

GIS TERM PROJECT PROPOSAL

Increasing Water Scarcity in the Rio Grande

Prepared by: Haytham Oueidat
EID: ho2769
MPAff 2015 -2017 (Expected)
LBJ School of Public Affairs
The University of Texas at Austin

To: Prof. David Maidment
Prof. David Tarborton

Introduction:

The choice to contemplate that particular region originated alongside a comprehensive policy analysis research endeavor on transboundary water resource sharing between the United States of America and Mexico, namely the frontier defining river basin between New Mexico-Texas and Chihuahua-Coahuila-Nuevo Leon. The nature of relations that exists between stakeholders on both ends of the border is interesting in itself, in fact the American managing International Border and Water Commission (IBWC) is roughly a single state based institution cooperating with the Mexican National 'Comisión Internacional de Límites y Aguas' (*CILA*). A light perspective on the enormity of the Texan superficies. The Rio Grande Rio Bravo complex is a case study worth delving into for the extensive breadth of matters involved in the effort to depict an accurate picture of existing inter-state / inter-national resource management issues.

Background:

The Rio Grande Initially springs upstream form the straits of Colorado, fluctuates through New Mexico Down along the frontier between Texas and the Mexican states, towards Rio Bravo and down to the Atlantic Ocean. Ever since the Mexican/US peace was established in the 1846, both sides have collaborated to modify the existing boundaries and treaties have been ratified in the following years to manage Water resource sharing.

Few gross numbers based on the more detailed treaty of 1944¹ (Including Mexican and US rights on water allocation):

- 1/2 of the Flow to both parties
- 2/3 of the Conchos² goes to Mexico and 1/3 to the US

The values are quite prominent to a current dispute over Water between the two countries, Mexico's water debt to the US should be subsidized within cycles of 5 years with a yearly debit of 350000 acre-Ft. This cyclical management process provides flexibility for Mexico to transaction its water duties in more adaptable patterns to the available supply.

However that debt has been accumulating and Mexico is falling short on delivering its required amount to the United States that's been fully consistent with its yearly share of owed water.

Objective:

In that respect there are many factors that influence regional resource decision making and fractioning, Dams and diversions have been erected over the years to contain riverine flows in localized areas, natural land developments on frontiers include but are not limited to:

- Twin cities
- Agricultural areas
- Industrial zones

Many reasons exist behind Mexico's lag in water delivery, the resource is increasingly scarce and the long practiced general usage is simply too demanding. Climate change, sedimentation and uncontrolled groundwater extraction³ are factors constantly compromising availability of the resource and making decisions entirely unreliable.

This term project will aim to visualize the difficulties associated with a resource in constant fluctuating evolution, increasing demands and decreasing supplies. The elements of interest will be periodic water volume monitoring alongside trending consumptive patterns (Man-made or natural), changing media for water transport (Mainly from sediment transport) and the effect of the latter on multiple milestone points of the basin (Dams, reservoirs, civil structures).

If it is permitted to overreach on some objectives, then the project might also encompass waterway modeling, and projections on the earlier described criteria. The methodology of reaching project requirements has yet to be defined (Nature of maps, basins and watersheds, logic for visualization, data structures, data interpretation and manipulation).

Some Aspects might change depending on levels of software proficiency reached throughout the course in time for completion date, and the complexity associated with such an exercise. Hopefully it will be a good constructive project.

¹ "Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande."

² The conchos river initiates from higher grounds in Chihuahua Mex. It is the principal recharge stream to the drying Rio Grande at their point of intersection in Ojinaga.

³ In Texas, Groundwater is the Land owner's personal property. While there are restrictions on how that extracted water is exploited, Texas is the only State that does not regulate amounts of water from private extraction.