

MEMO

To: Lauri Gillam, Chair
Region K Population and Water Demand Committee
Fr: Daniel Berglund
David Wheelock
Date: Oct 5, 2017

Re: Projected Irrigation Demands for 2021 Region K Water Plan - Colorado, Matagorda,
Wharton counties

Lauri –

David and I have discussed Region K Irrigation Projections and have agreed on a methodology that we feel is appropriate considering the most current data is not representative of surface water demands. This methodology develops a base demand and keeps this demand flat for the duration of the planning period. Since no concerns were expressed regarding the groundwater demand projections, those values will simply be added to the agreed upon surface water demand projections at the county level. The TWDB representatives at the Committee meeting confirmed that our methodology should represent a dry year demand and for that reason we chose 2011. We felt that if we were to use the average of the 5 years prior to 2012, we would not be representing a dry year demand and could possibly understate future irrigation needs.

Historical Data

The agricultural surface water diversions for the most recent 10 years of available data for the four irrigation operations in Region K are shown in Table 1. It is important to note that these quantities are river diversions, and therefore include both water applied at the farms, as well as canal losses, which represents the total surface water irrigation demand from the river. Table 2 shows the planted acreage for these irrigation divisions over the same period.

Table 1. Historical Irrigation Surface Water Diversions (acre-feet)

Year	Garwood	Gulf Coast	Lakeside	Pierce Ranch	Total
2007	45,205	83,535	56,360	14,285	199,386
2008	103,623	157,332	134,304	23,630	418,889
2009	100,150	197,610	115,888	28,795	442,443
2010	88,895	150,647	96,362	23,452	359,356
2011	117,667	170,633	142,488	33,526	464,314
2012	85,478	11,812	649	4,729	102,668
2013	90,474	10,696	-	4,101	105,271
2014	82,114	-	-	4,613	86,727
2015	66,548	1,667	-	6,508	74,723
2016	68,325	84,500	88,142	13,118	254,085

Table 2. Historic Planted Acreage (acres)

Year	Garwood			Lakeside			Pierce Ranch			Gulf Coast			Total		
	1st crop	2nd crop	Supp*	1st crop	2nd crop	Supp*	1 st crop	2 nd crop	Supp*	1st crop	2nd crop	Supp*	1st crop	2nd crop	Supp*
2007	12,989	9,899		22,758	12,487	1,799	3,654	2,339	708	14,441	6,136	7,421	53,842	30,861	9,928
2008	17,133	14,453		27,974	16,501	2,727	3,419	1,813	1,533	17,241	12,428	16,044	65,767	45,195	20,304
2009	17,371	14,342	1,842	27,786	12,433	351	4,402	3,848	3,609	21,778	17,816	14,517	71,337	48,439	20,319
2010	17,703	15,219	2,380	26,951	14,207	1,323	4,333	3,693	2,459	22,552	14,373	6,776	71,539	47,492	12,938
2011	18,687	14,651	-	27,554	12,736	-	6,792	3,693	-	18,316	15,120	12,404	71,349	46,200	12,404
2012	16,866	14,949	-	-	-	-	-	324	1,920	-	-	4,543	16,866	15,273	6,463
2013	18,638	16,982	1,799	-	-	-	506	-	2,027	-	-	3,077	19,144	16,982	6,903
2014	18,750	16,263	2,376	-	-	-				-	-	-	18,750	16,263	2,376
2015	18,353	14,141	2,255	-	-	-	584		1,094			1,820	18,937	14,141	5,169
2016	19,290	14,238	2,300	24,190	18,099	1,047	2,482	2,068	1,162	13,714	10,861	3,704	59,676	45,266	8,213

*Supp = Supplemental water (acreage that was planted in crops other than rice, such as turf grass, hay, row crops, aquaculture, and water for wildlife management)

Our suggested methodology is to use the most recent dry year with no curtailment. For that reason we used 2011 planted acreage and actual applied acre-foot per acre data, but reduced the use per acre planted to reflect recent improvements in irrigation efficiency and current LCRA contracting. For this method, an adjusted acre-foot per acre demand was calculated by capping the actual water use at each individual field by the acre-foot per acre duty stated in the water use contracts. The duties stated in the water use contracts were developed by LCRA in coordination with the farmers to reflect an irrigation rate that was considered reasonable and appropriate.

Table 3 shows the actual acre-foot per acre demands applied in each irrigation operation, the cap applied for the adjustment calculation, and the adjusted duty used to develop the base demand.

Table 3. Actual and Adjusted Surface Water Acre-Feet per Acre Use for 2011

		2011 actual acre-foot per acre use	Duty specified in contract	2011 adjusted acre-foot per acre demand
		ac-ft/ac		
1st Crop	Garwood	3.80	3.25	3.07
	Lakeside	3.34	3.25	2.99
	Pierce Ranch	No on farm data	3.25	3.03*
	Gulf Coast	3.65	3.75	3.44
2nd Crop	Garwood	2.54	2.00	1.93
	Lakeside	2.31	2.00	1.88
	Pierce Ranch	No on farm data	2.00	1.91
	Gulf Coast	2.31	2.50	2.16
Supplemental	Garwood	No planted acreage	No contract duty	NA
	Lakeside	No planted acreage	No contract duty	NA
	Pierce Ranch	No planted acreage	No contract duty	NA
	Gulf Coast	1.13	No contract duty	1.13**

*Because data was not available by field, used Garwood and Lakeside average adjusted acre-foot per acre demand.

**Because there is no contract duty, no cap was applied and the actual acre-foot per acre application rate was used

These adjusted acre-foot per acre demands were then applied to the actual 2011 planted acreages to develop a base demand estimate. Because this demand represents an on farm demand, a canal loss factor was added to estimate the total diversion amount required to meet demand. Table 5 shows the 2011 planted acreages, adjusted acre-foot per acre demands, canal loss factors, and a total estimated base irrigation demand. Demands for Pierce Ranch and Garwood were adjusted downward to reflect current contractual obligations.

Table 5. Base Irrigation Demand (Surface Water) Calculation for Methodology B

		2011 Acres Planted (ac)	2011 Adjusted acre-foot per acre demand	Calculated On-Farm Dry Year Use (ac-ft)	Approximate Canal Loss (%)	Calculated Base Demand with Canal Loss (ac-ft)
1st Crop	Garwood	18,687	3.07	57,369	20%	71,711
	Lakeside	27,554	2.99	82,386	20%	102,982
	Pierce Ranch	6,792	3.03	20,580	20%	25,725
	Gulf Coast	18,316	3.44	63,007	30%	90,010
2nd Crop	Garwood	14,651	1.93	28,276	20%	28,289 ⁽¹⁾
	Lakeside	12,736	1.88	23,943	20%	29,929
	Pierce Ranch	3,693	1.91	7,035	20%	4,275 ⁽²⁾
	Gulf Coast	15,120	2.16	32,659	30%	46,656
Supplemental	Garwood	-	NA	-	20%	-
	Lakeside	-	NA	-	20%	-
	Pierce Ranch	-	NA	-	20%	-
	Gulf Coast	12,404	1.13	14,017	30%	20,024
Total		129,952		329,272		419,601

(1) Demand based on the current contractual obligation of up to 100,000 af per year to the Garwood irrigation division.

(2) Demand based on the contractual obligation of up to 30,000 af per year to Pierce Ranch.