

Irrigation District Database Analysis¹

A report prepared for

Cameron County Irrigation District No. 2

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by

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Irrigation District Database Analysis

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Problem

The district's existing database and water ordering process have no method to relate irrigation water orders to individual fields.

Causes

Water orders are placed by name, account number and block number. When using the "Water Ticket" data entry form (see Chart 1), once a water account is selected, a list of available blocks and subdivisions are shown for that account. With this information, the canal rider can deliver the water to the correct canal and block

Chart 1:
Water Ticket Software

Each water ticket includes name, account, subdivision, and block, but no field ID.

However, a block may have more than one field. Thus it is impossible to relate the water order to an individual field. Chart 2 and 3 illustrate this in more detail. Chart 2 shows the *Water Ticket Database Table*. There is no column for the field identification.

Chart 3 shows the *Property Database Table*. Highlighted is account 1045 which has two fields in block 122. The PID (field ID) in this table does not appear in the *Water Ticket Database Table*; thus there is no way to tie the water order to an individual field.

This same problem is also illustrated in Charts 4 and 5 which show blocks with more than one field. Charts 6 and 7 illustrate how when water is only related to an account number, it is impossible to know which field is receiving the water.

tblTicketlines : Table									
TICKETNO	LINENO	OWNER	ACCT	SUBDIV	BLOCK	CROP	TYPE		R
762	5.00	JAMES, BESSI	10225	SBICO	254	S/Cane	G		
762	6.00	JAMES, BESSI	10225	SBICO	263	S/Cane	G		
763	1.00	DAVIS, RAYMC	4131	UNIT 1	114-121	Canus	G		
764	1.00	ELKINS, TED	4850	SBL&WCO	105	Pasture	G		
765	1.00	BUCHANAN, BI	2109	E SANTO	153,157	S/Cane	G		
766	1.00	GARCIA, DAVI	6287	SBL&WCO	03	Pasture	G		
767	1.00	THOMPSON, V	20910	SBL&WCO	43	Pasture	G		
769	1.00	CORTEZ, JUAN	3690	SBICO	307	Pasture	G		
769	1.00	GONZALES, EL	7590	SBL&WCO	15	Pasture	G		
769	2.00	GONZALES, EL	7590	HOOD	HOOD TR	Pasture	G		
770	1.00	ATKINSON, RA	959	SBL&WCO	222	Pasture	G		
771	1.00	SCOGGINS, BII	19345	SBL&WCO	71	Pasture	G		
771	2.00	SCOGGINS, BII	19345	A.BRYAN	1	Pasture	G		
772	1.00	ARIZMENDI, PC	820	SBILCO	05-96	Okra	G		
773	1.00	GUERRA, ALFF	0429	LANDRUM	7	Pasture	G		
774	1.00	GONZALES, RA	7920	SBL&WCO	202	Pasture	G		
775	1.00	VEGA, TED	21807	E SANTO	156	Pasture	G		
776	1.00	GARCIA, EDUA	6295	SBICO	56	Pasture	G		
777	1.00	ORTEGA, ANDI	15217	SBICO	309	Pasture	G		
779	1.00	FOX, N. L.	5650	SBL&WCO	6	Pasture	G		
779	1.00	GUERRA, ALFF	0429	LANDRUM	7	Pasture	G		
780	1.00	ATKINSON, RIC	973	SBL&WCO	246	Pasture	G		
780	2.00	VALADEZ, MA	21490	SBL&WCO	246	Pasture	G		
781	1.00	MCCAIN, JOE	13210	SBL&WCO	44	S/Cane	G		
782	1.00	HERNANDEZ, L	9499	SBL&WCO	207	Pasture	G		
783	1.00	LA BELLE, LYN	11170	A.BRYAN	1	Pasture	G		
784	1.00	LONG, MARCE	11740	SBL&WCO	105	S/Cane	G		
784	2.00	BROWN, TURM	2070	SBL&WCO	163	S/Cane	G		
784	3.00	TURNER, BRO	21350	SBL&WCO	164	S/Cane	G		
785	1.00	BOI FARMS, IN	4815	UNIT 1	95	S/Cane	G		

Chart 2:
Water Ticket Database Table

Using the ticket number we can find the account number and block to which the water was delivered. We cannot determine which field was irrigated from the database due to the lack of a field ID.

ACCT	SUBDIV	BLOCK	LOT	GROSS	OUTAGE	NET	DATE	PID
1000	SBICO	96	S 1/2	20	0.97	19.03		1000-1
1010	SBICO	220	S 1/2	20	3.62	16.38		1010-1
1027	SBISCO	129		10	0	10		1027-1
1028	SBISCO	2	PART	1.84	0	1.84		1028-1
1030	SBL&WCO	26	S1/2N1/2SW1/4	10	0.15	9.85		1030-1
1040	SBL&WCO	15	PARTS	19.91	2.71	17.2	8/8/1993	1040-1
1045	SBICO	119	N PT	4.08	0	4.08		1045-1
1045	SBICO	121	ALL	36.58	4.51	32.07		1045-2
1045	SBICO	122	S PT	28.24	7.26	20.98		1045-3
1045	SBICO	122	PT	9.81	1.03	8.78		1045-0
1045	SBICO	123	PT	4.81	2.26	2.55		1045-0
1045	SBICO	140	PT	6.86	2.26	4.6		1045-0
1045	SBICO	141	PT	13.07	5.23	7.84		1045-0
1045	SBL&WCO	14	PT NW CORNER	5.73	1.48	4.25		1045-0
1070	SBL&WCO	148	S PT	62.77	1.08	61.69		1070-1
1070	SBL&WCO	149	E1/2	75.74	9.7	66.04		1070-2
1080	SBL&WCO	209/215	TRACT D	2.5	0	2.5		1080-2
1081	SBL&WCO	209	PARTS 3&4	4.5	0.41	4.09		1081-0
1085	LANDRUM	4	3 M DELA FUENTE	1.42	0.03	1.39		1085-1
1087	SBICO	136	PART	10	0.25	9.75	9/22/1994	1087-1
1105	SBL&WCO	34	W 1/2 NE 1/4	20	2.74	17.26		1105-1
1110	SBL&WCO	85	PT S PT	3.62	0.4	3.22		1110-2
1112	SBL&WCO	85	PT S PT	1.38	0	1.38		1112-1
1115	SBICO	745	ALL	40	4.44	35.56		1115-1

Chart 3:
Property Database Table

Here we see the property table of the database. A field ID (PID) has been implemented here; however it is not fully useful. There is no way to cross reference the field ID to the water ticket, because one account can own several fields in the same block.

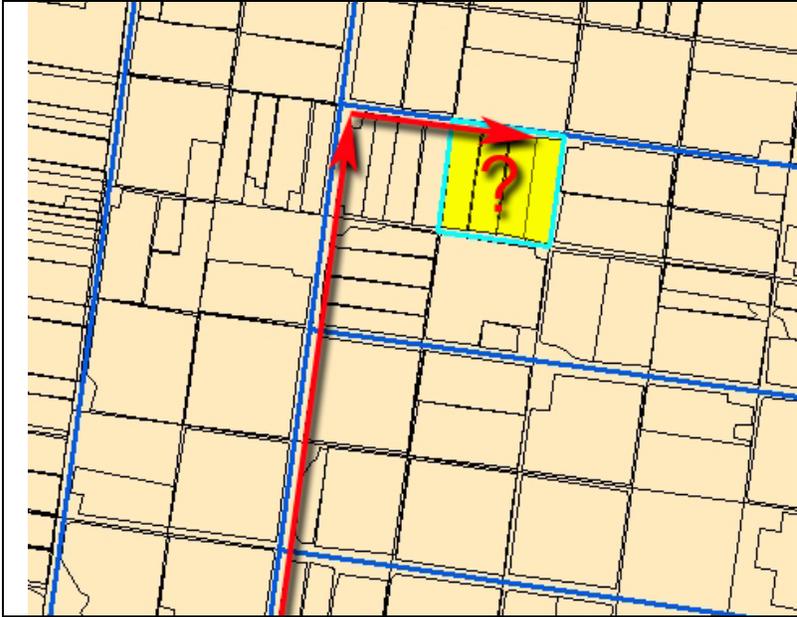


Chart 4:
Block ordering
(current system)

Water is delivered to the correct block, but which field receives the water?

In this case there are four fields located in this single forty acre block.



Chart 5:
Field ID ordering
(proposed solution)

Water is delivered to the correct field ID. There is no question as to where the water went.

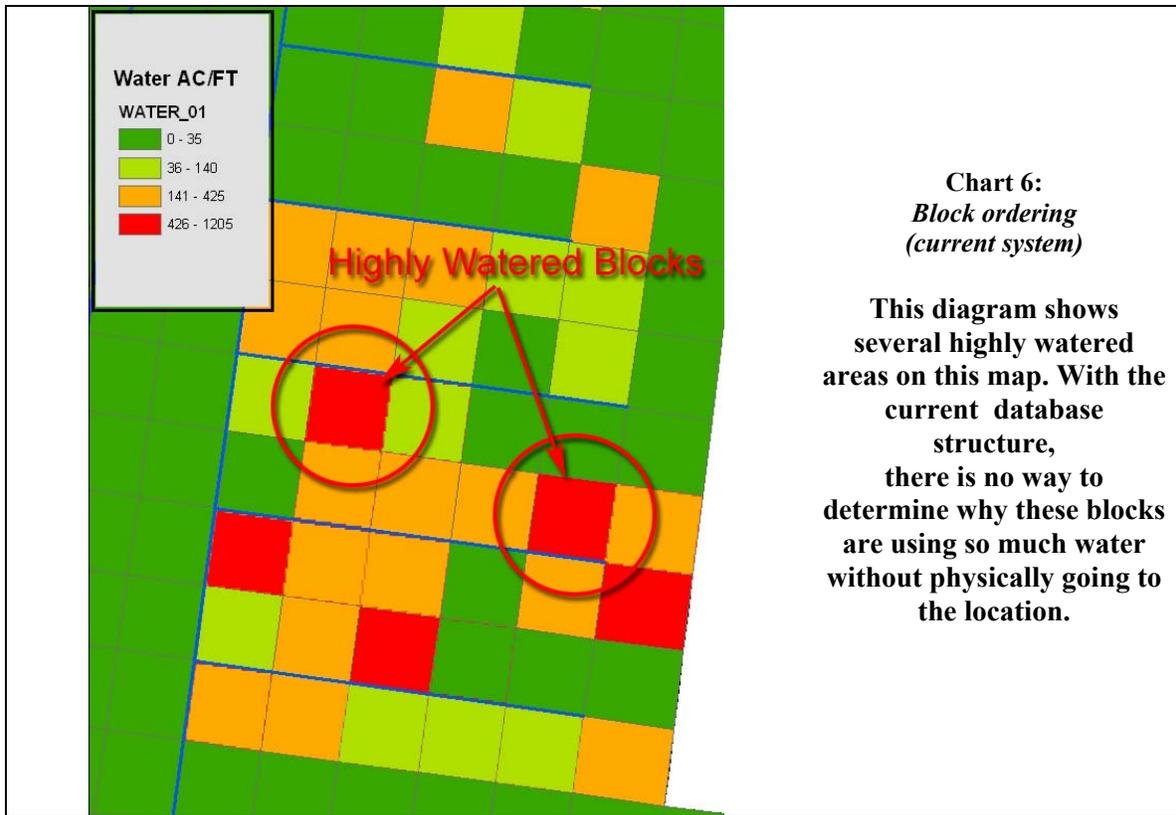


Chart 6:
Block ordering
(current system)

This diagram shows several highly watered areas on this map. With the current database structure, there is no way to determine why these blocks are using so much water without physically going to the location.

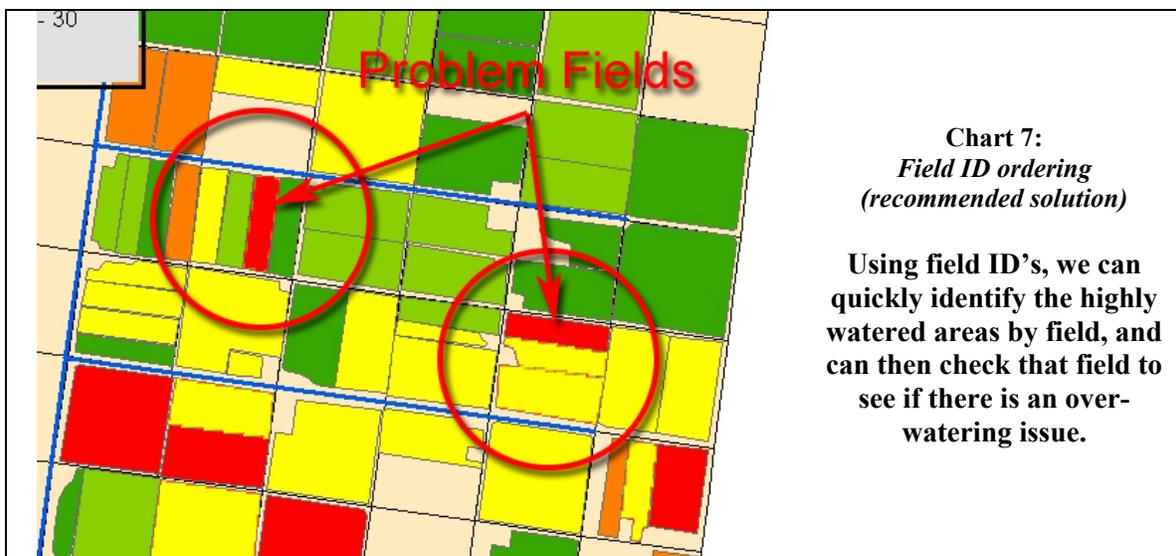


Chart 7:
Field ID ordering
(recommended solution)

Using field ID's, we can quickly identify the highly watered areas by field, and can then check that field to see if there is an over-watering issue.

Ordering water with the Field ID simplifies the identification of problem areas; thus, problems can be pin pointed rather than generalized . Water can be ordered directly by field ID or ordered by field map, once an accurate map has been created using GIS.

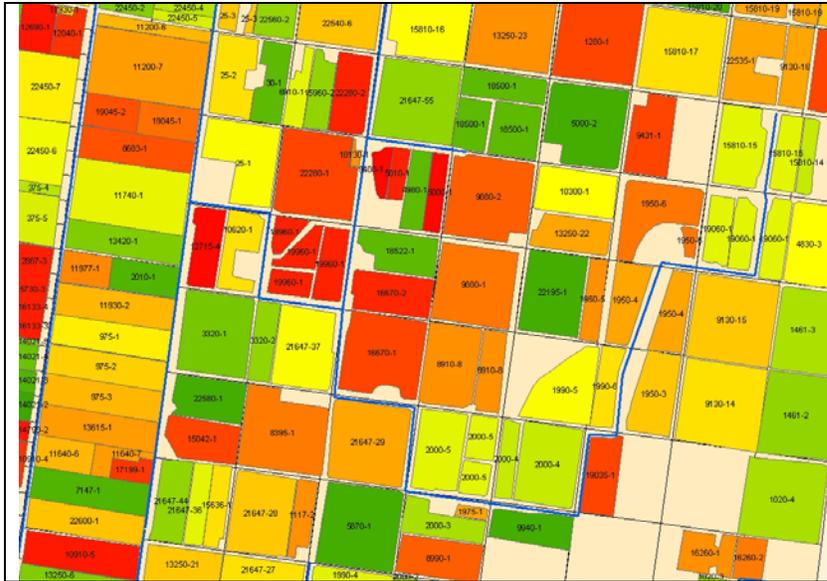


Chart 8:
A field map can be
made available to
simplify water
ordering.

(note individual field IDs)

Recommendations

Accounting methods should be changed to identify individual fields receiving water. Water orders should be placed by field ID making it easier to monitor water usage.

What is required to move to a field ID system? Complete a map of water account boundaries [i.e., fields]. Develop a field ID system to link individual fields to water accounts. Note: the district has already begun work on both.

A disadvantage of implementing the field ID ordering system is that it does not allow for backwards compatibility. The district's historic records will not be useable by the new system. It is recommended that the district implement the new system on the turn of the fiscal year, due to the compatibility issues.

Future Considerations

Implementing the field ID ordering and accounting system and completion of the GIS of the district (see Chart 8 above) will give the district additional capabilities. For example, rowers could order water by simply clicking on the correct field either on a computer at the district office or on the internet.

We are currently developing a prototype GIS/accounting system for use in irrigation districts. Once completed, we will demonstrate its capabilities and provide training to district personnel on its use.