

An Analysis of the 1944 U.S.-Mexico Water Treaty: Its Past, Present, and Future

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INTRODUCTION

The United States and Mexico share a 1,954 mile long border, from San Diego, California and Tijuana, Baja California, in the west, to Tamaulipas, Mexico and Brownsville, Texas in the east.¹ From the Pacific Ocean, the international boundary travels overland for 141 miles, along the southern border of California, until it reaches the Colorado River.² Then the boundary turns south and travels down the centerline of the Colorado River for 24 miles.³ The boundary continues overland 534 miles along the southern boundaries of Arizona and New Mexico until it reaches the Rio Grande at a point in El Paso, Texas and Ciudad Juárez, Chihuahua.⁴ The Rio Grande forms the easternmost 1,255 miles of the international boundary, traveling south and east until it reaches the Gulf of Mexico.⁵

Together, the Colorado River and the Rio Grande make up about two thirds of the international boundary.⁶ As settlement on both sides of the Border increased, use of the rivers became more intense and competitive. “[Q]uestions arose as to the location of the boundary and the jurisdiction of lands when the boundary rivers changed their course and transferred land from one side of the river to the other.”⁷ Problems also emerged involving the allocation of the waters, as increasing numbers of users on both sides of the Border competed for the finite water supply.⁸

The United States and Mexico entered into a series of agreements to resolve the boundary and water allocation issues. In 1944, the United States and Mexico entered into the Treaty for the Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande (“Treaty”).⁹ By 1945, both countries had ratified the Treaty and it entered into force in November 1945.¹⁰ The Treaty established water entitlements for both Mexico and the United States.¹¹ The

¹ About the U.S. IBWC, http://www.ibwc.state.gov/About_Us/About_Us.html (last visited Nov. 17, 2008); USGS International Programs, Map located at <http://international.usgs.gov/projects/prjsumexborder.htm> (last visited Oct. 11, 2008).

² About the U.S. IBWC, *supra* note 1.

³ *Id.*

⁴ *Id.*

⁵ *Id.*

⁶ *Id.*

⁷ History of the U.S. Section, IBWC, http://www.ibwc.state.gov/About_Us/history.html (last visited Nov. 17, 2008).

⁸ For example, in the 1880s, the Governor of Texas claimed Mexican citizens dug ditches to divert the waters of the Rio Grande and Mexico claimed that Americans in Colorado and New Mexico were using the Rio Grande water wastefully and aggravating the water shortage. Steven G. Ingram, Comment, *In a Twenty-First Century “Minute,”* 44 NAT. RESOURCES J. 163, 169 (2004).

⁹ Treaty between the United States of America and Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, U.S.-Mex., Feb. 3, 1944, 59 Stat. 1219 [hereinafter Treaty].

¹⁰ *Id.*

¹¹ *Id.*

Treaty placed implementation and enforcement authority in the International Boundary and Water Commission ("IBWC").¹²

The Treaty has been fairly successful in carrying out its mandate of policing allocation of the shared water resources between the United States and Mexico. This paper will first address the history of water uses at the Border and how the Treaty came about. Next, this paper will discuss the implementation of the Treaty and compliance with the Treaty's terms through examination of specific issues that have arisen under the Treaty. This paper will then evaluate the effectiveness of the Treaty thus far. Finally, this paper will discuss the pressing issues facing the IBWC today, evaluate the Treaty's ability to adapt to these issues, and recommend how the Treaty should be used in addressing these issues.

I. BACKGROUND

Water allocation between the United States and Mexico has long been a complex issue. In the late 1800s, United States water users complained that Mexican citizens were digging ditches to divert water from the Rio Grande.¹³ The Mexican government countered with an argument that wasteful United States use of Rio Grande water was aggravating the existing water shortage in the affected region.¹⁴ At the same time, development occurring in the Colorado River region led stakeholders in both countries to push for an agreement regarding Colorado River water, so as to make future developments more secure.¹⁵

Then-existing international water law provided no solutions to these problems. Water law in the United States and internationally had evolved as an appropriative system, where people gained a right to water through use of that water.¹⁶ The "Harmon Doctrine," developed in the context of addressing Mexican concerns over United States diversions of Rio Grande water. It expressed the international law principle that "a nation has general and absolute sovereignty over those resources within its territory."¹⁷ The United States and Mexico could not rely on these selfish principles of water law if they were to

¹² About the U.S. IBWC, *supra* note 1.

¹³ Ingram, *supra* note 8, at 169.

¹⁴ *Id.*

¹⁵ Brian Poulsen, Comment, *The North Giveth and the North Taketh Away: Negotiating Delivery Reductions to Mexico through the Colorado River Seven State Agreement for Drought Management – A Potential Conflict?*, 30 ENVIRONS ENVTL. L. & POL'Y J. 221, 227-28 (2007).

¹⁶ Dinniah M. Chahin, Comment, *Is the Once Mighty River Not So Mighty?: How the Distribution of Water Rights and Water Planning Along the Texas Portion of the Rio Grande River Affects Future Texans*, 6 TEX. TECH J. TEX. ADMIN. L. 115, 116 n. 5-7 (2005); A. Dan Tarlock, *International Water Law and the Protection of River System Ecosystem Integrity*, 10 BYU J. PUB. L. 181, 187-88, 190 (1996) ("rapid, uncoordinated, multiple-use development is rewarded; the best way for a state to define its fair share is to put the river to use").

¹⁷ Ingram, *supra* note 8, at 169.

effectively allocate their shared water resources. They needed to enter into an agreement that would equitably apportion the shared waters.¹⁸

II. THE TREATY

A. History of the Treaty

In response to growing populations on both sides of the Border and the growing need to formalize water sharing between the United States and Mexico, the two countries entered into their first water distribution treaty. The Convention of March 1, 1906 allocated the waters of the Rio Grande, from El Paso to Fort Quitman, an 89 mile international boundary.¹⁹ To further solidify water allocation and border demarcation between the two countries, the Convention of February 1, 1933, provided that the United States and Mexico would jointly construct, operate, and maintain the Rio Grande Rectification Project.²⁰ Administered through the International Boundary Commission ("IBC"), the Rio Grande Rectification Project straightened and stabilized the 155 mile river boundary through the El Paso-Juárez Valley.²¹ Finally, the Treaty expanded the agreement between the two countries by allotting specific quantities of Rio Grande and Colorado River water to the United States and Mexico.²²

The Treaty renamed the IBC the International Boundary and Water Commission ("IBWC"), and invested that entity with the powers of enforcing and implementing the Treaty.²³

B. Water Delivery Obligations Under the Treaty

The Treaty and the allocation of the shared international waters arose out of a process of negotiation between the United States and Mexico.²⁴ Articles 4 and

¹⁸ See, e.g., Robert E. Hall, Note, *Transboundary Groundwater Management: Opportunities under International Law for Groundwater Management in the United States-Mexico Border Region*, 21 ARIZ. J. INT'L & COMP. L. 873, 873-74 (Fall 2004) ("In the case of international boundary waters, that is, waters that define at least for part of their course the boundary between two countries, the parties have a more immediate and compelling incentive to come to an understanding because both would likely suffer the consequences of . . . deterioration of water quality or quantity by the unregulated activities of either or both parties. This self-interest is mutual to the extent that the resource itself is knowingly shared. For river systems, the connection is visible and the mutuality is obvious.").

¹⁹ History of the U.S. Section, IBWC, *supra* note 7.

²⁰ *Id.*

²¹ *Id.*

²² Treaty, *supra* note 9, arts. 4, 10.

²³ History of the U.S. Section, IBWC, *supra* note 7.

²⁴ Damien M. Schiff, Comment, *Rollin', Rollin', Rollin' on the River: A Story of Drought, Treaty Interpretation, and Other Rio Grande Problems*, 14 IND. INT'L & COMP. L. REV. 117, 125-27 (2003). For example, although Mexico originally requested 3.6 million acre-feet of Colorado River

10 of the Treaty allocate the waters of the Rio Grande and the Colorado River, respectively, to the United States and Mexico.²⁵ Article 4 also allocates the waters of the various tributaries of the Rio Grande.²⁶ The Treaty provides for temporary exemptions to its water delivery requirements.²⁷ The Treaty also includes a hierarchy of uses to guide the IBWC if it has to provide for joint use of any of the international waters.²⁸

1. Allocation of the Rio Grande and Its Tributaries

Under Article 4, the Treaty allocates to Mexico: (1) an amount of water equal to all of the waters reaching the main channel of the Rio Grande from the San Juan and Alamo Rivers, including the return flows from the lands irrigated from those two rivers; (2) two-thirds of the flow reaching the main channel of the Rio Grande from the Conchos, San Diego, San Rodrigo, Escondido and Salado Rivers, and the Las Vacas Arroyo, subject to the requirement that the remaining one-third shall not be less than an average of 350,000 acre-feet per year; and (3) one-half of all other flows occurring in the main channel of the Rio Grande downstream from Fort Quitman.²⁹

The Treaty allots to the United States: (1) an amount equal to all of the waters reaching the main channel of the Rio Grande from the Pecos and Devils Rivers, Goodenough Spring and Alamito, Terlingua, San Felipe and Pinto Creeks; (2) one-third of the flow reaching the main channel of the river from the Conchos, San Diego, San Rodrigo, Escondido, and Salado Rivers and Las Vacas Arroyo, which shall not be less, as an average amount in cycles of five consecutive years, than 350,000 acre-feet annually; and (3) one-half of all other flows occurring in the main channel of the Rio Grande downstream from Fort Quitman.³⁰

water per year and the U.S. countered with 750,000 acre-feet (an amount equal to Mexico's peak consumption up to that point in history), Mexico eventually received 1.5 million acre-feet per year, over the fierce opposition of lower Colorado River Basin states. This is because "of the fear in the minds of American negotiators that, by holding out, Mexico could win a far more favorable award under the provisions of a 1929 inter-American arbitration treaty, to which the United States and Mexico were parties." *Id.* at 125-26. Mexico was also able to play American Rio Grande parties, who wanted a treaty, against California, who strongly opposed any agreement that might threaten its then-current Colorado River allotments. *Id.* at 127.

²⁵ Treaty, *supra* note 9, arts. 4, 10.

²⁶ Treaty, *supra* note 9, art. 4.

²⁷ Treaty, *supra* note 9, arts. 4, 10.

²⁸ Treaty, *supra* note 9, art. 3.

²⁹ Treaty, *supra* note 9, art. 4. The Rio Conchos is a tributary in Mexico that feeds the Rio Grande. Ingram, *supra* note 8, at 171. The Rio San Diego, Rio San Rodrigo, Rio Escondido, and Rio Salado and the Arroyo de las Vacas feed the Rio Conchos. *Id.* An acre-foot of water is 325,850 gallons, or, the amount of water needed to cover one acre of land with water one foot deep. *Defenders of Wildlife v. Norton*, 257 F. Supp. 2d 53, 57 n.1 (D.D.C. 2003). It can support a family of five for one year. *Id.*

³⁰ Treaty, *supra* note 9, art. 4. The Pecos and Devils Rivers are the main tributaries of the Rio Grande in Texas. Texas Parks and Wildlife, *An Analysis of Texas Waterways*,

In sum, the Treaty obligates Mexico to deliver 350,000 acre-feet of water per year to the United States from the Rio Grande.³¹ The two countries divide equally the waters of the Rio Grande between Fort Quitman, Texas, and the Gulf of Mexico.³²

2. Allocation of the Colorado River

Under Article 10, the Treaty allocates to Mexico: (1) a guaranteed annual quantity of 1,500,000 acre-feet of the waters of the Colorado River, to be delivered in accordance with schedules formulated in advance by Mexico; and (2) any other quantities arriving at the Mexican points of diversion, but not to exceed 1,700,000 acre-feet per year.³³ Under this Article, Mexico has a right to 1,500,000 annual acre-feet of water from the Colorado River, and does not acquire any increased right to the waters of the Colorado River by virtue of use of those waters.³⁴

3. Temporary Exemptions

The Treaty does allow certain temporary exemptions from the annual water delivery requirements. If Mexico is unable to provide the United States with the average annual 350,000 acre-feet from the Rio Grande designated under Article 4(B)(c) because of “extraordinary drought or serious accident,” the Treaty allows Mexico to make up any water debt remaining at the end of one five-year cycle in the next five-year cycle.³⁵ On the other hand, if “extraordinary drought or serious accident” prevents the United States from delivering the guaranteed 1,500,000 acre-feet of water to Mexico from the Colorado River, the water allotted to Mexico under Article 10 will be reduced in proportion to the reduction in United States consumptive uses.³⁶ The Treaty does not explain the difference in the standards for reduction for each country. This is possibly a

http://www.tpwd.state.tx.us/publications/pwdpubs/pwd_rp_t3200_1047/index.phtml (last visited Nov. 15, 2008). Terlingua Creek is another significant Rio Grande tributary in Texas. The University of Texas at Austin, *Texas Beyond History: Paradise Site*, <http://www.texasbeyondhistory.net/trans-p> (last visited Nov. 15, 2008). Pinto and San Felipe Creeks are also tributaries of the Rio Grande in Texas. Center for Biological Diversity, *Devils River Minnow Facts*, http://www.biologicaldiversity.org/species/fish/Devils_River_minnow/ (last visited Nov. 15, 2008). Goodenough Springs, one of the largest springs in Texas, sits in a side canyon of the Rio Grande. The University of Texas at Austin, *Texas Beyond History: Lower Pecos*, www.texasbeyondhistory.net/pecos/natural.html (last visited Nov. 15, 2008). Alamito Creek also feeds the Rio Grande on the U.S. side. The University of Texas at Austin, *Texas Beyond History: La Junta de los Rios*, www.texasbeyondhistory.net/junta (last visited Nov. 15, 2008).

³¹ Ingram, *supra* note 8, at 171.

³² *Id.*

³³ Treaty, *supra* note 9, art. 10.

³⁴ *Id.*

³⁵ Treaty, *supra* note 9, art. 4.

³⁶ Treaty, *supra* note 9, art. 10.

result of the fact that the United States was more developed and used more water than Mexico at the time that the Treaty was executed.³⁷

4. Hierarchy of Uses Under the Treaty

Article 3 of the Treaty lists a hierarchy of uses for the shared waters: (1) domestic and municipal uses; (2) agriculture and stock-raising; (3) electric power; (4) other industrial uses; (5) navigation; (6) fishing and hunting; and finally, (7) "any other beneficial uses which may be determined by the Commission."³⁸ Article 3 also provides that the United States and Mexico "agree to give preferential attention to the solution of all border sanitation problems."³⁹

III. IMPLEMENTATION OF AND COMPLIANCE WITH THE TREATY

The Treaty granted the IBWC the authority to implement the Treaty.⁴⁰ The IBWC is an international body and consists of a United States Section and a Mexico Section.⁴¹ The IBWC must apply the Treaty, exercise the rights and obligations of both governments under the Treaty, and settle all disputes that arise under the Treaty.⁴² Disputes that arise under the Treaty are settled through the Minute process.⁴³

A. *The IBWC*

Article 2 of the Treaty provides that the IBWC "shall in all respects have the status of an international body," which consists of a United States Section and a Mexico Section.⁴⁴ Each section is headed by a Commissioner, and staffed by two principal engineers, a legal advisor, and a secretary, all of whom enjoy diplomatic privileges and immunities in the territory of the other country.⁴⁵ Each government is responsible for the expense of maintaining its own section of the IBWC, while joint expenses incurred by the IBWC are borne equally by

³⁷ Another possibility is that these differences result from a diplomatic trade-off. See Schiff, *supra* note 22, at 130 ("Unlike Mexico's Rio Grande obligation, the United States is required to furnish Mexico with water on a yearly basis without benefit of multi-year accounting periods and without the option of adding a water debt incurred during one year onto the following year's obligation. In place of these protections, the United States is afforded the option of reducing its treaty obligation to Mexico to the extent that the precipitating cause of the water shortage has reduced water consumption throughout the Colorado River Basin.").

³⁸ Treaty, *supra* note 9, art. 3.

³⁹ *Id.*

⁴⁰ Treaty, *supra* note 9, art. 24.

⁴¹ History of the U.S. Section, IBWC, *supra* note 7.

⁴² *Id.*

⁴³ Treaty, *supra* note 9, art. 25.

⁴⁴ Treaty, *supra* note 9, art. 2.

⁴⁵ *Id.*

the two governments.⁴⁶ Any works constructed, acquired, or used in fulfillment of the treaty and located wholly within the territory of either country are placed under the exclusive jurisdiction and control of the section in whose country they are located.⁴⁷ A section may assume jurisdiction or control over works located within the other country only with the express consent of that other country's government.⁴⁸ Matters that involve joint action or joint agreement by the two countries are handled through the Department of State of the United States and the Ministry of Foreign Relations of Mexico.⁴⁹

B. *The Minute Process*

When the IBWC exercises its rule-making power under the Treaty, it must record its decisions in the form of Minutes, written in both English and Spanish.⁵⁰ A Minute shall be signed by each Commissioner and forwarded to each government within three days of being signed.⁵¹ If neither government expresses approval or disapproval of a Minute, the Minute shall be deemed approved thirty days after its execution, unless specific approval of both governments is required by a provision of the Treaty.⁵²

The Minute process has proven useful in situations where the Treaty, as originally written, was silent or vague. The Minute process also gives the Treaty the adaptability it needs, enabling the IBWC to secure long-term compliance through short-term flexibility. The following discussion illustrates these features of the Treaty.

C. *Successes and Failures*

Overall, IBWC efforts to resolve issues arising under the Treaty have succeeded. However, these processes often take several years, and have frequently left stakeholders feeling dissatisfied. This section will examine two issues that arose under the Treaty and analyze the Treaty's success in resolving them. First, this section will analyze the Colorado River salinity crisis of the mid-twentieth century, when Colorado River water reaching Mexico was so saline as to render it unusable. Subsequently, this section will discuss Mexico's failure, during the late twentieth and early twenty-first centuries, to meet its obligations regarding Rio Grande water deliveries to the United States.

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ Treaty, *supra* note 9, art. 25.

⁵¹ *Id.*

⁵² *Id.*

1. The Colorado River Salinity Crisis

The Colorado River Salinity Crisis is an example of the Treaty struggling to achieve compliance and an equitable result for both nations. While the crisis took many years to resolve, ultimately, the Treaty provided equitable solutions to complex border issues. The Treaty said nothing directly about the quality of the water that must be delivered under the Treaty. In the early 1960s, the Colorado River's salinity levels rose dramatically and consequently, the water Mexico received from the United States was not usable for drinking or irrigation.⁵³ The process took several years, but eventually the IBWC recorded Minute 242 which boldly asserted itself as the "Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River."⁵⁴

a. Factual Background

The Colorado River is naturally salty, with half of the average annual salt load carried past the Hoover Dam attributed to natural occurrences.⁵⁵ "Human-caused increases in salinity concentration account for the remainder, and include saline irrigation return flows, reservoir evaporation, out-of-basin transfers, and municipal/industrial uses".⁵⁶

In the early 1960s, the filling of Lake Powell in Utah exacerbated this problem because it caused less water than normal to be released into the Colorado River flow downstream of Glen Canyon Dam.⁵⁷ Additionally, the Wellton-Mohawk Irrigation and Drainage District in Arizona began discharging saline wastewater into the Colorado River.⁵⁸ Together, these factors caused salinity levels in the lower Colorado River to rise dramatically, with devastating consequences for the prime agricultural land in the Mexicali Valley.⁵⁹ Drinking water supplies were also threatened by the high salinity levels, which were far above the World Health Organization's salinity limit at the time.⁶⁰

During the negotiations leading to the creation of the Treaty, Mexico had suggested the inclusion of water quality provisions but these did not make it into

⁵³ Paul Stanton Kibel & Jonathon R. Schutz, *Rio Grande Designs: Texans' NAFTA Water Claim Against Mexico*, 25 BERKELEY J. INT'L L. 228, 235-36 (2007).

⁵⁴ International Boundary and Water Commission (IBWC), Minute No. 242, Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River (Aug. 30, 1973), available at <http://www.ibwc.state.gov/Files/Minutes/Min242.pdf>.

⁵⁵ Commission for Environmental Cooperation, *North American Boundary and Transboundary Inland Water Management Report*, at 97 (2001), available at <http://www.cec.org/files/PDF/LAWPOLICY/NAELP7e.pdf>.

⁵⁶ *Id.*

⁵⁷ Kibel & Schutz, *supra* note 53, at 235.

⁵⁸ *Id.* at 235-36.

⁵⁹ *Id.* at 236; Hall, *supra* note 18, at 907.

⁶⁰ Kibel & Schutz, *supra* note 53, at 236.

the Treaty.⁶¹ Mexico's view of the Treaty was that since the Treaty expressly acknowledged that Mexico needed water for domestic, agricultural, and livestock uses - in Article 3 - then if poor quality rendered the water delivered by the United States unfit for these purposes, the delivery of that water was inconsistent with the Treaty.⁶² From the United States' perspective, Mexico "could not complain about the quality of water it received because it had been granted more water under the 1944 Rivers Treaty than it deserved."⁶³

These conditions led to protests outside the United States Consulate in Mexicali.⁶⁴ The protests prompted the IBWC to work towards a solution to the salinity crisis.⁶⁵ The first effort, Minute 218, went into force in 1965 and required the United States to extend the Wellton-Mohawk District's drainage channel so as to reduce Colorado River salinity.⁶⁶ Minute 218 was designed to last five years, while the IBWC conducted studies into the causes of the salinity problem and developed a new Minute to replace it.⁶⁷

Mexicali Valley farmers received Minute 218 poorly, particularly because the agreement still obligated Mexico to pay for the waters received, regardless of their salinity.⁶⁸ In 1971, with water quality still unacceptable, then-President Luis Echeverria threatened to sue the United States in the International Court of Justice ("ICJ").⁶⁹ At the time, United States and Mexican historians and legal scholars thought Mexico would almost certainly prevail at the ICJ.⁷⁰

Faced with the threat of ICJ litigation, and increasingly negative international attention over the crisis, the United States entered into a more comprehensive salinity-control agreement with Mexico.⁷¹ The IBWC recorded Minute 241, going into effect in 1972, in which the United States committed to finding an immediate solution to the problem.⁷² Minute 241 also reiterated the provisions

⁶¹ *Id.* at 235.

⁶² *Id.*

⁶³ *Id.*

⁶⁴ *Id.* at 236.

⁶⁵ *Id.*

⁶⁶ IBWC, Minute No. 218, Recommendations on the Colorado Salinity Problem (Mar. 22, 1965), available at <http://www.ibwc.state.gov/Files/Minutes/Min218.pdf>. Recommendation 1 calls for the United States to "construct at its expense an extension to the present Wellton-Mohawk District's drainage conveyance channel, with capacity of 353 cubic feet (10 cubic meters) per second, along the left bank of the Colorado River to a point below Morelos Dam, and a control structure in that extension of the channel in the reach between Morelos Dam and the mouth of the Araz Drain, which structure would permit the discharge of the Wellton-Mohawk District's drainage waters to the bed of the river at a point either above or below the Morelos Dam."

⁶⁷ *Id.*

⁶⁸ Kibel & Schutz, *supra* note 53, at 236.

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ *Id.* at 237.

⁷² IBWC, Minute No. 241, Recommendations to Improve Immediately the Quality of Colorado River Waters Going to Mexico (July 14, 1972), available at <http://ibwc.state.gov/Files/Minutes.Min241.pdf>.

of Minute 218.⁷³

b. The Outcome: Minute 242

In 1973, the IBWC recorded Minute 242, the "Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River."⁷⁴ This Minute limited the annual average salinity levels of Colorado River waters delivered to Mexico to a maximum of 145 p.p.m. over the average annual salinity of Colorado River waters arriving at the Imperial Dam, in Yuma, Arizona.⁷⁵ Minute 242 also required the United States to "support efforts by Mexico to obtain appropriate financing on favorable terms for the improvement and rehabilitation of the Mexicali Valley."⁷⁶ Furthermore, the Minute directed the United States to "provide non-reimbursable assistance on a basis mutually acceptable to both countries exclusively for those aspects of the Mexican rehabilitation program of the Mexicali Valley relating to the salinity problem."⁷⁷ The Minute also obligated the United States to construct, operate, and maintain another drainage channel.⁷⁸

c. Conclusion

In evaluating this crisis, Mexico's perspective was that the United States violated the Treaty with impunity for decades.⁷⁹ Additionally, the United States never assumed responsibility for the economic damages to farmers in Baja California caused by the high salinity levels.⁸⁰ However, the United States did not violate any explicit provision of the Treaty - and the United States complied with Minute 242 once that agreement was recorded - so arguably this crisis is an illustration of the Treaty's ability to secure compliance with its processes and terms.

The United States' actions leading up to Minute 242, and its original bargaining position, illustrate that this Minute was a significant accomplishment by the IBWC. The salinity level reductions required, and achieved, by the Minute were significant.⁸¹ The Minute also fairly placed the financial burden of

⁷³ *Id.* at 2.

⁷⁴ IBWC, Minute No. 242, *supra* note 54, at 1.

⁷⁵ *Id.*

⁷⁶ *Id.* at 3.

⁷⁷ *Id.*

⁷⁸ *Id.* at 2.

⁷⁹ Kibel & Schutz, *supra* note 53, at 237.

⁸⁰ *Id.*

⁸¹ U.S. IBWC, 2006 Report on Salinity Operations on the Colorado River Under Minute 242, Exhibit 2, "Flow-Weighted Annual Average Salinity Levels in the Water Arriving at Imperial Dam Since 1951, and at the Northerly International Boundary (NIB) Since 1958," available at http://www.ibwc.state.gov/EMD/Salinity/Annual_CO_Salinity_Report-2006.pdf [hereinafter IBWC 2006 Report] (showing significant reduction in salinity levels and much smaller difference

cleaning up the Colorado River water on the United States, the country responsible for damaging the quality in the first place. The United States was required to provide non-reimbursable assistance to Mexico for the Mexicali Valley cleanup and made to shoulder the financial and oversight burden of the new drainage channel. The IBWC's ability to place these obligations on a country whose original negotiating position was that it had no water quality obligations, only quantity, shows its true capabilities to provide equitable solutions to complex border issues.⁸²

2. The Mexican Water Debt Crisis

A discussion of the Mexican water debt illustrates the adaptability of the Treaty and its ability to secure long-term compliance through short-term flexibility. Interestingly, before this debt arose, Mexico had frequently delivered more water than required to the United States.⁸³ The following sections describe the water debt scenario and its outcome, and analyze the significance of that situation under the Treaty.

a. The Mexican Water Debt

During the two five-year cycles between 1992 and 2002, Mexico claimed that drought conditions made it impossible to meet its obligations for Rio Grande water to the U.S.⁸⁴ Minute 293, recorded in 1995, acknowledged the drought and observed that, "even when utilizing a program of protection and efficient use of the water, the present storage of waters belonging to Mexico at the dams would be just sufficient to cover needs for Mexico through June 1996."⁸⁵ Mexico could "face a serious threat to meeting the water supply demands for its riverside communities."⁸⁶

Minute 293, the IBWC's attempt to alleviate the severe drought conditions plaguing Mexico, authorized Mexican use of some of the waters belonging to the United States stored in two international reservoirs.⁸⁷ The authorization for this action came from Article 9(f) of the Treaty, which provides that:

between salinity levels at Imperial Dam and salinity levels at Border).

⁸² The nature of the Minute Process allows these kinds of flexible solutions because it only requires the consent of the foreign ministries and does not impose any other requirements for Minute approval, such as the advice and consent of the Senate. See Stephen P. Mumme, *Developing Treaty Compatible Watershed Management Reforms for the U.S. - Mexico Border: The Case for Strengthening the International Boundary and Water Commission*, 30 N.C. J. INT'L L. & COM. REG. 929, 935 (2005).

⁸³ Kibel & Schutz, *supra* note 53, at 239.

⁸⁴ *Id.* at 240.

⁸⁵ IBWC, Minute No. 293, Emergency Cooperation To Supply Municipal Needs Of Mexican Communities Located Along The Rio Grande Downstream of Amistad Dam (Oct. 4, 1995), available at <http://www.ibwc.state.gov/Files/Minutes/Min293.pdf>.

⁸⁶ *Id.* at 2.

⁸⁷ *Id.*; see also, Schiff, *supra* note 24, at 154.

in the case of the occurrence of an extraordinary drought in one country with an abundant supply of water in the other country, water stored in the international storage reservoirs and belonging to the country enjoying such abundant water supply may be withdrawn, with the consent of the Commission, for the use of the country undergoing the drought.⁸⁸

At the end of the 1992 to 1997 cycle, Mexico had a debt of approximately one million acre-feet, which it carried over, under the extraordinary drought provision of Article 4, to be repaid in the 1997 to 2002 cycle.⁸⁹ "In the event of extraordinary drought . . . making it difficult for Mexico to make available the run-off of 350,000 acre-feet annually," Article 4 allowed Mexico to repay any deficiencies existing at the end of one five-year cycle in the following five-year cycle.⁹⁰ Unfortunately, at the end of the 1997 to 2002 cycle, Mexico was still in debt by approximately one and a half million acre-feet.⁹¹ Minute 308, executed near the end of the 1997 to 2002 cycle, dealt with drought management and required Mexico conduct and report on studies concerning drought management planning.⁹² Minute 308 also called for both governments to consider a binational sustainable development plan.⁹³ It established a "forum for the exchange of information and advice to the Commission from government and non-government organizations" in both countries in order to "strengthen the Commission's role in the area of sustainable management of the basin and drought management planning."⁹⁴ By October 2004, Mexico had succeeded in reducing its debt to approximately 700,000 acre-feet.⁹⁵ Through diplomatic negotiations assisted by the IBWC, Mexico eliminated its water debt at the end of September 2005.⁹⁶

b. Compliance Lessons Taught by the Mexican Water Debt Scenario

The Mexican water debt scenario can be seen as an extended period of Mexican non-compliance with the Treaty. Its greater value lies in its illustration of the ability of the Treaty to bring a party back into compliance, thereby avoiding destruction of the Treaty or a break down in diplomatic relations.

Mexico did not comply with its substantive water delivery obligations under

⁸⁸ Treaty, *supra* note 9, art. 9(f).

⁸⁹ Kibel & Schutz, *supra* note 53, at 241.

⁹⁰ Treaty, *supra* note 9, art. 4.

⁹¹ U.S. IBWC Press Release of 3/10/2005, *USIBWC Commissioner Announces Resolution of Mexico's Rio Grande Water Debt*, available at <http://www.ibwc.state.gov/PAO/CURPRESS/2005/WaterDelFinalWeb.pdf>.

⁹² IBWC, Minute No. 308, United States Allocation of Rio Grande Waters During the Last Year of the Current Cycle (June 28, 2002), available at <http://www.ibwc.state.gov/Files/Minutes/Min308.pdf>.

⁹³ *Id.* at 4.

⁹⁴ *Id.* at 4.

⁹⁵ U.S. IBWC Press Release of 3/10/2005, *supra* note 91.

⁹⁶ *Id.*; Kibel & Schutz, *supra* note 53, at 241.

the Treaty, but its non-compliance was expressly considered by and allowed for under the extraordinary drought provisions of Articles 4 and 9 of the Treaty. Eventually, through the diplomatic efforts of Mexico, the United States, and the IBWC, Mexico was able to deliver its yearly requirements to the United States and pay back the water debt that it had incurred. It is true that this process took several years, and went beyond the single five-year cycle extension expressly contemplated by the extraordinary drought provision of Article 4 of the Treaty. However, given the border region's proclivity toward drought, the increasing competing uses of water on both sides of the border, and the tendency of water issues to inflame and divide, the Treaty functioned well. It brought Mexico back into compliance with its delivery obligations within three years of the five-year cycle in which the Treaty presumed Mexico would be able to repay its debt. It is far more beneficial that Mexico is now back in compliance than it would have been for the United States to insist on receiving its numerical water entitlements in a more rigid manner, possibly causing long term damage to Mexico's agricultural and ecosystem assets.

IV. EFFECTIVENESS

The Treaty has generally been effective in allocating shared water resources between the United States and Mexico. As with any instrument of international significance, it has been criticized, but scholarly praise for the Treaty exists as well. The following sections describe scholarly criticisms and praises of the Treaty, based on its ability to deal with issues that have arisen over the past several decades.

A. Criticisms of the Treaty

1. Mexico's Right to Hold Water in Its Reservoirs

At least two specialists in environmental and water law have posited that the Treaty does not "indicate whether Mexico is entitled to hold enough water in its reservoirs to meet its own water demands in times of drought."⁹⁷ This assertion was made in the context of Mexico's invocation of the drought provisions of the Treaty during the Water Debt Crisis, described above.⁹⁸ Since it meant that under the Treaty-imposed delivery obligations Mexico would be vulnerable to water shortages, this would be a significant shortcoming of the Treaty.

However, the Treaty cannot reasonably be construed to require Mexico to deliver water to the United States when such deliveries would cause Mexico to

⁹⁷ Kibel & Schutz, *supra* note 53, at 240-41. They do not specify which provisions of the Treaty they looked at in making this assertion, instead referring to the "1944 Rivers Treaty" as a whole. *Id.*

⁹⁸ See *supra*, Section IV.C.2.

not meet its own water needs. This is based on analysis of the extraordinary drought provision of Article 4(B)(d). That section provides that, "in the event of extraordinary drought . . . *making it difficult* for Mexico to make available the run-off of 350,000 acre-feet annually," Mexico may make up deficiencies in its water deliveries in the following five-year cycle.⁹⁹ If that clause instead said "impossible," commentators such as Kibel and Schutz would have a stronger argument that Mexico might be liable to deliver water even if that means Mexico will itself go wanting. Since the Treaty uses the much softer word "difficult," Kibel and Schutz's position is untenable. Thus, the criticism that the Treaty leaves Mexico vulnerable to water shortages during times of drought is not apt.

2. Low Priority for Ecological Uses of Water

Another criticism of the Treaty is that it does not adequately protect ecological water uses. A leading authority on environmental issues at the U.S.-Mexico Border, Stephen P. Mumme, has stated that "ecological uses are considered at the lowest rung of identified priorities within the treaty, as part of the catch-all category of 'any other beneficial uses which may be determined.'"¹⁰⁰ He argued that the current allocation of priorities is outdated and that ecological considerations are critical to maintaining "the habitat essential for fishing and hunting and residual navigational values on both rivers."¹⁰¹ Mumme also argued that an ecological minute is necessary to make the Treaty compatible with contemporary domestic and international law governing endangered species protection.¹⁰²

Mumme's criticism is apt. In an increasingly crowded border region, with more and more demands on the limited water resources, it is necessary to be concerned about the ecological health of the region.¹⁰³ Traditionally, international water law has been a "channel-based legal regime, as opposed to a watershed or ecosystem-based legal regime."¹⁰⁴ "[T]his focus is inherently biased toward development and against ecosystem protection."¹⁰⁵ This has caused ecosystem degradation in areas such as the Middle Rio Grande, where 36

⁹⁹ Treaty, *supra* note 9, art. 4(B)(d) (emphasis added).

¹⁰⁰ Stephen P. Mumme, *WATER USE SYMPOSIUM: The Case for Adding an Ecology Minute to the 1944 United States-Mexico Water Treaty*, 15 TUL. ENVTL. L.J. 239, 248 (2002).

¹⁰¹ *Id.* at 249.

¹⁰² *Id.*

¹⁰³ See, e.g., *id.*, and A. Dan Tarlock, *Safeguarding International River Ecosystems in Times of Scarcity*, 3 U. DENV. WATER L. REV. 231 (2000), and Rudy E. Verner, Comment, *Short Term Solutions, Interim Surplus Guidelines, and the Future of the Colorado River Delta*, 14 COLO. J. INT'L ENVTL. L. & POL'Y 241 (2003).

¹⁰⁴ Tarlock, *supra* note 16, at 199.

¹⁰⁵ *Id.*

to 63 percent of the native fish species have gone extinct.¹⁰⁶ Factors which likely led to this decrease in biodiversity include water quality reduction, sedimentation, development and management practices, and the introduction of nonnative fish.¹⁰⁷ This illustrates that the way of thinking about water management needs to change to incorporate ecosystem protection values. Unfortunately, based on the hierarchy of uses in the Treaty, it is unlikely that ecosystem protection could ever be elevated to a high priority.¹⁰⁸ But, through the development of ecological Minutes to the Treaty, discussed below,¹⁰⁹ ecological values could at least achieve explicit protection under the Treaty.

3. Slowness of the Treaty

Another serious criticism of the Treaty is that it often works at a slow speed. Minute 242, the "Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River," came more than a decade after the beginning of the Colorado River salinity crisis.¹¹⁰ Additionally, the IBWC recorded two ineffective Minutes to try to solve the problem before Minute 242.¹¹¹ It also should be pointed out that Minute 242 did not permanently solve the Colorado River salinity problem. This is an ongoing process, in furtherance of which the United States enacted the Colorado River Basin Salinity Control Act, authorizing the Secretary of the Interior to implement a salinity control program to enable the United States to "comply with its obligations under [Minute 242]."¹¹² The most recent amendments to the Act were in 1995.¹¹³ The IBWC continues to issue yearly Colorado River Salinity Reports and these show a significant reduction in salinity levels.¹¹⁴ The difference between salinity levels at the Imperial Dam and salinity levels at the Border are currently within the range required by Minute 242.¹¹⁵

Another example of the slowness with which the Treaty operates was in the context of developing a Minute to cover groundwater resources. The IBWC has

¹⁰⁶ Denise D. Fort, *Restoring the Rio Grande: A Case Study in Environmental Federalism*, 28 ENVTL. L. 15, 22 (1998).

¹⁰⁷ *Id.*

¹⁰⁸ Mumme, *supra* note 100, at 254 ("There can be little doubt that the 1944 Water Treaty strongly favors development over environment as it specifies priorities for the utilization of treaty waters.").

¹⁰⁹ See *infra*, Section V.C.1.

¹¹⁰ See *supra*, Section IV.C.1, for a full discussion of the Colorado River salinity crisis and Minute 242.

¹¹¹ *Id.*

¹¹² Colorado River Basin Salinity Control Act, 43 U.S.C. § 1571 (1974).

¹¹³ Colorado River Basin Salinity Control Act Amendments of 1995, Pub. L. No. 104-20, 109 Stat. 255 (1995).

¹¹⁴ IBWC 2006 Report, *supra* note 81.

¹¹⁵ *Id.*

called for development of a Minute on groundwater since 1973.¹¹⁶ This has still not happened, even though studies have continually been conducted, and in the United States a statute has been passed specifically dealing with transboundary aquifers.¹¹⁷

A final example of the slowness with which the Treaty operates is in the context of infrastructure problems. The Rio Grande salinity problem arose from repeated breakdowns of the waterworks associated with the saline water disposal system for controlling the salinity of the Lower Rio Grande. Minutes 223 and 224 identified both Mexican and United States causes of the increased Rio Grande salinity. They required a canal to be built through Mexican territory to carry some of the highly saline El Morillo Drain waters away from the Rio Grande and into the Gulf of Mexico.¹¹⁸ This canal and its associated pumping plant began operating in 1969.¹¹⁹

Due to continuous use over the next 21 years, the waterworks began experiencing frequent breakdowns during the late 1980s, causing periods of increased salinity.¹²⁰ The canal that carried saline waters to the Gulf of Mexico also deteriorated and became heavily silted.¹²¹ Minute 282, recorded in 1990, addressed the need “to rehabilitate the saline waters disposal system,” consisting of the diversion structure at the mouth of the El Morillo Drain, and the associated pumping plant and canal.¹²² In 2000, Minute 303 called for an annual work plan under whose terms the Mexican Section would coordinate the operation and maintenance of the waterworks.¹²³

The waterworks played an important role in the Treaty’s implementation, since without them the waters could not be stored, measured, and transferred to where they need to go. The fact that it took close to two decades before the IBWC was able to implement a plan for the maintenance of the works illustrates the frequently sluggish pace at which this Treaty operates.

¹¹⁶ See *infra*, Section VI.B, for a full discussion of groundwater.

¹¹⁷ See United States-Mexico Transboundary Aquifer Assessment Act, Pub. L. No. 109-448, 120 Stat. 3328 (2006).

¹¹⁸ IBWC, Minute No. 223, Measures for Solution of the Lower Rio Grande Salinity Problem (Nov. 30, 1965), available at <http://www.ibwc.state.gov/Files/Minutes/Min223.pdf> and Minute No. 224, Recommendations Concerning the Lower Rio Grande Salinity Problem (Jan. 16, 1967), available at <http://www.ibwc.state.gov/Files/Minutes/Min224.pdf>.

¹¹⁹ IBWC, *Joint Report of the Principal Engineers Regarding the Need to Rehabilitate the Saline Waters Disposal System for Control of the Salinity Problem in the Waters of the Lower Rio Grande*, at 1 (1990), available at <http://www.ibwc.state.gov/Files/Minutes/JR282.pdf>.

¹²⁰ *Id.* at 2.

¹²¹ *Id.*

¹²² IBWC, Minute No. 282, Rehabilitation of the Saline Waters Disposal System For Solution of the Saline Problem in the Waters of the Lower Rio Grande (Mar. 26, 1990), available at <http://www.ibwc.state.gov/Files/Minutes/Min282.pdf>.

¹²³ IBWC, Minute No. 303, Operation and Maintenance of the Jointly – Financed Works for Solution of the Lower Rio Grande Salinity Problem (May 15, 2000), available at <http://www.ibwc.state.gov/Files/Minutes/Min303.pdf>.

B. Praise for the Treaty

1. Ability of the IBWC to Achieve Equitable Solutions

The Colorado River salinity crisis solution is an example of the effectiveness of the Treaty and the IBWC.¹²⁴ During the negotiations prior to Minute 242, Mexico originally asked for a salinity level equal to that of water up-river from the Wellton-Mohawk District, and the United States sought an "equivalent salt balance."¹²⁵ The final solution was characterized as a "ppm level reflecting a rough median between the two extremes".¹²⁶ Thus, the IBWC successfully carried out its role in this conflict in an equitable manner.

2. The Treaty as Flexible and Expandable

Minutes 242 and 293 illustrate the flexibility and expandability of the Treaty. In recording Minute 242, the IBWC expanded the scope of the Treaty and helped the United States and Mexico avoid litigation and long term damage to their communities.¹²⁷ The Treaty initially had no provisions for water quality but the IBWC managed to change that through Minute 242.¹²⁸ This has led at least one commentator to characterize it as "the model for future agreements on water supply."¹²⁹

Furthermore, in the case of Minute 293 and the Mexican Water Debt, the Commission decided that the "spirit of Article 9" called for allowing Mexico to divert some waters of the Rio Grande normally reserved for the US.¹³⁰ This occurred even though United States water levels were below normal in the two international reservoirs established under the Treaty.¹³¹ Leading at least one commentator to point out that the IBWC interprets its powers under the Treaty broadly.¹³² The flexibility of the IBWC to interpret its powers broadly is a positive aspect of the Treaty. Article 9(f) authorizes water diversion such as the one that Minute 293 authorized in the event that one country has an "abundant" supply of water.¹³³ In Minute 293, the Commission acknowledged that the United States was currently imposing reduced use of its stored water, a sign that

¹²⁴ See *supra*, Section IV.C.1, for a full discussion of the Colorado River salinity crisis and Minute 242.

¹²⁵ Schiff, *supra* note 24, at 162.

¹²⁶ *Id.*

¹²⁷ See Kibel & Schutz, *supra* note 53, at 236-37 (discussing the extremely high salinity levels in Baja water supplies and President Echeverria's threat of ICJ litigation).

¹²⁸ IBWC, Minute No. 242, *supra* note 54, at 1.

¹²⁹ Verner, *supra* note 103, at 262. See *supra*, Section IV.C.2, for a full discussion of the Mexican Water Debt crisis.

¹³⁰ IBWC, Minute No. 293, *supra* note 85, at 2.

¹³¹ Schiff, *supra* note 24, at 153-55.

¹³² *Id.*

¹³³ Treaty, *supra* note 9, art. 9(f).

water availability in the United States at the time was not "abundant" in the conventional sense of that term.¹³⁴ However, it was in the best interests of Mexico, and future harmonious relations between the United States and Mexico, to interpret Article 9(f) broadly to authorize water diversion by Mexico to assist it in a time of serious drought.

3. Broad Vision of the Treaty

The Treaty is more receptive to national concerns tangential to the Treaty's water mandate than other international agreements. Kibel and Schutz have praised the Treaty for its involvement of the United States State Department and Mexico's Ministry of Foreign Relations in IBWC actions.¹³⁵ Including these departments ensures that the IBWC takes foreign policy matters into account in resolving disputes under the Treaty.¹³⁶ Kibel and Schutz use as an example the illegal immigration issue between Mexico and the United States.¹³⁷ They point out that "a sudden and severe reduction in Rio Grande water deliveries to border farms and cities in northern Mexico could create unemployment, health problems and disruption that contribute to existing immigration pressures."¹³⁸ Kibel and Schutz contrast this with Chapter 11 of NAFTA, which they argue permits only a "narrow investment scope of inquiry of the Chapter 11 panel."¹³⁹

V. LOOKING TO THE FUTURE

With rising border populations, climate change, and increasing concern for the environment, new scenarios will continue to arise under the Treaty that challenge the IBWC and require new Minutes. The two most pressing issues facing the IBWC today are ecological protection and groundwater allocation. The following discussion describes the status of these issues, evaluates the Treaty's handling of them thus far, and recommends how the Treaty should be used in addressing these issues.

A. Ecological Protection Under the Treaty

Ecological protection occupies the lowest priority slot in the Treaty's hierarchy of uses.¹⁴⁰ However, if the ecology of a river system deteriorates enough, this will affect that system's ability to provide acceptable water for

¹³⁴ IBWC, Minute No. 293, *supra* note 85, at 2.

¹³⁵ Kibel & Schutz, *supra* note 53, at 264.

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ *Id.*

¹³⁹ *Id.* at 262-65.

¹⁴⁰ Treaty, *supra* note 9, art. 3.

higher-ranked uses under the Treaty.¹⁴¹ As the concept of sustainable development gains momentum in the international arena, ecosystem protection will become increasingly central to international water law. Without a healthy ecosystem, the health of the river is threatened. This process is ongoing, as evidenced by the many threatened and/or endangered species. As such, this issue needs to be addressed by the IBWC.

The IBWC has already begun progress in this area, recording Minute 306 in 2000.¹⁴² This Minute only calls for studies of the ecosystem of the Colorado River Delta,¹⁴³ but it is significant because it signals that the IBWC is finally responding to the ecological needs of shared water resources. The ecosystem issue is one of the most complex issues facing the IBWC today, even eight years after recording Minute 306.¹⁴⁴ Due to space restrictions, this paper will focus on the need for ecological protection of the Colorado River Delta, but similar arguments could also be applied to the Rio Grande.¹⁴⁵

1. Minute 306

Minute 306 recognized that groups in both the United States and Mexico had begun conducting studies and collaborating in their efforts to preserve some water for ecological purposes in the Colorado River Delta.¹⁴⁶ The Minute states that, "the Commission shall establish a framework for cooperation by the United States and Mexico through the development of joint studies that include possible approaches to ensure use of water for ecological purposes in this reach and formulation of recommendations for cooperative projects, based on the principle of an equitable distribution of resources."¹⁴⁷ The Commission also took on the task of "defining the habitat needs of fish, and marine and wildlife species of concern to each country," through a binational technical task force.¹⁴⁸

Thus, Minute 306 established a mechanism through which studies would be

¹⁴¹ See Mumme, *supra* note 100, at 249 (arguing that ecological protection can better protect fishing, hunting, and recreational values on both the Rio Grande and the Colorado River).

¹⁴² See IBWC, Minute No. 306, Conceptual Framework for United States – Mexico Studies For Future Recommendations Concerning the Riparian and Estuarine Ecology of the Limitrophe Section of the Colorado River and its Associated Delta, (Dec. 12, 2000), *available at* <http://www.ibwc.state.gov/Files/Minutes/Min306.pdf>.

¹⁴³ See *id.* at 1.

¹⁴⁴ See Mumme, *supra* note 82, at 940 ("The question of ecological uses has cropped up most forcefully in the Colorado River delta region but is highly relevant for bi-national efforts to conserve habitat and biodiversity in other regions of the border as well. Conserving riparian ecology is now very much on the bi-national radar screen in the Tijuana river basin, the New River-Salton Sea, the river basins of the Sonoyta, the Santa Cruz, and the San Pedro, and along the various reaches of the Rio Grande.")

¹⁴⁵ *Id.*

¹⁴⁶ See IBWC, Minute No. 306, *supra* note 142, at 1-2.

¹⁴⁷ *Id.* at 2.

¹⁴⁸ *Id.*

conducted and plans for future ecological protection developed. However, it contains no substantive ecological protection elements. This led Alberto Szekely, advisor to the Secretary of Foreign Relations of Mexico, to comment, "I count myself among those who responded to Act 306 of the IBWC with a certain degree of exasperation, when I felt that with said Act we were not able to get past the purely academic phase, because it needs to be understood that we need immediate and effective measures."¹⁴⁹ For this reason, there is a need for a more substantive ecological Minute to protect the Colorado River Delta.

2. The Need for a Substantive Ecological Minute Protecting the Colorado River Delta

The Delta has shrunk to one tenth its original size, covering about 150,000 acres south of Yuma, Arizona and Mexicali, and north of the Gulf of California.¹⁵⁰ Although it now only receives 0.1 percent of the River's water, the Delta remains the most important wetland habitat in southwestern North America.¹⁵¹ It contains more native riparian habitat than the rest of the lower Colorado River.¹⁵²

Several endangered and threatened species live in the Delta region. The world's most endangered small marine cetacean, the vaquita, lives in the Delta region; the World Wildlife Fund estimates that fewer than 600 vaquitas remain.¹⁵³ Reduced freshwater input, caused by damming the Colorado River and diverting its water to other uses, has drastically altered the vaquita's habitat.¹⁵⁴ The totaba also resides in the Delta region¹⁵⁵ and is listed as endangered under the Endangered Species Act.¹⁵⁶ Fifty-five percent of the total bird species in North America use the Delta for breeding, wintering, and

¹⁴⁹ IBWC, *Colorado River Delta Bi-National Symposium Proceedings* at 15, transcribed from the audio recordings of the Symposium of 9/11/2001, available at www.ibwc.state.gov/FAO/CRDS0901/EnglishSymposium.pdf.

¹⁵⁰ Environmental Defense Fund, *Once a Mighty Delta: History*, <http://www.edf.org/article.cfm?ContentID=2642> (last visited Nov. 15, 2008).

¹⁵¹ Environmental Defense Fund, *The Colorado River Delta*, <http://www.edf.org/page.cfm?tagID=4237> (last visited Nov. 15, 2008).

¹⁵² *Id.*

¹⁵³ World Wildlife Fund, *Species Factsheets, Cetaceans, Vaquita*, http://www.panda.org/about_wwf/what_we_do/species/about_species/species_factsheets/cetaceans/vaquita/index.cfm (last visited Nov. 15, 2008).

¹⁵⁴ World Wildlife Fund, *Vaquita – Threats*, http://www.panda.org/about_wwf/what_we_do/species/about_species/species_factsheets/cetaceans/vaquita/threats/index.cfm (last visited Nov. 15, 2008).

¹⁵⁵ Environmental Defense Fund, *The Delta's Remarkably Resilient Flora and Fauna*, <http://www.edf.org/article.cfm?ContentID=2643> (last visited Nov. 15, 2008).

¹⁵⁶ NOAA Fisheries, Office of Protected Resources, *Marine/Anadromous Fish Species under the Endangered Species Act (ESA)*, <http://www.nmfs.noaa.gov/pr/species/esa/fish.htm> (last visited Nov. 15, 2008).

migrating.¹⁵⁷ The bald eagle uses the Delta, and most of the world population of the endangered Yuma Clapper Rail, a bi-nationally protected marsh bird, lives in the Delta.¹⁵⁸ Bivalve mollusks - an indicator of productivity and diversity in the Delta ecosystem - have greatly decreased in size and density.¹⁵⁹ The Colorado Delta clam, extremely abundant in the pre-dam area, is believed to be endangered by the increase in salinity resulting from fresh water diversion.¹⁶⁰ Finally, halophytes, particularly the *Distichlis palmeri*, are much less abundant in the Delta than they used to be.¹⁶¹ Even though they thrive in salt water environments, they require fresh water for germination and the lack of fresh water in the Delta means fewer halophytes germinate.¹⁶²

Thus, the Delta serves a vital ecological function and needs protection so that it can continue to support such diverse life. Serious concern for the Colorado River Delta has existed since the mid-1990s, fueled by "Mexico's establishment of the Reserva de la Biosfera Alto Golfo e California y Delta del Río Colorado (Upper Gulf of California and Colorado River Delta Biosphere Reserve), new scientific studies examining endangered and threatened species of marine mammals, birds, and wildlife, and the threat of greater salinity due to slated operation of the Yuma reverse-osmosis desalting plant."¹⁶³ Maintaining the Delta ecosystem requires regular and periodic water flows.¹⁶⁴ Water leakages and inefficiencies of the Colorado River water delivery system and canals provide the main source of sustenance for the Delta today.¹⁶⁵

A Mexican consultant estimated that the Delta needs about 32,000 acre-feet a year, and 256,000 acre-feet every fourth year in order to sustain flora and fauna in the Delta.¹⁶⁶ A United States scientist stated that the Delta needs about

¹⁵⁷ Sonoran Institute, News Release of 9/17/2007, *New Report Offers Hope for the Colorado River Delta*, http://sonoran.org/index.php?option=com_content&task=view&id=212&Itemid=253.

¹⁵⁸ *Id.*

¹⁵⁹ IBWC, *Bi-National Symposium*, *supra* note 149, at 49, comments of Karl Flessa, University of Arizona Department of Geosciences.

¹⁶⁰ *Id.*

¹⁶¹ *Id.* at 50-51, comments of Nicholas P. Yensen, NyPa International, Tucson, AZ.

¹⁶² *Id.* at 51.

¹⁶³ Mumme, *supra* note 100, at 245.

¹⁶⁴ *Id.* at 246.

¹⁶⁵ Sonoran Institute, News Release of 9/17/2007, *supra* note 157. See page from the All-American Canal (the last diversion of the Colorado River before it crosses into Mexico) feeds the Andrade Mesa wetlands in Mexico; the MODE canal, which carries saline wastewater from the Wellton-Mohawk Irrigation and Drainage District to the Santa Clara Slough in Sonora, Mexico, feeds La Cienaga de Santa Clara, a marsh wetland. Mark Lellouch, Karen Hyun, & Sylvia Tognetti, *Ecosystem Changes and Water Policy Choices: Four Scenarios for the Lower Colorado River Basin to 2050*, Sonoran Institute Island Press, at 27 (2007), available at http://sonoran.org/index.php?option=com_docman&task=doc_details&gid=195&Itemid=5. Both the Andrade Mesa wetlands and La Cienaga de Santa Clara are located in the Colorado River Delta region. *Id.*

¹⁶⁶ IBWC, *Bi-National Symposium*, *supra* note 149, at 41, comments of Luis Lopez Moctezuma Torres, Private Consultant, Baja California.

102,000 acre-feet annually to sustain its natural life.¹⁶⁷ The difference between both experts' estimates is 24,000 acre-feet over a four year period¹⁶⁸, and both stated that the Delta needs about .5 percent of the average annual flow of the Colorado River.¹⁶⁹ In 2007, the Sonoran Institute completed a study in which it determined that the Delta needs 50,000 acre-feet annually to sustain remaining riparian habitat.¹⁷⁰ These data all show that the Colorado River Delta needs some water left instream for its continued vitality.

3. Issues Preventing a Substantive Ecological Minute

A major issue preventing a substantive ecological Minute is the overallocation of Colorado River water. Within the United States, Upper Basin states fight with Lower Basin states over waters needed for future development.¹⁷¹ Arizona has gone to court to protect its claims to the river water, while California and Nevada struggle to live within their entitlements.¹⁷² In 2003, California was still using more than its legal entitlement.¹⁷³ Developed in response to California's chronic overuse of Colorado River water, the "California 4.4 Plan" aims to bring California within its annual apportionment.¹⁷⁴ Most years, the river below the Border is dry.¹⁷⁵ In order to preserve instream flows necessary to restore the Delta, Colorado River water use would need to decrease, or become more efficient, so that water actually reliably flows all the way to the Gulf of California.

The other major issue preventing a substantive ecological Minute is that reallocating the waters, changing the numerical allotments to both countries and thereby leaving more water instream, would require amending the Treaty. At the 2001 Colorado River Delta Bi-National Symposium, representatives from both the United States and Mexico were asked if "any agreement to alter the volumes of waters assigned to the respective nations by the 1944 Treaty would require congressional approval in the United States and national legislative

¹⁶⁷ *Id.* at 47, comments of Dr. Edward Glenn, University of Arizona, Environmental Research Laboratory.

¹⁶⁸ $(32,000 \times 4) + 256,000 = 384,000$; $102,000 \times 4 = 408,000$; $408,000 - 384,000 = 24,000$.

¹⁶⁹ IBWC, *Bi-National Symposium*, *supra* note 149, at 41 and 47.

¹⁷⁰ Sonoran Institute, News Release of 9/17/2007, *supra* note 157.

¹⁷¹ IBWC, *Bi-National Symposium*, *supra* note 149, at 14, comments of Bennett W. Raley, Assistant Secretary for Water and Science, U.S. Dept. of the Interior.

¹⁷² *Id.*

¹⁷³ Verner, *supra* note 103, at 243.

¹⁷⁴ *Id.* at 268. According to Michael Cohen, a Senior Research Associate with the Pacific Institute and a member of the IBWC's Colorado River Delta Advisory Committee, California has remained within its 4.4 million acre-feet entitlement for the past several years. Email correspondence with Michael Cohen, Apr 23, 2008 (on file with author).

¹⁷⁵ IBWC, *Bi-National Symposium*, *supra* note 149, at 39, comments of Jose Trejo Alvarado, Director, Mexicali Irrigation District, National Water Commission.

approval of the Nation of Mexico?”¹⁷⁶ Mary Brandt, a United States State Department representative, replied that under United States law, an alteration of water allocation would require an amendment to the Treaty, which would be subject to the advice and consent of the Senate.¹⁷⁷ Jaime Palafox, a private consultant from Washington, D.C., stated that “if the treaty has to be amended, that has to go through the Mexican Senate.”¹⁷⁸

Even if only the United States perceives reallocating waters for ecological use to require advice and consent of the Senate, this means that such a reallocation is unlikely to happen. One aspect of the Treaty that has allowed it to be so adaptable and responsive to problems is that Minutes recorded by the IBWC do not need the advice and consent of the Senate.¹⁷⁹ If the Senate needs to ratify the change in water allocation, this will at least slow the process considerably. A possible outcome is that the Senate simply would not ratify the change, halting the process altogether.¹⁸⁰

4. Recommendation for IBWC Action in Protecting the Delta

The best option for the IBWC would be to avoid implementing a change in the numerical allotments under the Treaty, so as to avoid the possibility of the United States Senate failing to approve the change. Such a change would likely not gain Senate approval since the waters of the Colorado River are already overallocated, and this problem will only get worse as population growth and development in the Western States continue.¹⁸¹ Instead, the IBWC should focus on encouraging both the United States and Mexico to increase the efficiency of their water use and to reach an agreement regarding binational protection of the

¹⁷⁶ *Id.* at 26, question read by Jim Davenport of the Colorado River Commission of Nevada.

¹⁷⁷ *Id.*, response of Mary Brandt.

¹⁷⁸ *Id.*, response of Jaime Palafox. No Mexican government representative participated in this question and answer session.

¹⁷⁹ Mumme, *supra* note 82, at 935.

¹⁸⁰ The Senate would not even need to vote the amendment down, instead defeating it by simply refusing to act on it. This happened with the Comprehensive Nuclear Test Ban Treaty, leading Senator Tom Daschle to criticize the Senate, in 1999, for allowing this Treaty to languish, without a hearing or a vote, for two years. See *Remarks by Senator Tom Daschle Urging the Senate to Consider the Comprehensive Test Ban Treaty*, Congressional Record, 106th Congress, September 23, 1999, available at <http://www.fas.org/nuke/control/ctbt/text/092399daschlestate.htm>. Another example is Protocol II to the Geneva Conventions, on which Presidents Reagan and Clinton both requested Senate action. Michael W. Meier, *A treaty we can live with: the overlooked strategic value of Protocol II*, Army Lawyer, September 2007.

¹⁸¹ See U.S. Department of the Interior, *Water 2025: Preventing Crisis and Conflict in the West* 1 (2003), available at <http://www.usbr.gov/water2025/images/Water2025-08-05.pdf> (“[T]he demands for water in many basins of the West exceed the available supply even in normal years. When combined with the fact that the West is home to some of the fastest growing communities in the nation, these realities guarantee that water supply crises will become more frequent if we do not act now.”); and Mumme, *supra* note 100, at 255 (“However, the present appropriation of treaty waters in excess of naturally available supplies makes any treaty amendment favoring a reallocation of water extremely controversial.”).

Delta, achieving protection through better water management rather than reallocation.¹⁸²

The recent binational Common Ground Conference regarding the restoration of approximately 1000 acres along the Colorado River, near San Luis, Arizona, provides a good example of how both countries can work together to achieve Delta restoration.¹⁸³ The 450 acre Hunters Hole-area is the United States part of the 1000 acre Limitrophe Division,¹⁸⁴ which is part of the Delta region and serves as the international boundary between the United States and Mexico.¹⁸⁵ The Hunters Hole project brings together the Yuma Crossing National Heritage Area, Yuma County, the Cocopah Indian Tribe, the United States Bureau of Reclamation, state wildlife and environmental agencies and Mexican educational and environmental groups, including Pro-Natura, located in San Luis Rio Colorado, Sonora.¹⁸⁶ A \$140,000 grant from the United States Bureau of Reclamation allowed the installation of groundwater pumps to aid in water restoration.¹⁸⁷ The parties involved are currently working to secure an additional \$700,000 to fund studies, channel excavation and creation, well construction, and vegetation clearing and replanting.¹⁸⁸

The eventual success of this restoration effort remains to be seen, but this shows that stakeholders in the two countries can come together voluntarily to work towards ecological restoration. It has been eight years since the adoption of Minute 306, and the time has come for the IBWC to require a concrete plan from the United States and Mexico. Each country must detail how it will increase its own water use efficiency so as to allow water to more consistently reach the Delta. The IBWC should also encourage the two governments to support and facilitate existing regional efforts at ecological protection in the Delta region, such as the Hunters Hole project.

¹⁸² See A. Dan Tarlock, *supra* note 103, at 262-63 (stating that it is possible, although difficult, to integrate new water management priorities into existing allocation regimes to reduce environmental damage to river systems); and Sean T. Olson, *International Perspective: Saving a Dying Oasis: Utilizing the United Nations Convention on Non-Navigational Uses of International Watercourses to Preserve and Restore the Colorado River Delta*, 9 U. DENV. WATER L. REV. 159, 177 (2005) ("On the United States side of the border, merely curtailing current water use by less than 1 percent of current allocations and transferring that water downstream to the Delta could provide the necessary amount of water.").

¹⁸³ Sarah Reynolds, *Binational River Conference Comes to End*, Yuma Sun, Apr. 11, 2008, available at www.yumasun.com.

¹⁸⁴ Sarah Reynolds, *Yuma Hosting Binational Conference on Colorado River*, Yuma Sun, Apr. 10, 2008, available at www.yumasun.com.

¹⁸⁵ U.S. EPA Region 9: Tribal Program, *Cocopah's Efforts to Restore the Lower Colorado River Limitrophe*, <http://www.epa.gov/region09/indian/features/cocopah/index.html>.

¹⁸⁶ Reynolds, *supra* notes 183 and 184.

¹⁸⁷ Reynolds, *supra* note 184.

¹⁸⁸ *Id.*

B. Groundwater Allocation Under the Treaty

Groundwater is a vital water source for an increasing number of people on both sides of the Border, and yet there is no Minute addressing groundwater use. As the Border region develops more and more, groundwater use will only increase. A Minute addressing groundwater is crucial if the Treaty is going to remain a viable instrument for allocating and managing shared water resources.

1. The Importance of Groundwater in the Border Region

In the Middle Rio Grande Basin, also known as the Albuquerque Basin, all drinking water supplied to residents comes from groundwater.¹⁸⁹ Forty percent of Arizona's water and sixty percent of Texas' water comes from underground aquifers.¹⁹⁰ Similarly, Nogales, Sonora, Mexico, relies on groundwater supplies to meet its water needs.¹⁹¹ Farmers in the Mexicali Valley pump water from the Mesa San Luis aquifer for irrigation; about sixty per cent of Mexicali Valley farmers rely exclusively on groundwater for irrigation needs.¹⁹²

A 1998 IBWC report identified three major binational aquifers in the El Paso/Ciudad Juarez area: the Hueco-Tularosa aquifer, lying under New Mexico, Texas, and Mexico, the key source of water for El Paso, Texas, Ciudad Juarez, Mexico, and several military bases and small towns in New Mexico, Texas, and Mexico; the Southeastern Hueco aquifer, east of the Hueco-Tularosa aquifer, a southeast trending aquifer divided almost equally between the United States and Mexico, largely undeveloped because of high salinity and low yield; and the Rio Grande aquifer, underlying the El Paso/Juarez Valley, subject to heavy municipal and irrigation pumping.¹⁹³ The 1998 IBWC report stated that, "Forecasts predict the depletion of the recoverable freshwater reserves of these binationally shared aquifers by the middle half of the 21st century."¹⁹⁴ Additionally, Arizona and Sedona, Mexico rely on and share the Santa Cruz River Valley and San Pedro aquifers.¹⁹⁵ Thus, developing a strategy to manage

¹⁸⁹ U.S. Geological Survey, *Ground-Water Monitoring and Municipal Pumpage in the Albuquerque Area, Central New Mexico* (2000), available at <http://nm.water.usgs.gov/groundwater.htm>.

¹⁹⁰ Robert C. Gavrell, Note, *The Elephant Under the Border: An Argument for New Comprehensive Treaty for the Transboundary Waters and Aquifers of the United States and Mexico*, 16 COLO. J. INT'L ENVTL. L. & POL'Y 189, 194 (2005).

¹⁹¹ *Id.* at 200-01.

¹⁹² George Frisvold & Margriet Caswell, *Financing Bilateral Water Projects on the U.S.-Mexico Border: Past, Present, and Future*, in *BOTH SIDES OF THE BORDER: TRANSBOUNDARY ENVIRONMENTAL MANAGEMENT ISSUES FACING MEXICO AND THE UNITED STATES* 131, 136 (Linda Fernandez & Richard T. Carson eds., Springer 2002).

¹⁹³ IBWC, *Transboundary Aquifers and Binational Ground Water Database for the City of El Paso/Ciudad Juarez Area* (1998), available at http://www.ibwc.state.gov/Water_Data/binational_waters.htm.

¹⁹⁴ *Id.*

¹⁹⁵ United States-Mexico Transboundary Aquifer Assessment Act, *supra* note 117, at sec. 4(c).

and share these vital resources is crucial to the continued vitality of communities on both sides of the Border.

2. The Treaty's Treatment of Groundwater

While there is no Minute specifically addressing groundwater, it has been an issue of concern since as far back as the late 1960s. During the same time period as the Colorado River salinity crisis, discussed above¹⁹⁶, the United States was concerned about Mexico's groundwater pumping project on the San Luis Mesa, immediately south of the border.¹⁹⁷ United States interests were threatened by this project because of its potential to absorb United States groundwater and impede United States Treaty deliveries.¹⁹⁸ As a result, Minute 242 contains two sections addressing groundwater:

5. Pending the conclusion by the Governments of the United States and Mexico of a comprehensive agreement on groundwater in the border areas, each country shall limit pumping of groundwaters in its territory within five miles (eight kilometers) of the Arizona-Sonora boundary near San Luis to 160,000 acre-feet (197,358,000 cubic meters) annually.

6. With the objective of avoiding future problems, the United States and Mexico shall consult with each other prior to undertaking any new development of either the surface or the groundwater resources, or undertaking substantial modifications of present developments, in its own territory in the border area that might adversely affect the other country.¹⁹⁹

Unfortunately, the "comprehensive agreement on groundwater" has not yet come into existence, almost 40 years later. In December 2006, the United States passed the United States-Mexico Transboundary Aquifer Assessment Act, whose purpose is to "direct the Secretary of the Interior to establish a United States-Mexico transboundary aquifer assessment program to systematically assess priority transboundary aquifers."²⁰⁰ The Act calls for a program that assesses both quantity of water used and the quality of that water.²⁰¹ The United States is directed to cooperate with Mexico and the IBWC in implementing this program.²⁰² The program got the funding necessary to begin operations with the passage of the fiscal year 2008 omnibus appropriations bill.²⁰³ Arizona's Water

¹⁹⁶ See *supra*, Section IV.C.1.

¹⁹⁷ Schiff, *supra* note 24, at 161.

¹⁹⁸ *Id.*

¹⁹⁹ IBWC, Minute No. 242, *supra* note 54, at 3.

²⁰⁰ United States-Mexico Transboundary Aquifer Assessment Act, *supra* note 117.

²⁰¹ *Id.* at sec. 4(b)(1)(A).

²⁰² *Id.* at secs. 4(d) and 5(a).

²⁰³ The University of Arizona Water Resources Research Center, *WRRC Enters Interstate, International Arenas*, 16 Arizona Water Resource 3 (Mar.-Apr. 2008), available at <http://www.ag.arizona.edu/azwater/awr/marapr08/image.html>.

Resource Research Center ("WRRC") is collaborating with the United States Geological Survey, Mexico, and water institutes in New Mexico and Texas "to conduct hydrological characterization, mapping, and assessments of priority transboundary aquifers."²⁰⁴

3. Recommendations for the IBWC in the Groundwater Context

The Treaty is not unique in its lack of a Minute addressing groundwater; groundwater resources "have historically been omitted from, or neglected under, international law and cursorily misunderstood within the legal community" and "there is a paucity of treaties and norms addressing transboundary and international ground water resources."²⁰⁵ This makes sense when one remembers that the traditional development of international water law has focused on a "channel-based legal regime."²⁰⁶ However, it is no longer feasible to adopt such a narrow approach to water resources. Groundwater resources need to become regulated under international agreements just as surface water resources are.²⁰⁷ The IBWC should lead the way, developing a groundwater Minute as soon as possible, so it can maintain its role as an internationally respected resource allocation body.

All the water resources at the Border are interrelated and it helps to have a singular centralized agency responsible for ultimate oversight over them all. In this way, the most holistic and comprehensive Border water solutions can be achieved. Utilizing different agencies and programs for different aspects of shared water resources will result in piecemeal solutions that run the risk of ignoring important peripheral issues. However, agencies and programs like the WRRC and the transboundary aquifer assessment program can assist the IBWC in its role. As the assessment program produces data, and regional stakeholders like the WRRC become more visible and vocal, the IBWC will feel increasing pressure to finally address this issue.

CONCLUSION

Despite some problems and limitations, the Treaty has generally functioned well over the past half-century. As illustrated by the Colorado River Salinity and Mexican Water Debt crises, the structure of the Minute process makes the Treaty flexible and adaptable to changing conditions. This in turn makes long-term compliance easier and more likely to occur. Problems will continue to arise under the Treaty since the waters are such a necessary and shared resource.

²⁰⁴ *Id.*

²⁰⁵ Gabriel Eckstein & Yoram Eckstein, *A Hydrogeological Approach to Transboundary Ground Water Resources and International Law*, 19 AM. U. INT'L L. REV. 201, 222 (2003).

²⁰⁶ Tarlock, *supra* note 16, at 199.

²⁰⁷ Hall, *supra* note 18 (arguing for regulation of transboundary groundwater resources).

Ecological protection and groundwater allocation need to be addressed under the Treaty as soon as possible so that the Treaty can remain a relevant and important tool in U.S.-Mexico relations as the twenty-first Century progresses.