

2013 Water Quality Summary

- 24 wells sampled
 - pH- All within normal range
 - 1 well exceeds the 700 $\mu\text{S}/\text{cm}$ agricultural standards and 900 $\mu\text{S}/\text{cm}$ drinking water standards
- 2 cooperative reports
 - CalWater 2012 Water Quality Report
 - Average pH=7.9
 - Average Specific Conductance=540 $\mu\text{S}/\text{cm}$
 - 2013 ANNUAL GROUNDWATER MONITORING RESULTS FOR JOHNS MANVILLE FIBERGLASS INSULATION MANUFACTURING PLANT'S WASTE-WATER TREATMENT PLANT, WILLOWS, CALIFORNIA

*Johns Manville
Annual 2013 Groundwater-Monitoring Report*

*July 17, 2013
Page 3 of 4*

**Table 1
Field Analyses of Groundwater Samples
(June 5, 2013)**

Well	pH	Temp.	SC @ 25°C	Top of Casing Elevation	DTW ²	Groundwater Elevation
	(pH units)	(°C)	($\mu\text{S}/\text{cm}$)	(feet, MSL ¹)	(feet)	(feet, MSL)
MW-1	7.45	21.6	833	163.60	13.69	149.91
MW-2	7.72	18.0	720	173.46	20.27	153.19
MW-3	7.21	20.2	812	171.13	21.67	149.46
MW-4	7.59	18.8	758	173.53	21.73	151.80
MW-5	7.64	17.9	670	177.45	20.46	156.99
MW-6	7.36	23.3	965	173.00	22.55	150.45
MW-7	7.28	20.5	912	172.60	22.12	150.48
MW-8	7.51	17.7	696	174.99	19.35	155.64
MW-9	7.37	20.3	831	171.46	22.49	148.97

Notes: 1 = Mean sea level; 2 = Depth to water.

2013 Groundwater Quality Summary

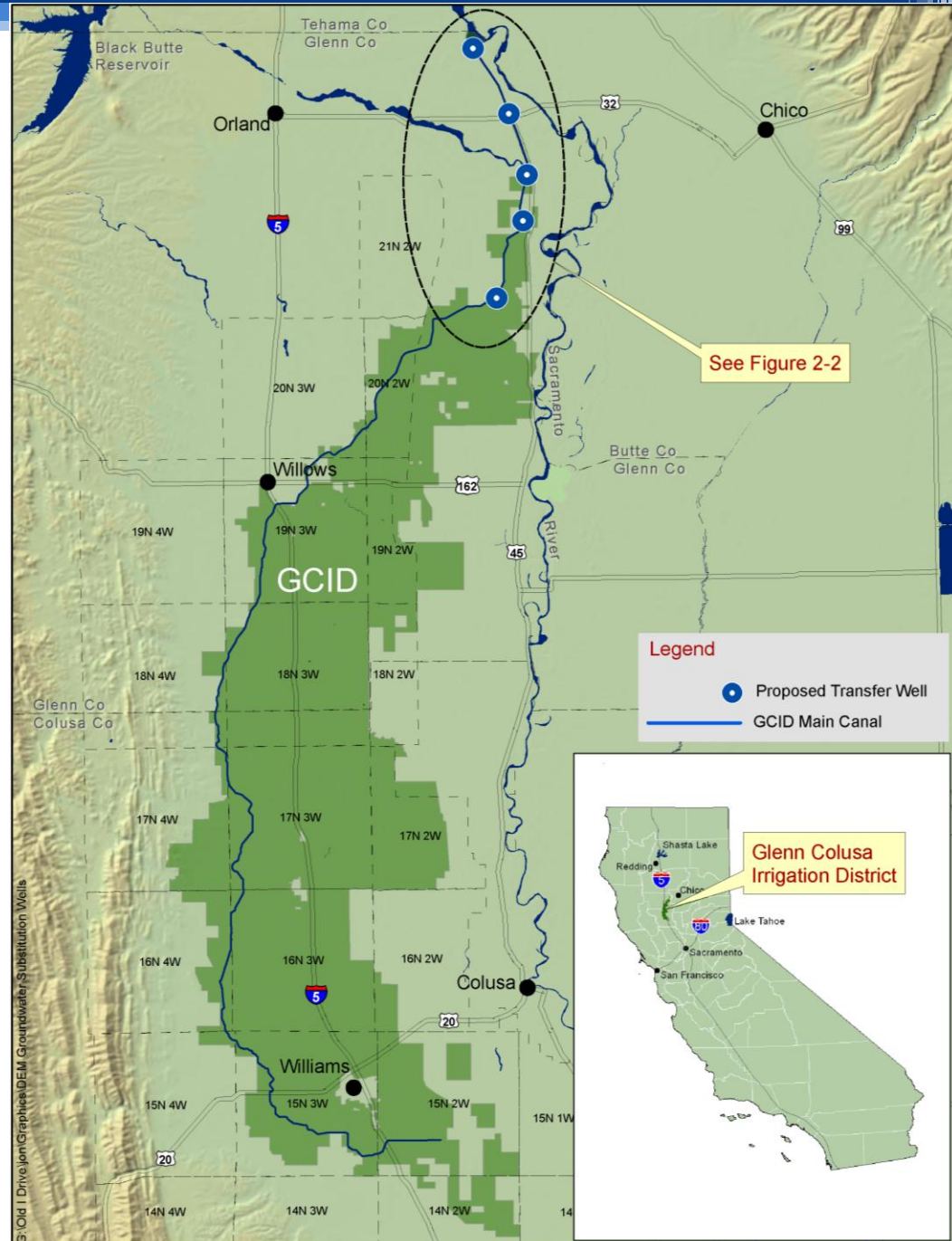
WELL	2013 TEMP (°C)	2013 pH	2013 EC (µs/cm)
SUB- AREA 3			
Big W E-8	21.6	7.7	313
Crystal 6	NM	NM	NM
Magnum 1	NM	NM	NM
SUB- AREA 4			
Hubbard	18.9	7.7	343
SUB-AREA 5			
Bailey	18.8	7.1	694
Romano	20.6	7.1	507
SUB-AREA 7			
Danley	18.6	7.6	609
Johns Manville South	SEE REPORT		
Five C	19.2	7.7	622
SUB-AREA 8			
Billiou	19.2	7.7	640
CF Koehnen (Shaw)	18.5	7.8	668
Cummings 15P	19.9	7.6	473
American Almond	19.2	7.5	529
SUB-AREA 9			
Lohse	18.1	7.3	1042
FTC	18.5	7.4	544
SUB-AREA 10			
Dominighini - 99 Ranch	18.5	7.5	648
Dominighini - P Ranch	19.5	7	457
R & D Farms	19.1	7.6	613
SUB-AREA 11			
Maben	19.1	7.8	653
SUB-AREA 12			
Provident 1	19.7	8	303
Marin & Mason	19.5	7.8	338
SUB-AREA 13			
Willow Creek 1	20.2	7.8	455
SUB-AREA 14			
Calvert	18.5	7.8	458
Jones	18.6	7.8	467
Princeton	18.6	7.8	480
SUB-AREA 15			
Zwald	20.3	8	334
Farrar	18.9	7.6	560
*** NO MULTI COMPLETION WELLS INCLUDED			
*** pH Water Quality Threshold 6.5---8.5			
*** EC Water Quality Threshold <900 µs/cm= Drinking Water <700 µs/cm = Ag water			

Water Transfer Monitoring

Evaluation of GCID Production Well
Interactions with Third Party Wells

GCID Transfer Wells

- Five deep production wells
 - 5,000 ac-ft groundwater substitution transfer
- Transfer period
 - July 1, 2013 – Sept. 30, 2013

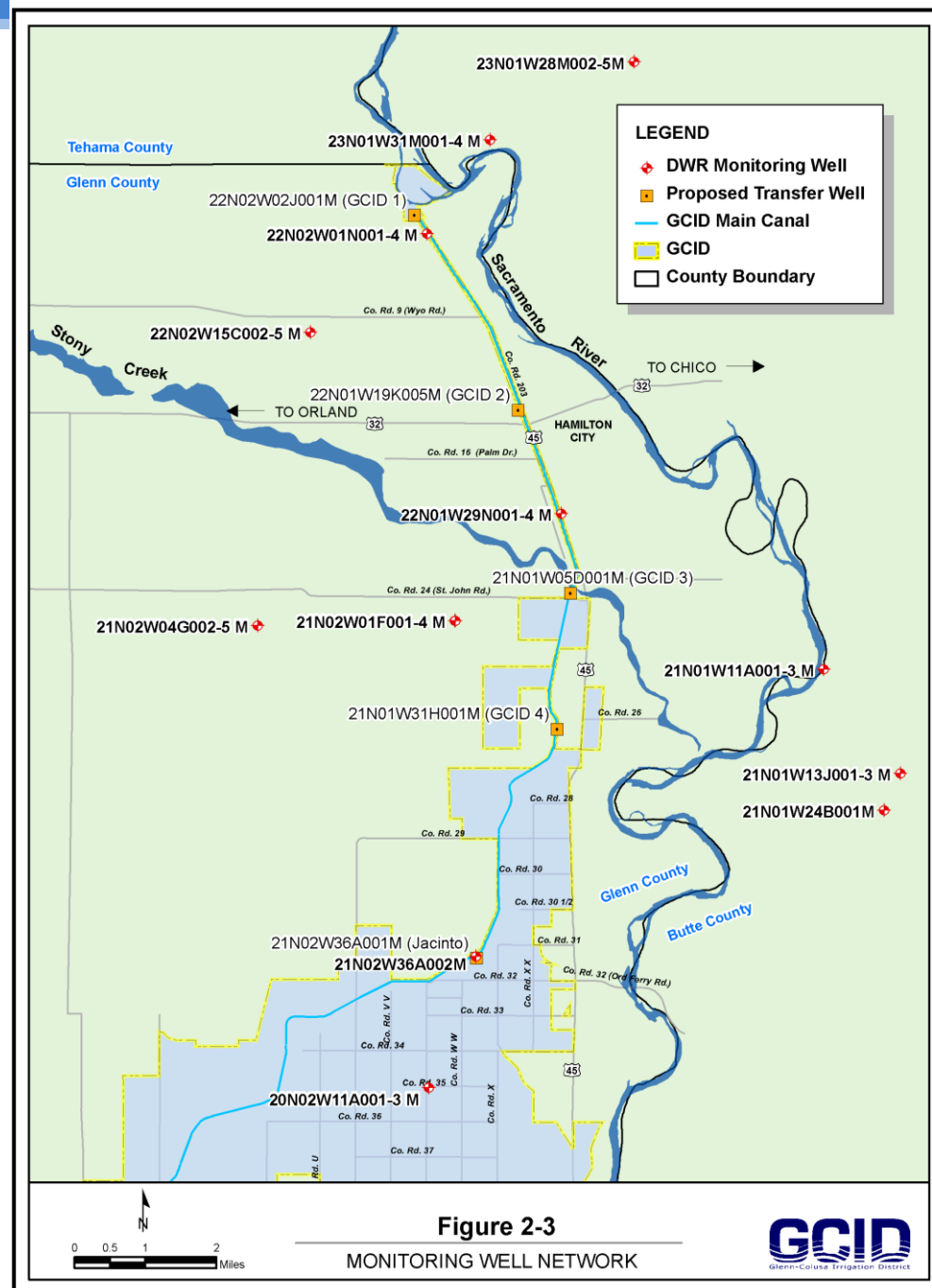


Transfer Monitoring

- GCID monitors the transfer wells for:
 - Water quality (Specific Conductivity, pH, turbidity, TDS, temperature, DO, ORP)
 - Groundwater levels
 - Pumping rate / volume pumped
- DWR monitors the designated transfer monitoring wells for:
 - Groundwater levels
 - Water temperature

Monitoring Network

- 12 multi-completion monitoring wells
- Weekly data collected
- DWR Monitoring well data posted to CASGEM
 - Collected by DWR – Northern Region
 - Available to the public



1994 Drought Water Bank

- Dry year conditions
- GCID participants pumped 65,000 ac-ft from May until August, 1994
 - Participating wells dropped 30-45 feet
 - Regional aquifer dropped by 5 feet
- Full recovery from Fall of 1994 through Winter 1995 (Reference 1, 62)

Stony Creek Fan Partners

Aquifer Performance Testing

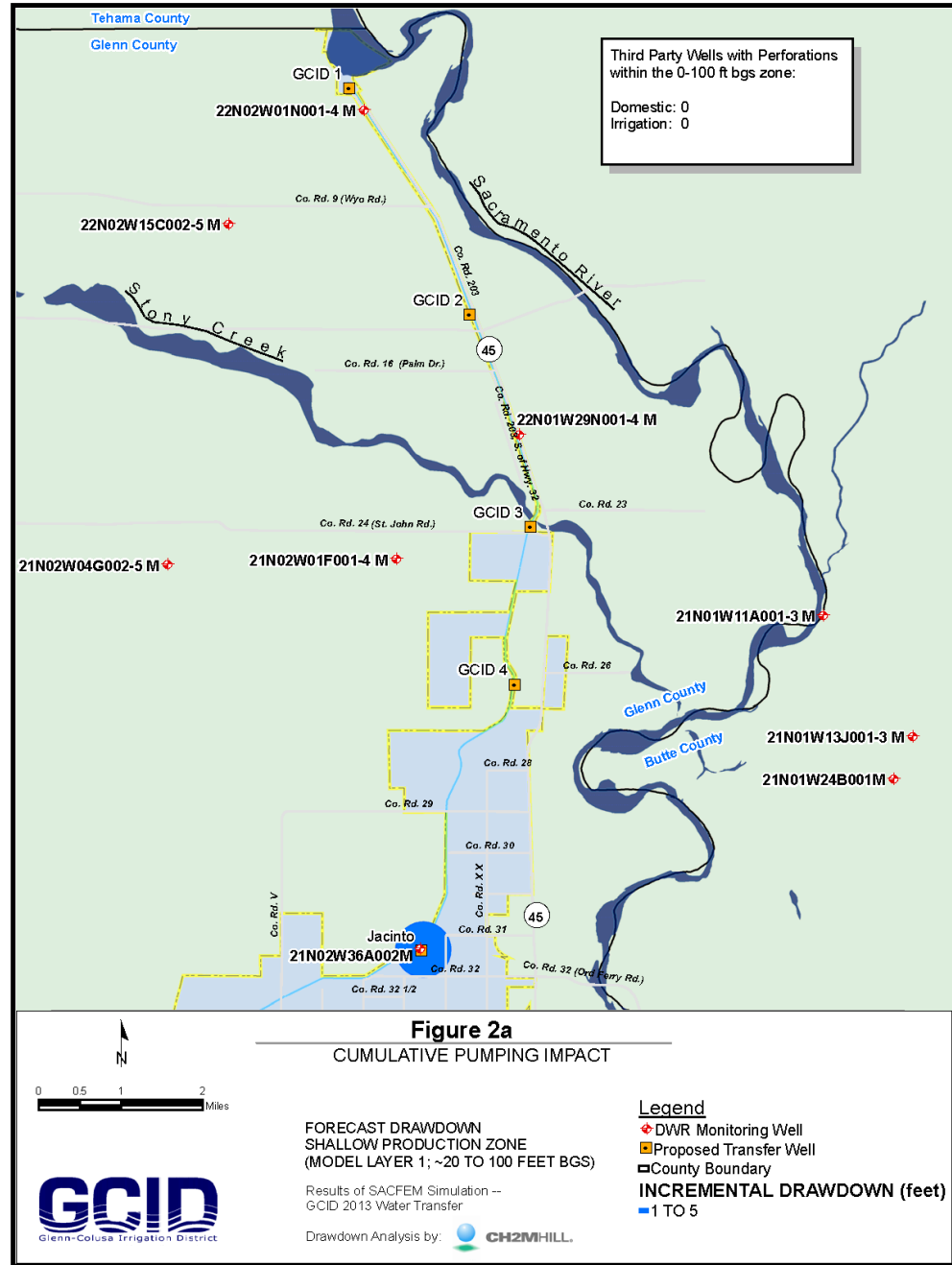
- 2011 season long pumping [06/16/11 – 11/17/11]
- All monitoring wells recovered to historical levels by March 2012 (please see Reference 2)

Drawdown Forecast Modeling

- Preliminary effort to analyze transfer effect to third party wells
- Model assumptions/characteristics:
 - Applies to the Sacramento Valley Groundwater Basin
 - Aquifer specific capacity (performance) based on 1,100 production wells
 - Accounts for:
 - Climate
 - Applied water (crop type, soil properties, land-use data)
 - Surface water (average stream stage) / groundwater interaction
 - 2013 GCID Transfer pumping
 - Agricultural and Urban pumping
 - Calibrated by over 30,000 well groundwater level data points

Modeled Drawdown

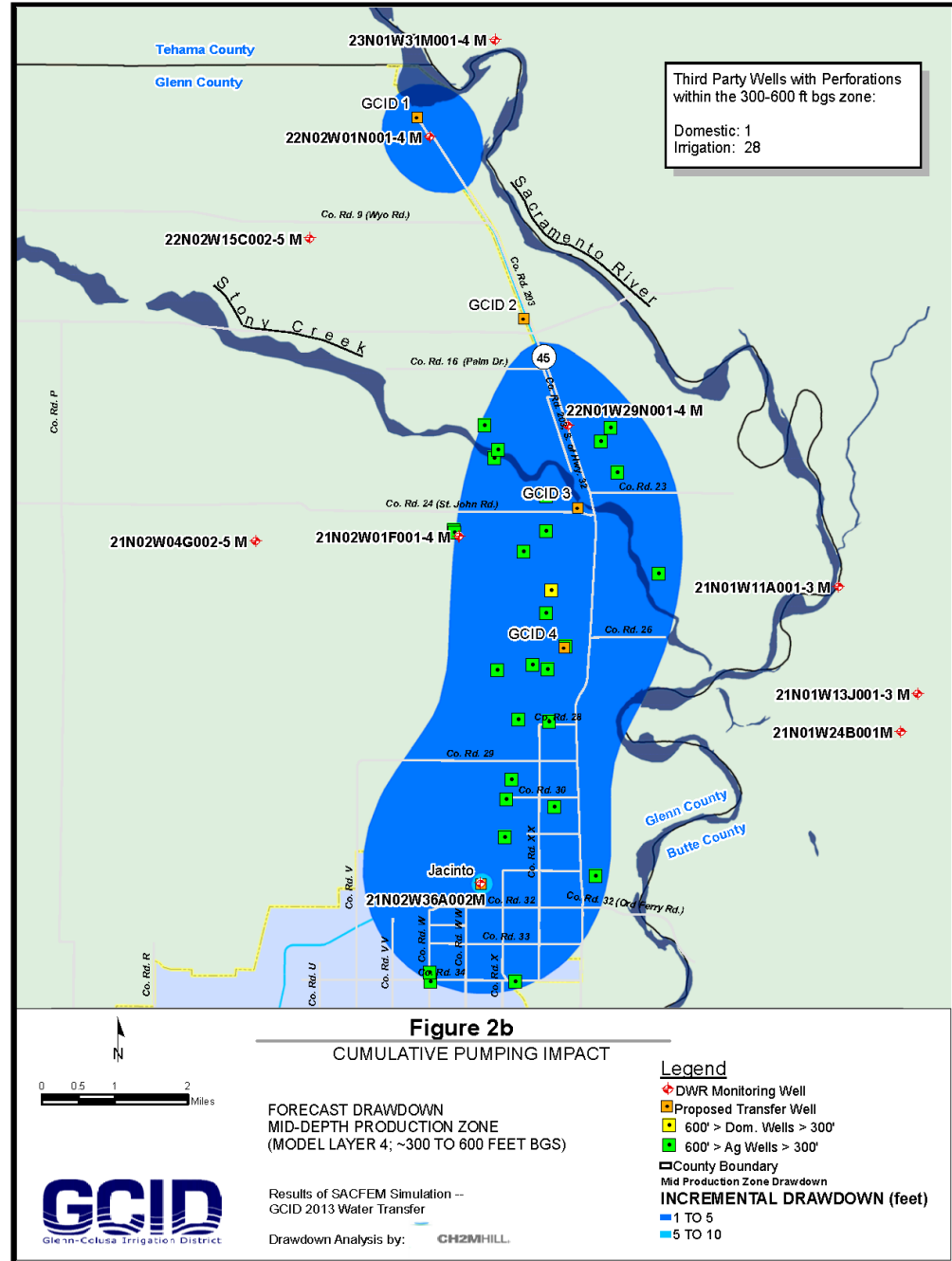
- Shallow Zone
 - ~20' to 100' below ground surface



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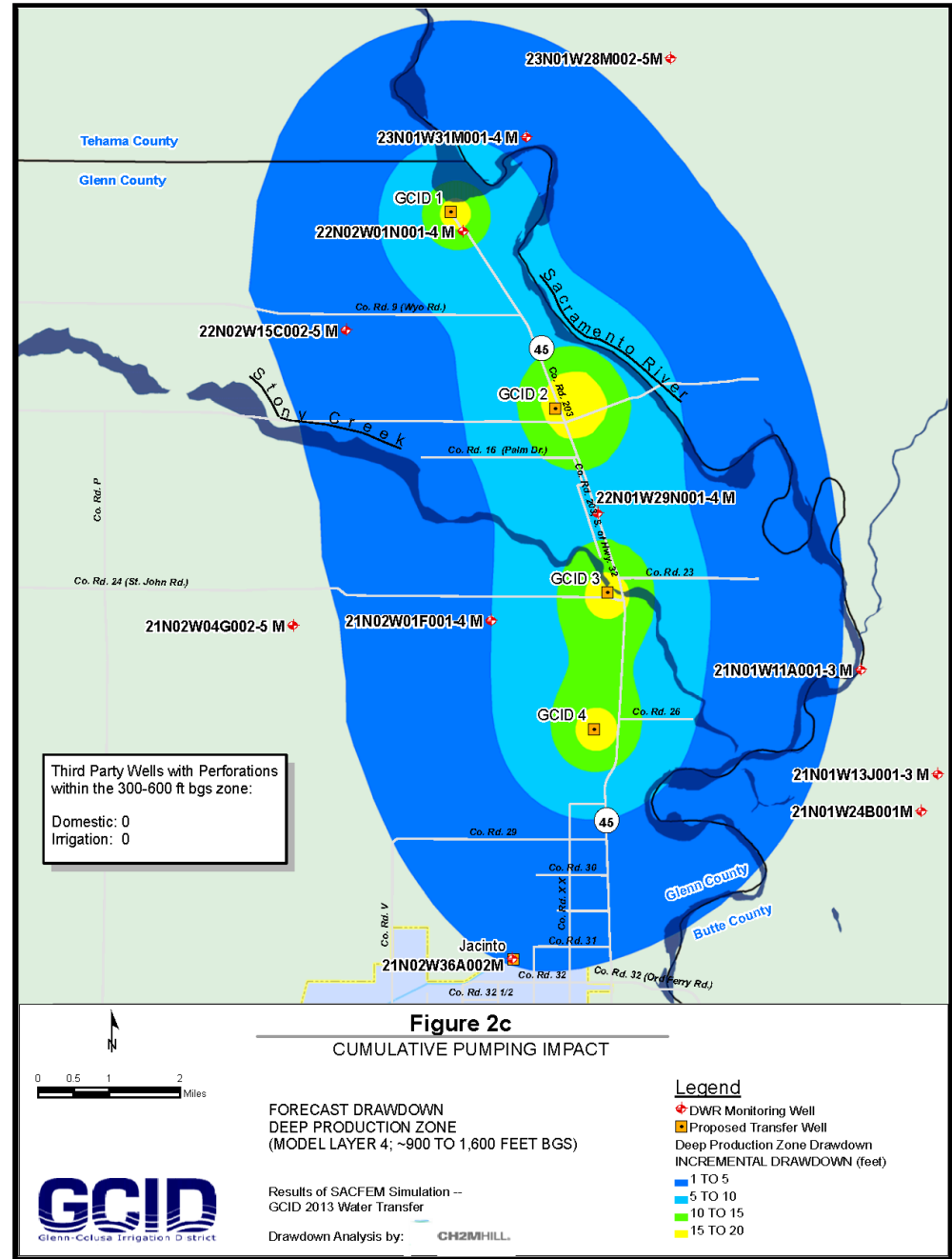
Modeled Drawdown

- Mid Zone
 - ~300' to 600' below ground surface



Modeled Drawdown

- Deep Zone
 - ~900' to 1,600' below ground surface



Transfer Monitoring Wells in Modeled Drawdown Zones

Model: CH2M Hill SACFEM Simulation
GCID 2013 Water Transfer

State Well Number	Model Layer (FEET BGS)	Forecast Drawdown (FEET)	Depth of Screened Intervals (FEET)			
				S1	S2	S3
23N01W31M001M	Layer 7 ~900'-1,600'	1-5	Top	969	1020	
			Bottom	979	1030	
22N02W01N001M	Layer 7 ~900'-1,600'	10-15	Top	810	1040	
			Bottom	820	1050	
22N01W29N001M	Layer 7 ~900'-1,600'	5-10	Top	859	990	1116
			Bottom	879	1010	1135
22N01W29N002M	Layer 4 ~300'-600'	1-5	Top	549	595	631
			Bottom	559	605	641
21N02W01F001M	Layer 4 ~300'-600'	1-5	Top	547		
			Bottom	557		
21N02W01F002M	Layer 4 ~300'-600'	1-5	Top	297		
			Bottom	307		

*Please note: BGS (Below Ground Surface)

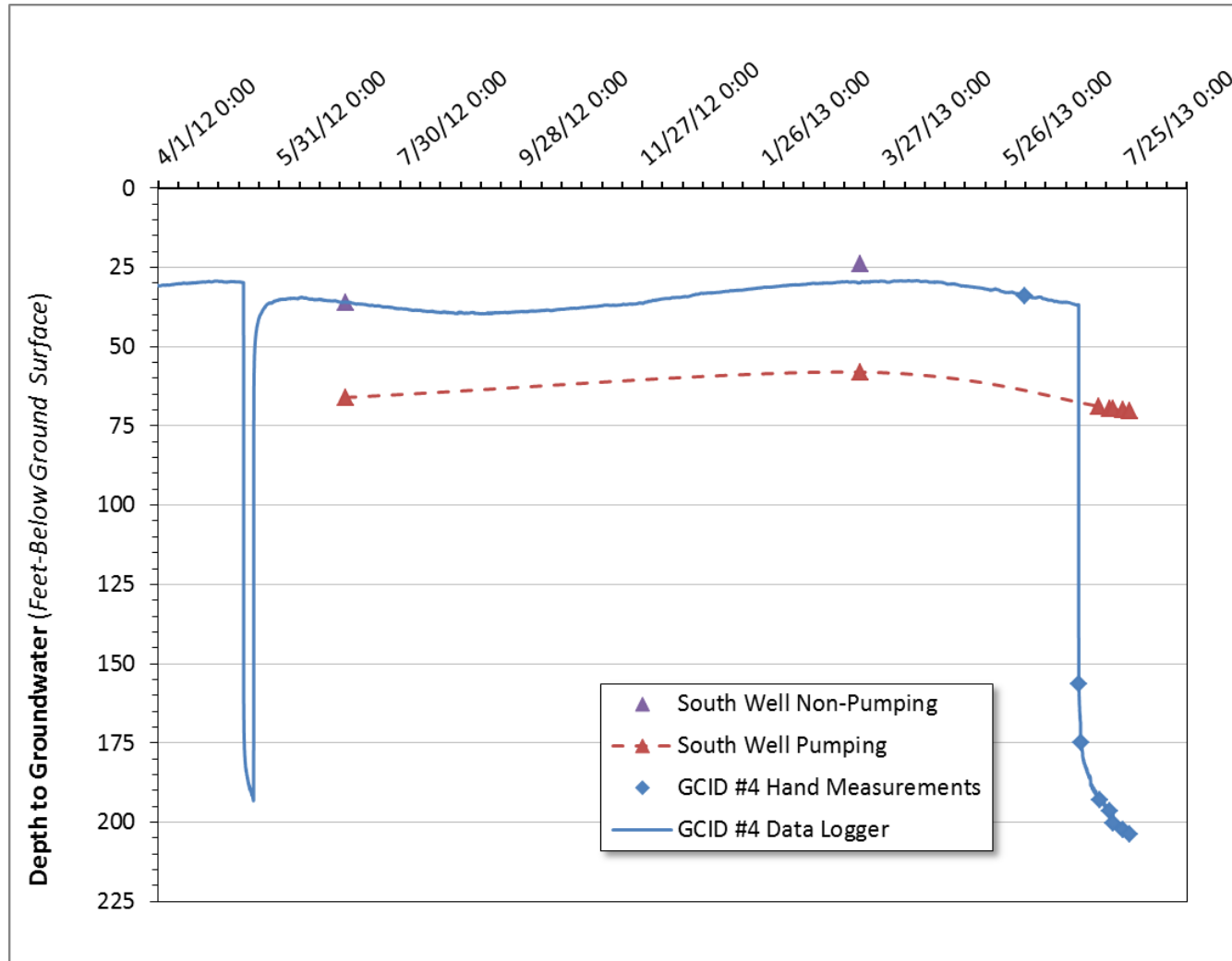
Model Findings

- Less than significant impact

Third Party Report 1

Report 1	
Report Date:	07/11/2013
Reporting Party:	Vern Vierra, farmer leasing land from Deseret Farms
Location:	Approximately 175' NE of GCID 4
Claim:	Verbal report of reduced capacity from irrigation well
Investigation of claim:	<p>GCID immediately initialized an effort to investigate these effects by analyzing:</p> <ol style="list-style-type: none">i. aquifer performance testing reports of select transfer wells near the claimants wellii. CASGEM continuous groundwater level hydrographs of wells surrounding the reportedly affected welliii. Water Data Library Large Production Well groundwater contours for the claimants well areaiv. Calls were made to Mr. Vierrav. Site visit of well<ul style="list-style-type: none">- Well motor: 60 HP 3 phase induction motor 1770 rpm 460 V, 60 Hz, 70Avi. Monitoring the well's groundwater level <p>▪ Lisa Hunter mailed Mr. Vierra the Report of Abnormal Groundwater Level form which would document the claim in greater detail</p> <ul style="list-style-type: none">- Ms. Hunter called Mr. Vierra to obtain more information- Mr. Vierra was very helpful in providing some 2013 pump test data

South Well & GCID 4 Hydrograph



Groundwater Level Data

Rice Researchers – South Pump								GCID – GCID #4 Pump				
Date – Time	Standing DTW (FT-BGS*)	QM	Pumping DTW (FT-BGS*)	Pumping Rate (GPM)	2 Min Ret (FT-BGS*)	QM	Notes	Date – Time	DTW (FT-BGS*)	Pumping Rate (GPM)	QM	Notes
07/03/12N /A	36	8	66	2606	58	1, 8	Data from North State Electric Pump	07/03/12				
03/15/13N /A	24	8	58	2916	24	1, 8	Data from North State Electric Pump	03/15/13				
								06/04/131 237	34.1	0		
								07/01/131 120	156.40	2500	1	
								07/02/131 127	174.9	2500	1	
07/11/13~ 1300			68.80	N/A		1, 8		07/11/131 505	192.9	2500	1	Vern Vierra contacts GCID in AM
07/16/131 433			69.7	N/A		1, 8		07/16/131 356	196.6	n/a	1	
07/18/13~ 1322			69.75	N/A		1, 8		07/18/131 328	200.3	2500	1	
07/23/13~ 1030			69.9	2550		1, 8	Saddle flow meter installed	07/23/131 106	202.6	2500	1	
07/26/13 1415			70.3	2500		1, 8		07/26/13 1410	203.9	2500	1	

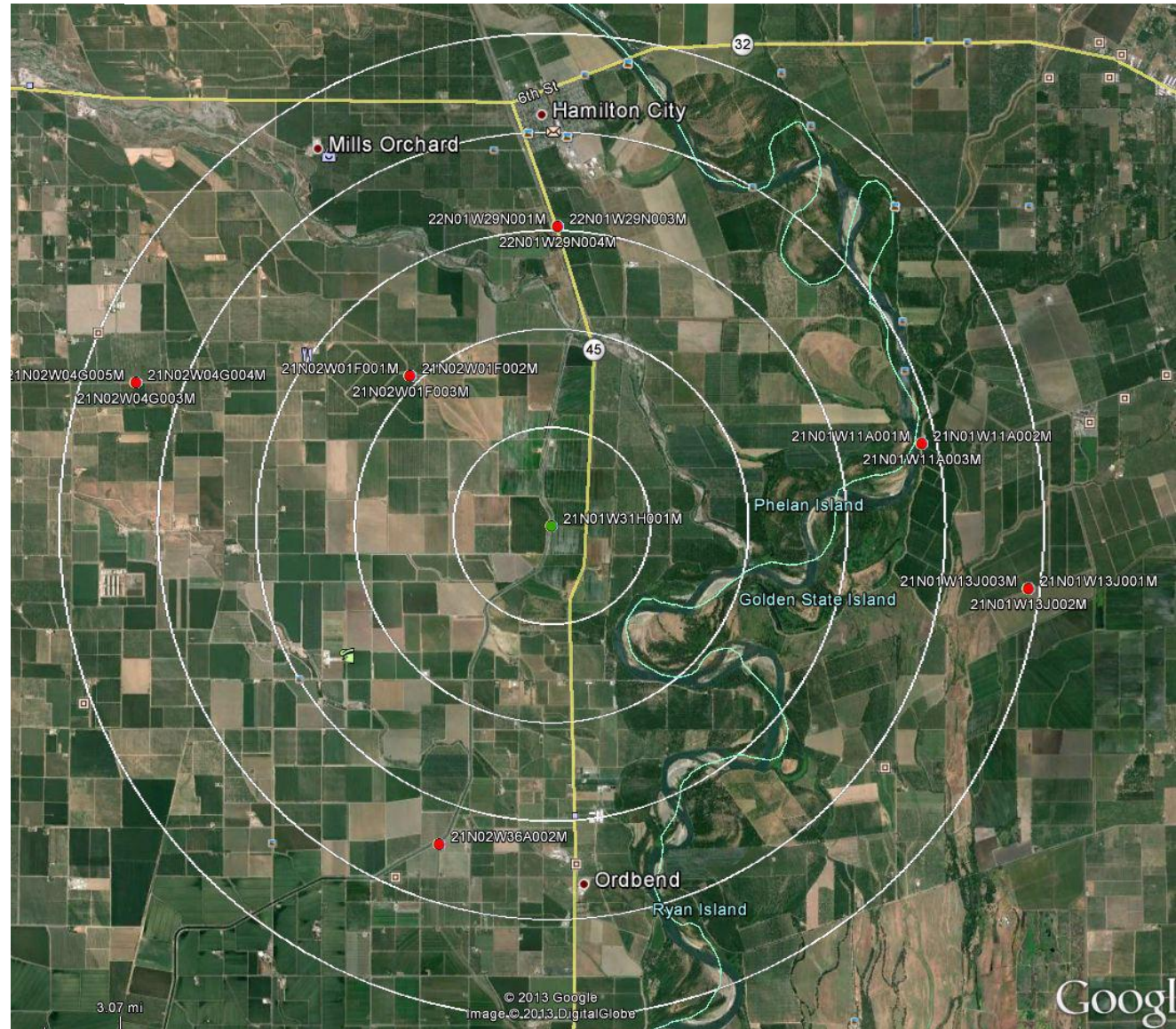
*Denotes: Feet-Below Ground Surface

Monitoring Area



Data collected and compiled by:
DWR Northern Region – Red Bluff, CA

- 5 mi. radius evaluated
- 6 DWR multi-completion monitoring wells



Groundwater Level Hydrograph -- Radius of Interest

Radius of Interest: 5 Miles -- Center of Interest: Lat: 39.682255 Long: -122.01168

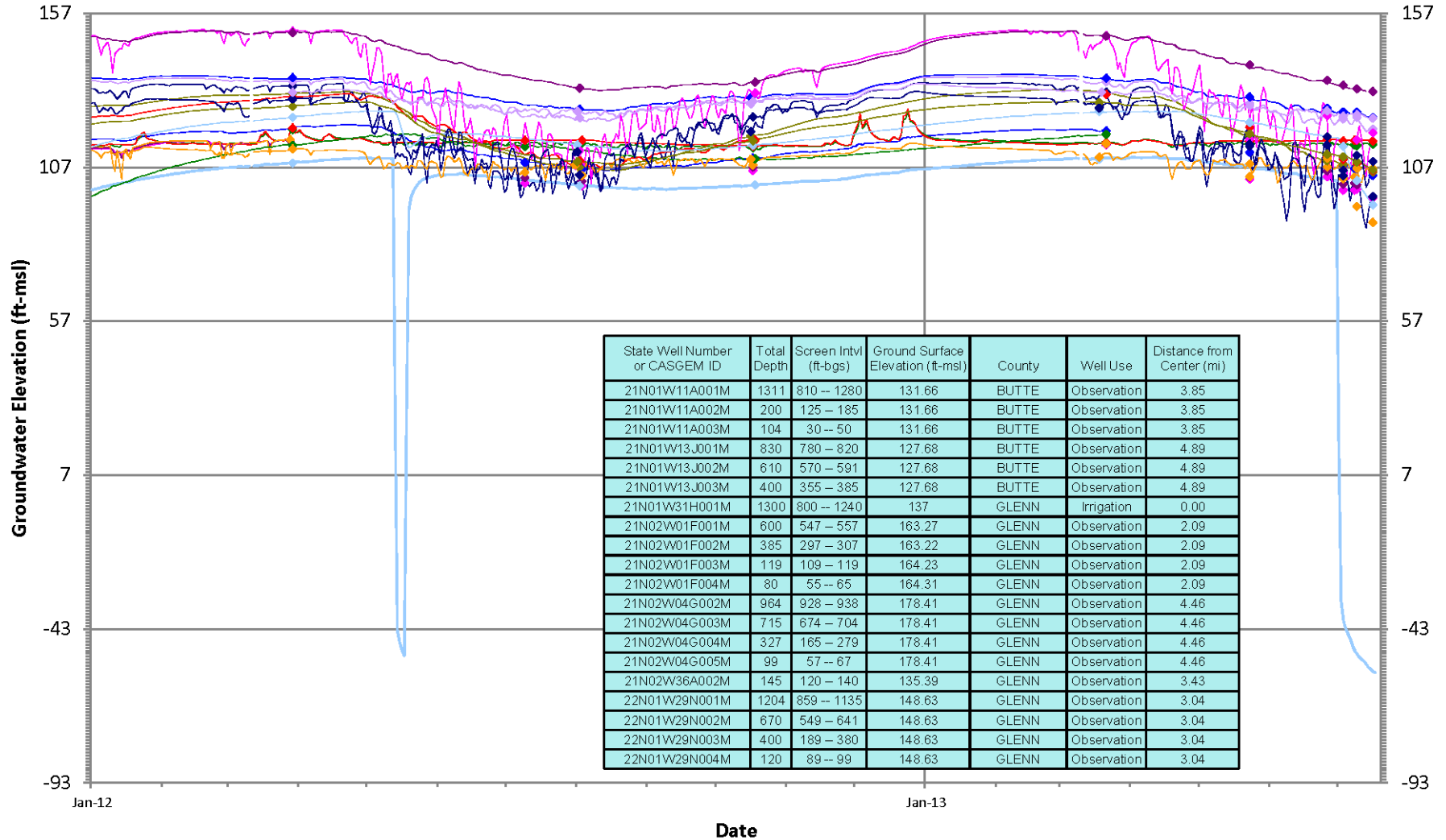
Period Of Interest: 1/1/2012 to 7/19/2013

Hydrograph Criteria

Well Use is 'Observation'

Radius of Interest: 5 miles

Center of Interest: 21N01W31H001M Lat: 39.682255 Long: -122.01168



- 21N01W11A001M
- 21N01W11A002M
- 21N01W11A003M
- 21N01W13J001M
- 21N01W13J002M
- 21N01W13J003M
- 21N01W31H001M
- 21N02W01F001M
- 21N02W01F002M
- 21N02W01F003M
- 21N02W01F004M
- 21N02W04G002M
- 21N02W04G003M
- 21N02W04G004M
- 21N02W04G005M
- 21N02W36A002M
- 22N01W29N001M
- 22N01W29N002M
- 22N01W29N003M
- 22N01W29N004M
- ◆ Periodic Meas

Groundwater Level Hydrograph -- Radius of Interest

Radius of Interest: 5 Miles -- Center of Interest: Lat: 39.682255 Long: -122.01168

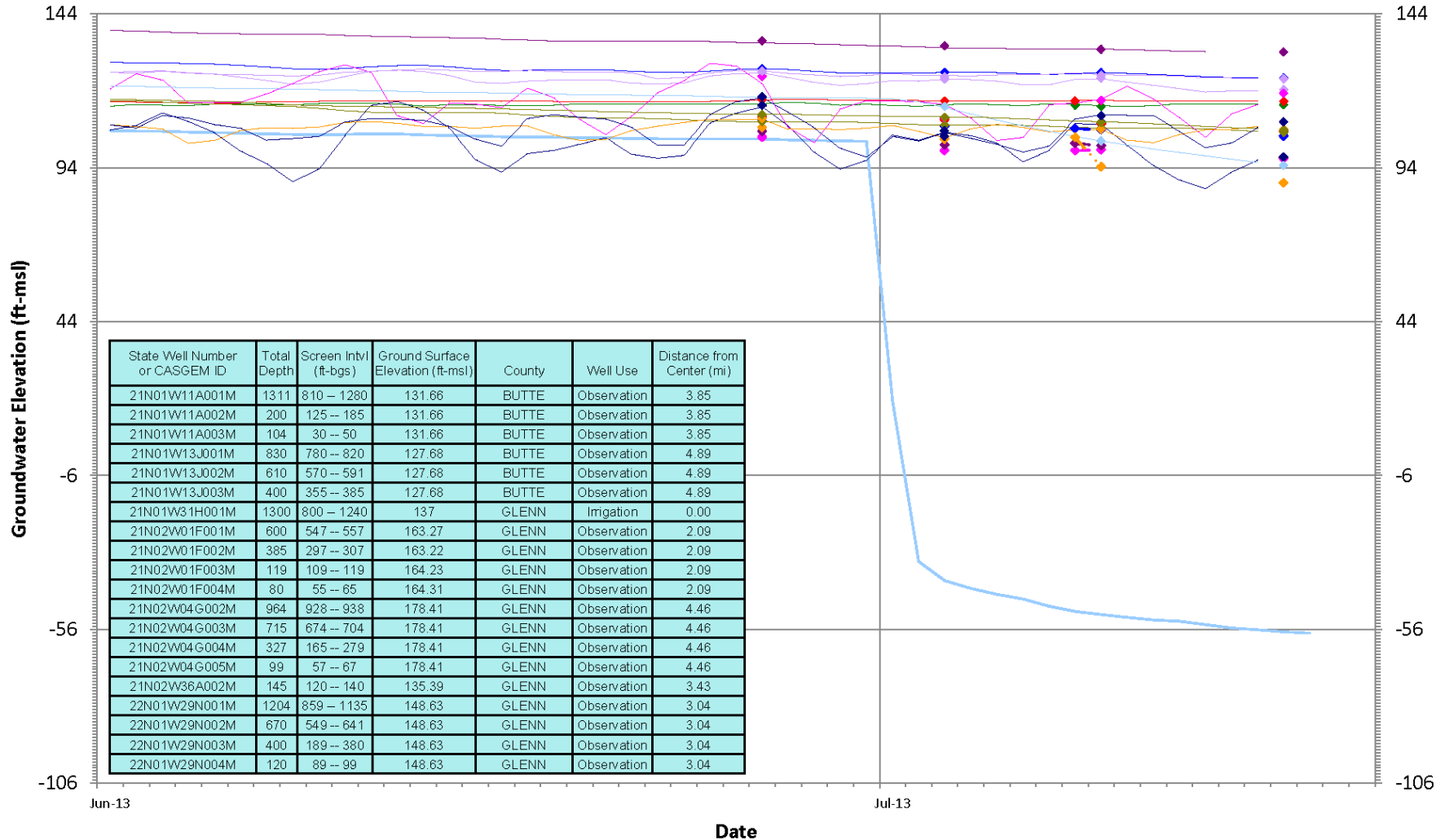
Period Of Interest: 6/1/2013 to 7/19/2013

Hydrograph Criteria

Well Use is 'Observation'

Radius of Interest: 5 miles

Center of Interest: 21N01W31H001M Lat: 39.682255 Long: -122.01168



State Well Number or CASGEM ID	Total Depth	Screen Intvl (ft-bgs)	Ground Surface Elevation (ft-msl)	County	Well Use	Distance from Center (mi)
21N01W11A001M	1311	810 – 1280	131.66	BUTTE	Observation	3.85
21N01W11A002M	200	125 – 185	131.66	BUTTE	Observation	3.85
21N01W11A003M	104	30 – 50	131.66	BUTTE	Observation	3.85
21N01W13J001M	830	780 – 820	127.68	BUTTE	Observation	4.89
21N01W13J002M	610	570 – 591	127.68	BUTTE	Observation	4.89
21N01W13J003M	400	355 – 385	127.68	BUTTE	Observation	4.89
21N01W31H001M	1300	800 – 1240	137	GLENN	Imigation	0.00
21N02W01F001M	600	547 – 557	163.27	GLENN	Observation	2.09
21N02W01F002M	385	297 – 307	163.22	GLENN	Observation	2.09
21N02W01F003M	119	109 – 119	164.23	GLENN	Observation	2.09
21N02W01F004M	80	55 – 65	164.31	GLENN	Observation	2.09
21N02W04G002M	964	928 – 938	178.41	GLENN	Observation	4.46
21N02W04G003M	715	674 – 704	178.41	GLENN	Observation	4.46
21N02W04G004M	327	165 – 279	178.41	GLENN	Observation	4.46
21N02W04G005M	99	57 – 67	178.41	GLENN	Observation	4.46
21N02W36A002M	145	120 – 140	135.39	GLENN	Observation	3.43
22N01W29N001M	1204	859 – 1135	148.63	GLENN	Observation	3.04
22N01W29N002M	670	549 – 641	148.63	GLENN	Observation	3.04
22N01W29N003M	400	189 – 380	148.63	GLENN	Observation	3.04
22N01W29N004M	120	89 – 99	148.63	GLENN	Observation	3.04



- 21N01W11A001M
- 21N01W11A002M
- 21N01W11A003M
- 21N01W13J001M
- 21N01W13J002M
- 21N01W13J003M
- 21N01W31H001M
- 21N02W01F001M
- 21N02W01F002M
- 21N02W01F003M
- 21N02W01F004M
- 21N02W04G002M
- 21N02W04G003M
- 21N02W04G004M
- 21N02W04G005M
- 21N02W36A002M
- 22N01W29N001M
- 22N01W29N002M
- 22N01W29N003M
- 22N01W29N004M
- ◆ Periodic Meas.

Findings

- No identifiable impact to pumping rate
- Approximately 390' separate South Well and GCID 4 perforations
 - ~320' clayey layers in this separation zone
- Monitoring well hydrograph data
 - Similar perforation zones as South Well showed no appreciable change
- Consensus among US Bureau of Reclamation and CA Dept. of Water Resources (DWR) that GCID does not impact the South Well

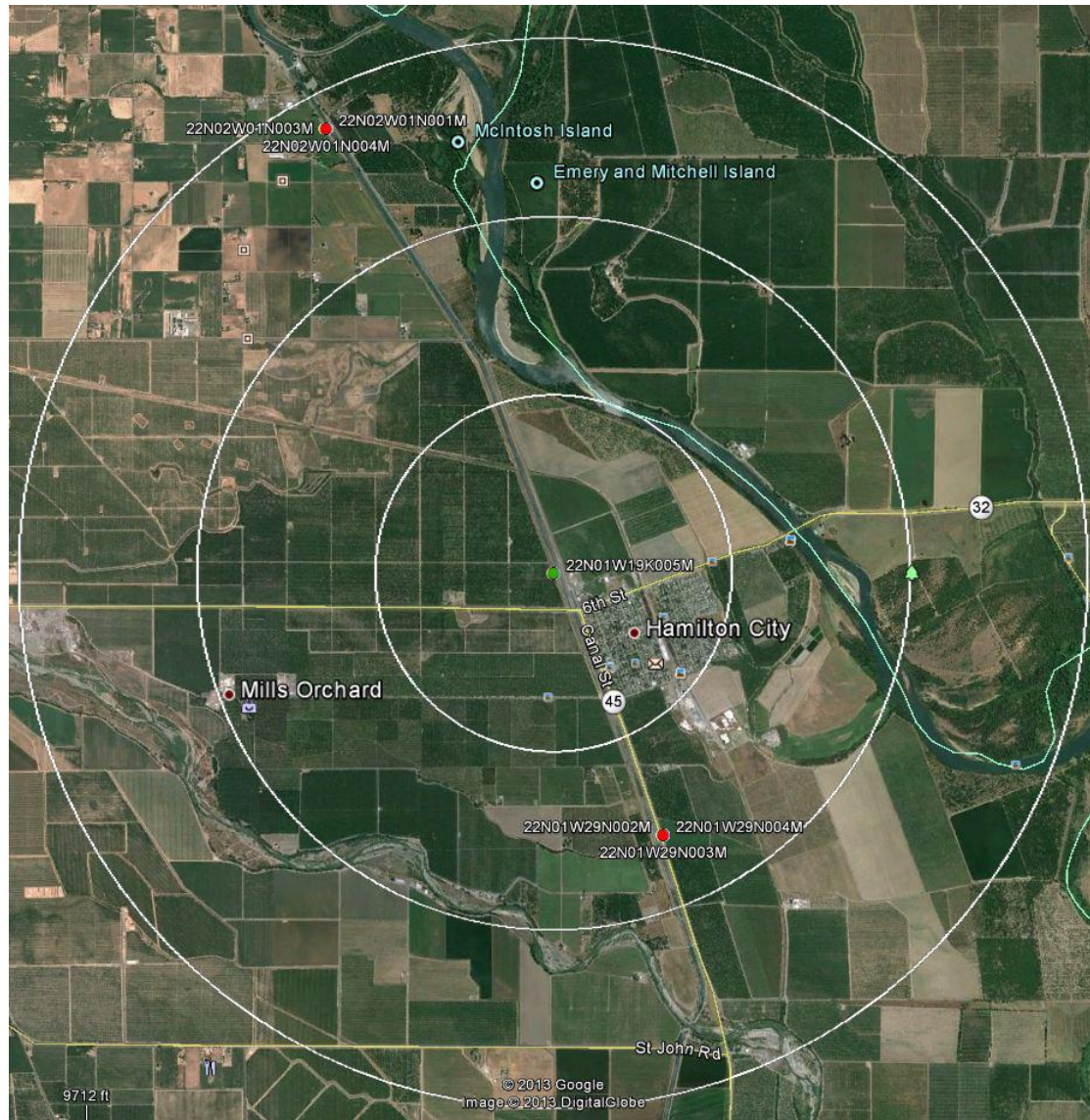
Third Party Report 2

Report 2	
Report Date:	07/12/2013
Reporting Party:	Lisa Hunter, Glenn County Department of Agriculture Water Resource Coordinator, reporting on behalf of concerned Third Party, Dan Ramos
Location:	Capay area (NE of Hamilton City)
Claim:	Verbal report of abnormal groundwater level in well approximately 1 mi. from GCID 1 <ul style="list-style-type: none">- Last year this well sucked air
Investigation of claim:	<ul style="list-style-type: none">▪ Lisa Hunter requested the individual complete a Glenn County form which documents the claim in greater detail▪ GCID shall continue to coordinate with Ms. Hunter to ascertain greater details as they become available<ul style="list-style-type: none">- Ms. Hunter made multiple calls and mailed the Report of Abnormal Groundwater Level Form

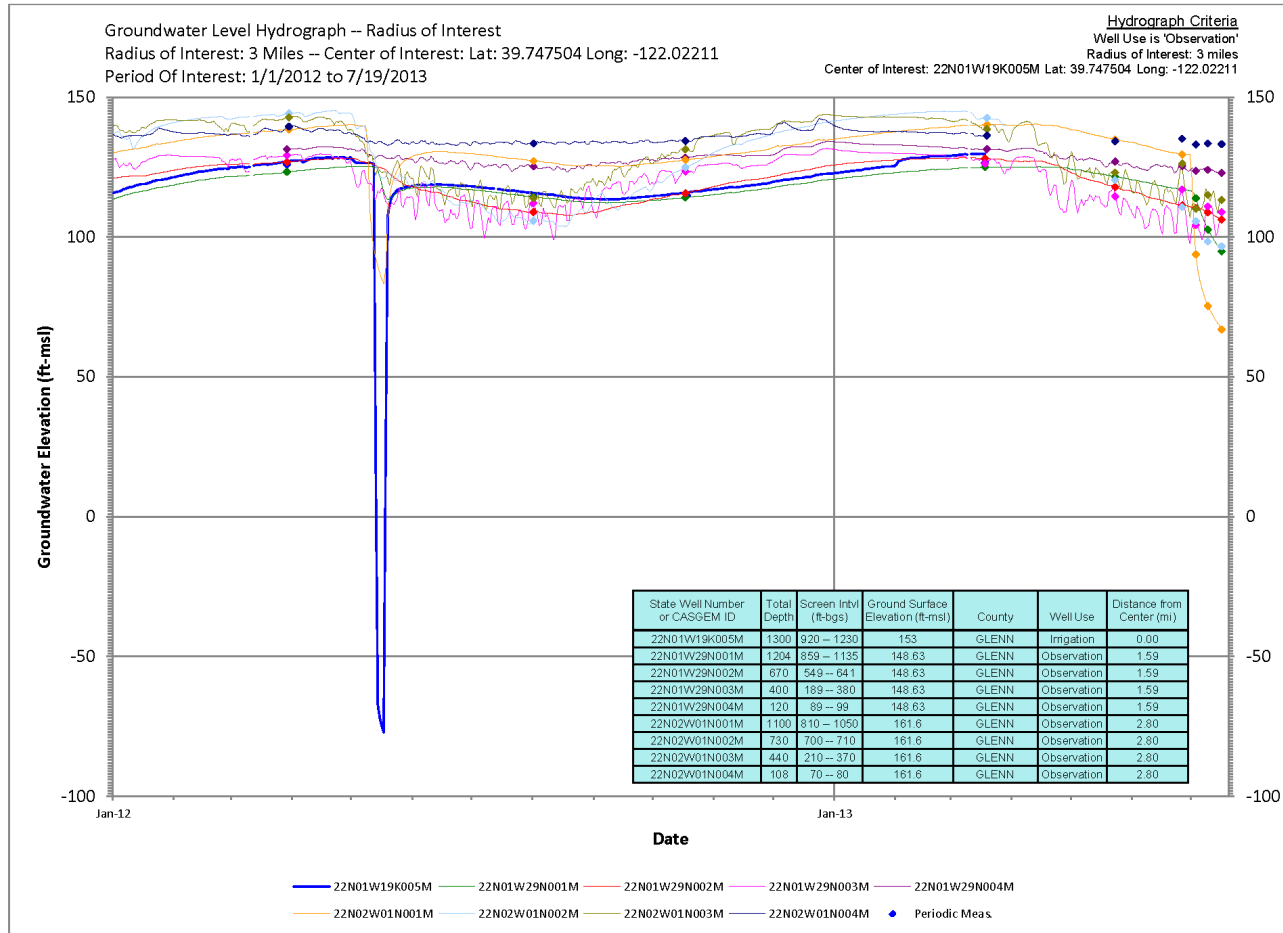
Third Party Report 3

Report 3	
Report Date:	07/24/2013 13:45
Reporting Party:	Lisa Hunter, Glenn County Department of Agriculture Water Resource Coordinator, reporting on behalf of concerned Third Party, Mike Billiou
Location:	~ ½ mi. SE of Hamilton City 1.3 mi. SE of GCID 2; 1.5 N of GCID 3
Well information:	Irrigation well with booster pump - Irrigates 108 acres
Claim:	Verbal report of: <ul style="list-style-type: none">▪ abnormal outlet pipe pressures (Typically 40 psi, currently varying between 27 and 29 psi)▪ pump sucking air in the early morning
Investigation of claim:	<ul style="list-style-type: none">▪ Lisa Hunter e-mailed Mr. Billiou the Report of Abnormal Groundwater Level form which would document the claim in greater detail▪ GCID has begun collecting groundwater levels on the well and 7 of his surrounding orchard wells▪ GCID coordinated with DWR Northern Region to obtain data for the DWR multi-completion well on Mr. Billiou's property▪ GCID shall continue to coordinate with DWR Northern Region, Ms. Hunter, and Mr. Billiou to ascertain greater details of the well

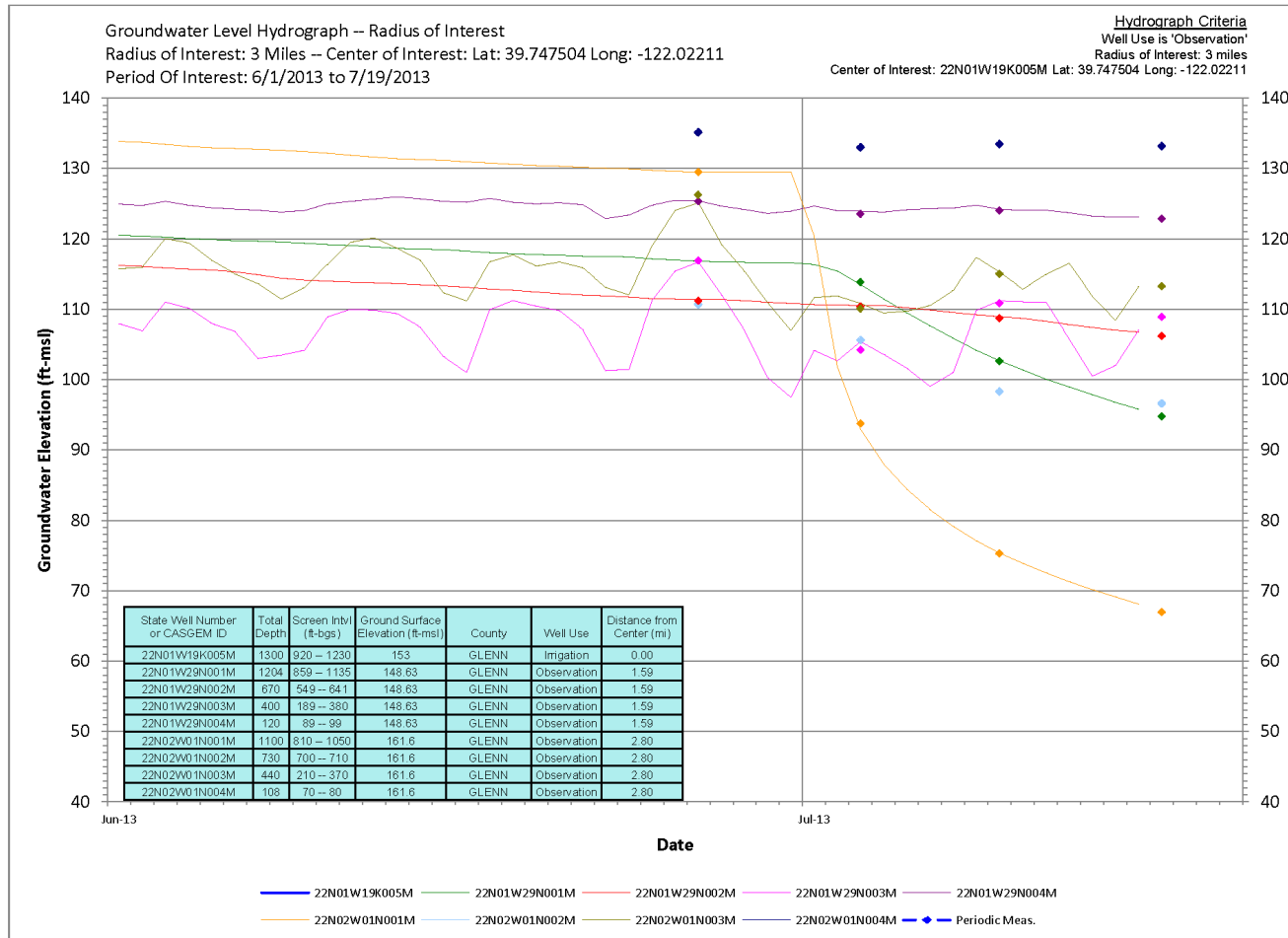
Third Party Report 3



Third Party Report 3



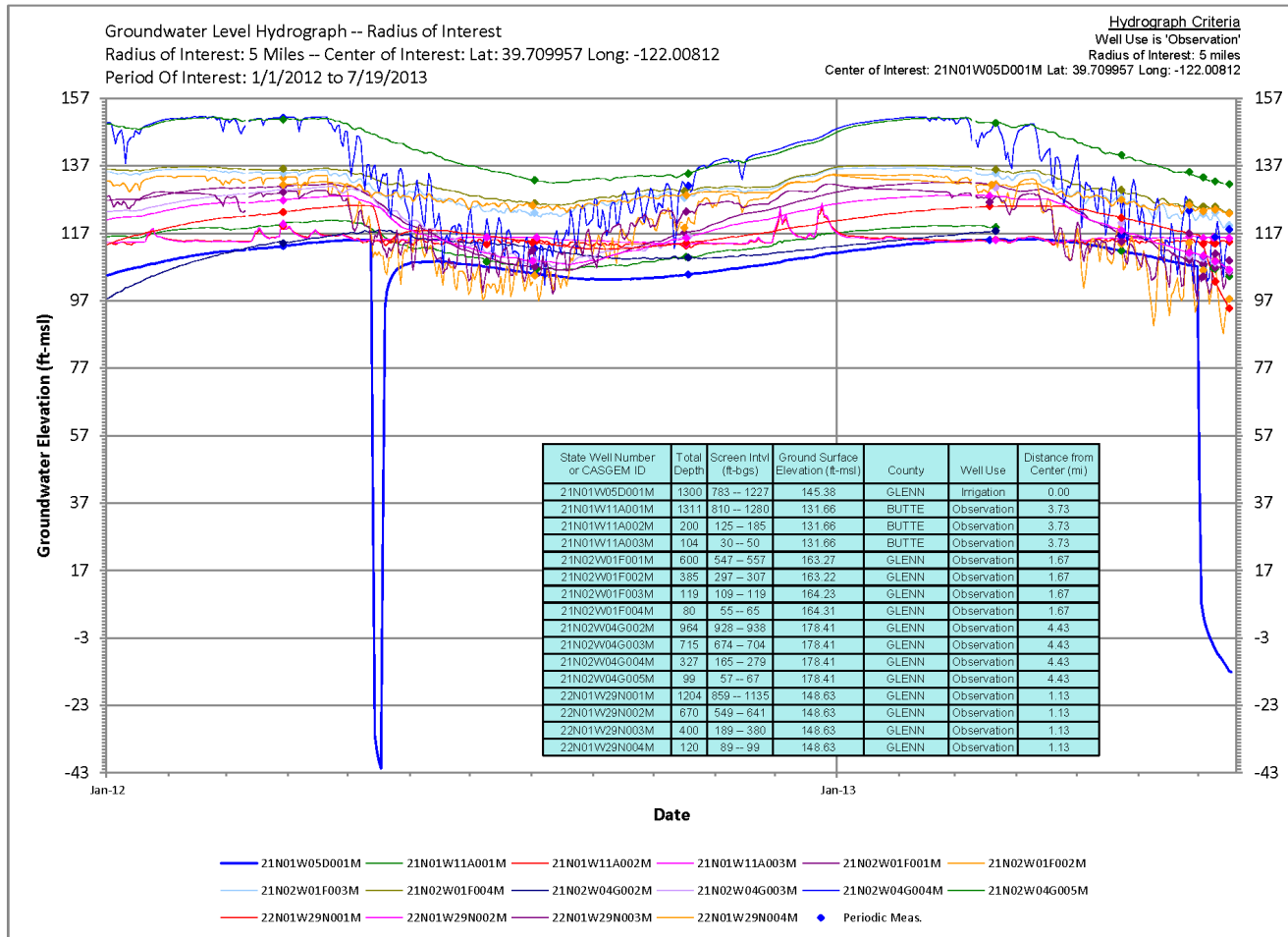
Third Party Report 3



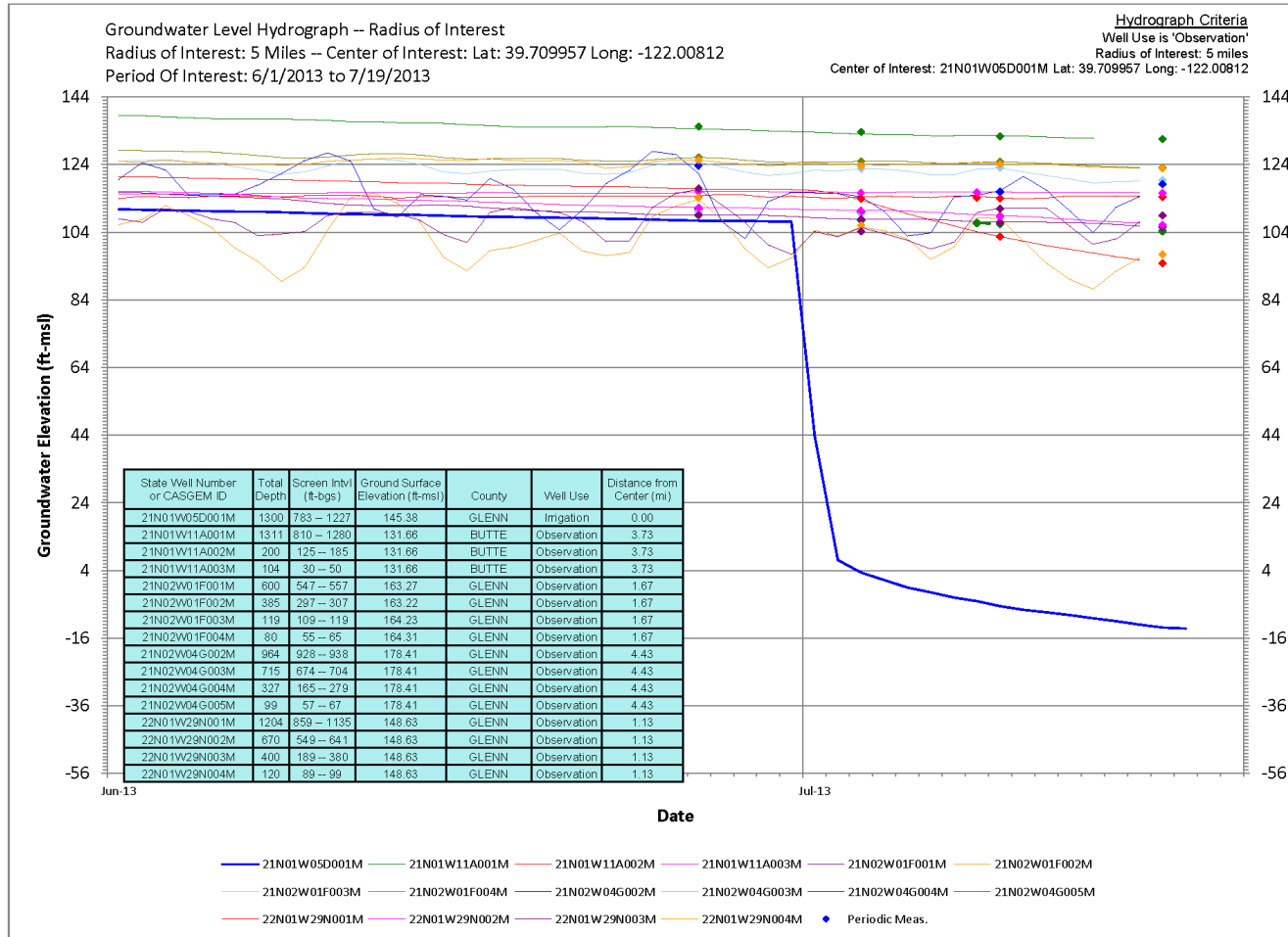
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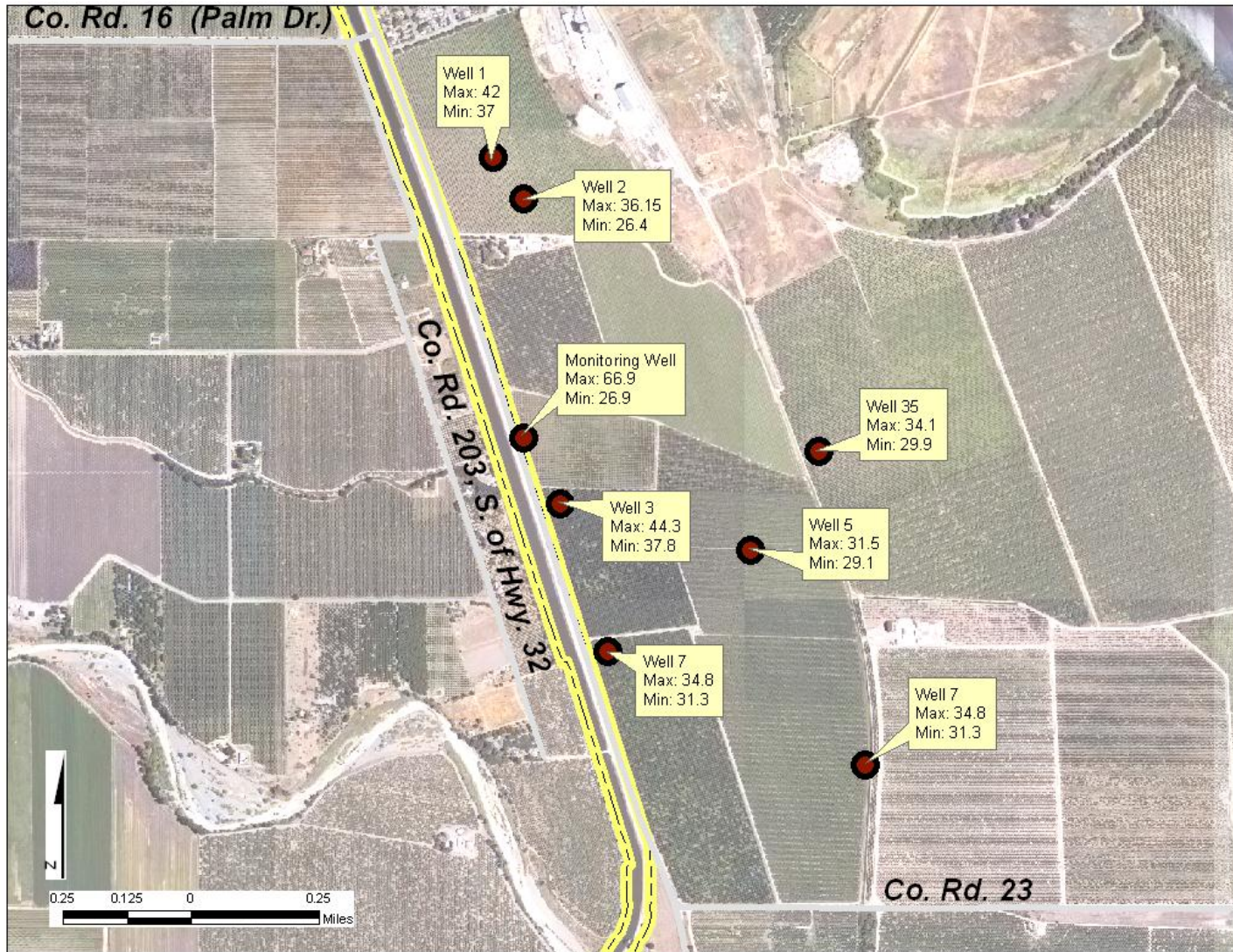
Third Party Report 3



Third Party Report 3



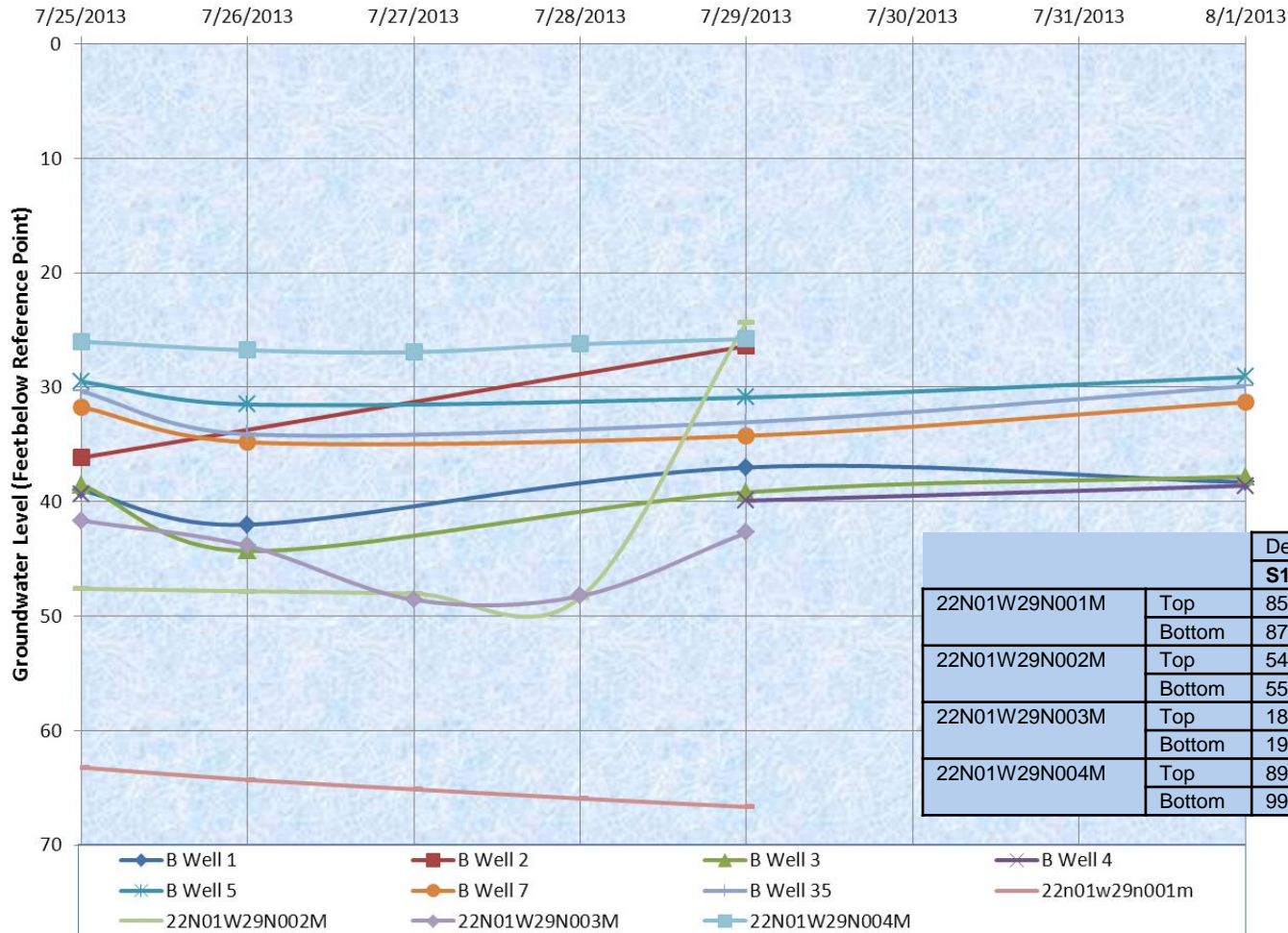
Third Party Report 3



Third Party Report

Groundwater Level vs. Time

Mike Billiou Wells And DWR 22N01W29N001-004



		Depth of Screened Intervals			
		S1	S2	S3	S4
22N01W29N001M	Top	859	990	1116	
	Bottom	879	1010	1135	
22N01W29N002M	Top	549	595	631	
	Bottom	559	605	641	
22N01W29N003M	Top	189	255	320	370
	Bottom	199	265	330	380
22N01W29N004M	Top	89			
	Bottom	99			

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References

Reference 1

- *GCID Initial Study and Negative Declaration for 2013 Water Transfer to San Luis & Delta-Mendota Water Authority*
<http://www.gcid.net/documents/Environment/5-13-13%20GCID%20Negative%20Decl.pdf>

Reference 2

- *Aquifer Performance Testing for Stony Creek Fan Partners – Dec. 2012*
<http://www.gcid.net/documents/Stony%20Creek%20Fan%20Project/SCF%20Final%20Report.pdf>

Thank you for your time

Comments or Questions?

GCID 1 GCID Main Pump Station
 DWR No. 22N02W02J001M
 *DTW= Depth to Water

			Flow Data			Water Quality Data							
Date	Time	DTW*	Pump Rate (gpm)	Flow Totalizer Reading (ac-ft)	Total Volume (ac-ft)	pH	S.C. (mS/CM)	S.C. (µS/CM)	Temp. °C	D.O. (mg/l)	Turbidity NTU	ORP (mV)	TDS (g/l)
6/31/13				1969.93									
7/1/13	10:00	144.15	3000	1970.67	0.74	8.12	0.412	412	23.33	9.05	3.4	15	0.268
7/2/13	10:18	180.70	3000	1983.05	13.12	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/11/13	10:18	204.70	3000	2104.64	134.71	7.99	0.524	524	25.77	9.98	7.2	180	0.335
7/15/13	14:56	208.30	3000	2156.60	186.67	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/18/13	11:15	213.13	3000	2193.25	223.32	8.34	0.457	457	28.88	11.84	8.4	48	0.297
7/25/13	13:09	217.70	3000	2285.43	315.50	7.65	0.545	545	27.19	8.93	0.0	92	0.349
8/1/13	8:19	220.90	3000	2373.04	403.11	7.28	0.479	479	23.37	8.7	3.2	35	0.311

GCID 2 NW of int. Hwy 32 and Co. Rd. 203 West of Hamilton High School
 DWR No. 22N01W19K005M
 *DTW= Depth to Water

			Flow Data			Water Quality Data							
Date	Time	DTW*	Pump Rate (gpm)	Flow Totalizer Reading (ac-ft)	Total Volume (ac-ft)	pH	S.C. (mS/CM)	S.C. (µS/CM)	Temp. °C	D.O. (mg/l)	Turbidity NTU	ORP (mV)	TDS (g/l)
6/31/13				2112.78									
7/1/13	12:30	206.05	N/D	N/D	N/D	8.17	0.413	413	26.69	8.44	6.52	-98	0.268
7/2/13	10:51	227.70	2700	2124.75	154.82	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/11/13	14:15	244.01	2577	2230.27	260.34	8.36	0.438	438	27.9	9.58	11.2	56	0.285
7/15/13	14:38	208.30	2500	2275.69	305.76	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/18/13	11:45	249.00	2500	2308.061	338.13	7.92	0.467	467	29.01	8.67	8.1	63	0.304
7/25/13	13:38	252.60	2500	2386.946	417.02	8.03	0.445	445	29.21	9.08	7.5	76	0.289
8/1/13	8:48	261.90	2500	2463.868	493.94	8.32	0.444	444	23.69	8.62	33.7	-12	0.288

GCID 3 Stony Creek
 DWR No. 21N01W05D001M
 *DTW= Depth to Water

			Flow Data			Water Quality Data							
Date	Time	DTW*	Pump Rate (gpm)	Flow Totalizer Reading (ac-ft)	Total Volume (ac-ft)	pH	S.C. (mS/CM)	S.C. (µS/CM)	Temp. °C	D.O. (mg/l)	Turbidity NTU	ORP (mV)	TDS (g/l)
6/31/13				2500.65									
7/1/13	11:00	126.1	2700	2502.02	532.09	8.14	0.478	478	26.65	6.27	1.66	-5	0.311
7/2/13	11:15	139.5	2600	2513.88	543.95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/11/13	11:01	155.4	2600	2618.71	648.78	8.33	0.483	483	27.04	9.37	0.0	131	0.314
7/15/13	14:25	158.60	2500	2664.165	694.24	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/18/13	12:59	160.60	2500	2697.383	727.45	8.43	0.446	446	28.75	12.67	7.7	90	0.29
7/25/13	14:00	197.60	2700	2774.25	804.32	8.42	0.48	480	29.14	10.41	13.1	48	0.312
8/1/13	9:31	194.60	2600	2854.89	884.96	8.36	0.488	488	23.69	8.51	0.0	37	0.291

GCID 4 Main Canal M.P. 9.16L
 DWR No. 21N01W31H001M
 *DTW= Depth to Water

			Flow Data			Water Quality Data							
Date	Time	DTW*	Pump Rate (gpm)	Flow Totalizer Reading (ac-ft)	Total Volume (ac-ft)	pH	S.C. (mS/CM)	S.C. (µS/CM)	Temp. °C	D.O. (mg/l)	Turbidity NTU	ORP (mV)	TDS (g/l)
6/31/13				2091.64									
7/1/13	11:20	156.40	2500	2092.82	122.89	8.22	0.546	546	25.59	10.02	3.46	-35	0.349
7/2/13	11:27	174.90	2500	2103.758	133.828	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/11/13	11:41	192.90	2500	2205.171	235.241	6.77	0.445	445	28.92	9.83	2.1	124	0.289
7/15/13	14:12	196.10	2500	2248.826	278.90	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/18/13	13:28	200.30	2500	2281.521	311.59	8.44	0.542	542	29.35	10.25	1.3	128	0.347
7/25/13	14:29	203.30	2500	2360.123	390.19	8.39	0.558	558	28.89	11.07	0.0	95	0.357
8/1/13	10:02	205.30	2500	2435.252	465.32	8.3	0.582	582	23.14	8.35	2.3	90	0.372

GCID 5-Jacinto
DWR No. 21N02W36A001M
*DTW= Depth to Water

			Flow Data			Water Quality Data							
Date	Time	DTW*	Pump Rate (gpm)	Flow Totalizer Reading (ac-ft)	Total Volume (ac-ft)	pH	S.C. (mS/CM)	S.C. (µS/CM)	Temp. °C	D.O. (mg/l)	Turbidity NTU	ORP (mV)	TDS (g/l)
6/31/13				0.00									
7/1/13	12:00	57.15	N/D	N/D	N/D	7.84	0.355	355	22.26	7.55	2.59	109	0.231
7/2/13	11:46	58.80	2600	12.44	-1957.49	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/11/13	15:20	58.80	2600	118.74	-1851.19	7.95	0.408	408	25.36	13.07	0.0	205	0.265
7/15/13	13:56	60.40	2600	164.187	-1805.74	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
7/18/13	13:51	57.90	2600	199.072	-1770.86	8.01	0.397	397	26.75	11.98	1.2	204	0.258
7/25/13	14:50	58.60	2600	280.962	-1688.97	8	0.425	425	26.21	12.23	0.0	174	0.267
8/1/13	10:29	55.60	2600	360.633	-1609.30	7.83	0.443	443	21.23	9.74	1.1	140	0.288