Legal & Institutional Framework for Restoring Instream Flows in the Rio Grande: Fort Quitman to Amistad

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General Overview

Geography

The Rio Grande in Texas runs 2,012 kilometers (1,207 miles) until it meets the Gulf of Mexico at Boca Chica beach a short distance downstream of Brownsville, Texas. This paper covers the section of the river from Fort Quitman (90 miles downstream of El Paso) to Amistad reservoir. Counties bordering the Rio Grande through this area include, from west to east, Hudspeth, Jeff Davis, Presidio, Brewster, Terrell, and Val Verde. Jeff Davis County touches on the Rio Grande but has very little land area actually bordering the river.

This area falls under the jurisdiction of the International Boundary and Waters Commission (IBWC) and its counterpart Mexican agency, the Comision Nacional de Limites y Aguas (CILA). The Texas Natural Resource Conservation Commission's (TNRCC) Watermaster's office oversees management of surface water from Fort Quitman to the Gulf, administering the distribution and allocation of water to satisfy water rights held by downstream users.

Canyons and small valleys comprise the physical geography of the desert Rio Grande from Fort Quitman to the Rio Conchos confluence.[1] This stretch, often referred to as the "Forgotten River", is remote and difficult to access, and as a result does not figure prominently in the public consciousness. The "junta de los rios" or confluence of the Rios Grande and Conchos, occurs just upstream of the dusty sister towns of Presidio/Ojinaga. The Rio Conchos is the first perennial tributary downstream of Elephant Butte providing inflows to the Rio Grande year-round.[2] Through the Big Bend region and to Amistad, the Rio Grande passes through three major canyons – Santa Elena, Mariscal and Boquillas – before passing into the "lower canyons" and eventually joining the Amistad Reservoir near Del Rio.

Land Use

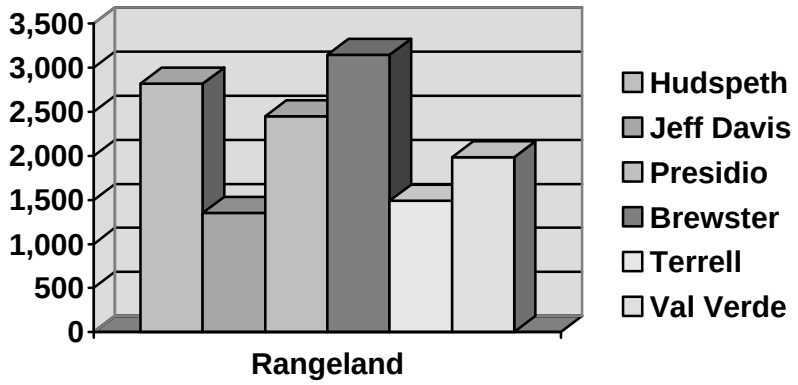
These are largely rural counties dominated by private ranches and rangeland. Figure 1 shows the amount of rangeland in acreage for each county. Some state and federal agencies and private organizations also have substantial landholdings in the region:

- Texas Parks and Wildlife Department owns and manages about 404,000 acres in Brewster and Presidio counties (Big Bend Ranch State Park), as well as some 11,000 acres in Hudspeth as part of the Sierra Diablo Wildlife Management Area.[3]

[1] Historic Reconstruction of the Ecology of the Rio Grande/Rio Bravo Channel and Floodplain in the Chihuahuan Desert; Report prepared for Chihuahuan Desert Program, World Wildlife Fund, June 14, 2000, Nancy Stotz, Desert Scribes, pp. 5-6.
[2] Ibid.
[3] Draft Environmental Baseline Document, SEIS for INS and JTF-6 Activities along the US-Mexico Border, Volume 2, Texas Land Border Study Area, March 1999.

- The Texas General Land Office (GLO) owns 97,259 acres in Brewster County, 285,546 in Hudspeth, 95,593 in Presidio County and another 5,933 acres in Jeff Davis, Terrell and Val Verde counties.[4]
- The National Park Service owns 801,163 acres in Brewster County, or about 25% of the total land area in the county, in Big Bend National Park.
- The Nature Conservancy owns 67,129 acres in Brewster County in the Rosillos Mountains Preserve.
- The University of Texas at El Paso owns land near the Rio Grande south of Van Horn in Jeff Davis County, where they manage a research station.[5]

Figure 1. Acres in rangeland (x 1,000)



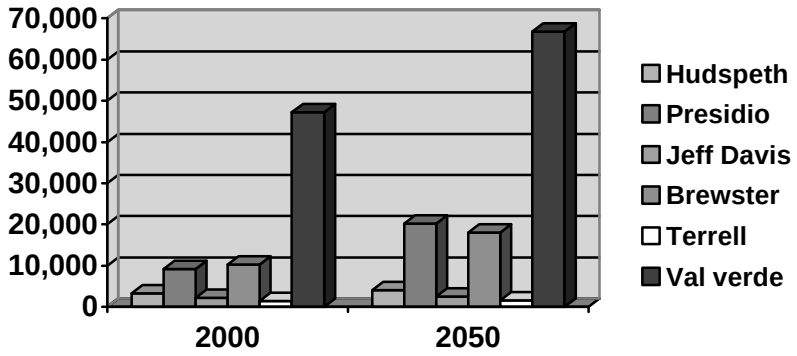
Source: U.S. Department of Agriculture, Census of Agriculture, 1992, and USDA Natural Resource Conservation Service, South Central Regional Office.

Population and Demographics

Counties in this stretch have comparatively low populations. Figure 2 shows expected increases in population for each county in the next 50 years. Val Verde is the most populous county in this stretch, but Presidio County is projected to grow faster than any other county: 118% in the next 50 years.

[4] Bob Blumberg, Texas General Land Office, pers. communication, 2/27/01.
[5] Jerry Johnson, UTEP Biology Dept. 1/11/01.

Figure 2. Population Projections by County



Source: Far West Texas and Plateau Regional Water Plans.

Demographics

As expected given the rural nature of these counties, ranching predominates as an economic activity. As shown in Table 1, unemployment rates vary widely; while Brewster has reduced its unemployment rate by half in the past ten years, Presidio's is a whopping 28%, compared to 17.3 % in 1990.

Table 1. Unemployment Rates (%)

County	January 90	January 01
Hudspeth	2.1	3.6
Jeff Davis	4.2	2.1
Presidio	17.3	28.4
Brewster	4.9	2.5
Terrell	2.5	2
Val Verde	14.9	7.6

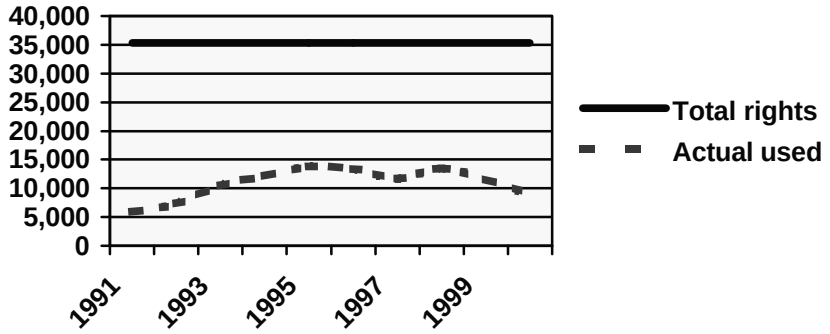
Water Availability and Use in the Region

The waters of the Rio Grande from Fort Quitman to the Gulf of Mexico are managed by the TNRCC through the office of the Rio Grande Water Master, currently headed by Carlos Rubinstein. The only other water master operation in the state is the San Antonio/Nueces River Basin, established at the same time as the Rio Grande operation and through the 1967 Adjudication Act.

The majority of Rio Grande water used in this six-county stretch is for irrigation, and even irrigation uses a relatively small amount of water. There are a total of 35,318 acre-feet of permitted (or paper) water rights in the Upper Rio Grande stretch (as this segment from Fort Quitman to Amistad Reservoir is categorized by the Watermaster's office). Of

this amount, 34,644 – 98% - are irrigation water rights.[6] Irrigation mainly occurs just below El Paso to below Fort Quitman in Hudspeth County - crops include alfalfa, hay and peppers - and in the Presidio Valley downstream of the Rio Conchos confluence. Presido Valley farms grow alfalfa, onions and some melons. Other private uses are for stock and rural domestic use – these are also classified as irrigation rights. Rarely is there sufficient water, however, for rights in this stretch to be fully realized. Figure 3 compares total rights owned with actual water used from 1991 to 2000 – the greatest amount of water used was in 1995, at 13,760 acre-feet. On average, users are only exercising about 30% of total water rights owned.

Figure 3: Water Use, Ft. Quitman to Amistad



Is the low amount of use (compared to paper rights) due to low flows in the river or because of lack of demand? While many people believe that the Rio Grande "dries up" frequently somewhere between Fort Quitman and Presidio, Mike Landis of the Bureau of Reclamation has compiled stream flow data from IBWC gauging stations in Fort Quitman, Candelaria and Presidio that seem to indicate the stretch of the river from Fort Quitman to Presidio may be intermittant and actually passing flows throughout. The flows are correlative and peak at the same time, (see insert following) indicating that there is some connection between Fort Quitman flows and those downstream. A small amount of additional flow in this segment may also be provided from groundwater, springs and small arroyos. At the same time, the Rio Grande Watermaster Eagle Pass office reports that most of the complaints they receive in this stretch are from water users unable to take advantage of their water rights due to low-flow conditions. Irrigators typically use suction pumps that pull water from the river, but the water level must cover the pipe opening and provide sufficient pressure to prime the pump. While flow does occur, there may not be enough to raise water levels to the point where pumps are operational. In short, judging from current water use practices there is simply not much Rio Grande water available from Fort Quitman to Presidio, and certainly not enough to support large-scale irrigated agriculture. Some residents of the area claim that historically there was more agriculture practiced in the region, indicating possibly higher historical flows.

The only major towns along the stretch of the Rio Grande downstream of Fort Quitman are the sister towns of Presidio and Ojinaga. Towns along this stretch the river typically

[6] Rio Grande use data supplied by Rio Grande Watermaster's office.

rely on groundwater to fulfill drinking water needs; therefore current water supply planning primarily focuses on groundwater supplies.

Hudspeth County river farms get their water from the Hudspeth County Conservation and Reclamation District #1, (HCCRD #1) which in turn is supplied water from return flows and operational spills from El Paso County Water Control and Improvement District #1 (EPCWID #1). EPCWID #1 is supplied with Project water from Elephant Butte. While HCCRD #1 does not directly receive Project water, because it receives water from EPCID #1, it bases its drought contingency planning on conditions in the headwaters of the Rio Grande, as does EPCWID #1.[7]

The Far West Texas Regional Water Planning Group (RWPG), established under Senate Bill 1 (*see* "Current Water Planning Efforts" *section*) to plan regional water supply for the next 50 years, predicts shortages in irrigation water for Hudspeth county farms along the Rio Grande. The plan identifies several means of meeting these projected shortages, including drilling additional wells in the Rio Grande Alluvium aquifer, expanded use of existing wells, and expansion/renovation of the regulating reservoir currently used by the Hudspeth County Conservation and Reclamation District #1.

It seems significant that in the RWPG there was little discussion of maintaining or restoring water in the river downstream of Fort Quitman, even for agriculture or to satisfy the admittedly meager existing private water rights. It seems likely some residents along that stretch would have wanted to use the planning process to address the chronic low-flow conditions that make it impossible to exercise an existing right, but according to planning group officials, this was not the case.[8]

Water Quality

Water in the Rio Grande between Fort Quitman and Presidio/Ojinaga, or the Junta de los Rios, is generally of poor quality. This section will examine three programs that are providing at least limited information about the river's water quality: 1) the Texas Clean Rivers Program; 2) local implementation of the Clean Water Act's 303(d) list of impaired water bodies; and 3) the Rio Grande Toxic Substance Study.

The Texas Clean Rivers Program

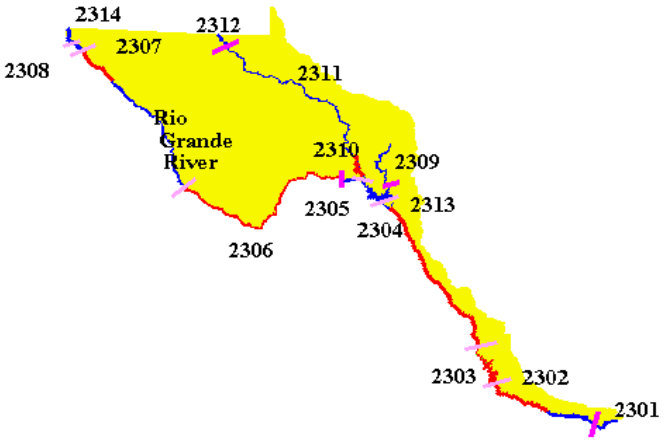
Until 1998, the TNRCC administered the Texas Clean Rivers Program, established under Texas Senate Bill 818, to provide a biennial report outlining general surface water quality for water bodies in the State. In October 1998, the TNRCC contracted with the U.S. IBWC to take over administration and reporting functions for this program. To fulfill this obligation, IBWC publishes a yearly *Basin Highlights Report.* These bulletins will provide the basis for a more comprehensive Clean Rivers report in 2003.[9] The stream segment designations used by both the IBWC and TNRCC are shown in Figure 4. The

[7] Far West Texas Regional Water Plan (final), January 2001, 5-31.
[8] Barbara Kauffman, Rio Grande Council of Governments, pers. communication, 2/28/01.
[9] Gilbert Anaya, U.S. Section IBWC, Clean Rivers Coordinator, pers. communication, 2/23/01.

most recent *Basin Highlights Report*,[10] released in April of 2000, shows elevated concentrations of total dissolved solids, chloride, sulfate, chlorophyll and phosphorus in both the upper (segment 2307) and lower (segment 2306) portions of the Fort Quitman to Amistad stretch, with ammonia nitrogen listed as a possible concern for some portions of both and fecal coliform a concern for the portion below the Rio Conchos confluence. The designated uses for both segments are contact recreation, high aquatic life use, and domestic water supply.

Clean Water Act 303 (d) list

Figure 4: Stream Segment Designations



As mandated by Section 303 (d) of the Clean Water Act, TNRCC compiles an inventory of impaired water bodies in the state of Texas. The 303 (d) list for 2000 contains the same two segments as discussed above - (2307 & 2306) of the Forgotten River stretch of the Rio Grande – that do not meet applicable water quality standards.

- Segment 2307, from (roughly) Fort Quitman to Presidio, has elevated concentrations of the salinity parameters (chloride, sulfate and total dissolved solids), along with high fecal coliform bacteria.
- Segment 2306, from Presidio to above Amistad Reservoir, shows periodic elevated bacteria levels, indicating the water is not safe for contact recreation. This segment also shows toxicity in the water may prevent full support of the designated high quality aquatic life use. (Toxicity is a biologically determined affect that generally occurs from a pesticide, metal or ammonia. The particular toxin was not identified through testing measures – only the effects of the toxin on the organism.)

Toxic Substances Study

The *Binational Study Regarding the Presence of Toxic Substances in the Rio Grande/Rio Bravo* grew out of a joint IBWC/CILA agreement to marshal a multi-agency effort and determine the effects of toxic substances in the Rio Grande. Two phases of this study are complete – phase 1, completed in 1994 and phase 2, completed in 1998. The Phase 2

[10] Available on-line at www.ibwc.state.gov/CRP.

Study[11] involved several testing sites within this segment of the river. Toxic chemicals and testing stations above and below Presidio/Ojinaga revealed toxicity in the water column sufficient to place these sites on the list of areas of high concern. Both above and below the confluence of the Rio Conchos, agriculture and industry in the twin cities may be affecting the water quality. Downstream of the Rio Conchos, toxicity affects on water fleas and flathead minnows appeared to be caused by elevated chloride levels. Santa Elena Canyon at Big Bend Park, another site in this stretch, was one of the least impacted overall, but it did have high levels of chlorides.

The fact that these parameters exceed the standards required to support designated uses for this portion of the Rio Grande may be a strategy for protecting additional flows in this stretch (i.e. more water to "dilute" pollution concentrations). Another option is eventually developing a Total Maximum Daily Load (TMDL) program. However, the 303 (d) list ranks segment 2306 of medium priority and segment 2307 a low priority for developing a TMDL. There are a couple of reasons for this, according to IBWC's Clean Rivers Program coordinator Gilbert Anaya.

Generally, the requirements for developing a TMDL stipulate that the basic (end of pipe) infrastructure must be in place before attempting to identify and address other, non-point sources of pollution. In this stretch, there are still cities without wastewater treatment facilities in place. The Valle de Juarez, with a population of around 60,000, and colonias in Texas downstream of El Paso (such as San Elizario, Fabens, and Tornillo) do not have wastewater infrastructure and are reliant on crude septic systems, some of which discharge sewage into open canals that eventually make their way to the Rio Grande. The city of Ojinaga is currently in the process of developing a plan for treatment facilities.[12]

Second, Mexico must be part of the development of the TMDL program, and neither the TNRCC nor the IBWC has been willing to approach Mexico on the TMDL issue until the treatment facilities are in place to help to alleviate point source problems. In theory, operation of the treatment plants might improve water quality to the point where developing a TMDL would not be necessary.

Current Water Planning Efforts

Senate Bill 1 (SB1), which was enacted by the Texas Legislature in 1997, establishes the framework for the regional water planning effort currently taking place in Texas. The state was divided into 16 regions and a Regional Water Planning Group (RWPG) was established for each region. The segment of the Rio Grande from Ft. Quitman to Presidio is located within the Far West Texas (E) water planning area. The segment from Presidio to the mouth of the Pecos River is located within both the Far West Texas water planning area and the Plateau (J) water planning area.

[11] *Second Phase of the Binational Study Regarding the Presence of Toxic Substances in the Rio Grande/Rio Bravo and its Tributaries Along the Boundary Portion Between the Unites States and Mexico;* Volume I, Final Report, April 1998.
[12] Maria Elena Giner, Border Environmental Cooperation Commission, Telecon 2/27/01.

Each RWPG was given the task to develop a regional water plan that would identify how to conserve water supplies, meet future water demands, and respond to future droughts in their planning area. The final versions of the regional plans were submitted to the Texas Water Development Board (TWDB) in January 2001.[13] The TWDB is now responsible for incorporating these regional plans into a comprehensive state water plan by January 2002.

One of the main goals of SB1 was to establish regional plans that ensure sufficient water will be available for the protection of natural resources.[14] The RWPGs were required to consider environmental water needs, including instream flows, during the development of the regional plans. The planning guidelines required the evaluation of alternative water management strategies for their effects on environmental water needs and directed the RWPGs to consider and pursue environmentally sensitive water management strategies where feasible.

In general, both the Region E and Region J planning groups fell short in accounting for, and allocating water to, environmental flows. Prior to the finalization of the plans, comments were taken on the draft plans. The U.S. Fish and Wildlife Service (USFWS) comments on the draft Far West Texas plan stressed that it was "very concerned about instream flows in the Rio Grande and springs that support Independence Creek in Terrell County…"[15] TPWD comments on the draft Far West plan include concern that environmental needs are not categorized as a water demand. They also raised concern that the plan lacked strategies to protect the existing quantity of water flowing in the Rio Grande river and that the plan did not provide for protection or even consideration of the natural resources, such as the Rio Grande River, that are supporting a growing ecotourism and recreational tourism industry. Planning group officials say they will take these comments seriously and try to address them in the next phase of regional planning.[16]

The TPWD comments to the Plateau Region's draft plan state that the plan is deficient in its evaluation of environmental flow needs and that the degree of impairment of these flows, due to existing and proposed water development, had not been properly assessed. The review of both region E and J's plans by the National Wildlife Federation (NWF) raised this same concern.[17,18]

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[13] The Far West Texas Plan (Region E) and the Plateau Region Plan (Region J) are available for download at http://www.twdb.state.tx.us.

[14] The Regional Planning Guidelines are included in 31 Texas Administration Code (TAC) part 10 §357.

[15] Letter to Tom Beard, Chairman, Far West Texas Regional Water Planning Group, dated September 29, 2000, David Frederick, U.S. Dept. of Interior, U.S. Fish and Wildlife Service.

[16] Barbara Kauffman, Rio Grande Council of Governments, pers. communication, 2/28/01.

[17] Letter to Tom Beard, Chairman, Far West Texas Regional Water Planning Group, dated September 29, 2000, Myron Hess, National Wildlife Federation, Gulf States Natural Resource Center.

[18] Letter to Jonathon Letz, Chairman, Region J Water Planning Group, dated November 1, 2000, Myron Hess, National Wildlife Federation, Gulf States Natural Resource Center.

In an effort to distinguish environmentally sensitive waterways, the regional planning guidelines allowed for the designation of a river or stream segment as having a unique ecological value.[19] The criteria used to justify designation include biological or hydrologic functions, presence of riparian conservation areas, high water quality, exceptional aquatic life, high aesthetic value, threatened or endangered species, or unique communities. Designation as a unique ecological segment by the legislature would ensure that state agencies and political subdivisions may not obtain an easement or fee title that would destroy the unique value of the segment.[20]

TPWD designated segments with potential to be considered ecologically unique for each of the planning regions, and the RWPGs were allowed to submit additional segments for consideration. The TPWD did not propose any segments of unique ecological value for the stretch of the Rio Grande from Ft. Quitman to Presidio. Between Presidio and the mouth of the Pecos, they proposed segments of six of the Rio Grande tributaries including Cienega, Alamito, Fresno, Terlingua, and Tormillo Creeks, and the Pecos River. More importantly to this effort, the main channel of the Rio Grande from the confluence with the Rio Conchos to 1.1 miles downstream of the confluence of Ramsey Canyon was identified.[21] This segment of the Rio Grande met the designation criteria as outlined in Table 2.

Table 2. Unique Ecological Value

Criteria	Rule	
Riparian Conservation area	31 TAC §357.8(b)(1)	Specifically Big Bend Ranch State Natural Area, Big Bend National Park, and the section designated as a National Wild and Scenic River
High Water Quality /exceptional aquatic life/high aesthetic value criteria	31 TAC §357.8 (b)(4)	For the Benthic macro invertebrates present

Neither the Far West nor the Plateau RWPG chose to include the TPWD proposed segments in their plans, nor did they recommend any additional segments for designation. The groups felt that the effects of designation on the future uses of the segment were too unclear in the provisions of SB1. This was a common concern among all the regional planning groups and they, along with the TPWD, are asking for further clarification on this issue from the Texas legislature. Most planning groups indicated a willingness to reconsider the designation in future regional planning activities if such clarification were to be made.

[19] 31 TAC §357.8.
[20] Texas Water Code §16.051 (g) (1). State political subdivisions include counties, cities, districts, authorities, interstate compact commissions, nonprofit water supply corporations, etc.
[21] *See* www.tpwd.state.tx.us/texaswater/sb1/rivers/unique/regions.text/TableE_FarWest_.pdf.

The TWDB still has the option of identifying unique ecological segments from all the sources (the RWPGs, the TPWD, and the TNRCC) to include in the state water plan that is scheduled to be complete in January 2002. Any segments so identified will be recommended for legislative protection.[22]

However, given that there was so much confusion and concern regarding these designations, it is unclear how the TWDB will handle the issue of including such segments in the State Water plan. The best strategy here is to wait and see how the legislature handles the requests for clarification of the designation. Having the Rio Grande segment and the tributaries designated as having unique ecological value could help build support for preserving or reserving instream flow in these reaches. However, the weight that the designation carries or will potentially carry in the future remains to be seen.

The TWDB is currently incorporating the regional plans into a statewide water plan. It is unclear to most everyone involved what this process of incorporation will produce. TWDB's"first flush" effort, which was introduced to both the House and Senate Natural Resources Committees in February 2001, consisted of an overview of the general findings of the groups and summaries of the proposed water supply projects by region.[23]

The TWDB is also currently drafting changes to their rules for the RWPGs to follow during future rounds of regional planning. There is a particular focus on strengthening the specific language that covers the protection of environmental flows in the planning process. Given the initial plans' shortfalls and the groups' general confusion regarding designating unique streams and accounting for environmental flows, the regional planning process cannot be currently depended on to safeguard environmental flows.

Water Rights & Permitting

In Texas, water is a public property held in trust by the state. Water rights are permitted through the TNRCC. Rights are granted as a "conditional property interest" to the appropriator, but the state retains title to the water.[24] The priority of the water right is based upon the "first in time, first in right" principal, which was established under Texas 027. This means that more junior water rights may not be honored during times when available water is not sufficient to fulfill all water permit obligations. As rights are sold or leased, they generally keep this priority status (except for inter-basin transfers).

Rights to river water downstream of Fort Quitman and upstream of Amistad are run-of-river rights governed by the prior appropriation law (see text box for key points of prior

[22] Outlined in Texas Water Code §16.051(e).
[23] This is available for viewing at http://www.twdb.state.tx.us/publications/reports/RWPGdocuments/rwp_summary/rwp_summary_index.htm.
[24] *A Regulatory Guidance Document for Applications to Divert, Store or Use State Water,* TNRCC, June 1995 p. 7.

appropriation). All rights downstream of Fort Quitman have been adjudicated, but since no user from Fort Quitman to Amistad can actually "call" for water to be released from Elephant Butte to satisfy a right in this stretch, any water needed for use must be satisfied by water that is in the river already, through run-of-river water.

Run-of-river water is an informal term used to describe rights that may be exercised whenever there is sufficient water in the river, but which are subject to water being available in the stream. This is determined by the TNRCC Watermaster and based on gage flows in the river. A diverter must make a request to the Watermaster and inform the agency whenever rights are exercised, and must also submit reports describing the time of pumping and the amount diverted after each diversion period.

Some Key Elements of the Prior Appropriation Doctrine in Texas

Key Elements of the "prior appropriation" doctrine include (1) the definition of "beneficial use"; (2) the possibility of cancellation of water rights for non-use; (3) the "no injury" and "third party/public interest rules" for transfer of water rights; and (4) precedence of municipal uses during times of shortage.

Appropriative water rights are subject to **cancellation for non-use**, if not put to beneficial use during a consecutive 10-year period. Traditionally, the state has been extremely reluctant to cancel water rights, and has sometimes been hampered by a lack of the type of water use data necessary to initiate cancellation proceedings. No water rights have ever been cancelled in Texas for non-use.

The **"no injury"** rule of appropriation systems limits transfers of water rights by preventing transfers that would adversely affect any downstream appropriator, whether junior or senior. Thus, a transfer from one use to another that would increase water consumption, thereby reducing return flows to the stream, may be prohibited if it would adversely affect downstream users. Texas, New Mexico and Arizona allow proposed water transfers to be rejected if they are not in the **public interest or public welfare**. Various factors—including environmental, economic, recreational and social—can be considered in this determination.

Finally, in times of shortage, **municipal uses may take precedence** over other uses. This is expressly stated, for example, in the 1997 comprehensive water management legislation enacted in Texas. This law allows for emergency transfers from agricultural to municipal use, though in some cases the agricultural users may be entitled to compensation.

All water rights granted are to be put to "beneficial use", which involves either a consumptive or a non-consumptive use. Non-consumptive uses could include recreation or instream flow maintenance.

To promote better water conservation practices, Senate Bill 1 changed the Texas Water Code to allow for the sale, transfer or lease of "conserved" water. Basically, any water that is not being "used" according to the amount and purpose indicated in the adjudication might be termed conserved water. The current price for the purchase of an acre-foot of water ranges from $800 to $1,200. Leasing of water is less expensive, ranging from $10 to $50 per acre-foot.

Beneficial Use

Texas' definition of what constitutes beneficial use includes the following (verbatim from the Texas Water Code §11.023):

(a) State water may be appropriated, stored or diverted for:

(1) domestic and municipal uses, including water for sustaining human life and the life of domestic animals;
(2) industrial uses, meaning processes designed to convert materials of a lower order of value into forms having greater usability and commercial value, including the development of power by means other than hydroelectric;
(3) irrigation;
(4) mining and recovery of minerals;
(5) hydroelectric power;
(6) navigation;
(7) recreation and pleasure;
(8) stock raising;
(9) public parks; and
(10) game preserves.

(b) State water also may be appropriated, stored, or diverted for any other beneficial use.

The next section of the water code describes how these uses are to be prioritized, and includes the first seven uses only, (8) being "other beneficial uses".

Beneficial use as instream flow is not expressly included in the statute, and some argue that no permit can be issued for instream use.[25] However, TNRCC has enacted rules that include instream flow as a beneficial use. This rule also purports to provide the agency with the authority to reserve instream flows:

> *beneficial use of instream flows for such purposes including, but not limited to, navigation, recreation, hydropower, fisheries, game preserves, stock raising, park purposes, aesthetics, water quality protection, aquatic and riparian wildlife habitat, freshwater inflows for bays and estuaries, and any other instream use recognized by law. An instream use is a beneficial use of water. Water necessary to protect instream uses for water quality, aquatic and riparian wildlife habitat, recreation, navigation, bays and estuaries, and other public purposes may be reserved from appropriation by the commission.* (30 TAC § 297.1 (23))

Addressing Need for Instream Flows

In practice, instream flows in Texas seem to be given more deference as freshwater inflows for bays and estuaries. Bays and estuaries are generally recognized as important for sustaining offshore and near-shore fisheries stocks. Further guidance on avoiding impacts to bay and estuary flows as a part of the permit review process is provided in §11.147 of the Texas Water Code. This section states that before issuing any permit application, the TNRCC must consider "the effects, if any, on the issuance of the permit on fish and wildlife habitats", but also provides specific language on factors to consider in determining whether or not a permit would affect bay and estuary flows.

[25] Johnston, *Environmental Significance of Instream Flows*, 17 St. Mary's L. Jour. 1297.

In 1995, TNRCC issued a regulatory guidance document[26] that includes a description of the type of water rights permit actions subject to technical review for environmental effects. Any new permit application would be reviewed, as well as certain permit amendments. Types of permit amendments would include:

- increases in the total appropriative amount;
- a significant change in the point of diversion;
- a significant change in the rate of diversion;
- a significant change in place of use; and
- a change in the purpose of use.

Water quality and fish and wildlife habitat in general are minimally addressed in §11.150 and §11.152 of the Texas Water Code. These sections only require the Commission to "assess the affects" on water quality and on fish and wildlife habitat before issuing a permit.

In his address to the audience at the 25th Water for Texas Conference in Austin, TPWD Director of Aquatic Resources, Larry McKinney, stated the TNRCC does provide additional guidance for determining adverse affects but that while "good progress, (it is) not a solution to assuring environmental flows…"

In conclusion, Texas regulations and statutes do provide for some protection of water for instream flow especially in the course of environmental assessment and review on a specific permit or permit amendment application. Nevertheless, most of the specific statutory language deals with protection of freshwater inflows to bays and estuaries. There is some controversy over whether instream flow can qualify as a beneficial use for water rights permitting purposes,[27] and no institutional process for how an instream flow permit would be exercised *in practice*. As far as we can determine, TNRCC has yet to issue a water rights permit specifically for instream use. Moreover, in most parts of Texas, including the Rio Grande, the technical information required to determine the level of instream flow necessary to sustain healthy aquatic ecosystems has not been developed.

Texas Water Bank

The Texas Water Bank was established in 1995 as a component of the Research Division of the TWDB.[28] It was created to provide a forum for the purchase or lease transfer of water rights between buyers and sellers. Water rights, or portions of them, can be deposited in the bank for an initial term of up to 10 years, during which time they are

[26] *A Regulatory Guidance Document for Applications to Divert, Store or Use state water*, TNRCC publication # RG-141, June 1995, p. 39.
[27] Though a test case is about to begin at TNRCC: The San Marcos River Foundation has applied for a permit to appropriate 150,000 acre-feet of Guadalupe River water for instream use. Also, proposed legislation filed this month in the Texas legislature would specifically add "instream flow" as a beneficial use under the Texas Water Code.
[28] The Texas Water Bank was created by the 73rd Texas Legislature (Texas Water Code Chapter 359).

exempt from cancellation.[29] This method of avoiding cancellation is the most obvious incentive for using the bank. However, no water rights have ever been cancelled in Texas for non-use, and recent trends do not show a change in this pattern.[30]

Another potential incentive for using the water bank is that deposits can also include water that was made available by a permit holder through conservation practices. Conserved water is defined as water that has been saved during transportation, storage, distribution, or application that would otherwise be lost to all consumptive beneficial uses.[31] There has not been a test case for this type of deposit. This could potentially include such activities as increasing water flows through brush removal or water saved via improvements in irrigation practices. For example, if the removal of vegetation leads to an increase in nearby spring flow that consequently increases the flow of the river, the potential is there to be able to claim that water as conserved water. This example also shows how complicated it could be to prove what amount of water is related to the clearing, versus changes in climate conditions or nearby water related activities such as pumping and irrigating. A more tangible example of conserved water would be the installation of water efficient technologies in an irrigation operation. The conserved water would be the amount of water saved. In this scenario, it is feasible that an outside entity might enter into an agreement to help upgrade an outdated irrigation system in return for the use of the conserved water.

According to Dan Beckett, the current manager of the bank, there has only been one transaction conducted through the bank.[32] This involved the leasing of an irrigation right of 396 acre-feet located at the confluence of the Blanco and San Marcos Rivers. Another service that is provided by the Bank's Internet site is a registry of buyers and sellers.[33] On these pages, people post information about water permits that they would like to sell or lease, and conversely amounts that they would like to purchase or lease. In February 2001, the Registry of Sellers contained one permit for sale/lease within the Rio Grande Basin in Presidio County. The permit is for 743 acre-feet with a 1925 Priority Date.[34]

The Bank has yet to become a useful or necessary tool in the trading of water permits. This is in part due to the bank's lack of an incentive program, and, according to Beckett,

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[29] Under Texas Water Code chapter 11, subchapter E, §11.173, permitted water rights that are not put to beneficial use during a consecutive 10-year period are subject to cancellation by the TNRCC.

[30] Hess, *Providing Environmental Flows, Water Allocation in Texas: Legal Issues*, January 25-26, 2001, Austin, Texas. The TNRCC and its predecessor agencies have lacked the political will to initiate the process of canceling water rights. In addition, in SB1 the provision was added to Texas Water Code §11.173 exempting water rights from cancellation if they have been used "in accordance with" a regional water plan. The vagueness of this clause may make it difficult to cancel rights in the future. Even if a water right were cancelled, a new appropriation of that water would become junior in right to all other existing appropriations in the basin.

[31] 31 TAC § 359.2(5).

[32] Dan Beckett, Manager of the Texas Water Bank, Texas Water Development Board, Telecon 2/14/01. Mr. Beckett can be reached at 512/936-0857 or via e-mail at dbeck@twdb.state.tx.us.

[33] *See* http://www.twdb.state.tx.us/assistance/WaterBank/waterbankMain.htm.

[34] Ibid.

the lack of any direct appropriations to the bank for its management. Beckett is also doubtful that any funds will be appropriated during the 77th legislative session.

Despite the current lack of use, the bank could ultimately be a useful venue for identifying water permits for purchase or lease. Additional venues for available permits include local newspapers in the counties (Hudspeth, Presidio, Brewster, Terrel, and Val Verde), notices through the Irrigation Districts, and word of mouth.

The Texas Water Trust

The Texas Water Trust was established as part of the Texas Water Bank as a means to hold water rights specifically for environmental needs. [35] Water rights can be deposited directly into the Texas Water Trust for any length of time. The donated right would keep its status, and would not be subject to cancellation.

To date, there have not been any donations into the Trust. The Trust currently suffers from lack of staffing and funding, and there are also no concrete incentives to encourage donations. As it now stands, the benefits of donating water into the Trust are unclear and the strength of the Trust in the future is uncertain. Procedurally, to change the designated use of a permit, the holder of the right must apply to the TNRCC for a permit amendment. Currently the most obvious incentive to donating into the Trust is that if the TPWD is named as the trustee for an application, the TPWD is exempt from the permit fee.

The TPWD water resources staff is currently working to draft legislation that would bring the Texas Water Trust under TPWD management. [36] Once under the direction of the TPWD, plans include hiring a full time employee to manage the Trust, apply for grant money, and targeting areas in the State where donations to maintain instream flow are needed the most.

Given that there is no money available through the Trust to purchase permits, the best strategy might be to monitor the progress of the Trust. Secured permits can always be donated to the trust at a later date if it becomes a more viable option.

[35] TWC §15.7031. The Texas Water Trust was established in 1997 through SB1. Additional information about the Trust can be obtained through Cindy Loeffler of the TPWD at 512/912-7015 or via e-mail at cindy.loeffler@tpwd.state.tx.us.

[36] Collette Baron, TPWD Water Resources Division, Telecon 2/26/01. This change was to be included in Senate Bill 2, filed in March, 2001. The legislation covering management of the Texas Water Trust was not included as part of the initial filing of the bill; however, it could be included as part of the substitute bill that will be filed at a later date.

Federal Leverages and Designations

United States

Public Trust Doctrine

The public trust doctrine is a common-law principal that can be used to protect the interest of the public when state owned property is involved. In Texas, the doctrine stems from the fact that all surface water in rivers, streams, and lakes is property of the state [37], and is held in trust for the benefit of all of its inhabitants. For water resources, the public trust doctrine says that the public has the right to use the flow of the river for navigation, commerce and fisheries, and this right predates and supersedes the rights of private users. The Doctrine's use in the argument for preserving and securing instream flow is based on the idea that the public's interest may serve to limit the amount of water that may be diverted from a river.[38]

The standards for applying the public trust doctrine are created and enforced judicially at the state level. Historically, the public trust doctrine has applied only to navigation, commerce, and fishing. The landmark case in solidifying the potential role of the public trust doctrine in preserving environmental needs was the National Audubon Society v. Superior Court of Alpine County.[39] This case challenged the exercise of water rights that interfered with instream uses and the maintenance of ecological integrity of Mono Lake.[40] This case helped broaden the application of the public trust doctrine in California to fish and wildlife, environmental quality, and recreation.

To date, the Texas Judicial system has not expanded the application of the public trust doctrine in Texas.[41] This first step in expanding the application beyond navigation, commerce, and fisheries to include environmental values is essential for using this as a tool to preserve instream flow. In most cases, the public trust doctrine has been used to reclaim damaging appropriations or to provide a case against proposed permits. However, even if the application of the public trust doctrine were to be expanded in Texas, it is doubtful whether the doctrine would be an effective tool if the minimum stream flow requirements for a river were not quantified.[42] This is another drawback to using this strategy for the Rio Grande River.

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[37] Texas Water Code §11.021.
[38] The concept of the Public Trust Doctrine is outlined well in Ronald Kaiser and Shane Binion, *Untying the Gordian Knot: Negotiating Strategies for Protecting Instream Flows in Texas*, 38 Nat. Res. Journal 181 (Winter 1998).
[39] 33 Cal 3d 419, 658 P.2d 709.
[40] *See* John Harbison, *Waist Deep in the Big Muddy: *Property Rights, Public Values, and Instream Waters*, Land and Water L. Rev. 340-341 (1991).
[41] Johnston, *Environmental Significance of Instream Flows*, 17 St. Mary's L. Jour. 1340-1341 (1986), and telecon with Tom Bohl, Texas Attorney General's office, 3/15/01.
[42] Ibid.

[45] This issue will have to be resolved through the court system.

Big Bend National Park / Federal Reserved Rights Doctrine

When land is removed from the public domain for the establishment of a national reserve, there is the potential to recognize an implied water right for the reservation. The U.S. Supreme Court first recognized the existence of water rights for federally reserved lands in 1908.[46] This "federal reserved rights doctrine" implicitly reserves the amount of water necessary to accomplish the identified purposes of the reservation.[47]

The Supreme Court's litmus test for validating an implied water right has been that the specific purposes of the reservation would be entirely defeated without the water.[48] The key catch here is that if the water right is not necessary to sustain the "primary purposes", the reserve must acquire water rights under the state water law. Big Bend National Park was established by congress in 1935 "to preserve and protect a representative area of the Chihuahuan Desert along the Rio Grande for the benefit and enjoyment of present and future generations."[49] The case for implied federally reserved rights for Big Bend National Park is arguable, but uncertain. It is unclear whether water rights can be implied in order to support the purpose of enjoyment of the park by future generations. The truth of the matter is that the park was established after the treaties with Mexico were enacted (see later discussions) and after the Rio Grande Project took hold of the river flow, so additional flows for the park are dependent on modifications to these pre-dated agreements. The park currently holds rights to approximately 1,500 acre-feet of water, which it uses to maintain its campground facilities.

According to park officials, this avenue to secure additional flow for the park has not been fully explored. Their focus now is to support scientific studies that will quantify current flows thru the park and assess water quality. The park is currently redrafting its General Management Plan and the Rio Grande Wild and Scenic River Management Plan.

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[43] John S. Harbison, *Waist Deep in the Big Muddy:* Property Rights, Public Values, and Instream Waters.* 26 Land and Water Law Review 559 (1991).
[44] Ibid.
[45] Ibid.
[46] *See* Cappaert v. United States, 426 U.S. 128, 138 (1976).
[47] Blomfield, *Forcing the Federal Hand: Reserved Water Rights v. States' Rights for Instream Protection,* 4 Hastings Law Journal1271-1300. (1990)
[48] *See* United States v. New Mexico, 483 U.S. 696, 700 (1978).
[49] Big Bend National Park, General Management Plan and Rio Grande Wild and Scenic River Management Plan, Newsletter 1, Spring 2000.

Endangered Species Act

The Endangered Species Act can be a useful tool to protect riparian ecosystems. *Sierra Club et al. v. Babbitt et al*. was a significant case in Texas where the Endangered Species Act was used as a leverage to secure environmental flows necessary to sustain endangered species and their habitat. In this case, the plaintiffs alleged that the Secretary of the Interior and the U.S. Fish and Wildlife Service had allowed a taking of endangered species by not ensuring a water level in the Edwards Aquifer adequate to sustain the flow of the Comal and the San Marcos Springs systems (the species' critical habitat). The district court judge ruled for the plaintiffs, and in response, the Texas Legislature established a management plan to limit withdrawals from the aquifer. The Edwards Aquifer Authority has since developed overall withdrawal limitations and a permit system for groundwater withdrawals from this segment of the Edwards Aquifer.

Table 3 is the list of Federally listed endangered species that are potentially located along the Rio Grande between Fort Quitman and Amistad Reservoir. This list does not include any aquatic species. Unfortunately, the use of the Endangered Species Act as a strategy can backfire in Texas. In a state where private property rights are held to such a high regard, passions can run high against Act, especially among conservative West Texas landowners.

Table 3. Federally Listed Endangered Species[50]

Mammals	
Mexican Long-nosed Bat	Leptonycteris Nivalis
Birds	
Southwestern Willow Flycatcher	Empidonax traillii extimus
Blacked-capped Vireo	Vireo atricappilu
Plants	
Nellie Cory Cactus	Coryphantha Minima
Terlingua Creek Cat's Eye	Cyryptantha Crassipes
Davis' Green Pitaya	Echinocereus Viridiflorus Var Davisii
Texas Snowbells	Styrax Texanus
Tobusch Fishook Cactus	Ancistrocactus Tobuschii

[50] Texas Parks and Wildlife Department, Wildlife Diversity Division, Special Species Lists for Hudspeth, Presidio, Brewster, Terrel, and Val Verde Counties. Specific information regarding potential habitat of these species is included in Stotz, Nancy, *Historic Reconstruction of the Ecology of the Rio Grande/Rio Bravo Channel and Floodplain in the Chihuahua Desert*, World Wildlife Fund, June 2000.

Federal Wild and Scenic River Designation

In 1978, the segment of the Rio Grande River from the Chihuahua/Coahuila state line (above Mariscal Canyon) to the Terrell-Val Verde county-line for a total of 196 miles, was designated by the U.S. Congress as a component of the National Wild and Scenic River System. This designation, which is made under the Federal Wild and Scenic Rivers Act[51], means it is recognized as a segment to be preserved in free-flowing condition for the benefit of preserving scenic, recreational, geologic, fish, and other established values. The law protects designated rivers against detrimental affects of future hydropower and water resource development projects.[52]

Only sixty-nine miles of the designated river lie within the boundary of Big Bend National Park, however the park administers the whole length of the Rio Grande Wild and Scenic River. In a letter dated January 10, 2001[53], Frank Deckert, Superintendent of Big Bend National Park, outlined the current status of the designated segment. Deckert wrote that changes in the source of the flow through the Rio Grande Wild and Scenic River (from predominately Conchos flow to predominately Rio Grande flow from below Ft. Quitman) have altered the water quality over the last several years. In this letter, Deckert urged the IBWC to maintain minimum flows in the Rio Grande River at Ft. Quitman and to reduce the salinity of the waters to comply with state water quality standards for chloride, sulfate, and TDS. He also made it clear that the National Park Service will not support any programs or projects "that will further degrade the water quality and quantity in the Rio Grande through Big Bend National Park and the Rio Grande Wild and Scenic River".

The Rio Grande's designation may give Federal weight to the need to preserve flows through the park system. This letter is significant in that it shows that the National Park Service is willing to use this designation as a tool for protecting flows along the designated segment.

American Heritage River Designation

In 1998, the stretch of the Rio Grande River from El Paso to Laredo was designated as an American Heritage River (AHR). The Rio Grande was among the original ten rivers to receive this federal designation during the first phase of the AHR initiative. The goals of the initiative include economic revitalization, natural resource and environmental protection, and historic and cultural preservation along the stretch of the designated river. Communities along the river receive improved access to technical and financial assistance from federal agencies, and these agencies make existing field staff available to help match community needs with available resources from current programs.

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[51] Wild and Scenic Rivers Act, 16 U.S.C. 1271-1287, Section 1274 (a)(17) designates the Texas portion of the Rio Grande River.

[52] 16 U.S.C. 1278 (a) as stated "no department or agency of the United States shall assist by loan, grant, license, or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such river was established…".

[53] Letter to Doug Echlin, IBWC, dated January 10, 2001, Frank Deckert, U.S. Dept. of the Interior, National Park Service.

In 2000, Miguel Flores of the Nation Park Service was appointed as the River Navigator for the Rio Grande. His role is to help facilitate the process of securing federal assistance, by directing interested communities towards appropriate grants and federal funding possibilities. Once the grants are filed, he tries to work with the funding agency to gain leverage or special priorities for the project based on the Rio Grande's designation as an American Heritage River.[54] Apparently, this strategy has achieved varying degrees of success. Mr. Flores said that the designation seems to pull more weight with economic development programs.

According to Mr. Flores, all fourteen of the currently designated rivers have restoration efforts underway to some degree. Examples of current American Heritage River Initiative projects on the Rio Grande include funding through the Land and Water Conservation Fund administered by the TPWD to establish a "river walk" area in downtown El Paso. Another project is the El Portal Riverfront Park project in Laredo. This project includes the construction of a riverside road and its off-ramp from the highway, development of a greenbelt and a nature preserve, and infrastructure for new urban development.[55]

The Consortium of the Rio Grande (CoRio) is a not-for-profit corporation that formed to secure the designation of the Rio Grande as an American Heritage River. CoRio is composed of various jurisdictions along the river (see box).[56]

CoRio is continually working on establishing a basin wide approach to river stewardship, it assists participating communities in securing needed resources for projects, and it works to form strategic alliances for regional scale projects.

CoRio Member Jurisdictions
Amistad National Recreation Area
Atascosa National Wildlife Refuge
Big Bend National Park
Brownsville
Chamizal National Memorial
El Paso
El Paso County
Lake Falcon
Laredo
Palo Alto Battlefield Historic Site
Presidio
Roma
Socorro
Webb County
Zapata County

Mexico

Treaty Allocations

The two U.S./Mexico treaties governing transboundary surface water management are the 1906 Rio Grande Convention and the 1944 Water Treaty. The 1906 convention applies

[54] Phone conversation with Miguel Flores, Rio Grande River Navigator, on March 9, 2001. Mr. Flores can be reached at 512/916-5050, 300 East 8th Street, Suite 914, Austin, Texas 78701, or via email at Miguel.flores@gsa.gov.

[55] Additional information about the American Heritage River designation and associated projects along the Rio Grande can be found at http://www.epa.gov/rivers/98rivers/fsriogra.html.

[56] Any local jurisdictions along the Rio Grande may enter into the consortium by signing their cooperative interjurisdictional agreement.

to the distribution of surface water of the Río Bravo/Río Grande above Fort Quitman, Texas.

The 1944 Treaty is more comprehensive, applying to other transboundary waters in addition to the Río Bravo and also governing such matters as the maintenance of the boundary between the two countries. The pertinent legal features of the 1944 Treaty regarding allocation of the surface waters of the Río Bravo watershed from Fort Quitman to the Gulf of Mexico are shown in Table 4.

Table 4: 1944 Treaty Allocations

Mexico	*United States*
All waters reaching the main channel of the Río Bravo from the Río San Juan and the Río Alamo, including the return flow from the lands irrigated from these two rivers.	All waters reaching the main channel of the Río Bravo from the Pecos and Devils Rivers, Goodenough Springs and the Alamito, Terlingua, San Felipe and Pinto Creeks.
One-half the flow in the main channel of the Río Bravo below the lowest major international storage dam (Falcon), so far as it is not specifically allocated under the Treaty to either of the two countries.	One half of the flow in the main channel of the Río Bravo below the lowest international storage dam (Falcon) so far as it is not specifically allocated under the Treaty to either of the countries.
Two thirds of the flow reaching the main channel of the Río Bravo from the Rios Conchos, San Diego, San Radrigo, Escondido and Salado and the Las Vacas Arroyo, subject to the U.S. right to an average of at least 350,000 AF/yr in cycles of five consecutive years.	One-third of the flow reaching the main channel of the Rio Grande from the Rios Conchos, San Diego, San Rodrigo, Escondido, and Salado and the Las Vacas Arroyo, provided that this third shall not be less, as an average amount in cycles of five consecutive years, than 350,00 AF/yr. The U.S. does not acquire rights in the Mexican tributaries in excess of the 350,00 AF/yr except the right to use one-third of the flow reaching the Río Bravo from these tributaries, although the one-third may be in excess of 350,00 AF/yr.
One-half all other flows of the main channel of the Río Bravo not otherwise allotted, including contributions from all unmeasured tributaries between Fort Quitman and the lowest major international storage dam (Falcon)	One half of all the flows of the main channel of the Río Bravo not otherwise allotted by the Treaty, including contributions from all unmeasured tributaries between Fort Quitman and the lowest major international storage dam (Falcon).

The persistent drought in Chihuahua has led to significantly less water from the Conchos reaching the main stem of the Río Bravo. In fact, flows have been reduced to the point where Mexico is now is a "deficit" situation with respect to the 1944 U.S./Mexico water treaty that governs allocation of the Río Bravo/Río Grande.

The 1944 Treaty provides that one-third (1/3) of the flow reaching the main channel of the Río Bravo from the Rios Conchos, San Diego, San Rodrigo, Escondido and Salado and the Las Vacas Arroyo is allocated to the United States, *provided that* this third shall not be less, as an average amount in cycles of five consecutive years, than 431,721 Mm^3/year (350,000 acre-feet per year). The vast majority of this water comes from the Conchos basin, as flow in the other tributaries is minimal during much of the year.

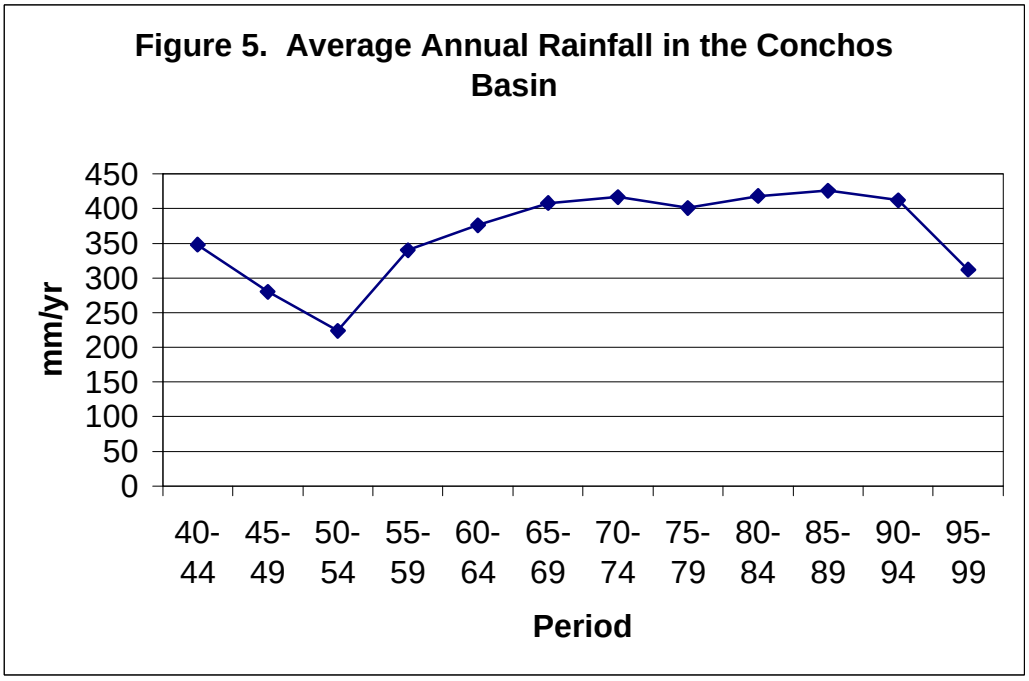
In the five-year cycle ending on October 2, 1997, Mexico owed the U.S. about 1,240 Mm^3 (1.024 million acre feet). This is more than double the deficit incurred by Mexico during the drought of the 1950s, which is the only other time Mexico has failed to meet the minimum flow requirements during a five-year cycle. By February 2000, Mexico had accumulated an additional 0.48 Mm^3 (0.40 MAF) deficit in the current five-year cycle.

According to Article 4 of the treaty, total flow from these Mexican tributaries can average less than 350,000 acre-feet/year over a five-year cycle without Mexico being in "violation" of the treaty if there is a situation of "extraordinary drought". The treaty requires that Mexico make up the deficit in the subsequent five-year cycle.

Unfortunately, the treaty does not provide further definition of the term "extraordinary" drought. This lack of certainty is now at the heart of a raging controversy, as U.S. farmers in the Lower Rio Grande are alleging that the drought in Chihuahua was not so severe as to justify Mexico's withholding of flows in the Conchos basin. Based on a report by the consulting firm R.J. Brandes and Associates, the farmers essentially claim that the Conchos basin received about 80 percent of its normal rainfall during the 1993 to 1997 period and that because flow in the Mexican tributaries did not cease "entirely" there was no "extraordinary drought".[57] They further claim that, under the treaty, Mexico should have *released* water stored in reservoirs in the Conchos basin to meet the 350,000 acre-feet/year requirement.

Mexico has responded that the lower levels of rainfall, particularly in the Conchos basin, do constitute an extraordinary drought, though it did not dispute the Brandes report calculation of an average 80% of normal rainfall during 1993-1997. Nevertheless, as shown in Figure 5, only during the late 1940s and early 1950s was average annual rainfall in the Conchos basin less than during the 1995-1999 period. Mexico further argues that it is entitled, under the treaty, to withhold enough water in reservoir storage to meet water demands in the Conchos basin, before water is released to the Río Bravo to satisfy treaty requirements, as long as it pays back the water owned in the subsequent five-year cycle. It also states that the storage capacity of the reservoirs on the Conchos is less than assumed by the U.S. since there has been significant sedimentation in some of those reservoirs.

[57] The Brandes report places annual average rainfall in the Conchos basin at 47% of normal in 1994 and 69% of normal in 1995, with three others years (1993, 1996 and 1997) experiencing normal or near normal rainfall levels.



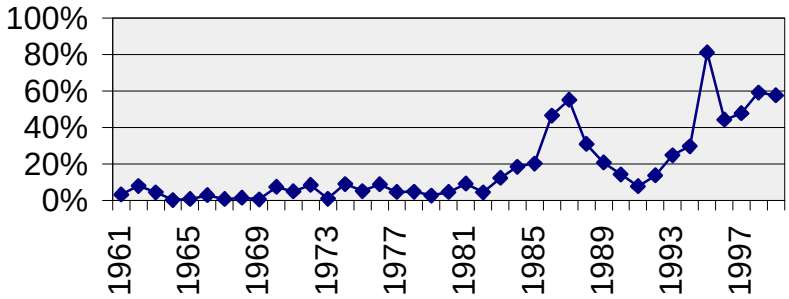
The dispute has reached the level of the respective state departments in Mexico and U.S. The International Boundary and Water Commission (IBWC), a binational agency set up under the treaty to administer the water allocation between U.S. and Mexico, has been meeting with government agencies and water users in both countries in an attempt to resolve the disputes. Since February 2000, through a combination of releases from the Conchos and transfer of Mexico-owned water in the Amistad/Falcon reservoir system to U.S. ownership, Mexico has reduced its deficit *for the 1992-1997 cycle* to about 841 Mm^3 (690 MAF). Under the treaty, this entire deficit must be repaid by the time the current five-year cycle ends on October 2, 2002.

The current controversy over the interpretation and implementation of the 1944 Treaty indicates the need for the two countries to better define the term "extraordinary drought" and, possibly, to clarify other provisions of the treaty. Negotiations are now underway between the U.S. and Mexico to reduce the deficit, and to develop a basin management plan to prevent recurrence of this type of large deficit situation.

Conchos River

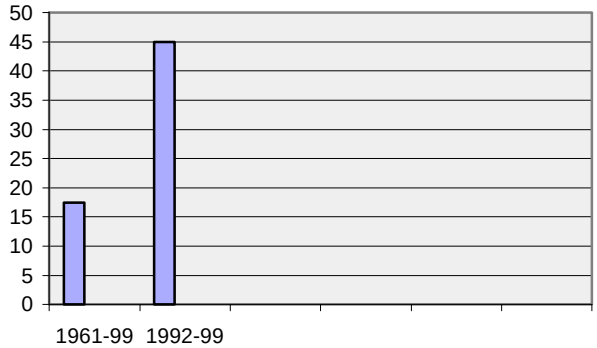
As shown in Figure 6, flow from the Conchos has regularly exceed Rio Grande base flow just above the confluence with the Conchos. During the period of 1961 to 1999, the Rio Grande flow averaged less than 20% of the total Rio Grande/Conchos flow just below Presidio. This includes recent years of low flow in the Conchos due to a drought in northeastern Mexico and water storage in upstream reservoirs on the Conchos.

Figure 6. Rio Grande Flow as Percent of Total Flow below Conchos/Rio Grande Confluence



During the 1992-1999 period, however, flows from the Conchos have been severely reduced. In this drought period, the Rio Grande has averaged almost 45 % of the total flow below the confluence.

Figure 7. Rio Grande as a Percent of Total Flows Below Confluence with Conchos



Evaluating the possibility of instream flows from the Conchos involves several separate, but related, inquiries:

- Current and projected water supply, demand and management policies in the Río Conchos basin;
- Options under Mexican law for securing instream flows or meeting environmental water needs;
- Flow requirements for the Conchos under the 1944 U.S./Mexico water treaty; and
- Political and practical considerations in securing Conchos flows.

It is beyond the scope of this paper to provide a detailed analysis of surface water supply, demand and management in the Conchos basin. We include instead TCPS' recent report, *The Río Conchos: A Preliminary Overview*, for those interested in more detail.[58] From this report, which summarizes currently available information on the Conchos, we can make a few general, but important, conclusions:

- Agricultural irrigation accounts for about 90% of all water use in the basin and most of this is surface water. Irrigation water is supplied by several major reservoirs on the Conchos and on its primary tributaries. Management of these reservoirs, particularly Las Boquillas and Luis Leon (El Granero), largely determines how much Conchos water reaches the Rio Grande;
- Municipal and industrial water demands currently supplied mostly by groundwater, but these demands are growing and cities may turn increasingly to surface water as more groundwater reserves becomes over-exploited;
- Surface water availability in the Conchos basin is also greatly affected by droughts, which can be severe and prolonged, as well as by deforestation in the headwaters in the Sierra Tarahumara.

Article 27 of the Mexican Constitution establishes the legal framework for water resources management in Mexico. It essentially provides the federal government with ownership of and jurisdiction over almost all water. The federal government issues permits for water use pursuant to the 1992 federal water law.[59] Permits can be in force for anywhere between 5 and 50 years, with extensions available. Permit issuance is contingent on water availability, though it is unclear whether Mexico has had sufficient resources to collect and analyze the kind of hydrological data necessary to make such water availability determinations with certainty. No permit is required for small domestic uses that do not involve construction of a water distribution system.

Mexico has not developed the full "prior appropriation" doctrine and thus it appears that all users may have their allocations reduced across-the-board during times of shortages. The 1992 law gives the federal government broad discretion to impose use restrictions and allocations in areas of shortages or during periods of drought. In practice, however, municipal needs often take precedence over agricultural needs, as has been the case in many parts of northeastern Mexico during the recent persistent drought.

The 1992 law gives the government broad discretion to control surface water use and groundwater pumping, including for the purpose of "protecting or restoring an

[61] The law gives CNA three basic options:

[58] Kelly, Mary E., The Río Conchos: A Preliminary Overview (Texas Center for Policy Studies: Austin, Texas 2000); available at www.texascenter.org/borderwater.

[59] The "permits" include concessions to private interests and assignments (*asognaciones)* to government entities, such as municipal water supply systems. Water use authorizations issued prior to the 1992 law remain effective if they are registered in the Public Rights Registry established by the 1992 Act.

[60] Ley de Aguas Nacionales, Article 38 (II).

[61] Reglamento de la Ley de Aguas Nacionales (published in the *Diaro Oficial* on January 12, 1994), Title V, Article 73-74.

ational and integral" administration of the resource.[62] The government, after appropriate technical studies, can declare a "regulated" zone; with the regulations can apply to both existing and new uses. The regulations must define, among other things, the volume of water available, and its geographical distribution; conditions for development and use of the water supplies; methods necessary to confront emergency conditions, extreme scarcity or over-exploitation; and procedures for implementation and enforcement.

Zonas de Veda

Zonas de veda can be declared, in the public interest, when it is no longer possible to maintain or increase the use of surface or groundwater without "affecting the sustainable development of the resource and without the risk of inducing adverse economic or ecological effects" on the sources of water or water users in the zone.[63] Water use in zonas *de veda* can also be limited in order to protect water quality (something that has a direct relation to instream flows for surface water). Local water users are supposed to be involved in the establishment and administration of water use in any *zona de veda*.[64]

The National Water Commission has established *zonas de veda* for several aquifers in the Conchos basin. It is not clear, however, whether CNA has followed through with appropriate and enforceable regulations on water use.

La Reserva de Aguas Nacionales

A third option is for the federal government to decree federal reserved water rights (*la reserva de aguas nacionales*).[65] These reserves can be used to supply municipal water needs, generation of electric energy or for environmental purposes. Two environmental purposes are specified in the law:

- guarantee minimum flows required for stability of watercourses, lakes, lagoons and maintenance of aquatic species; and
- the protection, conservation or restoration of an aquatic ecosystem, including wetlands, lakes, lagoons and estuaries, as well as aquatic ecosystems that have historic, tourism or recreation values.[66]

[62] Reglamento de la Ley de Aguas Nacionales, Art. 75 and 76.
[63] Ley de Aguas Nacionales, Art. 40; Reglamento de la Ley de Aguas Nacionales, Art. 77.
[64] Reglamento de la Ley de Aguas Nacionales, Art. 77.
[65] Ley de Aguas Nacionales, Art. 41; Reglamento de la Ley de Aguas Nacionales Art. 78.
[66] Reglamento de la Ley de Aguas Nacionales Art. 78.

A declaration of federal reserved water rights must be published in the *Diaro Oficial (*Mexico's Federal Register).

Thus, at least in terms of statutory authority, there are options for securing instream flows in the Conchos basin, though the options discussed above would all require considerable governmental action and oversight.

The regulation implementing the federal water law defines "use of water for ecological conservation" as a "minimum flow in a stream or the minimum volume in reservoirs that should be conserved to protect the environmental conditions and ecological equilibrium of the system".[67]

[67] Reglamento de la Ley de Aguas Nacionales, Art. 2(XXII).

Strategies

A major caveat for formulating any strategy for securing additional instream flows in this stretch of the Rio Grande is that without a target flow amount, it is difficult to know how much water is needed and therefore difficult to know which strategies will work the best. The strategies discussed in this paper are offered because they seem to apply to this particular segment of the Rio Grande, but we cannot know what priority should be assigned to each until and unless we know what amount of water we are after.

The stretch of Rio Grande from Fort Quitman to the Junta de los Rios is probably the most difficult stretch of river for which to obtain instream flows. Above the Fort Quitman gauge, waters fall under the Rio Grande Compact and are considered Project Water. Below the Fort Quitman gauge, water rights are run-of-river and priority dated. However, there is currently little actual use of water below Fort Quitman, there being very little reliable, year-round run-of-river flow to satisfy existing rights.

The TNRCC considers any water crossing state lines to fall within the jurisdiction of the state of Texas – even Rio Grande Project Water.[68] For this reason, TNRCC filed a motion in 1994 with the State Office of Administrative Hearings (SOAH) to adjudicate the water rights from El Paso to Fort Quitman. However, the Quiet Title suit brought by EBID in New Mexico has tied up the adjudication process. The 14 water claims filed between the state line and Fort Quitman are on hold with SOAH, and TNRCC is forced to wait while the litigation process unfolds.

The only direct user of Project Water from the Texas state line to Fort Quitman is EPCWID #1. However, EPCWID #1 leases water to other local users, such as El Paso Water Utility and Hudspeth County Conservation and Improvement District. It remains unclear what amount of the water being used is Project Water and what is not. Much of the water originated from Elephant Butte, but users are also getting return flows from irrigation and municipal use, thus making this returned water hypothetically subject to adjudication by the state.

There is no Texas statutory provision for adjusting existing upstream water rights to provide for water quality or fish and wildlife habitat should those become degraded due to diminished flows as a result of over-use or drought. Moreover, the Rio Grande in Texas, as elsewhere, is highly over-appropriated. Some estimate it is 100% over-appropriated; in other words, users hold on paper roughly twice the amount of the actual firm annual yield of the river.

As pointed out earlier, there are less then 25,000 total acre-feet of water rights being exercised in the stretch from Fort Quitman to Amistad. Purchase or cancellation of water rights in this segment, therefore, would probably not yield enough water to make a significant contribution toward a water budget for wildlife or riparian needs, and, as discussed, any water entering the river below the Fort Quitman gauge will be used to

[68] Herman Settemayer, TNRCC water rights division, pers communication, 3/6/01.

meet existing rights first. Thus, there are three ways additional water might be provided through this stretch:

- Via El Paso
- Salt Cedar Removal
- Rio Conchos releases

El Paso

Downstream of Fort Quitman no user currently has direct access to or can call for Rio Grande Project water. Assuming that any strategy to obtain additional water for instream use upstream of Fort Quitman is successful (i.e. leasing or buying Project Water), once this water passes the Fort Quitman gauge, and possibly before, it would need to be protected with a permit for beneficial instream use. If the water were bought or leased from an existing above-Fort Quitman claim, it would still be subject to the adjudication process by the state. Assuming the water carried a priority date, it would probably be protected from the point of diversion down to the Fort Quitman gauge.[69]

After the water passes Fort Quitman, however, it is unclear how it would be protected. The same goes for any water obtained downstream of Fort Quitman. A water right when exercised is protected to the point of diversion. In other words, while the law provides that environmental instream uses should be protected from appropriation, it does not stipulate how an instream use with *no point of diversion or specific place of use* is to be protected under the existing statutes. This type of situation would likely test the limits of the environmental instream use language and possibly provide a precedent-setting case.[70] Working within the existing operational structure, another strategy would be to have multiple permit holders for the same environmental instream water at downstream diversion points. In order to exercise the permitted water right, presumably the permit holders would have to each request the water, in turn, in order for it to be institutionally recognized and left in the stream.

If an additional water right could be "created" through conservation or some other means, and the sponsoring entity applied for and protected this water with an instream use right, it would still be junior to all other downstream rights and might become subject to other water rights exercised – especially if the additional flows were enough to supply a reliable source of water more frequently, though this is a fairly unlikely scenario. In this case perhaps the best strategy would be to obtain agreements from downstream irrigators that this water be allowed to remain in the stream. This would involve a long, slow process of organizing stakeholder support; over the long term such agreements might erode, especially as regional growth continues.

An economic value associated with instream flow in this stretch would strengthen the case for instream flow protection. Examining the potential for establishing some type of nature tourism initiative in Hudspeth County could be beneficial in this regard.

[69] Ibid.
[70] The San Marcos River Foundation application, as noted previously, involves similar issues.

Salt Cedar Removal

Another strategy that merits consideration is water salvage through removal of salt cedar. It is estimated that a single salt cedar consumes 250 gallons of water per day.[71] Removal of 10,000 trees would result in additional flows in the riparian zone of the river of 2.5 million gallons per day (mgd), or approximately 7 acre-feet/day. Over a year, 2,800 acre-feet would be saved. Bosque del Apache National Wildlife Refuge in New Mexico and the Lajitas Resort in Texas provide two examples of water salvage through salt cedar removal that were successful in liberating additional flows.

In the case of the Lajitas Resort, salt cedar was physically removed in a 200-acre segment of the property by digging the trees from the root. Resort officials say they are prepared to continue maintaining the site free of salt cedar and have planted native Cottonwoods in their place. Cottonwood consumes 2/3 less water than salt cedar. Bosque del Apache NWR has been experimenting with salt cedar removal for some time and has also shown some success through fairly intensive management techniques.

If salt cedar were to be removed in sufficient quantities, a conservation organization or the National Park Service might be able to apply for a permit for this amount for use as instream flow. As shown, conserved water through brush removal qualifies under the definition of conserved water for donating to the Texas Water Trust. Once permitted, however, these flows might still be junior to other rights. This clearly illuminates a flaw in the statutes – while the language alludes to protection for instream flow, it is difficult to realize in practice.[72] A strategy for dealing with this might be to organize stakeholder support for allowing this water to remain in the stream. Stakeholders might even be allowed, through signed agreements, to use a percentage of the water provided there is any additional available after meeting instream flow needs.

The federal Wild and Scenic River designation certainly lends some weight to the argument for instream flows through Big Bend. Other states have successfully used Wild and Scenic River designation for halting dam construction and creating broad-based support for river management initiatives. The reality is that in this stretch - an over-appropriated river with priority water rights, none of which include instream uses - there is no legal protection for those rights. But, depending on where the salt cedar were cleared, in the stretch from Presidio to Amistad there is little water use and it is likely the water would remain in the stream through Big Bend National Park to Amistad Reservoir.

If salt cedar removal were to take place in the stretch from Fort Quitman to Presidio, it might also have little affect on existing water use, though to protect these flows long term it would seem beneficial to obtain a permit for instream flows related to conserved water from brush removal. Again, the limitation of current instream flow protection becomes obvious: there is no mechanism or statutory language for protecting instream rights past

[71] Richard Hubble, President, SRS Properties, of the Lajitas Resort, pers. communication, 3/5/01.
[72] There may be some protection under the definition of "surplus water" water that would not have been in the stream otherwise. This definition generally applies to water from outside the system, so there is still some question as to whether this "new" water would qualify.

the point of diversion or permit location, so any user downstream of the brush removal site with a run-of-river right might be able to take advantage of these increased flows.

Rio Conchos Releases

The situation with the 1944 Treaty presents both risks and opportunities for getting instream flows into the Rio Grande from the Conchos (and for instream flows in the Conchos itself). Obviously, the more water Mexico agrees to release from the Conchos to "pay back" the deficit and satisfy the treaty's flow requirements, the better, at least for the Presidio to Amistad segment. Water released to the Rio Grande from the Conchos will likely go to Amistad without much use in between.

Thus, concerned organizations should not miss the opportunity to be involved, to the extent possible, in the discussions of the deficit solution. Concerned organizations should begin to formulate an agenda regarding both short-term flows and medium- to long-term basin management and drought management plans for the Conchos. All these areas present important opportunities to make sure that instream flows and environmental needs are accounted for in these plans. This should be done, to the greatest extent possible, in a binational manner (i.e. involvement of concerned NGOs from both sides of the border).

If NGOs fail to get involved in these discussions, there is a risk that the two governments will focus on resolving the deficit situation and developing management plans that are solely focused on consumptive water demand (e.g. for municipalities and agriculture). This would leave little, if any, water for instream flows, particularly in the Conchos itself, but also in the Rio Grande below Falcon/Amistad.

There is also a risk that the U.S./Mexico negotiations could break down or become so polarized that Mexico is only willing to supply 350,000 acre-feet/year, averaged over a 5-year cycle (e.g. the minimum flow required by the treaty). This would result in reduced instream flows in the Conchos, the segment of the Rio Grande from Presidio to Amistad and ultimately in the lower portion of the Rio Grande. *Essentially, Mexico could do to the Conchos what the U.S. has done to the Colorado—an outcome that should be avoided at all costs.*