

Groundwater Report Fall 2018

San Joaquin County

Flood Control and Water Conservation District



San Joaquin County

Flood Control and Water Conservation District

Board of Supervisors

Miguel Villapudua (District 1)

Katherine Miller (District 2)

Tom Patti, Chair (District 3)

Chuck Winn, Vice-Chair (District 4)

Robert Rickman (District 5)

Flood Control Engineer Director of Public Works

Kris Balaji, P.E.

Deputy Director of Public Works

Fritz Buchman, P.E.

Report Prepared by:

DISTRICT STAFF

Matt Zidar, Water Resources Manager

Glenn Prasad, P.E., Senior Civil Engineer

Justin Padilla, Engineering Assistant

San Joaquin County Department of Public Works, Stockton, 2021 Copies of the Fall 2018 Groundwater Report may be available upon request from:

San Joaquin County Department of Public Works P.O. Box 1810 Stockton, California 95201

Acknowledgements

. . .

This Groundwater Report is a product of the commitment that the San Joaquin County Flood Control and Water Conservation District together with many other interested agencies made to sustain and enhance the groundwater resources of the Eastern San Joaquin Basin. The District extends thanks to...

California Water Service

City of Lathrop

City of Lodi

City of Manteca

City of Stockton Municipal Utilities Department

East Bay Municipal Utility District

Morada Area Association Pacific Gas and Electric Company

San Joaquin County Department of Public Works

State of California, Department of Water Resources,

Central District Stockton East Water District

United States Bureau of Reclamation

United States Geological Survey

Most of all, we would like to thank all of the individual well owners, who give us access to their wells and in some cases some of their time.

Table of Contents

Intro	oduction	1-1
1.1	Purpose	1-1
1.2	Procedure	1-1
<u>Rair</u>	fall Distribution	2-1
Grou	undwater Elevation Monitoring	3-1
<u>Grou</u> 3.1	undwater Elevation Monitoring Hydrographs	3-1 3-2
<u>Grou</u> 3.1 3.2	undwater Elevation Monitoring Hydrographs Groundwater Level Profiles	3-1 3-2 3-2
Grou 3.1 3.2 3.3	Undwater Elevation Monitoring Hydrographs Groundwater Level Profiles Groundwater Level Changes	3-1 3-2 3-2 3-2 3-2

Tables

Table 3-1 Comparison of CSJWCD Water Surface Elevations	3-3
Table 3-3 Comparison of OID Water Levels	3-6
Table 3-4 Comparison of SEWD Water Levels	3-7
Table 3-5 Comparison of SSJID Water Levels	3-10
Table 3-6 Comparison of Southwest Area Water Levels	3-11
Table 3-7 Comparison of WID Water Levels	3-12
Table 4-1 Comparison of Water Quality Results	4-35

Figures

Figure 2-1 Total Annual Rainfall (Tracy Carbona Station)	2-1
Figure 2-2 Total Annual Rainfall (Camp Pardee Station)	2-2
Figure 2-3 Monthly Rainfall Distribution (Tracy Carbona Station)	2-2
Figure 2-4 Monthly Rainfall Distribution (Camp Pardee Station)	2-3
Table 3-2 Comparison of NSJWCD Water Surface Elevations	3-5
Figure 3-1 Hydrograph Well Locations	3-13
Figure 3-2 Fall Hydrograph Well A - East of Thornton Rd & South of Benson Ferry	
Rd.	3-14
Figure 3-3 Fall Hydrograph Well B - East of Lower Sac Rd. & South of Acampo Rd.	3-14
Figure 3-4 Fall Hydrograph Well C - North of Liberty Rd. & West of North Cherokee	
Ln.	3-15
Figure 3-5 Fall Hydrograph Well D - West of Elliotto Rd. & North of Jahant Rd.	3-15
Figure 3-6 Fall Hydrograph Well E - East of Davis R. & South of Armstrong Rd.	3-16
Figure 3-7 Fall Hydrograph Well F - West of Route 88 & North of Eight Mile Rd.	3-16
Figure 3-8 Fall Hydrograph Well G - West of Route 26 & South of Shelton Rd.	3-17
Figure 3-9 Fall Hydrograph Well H - East of Ijams Rd. & North of McAllen Rd.	3-17
Figure 3-10 Fall Hydrograph Well I - West of Gogna Rd. & North of Route 26	3-18
Figure 3-11 Fall Hydrograph Well J - East of Duncan Rd. & South of Milton Rd.	3-18
Figure 3-12 Fall Hydrograph Well K - East of Ash Rd. & North of Carpenter Rd.	3-19
Figure 3-13 Fall Hydrograph Well L - West of Jack Tone Rd. & North of Mariposa	
Rd.	3-19
Figure 3-14 Fall Hydrograph Well M - West of Hewitt Rd. & South of Hwy. 4	3-20
Figure 3-15 Fall Hydrograph Well N - West of Wright Rd. & North of Kasson Rd.	3-20
Figure 3-16 Fall Hydrograph Well O - East of Jack Tone Rd. & North of French	
Camp Rd.	3-21
Figure 3-17 Fall Hydrograph Well P - East of Steinegul Rd. & North of Owens Rd.	3-21
Figure 3-18 Fall Hydrograph Well Q - East of McArthur Rd. & North of Darlene Rd.	3-22
Figure 3-19 Fall Hydrograph Well R - West of Tully Rd. & North of Brandt Rd.	3-22
Figure 3-20 Fall Hydrograph Well S - East of Hays Rd. & North of Mullin Rd.	3-23
Figure 3-21 Fall Hydrograph Well T - East of Carlton Rd. & South of Lone Tree Rd.	3-23
Figure 3-22 Fall Hydrograph Well U - East of Airport Rd. & South of Perrin Rd.	3-24
Figure 3-23 Fall Hydrograph Well V - East of Murphy Rd. & South of Cedar Ln.	3-24
Figure 3-24 Fall Hydrograph Well W - West of Henry Rd. & North of Carter Rd.	3-25
Figure 3-25 Fall Hydrograph Well X - East of Wolfe Rd. & South of Howard Rd.	3-25
Figure 3-26 Fall Hydrograph Well Y - Esat of Bruella Rd. & North of Schmiedt Rd.	3-26
Figure 3-27 Fall Hydrograph Well Z - East of Johnson Rd. & South of Route 12	3-26
Figure 3-28 Water Surface Cross Sections	3-27
Figure 3-29 Highway 99 Cross Section Fall 2018	3-28
Figure 3-30 Highway 4 & Highway 26 Cross Section Fall 2018	3-28
Figure 3-31 Jack Tone Rd Cross Section Fall 2018	3-29
Figure 3-32 Change in Groundwater Elevation – Fall 2017 to Fall 2018	3-30
Figure 3-33 Depth to Groundwater – Fall 2017	3-31
Figure 3-34 Depth to Groundwater – Fall 2018	3-32
Figure 3-35 Groundwater Surface Elevation – Fall 2017	3-33

Figure 3-36 Groundwater Surface Elevation – Fall 2018	3-34
Figure 4-1 Salinity Monitoring Well Locations	4-36
Figure 4-1 Water Quality Comparison Graph Well 35E5	4-37
Figure 4-2 Water Quality Comparison Graph Well 35G2	4-37
Figure 4-3 Water Quality Comparison Graph Well 25M3	4-38
Figure 4-4 Water Quality Comparison Graph Well 25M4	4-38
Figure 4-5 Water Quality Comparison Graph Well 4E1	4-39
Figure 4-6 Water Quality Comparison Graph Well 7D2	4-39
Figure 4-7 Water Quality Comparison Graph Well 8C1	4-40
Figure 4-8 Water Quality Comparison Graph Well 8Q2	4-40
Figure 4-9 Water Quality Comparison Graph Well 35N1	4-41
Figure 4-2 Water Quality Comparison Graph Well 29M1	4-41

1 Introduction

Since the fall of 1971, the San Joaquin County Flood Control and Water Conservation District has monitored groundwater levels and groundwater quality and has published the data in the Semi-annual Groundwater Report. This report utilizes data from federal, state and local government agencies as well as non-governmental sources.

Water level data is collected on a semi-annual basis, during the months of April and October, to observe groundwater levels before and after peak groundwater pumping conditions. Over 350 wells, most of which are measured by County staff, are included in the Monitoring Program. The exact number of wells varies from year to year, depending on circumstances such as destructions, new well construction, well accessibility, and well condition.

1.1 Purpose

The purpose of the semi-annual Groundwater Reports is to provide information on groundwater conditions in San Joaquin County and to publish the results of the groundwater monitoring program which consists of the following:

- 1. Monitor groundwater quality along a North-South line from the north of the City of Stockton to the City of Lathrop.
- 2. Measure groundwater levels on a County-wide basis.

In general, water quality data is more meaningful after peak production which usually occurs during the summer months. Therefore, groundwater quality data is only published in the fall report. The groundwater depth and elevation data are published in both the spring and fall.

Saline intrusion from the west is a continuing concern affecting the quality of groundwater in the Eastern San Joaquin and Tracy Groundwater Basins. Groundwater quality analysis is completed on an

annual basis, from approximately 18 municipal and domestic supply wells (exact number varies from year to year) located in proximity to the saline front.

1.2 Procedure

Water level measurements are performed using either a steel chain or sounder. Data is then immediately recorded in field books and then stored in a database for accessibility and reporting requirements.

Groundwater quality sampling is conducted on an annual basis during the month of October, along with the Fall measurements. Approximately 18 wells are currently sampled. The exact

number of wells may vary depending on well access and other conditions. Replicate groundwater samples (two) are analyzed for Chloride (Cl-) by Fruit Growers Laboratory, Inc., and analyzed for Electrical Conductivity (EC) using DiST 3 by Hanna Instruments. Total Dissolved Solids (TDS) are calculated using the formula: $TDS = 0.64 \times EC$ (umhos). Data is then stored in a database for accessibility and reporting requirements.

2 Rainfall Distribution

The groundwater basins in San Joaquin County responds to changes in annual precipitation. There are four stations throughout the county which track rainfall throughout the year; however, rainfall records for two of these stations (Lodi Station and Stockton Fire Station) were not available. The precipitation data from west to east, is presented in Figures 2-1 through 2-4. These graphs reflect areas located across San Joaquin County and one area in Calaveras County. These stations have been collecting rainfall data since the 1950's.



Figure 2-1 Total Annual Rainfall (Tracy Carbona Station)







Figure 2-3 Monthly Rainfall Distribution (Tracy Carbona Station)



Monthly Rainfall Distribution (Camp Pardee Station)

Figure 2-4 Monthly Rainfall Distribution (Camp Pardee Station)

3 Groundwater Elevation Monitoring

Groundwater level data was provided by San Joaquin County and supplemented with data available through the Department of Water Resources CASGEM program. Groundwater levels were gathered in San Joaquin County for the Eastern San Joaquin County Subbasin and the Tracy Subbasin. Groundwater levels were also gathered from collected and presented for adjacent counties within the Eastern San Joaquin County Subbasin.

3.1 Groundwater Levels in San Joaquin County

Wells included in previous reports that had no available construction details, or discontinued measurements have been removed from Tables 3-1 to 3-7. Wells with comparable data are those wells with groundwater level measurements in Fall 2017 and in Fall 2018. The information gathered is summarized as follows:

Central San Joaquin Water Conservation District (CSJWCD) – Twenty-eight (28) wells were able to be compared (Table 3-1). Twenty-one (21) wells show decreases in groundwater levels. Seven (7) wells show an increase in groundwater levels. There were zero (0) wells which had no change in groundwater elevation.

North San Joaquin Water Conservation District (NSJWCD) – Twenty-three (23) wells were compared in NSJWCD (Table 3-2). Fourteen (14) wells decreased in groundwater levels. Eight (8) wells increased in groundwater levels. There were four (4) wells that had no change in groundwater elevation.

Oakdale Irrigation District (OID) – Out of two wells in the OID, there was one (1) comparable well for groundwater levels (Table 3-3). The one well compared had an increased groundwater level.

Stockton East Water District (SEWD) – Seventy-two (72) wells were compared in SEWD (Table 3-4). Nineteen (19) wells decreased in groundwater levels. Fifty (50) wells show increases in groundwater levels. Three (3) wells had no change in groundwater elevation.

South San Joaquin Irrigation District (SSJID) – Twenty-three (23) wells were compared in the SSJID area (Table 3-5). Twenty (20) wells declined in groundwater elevation. Three (3) increased in groundwater elevation. Zero (0) wells had no change in groundwater elevation.

Southwest County Area in the Tracy Subbasin - Twenty-five (25) wells were compared in the southwestern portion of the County (Table 3-6). Four (4) wells declined in groundwater elevation. Twenty (20) increased in groundwater elevation. One (1) well had no change in groundwater elevation.

Woodbridge Irrigation District (WID) – Twenty-four (24) wells are monitored in WID (table 3-7. Nineteen (19) wells were compared in WID. Fourteen (14) wells decreased in

groundwater levels. Four (4) wells showed an increase in groundwater levels. There was one (1) well with no change in groundwater elevation.

3.1 Hydrographs

Hydrographs of select wells within the County are provided on Figures 3-1 through 3-27 to illustrate the changes in groundwater levels with time. Trend lines are plotted on each figure using data from 1990 to present (or shorter period if measurements are not available) to illustrate current groundwater levels, whether they are increasing or decreasing. Wells C and W are provided but monitoring at these wells has stopped at the request of the well owners.

3.2 Groundwater Level Profiles

Groundwater level profiles were developed to illustrate the relationship of where groundwater levels were increasing or decreasing in relationship to Spring 1986, recent historic high groundwater levels, and Fall 1992, historic low groundwater levels. Figure 3-28 shows the location of the profiles and Figures 3-29 through 3-31 provide the profiles.

3.3 Groundwater Level Changes

Changes in groundwater levels from Fall 2017 through Fall 2018 throughout the County are summarized on Figure 3-32. Figures 3-33 through 3-36 show depths to groundwater along surface elevation maps that were used to develop Figure 3-32.

State Well ID	Fall 2018	Fall 2017	Change (Feet)
01N07E11L001		-61	
01N07E14J002	-50.6	-59.6	9
01N07E14L001	-49.21	-48.91	-0.3
01N07E24R001	-53.5		
01N07E26H003	-47	-35	-12
01N07E32A001	-21.59	-19.79	-1.8
01N08E02B001	-57.24	-56.64	-0.6
01N08E02J001		-55.23	
01N08E11L001	-61	-62.5	1.5
01N08E13J001	-67.7	-52.7	-15
01N08E16G001	-60.7	-52.7	-8
01N08E16H002	-107.5	-79.5	-28
01N08E16P001		-52.25	
01N08E18A002		-56	
01N08E22J001	-49.5	-44	-5.5
01N08E27R002	-67		
01N08E28K001		-58.93	
01N08E29M002	-111		
01N08E35F001	-86.9	-62.9	-24
01N08E36F001	-71	-60	-11
01N09E13D001	-9		
01N09E15B002	-23.5		
01N09E17D001	-53.5		
01N09E17M001	-43.5	-50.5	7
01N09E19C001	-76	-57.5	-18.5
01N09E21J001		-15.56	
01N09E22G002		-30.4	
01N09E29R001	-35.5		
01N09E30C005	-43.2	-33.7	-9.5
01N09E35K001		-0.62	
01S07E01J001	-41.6	-37.6	-4
01S07E12H001	-32		
01S08E04R001	-60	-63.5	3.5
01S08E05A001	-91.4	-72.4	-19
01S08E05R001		-39.8	
01S08E06D001		-35.1	
01S08E09Q001	-46.9	-36.9	-10

Table 3-1 Comparison of CSJWCD Water Surface Elevations

State Well ID	Fall 2018	Fall 2017	Change (Feet)
01S08E11F001	-43.9	-33.9	-10
01S08E14B001	-28.7	-33.2	4.5
01S08E15A001	-30.57	-27.07	-3.5
01S08E23A001	25.5		
01S08E27A001	-6.45	-6.15	-0.3
01S09E05H002	-33	-20	-13
01S09E07A001	-21.3	-37.3	16
01S09E07N001	-32.3	20.7	-53
01S09E09R001	-20.7	-3.7	-17
01S09E19Q002	3	-7	10

Number of Wells 2018-2017				Change ir	n Storage
Comparable	Comparable Decrease Increase No Change			Range	Average
28	21	7	0	-53 to 16	-7.59

State Well ID	Fall 2018	Fall 2017	Change (Feet)
03N06E04C001	6.76	7.66	-0.9
03N06E25R005		-45.02	
03N07E02G003	-34.64	-34.24	-0.4
03N07E03R001	-32.8	-32.3	-0.5
03N07E08E002	-27	-30	3
03N07E09C001	-30.7	-29.7	-1
03N07E12P001		-52.55	
03N07E15C004	-46.5	-44.5	-2
03N07E17D004	-27.9	-29.4	1.5
03N07E18D012	-29	-29	0
03N07E19J004		-72	
03N07E23C002	-51	-51	0
03N08E07D002	-51.66	-50.06	-1.6
03N08E22A001	-62.5		
04N06E12C004	-37		
04N06E12N002		-36.8	
04N06E15B002	-10.7	-17.7	7
04N06E23K00	-6.5	-13	6.5
04N06E24F001	-21	-21	0
04N06E25R001	-3.5	-3	-0.5
04N06E27D002	5.2	14.7	-9.5
04N07E12E001	-54.5		
04N07E17N001	-38.8	-39.8	1
04N07E19K001	-26.1	-25.6	-0.5
04N07E20H003	-31.44	-32.84	1.4
04N07E21F001	-35.3	-35.3	0
04N07E27C002	-30	-29.5	-0.5
04N07E28J002	-25.2	-24.2	-1
04N07E33H001	26	27	-1
04N07E36L001	-32.1	-31.2	-0.9
04N08E14K001		-12.6	
04N08E17J001	-40.5	-39.5	-1
04N08E21M001	-39.1	-44.1	5
04N08E32N001	-47.1	-47.6	0.5
05N07E34G001	-59.1		

Table 3-2 Comparison of NSJWCD Water Surface Elevations

Number of Wells 2018-2017				Change in Storage	
Comparable	Comparable Decrease Increase No Change		Range	Average	
26	14	8	4	-9.5 to 7	0.18

State Well ID	Fall 2018	Fall 2017	Change (feet)
01S09E21J002	24.5	22.5	2
01S09E24R001	52.1		

Table 3-3 Comparison of OID Water Levels

Nun	nber of We	Change i	n Storage		
Comparable Decrease Increase No Change			Range	Average	
1	0	1	0	2	2.00

	<u>+ 00111901130</u>		
State Well ID	Fall 2018	Fall 2017	Change (feet)
01N06E02C001	-10.23	-12.73	2.5
01N06E04J003	-12.63	-13.23	0.6
01N06E04J004	-8.17	-8.57	0.4
01N06E04J005	-3.81	-3.71	-0.1
01N06E05H001		-9.59	
01N06E05M004	-10.5	-10.5	0
01N06E36C003	-16.4	-14.5	-1.9
01N06E36C004	-12.3	-9.4	-2.9
01N06E36C005	-13	-7.4	-5.6
01N07E01M002	-74	-70	-4
01N07E02G001	-18.5		
01N07E03D002	-53.06		
01N07E03M001	-29	8	-37
01N07E04R001	-20	-21.5	1.5
01N07E09E004	-24	-39	15
01N07E09H001	-32.5		
01N07E09Q003	-36	-39	3
01N07E10D001	-35	-46	11
01N07E10G001	-42	-48	6
01N07E20G001	-21	-20	-1
01N09E05B001		-31.59	
01S06E01C002	-8	-4	-4
01S06E02G002	-8.57	-3.47	-5.1
01S06E10G001	-7.8	-4.8	-3
01S07E06M002	-8	-5	-3
01S07E08J002	-14	-4	-10
02N05E01A002	-27.64	-28.64	1
02N05E01A003	-17.71	-17.81	0.1
02N05E01A004	-14.96	-14.86	-0.1
02N05E01A005	-10.14	-12.74	2.6
02N05E01A006	-10.08	-9.68	-0.4
02N06E01A001	-36.32	-40.12	3.8
02N06E08N001	-24.68	-25.38	0.7
02N06E08N002	-22.82	-23.52	0.7
02N06E08N003	-20.11	-21.61	1.5
02N06E12H001	-38.69	-42.09	3.4
02N06E20E001	-17	-17.5	0.5
02N06E20E002		-16.6	
02N06E20E003	-14.9	-15.2	0.3

Table 3-4 Comparison of SEWD Water Levels

State Well ID	Fall 2018	Fall 2017	Change (feet)
02N06E24F001	-28.5	-29.5	1
02N06E24J002	-29.3	-31.3	2
02N06E24J003	-28.27	-30.27	2
02N07E03D001	-65	-74	9
02N07E08D001	-71.2	-66.2	-5
02N07E08K003	-64	-77	13
02N07E08R002	-59.24	-61.84	2.6
02N07E10F002	-65.8		
02N07E11F001	-98		
02N07E11R002	-68	-70	2
02N07E15C001	-64.3		
02N07E16F002	-64.44	-70.44	6
02N07E16L001	-62.3	-71.3	9
02N07E20N002	-39	-43	4
02N07E21A002	-43.81	-44.81	1
02N07E21K002	-62	-79	17
02N07E21N001	-107		
02N07E23B001	-88		
02N07E24B001	-75.1	-76.1	1
02N07E24Q001	-84		
02N07E26N001	-93.2	-72.2	-21
02N07E28K002	-64		
02N07E28N004	-43	-41	-2
02N07E28P001	-77		
02N07E29B001	-46.5	-49.5	3
02N07E29M002	-38	-59	21
02N07E30H001	-34.5	-36.5	2
02N07E31M001	-4.8	-13.8	9
02N07E32J002	-32	-26.5	-5.5
02N07E32M002	-7	-7	0
02N07E32R001	-14.6	-4.6	-10
02N07E33L001	-39	-41	2
02N07E34R001	-67	-72	5
02N08E03G002	-64.7	-83.7	19
02N08E04C001	-73.4	-81.5	8.1
02N08E05C001	-70.5	-81.5	11
02N08E08N001	-83.5	-72.5	-11
02N08E09G002	35	-7	42
02N08E10H002	-93.1	-96.1	3
02N08E13K001		-44.6	

State Well ID	Fall 2018	Fall 2017	Change (feet)
02N08E14C001	-66	-68	2
02N08E16D001	-88.1	-88.1	0
02N08E18C001		-72.7	
02N08E20F001	-76.8		
02N08E24J001	-62.1		
02N08E28H002		-51.6	
02N08E32L002	-62.2		
02N08E33E001	-68.6	-91.6	23
02N09E05N001		-30.39	
02N09E09D001	-21.8		
02N09E28N001	-23.1		
03N06E35P002	-25.34		
03N07E35C002	-78.8	-79.8	1
03N07E35L001	-84.5	-74.5	-10
03N07E36J001	-69.3	-71.3	2
03N08E32P001		-68.12	
03N09E25R001	80.5	86.6	-6.1
03N09E36G001	68.2	70.2	-2

Number of Wells 2018-2017				Change ir	n Storage	
Comparable	Decrease	Increase	No Change	e Range Average		
72	19	50	3	-37 to 42	1.76	

Table 3-3 comparison of 3351D water Levels					
State Well ID	Fall 2018	Fall 2017	Change (feet)		
01S07E14M001	-19.1	-9.1	-10		
01S07E14P003	-33.8	-10.8	-23		
01S07E15F002	-21.6	-10.6	-11		
01S07E18L001	1.57	4.87	-3.3		
01S07E21G001	7.35	10.05	-2.7		
01S07E25E001	-7	2	-9		
01S07E26G001	-11				
01S07E27K001	-0.5	3.6	-4.1		
01S07E30R001	7.06				
01S07E36D001	8.05	10.65	-2.6		
01S08E19R001	-12.7				
01S08E30C002	-11	-3	-8		
01S08E34Q001		11.76			
01S08E35R002	21.27	19.57	1.7		
01S09E29M002		31			
01S09E33J002	43.92	45.32	-1.4		
01S09E33P001	34.71	40.71	-6		
02S07E07D002	6	9	-3		
02S07E07Q001		21.76			
02S07E08R001		25.66			
02S07E10B002		20.26			
02S07E11N002	23	25	-2		
02S07E19H001	21	20	1		
02S07E22N002		23.25			
02S08E04M001	-5.5	13.5	-19		
02S08E06J001	3	15	-12		
02S08E07R001	20	29	-9		
02S08E08A001		19			
02S08E08E001	12.2	18.2	-6		
02S08E09J001	29.06	30.36	-1.3		
02S08E12D001	32.07	29.97	2.1		
02S08E14E001	41.27	43.67	-2.4		
02S09E07D001		30.39			
02S09E11K001		68.34			
02S09E12R001	60.95	62.15	-1.2		

Table 3-5 Comparison of SSJID Water Levels

Number of Wells 2018-2017				Change ir	n Storage
Comparable	Decrease	Increase	No Change	e Range Averag	
23	20	3	0	-23 to 2.1	-5.75

State Well ID	Fall 2018	Fall 2017	Change (feet)
01S05E31R002	0.6	0.6	0
01S06E12P001		0.22	
01S06E15F001		1.41	
02S04E15R001	52.41	48.41	4
02S05E08B001	-1.8	-2.3	0.5
02S06E11J001		11.36	
02S06E25J001	16.86	17.76	-0.9
02S06E31N001	49.78	51.88	-2.1
03S06E27N001	63.23	66.13	-2.9
03S07E06Q001	18.26	20.16	-1.9
MW-1A	-16.34	-18.31	1.97
MW-1B	-24.8	-27.76	2.96
MW-1C	-25.07	-27.9	2.83
MW-2A	-22.31	-24.04	1.73
MW-2B	-26.39	-28.84	2.45
MW-2C	-26.47	-29.1	2.63
MW-3A	-20.28	-22.8	2.52
MW-3B	-26.84	-29.1	2.26
MW-3C	-27.55	-29.94	2.39
MW-4A	-22.35	-24.55	2.2
MW-4B	-26.33	-28.98	2.65
MW-4C	-26.54	-29.18	2.64
MW-5A	-22.12	-26.56	4.44
MW-5B	-22.98	-25.91	2.93
MW-5C	-22.59	-25.22	2.63
MW-6A	-19.41	-21.85	2.44
MW-6B	-22.47	-25.05	2.58
MW-6C	-20.98	-23.58	2.6

 Table 3-6 Comparison of Southwest Area Water Levels

Number of Wells 2018-2017				Change in	Storage		
Comparable	Decrease	Increase	No Change	Range Average			
25	4	20	1	-5 to 1.5	1.74		

State Well ID	Spring 2019	Spring 2018	Change (feet)
03N05E14C001	-4.6	-2.1	-2.5
03N06E05N003	-4.07	-5.07	1
03N06E07H003	-10	-11	1
03N06E10D001	3.6	2.1	1.5
03N06E17A004	-19.7	-18.7	-1
03N06E18M003	-12.1	-10.1	-2
03N06E20D002	-15	-15.5	0.5
03N06E32R001	-23	-23	0
04N05E10K001	-6.5	-5.5	-1
04N05E13H001	-1	1	-2
04N05E13R004	-4	0	-4
04N05E14B002	-6.9	-3.4	-3.5
04N05E24J004	0.9	3.9	-3
04N05E36H003	1.5	4	-2.5
04N06E17G004	0	5	-5
04N06E19F001		8	
04N06E21D001		10.64	
04N06E29N002	0	2.6	-2.6
04N06E30E001	4.7	7.2	-2.5
04N06E34J002	23.9	26.4	-2.5
05N05E28L003	-6	-5.5	-0.5

Table 3-7 Comparison of WID Water Levels

Number of Wells 2019-2018			Change ir	n Storage	
Comparable	Decrease	Increase	No Change	Range	Average
19	14	4	1	-5 to 1.5	-1.61



Figure 3-1 Hydrograph Well Locations



Figure 3-2 Fall Hydrograph Well A - East of Thornton Rd & South of Benson Ferry Rd.



Figure 3-3 Fall Hydrograph Well B - East of Lower Sac Rd. & South of Acampo Rd.



Figure 3-4 Fall Hydrograph Well C - North of Liberty Rd. & West of North Cherokee Ln.



Figure 3-5 Fall Hydrograph Well D - West of Elliotto Rd. & North of Jahant Rd.



Figure 3-6 Fall Hydrograph Well E - East of Davis R. & South of Armstrong Rd.



Figure 3-7 Fall Hydrograph Well F - West of Route 88 & North of Eight Mile Rd.



Figure 3-8 Fall Hydrograph Well G - West of Route 26 & South of Shelton Rd.



Figure 3-9 Fall Hydrograph Well H - East of Ijams Rd. & North of McAllen Rd.



Figure 3-10 Fall Hydrograph Well I - West of Gogna Rd. & North of Route 26



Figure 3-11 Fall Hydrograph Well J - East of Duncan Rd. & South of Milton Rd.



Figure 3-12 Fall Hydrograph Well K - East of Ash Rd. & North of Carpenter Rd.



Figure 3-13 Fall Hydrograph Well L - West of Jack Tone Rd. & North of Mariposa Rd.



Figure 3-14 Fall Hydrograph Well M - West of Hewitt Rd. & South of Hwy. 4



Figure 3-15 Fall Hydrograph Well N - West of Wright Rd. & North of Kasson Rd.



Figure 3-16 Fall Hydrograph Well O - East of Jack Tone Rd. & North of French Camp Rd.



Figure 3-17 Fall Hydrograph Well P - East of Steinegul Rd. & North of Owens Rd.



Figure 3-18 Fall Hydrograph Well Q - East of McArthur Rd. & North of Darlene Rd.



Figure 3-19 Fall Hydrograph Well R - West of Tully Rd. & North of Brandt Rd.



Figure 3-20 Fall Hydrograph Well S - East of Hays Rd. & North of Mullin Rd.



Figure 3-21 Fall Hydrograph Well T - East of Carlton Rd. & South of Lone Tree Rd.



Figure 3-22 Fall Hydrograph Well U - East of Airport Rd. & South of Perrin Rd.



Figure 3-23 Fall Hydrograph Well V - East of Murphy Rd. & South of Cedar Ln.



Figure 3-24 Fall Hydrograph Well W - West of Henry Rd. & North of Carter Rd.



Figure 3-25 Fall Hydrograph Well X - East of Wolfe Rd. & South of Howard Rd.











Figure 3-28 Water Surface Cross Sections



Cross Section along Highway 99 Alignment (South County Limit to North County Limit)

Figure 3-29 Highway 99 Cross Section Fall 2018



Cross Section along Highway 4 and Highway 26 Alignment (Fresno Ave to Escalon-Bellota Rd)

Figure 3-30 Highway 4 & Highway 26 Cross Section Fall 2018



Cross Section along Jacktone Rd Alignment (Highway 99 to Brandt Rd)

Figure 3-31 Jack Tone Rd Cross Section Fall 2018



Figure 3-32 Change in Groundwater Elevation – Fall 2017 to Fall 2018



Figure 3-33 Depth to Groundwater - Fall 2017



Figure 3-34 Depth to Groundwater - Fall 2018



Figure 3-35 Groundwater Surface Elevation – Fall 2017



Figure 3-36 Groundwater Surface Elevation – Fall 2018

4 Groundwater Quality Monitoring

Three new wells were sampled in Fall 2018 that had not previously been sampled (1, 2, and 3). The information for water quality in the Fall 2018 in comparison to 2017 concentrations are summarized as follows:

North San Joaquin County – One well (1) near well 34E5 was sampled. No results were historically available.

North Stockton – One well (8C1) was sampled in North Stockton this year. Concentrations of chloride, TDS and EC increased.

County Hospital Area – Due to access constraints no wells were tested in this area this year.

Lathrop – Two wells (25M3 and 25M4) were sampled in Lathrop. One well had increased levels of chloride concentrations and one well had no change. Both wells had decreased in TDS and EC.

		Fall 2017			Fall 2018		
Well	Chloride	EC	TDS	Chloride	EC	TDS	
	(ppm)	(umhos/cm)	(ppm)	(ppm)	(umhos/cm)	(ppm)	
35G2							
35N1							
25M3	64	734	470	84	726	450	
25M4	37	531	340	37	509	310	
4E1	30	688	440				
8C1	38	828	530	46	865	550	
8Q2							
29M1	83	609	390				
7D2	5.3	484	310				
34E5							
1				2	137	100	
2				9	321	200	
3				32	556	340	

Table 4-1 Comparison of Water Quality Results



Figure 4-1 Salinity Monitoring Well Locations







Figure 4-2 Water Quality Comparison Graph Well 35G2







Figure 4-4 Water Quality Comparison Graph Well 25M4







Figure 4-6 Water Quality Comparison Graph Well 7D2

4-39







Figure 4-8 Water Quality Comparison Graph Well 8Q2



Data prior to 2007 is available in the san Joaquin County Hood Control and Water Conservatio District Groundwater Fall Reports





Well 29M1 - 02N06E29M001

Figure 4-2 Water Quality Comparison Graph Well 29M1