



DEPARTMENT OF WATER RESOURCES

Northern District

2440 Main St.

Red Bluff, CA 96080

November 19, 2008

GROUNDWATER LEVEL MONITORING REPORT SACRAMENTO VALLEY and REDDING GROUNDWATER BASINS CHANGE IN GROUNDWATER ELEVATIONS FALL 2007 TO FALL 2008

The Fall 2008 Groundwater Level Monitoring Report summarizes the October 2008 groundwater level measurements collected from wells in the northern Sacramento Valley by the Department of Water Resources (DWR) Northern District and DWR monitoring cooperators. Northern Sacramento Valley groundwater levels are measured up to four times a year as part of our ongoing data collection program. Many of the wells have over 30 years of monitoring history, with the longest active monitoring well dating back to 1921, or 87 years. The groundwater level data provide valuable information regarding seasonal fluctuations and long-term changes in groundwater level trends over time. The groundwater level data presented in this report includes the Sacramento Valley and Redding groundwater basin portions of Butte, Colusa, Glenn, Tehama, and Shasta counties.

The groundwater level monitoring grid includes active and inactive wells drilled by varying methods, under varying designs, and for varying uses. Types of well use include domestic, irrigation, observation and other (stock, unused, etc) wells. Wells may be constructed over discreet aquifer intervals or multiple aquifer zones. The total depth of monitoring grid wells ranges from 18 feet below ground surface (ft-bgs), to 1,380 ft-bgs; with screened intervals ranging from 8 to 1,310 ft-bgs. The wide variety of well uses and construction provides the opportunity to examine the groundwater level response to seasonal and long-term changes in climate and land use over multiple aquifer zones.

Static groundwater level data from 445 monitoring wells were analyzed by well use and well depth for the October 2007 versus October 2008 monitoring periods. Wells that were pumping or had been recently pumped at the time of measurement were excluded from the analysis due to inherent uncertainties associated with pumping level data. It is important to note that the change in groundwater elevation data represents the individual annual change which occurred in one well over two monitoring periods. Daily and seasonal changes in groundwater levels are also occurring and are influenced by many factors, such as a nearby well pumping, changing land use, weather, precipitation, and surface water supply, among others.

Seasonal and long-term changes in groundwater levels in individual wells are best examined with hydrographs. Hydrographs for each of the monitoring wells can be obtained at DWR's Water Data Library (<http://wdl.water.ca.gov>). Regional evaluation of seasonal or long-term changes in groundwater levels are typically evaluated through groundwater contour mapping. Annual groundwater elevation contours, along with copies of this report, are available online at DWR Northern District's website: (<http://www.nd.water.ca.gov/PPAs/GroundwaterBasins/GroundwaterLevel/>).

Groundwater elevation is determined by subtracting the measured depth to groundwater in a well from the ground surface elevation, and is expressed as feet-mean sea level (ft-msl). The change in groundwater elevation was calculated by subtracting the October 2007 measurement from the October 2008 measurement for each of the measured wells. A change in groundwater level indicated by a positive number indicates that the groundwater level was higher in

October 2008 than it was in October 2007. A change in groundwater level indicated by a negative number indicates that the groundwater level was lower in October 2008 than it was in October 2007.

The groundwater level data that were analyzed for this report are summarized below and are listed in Tables 1 and 2, and illustrated in Plates 1 through 4. Table 1 shows the change in groundwater elevation by well depth and Table 2 shows the change in groundwater elevation by well use. Also provided are three plates that show the locations of the wells by well depth, well type, and change in groundwater level from October 2007 to October 2008. Plate 1 shows monitoring wells with depths ranging from 0 to 200 feet; Plate 2 shows monitoring wells with depths ranging from 201 to 600 feet; and Plate 3 shows monitoring wells with depths ranging from 601 to 1,380 feet. Plate 4 shows the locations of observation wells only, by well depth and by the change in groundwater level, from October 2007 to October 2008.

GENERAL SUMMARY:

- ✓ On average, groundwater levels were down by about 3 feet (-3 ft) in the northern Sacramento Valley groundwater basin, and down by about 1 foot (-1 ft) in the Redding Basin in October 2008, when compared to October 2007.
- ✓ The greatest decrease in groundwater elevation was on the west side of the Sacramento Valley in Glenn County, in an observation well that had a decline of 26 feet (-26 ft) in October 2008 compared to October 2007.
- ✓ The greatest increase in groundwater elevation was in an observation well also in Glenn County, with a groundwater elevation 11 feet (+11 ft) higher in October 2008 than in October 2007.
- ✓ Groundwater levels were down, on average, in all well types:
 - domestic wells: 2 feet (-2 ft)
 - irrigation wells: 3 feet (-3 ft)
 - observation wells: 4 feet (-4 ft)
 - other well types: 3 feet (-3 ft)
- ✓ Groundwater levels were also down, on average, for all well depths:
 - 0 to 200 feet deep: 2 feet (-2 ft)
 - 201 feet and 600 feet deep: 4 feet (-4 ft)
 - 601 and 1380 feet deep: 5 feet (-5 ft)
 - unknown well depth: 3 feet (-3 ft)
- ✓ Looking at the average groundwater level decline by county:
 - Sacramento Valley Groundwater Basin
 - Butte: 3 feet (-3 ft)
 - Colusa: 3 feet (-3 ft)
 - Glenn: 4 feet (-4 ft)
 - Southern Tehama: 3 feet (-3 ft)
 - Redding Basin
 - Northern Tehama/Shasta: 1 foot (-1 ft)
- ✓ The average well depth for all wells monitored in the northern Sacramento Valley and Redding Groundwater basins is about 326 feet, with a shallowest well depth of 18 ft-bgs and a deepest well depth of 1,380 ft-bgs.

FOLLOWING ARE TABLES AND PLATES PORTRAYING THE GROUNDWATER MEASUREMENT DATA COLLECTED:

TABLES

Table 1. Change in Groundwater Elevation by Well Depth

Table 2. Change in Groundwater Elevation by Well Use

PLATES

Plate 1. Sacramento Valley Change in Groundwater Elevation Map
Fall 2007 to Fall 2008
Monitoring Wells Up to 200 Feet in Depth

Plate 2. Sacramento Valley Change in Groundwater Elevation Map
Fall 2007 to Fall 2008
Monitoring Wells 200 Feet to 600 Feet in Depth

Plate 3. Sacramento Valley Change in Groundwater Elevation Map
Fall 2007 to Fall 2008
Monitoring Wells Over 600 Feet in Depth

Plate 4. Sacramento Valley Change in Groundwater Elevation Map
Fall 2007 to Fall 2008
Dedicated Groundwater Observation Wells

DEPARTMENT OF WATER RESOURCES
FALL GROUNDWATER ELEVATION MEASUREMENTS
 NORTHERN SACRAMENTO VALLEY & REDDING BASINS, CALIFORNIA

**CHANGE IN GROUNDWATER ELEVATION
 BY WELL DEPTH**

OCTOBER 2007 to OCTOBER 2008

	All Well Depths	Well Depth			
		0 to 200 ft-bgs	200 to 600 ft-bgs	600 to 1,380 ft-bgs	Unknown
BUTTE					
Maximum Increase in GWE* (ft)	4	4	4	-1	-1
Maximum Decrease in GWE (ft)	-11	-11	-11	-8	-10
Average GWL Change (ft)	-3	-2	-3	-3	-5
Range of GWL Change (ft)	15	15	15	7	9
Number of Wells	89	31	39	11	8
COLUSA					
Maximum Increase in GWE* (ft)	2	2	1	-2	-1
Maximum Decrease in GWE (ft)	-16	-11	-10	-16	-1
Average GWL Change (ft)	-3	-2	-4	-6	-1
Range of GWL Change (ft)	18	13	11	13	0
Number of Wells	49	16	26	6	1
GLENN					
Maximum Increase in GWE* (ft)	11	11	7	-1	3
Maximum Decrease in GWE (ft)	-26	-17	-26	-22	-8
Average GWL Change (ft)	-4	-3	-5	-7	-3
Range of GWL Change (ft)	37	28	33	21	11
Number of Wells	145	57	53	24	11
TEHAMA					
Maximum Increase in GWE* (ft)	6	2	5	0	6
Maximum Decrease in GWE (ft)	-14	-14	-13	-9	-2
Average GWL Change (ft)	-3	-2	-3	3	1
Range of GWL Change (ft)	20	16	18	8	-2
Number of Wells	129	57	48	19	5
REDDING BASIN					
Maximum Increase in GWE* (ft)	3	0	3	3	
Maximum Decrease in GWE (ft)	-13	-13	-5	0	
Average GWL Change (ft)	-1	-2	-1	2	
Range of GWL Change (ft)	16	13	8	3	
Number of Wells	33	13	18	2	0
TOTAL					
Maximum Increase in GWE* (ft)	11	11	7	3	6
Maximum Decrease in GWE (ft)	-26	-17	-26	-22	-10
Average GWL Change (ft)	-3	-2	-4	-5	-3
Range of GWL Change (ft)	37	28	33	24	16
Number of Wells	445	177	179	64	25

Note: A positive number indicates that groundwater levels were higher in October 2008 than in October 2007; a negative number indicates that groundwater levels were lower in October 2008 than in October 2007.

***GWE=Groundwater Elevation**

DEPARTMENT OF WATER RESOURCES

FALL GROUNDWATER ELEVATION MEASUREMENTS

NORTHERN SACRAMENTO VALLEY & REDDING BASINS, CALIFORNIA

**CHANGE IN GROUNDWATER ELEVATION
BY WELL USE**

OCTOBER 2007 to OCTOBER 2008

	All Well Depths	Well Use			
		Domestic	Irrigation	Observation	Other
BUTTE					
Maximum Increase in GWE* (ft)	4	4	3	3	0
Maximum Decrease in GWE (ft)	-11	-11	-11	-8	-10
Average GWL Change (ft)	-3	-3	-3	-2	-4
Range of GWL Change (ft)	15	15	14	11	9
Number of Wells	89	16	28	32	13
COLUSA					
Maximum Increase in GWE* (ft)	2	2	1	-1	0
Maximum Decrease in GWE (ft)	-16	-10	-16	-10	-8
Average GWL Change (ft)	-3	-2	-4	-5	-3
Range of GWL Change (ft)	18	13	17	9	7
Number of Wells	49	15	12	7	15
GLENN					
Maximum Increase in GWE* (ft)	11	9	11	7	3
Maximum Decrease in GWE (ft)	-26	-17	-23	-26	-10
Average GWL Change (ft)	-4	-2	-4	-5	-3
Range of GWL Change (ft)	37	26	34	33	13
Number of Wells	145	21	33	78	13
TEHAMA					
Maximum Increase in GWE* (ft)	6	6	5	2	1
Maximum Decrease in GWE (ft)	-14	-7	-13	-14	-4
Average GWL Change (ft)	-3	-2	-3	-3	-2
Range of GWL Change (ft)	20	13	18	16	5
Number of Wells	129	4	40	41	44
REDDING BASIN					
Maximum Increase in GWE* (ft)	3	1	3	3	2
Maximum Decrease in GWE (ft)	-13	-13	-5	-4	-1
Average GWL Change (ft)	-1	-2	-2	-1	1
Range of GWL Change (ft)	16	14	8	7	3
Number of Wells	33	11	6	13	3
TOTAL					
Maximum Increase in GWE* (ft)	11	9	11	9	3
Maximum Decrease in GWE (ft)	-26	-17	-23	-26	-10
Average GWL Change (ft)	-3	-2	-3	-4	-3
Range of GWL Change (ft)	37	26	34	35	13
Number of Wells	445	107	120	170	48

Note: A positive number indicates that groundwater levels were higher in October 2008 than in October 2007; a negative number indicates that groundwater levels were lower in October 2008 than in October 2007.

*GWE=Groundwater Elevation