

**An Overview of Operational Characteristics of
Selected Irrigation Districts in the Texas Lower Rio
Grande Valley: Delta Lake Irrigation District**

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Preface

With the publicity and public recognition of water shortages that have existed across the Texas Lower Rio Grande Valley (Valley) in the 1990s and early 2000s, many questions have surfaced related to the characteristics, basic operations, and how irrigation districts allocate water among users. In response to questions about the history and legal framework related to water in the region, the report, “Evolution of Irrigation District and Operating Institutions: Texas, Lower Rio Grande Valley” (Stubbs et al. 2003), was developed to give insight on the overall evolution of agriculture and the establishment of institutions for irrigation operations.

A series of reports are being developed that address specific characteristics of selected irrigation districts. Through case-study evaluations of individual irrigation districts, they can be compared and contrasted as to methods of operation and water allocation procedures. An irrigation district that provides water to both urban communities and agriculture (which includes most of the irrigation districts in the Lower Rio Grande Valley) brings forth more questions related to how each of these systems operates. Individuals or groupings of irrigation districts’ methods of operation remain unknown to many and, to a large extent, may impact the image of all irrigation districts – particularly with regards to basic efficiency and capability to react to alternative conditions. The clientele base, infrastructure, adoptive rate of technology, etc. can vary significantly across irrigation districts. So, to understand and appreciate the collective Lower Rio Grande Valley irrigation district system, one must understand the idiosyncrasies that distinguish one from another. The first report in the series of individual irrigation districts (Stubbs et al. 2004) addressed the specific operational characteristics of the Brownsville Irrigation District. In that report, the format to be used in this and other such reports (e.g., Stubbs et al. 2005) was established.

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Abstract

Population expansion and water shortfalls have placed the Texas Lower Rio Grande Valley (Valley) center stage in water publicity. The unique characteristics and lack of public knowledge on how irrigation districts divert and convey water from the Rio Grande to municipal, industrial, and agriculture consumers have precipitated questions regarding the operations and makeup of these districts. Differences between and similarities across irrigation districts can be partially attributed to the topography, water-delivery infrastructure system, past financial decisions, and population demographics and clientele base of each irrigation district. Delta Lake Irrigation District (DLID) is one of the 29 irrigation districts in the Valley. This study presents an overview of DLID that includes a brief historical background, a description of the District, and discussion of the District's current operations. Specific information in the report details how the District diverts and delivers its allocated water from the Rio Grande, how it is used (i.e., municipal, industry, and agriculture), and mechanisms for allocation within and outside the District.

The uniqueness of the Lower Rio Grande Valley irrigation districts requires an understanding of their origins and operating mannerisms to explain their overall institutional effects. Through unlocking some of the conundrum associated with these individual irrigation districts, policymakers and other interested stakeholders will have a better perception of the culture and evolution that surround these unique districts, thereby facilitating improved policy-making decisions affecting the region's water supply and usage.

About the Authors

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- **Joe A. Pennington.** Raymondville-area farmer and DLID Board member who provided contact information and knowledge about the District's operations;
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Thanks to the individuals noted above. Nonetheless, we, the authors accept all responsibilities for any errors and/or other oversights that are present in the manuscript. In publishing this report, we are describing operations and practices of the irrigation district and, therefore, offer no opinions. Specific operations and practices are neither supported nor criticized by the authors or the Texas Cooperative Extension and Texas Agricultural Experiment Station.

CDW, MJS, ELP, MER, AWS, RDL, CSR

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Chapter 1

Introduction and Background

The Texas Lower Rio Grande Valley (Valley) irrigation districts that exist today were officially formed after the turn of the twentieth century. Article III, Section 52 of the Texas Constitution allowed for the public development of the State's surface water. Created in 1904, this article allowed farmers within the Lower Rio Grande Valley to organize and create districts that became legal entities of the State. Due to the financial failure of many land and irrigation development companies in the Valley, local farmers were able to purchase the water rights and infrastructure through the legal indebtedness that Article III, Section 52 allowed (Strambaugh and Strambaugh). The Great Depression of the 1930s caused most of the land and development companies to collapse, leaving the newly created irrigation districts to maintain the lifeblood of the Valley: irrigated agriculture.

This chapter introduces historical and background information pertaining to the Delta Lake Irrigation District (DLID) and the entire Valley. The intent is to present an informed understanding of how the area operated in the past and to explain some of the current day practices. Also discussed are other relevant cooperating agencies, such as the Texas Commission on Environmental Quality (TCEQ) and the International Boundary and Water Commission (IBWC). Both the TCEQ Rio Grande Watermaster program and the U.S. Section of the IBWC significantly influence the daily operations of Valley irrigation districts.

Historical Overview

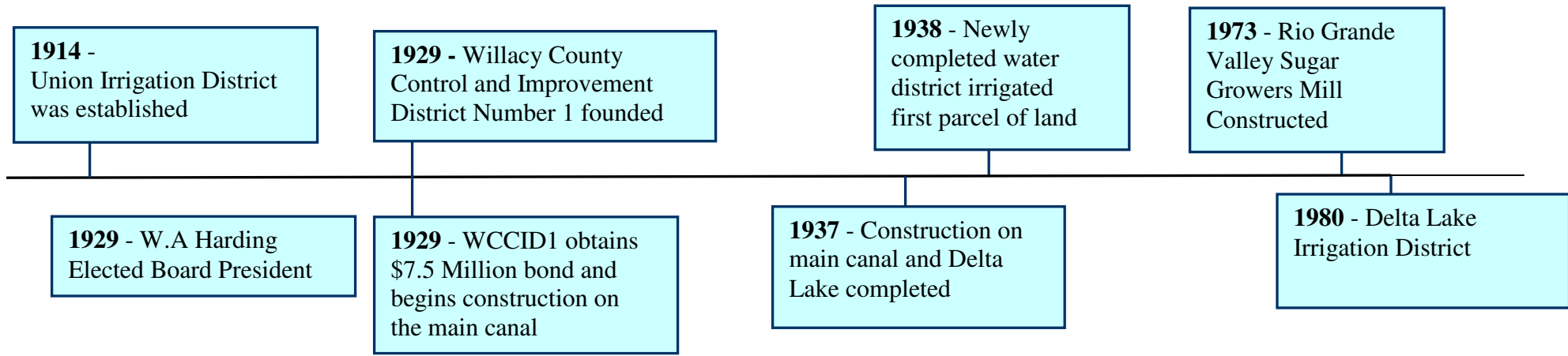
In the beginning of the twentieth century, land developers and businessmen alike stumbled upon a stretch of land for which irrigation opportunities and fortunes had previously been overlooked by others. Consequently, the Texas Lower Rio Grande Valley did not become heavily populated until the 1920–1930s (**Figure A1, and Tables B1 and B2**). Prior to that time, the population consisted mostly of Spanish descendants, Texas Rangers, and Border Patrolmen (McKenna).

It was not until the idea of expanding irrigation beyond the banks of the Rio Grande emerged that large masses of people from northern areas of the country began moving South to what was then called “The Magic Valley” (Strambaugh and Strambaugh). As irrigation and agriculture expanded, so did development across the Valley. This growth is evident by the fact that in 1920 the city of Raymondville had a population of only 1,800. After development of irrigation systems and establishment of railroad lines in the area, the population increased to 4,050 in 1941 and to more than 9,000 in 1952 (Addington).

On June 22, 1914, Union Irrigation District, the predecessor to DLID was formed. In 1928, Union Irrigation District filed to receive unappropriated waters of the Rio Grande. Before this time, the area was largely nonirrigated (Harding Collection). On May 22, 1929, the Willacy County Control and Improvement District Number 1 (WCCID1) was founded under the direction of Board President W.A. Harding. Formally known as the Union Irrigation District, WCCID1 obtained an original bond of \$7.5 million from the Hartford Accident and Indemnity Company of Hartford, Connecticut for the development and construction of the District’s canal system in an attempt to expand irrigation from the Rio Grande. The contractor for the system was Trinity Farms Construction Company (Harding Collection) (**Exhibit C1**).

By 1910, most of the land and water companies in the area were in financial difficulty and many went bankrupt by the 1930s. New landowners in the region needed a way to provide for the diversion and delivery of water to farms recently put into cultivation. With bankrupt water suppliers and a need for irrigation water, the 33rd Legislature of the State of Texas passed legislation for the creation of irrigation districts. Major historical events for DLID are depicted in the timeline represented in **Exhibit 1**.

In July 1929, construction began on the District’s main canal from the Rio Grande (Harding Collection). Later that year, the original Board of Directors of the WCCID1 (i.e., W.A. Harding, Alva Lindale, Geo Lochrie, W.T. Holder, and Gorman Fox) requested 260,000 acre feet (ac-ft) of flood waters from the Rio Grande to be diverted and used by the District. By 1937, construction of the main canal and Delta Lake was complete (Harding Collection) (**Exhibits C2-C4**). With the infrastructure complete, Willacy County irrigates its first parcel of land, an orange grove, belonging to Goe R. Lochrie. WCCID1 continued to serve area irrigators until May 22, 1980, when under the provisions of Section 51 and 58 of the Texas Water Code (Texas Legislature Online), WCCID1 officially became DLID.



1914 – Union Irrigation District (UID) was established on June 22 of this year. UID was the predecessor of the Delta Lake Irrigation District (DLID).

1929 – Willacy County Control and Improvement District Number 1 (WCCID1) was founded on May 22.

1929 – W.A. Harding Elected Board President of WCCID1.

1929 – WCCID1 obtains \$7.5 Million Bond. This bond was the largest recorded irrigation issuance at the time. **Construction began on the main canal** from the Rio Grande on July 3.

1937 – Construction on main canal and Delta Lake completed.

1938 – Newly completed water district irrigates first parcel of land in Willacy County. The land was the Geo R. Lochrie Citrus Grove.

1973 – Rio Grande Valley Sugar Mill (RGVSG) Constructed and began grinding cane on December 8. The planting of cane (and associated additional water needs) began in 1970 and spread to present-day acreage.

1980 – WCCID1 becomes Delta Lake Irrigation District (DLID) on May 22 of this year.

Sources: Verna McKenna, The Harding Collection of Reber Memorial Library, Raymondville, Texas; and personal electronic communication with Steve Bearden of RGVSG.

EXHIBIT 1. Key Historical Events Affecting the Organization and Development of the Delta Lake Irrigation District (1914-1980).

The Rio Grande Watermaster

The Watermaster acts as a policing force in controlling and enforcing water rights along the Rio Grande. Operating under Chapters 303-304 of the TCEQ regulations, the Watermaster is required to regulate, monitor, and record the flow levels, patterns, and rates of water being diverted and used within the Watermaster's program area. Diverters of the Rio Grande must notify the Watermaster's office prior to diverting and are subject to recorded measurements by the Watermaster to ensure that diverters are the true holders of the water rights and that they are diverting no more than their allotted amount (Texas Commission on Environmental Quality 2004).

The first Rio Grande Watermaster program began in the 1950s as a voluntary water administration commonly called the "Falcon Compact" (Jarvis). Under the Falcon Compact, water rights holders voluntarily employed a Watermaster and divided more than 450,000 ac-ft of irrigation water equally (Jarvis). This program worked for only a few years. In 1956, Falcon Reservoir was drained below the desired minimum level due to the lack of enforcement powers by the Watermaster and excessive and illegal pumping that occurred along the Rio Grande. A landmark lawsuit, *State of Texas v. Hidalgo County Water Control and Improvement District No. 18* (1969), commonly called the "Valley Water Suit," ensued and took 13 years to resolve.

When the Valley Water Suit was filed on June 27, 1956, the District Court judge in Hidalgo County took possession of the U.S. share of the Rio Grande waters and appointed a Watermaster (Jarvis). During the Valley Water Suit, the court-appointed Watermaster controlled and enforced the allocations and regulations of the Rio Grande. In 1967, the State passed the *Water Rights Adjudication Act* that created a new administrative and judicial process for dealing with water rights. Upon completion of the Valley Water Suit in 1969, the Texas Water Commission (then known as the Texas Water Rights Commission) gained control over the Watermaster program from the courts under the provisions previously established in *Water Rights Adjudication Act* of 1967. Currently, the TCEQ is the State agency that manages the Watermaster Program. The executive director of TCEQ appoints one Watermaster per division. The State of Texas has only two Watermaster division areas: the South Texas Watermaster and the Rio Grande Watermaster. The Rio Grande below Fort Quitman is managed by the Rio Grande Watermaster (**Figure 1**).

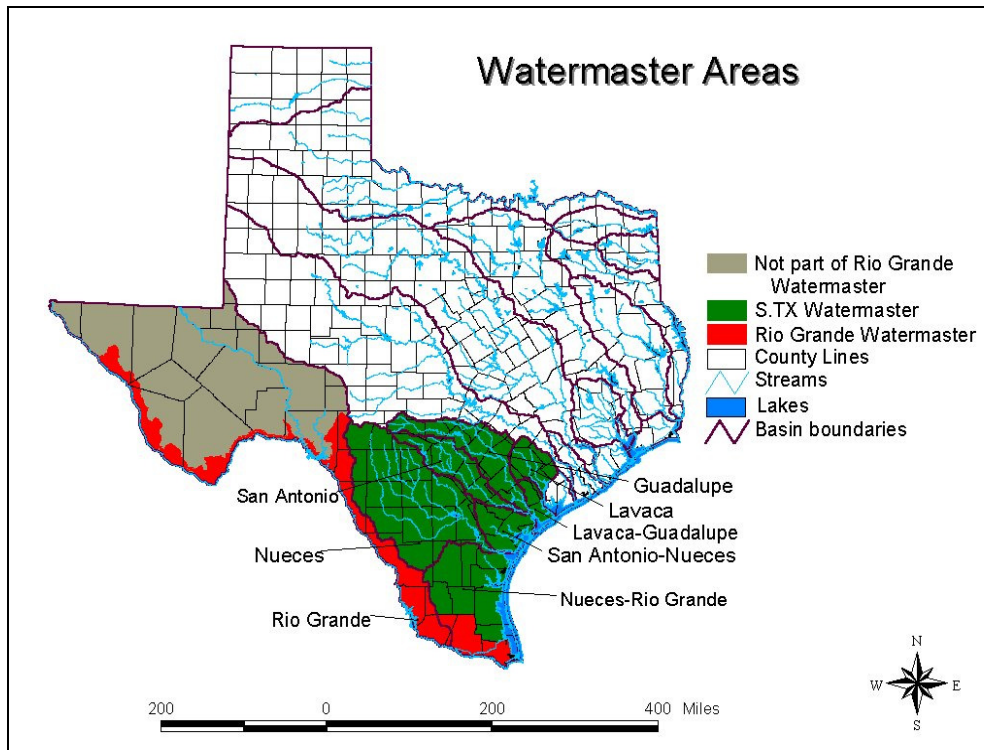


FIGURE 1. Geographical Location of the Watermaster Areas in Texas, 2004
(Texas Commission on Environmental Quality 2004).

The Watermaster program is funded through flat rate and variable fees charged to water right holders within the Watermaster’s program area. The current annual base assessment fee is \$50.00 per water rights holder, plus an assessment fee that is based on the projected operating budget and the amount of water rights owned by the user (Texas Commission on Environmental Quality 2004). The 2003-2006 variable assessment fees are listed in **Table 1**. An exception to variable rate charges being assessed based upon the amount of water rights held is the instance of “no-charge” water, which is based on the volume of water diverted.¹ No-charge water is priced to the districts based upon the type (i.e., water use category) of water and the year diverted.

¹ No-charge water refers to a temporary situation of excess water flow in the Rio Grande whereby the Watermaster allows the diversion of water at “no charge” to a district’s Watermaster-controlled allocation. That is, the district’s annual claim to Rio Grande flows is not reduced by any amount when it diverts under no-charge conditions. Note that no-charge water is not “free” as the district does incur certain costs such as the variable rate assessed by the Watermaster and energy costs to divert the no-charge water from the Rio Grande.

**TABLE 1. Selected Texas Commission on Environmental Quality (TCEQ)
Watermaster Variable Assessment Rates for Fiscal Years 2003-2006**
(Hinojosa 2003, 2004; Vela).

Type of Water Use	Fiscal Year Assessment Rate (\$/ac-ft) ^a			
	2003	2004	2005	2006
Municipal	\$0.2721	\$0.2509	\$0.2171	\$0.2524
Industrial	\$0.2721	\$0.2509	\$0.2171	\$0.2524
Irrigation	\$0.2177	\$0.2007	\$0.1736	\$0.2019
Mining	\$0.2721	\$0.2509	\$0.2171	\$0.2524
Hydroelectric	\$0.0136	\$0.0125	\$0.0108	\$0.0126
Recreation	\$0.2721	\$0.2509	\$0.2171	\$0.2524
Recharge	\$0.1360	\$0.1254	\$0.1085	\$0.1262
Secondary	\$0.1360	\$0.1254	\$0.1085	\$0.1262
Salt Water	\$0.0272	\$0.0250	\$0.0217	\$0.0202
Spreader Dam	\$0.1088	\$0.1003	\$0.0868	\$0.1009
Domestic & Livestock	\$0.2721	\$0.2509	\$0.2171	\$0.2524
Storage	\$0.1088	\$0.1103	\$0.0868	\$0.1009
Stock Raising	NA ^b	\$0.2509	\$0.2171	\$0.2524
Game Preserves	NA ^b	\$0.2509	\$0.2171	\$0.2524
Reuse	NA ^b	\$0.1254	\$0.1085	\$0.1262
Public Parks	NA ^b	\$0.2007	\$0.1736	\$0.2019
Multi Use	NA ^b	\$0.2509	\$0.2171	\$0.2524

^a Assessments are charged (by the TCEQ) per acre-foot of water right.

^b New water-use category beginning in 2004.

The Rio Grande Watermaster Advisory Committee (RGWAC) provides oversight and administrative guidance to the Watermaster. Established in 1998, the RGWAC consists of 15 members and one alternate, who each serve a two-year term (**Figure A2**). Members serve voluntarily, hold water rights or represent those who hold water rights, and are chosen by the Executive Director of TCEQ based on the amount of water rights held, experience in water management, geographic location, and water-use type (i.e., irrigation user, municipal supplier, industrial, etc.) (Texas Commission on Environmental Quality 2004). The RGWACs responsibilities include: providing recommendations to the Rio Grande Watermaster and Executive Director, reviewing the annual budget of the Rio Grande Watermaster Program, and other duties as requested by the Executive Director (Texas Commission on Environmental Quality 2004).

International Boundary and Water Commission

The first International Boundary Commission (IBC) for the U.S.-Mexico border was created to survey the California-Baja California border in 1848 and then again to survey the New Mexico-Chihuahua border in 1853. The third temporary commission was established to conduct surveys and studies along the U.S.-Mexico border in 1882. In 1889, the Convention between the United States and Mexico permanently established the IBC for the purpose of carrying out the duties of the 1884 Convention. These duties included resolving boundary disputes, as well as water investigations for the Rio Grande and Colorado Rivers (U.S. General Accounting Office).

A 1944 Treaty changed the IBCs name to IBWC and created additional duties. The 1944 Water Treaty, "U.S.-Mexico Treaty for Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande,"² divided the international portions of the Rio Grande from Fort Quitman, Texas to the Gulf of Mexico. The Treaty also commissioned the IBWC to construct and maintain international dams for the purpose of flood control. In 1953 and 1969, construction was completed on the two international reservoirs, Falcon and Amistad, respectively (U.S. Section, International Boundary and Water Commission).

The IBWC plays a large role in the daily operations of the Valley irrigation districts. The rules set forth by the 1944 Water Treaty are still in practice today, and because the irrigation districts receive their water from an international river (i.e., the Rio Grande), they too must abide by these rules. When irrigation districts contact the TCEQ Watermaster's office requesting the diversion of water, it is the Watermaster that contacts the IBWC to release water from the reservoirs.

Articles 4 through 9 of the 1944 Water Treaty deal directly with the distribution of the Rio Grande waters.³ Article 4 defines specific allocation procedures from tributaries contributing to the Rio Grande (**Table 2**). The IBWC is responsible for recording and measuring the flows of contributing streams that are stated in the 1944 Water Treaty (U.S. Section, International Boundary and Water Commission). Each IBWC section (i.e., U.S. and Mexico) is responsible for maintaining and funding its country's operations and equipment. Most cooperative project costs are shared proportional to the benefits received unless otherwise contractually stated (U.S. Section, International Boundary and Water Commission).

² Commonly referred to as the 1944 Water Treaty.

³ Excerpts of 1944 Water Treaty that are cited in the text are included in **Appendix G**.

TABLE 2. U.S. and Mexico Allocations of the Rio Grande According to the 1944 Water Treaty (U.S.-Mexico Treaty for Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande).

Contributing Flows	To the United States	To Mexico
Rio San Juan	None	All Flows
Rio Alamo	None	All Flows
Pecos River	All Flows	None
Devils River	All Flows	None
Good-enough Springs	All Flows	None
Alamito Creek	All Flows	None
Terlingua Creek	All Flows	None
San Felipe Creek	All Flows	None
Pinto Creek	All Flows	None
Rio Conchos	1/3 of Flows	2/3 of Flows
Rio San Diego	1/3 of Flows ^a	2/3 of Flows
Rio San Rodrigo	1/3 of Flows ^a	2/3 of Flows
Rio Escondido	1/3 of Flows ^a	2/3 of Flows
Rio Salado	1/3 of Flows ^a	2/3 of Flows
Las Vacas Arroyo	1/3 of Flows ^a	2/3 of Flows
Main Flows of Rio Grande below Falcon	1/2 of Flows	1/2 of Flows
Non Measured Contributing Flows & not named in Treaty	1/2 of Flows	1/2 of Flows
Measured Contributing Flows & not named in Treaty	100% of Flows ^b	100% of Flows ^b

^a The average annual minimum delivery required of Mexico (over each five-year cycle) is 350,000 ac-ft. See Article 4, Section B, Subsection (c) in **Appendix G**.

^b 100% of contributing flows that are measured and not named in the 1944 Treaty belong to the country from which the flows originated.

It is the provisions of subparagraph (c) of Paragraph B in Article 4 that has created controversy relating to Mexico’s delivery obligations to the U.S.⁴ Though the IBWC operates under broad treaties, specific agreements between the U.S. and Mexican governments come in the form of Minutes.⁵ Recent Minutes from the IBWC are evidence of attempts made to allow Mexico to repay its water debt associated with the 1992-1997 five year cycle and continuing into the 1997-2002 cycle to the U.S. in a timely fashion. The International Boundary and Water Commission announced on September 30, 2005 that “Mexico has fulfilled its commitment to eliminate its deficit in Rio Grande

⁴ For additional information regarding the 1944 Treaty non-compliance, refer to “Evolution of Irrigation Districts and Operating Institutions: Texas, Lower Rio Grande Valley” (Stubbs et al. 2003).

⁵ Minutes are documented decisions or recommendations between the U.S. and Mexico. Once each Minute is signed by the required Commissioner, Secretaries, and governments, the Minute becomes a binding contract between the U.S. and Mexico (U.S. Section, International Boundary and Water Commission).

deliveries to the United States” (Spencer). These numbers account for all of the deliveries from Mexico to date and assume the minimum payments for the rest of the cycle.

Chapter Summary

This chapter discussed significant historical events that took place in DLID. Beginning as far back as 1929, the DLID area has played an intricate role in the Valley. Many of the past decisions and events presented in this chapter have formed both the current look of the District, as discussed in Chapter 2, and the current operating practices, as discussed in Chapter 3.

Also discussed were relevant state and international agencies, such as the TCEQ Watermaster program and the IBWC. The Watermaster program plays an important role in the daily operations of the Lower Rio Grande Valley irrigation districts. The organization of the Lower Rio Grande Watermaster program was the result of a failure of the irrigation districts to voluntarily control their own pumping along the Rio Grande in the 1950s. The program’s current enforcement and distributive powers, as well as the RGWAC, significantly impact irrigation districts’ operations. The IBWC also has an impact on the daily operations of irrigation districts. The requirements of the 1944 Water Treaty dictate the amount of the Rio Grande and its contributing flows that belong to Mexico and to the U.S. The amount of water that each irrigation district is allocated by the Watermaster’s office is dependent on these flows, making the IBWCs role increasingly important in times of drought and reduced water flow.

Chapter 2

District Description

The Delta Lake Irrigation District (DLID) covers 95,328 acres within its borders. The District delivers water to 69,936 acres of farmland each year and has an authorized water right for 70,000 acres (Allen 2005a). The District is unique in that it does not actually border the Rio Grande. It is located some 34 miles north of the Rio Grande (Figure 2). Though similar in nature and operating under the same State mandates, each of the 29 Rio Grande Valley Irrigation Districts are distinct. Their distinctiveness is apparent in varying topography, physical location, cropping patterns, and urbanization, as well as past and present decisions relating to financing and technological acceptance. DLID represents only one of the 29 different irrigation districts in the Valley.

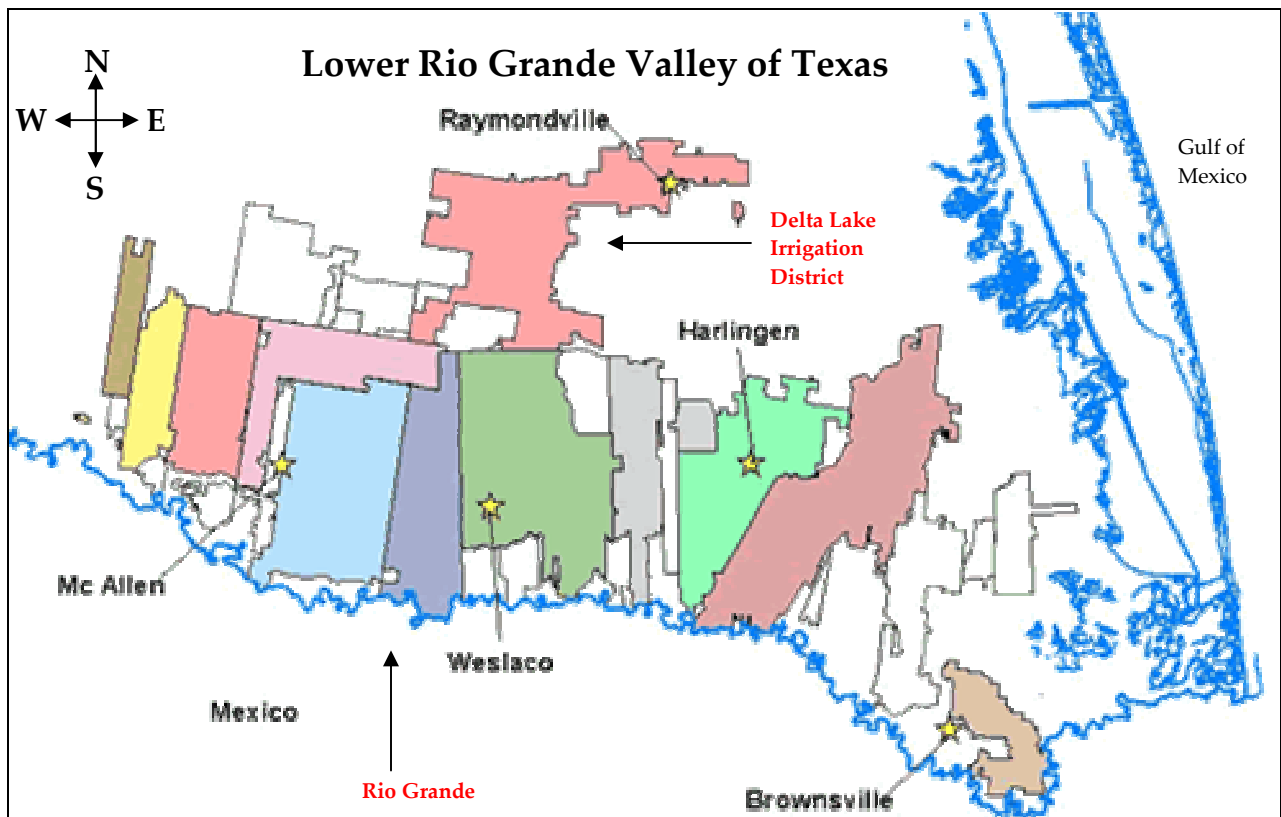


FIGURE 2. Irrigation Districts of the Lower Rio Grande Valley, 2002 (Fipps et al.).

First discussed in this chapter is the use and level of technology incorporated in DLIDs operation. Discussed next is the diversion of water from the Rio Grande into DLIDs water distribution system. Although all irrigation districts adhere to the same rules and regulations, how and where a district diverts its water from the Rio Grande is exclusive to that individual district. As with all systems, there is a continuous need for maintenance and repair. Discussed in the third section of this chapter are the current improvements to the canal system and to the District as a whole. Infrastructure only describes one aspect of a district; cropping patterns, water use, water rights, and urban areas also all impact the operation of the District. These issues are discussed in the latter sections of this chapter.

Technology

The DLID water-delivery system includes both aboveground canals and laterals, and underground pipelines. The District is continually upgrading and advancing this technology in order to improve operational efficiency. The District is looking to install 20 new telemetry sights with insertion magmeters during the next five years. The meters will be read manually by canal riders indicating gallons per minute and ac-ft of water passing through the system. Furthermore, the District is looking into the possibility of installing automated metering devices providing instant real time data to the District office. The telemetry system would allow the District to periodically, and on demand, poll data from field devices, process the data into a central database (i.e., base computer), send instructions to field devices, and display the data to district personnel for improved water management (Allen 2005b). The economic justification for meter and telemetry systems lies in the fact that, if used properly, the resulting information can prevent over deliveries of water.

Diversion from the Rio Grande

DLID diverts 100 percent of its water deliveries from the Rio Grande. All of the water diverted by the District from the Rio Grande originates as surface water that is released by the International Boundary and Water Commission (IBWC) from Falcon Reservoir. The District averages annual deliveries of 34,819 ac-ft of water to 462 agricultural accounts totaling more than 73,857 acres of land and 5,240 ac-ft to municipal accounts, serving almost 4,000 individual water users (Allen 2005a).

The District is located approximately 90 miles southeast of Falcon Reservoir. To request water from Falcon Reservoir, the District manager must contact the Rio Grande Watermaster and request a diversion certificate. The TCEQ Rio Grande Watermaster reports a three-day travel time to deliver water from Falcon Reservoir to DLIDs point of diversion on the Rio Grande (Allen 2005a).

DLIDs main pumping plant diverts water directly out of the Rio Grande south of the city of Mercedes, Texas (**Exhibit C5**). The facility was built in 1938 and is in good working condition for its age and use (Phillips). The pumping plant’s current operating capacity is 640 cubic feet per second (cfs) with a typical peak-pumping rate of 480 cfs, and a minimum pumping capacity of 160 cfs.

The pumping station houses four electrical pumps (**Table 3 and Exhibit C6**) which generate 160 cfs each. The largest volume of water pumped from the river typically occurs during the months of April and May, which correlates with the growing season of the region’s major crops (i.e., grain sorghum, cotton, corn, and sugar cane) and the low rainfall period for the area (Phillips).

TABLE 3. Delta Lake Irrigation District’s Pump Details, 2005 (Allen 2005a).

Pump No.	CFS	Pump Size	Horsepower	Energy Use
1	160	48"	300	Electric
2	160	48"	300	Electric
3	160	48"	300	Electric
4	<u>160</u>	48"	<u>300</u>	Electric
Total	640		1,200	

According to TCEQ rules, the Rio Grande Watermaster administers regulatory functions along the Rio Grande pertaining to diversions.⁶ The Watermaster records and certifies each diverter (i.e., irrigation district) along the Rio Grande based on §303.11 (Texas Commission on Environmental Quality 2003).⁷ Each diverter must first have an authorized diversion site (Texas Commission on Environmental Quality 2003; §303.11.a) recognized by the Watermaster. Then, for each diversion, the diverter must have written certification from the Watermaster in advance stating the intended amount of water to be diverted and the number of pumps that will be used in the diversion process (Texas Commission on Environmental Quality 2003; §303.11.b).

⁶ The terms “diversions” and “pumping” are used interchangeably in this section.

⁷ Excerpts of TCEQ Rules and Regulations that are cited in the text are included in **Appendix F**.

The diverter is also responsible for providing, maintaining, and operating meters that accurately measure the amount of water being diverted (Texas Commission on Environmental Quality 2003; §303.11.e). DLIDs Rio Grande diversion meters are located behind the pumping facility, approximately 200 yards from the river. Details of DLIDs pumps can be found in **Table 3**. Records of amounts pumped from the river as measured by these meters are kept by the Watermaster and subtracted from the diverter’s account.

A district is charged for its diversions according to the policy schedule found in **Table 4**. Water diverted between 90 percent and 110 percent of the amount requested is charged to the district at the diverted amount (Texas Commission on Environmental Quality 2003; §303.12.e.1). If a district pumps less than 90 percent of what was requested from the Watermaster, it is still charged 90 percent of that request (Texas Commission on Environmental Quality 2003; §303.12.e.2). This rule is intended to discourage the wasting of water for those who would request too much water and not divert it. If a district pumps more than 110 percent of the requested amount, then the district is charged for the total amount of water that was pumped and could face penalties for this violation through the Watermaster (Texas Commission on Environmental Quality 2003; §303.12.e.3). This rule is intended to discourage excess diversions by a district, which has the potential to impact other downstream users.

TABLE 4. Texas Commission on Environmental Quality Rio Grande Watermaster’s Diversion Policy (Texas Commission on Environmental Quality §303.12.e).

Amount Pumped as Percent of Request	Charge
< 90%	90% of Request
90%-110%	Actual Amount Diverted
> 110%	Actual Amount Diverted ^a

^a Also subject to possible penalties by the Watermaster for excessive pumping violation.

Water-Delivery Infrastructure System

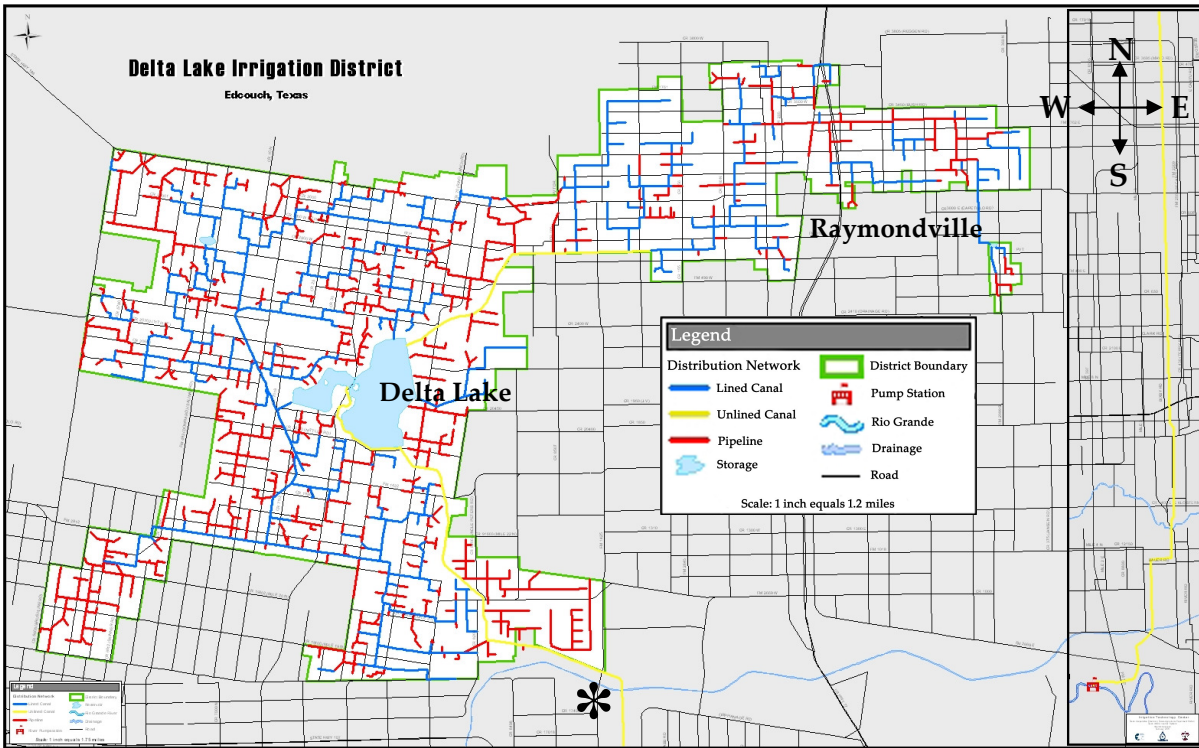
Water diverted from the Rio Grande must travel some 34 miles in an open canal before it reaches Delta Lake, taking approximately 26 hours. Water is pumped from DLIDs pumping facility into the District’s distribution canal via 48-inch pipes (**Exhibit C7**). From the main earthen canal (**Exhibit C8**), water is diverted to the Willacy Canal. This main canal, constructed in 1938, lies to the west of the Adams tract in Cameron County, and averages from 80 to 140 feet in width. This canal terminates at the southeast corner of the East Reservoir of Delta Lake (Allen 2005a). Key components

of the distribution system include 42 miles of earthen canals, mainly constructed in clay soils in the late 1930s and 1940s (Allen 2005b). Under normal flow conditions, canals have an average depth of five to six feet. The main canal system is operated with a series of locks or check gates which regulate the flow and elevation of water.

From its main earthen canal (**Exhibit C9**), water is diverted into smaller lateral canals for distribution during the irrigation season or to a relift pump that relifts surplus water into reservoirs for storage. The smaller lateral system consists of 250 miles of lined or partially-lined canals and 122 miles of unlined laterals (Blair). The canals vary from 10 to 15 feet in width and four to six feet in depth. The canals were constructed in the latter 1930s and the 1940s (Allen 2005b).

DLID maintains check gates to stabilize water levels in order to facilitate water delivery to fields behind the checks. Located along the canal system are 55 metered relift pump sites that charge (i.e., fill) the canals which supply water to individual customers. These metered relift pumps allow the District to charge volumetrically for the water being used by its customers. Relift pumps are fueled by either diesel or electricity and are maintained by the District under the supervision of canal riders. They are located in various locations on the Lake, on main canals, and on tributary canals. These relift pumps are used primarily during the peak growing season. At one time, the District had more than 100 relift pumps along its conveyance system. Due in part to improvements made to the system over the years, this number has been reduced. DLID plans to continue to reduce the number and kind (i.e., diesel to electric) of relift pumps to further its efficiency improvements.

Delta Lake's level is critical to the District's operation. At full capacity, lake water levels are at 49-foot elevation above sea level. The lake must be at 44.5-foot elevation in order to divert water from the lake to irrigation canals. The District uses Delta Lake (**Exhibit C10**), constructed in the late 1920s, as a buffer against changes in producers' water use on a daily basis and as a buffer against travel time between Falcon Reservoir and the District's diversion point south of Mercedes (i.e., three days). Delta Lake is located 34 miles from the Rio Grande, four miles north of Monte Alto, and three miles from its southernmost district line in Hidalgo County (**Figure 3**) and supplies water to the northeast portion of the District (Allen 2005a).



^a The* in the lower mid-area of the figure denotes the upper section of the DLID's main delivery canal which transports water from the Rio Grande to the District.

FIGURE 3. Illustrated Layout of Delta Lake Irrigation District Highlighting the Type of Key, Within District, Water-Delivery Infrastructure, 2002 (Fipps et al.).^a

Delta Lake is divided into two sections, with a total capacity of 10,750 ac-ft and a surface area of 2,200 acres. The largest section is 1,700 acres in size and is referred to as the eastern section; it has an approximate storage capacity of 9,400 ac-ft. The western section totals 500 acres and has a storage capacity of 1,350 ac-ft. Lake levels are recorded daily using a set gauge within the lake. There are five relift pumps located along the lake that either (1) bring water into the lake from the main canal, (2) pump water from the lake to customers in the eastern part of the District, or (3) pump water to the city of Raymondville for municipal purposes. The lake pumping station houses five electrical pumps-four pumps operate at 120 cfs and the other is a variable-speed pump operating between 10 and 100 cfs (Allen 2005a). The District's secondary relift pumps range in efficiency from 60 to 80 percent. This efficiency rating does not account for excess water pumped and returned to the canal (Blair).

Delta Lake has significant evaporative losses. At an elevation of 49-ft (full capacity), losses due to evaporation are approximately 5,000-6,000 ac-ft per year. At a

capacity of 47-ft elevation (i.e., a drop of only two feet), evaporative losses decline considerably to only 2,000 ac-ft per year (Allen 2005b).⁸ In an effort to reduce water loss caused by evaporation, the District constructed a bypass canal around the eastern section of the lake. Completed in 2006-2007, the bypass canal serves to deliver water to the cities of Raymondville, Lyford, and the North Alamo Water Supply Corporation. This bypass canal allows the District to reduce its reliance on the lake and reduce evaporative losses. The lake is filled prior to the heavy irrigation season to meet irrigation needs and then lowered during the off-peak season, reducing evaporative losses of the District (Allen 2005b).

Until the late 1970s, area residents used the lake as a recreational facility. In 1995, after the water was discovered to be contaminated, it was closed to swimmers and fisherman. Delta Lake no longer has contamination issues resulting from excessively high bacterial levels. The park is once again open to the public, but attracts few visitors. The lake is currently a private entity that has residents living on the east-side of the west lake (Phillips). The District conducts water quality testing for salinity on the lake, as water with a high-salinity level could adversely affect crops.

The District operates two other smaller reservoirs, the Hargill Reservoir, in the northwestern portion of the District with a full storage capacity of approximately 120 ac-ft, and the Nile Reservoir with storage capacity of 40 ac-ft. The total storage capacity of the District is approximately 10,910 ac-ft.

Improvements and Maintenance to the System

Similar to other large-scale operations that rely heavily on infrastructure, repairs and maintenance are necessary for maintaining efficiency of DLIDs water-delivery system. In addition to daily maintenance, the water-transportation system is continually being updated with improvements that will streamline operations and consequently improve its water-delivery efficiency as well as conserve water. Being required to provide water continuously throughout the year to farmers and municipalities alike makes it difficult for DLID to schedule an ideal time for maintenance and repairs. The District's main canal and the canals servicing the city of Raymondville and Monte Alto are in use throughout the year and comprise 20 percent of the District's conveyance system. The remaining 80 percent of the District's canals can be shut down for repairs when surrounding fields are not under cultivation. The

⁸ This decline in evaporative losses is due to the decreased surface area of the lake.

problem is that the 20 percent of the system needing the most repairs must always be in service (Allen 2005b).

In the 1970s, DLID converted five miles of unlined canals to pipelines in and around the city of Raymondville and did improvements to the city's main drain. In the 1980s, as part of the Evergreen Rehabilitation project, 16 miles of canals were converted into pipelines. Another five miles of canals were converted to pipelines in the 1990s. DLID is currently (as of early 2006) replacing 18 miles of concrete-lined canals to pipelines in the Hargill area of the District.

Canal maintenance is a continual issue for all irrigation districts. DLIDs lateral canals may be accessed by motor vehicle, allowing them to be easily checked for maintenance and needed repairs. Additionally, vegetation along canal borders is mowed, on average, four times per year and kept free from brush and trees that would consume measurable amounts of water as well as hinder timely deliveries (Allen 2005a).

The District's main canal (Willacy) is an exception to the routine mowing and maintenance rule. In 1989, the canal was put under the jurisdiction of the U.S. Fish and Wildlife Service as part of a mitigation agreement between the Agency and DLID. This main canal serves as natural habitat for migrating waterfowl. The canal is still mowed to make it navigable, but woody plants can only be removed every two years on either side as woody plants provide an area for nest building (Allen 2005a).

Inclusion of Land to the District⁹

Land can be, and occasionally is, added and/or removed from a district. For land to be legally added to an existing irrigation district, the owner of the land must adhere to an application process and request that the Board of Directors adopt a resolution and record such approval within its meeting minutes (Texas Legislature Online; Texas Water Code §58.706).¹⁰ Originally, the owner had to pay "back taxes" on the new "included" land as if it had been incorporated originally into the district in 1914 (Texas Legislature Online; Texas Water Code §58.706). Recent DLID policy is to now charge a flat fee of \$300 per acre plus a \$500 administrative fee for the request (Allen 2006). Also, the irrigation district has the same responsibility to serve and provide water to the new included land as it does to land originally incorporated in the district (Texas Legislature

⁹ "Inclusion" is a *voluntary* application process of being included into the District that is initiated by the landowner. The word "annexation" is not used in this section because it is an act usually initiated by a city or district, not the landowner.

¹⁰ Excerpts of the Texas Water Code that are cited within the text are located in **Appendix E**.

Online; Texas Water Code §58.713). Additional information regarding the District’s policy for land inclusion is provided in **Appendix D**.

The inclusion of land into an existing irrigation district is not a common occurrence in the Valley. Most existing irrigation districts are landlocked by municipalities and other irrigation districts and, therefore, do not have the option of including additional land into their district. This is not the case for DLID, given that the District is still relatively rural in nature. DLID tries to maintain 70,000 acres of irrigatable land, thereby delivering the maximum amount of water for which it has allocations. The District has a waiting list of individuals that have requested that they be included into the District. Approximately 500 acres are waiting inclusion into the District (Allen 2005a). The District can only service the 70,000 acres for which it has authority.

Cropping Patterns and Water-Use Trends

Cropping patterns of DLID are continually changing due to population increases, weather patterns, and crop prices (and resulting crop profitability). The region produces a wide variety of vegetables and citrus crops along with cotton, corn, grain sorghum, and sugar cane. **Table 5** depicts the District’s typical irrigated acreage by crop and acres. Typical yields for the primary crops grown and irrigated in the District are shown in **Table 6**.

TABLE 5. Typical Irrigated Acreage: Delta Lake Irrigation District, 2005 (Allen 2006).

Crop	Acres	Percent	Crop	Acres	Percent
Grain sorghum	15,150	24.48	Cabbage	560	.91
Cotton	14,925	24.11	Peas	490	.80
Sugar cane	13,650	22.05	Carrots	200	.33
Corn	4,570	7.39	Soybeans	150	.25
Pasture	3,825	6.18	Collard	150	.25
Watermelon	2,365	3.89		150	.25
Onion	1,948	3.15	Spinach	100	.17
Citrus	1,925	3.11	Squash	50	.08
Other vegetables	1,571	2.54	Other	125	.21
			TOTAL	61,904	100

TABLE 6. Typical Irrigated Crop Yields: Delta Lake Irrigation District, 2005 (Allen 2006).

Crop	Range in Crop Yield
Citrus	15 to 25 tons per acre
Corn	75 to 100 bushels per acre
Cotton	1.25 to 2.5 bales per acre
Grain Sorghum	4,000 to 4,500 lb per acre
Sugar cane	30 to 50 tons per acre

Farmers in DLID are limited in the irrigation techniques they employ due to the distinct nature of the crops they grow. Furrow irrigation comprises 84 percent of irrigation deliveries to agricultural land. Furrow irrigation is typically used on pasture, sugar cane, cotton, and grain crops, as well as on almost 75 percent of the orchards. Fourteen percent, or approximately 15,000 acres of production, is serviced with drip irrigation or micro spray systems. These systems are typically used in the cultivation of vegetable crops. Sprinkler systems account for about one percent of the irrigation deliveries in the district.

Proper management and watering schedules are imperative to conserve water. The District’s estimated efficiency of water delivered for irrigation is approximately 60 to 70 percent. Approximately 0.6 ac-ft of water is delivered for every acre irrigated per irrigation (Allen 2005a).

Water Rights

There are two separate types of surface water accounts within the State of Texas, one for the Lower and Middle Rio Grande below Amistad Dam and the other for the remainder of Texas. The area located below Falcon Dam operates under a water rights system that was established after the landmark Valley Water Suit (1969), as mentioned earlier. After that lawsuit, Domestic, Municipal, and Industrial (DMI) water rights were placed into a separate category from Irrigation water rights. Historical-cropped acreages were used to determine the amount of water rights that were allocated to each irrigation district or farmer. Within the irrigation water rights category, two separate subcategories of irrigation water rights were identified: Class A and Class B. Class A rights were given to those entities that could prove prior documented water rights (i.e.,

riparian,¹¹ prior appropriation,¹² or Spanish/Mexican land grant). Class B rights were awarded to those entities who could prove a history of diversion from the Rio Grande.

In 1967, the Texas Legislature merged the riparian-rights system into the prior-appropriation system with passage of the *Water Rights Adjudication Act*. The Act required any person claiming a riparian water right to file a claim for the right by 1969 with the Texas Water Commission. With passage of the 1967 Act, Texas consolidated the allocation of surface water into a unified water permit system. Anyone wishing to use surface water (exclusive of drainage water) must receive permission from the State in the form of a water right. Awarding permits for these water rights is a task of the Texas Commission on Environmental Quality (Kaiser).

Certificate of adjudication No. 23-811, issued by TCEQ, authorizes DLID to divert from the Rio Grande a maximum quantity of 175,026 ac-ft of Class A water, 1,320 ac-ft of water for domestic use, and 6,880 ac-ft of water for municipal purposes respectively. The District also holds certificate of adjudication No. 464-001 which authorizes them to divert 202.5 ac-ft of Class B water (Allen 2005a).

DLID currently has a right to 175,026 ac-ft of Class A authorized annual water rights (Allen 2005a). This is roughly 12.5 percent of the total irrigation water rights in the Valley. In addition to the 202.5 ac-ft of Class B water mentioned above, the District also is charged with diverting Class B water for individual water right holders and municipalities listed in **Table 7**.

The sale of any water right must be approved by a vote of the District's Board of Directors. The selling of water rights by an irrigation district is seldom done in the Valley.¹³ This is because annual water allocations are based on the number of irrigation water rights owned by the district.

¹¹ The riparian doctrine is based on English common law. Private water rights are tied to the ownership of land bordering a natural river or stream. Thus, water rights are controlled by land ownership. Riparian landowners have a right to use the water, provided that the use is reasonable in relation to the needs of all other riparian owners (Kaiser).

¹² The prior appropriation doctrine is controlled by statute. Applied in the western states, prior appropriation is not related to land ownership; instead, water rights are acquired by compliance with statutory requirements. During their early development, western states failed to control rivers and streams, and water was treated as though it belonged to no one. In the absence of any rules, people simply took water from streams and used it; that is, they appropriated it. When this practice became legalized, it became known as the Doctrine of Prior Appropriation (Kaiser).

¹³ So far as can be determined, DLID has never sold any water rights (Allen 2006).

TABLE 7. Class B Water Rights: Delta Lake Irrigation District, 2005 (Allen 2005a).

Adjudication No.	Acre-Feet of Water	Water Right Holder
0007-000	242.50	Bert Brown
0007-003	145.00	Ernesto Davilla
0008-000	230.00	Roy Pena
0138-008	5.00	Monty Tomlinson
0226-000	5.00	Leatha Jeffery
0240-000	3,966.92	North Alamo Water Supply
0423-000	2,125.00	Valley Onions
0443-000	42.50	Amelia Garcia
0459-000	1,686.15	Jolene Gustafson
0807-000	22,500.00	Valley Acres ID
0809-002	20,031.30	Engleman ID
0811-003	610.00	City of Lyford
0811-004	600.00	City of Monte Alto
0811-005	5,670.00	City of Raymondville
0817-000	10,182.50	Santa Maria Water District
TOTAL	65,041.87	

Unlike municipal water rights that are given priority and are adjusted to the total amount of water rights owned at the beginning of every year, irrigation water account balances are carried forward from the previous year (Texas Commission on Environmental Quality 2004). Irrigation accounts are replenished only when the Watermaster has determined there to be excess water available within a given month. By selling water rights, a district decreases its base amount of water used in determining the Watermaster's monthly allocations for that district. This is particularly important in times of drought, when water is allocated less frequently.

Irrigation districts can convert their irrigation water rights to DMI water rights. There is a 2-to-1 conversion factor,¹⁴ (i.e., two ac-ft of irrigation water rights are required to obtain one ac-ft of DMI water right).

¹⁴ For further information regarding DMI conversion, refer to Chapter 2, page 18, in "Evolution of Irrigation Districts and Operating Institutions: Texas, Lower Rio Grande Valley" (Stubbs et al. 2003).

Urban Areas

The city of Raymondville, with a population of 9,733 (U.S. Census Bureau), lies in the northern portion of DLID. Delta Lake Irrigation District, unlike numerous other irrigation districts in the Valley, is not experiencing rapid urbanization, and is predominantly agriculturally based. Other cities within the District's boundaries include Lyford (1,973), North Alamo (2,061), and Monte Alto (1,611).¹⁵

If a subdivision were to be built inside of the current District lines, the development company would have to receive approval from DLID prior to construction. This approval is to ensure that development did not occur on any of the District's easements or right-of-ways.

For a subdivision to be excluded from the district, it must petition the district for exclusion. Under §58.702-§58.713 of the Texas Water Code, any land that is no longer considered to be agricultural in nature, or able to be irrigated, can be excluded from the district. For an exclusion to take place, the landowner must apply with the district and a hearing must take place. A notice must be published in a local newspaper 10-20 days prior to the hearing (Texas Legislature Online; Texas Water Code §58.708), and the Board of Directors must conduct an open hearing for all parties involved (Texas Legislature Online; Texas Water Code §58.709). If the Board of Directors approves the petition, it may be adopted into the minutes, thereby excluding the land from the District (Texas Legislature Online; Texas Water Code §58.710).

The new law (Texas Water Code §58.222) states that if the landowner owns less than one acre, they are automatically excluded from the district (Texas Legislature Online). Because most development areas are developed into less than one-acre lots, they are excluded automatically without anyone having to file an application with the district and consequently, then receive water through the municipality, as it is no longer agricultural by nature and eligible irrigable land. Additional information regarding the District's policies for land exclusion and subdivision approval is provided in **Appendix D**.

¹⁵ Populations as of 2002 represented in parentheses (U.S. Census Bureau).

Chapter Summary

This chapter provided a descriptive overview of Delta Lake Irrigation District. Discussed first was the water release from Falcon Reservoir to DLID's diversion point and its relift pumping into the District's delivery system. DLID utilizes Delta Lake to store and move water from one point to another throughout the District and to supply water to municipalities. In addition to Delta Lake, 250 miles of lined or partially-lined canals, 42 miles of unlined canals, and 122 miles of unlined laterals require continuous maintenance and repair to function properly. Also discussed are cropping patterns, water use, water rights, and urban areas. All of these elements of the District are reviewed such that the reader is provided a "picture" of DLID, thereby enabling an informative "look" into this District, as well as a basis to compare to other irrigation districts.

Chapter 3

District Operations

The operating practices of individual irrigation districts in the Valley are not well understood by the general public. It is evident that each irrigation district is made up of different components that attribute to its uniqueness, its operating principles, and complexity. Each district is subject to the same set of rules, but the actual implementation thereof and mechanisms employed vary significantly from district to district.

This chapter discusses the operating practices of the Delta Lake Irrigation District. First, identification of the organizational hierarchy and the Board of Directors of the District provides the foundation of District operations. Secondly, the water allocation procedures for both the District and all of the irrigation districts within the Valley are discussed. This includes two small sections on how “no-charge” water and the transferring of water inside and outside of the District are handled. How a district sells water is one of its most distinctive aspects. Finally, other special water districts that operate near DLID and the water conservation efforts in which DLID participates are discussed.

Organizational Hierarchy

DLID currently employs a total of 40 individuals (**Exhibit 2**). In addition, five board members comprise the Board of Directors and serve as elected officials that preside over the District. One General Manager, hired by the Board of Directors, oversees day-to-day operations and supervises both the office and field staffs. The office staff consists of a business operations staff. The Operations Superintendent reports to the General Manager and is in charge of and oversees new projects. The field staff consists of a District Watermaster Superintendent and a Maintenance Superintendent. These individuals, along with their subordinates, are charged with maintenance of the water delivery systems and pumping facilities (Allen 2005a).

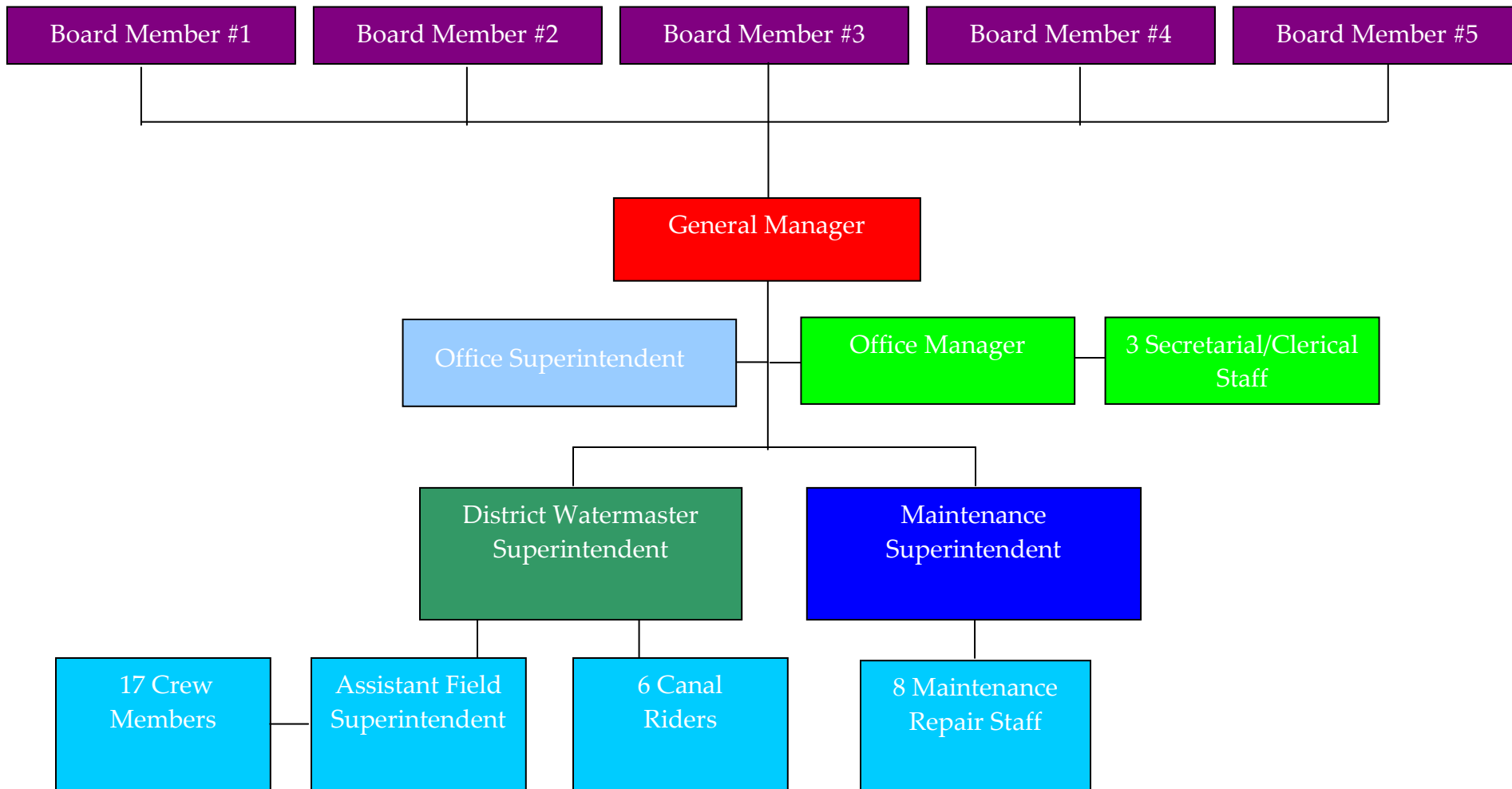


EXHIBIT 2. Delta Lake Irrigation District's Organizational Chart, 2005 (Allen 2005a).

Board of Directors

According to the Texas Water Code §58.071, a district's Board of Directors is a governing body that must consist of five individuals (Texas Legislature Online). All directors are formally elected within a district and serve four-year, staggered terms. To be eligible to hold a director's position, a person must: be at least 18 years of age, have no prior payment obligations to the district, be a resident of the State of Texas, and "be the owner of record of fee simple title to land in the district" (Texas Legislature Online; Texas Water Code §58.072). Currently, five directors, all actively engaged in agricultural production, oversee the DLID (**Figure A3**).

The district is divided into five precincts, with each precinct having representation on the board of directors along with the Irrigation District Manager. In order to vote in board member elections, you must be a landowner in the precinct in which you hold water allocations. Individuals can cast votes in each precinct in which they own land and have an allocation. Elections for Directors of the Board are held in conjunction with general county elections, every year ending with an odd number and on the first Saturday in May. If no one contests a current director(s) up for election, they are elected without contest and serve another four-year term (Allen 2005a). Contested elections for DLID Board of Director members were held in 2003 and 2005 (Allen 2006).

The Board of Directors (i.e., the Board) serves a critical role in that they make decisions affecting the future of the District. The Board, with input and recommendations from the General Manager, votes on improvement projects within the District, with each project required to receive a majority of the votes before being implemented. The Board makes an inventory of the condition of infrastructure within the District and bases its decisions on capital improvements according to this database of knowledge. Projects are presented for consideration to the Board where they are evaluated for profitability, benefit to the customers, increased efficiency of the District, and its operating system. The Board is also charged with developing a budget for the District and evaluating and setting prices for services. The District operates under the power of eminent domain, meaning that the District has the authority and mechanism for future development of new or modified canal systems.

*Allocation Procedures*¹⁶

As mentioned in the previous chapter, every irrigation district in the Lower Rio Grande Valley owns a specific amount of water rights. The Watermaster's office is responsible for keeping track of the total amount of water in the Falcon and Amistad reservoirs and the amounts that water-right holders are entitled to receive (while accounting for a 225,000 ac-ft reserve for DMI users, and an operating reserve of 75,000 ac-ft) (Texas Commission on Environmental Quality 2003; §303.21.b). The Watermaster allocates water using the following steps:

- 1) From the total usable storage of the Falcon and Amistad reservoirs, as reported by the IBWC, the dead storage is deducted;¹⁷
- 2) From the remaining amount, the 225,000 ac-ft of water that acts as the DMI reserve is deducted. This reserve is reestablished at the end of every month;
- 3) Next, the 75,000 ac-ft of operating reserve is deducted;¹⁸ and
- 4) The remaining amount after deductions is allocated to Class A and Class B irrigation water rights holders. This allocation is in addition to the ending monthly balance for the irrigation account holders.

When the District needs water to be released from Falcon Reservoir, the District contacts the Watermaster's office and places a request for the desired amount. Depending on the travel time associated with the District's diversion point, the required advanced notice to the Watermaster's office varies. Because each water-right holder is limited to their annual authorization amount, the manager does not request a release amount in excess of what they can pump (i.e., divert) at the river. If the amount of water requested from the Watermaster (by a district) is not diverted into the district's delivery system, then 90 percent of the loss is solely absorbed by the irrigation district.¹⁹ Balances in irrigation accounts with the Watermaster's office are rolled over from one year to the next (Stubbs et al. 2003). Water loss that occurs during travel from Falcon

¹⁶ Additional information available in **Appendix E**.

¹⁷ Dead storage is the amount of water behind the dams that cannot be removed because of hydrologic restrictions (Texas Commission on Environmental Quality 2003; §303.22.a). Falcon Reservoir has a dead storage of 54.3 ac-ft whereas Amistad's dead storage is 4,600 ac-ft (Rakestraw).

¹⁸ Operating reserve covers seepage, evaporation, conveyance losses, and emergency requirements (Texas Commission on Environmental Quality 2003; §303.21.c).

¹⁹ For example, if 1,000 ac-ft are ordered by a district and then only 400 ac-ft are diverted, the district is charged with 940 ac-ft (i.e., $[400 + (.90 * 600)]$).

Reservoir to the diverter's diversion point (due to evaporation, invasive weeds, etc.) does not affect the amount of water the diverter is allowed to pump. The loss incurred during transportation to the diversion point is covered by the operating reserve mentioned above.

Each district handles individual accounts within the District differently. These differences become even more apparent when the District is faced with water shortages. In the case of DLID, water shortage is defined as when the District's water adjudication account with the Watermaster's Office falls to or below 75,000 ac-ft of water. In the past, DLID has dealt with this issue by instituting an "on-allocation" basis. This approach entails allocating one ac-ft of water per acre to each individual customer's account, which allows the recipient one to two irrigations. In addition, 5,000 ac-ft of water is kept in reserve by the district, which serves as a buffer to maintain lake levels and as push water for the municipalities. Currently, the District is not under allocation. It is important to note, however, that although these are the current guidelines, they are subject to change with the District's acceptance of new drought and conservation policies. This causes DLID to vary in the way that they handle allocation on a situational basis.

Starting January 1 of the planning year, the first water assignments, or allocations, are made. The first assignments are based on the number of acres a farmer plans on planting during the upcoming crop year. This initial projected amount of acreage is determined from the number of acres planted in previous years. Only customers in good standing, meaning they are up-to-date on their per acre flat rate payment,²⁰ are given allocations for the year (Phillips).

In years where water is severely limited, TCEQ may reallocate water to a specific district. The District's last reallocation from the TCEQ Watermaster was in March 2003 for April delivery. This reallocation at such an important time is critical for farmers as this is in the peak of their growing season. Reallocations could mean that individual customers do not have adequate water supplies to finish the cropping season, causing reduced yields or total loss of their crop.

²⁰ Payments and flat rates are discussed in detail beginning on page 32.

The following steps are required in order to obtain water:

1. Customers contact DLID and request a specified quantity of water;
2. The District determines if the customer is up to date on his/her per-acre flat-rate fees and that he/she has the requested water quantity remaining in his/her allocation account;
3. After that, the District contacts the Watermaster to release the requested amount of water;
4. Water is released from Falcon Reservoir for delivery to the District. Delivery to the District usually takes four days from the time it is released from the Reservoir (Allen 2005a);
5. Once the released water reaches the District's pumping station, water is captured by its pumps and transported into the canal system for delivery to the customer; and
6. Water flows in the IDs water-delivery system to the customer's delivery point where it is used for irrigating agricultural crops, or placed in municipal storage facilities.

The District requires a four-day advance notice for irrigators to request water due to travel time from Falcon Reservoir to the District's distribution system. In most cases, however, the District can provide water to a user within 24 hours of the order due to reserve storage in Delta Lake. The four-day advance notice rule is maintained for instances when the storage lake reserves are low. This keeps the District from being delinquent in its water deliveries to customers who have made prior orders and/or obtained prior water delivery commitments.

No-Charge Water

No-charge water is the excess flow of water in the Rio Grande that is determined by the Watermaster, usually due to rainfall, and is made available at what is termed no-charge pumping. No-charge pumping occurs when excess water can be pumped from the river at "no charge" to the district's surface water account (Stubbs et al. 2003).

No-charge water is administered by the TCEQ Watermaster. When the Watermaster determines that there is potential no-charge water that can be made available to water right holders, the Watermaster sends out a notice to all holders and allocates the water based on a first-come, first-serve basis. For example, if it is determined that there is a minimum of 60 cfs of water to be released as no-charge, and DLID has the capacity within their system to store the water or provide it to a customer,

the General Manager can respond to the notice and begin pumping when notified by the Watermaster.

DLID is limited, by the size of its pumps, in its ability to accept no-charge water. Having a minimum operating capacity of 160 cfs severely limits DLID's ability to capture and utilize no-charge water. Particularly since such a large volume of water is very rarely made available by the Watermaster. This additional no-charge water could be stored in Delta Lake or provided to customers at the time of receipt to offset allocations.

Transfer Options

Under §303.51-§303.55 of the TCEQ Rules and Regulations, any owner of water rights may contractually sell all or part of their annual authorized water amount (Texas Commission on Environmental Quality 2003). This does not mean that they sell the actual water right, but rather the water attached to that right for the authorized year. In order for a contractual sale, also known as a transfer, to take place, the seller must comply with the following rules:

1. The sale of the water must be for the same purpose of the original water right (e.g., an irrigation water right, if transferred, must be used for irrigation, but not municipal, domestic, or industrial). If the intended use differs from that of the original right, the seller must apply to amend the water right permanently to that of the intended use;
2. There is no change in the original water right of the seller or purchaser, even if the diversion point, diversion rate, or place of use is different;
3. The seller must actually own the water right or be a designated agent;
4. All of these requirements must be met before the transfer can be made;
5. No contract approval is necessary if the transfer occurs within the District, and the District's delivery system is used; and
6. The seller cannot sell more water than what he/she owns.

If all of the above requirements are met, and the Watermaster approves the application, the contracted amount is then transferred into the purchaser's account. Once the purchaser is in possession of the water (i.e., it is in their account), they are not allowed to resell that amount and must use the purchased amount first before any other

water within their account (Texas Commission on Environmental Quality 2003; §303.51).

There are two different types of water transfers, in-district and out-of-district. As discussed previously, farmers are allocated water on January 1 of the planning year and are reallocated water throughout the year.²¹ The water that is allocated to a farmer's individual account in DLID is allowed to be resold within the District by the account holder (Phillips). Neither Delta Lake Irrigation District nor any of its customers sells water outside of the district. Water bought by Delta Lake customers outside of the district may be brought into the district.²² In 2002, approximately 4,000 ac-ft of water was brought into the District through external district transfers (Phillips).

DLID has the following rules regarding water allotment transfers:

1. Water coming into the District from outside sources is limited to a maximum of one ac-ft/ac per occurrence. The drawback to this practice is that the individual incurs a 40 percent deliverance loss in the amount of water originally purchased due to transportation losses (evaporation and seepage loss in the canal).
2. The customer must also pay an irrigation charge, in addition to the cost of the water, to the District for transportation of the water at a rate of \$20/ac-ft (predelivery loss). Water bought from outside sources and brought into the District cannot be resold to another customer. This practice helps to maintain price stability within the District.

District Revenue and Sales

Irrigation districts have several means of generating revenue. They have the ability to tax land within the district, raise bonds, and set variable charges for water, transportation fees, penalty fines, flat rate fees, etc. DLID operates on an annual budget of roughly \$2.8 million. Of this total budget, most of its revenue is generated from agricultural accounts, given the nature of the District. Roughly three percent of the District's income is attributed to the delivery of water to municipal accounts. There are two categories of major revenues for the District, including water sales and Ad Valorem Taxation. Each of these categories is discussed in the following section.

²¹ See previous 'Allocation Procedures' section on page 27.

Water Delivery Charges

Water revenues to the District are dependent on the crop mix and weather patterns (i.e., rainfall) of the region. DLID operates on a two-tier pricing system -- one for agricultural customers and the other for municipal users. The charge to municipalities is tied to the flat rate and irrigation fee structure charged to agricultural customers. Fees for agricultural and municipal use are established on a negotiated process based on (1) agricultural water, when converted to municipal use, is converted at two ac-ft to one, (2) agricultural users pay flat rates not included in municipal rates, and (3) municipal accounts are demand accounts that are treated as having priority over agricultural deliveries (Allen 2005a). DLIDs pricing structure is summarized in **Table 8**.

TABLE 8. Delta Lake Irrigation District's Pricing Table, 2005 (Allen 2005a).

<i>Irrigation</i>	In-District	Out-of-District
Metered	\$30.00 per ac-ft	\$75.00 per ac-ft
• Drip & Sprinkler	\$30.00 per ac-ft ^a	
• Flood	\$30.00 per ac-ft ^b	
Non-Metered	\$15.00 per acre per irrigation ^c	NA
<i>Lawn-Watering</i>		
• Up to one acre	\$15.00 per application	\$15.00 per application
<i>Municipal</i>	\$0.19 per 1,000 gallons	\$0.19 per 1,000 gallons
• Flat Rate	\$5.00 per request	\$5.00 per request
• Delivery Charge	15% travel and storage loss	15% travel and storage loss

^a \$6.00 per acre for a 0.2 ac-ft/ac application, plus an additional \$3.00 per acre for each additional 0.1 ac-ft/ac applied per irrigation in excess of 0.2 ac-ft/ac.

^b \$10.50 per acre for a 0.35 ac-ft/ac application, plus an additional \$3.00 per acre for each additional 0.1 ac-ft/ac applied per irrigation in excess of 0.35 ac-ft/ac.

^c \$15.00 per acre for a 0.5 ac-ft/ac application.

The District's Board reviews the respective agricultural and municipal rate structures annually. Currently, the rate charged to municipal users is \$0.19 per 1,000 gallons delivered plus a \$5.00 flat rate per request/delivery. Water is metered at the delivery point and charged a travel and storage loss. Municipal accounts are charged a 15 percent travel and storage loss.

The District charges an annual flat-rate assessment on every acre classified as irrigable, whether or not it is irrigated. The flat-rate assessment is used for maintenance

and operation of the District. The flat-rate fee is currently set at \$15.00 an acre in each parcel.

Agricultural accounts are not billed, but rather payment is made in advance when water is requested from the District, (i.e., advance payment must be made or no water is diverted/delivered). The District charges agricultural customers a delivery fee of \$15.00 per acre/per irrigation (Allen 2006).²³ For example, if a farmer owned 20 acres to be irrigated, they would pay a one-time, annual \$15.00 flat rate for each of the 20 acres, and \$15.00 per irrigated acre per irrigation for all 20 acres, totaling \$600.00 for the first irrigation and \$300.00 per irrigation thereafter within the year. Additional information regarding the District's rates and charges for water deliveries is provided in **Appendix D**.

Lawn Watering

DLID is in the process of developing lawn-watering accounts (Allen 2005a). Lawn-watering accounts will be established for residents that are both inside and outside of the District boundaries. Lawn-watering accounts allow residents to connect to waterlines for the purpose of watering their lawns, parks, and school yards. The District proposes a charge of \$15.00 per application (i.e., typically three inches) for up to one acre of land to supply water for the purpose of irrigating lawns (Allen 2005a).

Financial Resources – Ad Valorem Tax

Delta Lake Irrigation District has flat rate charges, water rates, and also an Ad Valorem tax. Currently, the Ad Valorem tax rate is \$0.55 per \$100.00 valuation of property. The tax was originally initiated in 1929 to pay the cost of bonds used to improve District infrastructure. Since being repaid, the Ad Valorem tax has been applied to maintain infrastructure and for new construction projects within the District. This is a more complicated system than exists for most other irrigation districts, but it provides needed income to the District. With the Ad Valorem tax, all individual land owners within the confines of the irrigation district are taxed even if they are not water customers. This can be cause for serious debate as individuals who do not benefit directly from irrigation programs still pay some of the cost and may receive no water. Revenues from this tax account for approximately \$380,000 a year (Allen 2005a).

²³ The average volume of water determined per acre per irrigation is 0.5 ac-ft (Allen 2006).

*Conservation Efforts*²⁴

Water conservation by the District has become increasingly important due to the enduring drought that has affected the Rio Grande Valley over the past several years. The drought and the projected decrease in the amount of water available for irrigation have forced the District to place greater consideration on conservation efforts.

To conserve water, DLID has proposed or is in the process of constructing the following water-saving projects:²⁵

1. Building a 17,000 linear foot bypass canal along the eastern reservoir of Delta Lake;
2. Conducting a feasibility study into the possibility of collecting water that seeps from the main canal and pumping it back into the water delivery system;
3. The installation of flow measurement devices at 20 water diversion points to monitor deliveries and send this information, by telemetry, to the District office; and
4. Replacing approximately 17,800 linear feet of open canal laterals with new gasket joint PVC or RCP pipe and the preparation of a plan to replace an additional 13.4 miles of open channel laterals with pipe.

DLIDs use of Delta Lake helps solve the problem of push water required to (a) move the small amount of water needed by drip and sprinkler systems, and (b) provide uninterrupted service to municipal users.²⁶ Therefore, farmers and growers that utilize additional conservation efforts on-farm within the District do not actually put a strain on the system, as compared to circumstances in many other irrigation districts which incur additional water losses due to drip or sprinkler adoption and use. Additional information regarding the District's conservation and drought policies and a Board resolution regarding wasted water is provided in **Appendix D**.

²⁴ Additional information regarding these outlined conservation projects can be found in "Project Report for the Delta Lake Irrigation District Water Conservation Project" (Blair 2003).

²⁵ Funds for water-savings project were made available from the North American Development Bank and U.S. Congressional appropriations in 2004.

²⁶ Push water is water that files a District's delivery system and is used to propel (or transport) "other water" from the river-side diversion point to municipalities (Rister et al.).

Chapter Summary

This chapter discussed the operating practices of DLID. The foundation of the DLID operations is the Board of Directors and overall organizational hierarchy. Secondly, the discussion of allocation procedures (inside and outside) of the District indicates how the District handles its water once it is diverted from the Rio Grande. Also explained was how no-charge water and water transfers are handled. In the case of DLID, no-charge water is very seldom captured due to the incompatibility of its relatively large diversion pumps and the typical small amount of no-charge water made available. Exactly how the irrigation district sells and distributes its water, as well as other revenue-making activities, were discussed. Finally, DLID encourages conservation activities within the District to help ensure that future water needs can be met.

Conclusion

The Delta Lake Irrigation District represents only one of the 29 irrigation districts in the Lower Rio Grande Valley. Though they follow the State and International guidelines, as do all Valley irrigation districts, they operate in a unique and discernable way that separates them from other Valley irrigation districts. DLID is distinctive in that it is still a predominantly agricultural-based irrigation district with limited revenue from municipal customers. It has a large storage reservoir, which holds and maintains water for delivery within its system. The District experiences large evaporative losses given its distance from the Rio Grande and the overall size of its storage facility.

This report illustrated a brief history of DLID and how those activities played a key role in forming the makeup of the District, as well as how it operates today. The report was developed to be one part of a broader picture in helping to explain some of the differences in operating practices between irrigation districts in the Valley. The objective is to provide insight into separate irrigation districts, thereby allowing for future evaluation across multiple districts and providing insight on implications of alternative conservation tools.

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Appendices

Appendix A: Additional Figures

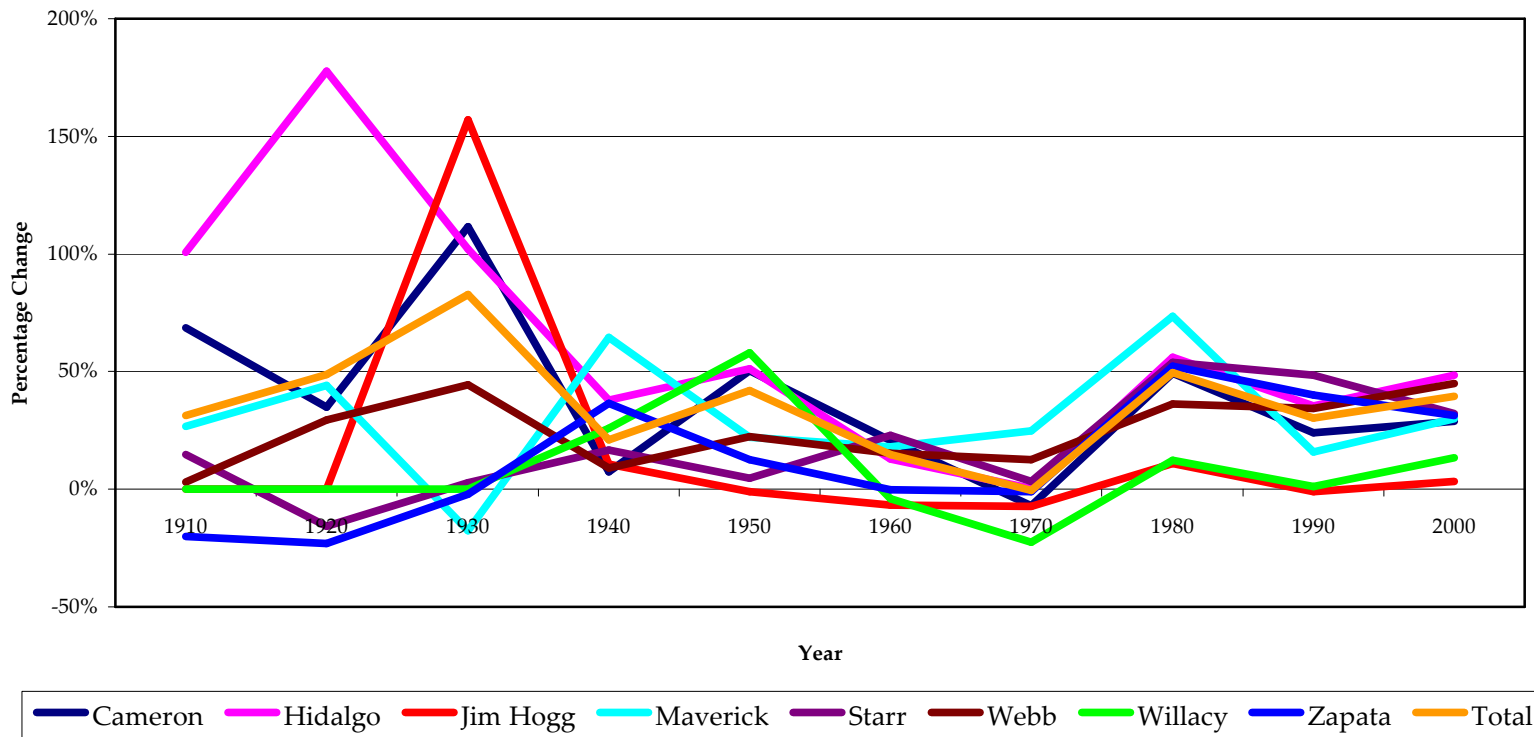


FIGURE A1. Graphical Representation of Lower Rio Grande Valley Counties' Populations as a Percentage Change of Growth per Decade, 1900-2000 (Forstall).

Name	Water Interests Represented	Association Represented
Terms Expiring August 31, 2004		
Charles Browning, Jr.	DMI	North Alamo WSC
Robert Burkhart	DMI	City of Harlingen
Rudy Atkinson	Industrial	AEP
Benton Beckwith	Irrigation	Beckwith Farms
Sonny Hinojosa (Secretary)	Irrigation	HCID2
Frank White	Irrigation	H&CCID9
Vidal Davila	Recreation	National Parks Service
Terms Expiring August 31, 2005		
Orville Ballard (Vice-Chair)	Recreation	Falcon
Wayne Halbert (Chair)	Irrigation	Harlingen ID
Sharon Williams	Nature	USFWS
James R. Elium	Municipal	Olmito Water Supply
Jed A. Brown	Irrigation/Industrial	Killam Corp., Laredo
Brenda Paez	Mining	Alice Southern Equipment
Jimmy Paz	Nature	National Audubon Society
Alternate		
Bruce Hardwicke		
Ex-Officio		
Carlos Rubinstein, Rio Grande Watermaster		

FIGURE A2. Rio Grande Watermaster Advisory Committee Appointments, 2004 and 2005 (Hinojosa 2005).

Position	Individual
President	Dale Murdeon
Vice-President	Glen Hester
Secretary	Neal Galloway
Director	Chuck McDonald
Director	Joe Pennington

FIGURE A3. Delta Lake Irrigation District's Board of Directors, 2006 (Allen 2006).

Appendix B: Additional Tables

TABLE B1. Lower Rio Grande Valley Counties' Populations, 1900-2000 (Forstall).

Rio Grande Counties	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
Cameron	16,095	27,158	36,662	77,540	83,202	125,170	151,098	140,368	209,727	260,120	335,227
Hidalgo	6,837	13,728	38,110	77,004	106,059	160,446	180,904	181,535	283,229	383,545	569,463
Jim Hogg	NA ^a	NA ^a	1,914	4,919	5,449	5,389	5,022	4,654	5,168	5,109	5,281
Maverick	4,066	5,151	7,418	6,120	10,071	12,292	14,508	18,093	31,398	36,378	47,297
Starr	11,469	13,151	11,089	11,409	13,312	13,948	17,137	17,707	27,266	40,518	53,597
Webb	21,851	22,503	29,152	42,128	45,916	56,141	64,791	72,859	99,258	133,239	193,117
Willacy	NA ^b	NA ^b	NA ^b	10,499	13,230	20,920	20,084	15,570	17,495	17,705	20,082
Zapata	4,760	3,809	2,929	2,867	3,916	4,405	4,393	4,352	6,628	9,279	12,182
Total	65,078	85,500	127,274	232,486	281,155	398,711	457,937	455,138	680,169	885,893	1,236,246

^a Jim Hogg County was organized in 1913, out of parts of Duval and Brooks Counties. The census population information was not available for Jim Hogg County until 1920.

^b Willacy County was organized in 1921, out of parts of Kennedy, Hidalgo, and Cameron Counties. The census population information was not available for Willacy County until 1930.

TABLE B2. Lower Rio Grande Valley Counties' Populations as a Percentage Change of Growth per Decade, 1900-2000 (Forstall).

Rio Grande Counties	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
Cameron	NA	68.7%	35.0%	111.5%	7.3%	50.4%	20.7%	-7.1%	49.4%	24.0%	28.9%
Hidalgo	NA	100.8%	177.6%	102.1%	37.7%	51.3%	12.8%	0.4%	56.0%	35.4%	48.5%
Jim Hogg	NA	NA ^a	NA ^a	157.0%	10.8%	-1.1%	-6.8%	-7.3%	11.0%	-1.1%	3.4%
Maverick	NA	26.7%	44.0%	-17.5%	64.6%	22.1%	18.0%	24.7%	73.5%	15.9%	30.0%
Starr	NA	14.7%	-15.7%	2.9%	16.7%	4.8%	22.9%	3.3%	54.0%	48.6%	32.3%
Webb	NA	3.0%	29.6%	44.5%	9.0%	22.3%	15.4%	12.5%	36.2%	34.2%	44.9%
Willacy	NA	NA ^b	NA ^b	NA	26.0%	58.1%	-4.0%	-22.5%	12.4%	1.2%	13.4%
Zapata	NA	-20.0%	-23.1%	-2.1%	36.6%	12.5%	-0.3%	-0.9%	52.3%	40.0%	31.3%
Total % Change from Previous Decade	NA	31.4%	48.9%	82.7%	20.9%	41.8%	14.9%	-0.6%	49.4%	30.2%	39.5%

^a Jim Hogg County was organized in 1913, out of parts of Duval and Brooks Counties. The census population information was not available for Jim Hogg County until 1920.

^b Willacy County was organized in 1921, out of parts of Kennedy, Hidalgo, and Cameron Counties. The census population information was not available for Willacy County until 1930.

Appendix C: Additional Exhibits

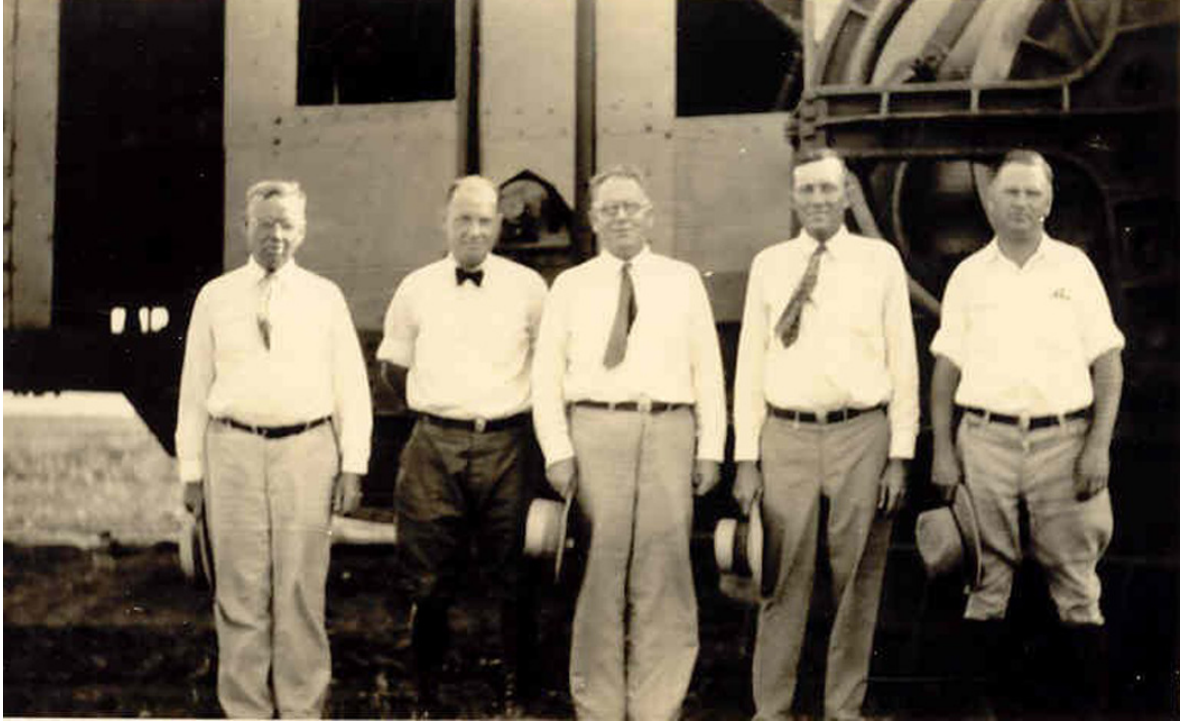


EXHIBIT C1. 1929 Willacy County Control and Improvement District Board Members; W. Harding (center) (Harding Collection).



EXHIBIT C2. Construction of the Main J Canal, 1930
(Harding Collection).



EXHIBIT C3. Construction of the Main J Canal to Raymondville, 1930 (Harding Collection).



EXHIBIT C4. Construction of Erosion Control Measures on the Shores of Delta Lake, 1935 (Harding Collection).



EXHIBIT C5. Rio Grande near the Diversion Point for Delta Lake Irrigation District's Pumping Plant, 2003 (Wolfe).



EXHIBIT C6. Delta Lake Irrigation District's Pumping Station and Pumps, 2003 (Wolfe).



EXHIBIT C7. Rio Grande View of Delta Lake Irrigation District's Pumping Plant and Pipes which Carry Water from the Inlet Canal into the Pumping Plant and Eventually to the Canal System, 2003 (Wolfe).



EXHIBIT C8. Beginning of Delta Lake Irrigation District's Main Canal at the Pumping Station, 2003 (Wolfe).



EXHIBIT C9. Delta Lake Irrigation District's Main Earthen Canal, with Concrete Pipes Placed Along the Bank to Lessen Soil/Bank Erosion, 2003 (Wolfe).



EXHIBIT C10. West Delta Lake, 2003 (Wolfe).

Appendix D: Additional DLID Rules and Regulations

DELTA LAKE IRRIGATION DISTRICT POLICY FOR LAND INCLUSION

The Delta Lake Irrigation District will only consider including new tracts of land into the District if the District is under its Adjudication account with TCEQ-Rio Grande Watermaster office. The District Authorized Water Right is 174,776.375 or 69,910.548 acres of land.

1. Any landowner petitioning the Board to be included must present a warranty deed proving ownership.
2. The petitioner must include a legal recorded plat of said property describing by metes and bounds if appropriate. Land to be included must be complete Lots or Blocks.
3. The Board shall follow Texas law in regarding to a hearing and may add to the District the land described in the petition if it is feasible, practicable and to the advantage of the District and if the District's system and other improvements of the District are sufficient or will be sufficient to supply the added land without adversely affecting land already in the District.
4. The District may require an engineering study on said property to determine any impact to the District's facilities and other properties being served off said facilities, at the petitioner's expense.
5. If the petition is granted, the landowner will become responsible for all taxes and charges beginning with the date of inclusion. The landowner will also pay the equivalent of one full year of flat rate tax on a per acre basis, as well as to all legal fees and expenses incurred by the District in connection with the inclusion.
6. Before the request for inclusion is considered by the Board, a flat fee of \$ (300.00) per net taxable acre plus a fee of \$ 500.00 is to be paid by the owner requesting inclusion. The fee is intended to cover the District's legal fees and administrative costs, and the cost of publishing any notice in a newspaper in connection with the inclusion. The fee is also fixed as a flat fee so that all persons seeking inclusion will be treated alike.
7. Inclusion of land into the District is at the discretion of the Board of Directors and the inclusion of any particular block of land does not in anyway obligate the District to include any other land now or in the future.
8. All decisions made by the Board regarding subdivisions will be based on preventing and avoiding any harm or disadvantage to the District.

DELTA LAKE IRRIGATION DISTRICT POLICY FOR LAND EXCLUSION

All discussions pertaining to "exclusion of property" should be in person at the Delta Lake Irrigation District office.

After reading and understanding all circumstances listed in this guideline sheet, the owner of the property proposed for exclusion shall complete an application form for property exclusion, providing all required information.

1. All ad valorem and flat rate taxes must be paid in full for each property/properties being filed prior to exclusion. This includes taxes assessed during the year exclusion is approved (if approved). No property will be placed on the agenda until all taxes are current and the \$500.00 filing fee is paid.
2. Owner shall provide the District a copy of Owner's property deed. A valid and complete legal description is necessary on each property for which exclusion is being requested. The property requested to be excluded must be a separate tract on County Appraisal Rolls; otherwise, re-subdividing will be necessary.
3. The property needs to be listed as an item on the agenda of a Regular Board Meeting. A request to be placed on the agenda should be addressed to the General Manager.
4. The agenda item shall first be for the purpose of calling a hearing on the request for exclusion. If the Board votes to call a hearing, a date and time will be determined, and a notice of such hearing shall be published in a newspaper published in Hidalgo or Willacy County. On the hearing date, the Board of Directors will consider excluding the subject property.
5. Before the request for exclusion is considered by the Board, a flat fee of \$ 500.00. will be paid by the owner requesting exclusion. The fee is intended to cover the District's legal fees and administrative costs, and the cost of publishing any notice in a newspaper in connection with the exclusion. The fee is also fixed as a flat fee so that all persons seeking exclusion will be treated alike. To the extent possible, all request for exclusions will be kept and included in a single hearing to be done all at one time in August before the tax rolls are set.
6. The exclusions of property contemplated by these guidelines are governed by Section 51.759, et seq. and Section 58.731 of the Texas Water Code, and other pertinent statutes.
7. Notification: A date will be set for notification by the District's attorney of all parties entitled to be given notice of any exclusion of land, such as Appraisal Districts and the Texas Commission on Environmental Quality.
8. The owner's request for exclusion, with required documentation and payment of any unpaid charges and taxes shall be presented to the Delta Lake Irrigation District a minimum of thirty days prior to the meeting at which such request for exclusion shall be first placed on the agenda.
9. A verbal approval by one Board member or by any District employee shall not be relied upon as any guarantee of a valid exclusion. Exclusions are not scheduled on any particular timetable, but are handled as the Board directs and when the District's attorney has completed the required preparation. No landowner may assume that exclusions are approved at the time all criteria are completed. Exclusion

occurs only after calling a hearing, publishing notice in a newspaper, and then conducting the hearing, with the Board then voting for exclusion. Once land is excluded, the District's legal counsel will notify the Appraisal District of your exclusion.

10. If the land at the time of exclusion has a water allocation the landowner must either surrender their water allotment to the District or the landowner may sell the land's water allotment prior to exclusion of their land.

11. After a properly approved exclusion has been completed, the property owner shall have no rights to irrigation water or any right in any allocation of water now or in the future, for the excluded properties.

12. All decisions made by the Board regarding exclusions will be based on preventing and avoiding any harm or disadvantage to the District.

DELTA LAKE IRRIGATION DISTRICT POLICY FOR APPROVING SUBDIVISIONS

Prior to the approval by Delta Lake Irrigation (District) of any subdivision, the following requirements must be met:

1. Not less than 30 days before the District board meeting at which the plat will be considered, submit the plat to the District's General Manager and pay the District a fee of \$ 750.00. The fee is not refundable if the subdivision is not approved.

2. The plat must be signed by a licensed civil engineer, identifying the land to be subdivided and the exact location of any canal, lateral, pipeline, drainage ditch, or other facilities owned, operated or controlled by the District.

3. The plat shall contain a notation "All rights, rules and regulations of the Delta Lake Irrigation District existing prior to the submission of this plat are not abridged by the subsequent approval of this plat by the said District, notwithstanding any provision or notation otherwise in this plat." (This requirement will be inapplicable if any rights, rules or regulations of the District are intended by the District to be abridged.) The plat shall also contain a statement that the District will not allow any structures 15' from the centerline of a pipeline or 25' from the inside toe of any main or lateral canal or drainage ditch, and that no fencing be will installed or remain on any Districts easement or right of way unless approved by the District Management. All approved fencing will be required to have gates providing a minimum opening of 16 feet.

4. The plat submission to the District will also include a petition for exclusion of the platted land from the District. If the land at the time of exclusion has a water allocation the landowner must either surrender their water allotment or the landowner shall sell the land's water allotment prior to exclusion of their land. If the lots are five acres or greater the subdivider may petition the Board to remain in the District, provided the subdivider installs a new PVC pipeline not less than 12" in diameter with appropriate valves at least 10" in diameter so that each lot within said subdivision may be served by the District, and such lines and valves shall be indicated upon the plat submitted for approval. Any necessary check gates or canal diversion gates will be purchased and installed as part of the project. All of the foregoing shall be at the expense of the subdivider. The District may at its discretion install all lines and

gates for subdivider (at the subdivider's expense). The line and/or gates become the property of the District. All work to be performed by the District will be paid in advance.

5. The District may require a subdivider to relocate or replace any canal, lateral, pipeline, or drainage ditch, and other facility owned, operated or controlled by the District. All Districts facilities no longer in use will be removed at the subdivider's expense.

6. If an valid easement does not exist for any canal, lateral, pipeline or drainage ditch, and any other facility owned, operated or controlled by the District, the proposed subdivision plat shall indicate an easement of sufficient size, as determined by the District, to allow for the operation, maintenance, repair or replacement of any such facility.

7. All easements dedicated to the use of the District shall be exclusive easements in favor of the District.

8. All Right of Ways no longer needed within the subdivisions boundaries will be offered for sale to the subdivider at current market value.

9. The District must be satisfied that the subdivider is the owner of the property, as evidenced by a title report, title insurance, warranty deed or other reliable evidence.

10. All ad valorem and flat rate taxes must be paid in full for land proposed to be subdivided prior to the consideration of approval by the Board.

11. All decisions made by the Board regarding subdivisions will be based on preventing and avoiding any harm or disadvantage to the District.

**DELTA LAKE IRRIGATION DISTRICT WATER RATES AND CHARGES
AS OF OCTOBER 1, 2005**

Metered Water Rate

Metered Water will be sold at a rate of \$30.00 per ac/ft

For drip & sprinkler irrigation:

A **Minimum** charge of 2 tenths of an ac/ft per acre of land being irrigated **\$6.00**

For flood irrigation:

A **Minimum** charge of 3.5 tenths of an ac/ft per acre of land being irrigated **\$10.50**

If meter plugs or is reading inaccurate the non-meter rate per acre will be accessed.

Non-Meter Rate

For flood irrigation:

Non-metered rate will be billed at **\$15.00** per acre of land being irrigated based on 5 tenths of an acre/foot.

Upon the first irrigation of the crop (pre irrigation, watering up, etc.) the grower will choose the method they will irrigate for the duration of the crop.

Wasted Water

WASTED WATER will be accessed at a **RATE of \$200.00 per violation per occurrence** within a 24hr period in which such violation occurs and shall be accessed against the water user.

Out of District Water Sales

Out of District water sales will only occur if the District has **Surplus Water**. All water distributed to lands outside of the District will be **METERED** and sold at **\$75.00** per ac/ft. The above minimum metered rates apply.

DELTA LAKE IRRIGATION DISTRICT WATER CONSERVATION POLICY

Section #1: Organization of the District

Delta Lake Irrigation District (The District) was established on June 22, 1928. The District is a political subdivision of the State of Texas, organized under and by virtue of Article XVI, Section 59 of the Constitution of the State of Texas. The District is operated under the statutes of chapter 58 and 49, in part, of the Texas Water Code.

Section #2: Structural Facilities

A: Service area.

The District provides irrigation, drainage, and raw water supply functions to 149 square miles of Hidalgo and Willacy Counties. The District delivers water to approximately 69,936 acre of irrigated land. The District also delivers raw water to the city of Monte Alto, La Sara, Hargill, Raymondville, Lyford, and North Alamo Water Supply Corp.

The District owns 175,026.375 acre-feet of Class A Water Rights, 202,500 acre-feet of Class B Water Rights, and 1320 acre-feet of Domestic Water Rights.

B: Canal System:

The Districts canal system consist of 250 miles of lined or partially-lined canals, and 42 miles of unlined canals. Lined canals range in width from 3' to 25'. Unlined canals range in width from 40' to 65'.

C: Pipeline System:

The Districts pipeline system, consist of 122 miles of concrete or pvc pipelines. Pipelines range in size from 10" to 72".

D: Reservoir System:

The District operates four reservoirs. The two main reservoirs Delta Lake Reservoir Unit #1 and Unit #2 have an approximate storage capacity of 10,750 acre-feet. 1,350 acre-feet for Unit #1 and 9,400 acre-feet for Unit # 2, at a water surface elevation of 49 feet. Water is diverted from the river to either of the two main reservoirs. Water is then diverted from the reservoirs to the District and Municipalities. The District also has two other reservoirs. The Hargill Reservoir with a full storage capacity of approximately 120 acre-feet, and the Nile Reservoir with a full storage capacity of approximately 40 acre-feet. The total storage capacity for the District is approximately 10,910 acre-feet storage.

E: Relift Pumps:

The District operates 53 relift pumps most of which are vertical lift pumps. Of these pumps nineteen are powered by Diesel Motors ranging from 40hp to 139hp, four are powered by Butane Motors ranging from 87hp to 105hp, and thirty are powered by Electric Motors ranging from 10hp to 200hp. Sizes of the pumps range from 10" to 30".

F: Pumping Plants

The Districts main pumping plant is located on the Rio Grande. Water is diverted from the Rio Grande through the main canal system 32 miles to the Delta Lake Reservoirs. The District also has a main relift station on Delta Lake Reservoir Unit #1.

There are four pumps at the river plant all being 450hp with 48" discharge capable of pumping 160 cfs each. Relift #1 on the reservoir has five pumps all being the same size with one pump being a variable speed magnetic pump. The sizes are 350hp with 42" discharge capable of pumping 120 cfs.

H: Metering Practices:

The District adopted mandatory metering in 1998. The District meters all field turnouts with propeller meters. Meters are read on a daily basis and reconciled at the end of the irrigation.

I: Field turnouts:

The Districts standard turnouts are alfalfa type valves ranging in size from 10" to 14". The District uses canal gates in most areas to control flow to the turnouts and to isolate parts of the system if repairs are needed.

J: Canal System Conditions:

The concrete canal system was originally constructed in the late 1930's through to late 1940's. The system overall is in fair to good condition. The District repairs structural damages as needed. The District started installing pipelines to replace parts of the antiquated system in the mid 1970's through present date as needed. In total to date the District has installed 65 plus miles of new concrete and PVC pipe. Currently we are in the process of replacing an additional 18 plus miles of pipeline.

K: Relift Pumps and Pumping Plants Condition:

The pumping system was constructed in the late 1930's through the late 1940's. The system is overall in good condition with updates to pumps and motors done as needed.

Section #3: Management Practices:

A: Water Deliveries:

The District total available water rights are 176,548.875 with the maximum storage amount of 248,392.709. The water rights numbers the district owns are (0003-001, 0464-001, 0811-000, and 0811-002). The District delivers water under contract to the cities of Monte Alto, Lyford, Raymondville, La Sara, and North Alamo Water Supply Corp.

The District also delivers water to the Valley Acres Irrigation District. The Districts average annual water diversions in acre/feet for the last three years is 64084.400 ac/ft.

The average annual water deliveries to customers for the last three years is 42836.336 ac/ft. The average delivery efficiency is 66.84%. The chart below shows historical diversions and deliveries.

Year	Annual Rainfall (in./yr.)	Total Annual Water Diverted (acre/feet)	Annual Irrigation Water Delivered (acre/feet)	Annual Municipal Water Delivered (acre/feet)	Annual Other Water Delivered (acre/feet)	Total Annual Water Delivered (acre/feet)	Estimated Delivery Efficiency (percentage)
2002	29.1	85466.088	44857.716	3596.642	4876.894	53331.252	62.40%
2003	31.27	49444.979	32288.685	2956.172	5835.392	41080.249	83%
2004	35.31	57342.140	27311.216	3084.199	3702.1	34097.515	59.50%
Average	31.89	64084.400	34819.203	3212.338	4804.795	42836.336	66.84%

B: Practices used to account for water deliveries:

The District meters all field turnouts through propeller type meters with the water being sold on a volumetric procedure. Growers can monitor their usage at all times to help in conserving their water. Water deliveries to Municipalities are also metered through propeller type meters. The District is currently looking into other methods of metering.

C: Agriculture Water Deliveries Policy:

To agriculture lands our rate is \$15.00 per acre flood, \$7.50 per acre drip, and \$48.00 per ac/ft for all other irrigation users.

D: Districts Rules and Regulations:

The District is currently working on an updated policy manual for rules and regulations. An updated manual will follow upon completion.

Section #4: User Profile:

A: Total number of acres in service area: 69,936

B: Average number of acres irrigated annually: 73,857 (3yr avg.)

C: Projected number of acres to be irrigated in 10 years: 75,000

D: Number of active irrigation customers: 462

E: Total irrigation water delivered annually (ac/ft): 34,819 (3yr avg.)

F: Types of crops grown by customers: Cotton, Grain, Sugar Cane, Vegetables, and Pasture.

G: Types of Irrigation Systems:

1). Furrow flood irrigation accounts for approximately 85% of the irrigation deliveries. This type of irrigation is used for most of the pastures, sugar cane, cotton, and grain crops, plus about 75% of the orchard crops.

2). Drip systems or micro spray emitters systems account for approximately 14% of the irrigation deliveries. This type of irrigation is used for most of the vegetable crops.

3). Sprinkler systems account for about 1% of the irrigation deliveries in the district.

H: Types of Drainage Systems:

The district installs drop structures and discharge pipes from the fields to the drainage facilities.

I: Municipal Water Right Holders within the District.

1). North Alamo Water Supply: 3,966.916

2). City of Lyford: 610.00

3). City of Monte Alto: 600.000

4). City of Raymondville: 5,670.000

Section #5: Districts future plans for water conservation.

A: The District is currently under construction of an 8.1 million dollar project. The projects consist of three separate components: 1) an 18-mile pipeline project to replace an existing lined canal. The cost for this project is \$ 5,478,798, with a projected water savings of 7,533 ac/ft per year. 2) A 17,000 ft bypass canal along the eastern edge of Delta Lake Unit #2 to lower the lake in off-season. The bypass will still allow the district to deliver water to the Cities of Raymondville, Lyford, and North Alamo Water Supply in off-season irrigation or in a drought period. Projected water savings is 2,685 ac/ft per year. 3). Telemetry and Flow Measure. The District plans to install meters on 20 main diversion sites to monitor flow measurements. These readings will be sent by telemetry to the headquarters to reconcile with readings at the field turnouts. The telemetry system will also help in monitoring canals to provide the best head pressure possible to growers. The long range plans for the District is to reline the larger lined canals where needed, and to continue to install pipelines to replace smaller lined canals.

B: The District currently monitors all pipelines, when in use, daily with canal riders. Work orders are turned in on a daily basis for needed repairs on lines that can be isolated and shut off. Major leaks are radio into the maintenance Superintendent immediately for repairs.

C: The District encourages growers to convert to poly pipe if applicable. Drip irrigation is also encouraged in areas where the district can provide an adequate supply of water. In areas within the district where it is not feasible for the district to keep the system full for a drip system the district encourages the grower to install a holding pond to reserve water for the drip system.

D: The five-year target for savings is 8,000- 10,000 ac/ft per year with the current project under way. The ten-year target is an additional 5,000 ac/ft per year with the re-lining of the main lined canals.

Adopted by Delta Lake Irrigation District Board of Directors on April 7, 2005

Delta Lake Irrigation District Drought Contingency and Irrigation Water Allocation Policy

Section #1: Purpose and Intent

The Board of Directors of the **Delta Lake Irrigation District (District)** deems it to be in the best interest of the District to adopt Policy governing the equitable and efficient allocation of limited water supplies during times of shortage. This policy constitutes the drought contingency plan required under Section 11.1272, Texas Water Code, (Vernon's Texas Codes Annotated), and associated administrative rules of the Texas Natural Resource Conservation Commission (title 30, Texas Administrative Code, Chapter 288)

Section #2: User Involvement

The District is a political subdivision of the State of Texas, governed by a Board of Directors, under the direction of the provisions of Section 49 & 58 of the Texas Water Code, (Vernon’s Texas Codes Annotated). The Board members must be landowners of the district and are elected by the Land Owners of the District. The Board will be open to comments on this policy by water users at the regular scheduled Board meetings during the public comment agenda item.

Section #3: User Education

The District will periodically provide the water users with information about the Plan, including information about the conditions under which water allocation is to be initiated or terminated and the District’s policies and procedures for water allocation. This information will be provided by means of available copies of the plan at all times at the District office as well as posted on the public bulletin board at the District office. When the Board determines that drought conditions warrant the implementation of the drought contingency plan, all landowners and water users for which the District has current addresses will be mailed a notice.

Section #4: Authorization

The general manager is hereby authorized and directed to implement the applicable provisions of this Plan upon determination by the Board that such implementation is necessary to ensure the equitable and efficient allocation of limited water supplies during times of shortage.

Section #5: Application

The provisions of this Plan shall apply to all persons utilizing water provided by the District. The term “person” as used in the Plan includes individuals, corporations, partnerships, associations, and all other legal entities.

Section #6: Initiation of Water Allocation

The general manager shall monitor water supply conditions on a daily basis and shall make recommendations to the Board regarding initiation of water allocation.

Upon approval of the Board, water allocation will become effective when:

- A. The storage balance in the District’s irrigation water rights account has declined to 75,000 ac/ft per taxable acre.

AND

- B. The Board determines that there is not sufficient water to complete the traditional crop year.

Section #7: Termination of Water Allocation

The District’s water allocation policies will remain in effect until the conditions defined in Section # 6 of the Plan no longer exist and the Board deems that the need to allocate water no longer exists.

Section #8: Notice

Notice of the initiation or termination of water allocation will be given by notice posted on the District's public bulletin board and by mail to each landowner and water user who has a valid mailing address on file at the District office.

Section #9: Water Allocation

A): Water Allocation Irrigation Accounts shall be the same parcels of land as identified by ownership for flat rate assessments purposes as shown in the records of the District. Upon institution of the Water Allocation Program, as water is allocated to the District's irrigation account by the Rio Grande Watermaster, in an amount reasonably sufficient for allocation to eligible District's users, the additional water allocated to the District less the loss will be equally distributed on a pro-rata flat rate acreage basis to those irrigation accounts eligible for water allocation. Eligible District users are those irrigation users having an account balance of .7th ac/ft or less for each flat rate acre and having no outstanding balances due to the District.

B): The amount of water allocated to an irrigation account shall be referred to as the District water user's "*Water Allotment*" and the amount of water which will be charged to water allotments will be based on the meter readings turned in from the canal rider. It shall be a violation of the District policy for a District water user to use water in an account greater than is contained in the District water user's water allotment. It is the intention of the District to insure that water users take every precaution to not use more than their water allocation. It will be considered a violation of these policies if the user uses more than there allotted amount.

Section #10: Transfers of Allotments

A): All or part of a water allotment may be transferred within the boundaries of the District from one irrigation account to another. The transfer of all or a portion of a water allotment from one irrigation account to another account, shall constitute irrigation use for purposes of use provided for in these Policies. Only the landowners or the landowner's agent may make the transfer of water allotments.

B): No water contained in a water allotment account may be transferred to land located outside the District boundaries except in special situations where traditionally these lands are irrigated as out of District lands and the water is diverted through the regular District diversion system.

C): Water from outside the District may be transferred into the District by a landowner for use within the District. The District will divert and deliver the water on the same basis as District water is delivered, except a 40% loss will be charged against the amount of water transferred for use in the District. The loss of 40% will be deducted at time of transfer. The District will allow the total amount of transferred water not to exceed 1 ac/ft per taxable acre of land. The transferred water will be stored in an account called OUT OF DISTRICT WATER. The District requires all transferred in water to be delivered first. The District will only be able to store the transferred water up to 12 MONTHS or when the Districts storage balance with the Rio Grande Master reaches the maximum allowable limit.

Section #11: Penalties

Any person who willfully opens, closes, changes or interferes with any head gate or uses water in violation of Section 11.083, Texas Water Code, may be assessed an administrative penalty up to \$5,000.00 a day under Section 11.0842 of the Texas Water Code. Additionally, if the violator is also taking, diverting, or appropriating state water, the violator may be assessed a civil penalty in court of up to \$5,000.00 a day. These penalties are provided by the laws of the State and may be enforced by complaints filed in the appropriate court jurisdiction in Hidalgo or Willacy County, all in accordance with Section 11.083; and in addition, the District may pursue a civil remedy in the way of damages and/or injunction against the violation of any of the foregoing Policies.

Section #12: Sever-Ability

It is hereby declared to be the intention of the Board of Directors of the District that the sections, paragraphs, sentences, clauses, and phrases of the Plan are severable and, if any phrase, clause, sentence, paragraph, or section of this Plan shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of the Plan, since the same would not have been enacted by the Board without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph, or section.

Section #13: Authority

The foregoing policies are adopted pursuant to and in accordance with applicable sections of the Texas Water Code, Vernon’s Texas Codes Annotated, which govern the actions of the District.

Section #14: Effective Date of Plan

The effective date of this Policy shall be April 7, 2005, and ignorance of the Policies of the District is not a defense for a prosecution for enforcement of the violation of these Policies.

Approved by Delta Lake Irrigation District Board of Directors on April 7, 2005

**RESOLUTION OF THE DELTA LAKE IRRIGATION
September 7, 2005 Board Meeting**

The board hereby adopts the following rules and instructs the District’s general manager to publish a substantive statement of the rules and the penalty for their violation in one or more newspapers with general circulation in the area in which the property of the district is located:

NEW RULES

- 1) The taking or diversion of water by persons other than the District’s employees or agents from the District’s canals, lateral canals, pipelines, reservoirs, or other facilities without a water ticket issued by the District is prohibited. The penalty for the taking or diversion of water without a

water ticket shall be \$200 per violation per occurrence for each 24 hour period in which such violation occurs in addition to the value of the water as determined by the sole discretion of the District. The penalty and value of the water shall be assessed against the owner of the land on which the water was applied or assessed against the owner or operator of the equipment or facility used to divert the water.

- 2) Waste of water (as defined) diverted from the Districts canals, lateral canals, pipeline, reservoirs, or other facilities by persons other than the District's employees or agents is prohibited. Waste of water shall be defined as excessive water running off an irrigated field for more than 24 hours as determined by the District's General Manager or his designated agent, and the District's Water Master. The penalty for waste of water shall be \$200 per violation per occurrence for each 24-hour period in which such violation occurs and such penalty shall assessed against the water user.
- 3) Non-district use of the District's Real Property without the approval of the District's Board of Directors is prohibited.

BACKUP MATERIAL – TEXAS WATER CODE

§ 11.088. DESTRUCTION OF WATERWORKS.

No person may willfully cut, dig, break down, destroy, or injure or open a gate, bank, embankment, or side of any ditch, canal, reservoir, flume, tunnel or feeder, pump or machinery, building, structure, or other work which is the property of another, or in which another owns an interest, or which is lawfully possessed or being used by another, and which is used for milling, mining, manufacturing, the development of power, domestic purposes, agricultural uses, or stock raising, with intent to:

- (1) maliciously injure a person, association, corporation, water improvement or irrigation district;
- (2) gain advantage for himself; or
- (3) take or steal water or cause water to run out or waste out of the ditch, canal, or reservoir, feeder, or flume for his own advantage or to the injury of a person lawfully entitled to the use of the water or the use or management of the ditch, canal, tunnel, reservoir, feeder, flume, machine, structure, or other irrigation work.

§ 11.091. INTERFERENCE WITH DELIVERY OF WATER UNDER CONTRACT.

No person may willfully take, divert, appropriate, or interfere with the delivery of conserved or stored water under Section 11.042 of this code.

§ 11.092. WASTEFUL USE OF WATER.

A person who owns or has a possessory right to land contiguous to a canal or irrigation system and who acquires the right by contract to use the water from it commits waste if he:

- (1) permits the excessive or wasteful use of water by any of his agents or employees; or
- (2) permits the water to be applied to anything but a beneficial use.

§ 11.093. ABATEMENT OF WASTE AS PUBLIC NUISANCE.

(a) A person who permits an unreasonable loss of water through faulty design or negligent operation of any waterworks using water for a purpose named in this chapter commits waste, and the commission may declare the works causing the waste to be a public nuisance. The commission may take the necessary action to abate the nuisance. Also, any person who may be injured by the waste may sue in the district court having jurisdiction over the works causing the waste to have the operation of the works abated as a public nuisance.

(b) In case of a wasteful use of water defined by Section 11.092 of this code, the commission shall declare the use to be a public nuisance and shall act to abate the nuisance by directing the person supplying the water to close the water gates of the person wasting the water and to keep them closed until the commission determines that the unlawful use of water is corrected.

§ 11.094. PENALTY FOR USE OF WORKS DECLARED PUBLIC NUISANCE.

No person may operate or attempt to operate any waterworks or irrigation system or use any water under contract with any waterworks or irrigation system that has been previously declared to be a public nuisance.

§ 58.127. ADOPTING RULES.

A district may adopt and make known reasonable rules to:

- (1) prevent waste or the unauthorized[0] use of water; and
- (2) regulate residence, hunting, fishing, boating, and camping, and all recreational and business privileges on any body or stream of water, or any body of land, or any easement owned or controlled by the district.

§ 58.128. EFFECT OF RULES.

After the required publication, rules adopted by the district under Section 58.127 of this code shall be recognized by the courts as if they were penal ordinances of a city.

§ 58.129. PUBLICATION OF RULES.

- (a) The board shall publish once a week for two consecutive weeks a substantive statement of the rules and the penalty for their violation in one or more newspapers with general circulation in the area in which the property of the district is located.
- (b) The substantive statement shall be as condensed as is possible to intelligently explain the purpose to be accomplished or the act forbidden by the rule.
- (c) The notice must advise that breach of the rules will subject the violator to a penalty and that the full text of the rules is on file with the principle office of the district where it may be read by any interested person.
- (d) Any number of rules may be included in one notice.

§ 58.130. EFFECTIVE DATE OF RULES.

The penalty for violation of a rule is not effective and enforceable until five days after the publication of the notice. Five days after the publication, the published rules shall be in effect and ignorance of it is not a defense for a prosecution for the enforcement of the penalty.

§ 49.004. PENALTY FOR VIOLATION OF DISTRICT RULES.

- (a) The board may set reasonable civil penalties for the breach of any rule of the district that shall not exceed the jurisdiction of a justice court as provided by Section 27.031, Government Code.
- (b) A penalty under this section is in addition to any other penalty provided by the law of this state and may be enforced by complaints filed in the appropriate court of jurisdiction in the county in which the district's principle office or meeting place is located.
- (c) If the district prevails in any suit to enforce its rules, it may, in the same action, recover reasonable fees for attorneys, expert witnesses, and other costs incurred by the district before the court. The amount of the attorney's fees shall be fixed by the court.

Appendix E: Excerpts of the Texas Water Code

The following is a verbatim reproduction of selected sections of the Texas Water Code (Texas Legislature Online). The sections represented here are those previously cited within the text.

SUBCHAPTER C. ADMINISTRATIVE PROVISIONS

§ 58.071. Board of Directors

*The governing body of a district is the board of directors, which shall consist of five directors.
Added by Acts 1977, 65th Leg., p. 1537, ch. 627, § 1, eff. Aug. 29, 1977.*

§ 58.072. Qualifications

*To be qualified for election as a director, a person must be a resident of the state, be the owner of record of fee simple title to land in the district, be at least 18 years of age, and owe no delinquent taxes or assessments to the district. Section 49.052 does not apply to a district governed by this chapter.
Added by Acts 1977, 65th Leg., p. 1537, ch. 627, § 1, eff. Aug. 29, 1977.
Amended by Acts 1995, 74th Leg., ch. 715, § 32, eff. Sept. 1, 1995.*

SUBCHAPTER E. ELECTION PROVISIONS

§ 58.222. Eligibility to Vote

Notwithstanding the Election Code and any other law, a landowner or the landowner's registered representative under this subchapter is entitled to one vote in an election conducted by a district only if the landowner:

- (1) owns at least one acre of irrigable land located within the district's boundaries that is subject to an assessment for maintenance and operating expenses under Sections 58.305(a) and (b);*
- (2) is entitled to receive and use irrigation water delivered by the district through the district's irrigation facilities; and*
- (3) satisfies all other requirements for voting prescribed by this subchapter.*

Added by Acts 2001, 77th Leg., ch. 107, § 1, eff. Sept. 1, 2001.

SUBCHAPTER G. WATER CHARGES AND ASSESSMENTS

§ 58.304. Board's Estimate of Maintenance and Operating Expenses

The board, on or as soon as practicable after a date fixed by standing order of the board, shall estimate the expenses of maintaining and operating the irrigation system for the next 12 months. The board may change the 12-month period for which it estimates the expenses of maintaining and operating the irrigation system by estimating such expenses

for a shorter period so as to adjust to a new fixed date and thereafter estimating the expenses for 12-month periods following the adjusted fixed date.

Added by Acts 1977, 65th Leg., p. 1537, ch. 627, § 1, eff. Aug. 29, 1977.

Amended by Acts 1997, 75th Leg., ch. 789, § 3, eff. Sept. 1, 1997.

§ 58.305. Distribution of Assessment

(a) Not less than one-third nor more than two-thirds of the estimated maintenance and operating expenses shall be paid by assessment against all land in the district to which the district can furnish water through its irrigation system or through an extension of its irrigation system.

(b) The assessments shall be levied against all irrigable land in the district on a per acre basis, whether or not the land is actually irrigated. The board shall determine from year to year the proportionate amount of the expenses which will be borne by water users.

(c) The remainder of the estimated expenses shall be paid by assessments against persons in the district who use or who make application to use water. The board shall prorate the remainder as equitably as possible among the applicants for water and may consider the acreage each applicant will plant, the crop he will grow, and the amount of water per acre he will use.

Added by Acts 1977, 65th Leg., p. 1537, ch. 627, § 1, eff. Aug. 29, 1977.

§ 58.319. Charge to Cities and Towns

If a district supplies untreated water, the charge for the use of the water and the time and manner of payment shall be determined by the board or fixed by the contract made with the board.

Added by Acts 1977, 65th Leg., p. 1537, ch. 627, § 1, eff. Aug. 29, 1977.

SUBCHAPTER N. ADDING AND EXCLUDING TERRITORY AND CONSOLIDATING DISTRICTS

§ 58.708. Notice of Hearing on Applications

The board shall give notice of the hearing on the applications by publishing the time, place, and nature of the hearing one time in a newspaper published in a county in which all or part of the district is located. The newspaper must have been published regularly for more than 12 months preceding the date of the publication of the notice and must have circulation in the district. The notice shall be published not less than 10 days nor more than 20 days before the date of the hearing.

Added by Acts 1977, 65th Leg., p. 1537, ch. 627, § 1, eff. Aug. 29, 1977.

§ 58.709. Hearing Procedure

The board shall hear all interested parties and all evidence in connection with the applications.

Added by Acts 1977, 65th Leg., p. 1537, ch. 627, § 1, eff. Aug. 29, 1977.

§ 58.710. Board's Resolution to Substitute Land

If the board finds that all the conditions provided for the exclusion of land and inclusion of other land in the district exist, it may adopt and enter in its minutes a resolution to exclude land which is nonagricultural or nonirrigable in a practicable manner and include land which may be irrigated from the facilities of the district in a practicable manner.

Added by Acts 1977, 65th Leg., p. 1537, ch. 627, § 1, eff. Aug. 29, 1977.

§ 58.713. Right to Serve New Land Included in District

The district has the same right to furnish water service to the included land that it previously had to furnish service to the excluded land. The mere inclusion of a larger total acreage than that excluded does not give the district the right to irrigate a larger total acreage or to appropriate a larger quantity or volume of public water for irrigation than the district would have had the right to irrigate or to appropriate before the exclusion and inclusion of the land.
Added by Acts 1977, 65th Leg., p. 1537, ch. 627, § 1, eff. Aug. 29, 1977.

Appendix F: Excerpts of Additional Texas Commission on Environmental Quality Rules

The following is a verbatim reproduction of selected sections of the Texas Commission on Environmental Quality Rules and Regulations (Texas Commission on Environmental Quality 2003). The sections represented here are those previously cited within the text.

SUBCHAPTER B : WATERMASTER-REGULATORY FUNCTIONS

§303.11. Records of Diversions--General.

(a) The watermaster shall locate, number by river mile or other method, and rate as to capacity all authorized diversion facilities on the Texas bank along the Rio Grande and tributaries, and the owner or operator thereof shall be advised in writing of these facts. When a permanent diversion facility is replaced at the same location or when any changes in rating are made, the diverter shall immediately inform the watermaster prior to diversion. Any change in the location of the diversion facilities and place of use on the Middle or Lower Rio Grande shall be made pursuant to §295.71 of this title (relating to Applications to Amend a Permit) and §295.158(c) of this title (relating to Notice of Amendments to Water Rights), not requiring mailed and published notice. Any change in the location of the diversion facilities and place of use on the Upper Rio Grande and tributaries to the Rio Grande shall be made pursuant to §295.71 of this title (relating to Applications to Amend a Permit) and §295.158(c) of this title (relating to Notice of Amendments to Water Rights), not requiring mailed and published notice; or §295.158(b) of this title (relating to Notice of Amendments to Water Rights), requiring mailed and published notice.

(b) Each diverter shall request written certification from the watermaster prior to diverting water by identifying the specific certificate of adjudication to be used and the pump number of the pump to be used. When a diverter orders water for a nondiverter, the diverter may request written certification under such diverter's certificate of adjudication or under the certificate of adjudication of the nondiverter to which the diverter is delivering water, but shall report the amount of water diverted for the nondiverter as provided in §303.12(d) of this title (relating Mainstem Middle and Lower Rio Grande). Certifications will be granted only for diversion from authorized diversion points associated with that water right. Certifications for irrigation water rights will be granted only for delivery of water to the authorized tract(s) covered by the water right or approved contractual sale. Certifications are limited to a maximum diversion period of one calendar month on the mainstream of the Lower and Middle Rio Grande and to one year on the Upper Rio Grande and all tributaries of the Rio Grande.

(c) Each diverter shall install and maintain measuring devices at the authorized point of diversion which will provide for accurate measurement and accounting of the quantities of water diverted. The installation, maintenance, and operation of measuring devices by the diverter shall be subject to approval of the watermaster. The diverter must ensure the accessibility of the measuring device, so it can be conveniently and safely located and checked by the watermaster. The diverter shall be liable for all expenses incurred in the acquisition, installation, maintenance, and operation of measuring devices.

§303.12. Records-Mainstem Middle and Lower Rio Grande.

(e) Diversions shall be charged against the appropriate accounts as follows.

(1) A diverter shall be charged with the actual amount diverted, without being penalized, if the total diversion is within plus or minus 10% of the amount requested pursuant to certification.

(2) A diverter shall be charged with 90% of the certification amount if the total diversion is less than 90% of the amount requested pursuant to certification.

(3) If the quantity of water diverted is more than 110% of the amount requested pursuant to certification, then the diverter will be charged with the actual amount of water diverted and the provisions of §303.31 of this title (relating to General) will apply.

SUBCHAPTER C: ALLOCATION AND DISTRIBUTION OF WATERS

§§303.21 - 303.23

Effective April 26, 2001

§303.21. Accounts-Amistad/Falcon Reservoirs.

(b) When there is adequate water to do so, the watermaster shall maintain the following accounts:

(1) a reserve of 225,000 acre-feet of water for domestic, municipal, and industrial uses;

(2) an operating reserve of 75,000 acre feet; and

(3) the accounts for irrigation uses and all other uses.

(c) The operating reserve is necessary to cover losses of water charged to the United States. These losses are the result of seepage, evaporation, and conveyance; emergency requirements; and adjustments of amounts in storage as may be necessary by finalization of provisional computations by the International Boundary and Water Commission.

Adopted April 4, 2001 Effective April 26, 2001

§303.22. Allocations to Accounts.

(a) Allocations shall be based on water in the usable storage of Falcon and Amistad Reservoirs.

Such storage shall be computed as the total storage in Amistad and Falcon Reservoirs as reported by the International Boundary and Water Commission on the last Saturday of each month, less the amount of water in dead storage, which is water behind the dams that cannot be released due to hydrologic restrictions. To determine the amount of water to be allocated to the various accounts, computations shall be made in the following sequence:

(1) from the amount of water in usable storage, deduct 225,000 acre-feet to re-establish the reserve for municipal, domestic, and industrial uses;

(2) from the remaining storage, deduct the total end-of-month account balances for all Lower and Middle Rio Grande irrigation and mining allottees;

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(3) from the remaining storage, deduct 75,000 acre feet for the operating reserve;

(4) after the deduction of the operating reserve, the remaining water will be allocated to the Class A and Class B accounts.

SUBCHAPTER F : CONTRACTUAL SALES

§§303.51-303.55

§303.51. General Policy.

Verified owners of water rights in the Middle and Lower Rio Grande with the right to call on releases from the Amistad-Falcon system may contract for the sale of all or part of their annual authorized amount of use to other water rights holders or their agents in the Middle and Lower Rio Grande as long as all of the contractual sales rules are complied with. The resale of purchased water is prohibited. The use of contract sale water by buyer will not go to the perfection of seller's appropriative right. All existing contracts shall be filed with the executive director in accordance with this section.

§303.52. General Filing Requirements.

(a) If the sale of water is for a purpose of use other than that authorized in the seller's water right, then the supplier must file an application to amend that right and have the right amended before any sale may be approved.

(b) If the use of water under the contract involves a change in the place of use, diversion point or diversion rate, an amendment to sellers or buyers water right is not required. Seller or buyer shall file a copy of the executed contract with the executive director for approval. Water diverted pursuant to this section shall be diverted from a diversion point and used on a tract of land identified in commission records in accordance with §303.53(b) of this title (relating to Documents Needed to File).

(c) The seller must be a verified owner of a water right. If the commission does not have adequate ownership records of the seller, then no sale may be approved by the executive director.

(d) All contracts must be filed with and approved by the executive director as complying with all the sections relating to contractual sales. No deliveries of sold water will be made by the watermaster until all requirements are met.

(e) The executive director will file the original approved contracts in the seller's permanent water right record and will send a copy of approved contracts to the watermaster.

(f) No contract approval is required for sales of water by a district when the district's distribution facilities are used to deliver the water to the buyer for purposes authorized by the district's water right.

(g) Seller can not use and/or sell in excess of his water right's annual authorized amount of use in any calendar year.

§303.53. Documents Needed to File.

(a) A contract of sale of water to be filed with the executive director in accordance with §303.52(d) of this title (relating to General Filing Requirements) shall indicate all of the following:

(1) the specific certificate of adjudication or other water right under which the water is being sold;

(2) the specific certificate of adjudication or other water right under which the bought water is to be used;

(3) the name and address of the seller and buyer;

(4) the total quantity of water being purchased in acre-feet;

(5) the purpose of use for which the water is to be used;

(6) the cost of water to the buyer per acre-foot;

(7) the diversion point to which the buyer is requesting deliveries to be made;

(8) the effective date and termination date of the contract (contract period can not exceed one year) the acreage to be irrigated, if applicable; and

(9) the contract executed by all verified owners of the water right from which water is purchased.

(b) The contract will be accompanied by an aerial photograph or United States Geological Survey topographic map with the location of diversion points and areas to be irrigated described thereon.

(c) The executive director may require any additional information needed to approve the contract, including any agreements with diverters if the buyer is not pumping from his own diversion point and deeds of any tracts to be irrigated.

§303.54. Responsibilities of Buyer and Seller.

- (a) Both buyer and seller must comply with all Texas Water Commission rules and watermaster orders.*
- (b) The buyer must obtain a certification from the watermaster before pumping.*
- (c) The buyer and seller are solely responsible as to the resolution of conflict regarding the terms and conditions of a water contract sale.*
- (d) The seller is responsible for reporting all sales of water on the yearly surface water use reports. The buyer must also report his use of purchased water separately from his water right on his yearly surface water use report.*

§303.55. Accounting for Contract Sale Water.

- (a) The watermaster will transfer the full amount of water, or portion thereof, specified in an approved contract from the seller's to the buyer's account upon contract approval.*
- (b) Upon transfer of contract sale water to buyer's account, subsequent use of water by buyer will be deducted from the contract water balance until the contract water balance equals zero or until the contract expiration date.*
- (c) Any contract water balance remaining in buyer's account at the contract expiration date will be deducted from buyer's account and will be available for allocation to the system reserves and accounts according to §303.22 of this title (relating to Allocations to Accounts).*
- (d) Buyer may not sell any water via contract as long as his bought water balance is greater than zero.*
- (e) At no time will buyer's or seller's irrigation storage account exceed 1.41 times the water right holder's recognized amount in acre-feet.*

Appendix G: Excerpts of the 1944 Water Treaty

The following is a verbatim reproduction of selected sections of the 1944 Water Treaty (U.S.-Mexico Treaty for Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande). The sections represented here are those previously cited within the text.

II -Rio Grande (Rio Bravo)

Article 4

The waters of the Rio Grande (Rio Bravo) between Fort Quitman, Texas and the Gulf of Mexico are hereby allotted to the two countries in the following manner:

- A. To Mexico: (a) All of the waters reaching the main channel of the Rio Grande (Rio Bravo) from the San Juan and Alamo Rivers, including the return flow from the lands irrigated from the latter two rivers. (b) One-half of the flow in the main channel of the Rio Grande (Rio Bravo) below the lowest major international storage dam, so far as said flow is not specifically allotted under this Treaty to either of the two countries. (c) Two-thirds of the flow reaching the main channel of the Rio Grande (Rio Bravo) from the Conchos, San Diego, San Rodrigo, Escondido and Salado Rivers and the Las Vacas Arroyo, subject to the provisions of subparagraph (c) of Paragraph B of this Article. (d) One-half of all other flows not otherwise allotted by this Article occurring in the main channel of the Rio Grande (Rio Bravo), including the contributions from all the unmeasured tributaries, which are those not named in this Article, between Fort Quitman and the lowest major international storage dam.
- B. To the United States: (a) All of the waters reaching the main channel of the Rio Grande (Rio Bravo) from the Pecos and Devils Rivers, Good-enough Spring, and Alamito, Terlingua, San Felipe and Pinto Creeks. (b) One-half of the flow in the main channel of the Rio Grande (Rio Bravo) below the lowest major international storage dam, so far as said flow is not specifically allotted under this Treaty to either of the two countries. (c) One-third of the flow reaching the main channel of the Rio Grande (Rio Bravo) from the Conchos, San Diego, San Rodrigo, Escondido and Salado Rivers and the Las Vacas Arroyo, provided that this third shall not be less, as an average amount in cycles of five consecutive years, than 350,000 acre-feet (431,721,000 cubic meters) annually.

The United States shall not acquire any right by the use of the waters of the tributaries named in this subparagraph, in excess of the said 350,000 acre-feet (431,721,000 cubic meters) annually, except the right to use one-third of the flow reaching the Rio Grande (Rio Bravo) from said tributaries, although such one-third may be in excess of that amount. (d) One-half of all other flows not otherwise allotted by this Article occurring in the main channel of the Rio Grande (Rio Bravo), including the contributions from all the unmeasured tributaries, which are those not named in this Article, between Fort Quitman and the lowest major international storage dam.

In the event of extraordinary drought or serious accident to the hydraulic systems on the measured Mexican tributaries, making it difficult for Mexico to make available the run-off of 350,000 acre-feet (431,721,000 cubic

meters) annually, allotted in subparagraph (c) of paragraph B of this Article to the United States as the minimum contribution from the aforesaid Mexican tributaries, any deficiencies existing at the end of the aforesaid five-year cycle shall be made up in the following five-year cycle with water from the said measured tributaries. Whenever the conservation capacities assigned to the United States in at least two of the major international reservoirs, including the highest major reservoir, are filled with waters belonging to the United States, a cycle of five years shall be considered as terminated and all debits fully paid, where upon a new five-year cycle shall commence.

Article 5

The two Governments agree to Construct jointly, through their respective Sections of the Commission, the following works in the main channel of the Rio Grande (Rio Bravo): I. The dams required for the Conservation, storage and regulation of the greatest quantity of the annual flow of the river in a way to ensure the continuance of existing uses and the development of the greatest number of feasible projects, within the limits imposed by the water allotments specified. II. The dams and other joint works required for the diversion of the flow of the Rio Grande (Rio Bravo). One of the storage dams shall be constructed in the section between Santa Helena Canyon and the mouth of the Pecos River; one in the section between Eagle Pass and Laredo, Texas (Piedras Negras and Nuevo Laredo in Mexico); and a third in the section between Laredo and Roma, Texas (Nuevo Laredo and San Pedro de Roma in Mexico). One or more of the stipulated dams may be omitted, and others than those enumerated may be built, in either case as may be determined by the Commission, subject to the approval of the two Governments. In planning the construction of such dams the Commission shall determine: (a) The most feasible sites; (b) The maximum feasible reservoir capacity at each site; (c) The conservation capacity required by each country at each site, taking into consideration the amount and regimen of its allotment of water and its contemplated uses; (d) The capacity required for retention of silt; (e) The capacity required for flood control.

The conservation and silt capacities of each reservoir shall be assigned to each country in the same proportion as the capacities required by each country in such reservoir for conservation purposes. Each country shall have an undivided interest in the flood control capacity of each reservoir. The construction of the international storage dams shall start within two years following the approval of the respective place by the two Governments. The works shall begin with the construction of the lowest major international storage dam, but works in the upper reaches of the river may be constructed simultaneously. The lowest major international storage dam shall be completed within a period of eight years from the date of the entry into force of this Treaty. The construction of the dams and other joint works required for the diversion of the flows of the river shall be initiated on the dates recommended by the Commission and approved by the two Governments. The cost of construction, operation and maintenance of each of the international storage dams shall be prorated between the two Governments in proportion to the capacity allotted to each country for conservation purposes in the reservoir at such dam. The cost of construction, operation and maintenance of each of the dams and other joint works required for the diversion of the flows of the river shall be prorated between the two Governments in proportion to the benefits which the respective countries receive therefrom, as determined by the Commission and approved by the two Governments.

Article 6

The Commission shall study, investigate, and prepare plans for flood control works, where and when necessary, other than those referred to in Article 5 of this Treaty, on the Rio Grande (Rio Bravo) from Fort Quitman, Texas to the Gulf of Mexico. These works may include levees along the river, floodways and grade-control structures, and works for the canalization, rectification and artificial channeling of reaches of the river. The Commission shall report to the two Governments the works which should be built, the estimated cost thereof, the part of the works to be constructed by each Government, and the part of the works to be operated and maintained by each Section of the Commission. Each Government agrees to construct, through its Section of the Commission, such works as may be recommended by the Commission and approved by the two Governments. Each Government shall pay the costs of

the works constructed by it and the costs of operation and maintenance of the part of the works assigned to it for such purpose.

Article 7

The Commission shall study, investigate and prepare plans for plants for generating hydro-electric energy which it may be feasible to construct at the international storage dams on the Rio Grande (Rio Bravo). The Commission shall report to the two Governments in a Minute the works which should be built, the estimated cost thereof, and the part of the works to be constructed by each Government. Each Government agrees to construct, through its Section of the Commission, such works as may be recommended by the Commission and approved by the two Governments. Both Governments, through their respective Sections of the Commission, shall operate and maintain jointly such hydro-electric plants. Each government shall pay half the cost of the construction, operation and maintenance of such plants, and the energy generated shall be assigned to each country in like proportion.

Article 8

The two Governments recognize that both countries have a common interest in the conservation and storage of waters in the international reservoirs and in the maximum use of these structures for the purpose of obtaining the most beneficial, regular and constant use of the waters belonging to them. Accordingly, within the year following the placing in operation of the first of the major international storage dams which is constructed, the Commission shall submit to each Government for its approval, regulations for the storage, conveyance and delivery of the waters of the Rio Grande (Rio Bravo) from Fort Quitman, Texas to the Gulf of Mexico. Such regulations may be modified, amended or supplemented when necessary by the Commission, subject to the approval of the two Governments. The following general rules shall severally govern until modified or amended by agreement of the Commission, with the approval of the two Governments: (a) Storage in all major international reservoirs above the lowest shall be maintained at the maximum possible water level, consistent with flood control, irrigation use and power requirements. (b) Inflows to each reservoir shall be credited to each country in accordance with the ownership of such inflows. (c) In any reservoir the ownership of water belonging to the country whose conservation capacity therein is filled, and in excess of that needed to keep it filled, shall pass to the other country to the extent that such country may have unfilled conservation capacity, except that one country may at its option temporarily use the conservation capacity of the other country not currently being used in any of the upper reservoirs; provided that in the event of flood discharge or spill occurring while one country is using the conservation capacity of the other, all of such flood discharge or spill shall be charged to the country using the other's capacity, and all inflow shall be credited to the other country until the flood discharge or spill ceases or until the capacity of the other country becomes filled with its own water. (d) Reservoir losses shall be charged in proportion to the ownership of water in storage. Releases from any reservoir shall be charged to the country requesting them, except that releases for the generation of electrical energy, or other common purpose, shall be charged in proportion to the ownership of water in storage. (e) Flood discharges and spills from the upper reservoirs shall be divided in the same proportion as the ownership of the inflows occurring at the time of such flood discharges and spills, except as provided in subparagraph (c) of this Article. Flood discharges and spills from the lowest reservoir shall be divided equally, except that one country, with the consent of the Commission, may use such part of the share of the other country as is not used by the latter country. (f) Either of the two countries may avail itself, whenever it so desires, of any water belonging to it and stored in the international reservoirs, provided that the water so taken is for direct beneficial use or for storage in other reservoirs. For this purpose the Commissioner of the respective country shall give appropriate notice to the Commission, which shall prescribe the proper measures for the opportune furnishing of the water.

Article 9

(a) The channel of the Rio Grande (Rio Bravo) may be used by either of the two countries to convey water belonging to it. (b) Either of the two countries may, at any point on the main channel of the river from Fort Quitman, Texas to the Gulf of Mexico, divert and use the water belonging to it and may for this purpose construct any necessary works. However, no such diversion or use, not existing on the date this Treaty enters into force, shall be permitted in either country, nor shall works be constructed for such purpose, until the Section of the Commission in whose country the diversion or use is proposed has made a finding that the water necessary for such diversion or use is available from the share of that country, unless the Commission has agreed to a greater diversion or use as provided by paragraph (d) of this Article. The proposed use and the plans for the diversion works to be constructed in connection therewith shall be previously made known to the Commission for its information. (c) Consumptive uses from the main stream and from the unmeasured tributaries below Fort Quitman shall be charged against the share of the country making them. (d) The Commission shall have the power to authorize either country to divert and use water not belonging entirely to such country, when the water belonging to the other country can be diverted and used without injury to the latter and can be replaced at some other point on the river. (e) The Commission shall have the power to authorize temporary diversion and use by one country of water belonging to the other, when the latter does not need it or is unable to use it, provided that such authorization or the use of such water shall not establish any right to continue to divert it. (f) In 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 with-drawn, with the consent of the Commission, for the use of the country undergoing the drought. (g) Each country shall have the right to divert from the main channel of the river any amount of water, including the water belonging to the other country, for the purpose of generating hydroelectric power, provided that such diversion causes no injury to the other country and does not interfere with the international generation of power and that the quantities not returning directly to the river are charged against the share of the country making the diversion. The feasibility of such diversions not existing on the date this Treaty enters into force shall be determined by the Commission, which shall also determine the amount of water consumed, such water to be charged against the country making the diversion. (h) In case either of the two countries shall construct works for diverting into the main channel of the Rio Grande (Rio Bravo) or its tributaries waters that do not at the time this Treaty enters into force contribute to the flow of the Rio Grande (Rio Bravo) such water shall belong to the country making such diversion. (i) Main stream channel losses shall be charged in proportion to the ownership of water being conveyed in the channel at the times and places of the losses. (j) The Commission shall keep a record of the waters belonging to each country and of those that may be available at a given moment, taking into account the measurement of the allotments, the regulation of the waters in storage, the consumptive uses, the withdrawals, the diversions, and the losses. For this purpose the Commission shall construct, operate and maintain on the main channel of the Rio Grande (Rio Bravo), and each Section shall construct, operate and maintain on the measured tributaries in its own country, all the gaging stations and mechanical apparatus necessary for the purpose of making computations and of obtaining the necessary data for such record. The information with respect to the diversions and consumptive uses on the unmeasured tributaries shall be furnished to the Commission by the appropriate Section. The cost of construction of any new gaging stations located on the main channel of the Rio Grande (Rio Bravo) shall be borne equally by the two Governments. The operation and maintenance of all gaging stations or the cost of such operation and maintenance shall be apportioned between the two Sections in accordance with determinations to be made by the Commission.

Notes
