



DEPARTMENT OF WATER RESOURCES

Northern District

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GROUNDWATER LEVEL MONITORING REPORT SACRAMENTO VALLEY and REDDING GROUNDWATER BASINS CHANGE IN GROUNDWATER ELEVATIONS SPRING 2008 TO SPRING 2009

The Spring 2009 Groundwater Level Monitoring Report summarizes the March 2009 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 479 monitoring wells were analyzed by well use and well depth for the March 2008 versus March 2009 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/index.cfm>

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 March 2008 measurement from the March 2009 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 March

2009 than it was in March 2008. A change in groundwater level indicated by a negative number indicates that the groundwater level was lower in March 2009 than it was in March 2008.

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 March 2008 to March 2009. 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 March 2008 to March 2009.

GENERAL SUMMARY:

- ✓ On average, groundwater levels were down by about 2 feet (-2 ft) in the northern Sacramento Valley and the Redding Basins in March 2009 compared to March 2008.
- ✓ The greatest decrease in groundwater elevation was on the west side of the Sacramento Valley in Glenn County in one domestic well that had a decline of 18 feet (-18 ft) in March 2009 compared to March 2008.
- ✓ The greatest increase in groundwater elevation was in a Redding Basin irrigation well with a groundwater elevation 10 feet (+10 ft) higher in March 2009 than in March 2008.
- ✓ Groundwater levels were down, on average, in all well types:
 - domestic wells: 2 feet (-2 ft)
 - irrigation wells: 3 feet (-3 ft)
 - observation wells: 3 feet (-3 ft)
 - other well types: 2 feet (-2 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: 3 feet (-3 ft)
 - 601 and 1380 feet deep: 3 feet (-3 ft)
 - unknown well depth: 3 feet (-3 ft)
- ✓ Looking at the average groundwater level decline by county:
 - Sacramento Valley Groundwater Basin
 - Butte: 2 feet (-2 ft)
 - Colusa: 3 feet (-3 ft)
 - Glenn: 4 feet (-4 ft)
 - Southern Tehama: 2 feet (-2 ft)
 - Redding Basin
 - Northern Tehama/Shasta: 2 feet (-2 ft)

FOLLOWING ARE THE TABLES AND PLATES SUMMARIZING THE GROUNDWATER LEVEL 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
Spring 2008 to Spring 2009
Monitoring Wells Up to 200 Feet in Depth

Plate 2. Sacramento Valley Change in Groundwater Elevation Map
Spring 2008 to Spring 2009
Monitoring Wells 200 Feet to 600 Feet in Depth

Plate 3. Sacramento Valley Change in Groundwater Elevation Map
Spring 2008 to Spring 2009
Monitoring Wells Over 600 Feet in Depth

Plate 4. Sacramento Valley Change in Groundwater Elevation Map
Spring 2008 to Spring 2009
Dedicated Groundwater Observation Wells

DEPARTMENT OF WATER RESOURCES					
SPRING GROUNDWATER ELEVATION MEASUREMENTS					
NORTHERN SACRAMENTO VALLEY & REDDING BASINS, CALIFORNIA					
CHANGE IN GROUNDWATER ELEVATION					
BY WELL DEPTH					
MARCH 2008 to MARCH 2009					
	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)	6	1	6	2	0
Maximum Decrease in GWE (ft)	-11	-6	-11	-7	-6
Average GWL Change (ft)	-2	-1	-2	-2	-3
Range of GWL Change (ft)	17	7	17	9	6
Number of Wells	99	39	40	15	5
COLUSA					
Maximum Increase in GWE* (ft)	0	0	0	0	
Maximum Decrease in GWE (ft)	-10	-9	-10	-9	
Average GWL Change (ft)	-3	-2	-3	-4	
Range of GWL Change (ft)	10	9	10	9	
Number of Wells	46	19	21	6	0
GLENN					
Maximum Increase in GWE* (ft)	2	2	0	0	0
Maximum Decrease in GWE (ft)	-18	-18	-16	-13	-16
Average GWL Change (ft)	-4	-3	-4	-6	-5
Range of GWL Change (ft)	20	20	16	13	16
Number of Wells	147	59	58	25	5
TEHAMA					
Maximum Increase in GWE* (ft)	8	8	2	3	2
Maximum Decrease in GWE (ft)	-11	-8	-8	-11	-4
Average GWL Change (ft)	-2	-1	-2	-2	-1
Range of GWL Change (ft)	19	16	10	14	6
Number of Wells	166	66	68	24	8
REDDING BASIN					
Maximum Increase in GWE* (ft)	10	0	10	0	
Maximum Decrease in GWE (ft)	-7	-3	-7	-3	
Average GWL Change (ft)	-2	-2	-1	-3	
Range of GWL Change (ft)	17	3	17	0	
Number of Wells	21	8	12	1	0
TOTAL					
Maximum Increase in GWE* (ft)	10	8	10	3	2
Maximum Decrease in GWE (ft)	-18	-18	-16	-13	-16
Average GWL Change (ft)	-2	-2	-3	-3	-3
Range of GWL Change (ft)	28	26	26	16	18
Number of Wells	479	191	199	71	18
Note: A positive number indicates that groundwater levels were higher in March 2009 than in March 2008; a negative number indicates that groundwater levels were lower in March 2009 than in March 2008.					
*GWE=Groundwater Elevation					

Table 1. Change in Groundwater Level Elevation by Well Depth.

DEPARTMENT OF WATER RESOURCES					
SPRING GROUNDWATER ELEVATION MEASUREMENTS					
NORTHERN SACRAMENTO VALLEY & REDDING BASINS, CALIFORNIA					
CHANGE IN GROUNDWATER ELEVATION BY WELL USE					
MARCH 2008 to MARCH 2009					
	All Well Depths	Well Use			
		Domestic	Irrigation	Observation	Other
BUTTE					
Maximum Increase in GWE* (ft)	6	6	2	0	1
Maximum Decrease in GWE (ft)	-11	-6	-11	-7	-6
Average GWL Change (ft)	-2	-2	-2	-2	-2
Range of GWL Change (ft)	17	12	13	7	7
Number of Wells	99	19	34	36	10
COLUSA					
Maximum Increase in GWE* (ft)	0	0	0	0	0
Maximum Decrease in GWE (ft)	-10	-9	-9	-10	-3
Average GWL Change (ft)	-3	-2	-4	-4	-2
Range of GWL Change (ft)	10	9	9	10	3
Number of Wells	46	17	13	12	4
GLENN					
Maximum Increase in GWE* (ft)	2	1	2	2	0
Maximum Decrease in GWE (ft)	-18	-18	-16	-15	-9
Average GWL Change (ft)	-4	-4	-5	-3	-3
Range of GWL Change (ft)	20	19	18	17	9
Number of Wells	147	22	38	77	10
TEHAMA					
Maximum Increase in GWE* (ft)	8	8	4	3	1
Maximum Decrease in GWE (ft)	-11	-8	-8	-11	-4
Average GWL Change (ft)	-2	-1	-2	-2	-1
Range of GWL Change (ft)	19	16	12	14	5
Number of Wells	166	54	53	50	9
REDDING BASIN					
Maximum Increase in GWE* (ft)	10	0	10	0	1
Maximum Decrease in GWE (ft)	-7	-3	-7	-3	-7
Average GWL Change (ft)	-2	-1	0	-2	-3
Range of GWL Change (ft)	17	3	17	3	8
Number of Wells	21	7	5	4	5
TOTAL					
Maximum Increase in GWE* (ft)	10	8	10	3	1
Maximum Decrease in GWE (ft)	-18	-18	-16	-15	-9
Average GWL Change (ft)	-2	-2	-3	-3	-2
Range of GWL Change (ft)	35	26	26	18	26
Number of Wells	479	119	143	179	38
Note: A positive number indicates that groundwater levels were higher in March 2009 than in March 2008; a negative number indicates that groundwater levels were lower in March 2009 than in March 2008.					
*GWE=Groundwater Elevation					

Table 2. Change in Groundwater Level Elevation by Well Use.