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Water & Land Management Newsletter



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- ◇ **A BRIEF, HISTORIC LOOK AT GROUNDWATER DEVELOPMENT IN GLENN COUNTY**
- ◇ **UPDATE ON 2014 GROUNDWATER LEVELS IN GLENN COUNTY**
- ◇ **SUGGESTED READING ABOUT GROUNDWATER MANAGEMENT IN CALIFORNIA**

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A BRIEF, HISTORIC LOOK AT GROUNDWATER DEVELOPMENT IN GLENN COUNTY

Figure 1 shows that 56,833 wells have been developed to supply groundwater in the five northern Sacramento Valley Counties of Shasta, Tehama, Glenn, Butte, and Colusa Counties. This estimate is based upon well completion reports (WCR) submitted to the California Department of Water Resources, Northern Region headquartered in Red Bluff, CA.

The number of WCRs submitted usually corresponds with the number of wells that have been drilled (with the exception of instances such as well destruction, which also requires a WCR to be submitted). Therefore, the number of water wells that have been drilled in an area over time can be an indicator of groundwater development.

Well completion reports were not required to be submitted in the early part of the 20th century, hence the low numbers from 1900 to about 1947. As might be expected, the data show that the highest number of wells drilled on an annual basis generally correspond with below normal, dry, or critically dry precipitation years. This reflects that when surface water is not available or reliable that the reliance on groundwater increases. During low precipitation years the number of wells drilled annually in the five county area generally ranged between 1000 and 1700 wells. In 1977, well development was about 2200 wells in the five county area.

Table 1 provides well development data specifically for Glenn County through 2013. The total number of wells developed in Glenn County according to WCR's is 6,017 wells. Privately owned domestic wells account for almost 48 percent of the total number of wells (2,869 wells) constructed in Glenn County. Irrigation wells tally for just over 28 percent of the total

Figure 1. Cumulative Number of Wells drilled in the northern Sacramento Valley Counties, 1900 through 2013 (Source: California Department of Water Resources (DWR), Northern Region).

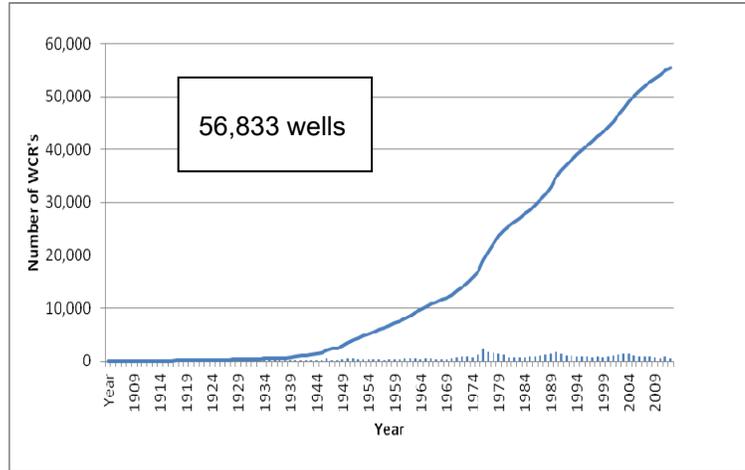


Table 1. Well Completion Report Data for Glenn County through 2013 (Source: California Department of Water Resources, Northern Region)

Well Use	Glenn Co.	Percentage
Domestic	2,869	47.7
Irrigation	1,689	28.1
Municipal & Industrial	82	1.3
*Other	1,377	22.9
Total	6,017	100

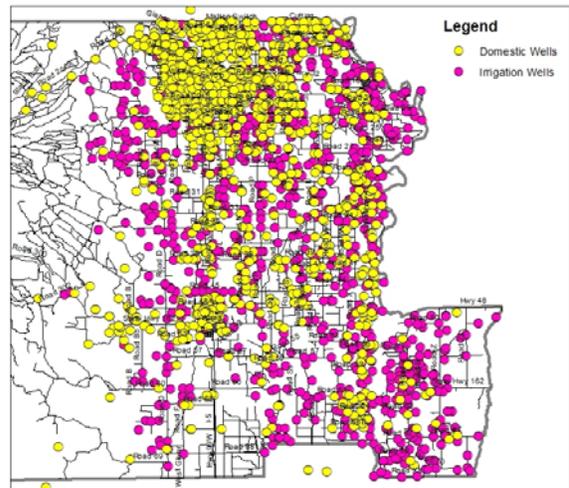
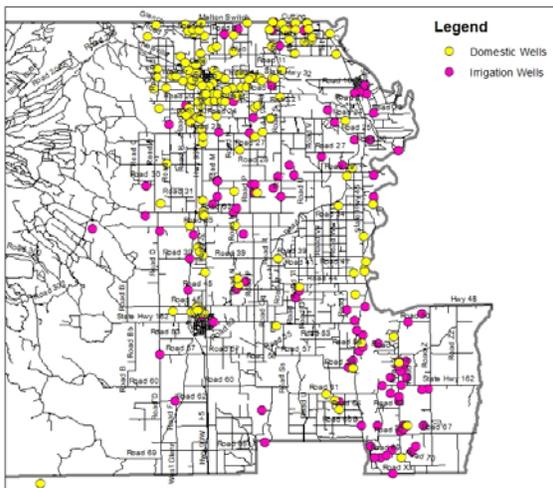
* Other well uses generally indicates wells that do not produce water or produce low volumes of water. Examples would include dedicated monitoring wells and wells for livestock watering. However, in some cases, the use may have not been specified on the WCR and they may be either domestic or irrigation wells.

(1,689 wells) and municipal and industrial wells account for only 1.3 percent of the total (82 wells). A fourth category of well use, "Other" accounts for almost 23 percent (1,377) of the total wells developed in Glenn County. Many of these wells do not produce water or produce low volumes of water. An example would be 83 multi-completion, dedicated groundwater monitoring wells that are overseen by the Glenn County Department of Agriculture and local irrigation districts. Another example would be small wells that provide livestock water. In addition, some of the Well Completion Reports may not have specified the use and they are likely to be either domestic or irrigation wells.

Figures 2 and 3 compares the extent of groundwater development on the valley floor of Glenn County in 1970-74 to the extent of groundwater development in 2010.

Figure 2. Illustration of water well development in Glenn County, 1970-74. (Source: Glenn County Department of Agriculture).

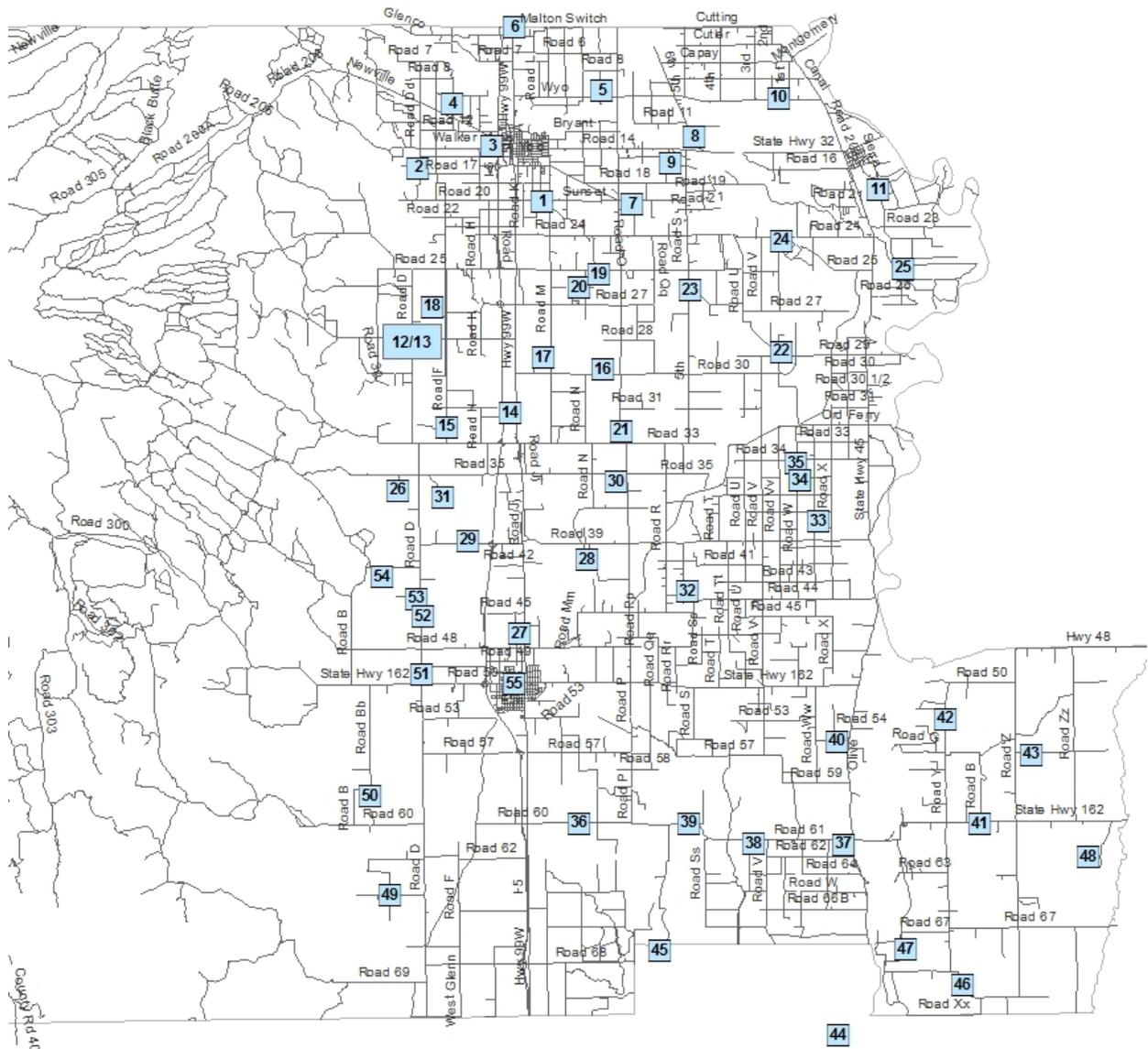
Figure 3. Illustration of water well development in Glenn County, 2010. (Source: Glenn County Department of Agriculture).



UPDATE ON 2014 GROUNDWATER LEVELS IN GLENN COUNTY

Glenn County Code 20.03 and Ordinance 1237, "Groundwater Coordinated Resource Management Plan", includes an element of groundwater monitoring in Glenn County. Figure 4 below shows a map of Glenn County and illustrates the location of 55 key wells that are used to routinely monitor groundwater levels. The key wells are numbered consecutively on the map and correspond with the map symbol numbers and descriptions listed in Table 2. Table 2 provides the Spring groundwater levels from 2012 through 2014 for each key well. The groundwater levels are expressed in feet below ground surface. Spring groundwater levels dating back to 1977, another period of severe drought, are also given for comparison for those key wells where records were available. The data indicate a wide range in groundwater levels. Levels that are shaded denote levels deeper than those recorded in 1977.

Figure 4. Map showing location of 55 key wells for monitoring groundwater levels on the valley floor of Glenn County
 (Source: Glenn County Department of Agriculture).



Groundwater levels are measured in each key well during the spring of each year (usually late March) and then again in the fall of each year (usually mid October). Static (non-pumping) groundwater levels measured in the spring and fall, before and after the most intensive summer pumping season, are better indicators of the groundwater conditions in Glenn County. Static levels versus actual pumping levels during the summer season, provide more accurate tracking data, because actual pumping levels are site-specific and can vary significantly depending upon how the well is constructed, whether water is pumped from it regularly, and whether other nearby wells are pumping at the same time. Groundwater levels are generally deeper in the fall following the summer season of highest water demand. Levels recover, to some degree, each spring after the fall and winter season ends. The extent of spring recovery is dependent on rainfall and snowpack totals.

Table 2. Summary of Spring Groundwater Levels from 2012 - 14 measured in 55 key monitoring wells in Glenn County (Source: California Department of Water Resources, Water Data Library and Glenn County Department of Agriculture).

Map Symbol #	Well ID Number	General Location	1977 Level	2012 Level	2013 Level	2014 Level
			----(feet below ground surface)----			
1	22N03W34A01M	Rd 20 & Rd M	21.8	17.7	14.6	22.5
2	22N03W30C01M	Between Rds 15 & 17 & Rd DD	103.0	109.3	112.7	118.2
3	22N03W21F02M	Rd 14 & Rd HH	29.5	26.1	21.2	29.1
4	22N03W17E01M	Rd 200 & Cedar Ave	17.3	20.1	15.3	20.2
5	22N03W12Q03M	Rd 9 & Rd O	39.9	35.2	36.1	42.7
6	22N03W03D01M	Rd 3 & Hwy 99W	78.9	77.1	79.7	NM
7	22N02W31C01M	Rd 20 & Rd P	26.0	23.7	22.0	29.7
8	22N02W21D01M	6th Ave & Hwy 32	33.1	25.8	26.0	41.5
9	22N02W20Q01M	Rd 16 & Rd XX	21.4	16.7	15.2	26.4
10	22N02W11Q01M	Rd 9 & Between 1st & 2nd Aves	25.9	25.5	29.0	30.7
11	22N01W29K01M	Rd 206 & Hamilton City	19.4	17.5	17.9	20.1
12	21N04W24A03M	Rd 28 & Rd D	NA	124.7	134.4	143.3
13	21N04W24A02M	Rd 28 & Rd D	113.5	NM	NM	NM
14	21N03W33A04M	Hwy 99W & Rd 31	55.0	55.6	68.4	68.5
15	21N03W31H01M	Rd 31 & Rd F	81.9	73.9	81.8	88.5
16	21N03W24P01M	Rd 30 & Rd P	56.1	46.2	50.9	58.4
17	21N03W22H01M	Rd 30 & Rd M	67.6	54.9	58.9	NM
18	21N03W18B02M	Rd 28 & Rd F	86.2	120.1	NM	140.9
19	21N03W12C02M	Rd 25 & Rd NN	42.7	34.4	33.6	40.8
20	21N03W11G01M	Rd 25 & Rd N	43.2	35.8	NM	NM
21	21N02W31M01M	Rd 33 & Rd P	NM	33.5	39.5	44.1
22	21N02W23G01M	Rd 29 & Rd V	31.0	25.9	NM	37.3
23	21N02W09M02M	Rd 25 & Rd S	45.0	37.9	40.6	50.0
24	21N02W02B02M	Rd V V & Rd 24	33.0	25.6	26.0	37.4
25	21N01W04N01M	Rd 23 & Rodgers Ranch Road	21.5	NM	20.0	22.8
26	20N04W12F02M	Rd 35 & Rd D	77.6	51.6	56.8	62.8
27	20N03W33J01M	Rd 45 & Rd J	33.4	10.1	10.4	15.4
28	20N03W23G02M	Rd 39 & Rd P	36.3	25.3	26.5	31.0
29	20N03W17P01M	Rd 39 & Rd H	57.0	19.3	31.5	22.8
30	20N03W12C01M	Rd 35 & Rd P	44.0	33.9	37.0	44.5
31	20N03W07K03M	Rd 35 & Rd D	77.4	40.3	44.4	48.7
32	20N02W29G01M	Rd 44 & Rd S	8.0	6.1	6.3	7.3
33	20N02W13G01M	Rd 37 & Rd W W	6.8	2.6	5.3	4.7
34	20N02W11A03M	Rd 35 & Rd W	NM	18.1	21.0	19.9
34	20N02W11A02M	Rd 35 & Rd W	NM	11.9	13.8	15.0
34	20N02W11A01M	Rd 35 & Rd W	NM	8.8	9.5	9.3
35	20N02W02J01M	Rd 34 & Rd W	12.6	6.6	9.9	11.5
36	19N03W26P01M	Rd 60 & Hwy 99W	4.7	0.0	0.0	1.6
37	19N02W36H01M	Rd 61 & Between Hwy 45 & Rd WW	8.6	10.5	10.4	9.6
38	19N02W34F01M	Rd U & Rd 61	7.2	3.4	4.7	3.1
39	19N02W29Q01M	Rd 60 & Rd SS	4.8	2.8	4.2	2.8
40	19N02W13J01M	Rd 56 & Between Hwy 45 & Rd WW	14.0	12.6	12.5	11.6
41	19N01W27R01M	Hwy 162 & Rd Y	15.8	12.8	11.6	11.2
42	19N01W15D01M	Rd 50 and Rd Y	15.6	11.4	NM	NM
43	19N01W13Q01M	Hwy 162 & Rd Z	NM	4.0	5.0	3.0
44	18N02W36B01M	Dodge Road & Hwy 45	11.4	5.5	12.1	13.5
45	18N02W18K01M	Norman Rd & Lambert Lane	11.1	7.4	8.0	7.1
46	18N01W22L01M	Rd 69 & Rd Y	8.7	6.3	NM	6.0
47	18N01W17G01M	Rd 67 & Levee Rd	19.8	18.4	17.7	19.1

48	18N01E05D01M	Hwy 162 & Rd Z	NM	NM	3.9	3.8
49	KWD-3	Rd 65 & D	NM	8.6	15.6	23.6
50	KWD-2	Rd 60 & Rd B	NM	8.7	10.7	14.7
51	KWD-1	Hwy 162 & Rd D	NM	9.7	12.7	16.7
52	GWD-3	Rd 45 & Rd D	NM	27.3	19.3	22.3
53	GWD-2	Rd 45 & Rd D	NM	17.8	19.8	25.8
54	GWD-1	Rd 43 & Rd D	NM	27.3	27.3	30.3
55	CALWater 002-01	Within the City of Willows	NM	20.0	14.7	19.0

Footnotes:

Highlighted measurements indicate that groundwater levels are deeper than measured in 1977 drought. NM indicates no groundwater level measurement was available.

Suggested Reading About Groundwater Management in California

1. Draft Sustainable Groundwater Management 5.22.14. The Governor's Office of Planning & Research. http://www.opr.ca.gov/docs/Draft_Groundwater_Management_Language.pdf (9 pages)
2. Recommendations for Achieving Groundwater Sustainability. April 2014. Association of California Water Agencies. http://www.acwa.com/sites/default/files/post/groundwater/2014/04/final_acwa-groundwater-sustainability-recommendations.pdf. (15 pages)
3. Recommendations for Sustainable Groundwater Management. April 2014. California Water Foundation. [http://www.californiawaterfoundation.org/uploads/1399077265-GroundwaterReport-5-2014\(00249329xA1C15\).pdf](http://www.californiawaterfoundation.org/uploads/1399077265-GroundwaterReport-5-2014(00249329xA1C15).pdf). (35 pages)
4. Sacramento Valley Groundwater Assessment. June 2014. Northern California Water Association. <http://www.norcalwater.org/res/docs/NCWA-GW-2014-web.pdf>. (Call to Action - 20 pages), (Technical Supplement - 91 pages).
5. An Evaluation of California Groundwater Management Planning. July 2014. California Water Foundation. [http://www.californiawaterfoundation.org/uploads/1405009350-GMPReport2014\(00256304xA1C15\).pdf](http://www.californiawaterfoundation.org/uploads/1405009350-GMPReport2014(00256304xA1C15).pdf). (64 pages)