

WATER MANAGEMENT POLICIES TO REDUCE THE OVER ALLOCATION OF WATER IN THE RIO GRANDE

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The Rio Grande/Bravo basin (Figure 1.a) has a severe problem of over allocation of water rights (Wong et al 2007), especially in the Rio Conchos (Figure 1.b) tributary of Mexico; due to a misunderstanding of the basin's hydrology and incorrect water rights allocations policies in the 1970's and 80's (Aboites 2002). Historically, the hydrology of the basin has shown periods of 25 years with plenty of water followed by extended drought periods of 10 years. During the decades of the 1970's and 80's, a wet period, there was an increase in the allocation of water rights in the basin, mostly in the irrigation districts. Later, from 1992 to 2002, an extended drought period occurred, threatening not only the water users but also the international obligations of water delivery in the Treaty of 1944 between Mexico and the U.S. In fact, during the drought period of 1992 to 2002, there was a deficit of water delivery for the treaty obligations from Mexico to the U.S. In 2005, the International Water and Boundary Commission (IBWC), which is the international water committee responsible to ensure the 1944 treaty compliance, reported the deficit of water was completely paid (IBWC-CILA 2005). At this point, the IBWC, the National Water Commission of Mexico (CONAGUA) and the Texas Commission on Environmental Quality (TCEQ), the last two institutions are the federal and state agency in charge of the water rights and water allocation in Mexico and Texas respectively, realized the over allocation of water and the necessity to solve this problem before another drought period comes. Nowadays, there is not enough water in the basin to meet the institutional and international obligations that the Rio Grande/Bravo basin is subject to.

Due to the lack of water availability for certain irrigation districts in Mexico, such as irrigation district 005 Delicias and 090 Bajo Conchos, in August 2003 the Minister of Agriculture in Mexico (SAGARPA) published the operation rules for the "Water Rights Use Adequacy and Resizing of Irrigation Districts" (Programa de Adecuación de Derechos de Uso del Agua y Redimensionamiento de Distritos de Riego, PADUA), with the objective to preserve the productivity and competitiveness of irrigation districts through the permanent buy back of water rights (SAGARPA 2003). The PADUA program tries to match the demand with the availability of water under different hydrologic conditions. In 2008, according to NAFTA regulations, there will be free tariffs for commerce of agricultural products between Mexico and the U.S. Because of this, productivity and competitiveness are key objectives in the PADUA program (Minister of Agriculture, SAGARPA 2003). From 2004 to 2006, SAGARPA made public the PADUA program and bought back surface water and groundwater rights in irrigation districts 090 Bajo Conchos (Figure 1.c) and 005 Delicias (Figure 1.d). A total of 130 million m³ of water were bought back permanently, which included 112 million m³ of surface water and 18 million m³ of groundwater (SAGARPA 2005, SAGARPA 2007). One of the requirements was that the water right titles were validated by CONAGUA. The price of water under the PADUA program was \$194 USD per thousand cubic meters for surface water and \$243 USD per thousand cubic meters for groundwater¹. A total of 25.6 million dollars were spent in this program.

¹ Monetary exchange \$10.28 Mexican pesos per dollar

To address the problem of water resources planning and management in the Rio Grande/Bravo basin, a group of universities, research centers and NGO's from Mexico and the United States, such as The University of Texas at Austin and the Mexican Institute of Water Technology (IMTA), made a consortium around a project known as "A physical assessment of the opportunities for improved management of the water resources of the bi-national Rio Grande/Bravo basin" (the Physical Assessment Project). The objective of this project is to examine the hydro-physical opportunities for expanding the beneficial uses of the fixed water supply in the Rio Grande/Bravo basin. The present article is part of the results obtained in the Physical Assessment Project, specifically in the water use alternative policy called Scenario I.A: Permanent buy back of water rights due to the PADUA program (2004-2006).

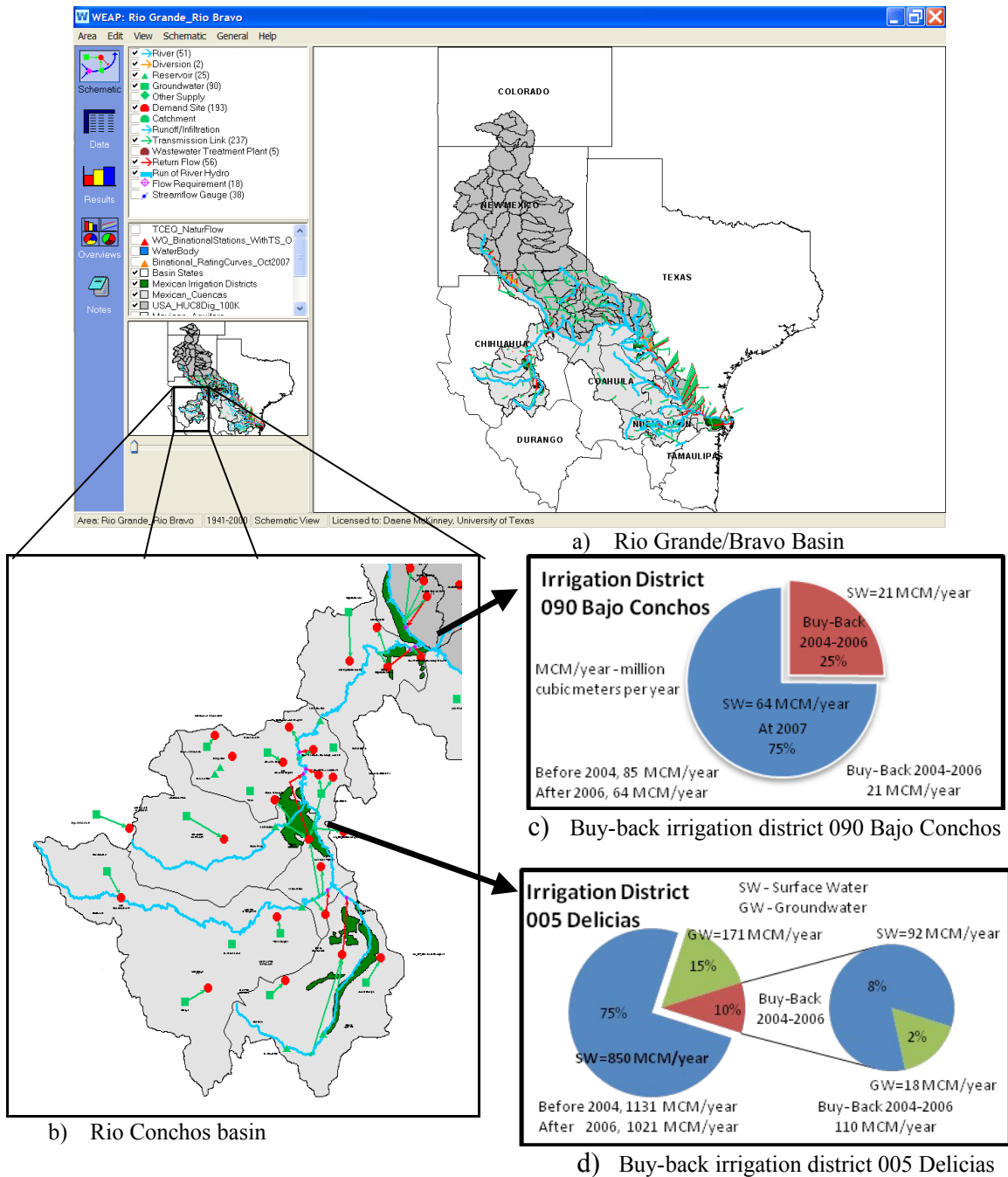


Figure 1: Rio Grande/Bravo basin.

This paper analyzes the benefits of the PADUA program in the Rio Grande/Bravo basin. Results of the hydrological period of analysis (1940-2000) shows an increase in the mean supply and reliability for irrigation district 005 Delicias. Also, the 1944 treaty obligations have an increased mean delivery from the Rio Conchos, which is the main Mexican tributary delivering water to the treaty obligations. La Boquilla and F. I. Madero dams see an increase in mean storage; however, the international reservoirs, La Amistad and Falcon, do not see any change. An analysis of the PADUA program under drought conditions shows a delay of shortages from 5 years without the program, to seven years with the program. One prospective buy back of water rights is proposed showing a delay of the onset of shortage to 8 years.

The analysis of the permanent buy back of water rights in the Rio Grande/Bravo basin shows that this policy has a positive effect on water resources in the basin. The buyback of water rights increases the mean supply and reliability for several water users. The mean delivery of water to treaty obligations increases from the Rio Conchos. Under drought conditions, the resilience of the irrigation districts is increased. The vulnerability of the system decreases. More water is saved in the dams and aquifers than without the PADUA program. However, increased evaporation losses are experienced in the dams. Although at this moment the PADUA program is on hold, it is recommended that the program be continued not only in the current irrigation districts, but applied in other districts in the basin, such as irrigation district 025 Bajo Rio Bravo.

References

- Aboites, L. (2002) *Hacia una historia del Rio Conchos*, El Colegio de México, <
http://www.edf.org/documents/2905_RioGrande_rioonchosHistoria.pdf>
- IBWC-CILA (2005), Mexico pays Rio Grande water deficit. El Paso Texas. Office of the Commissioner
United States Section
- SAGARPA (2003), *Reglas de Operación del Programa de Adquisición de Derechos de Uso del Agua*,
Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación, Diario Oficial de
la Nación, Martes 12 de agosto de 2003, <
http://www.sagarpa.gob.mx/subagri/info/sust/agua/padua/padua_dof_12082003.pdf>
- SAGARPA (2005), *Beneficiarios 2004*, <
http://www.sagarpa.gob.mx/subagri/info/sust/agua/padua/ben_padua04.swf>
- SAGARPA (2007), *Beneficiarios 2005-2006*, <
http://www.sagarpa.gob.mx/subagri/info/sust/agua/padua/ben_padua0506.swf>
- Wong, C. M., Williams C. E., Pittock, J, Coller, U and P. Schelle (2007) *World's top 10 rivers at risk*,
WWF International, Gland, Switzerland <
http://assets.panda.org/downloads/worldstop10riversatriskfinalmarch13_1.pdf>