Baseline Conditions Report
and
Irrigation District Indicators
for the
Harlingen Irrigation District Cameron County No. 1

Submitted to BECC/NADB

October 7, 2002

HARLINGEN IRRIGATION DISTRICT
P.O. Box 148 - Harlingen, Texas 78551
956-423-7015 FAX 956-423-4671
E-mail-halbwayn@aol.com

TABLE OF CONTENTS

1 Baseline Conditions Report

The information contained in section 2 of this report was prepared pursuant to a request from BECC. Some of the information report in Section 2 below was readily available and reasonably accurate, whereas the District could not locate sources of some of the requested information and the numbers are approximate and estimated. This information should be considered preliminary information for planning purposes only.

2 State and Pressure Indicators for Irrigation Districts

2.1 Water Source

The Harlingen Irrigation District diverts 100% of the water used in the system 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 from Falcon Reservoir.

2.2 Volume of Water Diverted from the Rio Grande

The average quantity of water diverted at the Rio Grande is approximately 52,000 acre feet per year for irrigation and 15,000 acre feet per year for the municipal and domestic use.

2.3 Texas Commission on Environmental Quality (TCEQ) Water Rights

The District holds from the TCEQ the Certificate of Adjudication No. 23-831 which authorizes the District to divert from the Rio Grande a maximum quantity (if allocated to the District) of 98,232 acre feet of "Class A" irrigation water and 4,692 acre feet of municipal water for domestic purposes. The District also holds a Certificate of Adjudication authorizing the District to divert 20,488 acre feet of municipal water for use by the City of Harlingen.

2.4 Global District Efficiency (Water Delivery Efficiency)

The District's water delivery efficiency for water diverted for irrigation is approximately 75% to 80%.

2.5 Loss of Water Stored in the District's Reservoirs

The District has approximately 40 miles of earthen canals, 20 miles of concrete canals and 3 reservoirs. The surface water for these systems is approximately 477 acres. The net evaporation in the Rio Grande Valley is approximately 5 feet per year. The net evaporative loss from the canals and reservoirs is approximately 2,385 acre feet per year.

2.6 Loss of Water in the District's Conveyance System (evaporation/infiltration)

Seepage losses vary greatly by location. In studies conducted by Texas A & M it was estimated that our concrete canals were losing 215 acre feet per mile per year. The District is currently conducting studies to verify these figures.

2.7 Water Productivity ($/acre-foot)

Texas A & M has done an analysis on the value of water to the Rio Grande Valley economy. Dr. John Robinson in his 2002 report "Alternative Approaches to Estimate the Impact of Irrigation Water Shortages on Rio Grande Valley Agriculture, Texas Water Resources Institute, Technical Report SR 2002-015" estimates the business activity value of irrigation water to be $652 per acre foot of water delivered to the farm gate.

2.8 Soil Productivity ($/acre)

Soils throughout the District are considered very productive. Farmland values for land with limited or no non-agricultural development potential is approximately valued at $1,200 per acre. Typical gross incomes vary depending on the crop from $1,000 per acre on sugarcane to $150 per acre on grain sorghum.

2.9 Crop Production (yield per acre)

Typical yields for the primary crops grown in the District are as follows:

Crop Name	Crop Yield
Sugarcane	40 to 50 tons per acre
Citrus	15 to 25 tons per acre
Cotton	1.25 to 2.5 bales per acre
Corn	75 to 100 bushels per acre
Grain Sorghum	4,000 to 4,500 lb per acre
Pasture	Not Available

2.10 *Existing Crops Grown in District*

The crop mix varies due to market and water availability. The following chart is a typical crop mix for the District:

Crop Name	Acres of Irrigated Crop per Year
Sugarcane	7,000
Citrus	600
Cotton	10,000
Corn	2,250
Grain Sorghum	10,850
Pasture	1,800
other	2,250
Total	**34,750**

2.11 *Consumptive Use of Water per Crop Type*

Crop Name	Consumptive Use (ac-ft/acre per year)*
Sugarcane	4.80
Citrus	3.60
Cotton	2.60
Corn	2.40
Grain Sorghum	1.50
Pasture	2.90
Other	Not Estimated

*Consumptive Use estimated from Potential ET during growing season multiplied by crop coefficient adjusted for crop growth periods for Brownsville, Texas. These are very rough estimates and should not be used for determining irrigation water requirements. The 30 year average annual rainfall in Brownville, Texas is approximately 26 inches.

2.12 Depth of Water Applied per Acre per Crop Type

Crop Name	Water Applied (acre-feet/acre per year)
Sugarcane	2.50
Citrus	2.50
Cotton	1.33
Corn	2.33
Grain Sorghum	0.67
Pasture	1.50
Other	2.00

2.13 Irrigation Efficiency Applied on Parcels

The on-farm field distribution and application efficiencies vary depending on the crop type, land slope, soil type, method use to apply irrigation water, irrigation practice, flow rate of the irrigation water delivered by the District, and other parameters. The District average ratio of quantity of crop consumptive use to the quantity of irrigation water delivered likely ranges from 0.60 to 0.80 (60% to 80%). This ratio has not been measured.

2.14 Irrigation Water Supplied per Acre by District

Crop Name	Delivered to Farm Turnout (af/acre per year)
Sugarcane	2.50
Citrus	2.50
Cotton	1.33
Corn	2.33
Grain Sorghum	0.67
Pasture	1.50
Other	2.00

2.15 Slope of Irrigated Lands in District

The District has determined that approximately 80% of the irrigated lands served by the District have been laser leveled. Typical slopes in the region vary from 0.05 to 0.10 of a foot per hundred feet.

2.16 Number of Water Users within District

The District has 3,309 irrigation accounts, 500 non agricultural accounts (lawn water, golf courses, parks and school grounds) and one municipal account, Harlingen Water Works Services (HWWS). HWWS services the cities of Harlingen, Combes, Primera, Palm Valley and rural water supplies, Military Highway Water Supply and East Rio Hondo Water Supply.

2.17 Existing Water Flow Measurement Devices

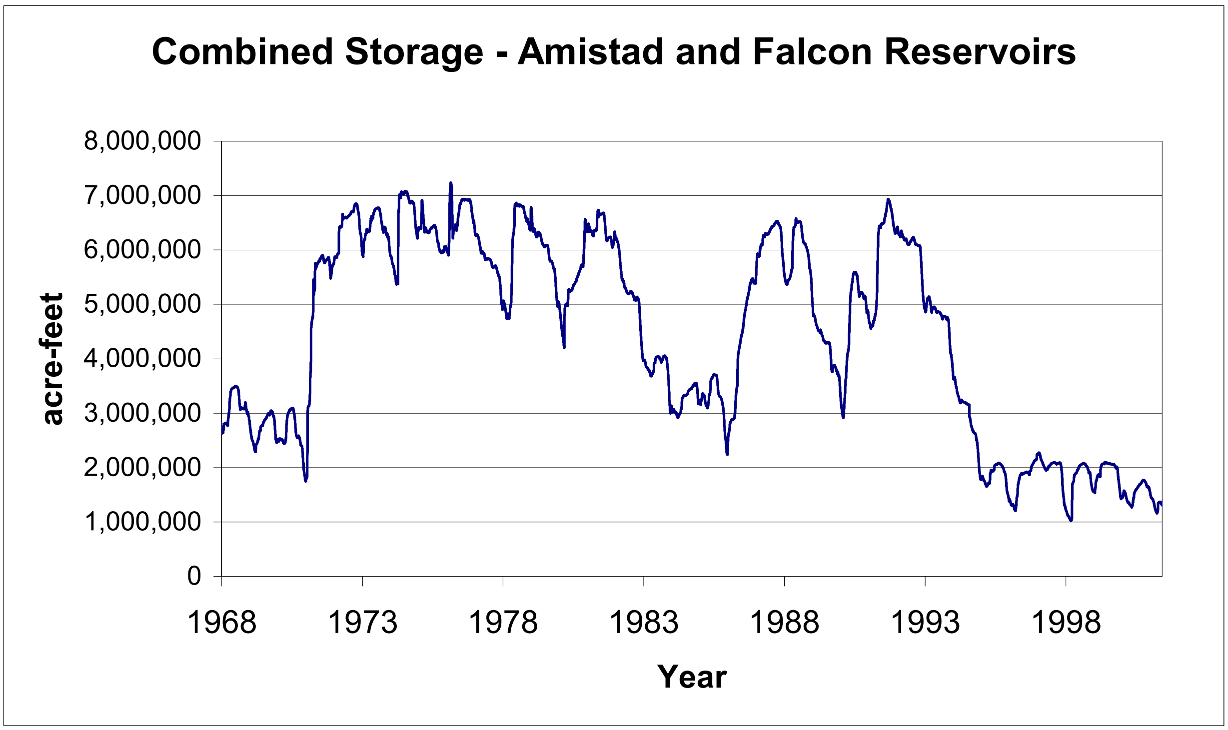
The District currently measures all water that is diverted from the Rio Grande at the diversion point. Waters delivered to the HWWS are also measured. There are no other current measurement devices in the irrigation system except for temporary demonstration sites to determine the effectiveness of such. This year the District instigated a voluntary on-farm metering program that was used to help educate the producers of the benefits of water conservation. Approximately 50% of our growers took advantage of the program, however more would have done so had the District had adequate metering devices available.

2.18 Water Control Mechanisms

The District maintains some 25 checks that hold the water levels at a usable level for the lands behind the checks. The District pumps the water from the Rio Grande and disperses these waters into the canal system at an elevation of approximately 58 feet above sea level. The end of the system is approximately 24 feet above sea level. These checks are used to keep the water levels in the system stabilized for use. There are forty four (44) pump sites that charge pipelines off the main channel of the canals. There are gate systems at each of these pump sites. There are field gates or turnouts on at least every field or parcel. The 3,300 accounts constitute the parcels. In some cases there are more than one field gate or turn out per parcel, depending on the size of the parcel.

2.19 Historic Water Reservoir Levels

The District reservoir levels are insignificant to our program. The District uses the reservoirs for buffers against changes in producer uses on a daily basis and to buffer against the time lag (4 days) between Falcon Reservoir and the District diversion point. The TCEQ allocations are based on the quantity of water held in Amistad and Falcon reservoirs by the International Water And Boundary Commission (IBWC) on behalf of the United States.



2.20 Irrigation Systems Currently in Use

The majority of the District is irrigated by furrow irrigation through polypipe field distribution systems. There are some drip systems and/or micro-jet systems on citrus orchards and some overhead sprinkler operations on turf farms. There are two limiting factors on types of irrigation systems: 1) The District is divided into twenty to forty acre average field sizes. 2) The types of crops grown will not justify the expense of higher technology systems.

2.21 District Flat Rate Assessments and Delivery Charges

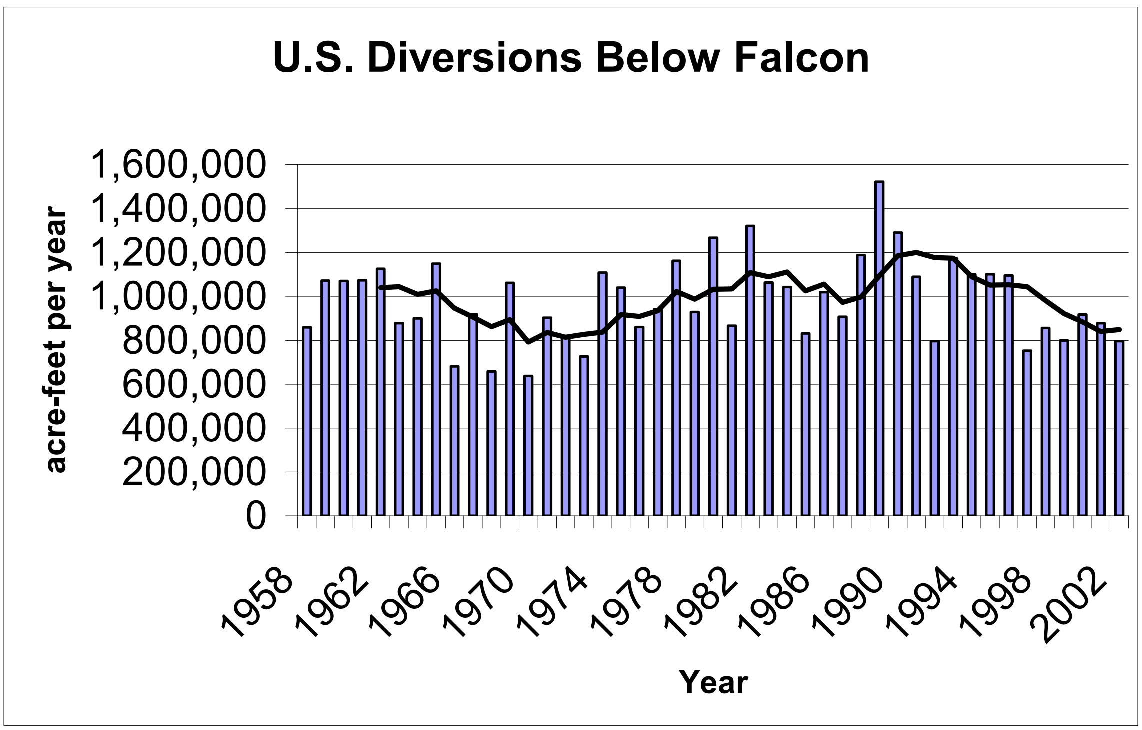
The District charges an annual flat rate assessment on every acre that is irrigable whether it is irrigated or not. That flat rate assessment is for the maintenance and operation of the District. The flat rate assessment is currently set at $24.00 for the first acre and $9.00 for every subsequent acre in each parcel. The District charges a delivery fee of $6.00 per acre for each irrigation. This irrigation charge is paid by the water user prior to the date that water is delivered by the District to the water user.

2.22 Pump Operating Efficiency

The District large capacity pumps (60 cfs and greater) used to divert water from the Rio Grande are estimated to have a pumping efficiency of 80% (ratio of water power to mechanical power expressed as a percentage). The District's secondary lift pumps (typically 5 to 20 cfs) range in pumping efficiency from 60 to 80% (efficiency term does not account for excess water pumped and returned to the canal).

2.23 Rio Grande Historic Flow

The firm yield of the Rio Grande for users downstream of Falcon is approximately 1.3 million acre feet. The 2002 year is the first year the Harlingen Irrigation District has had to allocate water to its producers since Falcon Dam was built in 1954.

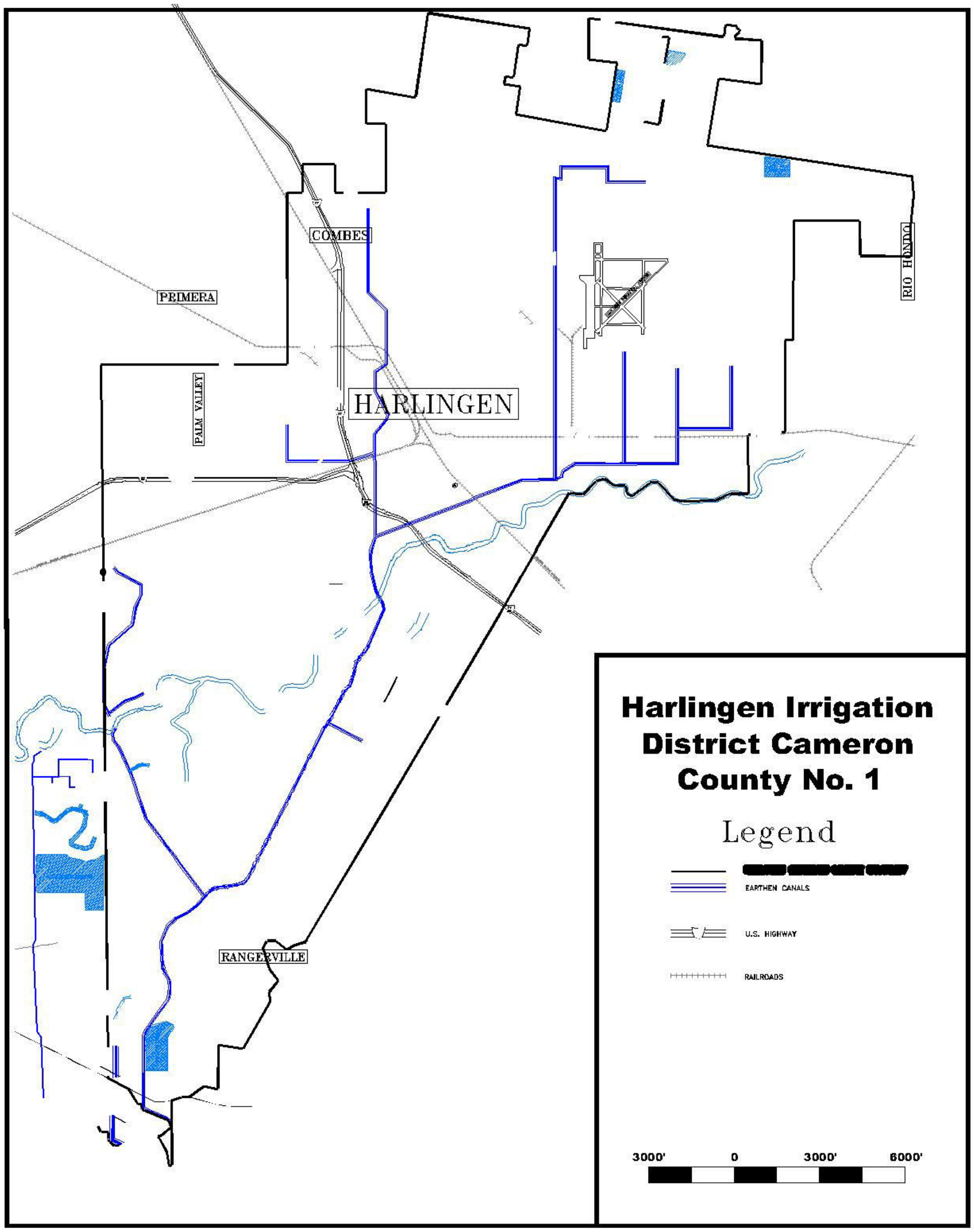


2.24 Surface Water Contamination Problems

The District's primary concern with water quality is the contamination of the water upstream of the District's diversion point on the Rio Grande. Discharges from Mexico into the Rio Grande are essentially unmonitored. There is zero runoff or return flow from the District to the Rio Grande. The District does not use groundwater. Groundwater in the area is undependable and runs at the high end of usability in salts (in excess of 1,500 mg/l of total dissolved salts, TDS).

2.25 Physical Area – District Map

The outer boundaries of the District encompass 88.3 square miles and include the cities of Harlingen, Palm Valley, Rangerville and part of Primera, Combs, and Los Indios. The District's primary pumping plant is on the Rio Grande approximately 10 miles south of Harlingen, Texas. The District extends northward approximately 8 miles north of Harlingen, Texas. The District is about 1 mile wide at the South end and 13 miles wide on the north end.



2.26 Irrigated Area

The District holds the Certificate of Adjudication number 23-831 for 40,133 acres of "Class A" irrigated crop land.

2.27 Geographical Distribution of Crops within District

The majority of the agricultural land is located in the southern and northern portions of the District.

2.28 Economic Status of Agricultural Water Users within District

The agricultural community has been hard hit over the past few years for numerous reasons. Commodity prices and unusual pest plagues have taken their toll but these are naturally occurring issues that producers usually survive. The key issue the past six years has been the failure of Mexico to deliver 1944 Treaty water to the United States, thus depriving the producer of the assurance of adequate supplies to produce a crop. This has not only been a direct problem for agricultural production but has indirectly affected the producers ability to obtain the financing for their annual farming operations.

2.29 Property (Land) Ownership within District

The District does not have summary data readily available regarding the ownership of land within the District. The District does have a complete list of all property owners names and property descriptions that is available on request.

2.30 Water Quality of the Rio Grande

The District does not analyze the water quality except for total soluble salts. The Rio Grande traditionally runs from 500 to 1,000 mg/l of total dissolved salts (TDS).

2.31 Environmental Flow of the Rio Grande

The Lower Rio Grande has no environmental or in-stream flow requirements by law.

3 References

The data presented in the Section 2 of this Report were obtained from the following sources.

Robinson, John, 2002, "Alternative Approaches to Estimate the Impact of Irrigation Water Shortages on Rio Grande Valley Agriculture, Texas Water Resources Institute, Technical Report SR 2002-015".

Region M Adopted Regional Plan, 2001, Region M Water Planning Group, Texas Water Development Board.

Harlingen Irrigation District Cameron County, Internal Records.

Texas Commission on Environmental Quality, Select Records, Lower Rio Grande Water Masters Office, Harlingen, Texas.

U.S. Section of the International Boundary and Water Commission, 2002, Diversions From The Rio Grande United States Side, Falcon Dam To The Gulf Of Mexico, http://www.ibwc.state.us

National Weather Service, 2000, Department of Commerce, Cooperative Data for Texas CD-ROM.

FAO, United Nations, Aquastat, Irrigation Crop Coefficients, http://www.fao.org/ag/agl/aglw/aquastat/water_use/index5.stm

ASCE, Evapotranspiration and Irrigation Water Requirements, 1982, Manual and Reports on Engineering Practice – No. 70, American Society of Civil Engineers, NY, NY

Texas A&M Extension Service, TexasET, ET Information for Brownsville, Texas, http://texaset.tamu.edu