

Irrigation District Database Analysis

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. However, a block may have more than one field. Thus it is impossible to relate the water order to an individual field.

Chart 1:
Water Ticket Software

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

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.

TICKETNO	LINEID	OWNER	ACCT	SUBDIV	BLOCK	CROP	TYPE
762	5.00	JAMES, BESS	10225	SBICO	254	SCane	G
762	6.00	JAMES, BESS	10225	SBICO	263	SCane	G
763	1.00	DAVIS, RAYMC	4131	UNIT 1	114-121	Other	G
764	1.00	ELKINS, TED	4860	SBILAWCO	186	Pond	G
765	1.00	BUCHANAN, BI	2109	E SANTO	153,157	SCane	G
766	1.00	GARCIA, DAVID	6207	SBILAWCO	63	Pasture	G
767	1.00	THOMPSON, V	20910	SBILAWCO	43	Pasture	G
768	1.00	CORTIZ, JUAN	3690	SBICO	307	Pasture	G
769	1.00	GONZALES, EL	7590	SBILAWCO	15	Pasture	G
769	2.00	GONZALES, EL	7600	HOOD TR		Pasture	G
770	1.00	ARMSTRONG, DA	68-58	SBILAWCO	222	Pasture	G
771	1.00	SIOGONS, BR	19345	SBILAWCO	71	Pasture	G
771	2.00	SIOGONS, BR	19345	A BRYAN	1	Pasture	G
771	1.00	ARMONDEL, PC	820	SBILCO	66-86	Other	G
773	1.00	GUERRA, ALFI	8429	LANDRUM	7	Pasture	G
774	1.00	GONZALES, RV	7528	SBILAWCO	202	Pasture	G
775	1.00	VEISA, TED	21807	E SANTO	156	Pasture	G
776	1.00	GARCIA, EDUA	6296	SBICO	56	Pasture	G
777	1.00	ORTEGA, ANDI	15217	SBICO	309	Pasture	G
778	1.00	FOX, N L	5950	SBILAWCO	6	Pasture	G
779	1.00	GUERRA, ALFI	8429	LANDRUM	7	Pasture	G
780	1.00	ATKINSON, RIC	973	SBILAWCO	246	Pasture	G
780	2.00	VALADEZ, MAI	21480	SBILAWCO	246	Pasture	G
781	1.00	MCCAIN, JOE	12370	SBILAWCO	44	SCane	G
782	1.00	HERNANDEZ, L	1949	SBILAWCO	207	Pasture	G
783	1.00	LA BELLE, LIN	11170	A BRYAN	1	Pasture	G
784	1.00	LONG, MARCE	11740	SBILAWCO	105	SCane	G
784	2.00	BROWN, TILINA	2070	SBILAWCO	163	SCane	G
784	3.00	TURNER, BROD	21950	SBILAWCO	164	SCane	G
785	1.00	BOY FARMS, IN	4815	UNIT 1	95	SCane	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.

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.

ACCT	SUBDIV	BLOCK	LOT	GROSS	OUTAGE	NET	DATE	PID
1000	SBICO	91	S 1/2	30	0.97	19.03		1000-1
1010	SBICO	220	S 1/2	20	3.62	16.38		1010-1
1027	SBICO	129		10	0	10		1027-1
1030	SBICO	2	PART	1.84	0	1.84		1030-1
1040	SBILAWCO	35	S 1/2 NW 1/4 SW 1/4	10	0.15	9.85		1040-1
1040	SBILAWCO	15	PARTS	19.91	2.71	17.2	8/9/1989	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	20.24	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	8.86	2.26	4.6		1045-0
1045	SBICO	141	PT	13.07	5.23	7.84		1045-0
1045	SBILAWCO	14	PT NW CORNER	5.73	1.45	4.28		1045-0
1070	SBILAWCO	148	S PT	62.77	1.08	61.69		1070-1
1070	SBILAWCO	149	E 1/2	75.74	9.7	66.04		1070-2
1080	SBILAWCO	209	PARTS SW 1/4	2.5	0	2.5		1080-2
1081	SBILAWCO	209	PARTS SW 1/4	4.5	0.41	4.09		1081-0
1085	LANDRUM	4	3 M DELA PUENTE	1.42	0.02	1.39		1085-1
1097	SBICO	138	PART	10	0.25	9.75	9/22/1994	1097-1
1105	SBILAWCO	34	W 1/2 NE 1/4	20	2.74	17.26		1105-1
1110	SBILAWCO	66	PT S PT	3.62	0.4	3.22		1110-2
1112	SBILAWCO	66	PT S PT	1.38	0	1.38		1112-1
1112	SBICO	548		6	4.4	36.20		1112-1

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.

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.

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.

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.