss in their public presentations that, "El Paso's fresh water portion of the Hueco Bolson may be exhausted in as little as 25 years, and Juarez' portion (Mexican side) possibly sooner".

It is clear that one of the concerns of ground water availability deals with the fact that although there is a large amount of data about the ground water of this particular region, there are also many disagreements on its interpretation in terms of statistics and future predictions. Then, the region confronts a bigger problem: how to bring about a solution to the differences in the political, jurisdictional and legal aspects of the administration of this water supply and work toward a common goal. Another aspect that would help determine the ground

water availability according to the many studies of EPWU is to determine the relative amount of fresh and brackish water, and how the implementation of large infrastructure projects such as El Paso's desalination project, on one side of the U.S./Mexico border affects other regional entities such as New Mexico and Mexico.

## **III- SURFACE WATER AVAILABILITY AND QUALITY**

The only replenishable source of water in the region is the Rio Grande. Consequentially, when water shortages occurs along the Rio Grande during dry years, potable water is insufficient, leading to rationing, which affects the agricultural and municipal users.

Another example leading to the conflict of water quantity and quality in The El Paso del Norte region is the treaty of 1906, between United States and Mexico. In accordance with the treaty, El Valle de Juarez (Mexico) would receive an annual delivery in perpetuity of 60,000 acre-feet of flow from the Rio Grande, and the U.S. side would receive annually 730,000 acre-feet. This disparity has become more vividly exemplified as the negative relationship between the burgeoning water demand and diminishing water supply are found in Cd. Juarez today.

Additionally, it can be mentioned that surface water agreements have established a formal and legal framework for addressing water allocation issues in the Rio Grande Project waters, but they do not address water quality issues. According to Miyamoto [5], after microbial pathogens, salinity is a major constraint for full utilization of water resources in the Rio Grande Basin. The high concentration of salinity as Total Dissolved Solids (TDS) in water supplies negatively impacts agricultural, municipal, and industrial users. Upstream users have no incentives to consider the water quality damages incurred in El Paso and Cd. Juarez when making decisions.

#### **IV- FRAGMENTATION**

Political boundaries divide the region and its resources. Water management is governed by different systems of law. The Office of the State Engineer manages both ground and surface water in New Mexico, under a legal system based on prior appropriation, and an adjudication process is underway to establish water rights; the same principle is applicable to surface water in Texas, but Texas exerts little authority over groundwater as individual property owners have access to groundwater based on the right of capture; in Mexico water belongs to the public, and thus individual property owners do not have secure claims to the use of either ground or surface water.

Another way in which fragmentation affects the policy environment is the effect of the power relations between stakeholders. Bi-national fragmentation of what is in reality a regional issue has had the effect of maintaining key stakeholders in a perceived subordinate position. The relative position of the Junta Municipal de Aguas (JMAS) and Distrito de Riego 009 and their relationship to their counterparts in the U.S. serves as an example of this condition. While it is recognized that technical, financial, and political asymmetries do exist between Mexican and U.S. water management institutions, this study finds that fragmentation is a significant obstacle to the creation of collaborative partnerships at the local level. In general, the fragmentation of interests expressed by the multiplicity of water management organizations in the region could be considered as a major contributor for conflict in this policy environment.

To better understand the complexity of water management policy in the Paso del Norte Region it is important to recognize the multi-faceted, multi-level nature of this policy environment. The system is a product of the multiple responsibilities and mandates regarding water management at the binational level. These responsibilities and mandates are now divided among multiple institutions. The

International Boundary and Water Commission (IBWC), as well as the NAFTA-inspired Border Environment Cooperation Commission (BECC) and its financial partner agency, the North American Development Bank (NADBank), all play a prominent role in formulating and implementing water management policy in the border. This institutional arrangement promotes the existence of a fragmented policy arena and disjointed policies on shared resources.

Water planning is also fragmented. Cities and utility agencies each engage in water planning, though the different plans differ in their time horizons, methodologies used to project population growth, forecast changes in per capita demand, and assumptions regarding resource availability. Irrigation districts in the region also undertake water planning efforts, but, because agricultural demand is relatively constant, planning activities tend to be short range and focus on distribution system enhancements.

#### **V- CONCLUSIONS**

Appropriate water management should include both water quantity and quality. Regional water management and planning developed in the 1930's did not address water quality. This omission is affecting agricultural and municipal users.

The issues of legislation and the clarification of water rights are vital for sustainable development of groundwater in an arid region such as the El Paso del Norte. The use of groundwater is a non-renewable source and, consequently, water used by one consumer is water that is forever lost for others; and this leads to water conflicts among entities. In order to achieve true regional groundwater management, there must be a consensus of the organizations involved in such management, with regard to the estimation of availability and quality of groundwater, particularly when this source, the Hueco Bolson, is shared by two countries and three states in the region.

The fragmentation of this policy arena affects

not only the level of integration achieved by policy but also heightens the differences in values among actors. Incorporating an array of institutional changes that balances the needs of the stakeholders with management of a scarce resource is critical to long term sustainability and efficiency.

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