

~~Peppersack, Jeff~~ → Fitz for TransPers 5044, 5045, 5046, 69624, 69626

From: Charles G. Brockway [charles.g.brockway@brockwayeng.com]
Sent: Thursday, June 11, 2009 2:49 PM
To: Peppersack, Jeff
Subject: Picabo Livestock
Attachments: Picabo Livestock delivery analysis.pdf; Analysis of delivery records.doc

Jeff,

Per your suggestion, we have compiled all known watermaster delivery records for 1946-2006 pertaining to the Picabo Livestock headgates. Please take a look and the data plus the attached narrative and let me know your thoughts. It appears the highest pre-1998 diversion that can be justified is 6.3 ac-ft/ac. Obvious, this is at the points of diversion rather than the field headgate(s). We are thinking that perhaps the limitation would be best stated in terms of the volume at the PODs since measurement of field headgate volume (especially in this case) would be extremely difficult.

Gary Slette will be forwarding you another draft petition for your review.

Thanks,
Chuck

Charles G. Brockway, Ph.D., P.E.
Brockway Engineering, PLLC
2016 Washington Street North, Suite 4
Twin Falls, Idaho 83301
(208) 736-8543
charles.g.brockway@brockwayeng.com

SUPPORT DATA

IN FILE # 37-21

6/11/2009

Picabo Livestock Co.
Analysis of Water Delivery Records

Brockway Engineering, PLLC
June 9, 2009

Surface water delivery records were obtained from the District 37/37M annual report books, either on file at Brockway Engineering or at the watermaster office. Years of record examined were 1946-2006.

For 1979, 1985, 1989, and 1990, the watermaster record for the O Drain was missing. For 1984 and 1986, the watermaster record lists only the total of the several drains in the Silver Creek system, of which the O Drain is one. For these six years the O Drain total volume was estimated as the average O Drain volume for 1970-1999.

For 1981, the watermaster record contains a table for the Kilpatrick Ditch, but the table is blank. It is highly unlikely that zero flow was delivered into this ditch in 1981.

Supplemental groundwater diversion has previously been estimated using power records for 1997 – 2002. This was done at the request of Allen Merritt in support of the 2004 transfer. To estimate groundwater diversion in other years (after the wells began to be used in 1960), a regression was developed relating groundwater diversion to surface water diversion on an annual basis (greater surface water availability should result in lower groundwater diversion). The relationship is weak, but is the best information available at this time. No power records are available prior to 1997. Based on the regression line, the groundwater diversion would be zero if the surface diversion exceeded 12,300 acre-feet.

Per-acre diversion volume was calculated assumed 2774 acres for 1946-1997 and 2711 acres for 1998-2006.

Statistics were calculated for the per-acre diversion volume for the entire period and for the period prior to the 1998 transfer. The statistics do not differ significantly between the two periods.

The mean per-acre diversion for 1946-1997 was 4.88 ac-ft/acre and the maximum was 6.32 ac-ft/acre in 1986. Other high volumes include 6.08 ac-ft/ac in 1982, 6.11 ac-ft/ac in 1974, and 6.02 ac-ft/ac in 1969.

Pdef for "alfalfa – less frequent cuttings" at the Picabo NWS station in 1986 was 788 mm or 2.59 ac-ft/ac (Allen & Robison, 2007). In this year, the diversion volume of 6.32 ac-ft/ac equated to an overall seasonal efficiency for the entire system of 41%. This is not unreasonable as a lower bound for a gravity and flood irrigation system. Using the mean diversion volume of 4.88 ac-ft/acre and the mean Pdef of 737 mm or 2.42 ac-ft/acre, the overall efficiency would be 50%.

PICABO LIVESTOCK ANNUAL WATER DIVERSION

Brockway Engineering, PLLC 1/29/08 Revised 6/9/09

PRELIMINARY

Year	Surface Water Diversion (acre-feet)	Estimated GW Diversion* (acre-feet)	Estimated Total Diversion (acre-feet)	Per-acre Diversion** (ac-ft/acre)	Runoff to Magic Res. (acre-feet)
1946	10669	0	10669	3.85	400000
1947	9343	0	9343	3.37	273000
1948	9245	0	9245	3.33	230000
1949	10711	0	10711	3.86	256000
1950	11066	0	11066	3.99	362000
1951	12104	0	12104	4.36	488000
1952	9911	0	9911	3.57	750000
1953	13132	0	13132	4.73	331000
1954	14819	0	14819	5.34	264000
1955	11525	0	11525	4.15	156000
1956	14452	0	14452	5.21	574000
1957	13646	0	13646	4.92	432000
1958	15388	0	15388	5.55	494000
1959	13132	0	13132	4.73	159000
1960	14685	0	14685	5.29	204000
1961	13479	0	13479	4.86	104000
1962	13998	0	13998	5.05	353000
1963	11975	181	12156	4.38	307000
1964	13438	0	13438	4.84	284000
1965	13485	0	13485	4.86	814000
1966	14329	0	14329	5.17	233000
1967	14433	0	14433	5.20	410000
1968	14274	0	14274	5.15	157000
1969	16692	0	16692	6.02	710000
1970	15905	0	15905	5.73	372000
1971	14947	0	14947	5.39	
1972	14632	0	14632	5.27	
1973	14232	0	14232	5.13	
1974	16937	0	16937	6.11	
1975	13010	0	13010	4.69	
1976	12869	0	12869	4.64	
1977	12415	0	12415	4.48	
1978	15855	0	15855	5.72	
1979	13207	0	13207	4.76	403200
1980	14972	0	14972	5.40	
1981	8978	1820	10798	3.89	
1982	16864	0	16864	6.08	
1983	15466	0	15466	5.58	
1984	16288	0	16288	5.87	
1985	13365	0	13365	4.82	
1986	17520	0	17520	6.32	
1987	15103	0	15103	5.44	
1988	9571	1496	11067	3.99	
1989	15662	0	15662	5.65	
1990	15409	0	15409	5.55	
1991	10537	968	11504	4.15	
1992	10591	938	11529	4.16	
1993	14333	0	14333	5.17	
1994	14306	0	14306	5.16	
1995	12064	132	12196	4.40	
1996	7048	2875	9924	3.58	
1997	13462	711	14173	5.11	838350
1998	11304	696	12000	4.43	593728
1999	13523	589	14111	5.21	509479
2000	11470	2596	14066	5.19	168348
2001	7018	3720	10737	3.96	61308
2002	6570	2824	9394	3.47	143460
2003	9222	1686	10909	4.02	185715
2004	11091	664	11755	4.34	88402
2005	12476	0	12476	4.60	166738
2006	12873	0	12873	4.75	555868

Statistics of Total Diversion

Mean	13327
Median	13479
Std dev	2055
Skew Coefficient	-0.14837
Upper Quartile	14685
Lower Quartile	11755

Statistics of Per-Acre Diversion

	All Data	1946 - 1997
Maximum	6.32	6.32
Minimum	3.33	3.33
Mean	4.82	4.88
Median	4.86	4.98
Std dev	0.73	0.74
Skew Coefficient	-0.17	-0.28
Upper Quartile	5.29	5.39
Lower Quartile	4.34	4.38
% of Years >3.5	95.1%	96.2%

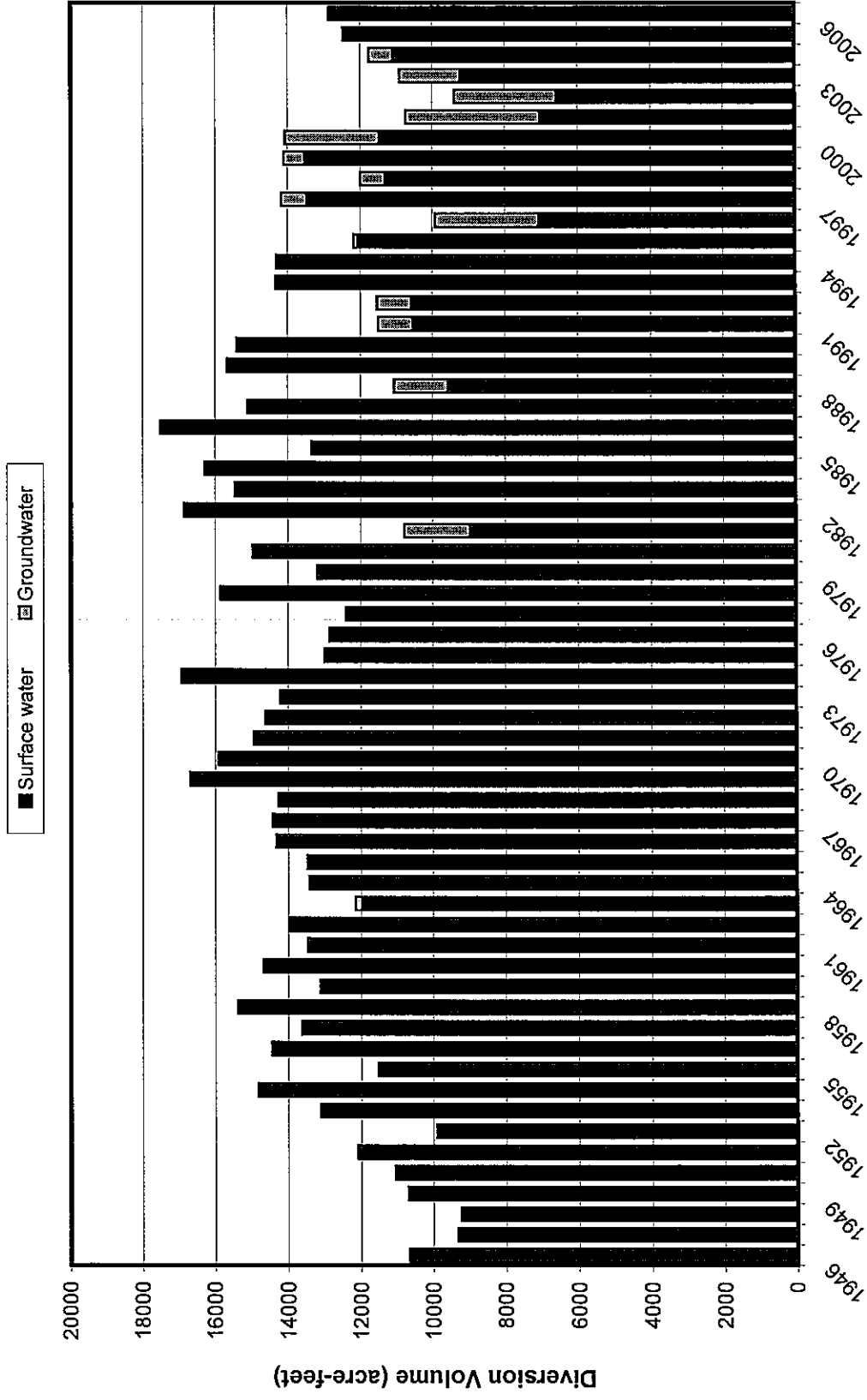
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* 1997-2002 est. with power records
1960-1996, 2003-2006 est. with regression equation developed with
1997-2002 data. Pre-1960 assumed to be zero (prior to GW rights).

** Assumes 2774 acres (1946-1997), and 2711 acres (1998-2006)

Picabo Livestock - Annual Water Diversions Surface Water Diversion Data from records of District 37 Watermaster



Attempt to Estimate GW Diversion with Surface Water Diversion

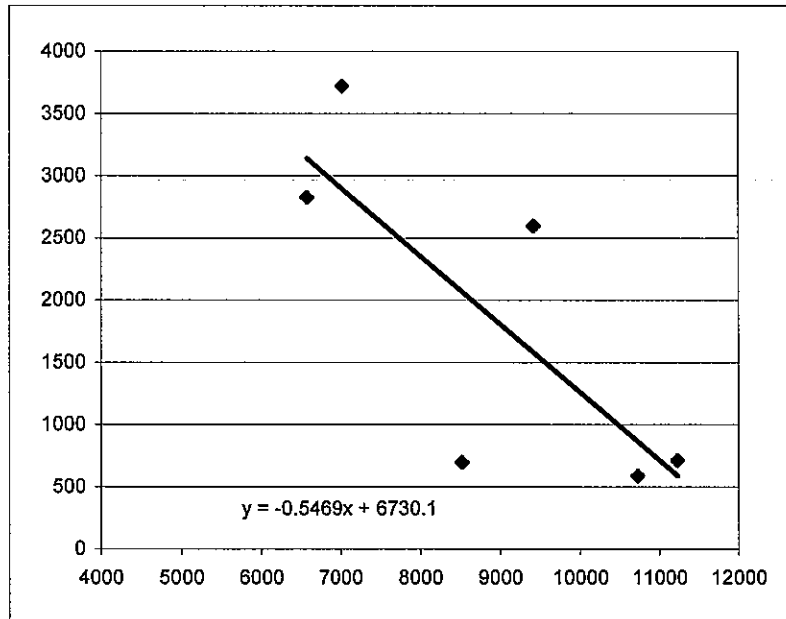
Hypothesize that GW diversion will decrease as surface water diversion increases.

C. G. Brockway 1/29/08

Acres 2774

PRELIMINARY

Year	Surface	GW	Total	Vol/acre
1997	11229	711	11940	4.30
1998	8520	696	9216	3.32
1999	10724	589	11313	4.08
2000	9419	2596	12014	4.33
2001	7018	3720	10737	3.87
2002	6570	2824	9394	3.39
2003	9222	Not calculated		
2004	11091	Not calculated		
2005	12476	Not calculated		
2006	12873	Not calculated		



Picabo Livestock Company
Watermaster records in CFS-DAYS

YEAR: 2008

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	0	570	703	922	693	302	0	3190	6327
Gillihan	0	150	196	202	155	165	0	869	1723
Iden	0	81	131	146	169	209	0	736	1459
Iden Pump	0	0	6	5	10	6	0	27	54
Albrethsen	0	83	106	81	80	78	0	428	849
O Drain	0	71	128	103	103	97	0	501	995
Meadow well	0	42	9	129	111	65	0	357	708
TOTAL	0	997	1279	1589	1321	922	0	6108	12115

YEAR: 2007

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	261	831	830	842	617	273	0	3654	7247
Gillihan	40	205	199	181	172	96	0	893	1771
Iden	38	148	143	147	155	94	0	726	1440
Iden #19-B	19	72	70	72	54	1	0	286	568
Iden Pump	0	0	9	7	7	2	0	25	50
Albrethsen	22	107	105	106	104	90	0	533	1056
O Drain	19	96	121	114	311	109	0	770	1527
Meadow well	0	50	46	151	136	119	0	501	994
TOTAL	397	1508	1523	1620	1555	784	0	7388	14654

Picabo Livestock Company
Watermaster records in CFS-DAYS

YEAR: 2006

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	0	729	688	826	828	766	0	3836	7608
Gillihan	0	103	166	149	139	116	0	672	1333
Iden	0	95	228	236	227	162	0	948	1880
Iden Pump	0	0	7	10	8	3	0	28	55
Albrethsen	0	54	59	61	61	59	0	294	582
O Drain	0	0	210	142	218	143	0	713	1415
Meadow well								0	0
TOTAL	0	980	1358	1423	1481	1249	0	6490	12873

YEAR: 2005

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	0	318	711	925	1022	905	0	3882	7700
Gillihan	0	0	189	148	119	150	0	605	1200
Iden	2	34	156	246	149	79	0	667	1322
Iden Pump	0	0	5	9	9	8	0	31	62
Albrethsen	22	74	72	74	109	141	0	492	976
O Drain	0	0	123	128	171	190	0	613	1216
Meadow well								0	0
TOTAL	23	427	1255	1530	1580	1474	0	6290	12476

YEAR: 2004

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	75	747	730	736	632	641	0	3560	7061
Gillihan	0	15	122	95	80	25	0	337	669
Iden	6	122	165	133	109	126	0	659	1308
Iden Pump	0	0	2	9	10	7	0	27	53
Albrethsen	27	124	80	62	62	58	0	413	820
O Drain	12	147	150	120	104	63	0	595	1180
Meadow well								0	0
TOTAL	119	1155	1249	1154	996	918	0	5592	11091

YEAR: 2003

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	34	412	844	575	353	359	0	2577	5111
Gillihan	0	38	116	145	130	0	0	428	850
Iden	5	36	194	204	135	135	0	710	1408
Iden Pump	0	0	3	10	10	3	0	26	52
Albrethsen	18	91	88	91	91	88	0	468	929
O Drain	0	19	120	124	107	70	0	440	874
Meadow well	no rec	no rec	no rec	no rec	no rec	no rec	no rec		
TOTAL	57	596	1366	1149	825	656	0	4649	9222

YEAR: 2002

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	0	375	565	368	104	240	0	1652	3277
Gillihan	0	108	150	132	0	0	0	390	773
Iden	0	47	222	92	0	5	0	366	727
Iden Pump	0	0	8	4	0	0	0	12	25
Albrethsen	0	77	126	111	93	90	0	497	986
O Drain	87	73	110	62	22	40	0	395	783
Meadow well									
TOTAL	87	680	1181	769	219	375	0	3312	6570

YEAR: 2001

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	149	503	440	244	218	60	0	1614	3202
Gillihan	0	148	165	86	62	54	0	515	1022
Iden	91	135	119	12	0	96	0	453	898
Iden Pump	0	0	2	0	0	0	0	2	4
Albrethsen	31	64	59	85	93	90	0	422	836
O Drain	70	110	112	66	95	78	0	532	1055
Meadow well									
TOTAL	341	959	898	493	468	378	0	3538	7018

YEAR: 2000

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	201	597	602	464	460	445	0	2769	5493
Gillihan	9	95	147	124	124	120	0	619	1228
Iden	55	142	224	177	177	172	0	947	1879
Iden Pump	0	7	4	5	6	2	0	24	47
Albrethsen	13	79	76	74	74	72		389	772
O Drain	84	320	179	105	148	198	0	1034	2052
Meadow well									
TOTAL	362	1240	1232	950	990	1008	0	5783	11470

YEAR: 1999

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	0	226	730	778	710	694	0	3137	6222
Gillihan	0	79	79	138	97	90	0	483	958
Iden	0	92	276	271	291	259	0	1189	2359
Iden Pump	0	0	5	10	10	3	0	27	53
Albrethsen	0	39	120	152	152	109	0	571	1133
O Drain	262	217	131	305	254	243	0	1411	2799
Meadow well									
TOTAL	262	652	1341	1653	1513	1397	0	6818	13523

YEAR: 1998

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	0	0	401	781	741	657	0	2580	5118
Gillihan	0	14	118	161	161	156	0	610	1211
Iden	0	35	169	213	234	213	0	865	1716
Iden Pump	0	0	3	1	3	2	0	10	20
Albrethsen	0	31	18	61	61	59	0	229	455
O Drain	82	84	128	337	393	380	0	1404	2784
Meadow well									
TOTAL	82	165	838	1554	1594	1467	0	5699	11304

YEAR: 1997

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick	0	511	447	938	786	763	0	3445	6833
Gillihan	0	88	136	226	155	137	0	742	1471
Iden	0	147	181	274	279	270	0	1151	2283
Iden Pump	0	4	4	5	10	9	0	32	63
Albrethsen	0	53	59	61	61	59	0	292	579
O Drain	108	98	216	196	239	268	0	1125	2232
Meadow well									
TOTAL	108	902	1043	1699	1529	1506	0	6787	13462

YEAR: 1996

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A								0	0
Gillihan #11	0	133	181	141	87	68	0	609	1209
Iden #19	0	122	142	238	256	191	0	950	1884
Iden Pump	0	0	0	7	6	4	0	17	33
Albrethsen #17	0	26	45	60	61	18	0	210	416
O Drain	131.46	226	283	252	478	397	0	1768	3507
Meadow well								0	0
TOTAL	131	508	652	697	888	677	0	3553	7048

YEAR: 1995

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	118	207	476	954	906	739	0	3399	6742
Gillihan #11	0	59	34	84	191	173	0	541	1073
Iden #19	0	12	120	136	204	199	0	671	1331
Iden Pump	0	0	0	4	10	6	0	20	39
Albrethsen #17	0	16	39	61	61	59	0	235	467
O Drain	87	141	307	213	165	302	0	1216	2413
Meadow well								0	0
TOTAL	205	435	977	1452	1536	1478	0	6082	12064

YEAR: 1994

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	239	678	733	565	548	508	0	3272	6491
Gillihan #11	50	136	142	156	182	117	0	784	1555
Iden #19	28	175	299	117	85	150	0	854	1694
Iden Pump	0	5	3	4	7	7	0	28	55
Albrethsen #17	0	51	66	93	85	38	0	333	661
O Drain	97	138	402	276	474	554	0	1942	3851
Meadow well								0	0
TOTAL	415	1185	1646	1211	1381	1375	0	7213	14306

YEAR: 1993

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	519	641	691	817	658	0	3326	6598
Gillihan #11	0	83	60	232	13	165	0	552	1094
Iden #19	0	169	182	207	242	236	0	1036	2056
Iden Pump	0	3	0.3	6	2	0	0	12	24
Albrethsen #17	0	28	49	61	61	59	0	257	510
O Drain	0	120	410	396	537	579	0	2043	4051
Meadow well									
TOTAL	0	923	1341	1593	1672	1697	0	7226	14333

YEAR: 1992

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	407	392	582	535	252	443	0	2610	5177
Gillihan #11	150	179	105	155	139	65	0	791	1569
Iden #19	125	167	154	146	126	88	0	806	1599
Iden Pump	0	7	5	0	1	3	0	16	32
Albrethsen #17	92	124	64	62	62	60	0	464	920
O Drain	49	148	123	94	117	120	0	652	1294
Meadow well									
TOTAL	823	1017	1032	992	697	779	0	5339	10591

YEAR: 1991

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	72	473	550	626	508	368	0	2597	5151
Gillihan #11	0	75	162	181	186	137	0	741	1470
Iden #19	18	150	142	93	134	142	0	679	1347
Iden Pump	0	0	5	7	2	0.4	0	15	30
Albrethsen #17	43	77	104	78	124	62	0	488	968
O Drain	0	60	162	171	196	204	0	792	1570
Meadow well									
TOTAL	133	835	1125	1156	1150	913	0	5312	10537

YEAR: 1990

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	44	510	818	501	517	466	0	2856	5664
Gillihan #11	66	186	174	144	128	86	0	784	1554
Iden #19	146	285	281	189	186	225	0	1312	2603
Iden Pump	146	285	281	189	186	225	0	1312	2603
Albrethsen #17	22	102	90	50	31	77	0	371	736
O Drain								1134	2249
Meadow well									
TOTAL	424	1368	1644	1073	1047	1078	0	7769	15409

No data found: Brockway or Water Dist 37 & 37M
Estimate O Drain with 1970-1999 average

Picabo Livestock Company
Watermaster records in CFS-DAYS

Average O Drain 1013

YEAR: 1989

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	48	704	718	602	562	710	0	3344	6633
Gillihan #11	0	206	225	155	135	133	0	854	1694
Iden #19	0	266	330	114	128	304	0	1142	2265
Iden Pump	0	266	330	114	128	304	0	1142	2265
Albrethsen #17	4	74	60	52	62	28	0	280	556
O Drain								1134	2249
Meadow well								0	0
TOTAL	52	1516	1663	1037	1015	1479	0	7896	15662

No data found: Brockway Eng. or Water Dist 37 & 37M
Estimate O Drain with 1970-1999 average

YEAR: 1988

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	156	551	524	419	450	469	0	2568	5093
Gillihan #11	0	148	255	127	126	126	0	782	1551
Iden #19	0	199	155	124	124	145	0	747	1482
Iden Pump								0	0
Albrethsen #17	6	148	110	115	124	140	0	643	1276
O Drain	0	0	31	40	15	0	0	85	169
Meadow well								0	0
TOTAL	162	1046	1075	825	838	880	0	4825	9571

No data found: Brockway Eng. or Water Dist 37 & 37M
Note: Listed as "Canal into Creek from Kilpat"
Kevin Lakey says this might be the O Drain

YEAR: 1987

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	334	565	771	619	621	558	0	3467	6877
Gillihan #11	95	292	341	227	213	156	0	1324	2625
Iden #19	76	150	290	151	201	120	0	989	1961
Iden Pump								0	0
Albrethsen #17	79	58	57	123	64	89	0	469	930
O Drain	180	296	244	272	204	170	0	1366	2709
Meadow well								0	0
TOTAL	764	1360	1703	1391	1303	1093	0	7614	15103

no data found: Brockway Eng. or Water Dist 37 & 37M

YEAR: 1986

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	752	1177	1006	1268	539	0	4741	9404
Gillihan #11	0	104	403	390	238	220	0	1356	2690
Iden #19	0	189	325	316	284	128	0	1242	2463
Iden Pump								0	0
Albrethsen #17	0	77	69	99	80	36	0	360	715
O Drain								1134	2249
Meadow well									
TOTAL	0	1122	1974	1811	1869	923	0	8833	17520

no data found: Brockway Eng. or Water Dist 37 & 37M
Only lists total of Drains C,D,F,G,H,J, K&L, M&N, O
Estimate O Drain with 1970-1999 average

YEAR: 1985

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	593	803	723	633	181	0	2933	5817
Gillihan #11	0	118	380	354	274	33	0	1158	2298
Iden #19	0	214	320	282	291	80	0	1186	2353
Iden Pump								0	0
Albrethsen #17	0	69	76	83	77	22	0	327	648
O Drain								1134	2249
Meadow well									
TOTAL	0	994	1578	1442	1274	316	0	6738	13365

no data found: Brockway Eng. or Water Dist 37 & 37M
No data found: Brockway Eng. or Water Dist 37 & 37M
Estimate O Drain with 1970-1999 average

YEAR: 1984

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	427	868	836	843	622	0	3595	7131
Gillihan #11	0	99	299	467	326	222	0	1413	2802
Iden #19	0	267	325	344	321	224	0	1481	2937
Iden Pump	0	0	6	18	4	0	0	29	57
Albrethsen #17	0	112	100	135	134	80	0	560	1111
O Drain								1134	2249
Meadow well									
TOTAL	0	905	1598	1800	1628	1147	0	8212	16288

Only lists total of Drains C,D,F,G,H,J, K&L, M&N, O
Estimate O Drain with 1970-1999 average

YEAR: 1983

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	228	875	823	828	605	0	3359	6663
Gillihan #11	0	117	344	370	348	223	0	1402	2781
Iden #19	0	56	427	447	259	285	0	1473	2922
Iden Pump	0	0	0	5	12	0	0	17	33
Albrethsen #17	0	60	143	167	107	131	0	607	1205
O Drain	0	16	187	248	248	240	0	939	1863
Meadow well									
TOTAL	0	477	1976	2059	1802	1484	0	7797	15466

YEAR: 1982

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	463	857	889	772	672	0	3652	7244
Gillihan #11	0	241	381	356	416	396	0	1789	3549
Iden #19	0	199	352	274	232	177	0	1233	2446
Iden Pump								0	0
Albrethsen #17	0	72	257	197	157	141	0	824	1634
O Drain	0	66	202	248	248	240	0	1004	1991
Meadow well									
TOTAL	0	1041	2048	1964	1825	1626	0	8502	16864

no data found: Brockway Eng. or Water Dist 37 & 37M

YEAR: 1981

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	0	0	0	0	0	0	0	0
Gillihan #11	0	317	313	440	390	333	0	1793	3557
Iden #19	4	253	278	206	173	205	0	1119	2219
Iden Pump								0	0
Albrethsen #17	33	89	163	209	94	86	0	674	1336
O Drain	0	127	183	214	210	207		941	1866
Meadow well									
TOTAL	37	787	937	1069	867	831	0	4526	8978

Table in book is blank for Kilpatrick Ditch — highly unlikely

No data found: Brockway Eng. or Water Dist 37 & 37M

YEAR: 1980

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	32	646	574	900	884	551	0	3588	7117
Gillihan #11	0	198	258	525	424	201	0	1806	3186
Iden #19	12	255	226	299	162	101	0	1055	2092
Iden Pump	0	0	14	34	30	9	0	87	172
Albrethsen #17	0	28	84	153	124	12	0	400	794
O Drain	0	127	162	186	213	126	0	813	1612
Meadow well									
TOTAL	44	1254	1318	2097	1837	1000	0	7548	14972

Note: Gillihan # 11 New #5
Note: Iden #19 New #13

Picabo Livestock Company
Watermaster records in CFS-DAYS

Average O Drain

964 cfs-days

YEAR: 1979

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	308	718	883	671	342	0	2921	5794
Gillihan #11	0	61	299	319	277	114	0	1070	2123
Iden #19	0	67	208	279	275	134	0	963	1910
Iden Pump	0	0	0	42	28	0	0	69	138
Albrethsen #17	0	50	130	164	112	45	0	501	994
O Drain								1134	2249
Meadow well									
TOTAL	0	487	1355	1686	1363	635	0	6658	13207

No data found: Brockway or Water Dist 37 & 37M
Estimate O Drain with 1970-1999 average

YEAR: 1978

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	303	1014	825	892	487	0	3521	6984
Gillihan #11	0	86	423	426	405	175	0	1515	3006
Iden #19	0	170	353	363	310	100	0	1296	2571
Iden Pump	0	9	41	43	31	6	0	130	257
Albrethsen #17	0	57	136	158	128	62	0	541	1072
O Drain	0	66	231	230	229	236	0	991	1965
Meadow well								0	0
TOTAL	0	691	2197	2046	1995	1065	0	7993	15855

YEAR: 1977

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	272	539	621	566	542	464	0	3004	5958
Kilpatrick #18 P	0	0	4	6	0	0	0		
Gillihan #11	62	149	156	180	145	121	0	813	1612
Iden #19	193	137	48	115	102	180	0	775	1537
Iden Pump	0	6	0	0	0	0	0	6	13
Albrethsen #17	80	81	109	117	147	101	0	635	1260
O Drain	74	195	193	184	178	204	0	1026	2036
Meadow well								0	0
TOTAL	681	1108	1130	1168	1114	1069	0	6259	12415

YEAR: 1976

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	308	717	882	671	341	0	2919	5790
Gillihan #11	0	61	299	318	277	114	0	1069	2120
Iden #19	0	67	207	279	275	134	0	962	1908
Iden Sprinkler	0	0	0	42	28	0	0	69	138
Albrethsen #17	0	50	129	164	111	45	0	499	990
O Drain	0	71	188	258	233	219	0	970	1923
Meadow well									
TOTAL	0	557	1540	1943	1595	853	0	6488	12869

YEAR: 1975

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	132	855	666	779	462	0	2894	5740
Gillihan #11	0	26	339	313	311	192	0	1181	2343
Iden #19	0	58	272	297	445	194	0	1266	2511
Iden Pump & Sprinkler	0	0	0	2	1	0	0	3	6
Albrethsen #17	0	0	50	160	113	52	0	375	744
O Drain	0	23	178	221	225	193	0	840	1667
Meadow well									
TOTAL	0	239	1694	1658	1875	1093	0	6559	13010

YEAR: 1974

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	665	911	1005	885	738	0	4204	8339
Gillihan #11	0	268	416	440	305	159	0	1588	3150
Iden #19	0	313	388	334	308	218	0	1561	3096
Iden Pump	0	0	0	2	0	0	0	2	5
Albrethsen #17	0	43	156	65	0	21	0	285	565
O Drain	0	90	193	204	206	206	0	898	1782
Meadow well									
TOTAL	0	1379	2064	2050	1704	1342	0	8539	16937

YEAR: 1973

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	353	882	864	814	498	0	3411	6766
Gillihan #11	0	129	327	393	416	144	0	1409	2795
Iden #19	0	166	264	245	251	187	0	1113	2208
Iden Pump								0	0
Albrethsen #17	0	66	108	98	52	0	0	324	643
O Drain	0	75	191	233	219	200	0	918	1822
Meadow well									
TOTAL	0	789	1772	1833	1752	1029	0	7175	14232

YEAR: 1972

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	486	728	884	656	469	0	3223	6393
Gillihan #11	0	324	391	384	312	104	0	1515	3005
Iden #19	0	148	262	307	223	178	0	1118	2218
Iden Pump								0	0
Albrethsen #17	0	65	192	201	94	0	0	552	1095
O Drain	0	124	209	227	243	166	0	969	1922
Meadow well									
TOTAL	0	1147	1782	2003	1528	917	0	7377	14632

YEAR: 1971

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	393	903	921	951	363	0	3531	7004
Gillihan #11	0	272	380	390	316	85	0	1443	2862
Iden #19	0	132	332	249	211	107	0	1031	2045
Iden Pump								0	0
Albrethsen #17	0	90	200	39	177	59	0	565	1121
O Drain	0	68	235	238	239	186	0	966	1916
Meadow well									
TOTAL	0	955	2050	1837	1894	800	0	7536	14947

YEAR: 1970

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Kilpatrick #18 & 18A	0	392	783	1043	1181	486	0	3885	7706
Gillihan #11	0	232	280	321	325	155	0	1313	2604
Iden #19	0	128	251	328	305	129	0	1141	2263
Iden Pump								0	0
Albrethsen #17	0	34	211	127	203	5	0	580	1150
O Drain	0	102	230	266	260	243	0	1100	2181
Meadow well									
TOTAL	0	888	1755	2085	2274	1018	0	8019	15905

Picabo Livestock Company
Watermaster records in CFS-DAYS

Average O Drain

907 cfs-days

YEAR: 1969

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	284	204	292	316	107	0	1203	2386
Albrethsen #17	0	110	128	161	158	0	0	557	1105
Kilpatrick #18	0	722	959	619	1358	554	0	4212	8355
Iden #19 & Purr	0	247	249	246	321	258	0	1321	2620
Iden Pump								0	0
O Drain	0	108	255	275	239	245	0	1123	2227
Meadow well								0	0
TOTAL	0	1471	1795	1593	2392	1164	0	8416	16692

YEAR: 1968

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	46	218	246	437	201	127	0	1275	2529
Albrethsen #17	9	123	194	195	75	10	0	606	1202
Kilpatrick #18	24	775	614	895	739	236	0	3283	6512
Iden #19 & Purr	28	134	157	367	112	112	0	910	1805
Iden Pump								0	0
O Drain	4	160	243	222	296	196	0	1123	2227
Meadow well								0	0
TOTAL	111	1410	1454	2116	1423	681	0	7197	14274

YEAR: 1967

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	190	329	301	313	136	0	1269	2517
Albrethsen #17	0	150	113	193	182	0	0	638	1265
Kilpatrick #18	0	331	614	790	1116	367	0	3218	6383
Iden #19 & Purr	0	123	227	405	335	86	0	1176	2333
Iden Pump								0	0
O Drain	0	38	219	255	259	205	0	975	1935
Meadow well								0	0
TOTAL	0	832	1502	1944	2205	794	0	7276	14433

YEAR: 1966

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	137	345	250	262	79	0	1073	2128
Albrethsen #17	30	235	179	235	164	202	0	1045	2073
Kilpatrick #18	45	595	732	811	787	787	0	3757	7452
Iden #19 & Purr	0	135	220	134	82	55	0	626	1242
Iden Pump								0	0
O Drain	0	91	144	168	153	167	0	723	1434
Meadow well								0	0
TOTAL	75	1193	1620	1598	1448	1290	0	7224	14329

YEAR: 1965

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	138	329	375	167	83	0	1092	2166
Albrethsen #17	0	146	117	160	58	21	0	502	996
Kilpatrick #18	0	269	1048	880	724	88	0	3009	5968
Iden #19 & Purr	0	15	495	326	234	96	0	1166	2313
Iden Pump								0	0
O Drain	0	33	247	254	264	231	0	1030	2042
Meadow well								0	0
TOTAL	0	601	2236	1995	1447	519	0	6799	13485

YEAR: 1964

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	44	321	426	289	87	0	1167	2315

Albrethsen #17	0	79	205	183	104	23	0	594	1178
Kilpatrick #18	0	159	689	1087	894	228	0	3057	6064
Iden #19 & Purr	0	82	285	285	271	176	0	1099	2180
Iden Pump								0	0
O Drain	0	34	181	245	227	171	0	858	1701
Meadow well									
TOTAL	0	398	1681	2226	1785	685	0	6775	13438

YEAR: 1963

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	136	166	470	251	95	0	1138	2257
Albrethsen #17	0	97	125	213	99	13	0	547	1085
Kilpatrick #18	0	69	553	1038	563	254	0	2477	4913
Iden #19 & Purr	0	45	115	352	279	134	0	925	1835
Iden Pump								0	0
O Drain	0	25	231	241	264	189	0	950	1885
Meadow well									
TOTAL	0	372	1210	2314	1456	685	0	6037	11975

YEAR: 1962

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	130	321	415	288	157	0	1311	2600
Albrethsen #17	0	88	152	190	79	107	0	616	1222
Kilpatrick #18	0	165	789	1034	887	228	0	3103	6155
Iden #19 & Purr	0	22	312	282	265	179	0	1060	2103
Iden Pump								0	0
O Drain	0	59	245	272	219	172	0	967	1919
Meadow well									
TOTAL	0	464	1819	2193	1738	843	0	7057	13998

YEAR: 1961

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	92	170	218	349	132	249	0	1210	2400
Albrethsen #17	0	183	213	204	195	148	0	943	1870
Kilpatrick #18	0	641	651	726	778	643	0	3439	6821
Iden #19 & Purr	13	134	128	89	93	93	0	550	1091
Iden Pump								0	0
O Drain	8	90	120	129	137	171	0	654	1297
Meadow well									
TOTAL	113	1218	1330	1497	1335	1304	0	6796	13479

YEAR: 1960

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	217	279	265	288	234	0	1283	2545
Albrethsen #17	0	121	191	204	100	105	0	721	1430
Kilpatrick #18	0	461	731	873	776	640	0	3481	6905
Iden #19 & Purr	0	65	289	327	326	240	0	1247	2473
Iden Pump								0	0
O Drain	0	52	131	167	166	156	0	672	1332
Meadow well									
TOTAL	0	916	1621	1836	1656	1375	0	7404	14685

	April	May	June	July	August	September	October	cfs-days	ac-ft
Gillihan #11	0	134	201	285	101	16	0	737	1462
Albrethsen #17	0	92	114	126	120	41	0	493	978
Kilpatrick #18	0	461	569	1035	950	455	0	3470	6883
Iden #19 & Pump	0	113	180	359	270	89	0	1011	2005
Iden Pump								0	0
O Drain	14	108	192	217	221	158	0	910	1805
Meadow well									
TOTAL	14	908	1256	2022	1662	759	0	6621	13132

Note: Drain Ditch Drainage District #1, Near Picabo "0"

YEAR: 1952

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	56	231	151	147	18	0	603	1196
Albrethsen #17	0	69	115	71	97	0	0	352	698
Kilpatrick #18	0	333	794	545	728	239	0	2639	5234
Iden #19 & Pump	0	19	165	157	254	10	0	605	1200
Iden Pump								0	0
O Drain	0	132	172	189	179	126	0	798	1582
Meadow well									
TOTAL	0	609	1477	1113	1405	393	0	4997	9911

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lahey said this was "O Drain")

YEAR: 1951

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	108	314	229	138	44	0	833	1652
Albrethsen #17	0	59	159	106	29	11	0	364	722
Kilpatrick #18	0	302	987	909	912	293	0	3403	6750
Iden #19 & Pump	0	49	181	228	186	118	0	762	1511
Iden Pump								0	0
O Drain	39	102	183	134	176	107	0	741	1469
Meadow well									
TOTAL	39	620	1824	1606	1441	573	0	6103	12104

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lahey said this was "O Drain")

YEAR: 1950

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	100	284	222	144	30	0	780	1547
Albrethsen #17	0	68	136	116	72	0	0	392	778
Kilpatrick #18	0	497	940	664	898	116	0	3115	6179
Iden #19 & Pump	0	122	101	174	171	44	0	612	1214
Iden Pump								0	0
O Drain	22	105	140	149	161	105	0	680	1349
Meadow well									
TOTAL	22	892	1601	1325	1446	295	0	5579	11066

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lahey said this was "O Drain")

Picabo Livestock Company
Watermaster records in CFS-DAYS

Average O Drain

500 cfs-days

YEAR: 1949

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	150	282	264	114	0	0	810	1607
Albrethsen #17	0	43	127	121	37	0	0	328	651
Kilpatrick #18	56	592	741	882	752	277	0	3300	6546
Iden #19 & Pump	17	72	96	138	82	0	0	405	803
Iden Pump								0	0
O Drain	23.5	110	131	116	106	72	0	557	1105
Meadow well								0	0
TOTAL	97	967	1377	1521	1091	349	0	5400	10711

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lahey said this was "O Drain")

YEAR: 1948

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	41	276	261	124	0	0	702	1392
Albrethsen #17	0	57	126	93	95	0	0	371	736
Kilpatrick #18	0	152	660	777	793	363	0	2745	5445
Iden #19 & Pump	0	0	75	182	90	24	0	371	736
Iden Pump								0	0
O Drain	6	14	64	155	101	132	0	472	936
Meadow well								0	0
TOTAL	6	264	1201	1468	1203	519	0	4661	9245

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lahey said this was "O Drain")

YEAR: 1947

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	4	211	168	288	76	10	0	757	1502
Albrethsen #17	0	151	148	160	29	0	0	488	968
Kilpatrick #18	0	517	655	723	331	357	0	2583	5123
Iden #19 & Pump	0	51	197	167	82	0	0	497	986
Iden Pump								0	0
O Drain	0	40	81	85	95	85	0	386	765
Meadow well								0	0
TOTAL	4	970	1249	1423	613	452	0	4711	9343

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lahey said this was "O Drain")

YEAR: 1946

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	128	215	128	88	0	0	559	1109
Albrethsen #17	0	4	222	178	31	0	0	435	863
Kilpatrick #18	0	474	681	802	623	238	0	2818	5590
Iden #19 & Pump	0	112	196	206	44	0	0	558	1107
Iden Pump								0	0
O Drain	0	62	132	337	322	156	0	1009	2001
Meadow well								0	0
TOTAL	0	780	1446	1651	1108	394	0	5379	10669

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lahey said this was "O Drain")

YEAR: 1945

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	18	139	232	156	15	0	560	1111
Albrethsen #17	0	98	94	165	118	0	0	475	942
Kilpatrick #18	0	246	267	988	866	361	0	2728	5411
Iden #19 & Pump	0	206	142	112	191	73	0	724	1436
Iden Pump								0	0
O Drain	0	25	38	68	81	60	0	271	538
Meadow well								0	0
TOTAL	0	593	680	1565	1412	509	0	4758	9438

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lahey said this was "O Drain")

YEAR: 1944

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	29	123	289	122	49	0	611	1212
Albrethsen #17	0	20	137	149	144	31	0	480	952
Kilpatrick #18	0	115	420	723	719	57	0	2034	4034
Iden #19 & Pump	0	120	83	160	240	0	0	604	1197
Iden Pump								0	0
O Drain	0	17	99	80	58	50	0	303	601
Meadow well								0	0

Note: #11 Gillihan & Co.

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lahey said this was "O Drain")

TOTAL	0	300	862	1401	1282	186	0	4032	7997
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YEAR: 1943

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11								0	0
Albrethsen #17								0	0
Kilpatrick #18								0	0
Iden #19 & Pump								0	0
Iden Pump								0	0
O Drain								0	0
Meadow well								0	0
TOTAL	0	0	0	0	0	0	0	0	0

Brockway Engineering nor Water Dist 37 has this journal

YEAR: 1942

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11								0	0
Albrethsen #17								0	0
Kilpatrick #18								0	0
Iden #19 & Pump								0	0
Iden Pump								0	0
O Drain								0	0
Meadow well								0	0
TOTAL	0	0	0	0	0	0	0	0	0

Brockway Engineering nor Water Dist 37 has this journal

YEAR: 1941

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	80	206	197	79	0	0	562	1114
Albrethsen #17	27	105	120	173	68	90	0	583	1157
Kilpatrick #18	90	408	649	884	598	257	0	2885	5723
Iden #19 & Pump	51	61	63	65	0	0	0	240	475
Iden Pump								0	0
O Drain	0	56	72	145	73	32	0	378	750
Meadow well									
TOTAL	168	709	1110	1464	818	379	0	4647	9218

Note: #11 Gillihan & Co.

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lakey said this was "O Drain")

YEAR: 1940

	April	May	June	July	August	September	October	Total cfs-days	Total ac-ft
Gillihan #11	0	149	192	206	163	34	0	745	1479
Albrethsen #17	32	101	75	150	88	93	0	540	1071
Kilpatrick #18	0	547	617	679	638	165	0	2646	5248
Iden #19 & Pump	0	40	73	0	19	137	0	268	532
Iden Pump								0	0
O Drain	0	60	91	57	67	101	0	376	746
Meadow well									
TOTAL	32	898	1049	1093	975	529	0	4575	9075

Note: #11 Gillihan & Co.

Note: Drain Ditch Drainage District #1, Near Picabo
(Kevin Lakey said this was "O Drain")