Groundwater Report

2021 Annual

San Joaquin County

Flood Control and Water Conservation District

San Joaquin County

Flood Control and Water Conservation District

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Copies of the 2021 Annual Groundwater Report may be available upon request from:

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

Acknowledgements

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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.

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1 Introduction

Since the fall of 1971, the San Joaquin County Flood Control and Water Conservation District (District) has monitored groundwater levels and groundwater quality and has published the data in Semi-annual Groundwater Reports. 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 250 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 annual Groundwater Reports is to provide information on groundwater conditions in San Joaquin County (County) and to publish the results of the groundwater monitoring program which consists of the following:

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

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 for the fall months. The groundwater depth and elevation data are published for both the spring and fall.

Saline intrusion from the west is a continuing concern affecting the quality of groundwater in the Eastern San Joaquin Groundwater Basin. Groundwater quality analysis is completed on an annual basis, from approximately 12 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 12 wells are 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 X EC (umhos). Data is then stored in a database for accessibility and reporting requirements.

2 Rainfall Distribution

The groundwater basins in the County responds to changes in annual precipitation. There are four stations throughout the county which track rainfall throughout the year; however, rainfall records for one of these stations (Lodi Station) were not available. Figure 2-1 shows the locations of the stations. The precipitation data from west to east, is presented on Figures 2-2 through 2-7. These graphs reflect areas located across the County and one area in Calaveras County. These stations have been collecting rainfall data since the 1950's. In 2021, rainfall was less than one-half of average.

A Water Year (WY) is the period between October 1st and ends on September 30th, the year in which the period ends denotes the water year, e.g. September 30th 2021, is the end of the 2021 Water Year. The WY type is based on million acre-feet (maf) of river water runoff observed during the WY period, these types are described as follows;

Wet Year	Equal to or greater than 3.8 maf
Above Normal	Greater than 3.1, and less than 3.8 maf
Below Normal	Greater than 2.5, and equal to or less than 3.1 maf
Dry	Greater than 2.1, and equal to or less than 2.5 maf
Critical	Equal to or less than 2.1 maf

The 2021 Water Year was classified as a Critical Year with 1.3 maf. However, at the time of this report, the 2021 data is provisional and may be subject to change.

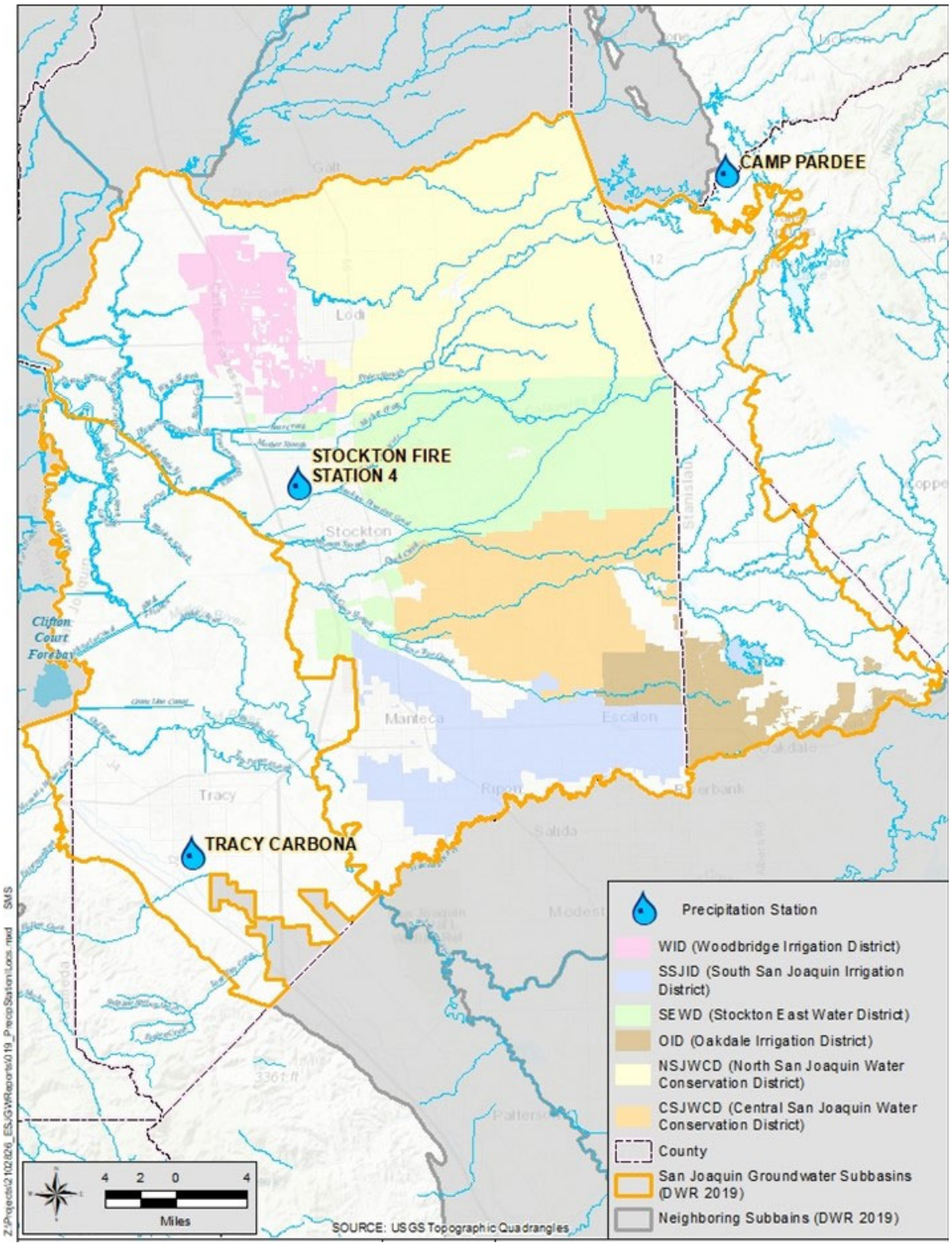


Figure 2-1 Precipitation Station Locations

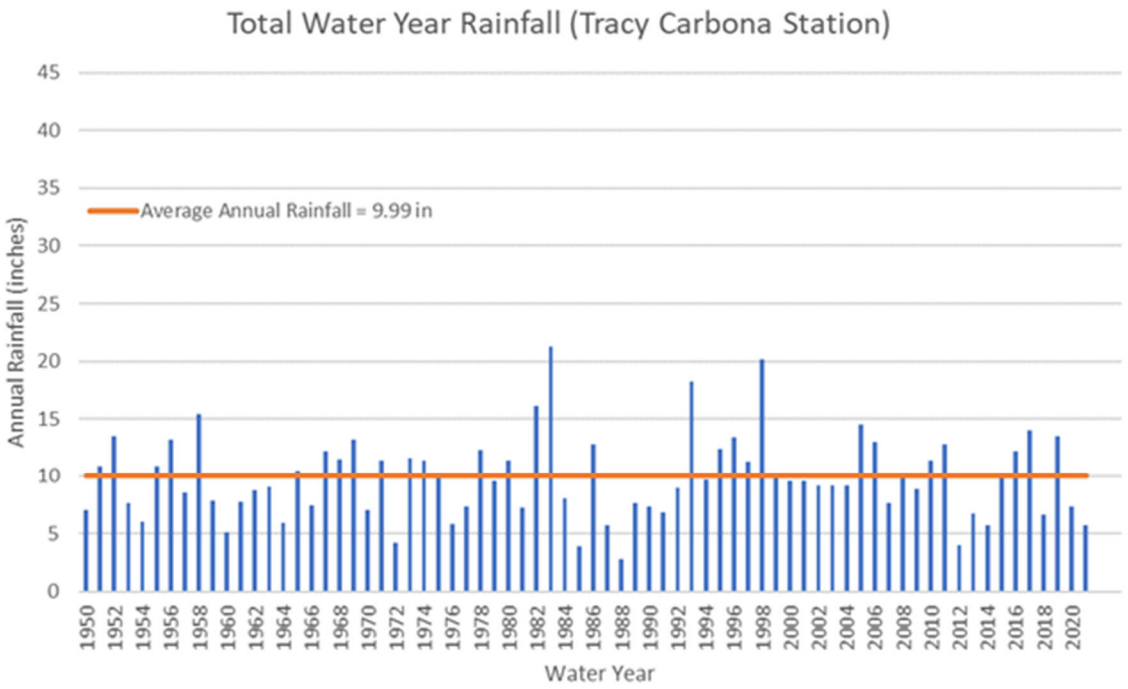


Figure 2-2 Total Annual Rainfall (Tracy Carbona Station)

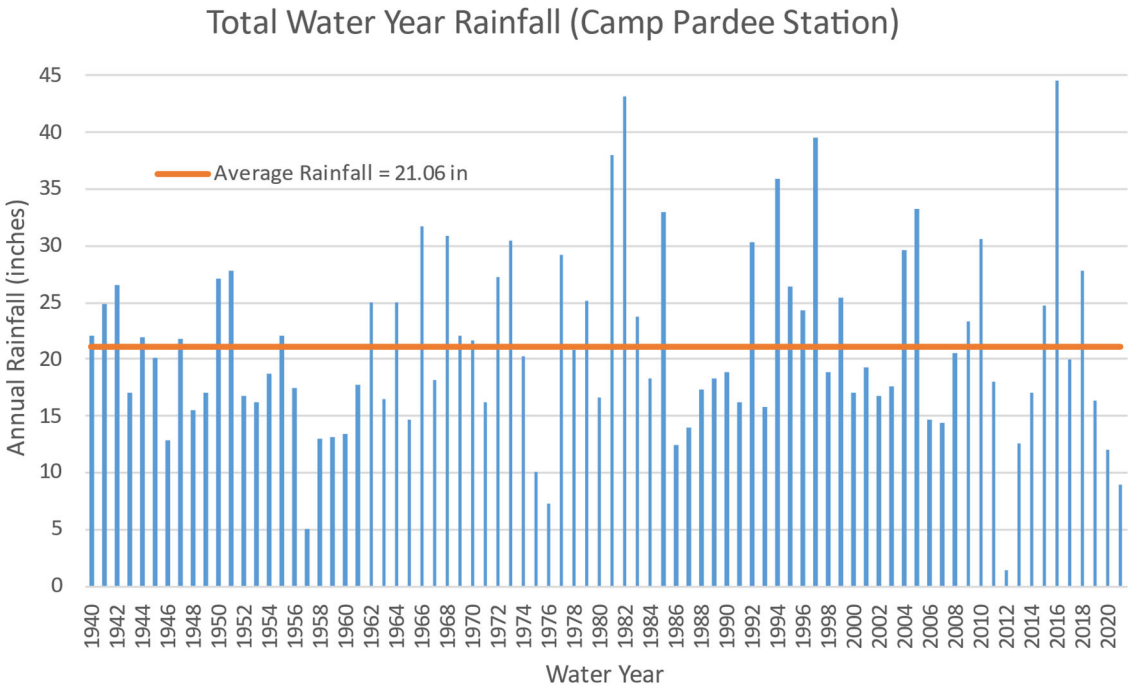


Figure 2-3 Total Annual Rainfall (Camp Pardee Station)

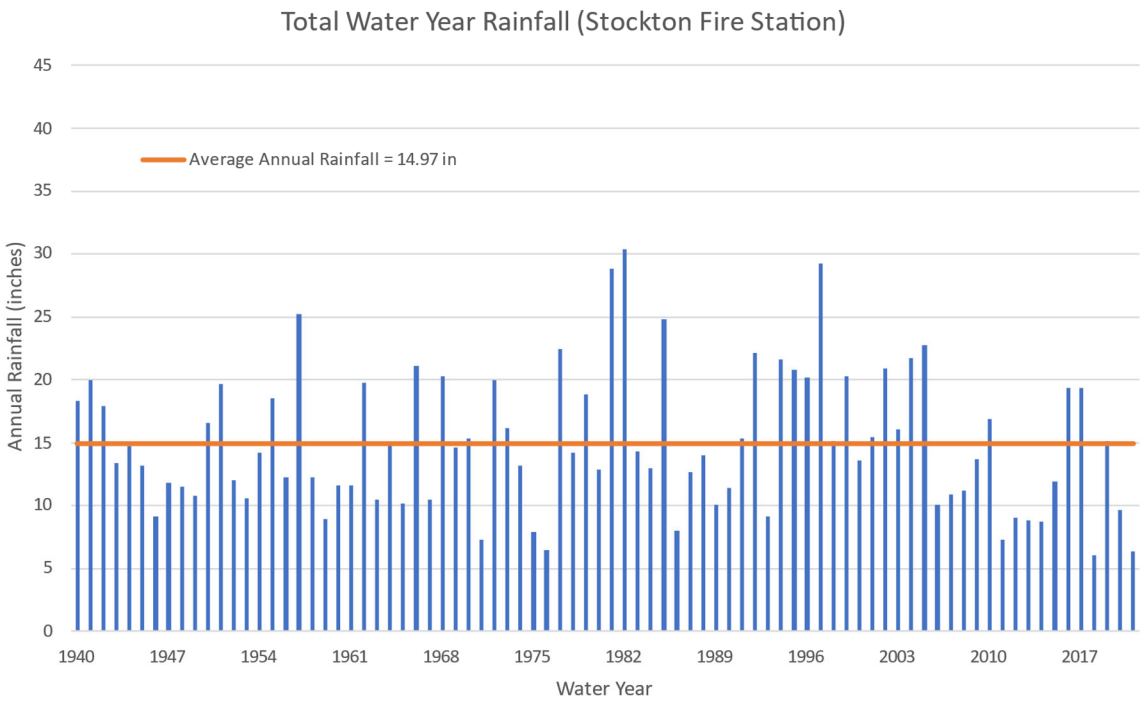


Figure 2-4 Total Annual Rainfall (Stockton Fire Station)

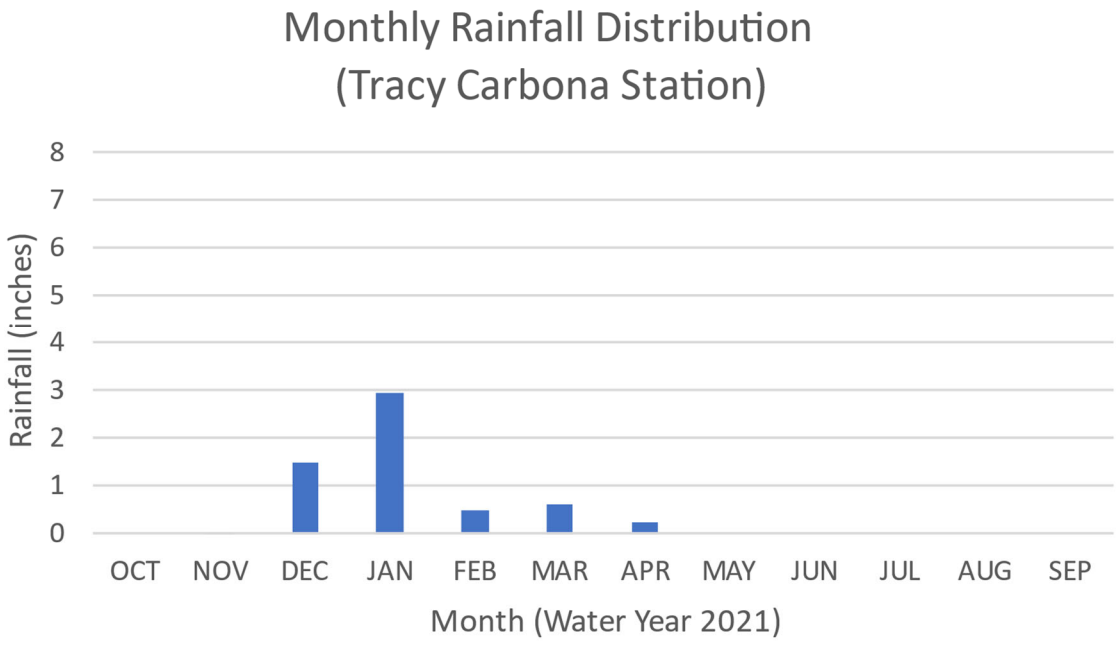


Figure 2-5 Monthly Rainfall Distribution (Tracy Carbona Station)

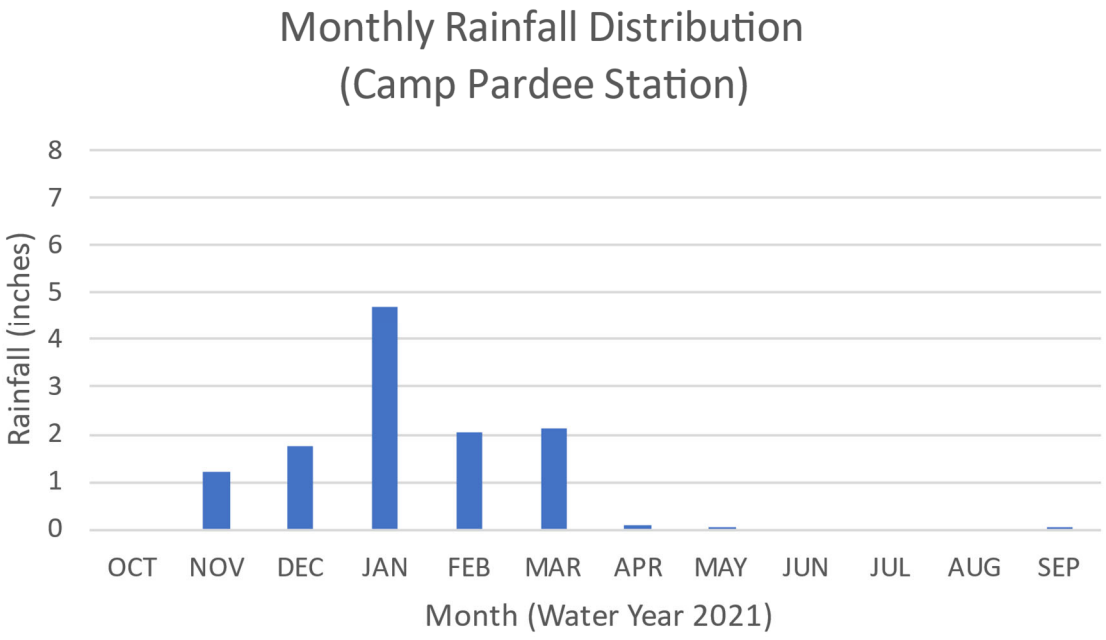


Figure 2-6 Monthly Rainfall Distribution (Camp Pardee Station)

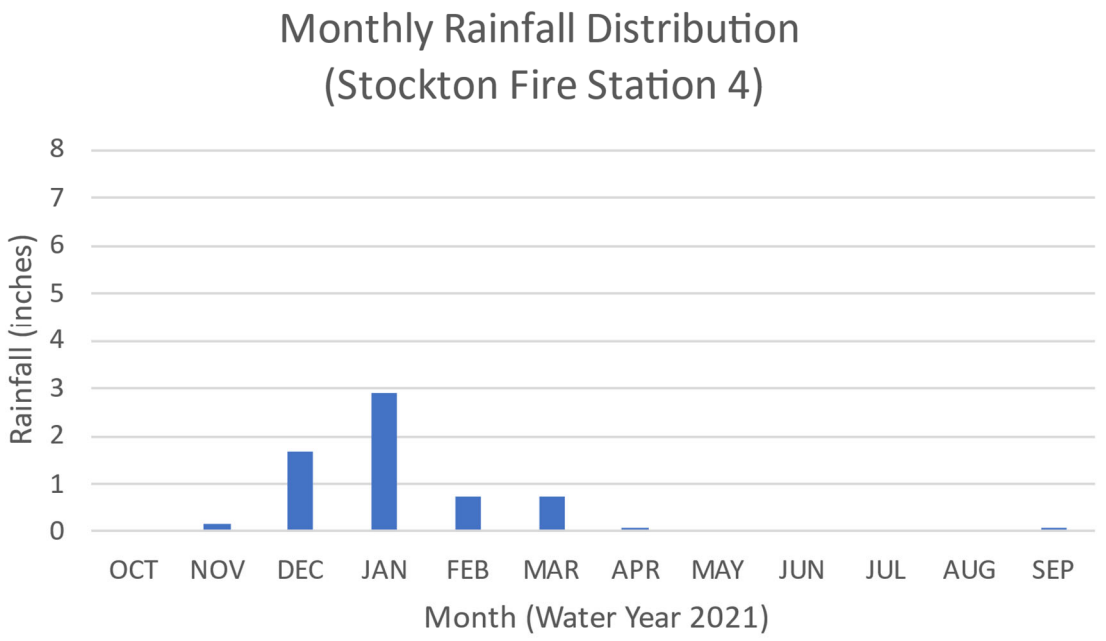


Figure 2-7 Monthly Rainfall Distribution (Stockton Fire Station)

3 Surface Water Levels and Storage

The groundwater levels in the County responds to not only changes in annual precipitation but also to the amount of surface water in storage and in the rivers. Typically, lower amounts of surface water in storage indicates higher amounts of groundwater pumping. Four river gaging stations were selected along the rivers and two reservoir stage stations. Figure 3-1 shows the location of these gages and Figures 3-2 through 3-6 provide the historic stages.

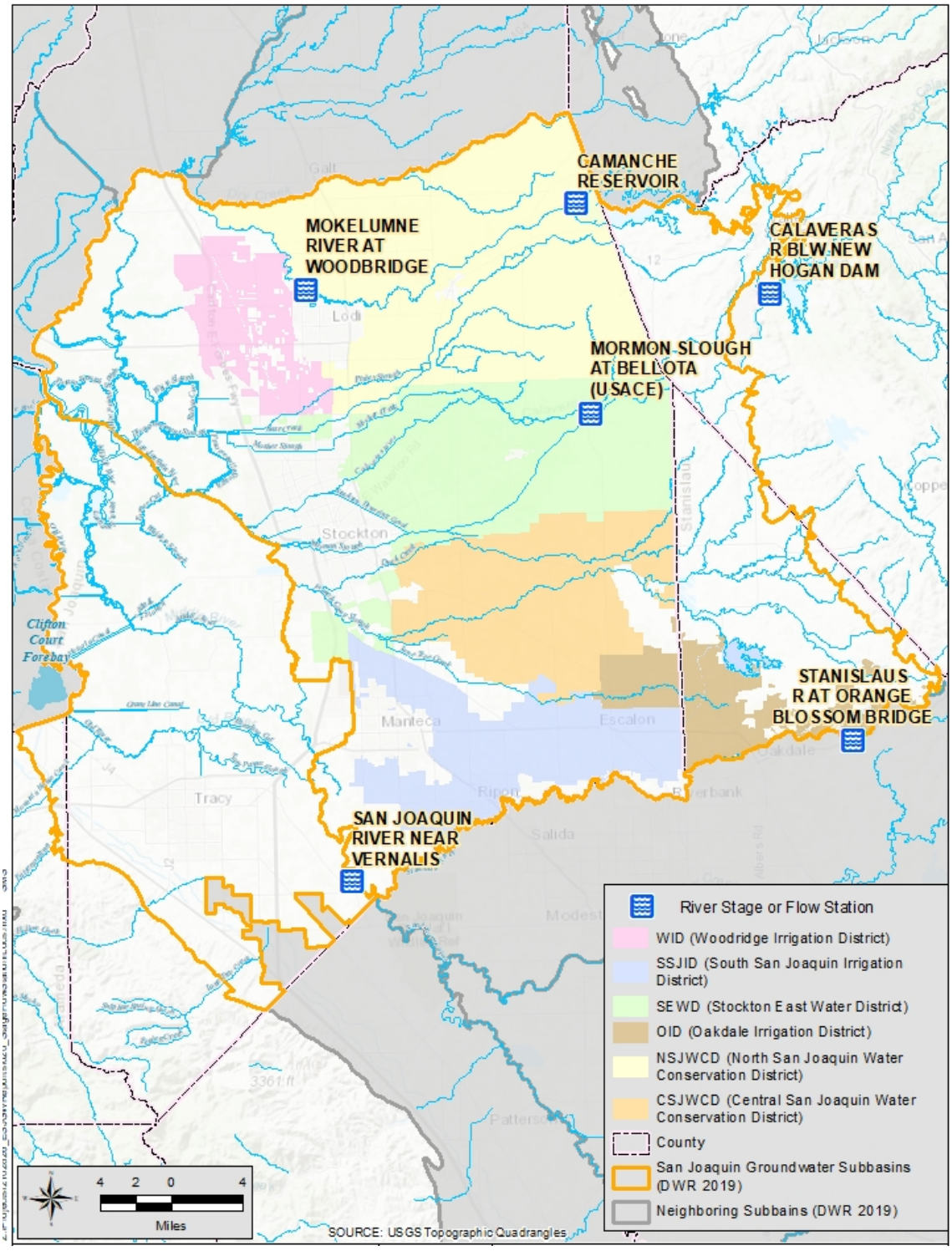


Figure 3-1 Surface Water Station Locations

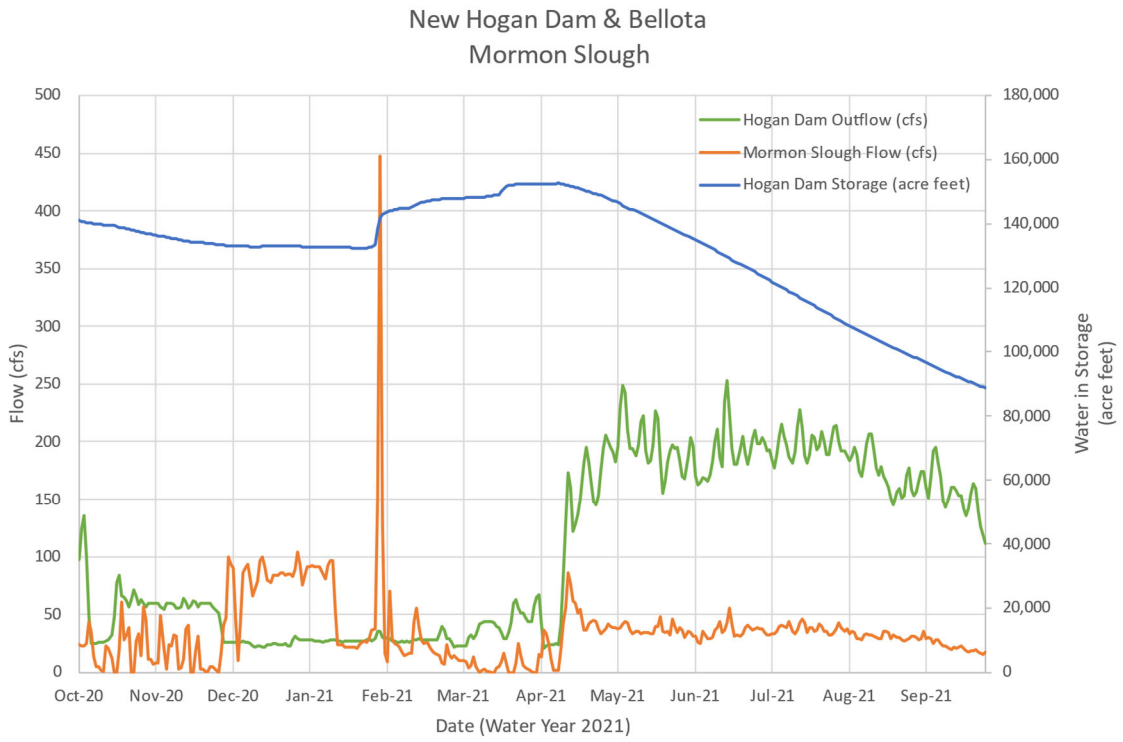


Figure 3-2 New Hogan Dam & Mormon Slough

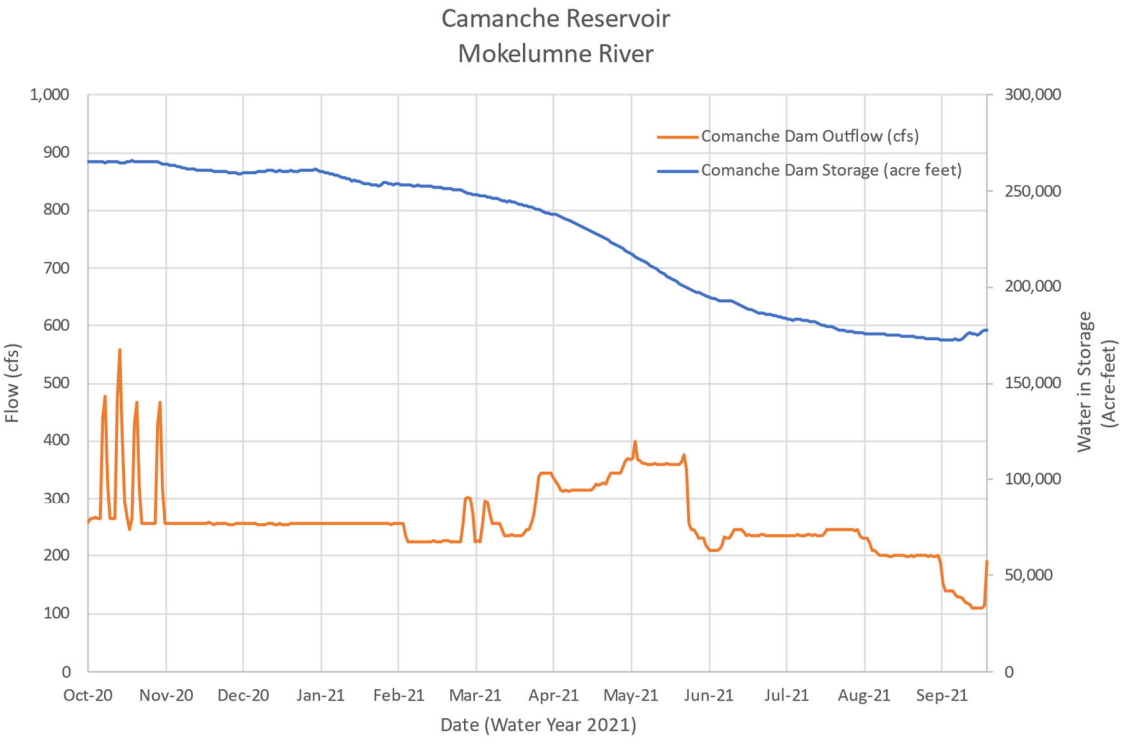


Figure 3-3 Camanche Dam

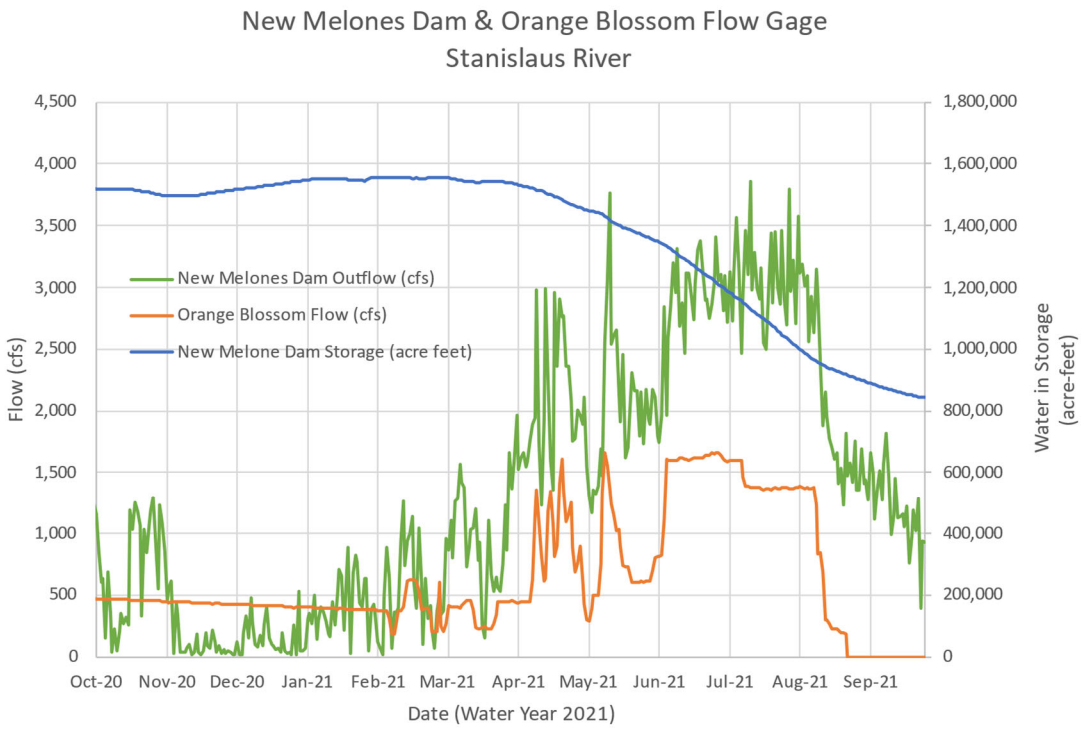


Figure 3-4 New Melones Dam & Orange Blossom Bridge

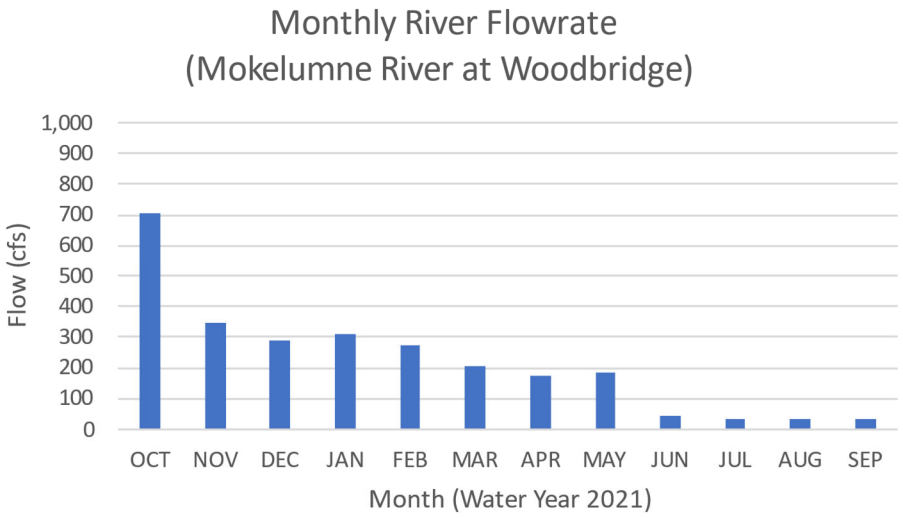


Figure 3-5 Mokelumne River Flow (Woodbridge Station) Monthly Average

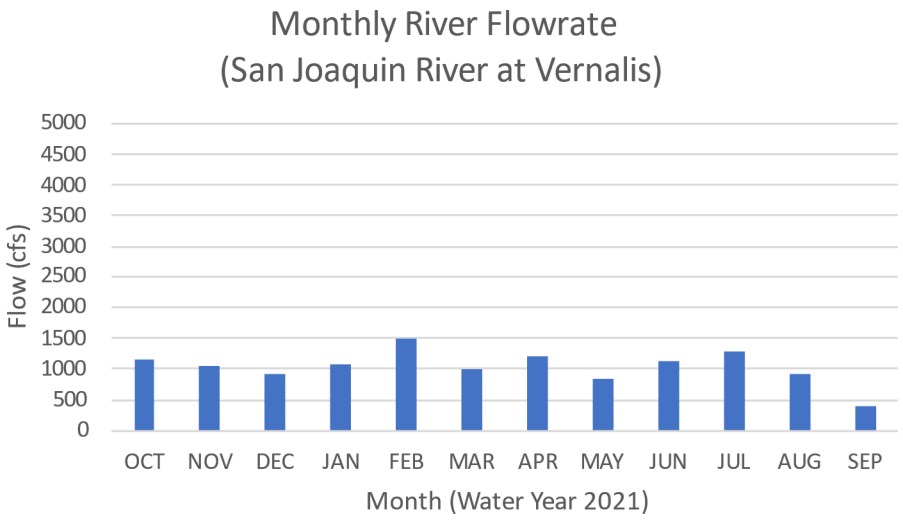


Figure 3-6 San Joaquin River Flow (Vernalis Station) Monthly Average

4 Groundwater Elevation Monitoring

Groundwater level data was provided by the County and supplemented with data available through the Department of Water Resources CASGEM program. Groundwater levels were gathered in the 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.

4.1 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 4-1 to 4-9. Wells with comparable data are those wells with groundwater level measurements in both Spring and Fall 2020 and Spring and Fall 2021.

Measurements included in the tables are from two sources. County collected data is prioritized over CASGEM data. County data is highlighted in blue in the tables. If a well was not measured by as part of the county data it is reported as no measurement (NM). If CASGEM data was not available it is reported as "—". County data is prioritized for data collection consistency, CASGEM data is not and may not necessarily be collected in the same month as recorded by the County.

Due to the on-going COVID-19 pandemic; several monitoring wells were not able to be sampled in the spring of 2020, which affects the total amount of comparable wells for 2021.

The information gathered is summarized as follows:

Central San Joaquin Water Conservation District (CSJWCD) – Thirty-three (33) wells were monitored, with fifteen (15) wells comparable for Spring, and twenty-three (23) wells able to be compared for Fall of 2021 (Table 4-1). In the Spring, nine (9) wells show decreases in groundwater levels while six (6) wells show an increase. There were no (0) wells with no change in groundwater elevations from Spring 2020 to Spring 2021. For Fall, fourteen (14) wells showed a decrease in groundwater levels, while nine (9) wells declined, there were no wells with no change from Fall 2020 to Fall 2021.

North San Joaquin Water Conservation District (NSJWCD) – Thirty-three (33) wells were monitored, twenty-seven (27) wells were compared in NSJWCD for Spring and twenty-three (23) for Fall (Table 4-2). In the Spring, twenty-three (23) wells decreased in groundwater levels and four (4) wells increased. During the Fall; twenty-one (21) wells decreased, while only one (1) well increased in groundwater level. There was one (1) well that had no change in groundwater elevation in the Fall.

Oakdale Irrigation District (OID) – Out of the two (2) wells in OID, both were comparable wells for Fall groundwater levels, but only one (1) was comparable for Spring (Table 4-3). All wells had decreased during the Spring and Fall comparison.

Stockton East Water District (SEWD) – Seventy-eight (78) wells were monitored, with forty-one (41) wells comparable in Spring, and thirty-three (33) wells could be compared in the Fall (Table 4-4). In the Spring, twenty-eight (28) wells decreased in groundwater levels, while twelve (12) increased, one (1) well with no change. During the Fall, twenty-four (24) wells show decreases in groundwater levels, while nine (9) showed an increase. No wells (0) had no change in groundwater elevation from Fall measurements.

South San Joaquin Irrigation District (SSJID) – Twenty-six (26) wells were monitored, seventeen (17) wells could be compared for Spring, while sixteen (16) could be compared for Fall (Table 4-5). In Spring, fourteen (14) wells had decreased water levels, and two (2) had increased and one (1) well had no change. During the Fall, thirteen (13) wells declined in groundwater elevation while three (3) increased. No wells (0) had no change in groundwater elevation.

Southwest County Area in the Tracy Subbasin – Out of twenty-five (25) wells monitored, only five (5) were comparable in the southwestern portion of the County for Spring, and twenty (20) wells could be compared for Fall (Table 4-6). During Spring, four (4) wells declined in groundwater elevation, while one (1) well had no change. In the Fall, nineteen (19) decreased in groundwater elevation. One (1) well had increased in groundwater elevation during the Fall.

Woodbridge Irrigation District (WID) – Eighteen (18) total wells were monitored, with sixteen (16) comparable during the Spring, and twelve (12) comparable in the Fall (Table 4-7). During the Spring, all sixteen (16) wells decreased in groundwater levels. During the Fall, ten (10) wells had decreased in water levels from the previous Fall season, while two (2) wells had increased.

Calaveras County – Fourteen (14) wells were monitored, with eleven (11) able to be compared in the Spring, and nine (9) comparable for the Fall (Table 4-8). In the Spring, ten (10) wells showed decreases in groundwater levels, while only one (1) increased. During the Fall, eight (8) wells showed a decrease and one (1) well showed an increase. There were no wells (0) with no change in groundwater level.

Stanislaus County – Eight (8) wells were monitored, and all eight (8) wells could be compared in the Spring, while only six (6) could be compared for the Fall (Table 4-9). Spring, seven (7) wells showed a decrease in groundwater levels and one (1) increased. During the Fall, five (5) showed a decrease and one (1) well showed an increase. No wells (0) with no change.

4.2 Hydrographs

Hydrographs of select wells within the County are provided on Figures 4-1 through 4-27 to illustrate the changes in groundwater levels with time. Trend lines are plotted on each figure using data from 1980 to present (or shorter period if measurements are not available) to illustrate current groundwater levels, whether they are increasing or decreasing. Wells N and Q are provided but monitoring at these wells has been prevented due to access issues, but is attempting to be resolved.

4.3 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, the historic high groundwater levels, and Fall 1992, historic low groundwater levels. Figure 4-28 shows the location of the profiles and Figures 4-29 through 4-31 provide the profiles.

4.4 Groundwater Level Changes

Changes in groundwater levels from Spring 2020 through Fall 2021 throughout the County are summarized on Figure 4-32. Figures 4-33 through 4-36 show depths to groundwater along with groundwater elevation maps that were used to develop Figure 4-32.

Table 4-1 Comparison of CSJWCD Water Surface Elevations

State Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (Feet)	Change Spring (Feet)
01N07E11L001	-51	-53	-66	--	15	--
01N07E14J002	-60	-56.6	-61.6	-81.41	1.6	24.81
01N07E24R001	-59	-55.5	-58.5	--	-0.5	--
01N07E26H003	NM	--	-44	--	--	--
01N07E32A001	-21.09	-16.69	-18.89	-14.69	-2.2	-2
01N08E11L001	NM	-53.7	-60	--	--	--
01N08E13J001	-49	-39.8	NM	NM	--	--
01N08E16G001	-61	-53.1	-39	-40.45	-22	-12.65
01N08E16H002	-60	-50.8	-57.6	-47.25	-2.4	-3.55
01N08E27R002	-52	NM	NM	--	--	--
01N08E29M002	NM	-46	NM	-35	--	-11
01N08E35F001	-74	-54.9	-61.9	--	-12.1	--
01N08E36F001	-40	-31	-38	--	-2	--
01N09E13D001	-3	NM	1.8	--	-4.8	--
01N09E17D001	NM	-43.5	-52.5	NM	--	--
01N09E17M001	-44	-37.1	-58.5	NM	14.5	--
01N09E19C001	-68	-53	-64	-63	-4	10
01N09E22G002	NM	-14.3	NM	NM	--	--
01N09E29R001	-35	-32.5	-40.5	-36.16	5.5	3.66
01N09E30C005	-41	-32.7	-44.2	NM	3.2	--
01S07E01J001	-42	-48.6	NM	-41.6	--	-7
01S08E04R001	-42	-35.8	-40.3	NM	-1.7	--
01S08E05A001	-69	-62.4	-42.4	-38.4	-26.6	-24
01S08E05R001	-43	-59.8	-54.8	-34.8	11.8	-25
01S08E06D001	NM	NM	-39.1	NM	--	--
01S08E09Q001	-41	-29.9	-46.9	-34.9	5.9	5
01S08E11F001	-35	-26.7	-29.9	-18.9	-5.1	-7.8
01S08E14B001	-30	-27.7	-32.7	NM	2.7	--
01S09E05H002	-20	-11.6	-20.1	-8.65	0.1	-2.95
01S09E07A001	-23	-15.4	-21.1	-16.3	-1.9	0.9
01S09E07N001	-19	-10.9	-16.3	NM	-2.7	--
01S09E09R001	NM	-3.7	-8.7	NM	--	--
01S09E19Q002	-1	4.7	1.3	-11	-2.3	15.7

Number of Wells Spring 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
33	15	9	6	0	-25 to 24.81	-2.39

Number of Wells Fall 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
33	23	14	9	0	-26.6 to 15	-1.30

Table 4-2 Comparison of NSJWCD Water Surface Elevations

State Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (Feet)	Change Spring (Feet)
03N06E04C001	--	--	4.66	7.36	--	--
03N07E02G003	--	--	-37.14	-28.14	--	--
03N07E03R001	-36	-29.8	NM	-26.3	--	-3.5
03N07E08E002	-31	-25.5	-28	-21	-3	-4.5
03N07E09C001	-32	-26.7	-32.7	-23.7	0.7	-3
03N07E15C004	-47	-39.5	-47	-36.8	0	-2.7
03N07E17D004	-33	-27.9	-29.3	-23.4	-3.7	-4.5
03N07E18D012	-33	-27	-29.8	-24	-3.2	-3
03N07E19J004	NM	NM	NM	NM	--	--
03N07E23C002	NM	-58	-52	-43.33	--	-14.67
03N08E07D002	--	--	-53.26	-47.06	--	--
03N08E22A001	NM	NM	-65.9	NM	--	--
04N06E12C004	-42	-34	-36.4	-30	-5.6	-4
04N06E12N002	NM	-28.3	-32.5	-21.32	--	-6.98
04N06E15B002	-17	-2.7	-12	-5.3	-5	2.6
04N06E23K00	-13	-7	-11.5	-7.5	-1.5	0.5
04N06E24F001	-26	-24	-21.5	-14	-4.5	-10
04N06E25R001	-8	-4	-5.3	-0.4	-2.7	-3.6
04N06E27D002	1	5.2	3.2	8.2	-2.2	-3
04N07E12E001	-55	-46.5	-52.5	-46	-2.5	-0.5
04N07E17N001	-41	-40.3	-38.9	-27.8	-2.1	-12.5
04N07E19K001	-32	-25.6	-27.6	-19.6	-4.4	-6
04N07E20H003	-38.44	-32.04	-33.94	-25.74	-4.5	-6.3
04N07E21F001	-39	-39.8	-36.8	-27.6	-2.2	-12.2
04N07E27C002	-35	-28.5	-32.5	-31.5	-2.5	3
04N07E28J002	-30	-25.7	-28.7	-19.7	-1.3	-6
04N07E33H001	22	24	23.1	25	-1.1	-1
04N07E36L001	-43	-30.9	NM	-28	--	-2.9
04N08E14K001	-19	-15.1	-17.1	-12.8	-1.9	-2.3
04N08E17J001	-46	-38.5	-42.8	-36.4	-3.2	-2.1
04N08E21M001	-50	-40.1	-47.1	-41	-2.9	0.9
04N08E32N001	-53	-46.1	-49.1	-43.1	-3.9	-3
05N07E34G001	-66	-55.1	NM	NM	--	--

Number of Wells Spring 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
33	27	23	4	0	-14.67 to 3	-4.12

Number of Wells Fall 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
33	23	21	1	1	-5.6 to 0.7	-2.75

Table 4-3 Comparison of OID Water Levels

State Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (feet)	Change Spring (feet)
01S09E21J002	20	24.1	21.8	NM	-1.8	--
01S09E24R001	48	51.1	49.9	52.1	-1.9	-1

Number of Wells Spring 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
2	1	1	0	0	-1	-1.00

Number of Wells Fall 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
2	2	2	0	0	-1.9 to -1.8	-1.85

Table 4-4 Comparison of SEWD Water Levels

State Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (feet)	Change Spring (feet)
01N06E02C001	-9.63	-10.63	-34.83	-4.03	25.2	-6.6
01N06E04J003	-13.13	NM	NM	-8.43	--	--
01N06E04J004	-7.77	NM	NM	-4.87	--	--
01N06E04J005	-3.31	NM	NM	-1.61	--	--
01N06E05M004	NM	NM	-8.5	NM	--	--
01N06E36C003	-16	NM	NM	-10.4	--	--
01N06E36C004	-12.4	NM	NM	-7.7	--	--
01N06E36C005	-10.3	NM	NM	-6.2	--	--
01N07E01M002	-52	-50.7	-73	NM	21	--
01N07E02G001	NM	NM	-8.5	NM	--	--
01N07E04R001	-19	-6.7	-10.9	-9	-8.1	2.3
01N07E09E004	-24	-15	-19	NM	-5	--
01N07E09H001	-47	-29.5	NM	NM	--	--
01N07E09Q003	-51	-35	-34.5	-64	-16.5	29
01N07E10D001	-22	-22	-31	NM	9	--
01N07E20G001	-19	-17	-18	-16	-1	-1
01S06E01C002	-8	-6	-9	-2	1	-4
01S06E02G002	-11.57	-10.67	-10.27	-5.77	-1.3	-4.9
01S06E10G001	NM	NM	NM	-7.8	--	--
01S07E06M002	NM	-6	-9	-7	--	1
01S07E08J002	-13	-8	NM	-3	--	-5
02N06E01A001	--	--	-37.22	-32.22	--	--
02N06E08N001	-27.08	-23.78	NM	-23.18	--	-0.6
02N06E08N002	-24.82	-22.92	NM	-22.42	--	-0.5
02N06E08N003	-21.21	-22.01	NM	-19.61	--	-2.4
02N06E12H001	--	--	-43.09	-37.69	--	--
02N06E20E001	NM	-15.9	NM	-14.7	--	-1.2
02N06E24F001	NM	NM	NM	-41.5	--	--
02N06E24J002	NM	NM	NM	-22.4	--	--
02N06E24J003	--	--	-25.87	-23.47	--	--
02N07E03D001	NM	-52.5	-56.5	NM	--	--
02N07E08D001	NM	--	NM	-58.2	--	--
02N07E08K003	-64	-51.6	-60.7	-47.7	-3.3	-3.9
02N07E08R002	-64.64	-48.84	-58.24	-49.04	-6.4	0.2
02N07E11F001	-101	-71.5	-86.5	-74.5	-14.5	3
02N07E11R002	-100	-61	-83	-66	-17	5
02N07E16F002	NM	-70.44	-61.04	-48.14	--	-22.3
02N07E16L001	-63	-49.8	-76.3	-66.3	13.3	16.5
02N07E20N002	-45	-40	-39	-43	-6	3
02N07E21A002	-69	-55.31	-65.71	-53.11	-3.29	-2.2
02N07E21K002	-61	-47.4	-56.7	-47.8	-4.3	0.4
02N07E21N001	-53	-61	-70	-63	17	2
02N07E23B001	-75	-74	-84	-79	9	5
02N07E24Q001	-76	-64.3	-72.7	-62.3	-3.3	-2
02N07E26N001	-78	-49.2	-63.2	NM	-14.8	--
02N07E28K002	-73	NM	-61	-44	-12	--
02N07E28N004	NM	NM	-36	-49	--	--
02N07E28P001	NM	NM	NM	-47	--	--

State Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (feet)	Change Spring (feet)
02N07E29B001	NM	-37.8	-41.2	-30.63	--	-7.17
02N07E29M002	-36	-27.1	-30.2	-24.3	-5.8	-2.8
02N07E30H001	-36	-27.7	-30.1	-23.7	-5.9	-4
02N07E31M001	NM	-6.8	-10.8	-3.8	--	-3
02N07E32J002	-21	-15.1	-19.3	-14.5	-1.7	-0.6
02N07E32M002	NM	-14.2	-15.4	-9.76	--	-4.44
02N07E32R001	-43	-12.6	NM	-12.6	--	0
02N07E33L001	-17	-18	-22	-19	5	1
02N07E34R001	-67	-42	-37	-32	-30	-10
02N08E03G002	-69	NM	NM	-57.3	--	--
02N08E04C001	NM	NM	-70.5	-53.5	--	--
02N08E05C001	-89	-81	-71.5	-77.5	-17.5	-3.5
02N08E08N001	-91	NM	NM	-46.5	--	--
02N08E09G002	NM	NM	40.8	50.6	--	--
02N08E10H002	-70	-59	-66.9	-56.5	-3.1	-2.5
02N08E14C001	-71	-67	-66	-57	-5	-10
02N08E16D001	-99	-70.1	NM	-47.1	--	-23
02N08E18C001	-99	NM	NM	-71.7	--	--
02N08E20F001	NM	NM	-74.8	NM	--	--
02N08E24J001	-85	NM	NM	NM	--	--
02N08E28H002	NM	NM	-85.6	-62.6	--	--
02N08E33E001	-72	-81.6	-87.6	-78.6	15.6	-3
02N09E05N001	-38.39	-34.29	-35.19	-31.69	-3.2	-2.6
02N09E09D001	NM	-31.8	NM	NM	--	--
02N09E28N001	NM	-29.1	NM	--	--	--
03N06E35P002	--	--	-24.84	-22.54	--	--
03N07E35C002	NM	NM	--	-52.7	--	--
03N07E35L001	-101	-93	-82	-84.5	-19	-8.5
03N07E36J001	NM	-66.3	-66.8	-56.3	--	-10
03N09E25R001	NM	81	80	--	--	--

Number of Wells Spring 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
78	41	28	12	1	-22.3 to 29	-2.03

Number of Wells Fall 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
78	33	24	9	0	-30 to 25.2	-2.78

Table 4-5 Comparison of SSJID Water Levels

State Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (feet)	Change Spring (feet)
01S07E14M001	-23	NM	-19.1	-9.1	-3.9	--
01S07E14P003	NM	NM	-15.8	--	--	--
01S07E15F002	-22	-14.6	-13.6	-6.6	-8.4	-8
01S07E18L001	-2.23	-0.63	0.37	2.17	-2.6	-2.8
01S07E21G001	1.75	3.55	4.35	4.95	-2.6	-1.4
01S07E25E001	-14	-3	-3	-1	-11	-2
01S07E26G001	NM	-4	-11	--	--	--
01S07E27K001	-3	0.1	-4	1.6	1	-1.5
01S07E30R001	2.96	8.16	4.56	11.46	-1.6	-3.3
01S07E36D001	3.55	6.25	6.45	5.95	-2.9	0.3
01S08E30C002	-7	-10	NM	-3	--	-7
01S09E29M002	NM	NM	20.5	--	--	--
01S09E33J002	39.82	41.62	41.52	43.32	-1.7	-1.7
01S09E33P001	36.01	39.51	36.21	40.01	-0.2	-0.5
02S07E07D002	8	9	7	6	1	3
02S07E11N002	NM	NM	22	--	--	--
02S07E19H001	20	NM	19	19	1	--
02S08E04M001	NM	7.5	NM	7.5	--	0
02S08E06J001	3	6	11	14	-8	-8
02S08E07R001	NM	NM	NM	22	--	--
02S08E08A001	14	18	15	21.36	-1	-3.36
02S08E08E001	NM	11.2	15.2	18.2	--	-7
02S08E09J001	--	--	29.06	29.76	--	--
02S08E12D001	29.97	31.67	30.97	32.17	-1	-0.5
02S08E14E001	--	--	39.67	39.97	--	--
02S09E12R001	56.45	62.95	58.45	63.05	-2	-0.1

Number of Wells Spring 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
26	17	14	2	1	-8 to 3	-2.58

Number of Wells Fall 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
26	16	13	3	0	-11 to 1	-2.74

Table 4-6 Comparison of Southwest Area Water Levels

State Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (feet)	Change Spring (feet)
01S05E31R002	1	0.2	NM	0.6	--	-0.4
02S04E15R001	NM	53	51	53	--	0
02S05E08B001	-1	-0.7	NM	--	--	--
02S06E25J001	16	12.4	14.5	14.3	1.5	-1.9
02S06E31N001	NM	48	46.5	49.18	--	-1.18
03S06E27N001	56	61.8	59.8	63.23	-3.8	-1.43
03S07E06Q001	--	--	18.26	17.76	--	--
MW-1A	-28.45	-11.17	-18.57	--	-9.88	--
MW-1B	-39.81	-23.72	-26.23	--	-13.58	--
MW-1C	-40.32	-25.92	-26.5	--	-13.82	--
MW-2A	-35.87	-16.01	-24.93	--	-10.94	--
MW-2B	-44.5	-21.87	-28.89	--	-15.61	--
MW-2C	-44.42	-22.05	-28.91	--	-15.51	--
MW-3A	-29.21	-15.64	-20.78	--	-8.43	--
MW-3B	-46.78	-21.84	-29.27	--	-17.51	--
MW-3C	-48.9	-22.42	-29.73	--	-19.17	--
MW-4A	-38.51	-15.37	-25.78	--	-12.73	--
MW-4B	-44.27	-21.54	-29.23	--	-15.04	--
MW-4C	-44.57	-21.2	-29.52	--	-15.05	--
MW-5A	-36.46	-14.44	-26.74	--	-9.72	--
MW-5B	-37.61	-17.34	-26.36	--	-11.25	--
MW-5C	-35.26	-16.49	-25.16	--	-10.1	--
MW-6A	-29.61	-14.56	-21.35	--	-8.26	--
MW-6B	-34.85	-24.4	-24.74	--	-10.11	--
MW-6C	-32.09	-21.32	-22.74	--	-9.35	--

Number of Wells Spring 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
25	5	4	0	1	-1.9 to 0	-0.98

Number of Wells Fall 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
25	20	19	1	0	-19.17 to 1.5	-11.42

Table 4-7 Comparison of WID Water Levels

State Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (feet)	Change Spring (feet)
03N05E14C001	NM	NM	NM	-3.1	--	--
03N06E05N003	NM	-5.5	NM	-2.07	--	-3.43
03N06E07H003	-15	-11	-12	-7.6	-3	-3.4
03N06E17A004	-23	-16.7	-19	-13.7	-4	-3
03N06E18M003	-16	-11.1	-12.2	-8.4	-3.8	-2.7
03N06E20D002	-20	-14	-16.5	-11.5	-3.5	-2.5
03N06E32R001	-28	NM	-24	-23.5	-4	--
04N05E10K001	-6	-5.5	-7.5	-3.14	1.5	-2.36
04N05E13H001	NM	-3.5	-5	2.88	--	-6.38
04N05E13R004	-12	-4.5	NM	-0.3	--	-4.2
04N05E14B002	NM	-3.9	-6.9	-1.9	--	-2
04N05E24J004	NM	-1.6	-1.6	4.8	--	-6.4
04N05E36H003	-7	-2	-2.1	3.33	-4.9	-5.33
04N06E17G004	-6	-0.5	-2	3.5	-4	-4
04N06E29N002	-11	-4	-3.3	0	-7.7	-4
04N06E30E001	-6	0.7	1.7	4.7	-7.7	-4
04N06E34J002	19	21.4	22.1	22.6	-3.1	-1.2
05N05E28L003	-5	-4.5	-6.7	-3.1	1.7	-1.4

Number of Wells Spring 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
18	16	16	0	0	-6.4 to -1.2	-3.52

Number of Wells Fall 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
18	12	10	2	0	-7.7 to 1.7	-3.54

Table 4-8 Comparison of Calaveras County Water Levels

Local Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (feet)	Change Spring (feet)
CCWD 001	DRY	74.67	99.5	91.5	--	-16.83
CCWD 002	79.92	77.33	85.22	96	-5.3	-18.67
CCWD 003	NM	NM	124.89	NM	--	--
CCWD 004	94.15	85.61	95.72	95.88	-1.57	-10.27
CCWD 005	90.35	83.99	92.61	96.36	-2.26	-12.37
CCWD 006	102.39	102.48	103.98	105.61	-1.59	-3.13
CCWD 007	DRY	DRY	DRY	DRY	--	--
CCWD 008	NM	60.85	72.35	73.46	--	-12.61
CCWD 009	109.89	110.39	110.85	NM	-0.96	--
CCWD 010	85.86	82.56	87.56	47.4	-1.7	35.16
CCWD 011	85.57	82.19	88.91	89.63	-3.34	-7.44
CCWD 012	150.08	148.07	147.41	149.93	2.67	-1.86
CCWD 014	147.79	130.16	157.73	134.86	-9.94	-4.7
CCWD 015	NM	144.97	147.4	151.27	--	-6.3

Number of Wells Spring 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
14	11	10	1	0	-18.67 to 35.16	-5.37
Number of Wells Fall 2021-2020					**Change in Storage**	
Total	**Comparable**	**Decrease**	**Increase**	**No Change**	**Range**	**Average**
14	9	8	1	0	-9.94 to 2.67	-2.67

Table 4-9 Comparison of Stanislaus Water Levels

State Well ID	Fall 2021	Spring 2021	Fall 2020	Spring 2020	Change Fall (feet)	Change Spring (feet)
01S10E04C001	--	65.32	64.34	68.22	--	-2.9
01S10E21A001	85.195	87.155	87.315	90.065	-2.12	-2.91
01S10E26J001	79	83.4	81.94	84.89	-2.94	-1.49
01S10E27Q001	68.83	73.48	71.02	74.81	-2.19	-1.33
01S10E34R001	72.99	75.09	71.61	76.48	1.38	-1.39
01S11E25N001	NM	126.11	149.31	124.01	--	2.1
02S10E02P001	81.7	87.62	84.07	89.72	-2.37	-2.1
02S10E10M002	70.88	75	71.24	75.61	-0.36	-0.61

Number of Wells Spring 2021-2020					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
8	8	8	0	0	-2.91 to 2.1	-1.33
Number of Wells Fall 2021-2020					**Change in Storage**	
Total	**Comparable**	**Decrease**	**Increase**	**No Change**	**Range**	**Average**
8	6	5	1	0	-2.94 to 1.38	-1.43

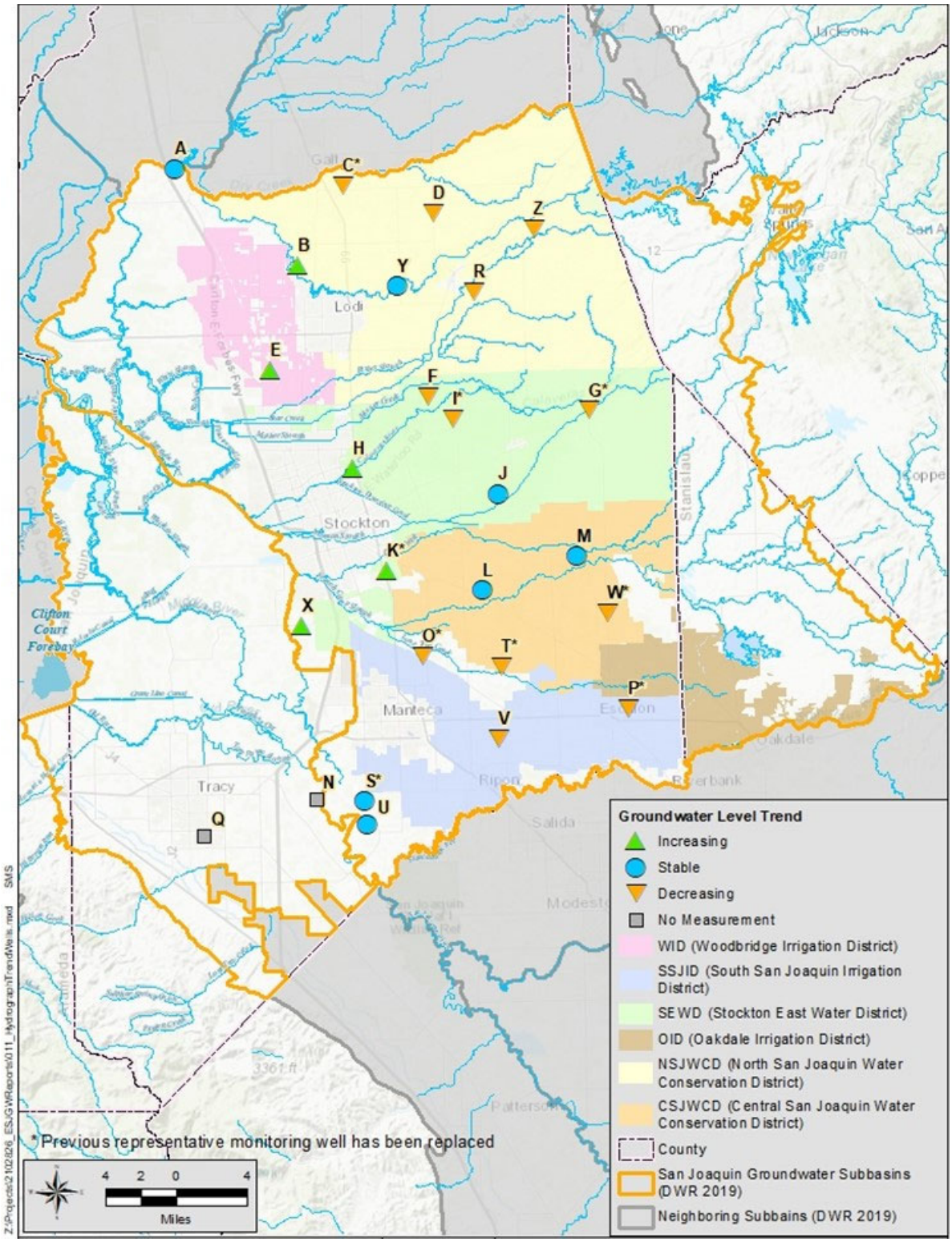


Figure 4-1 Hydrograph Well Locations

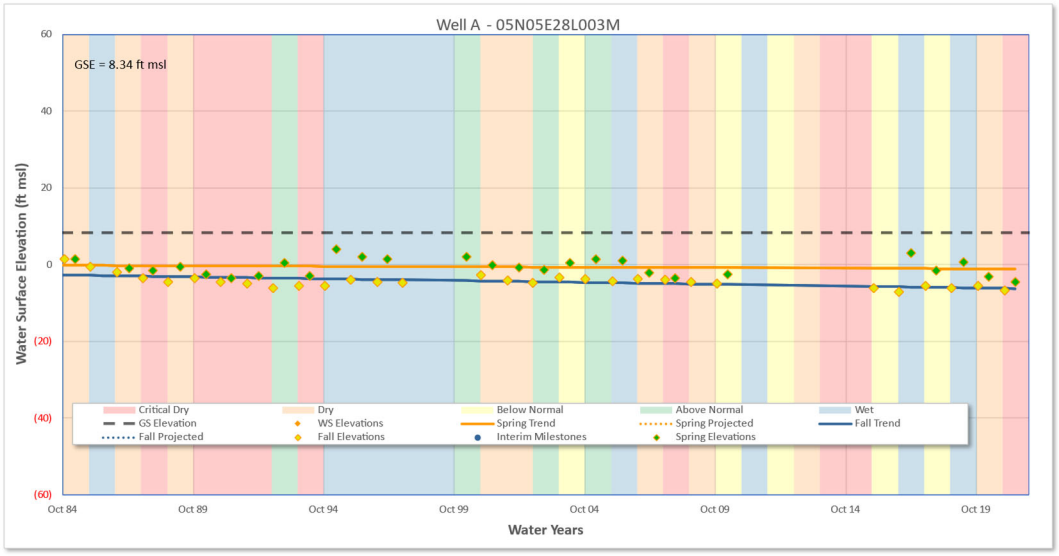


Figure 4-2 Fall Hydrograph Well A - East of Thornton Rd & South of Benson Ferry Rd.

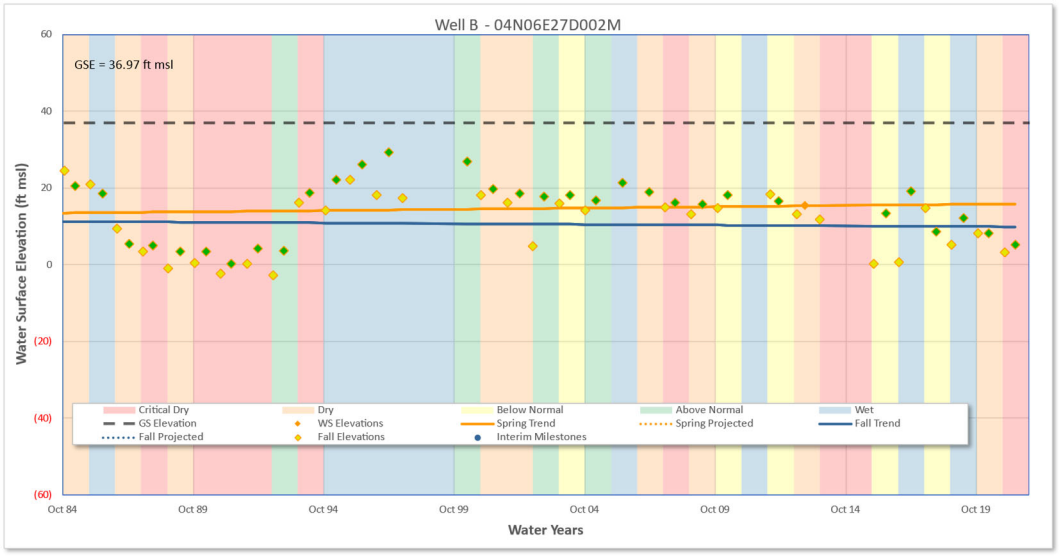


Figure 4-3 Fall Hydrograph Well B - East of Lower Sac Rd. & South of Acampo Rd.

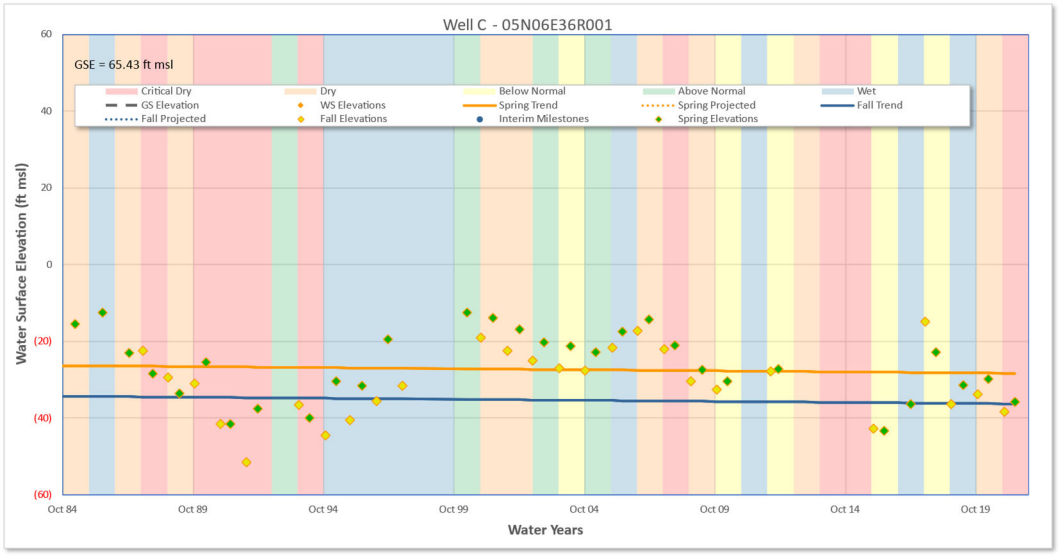


Figure 4-4 Fall Hydrograph Well C - North of Liberty Rd. & West of North Cherokee Ln.

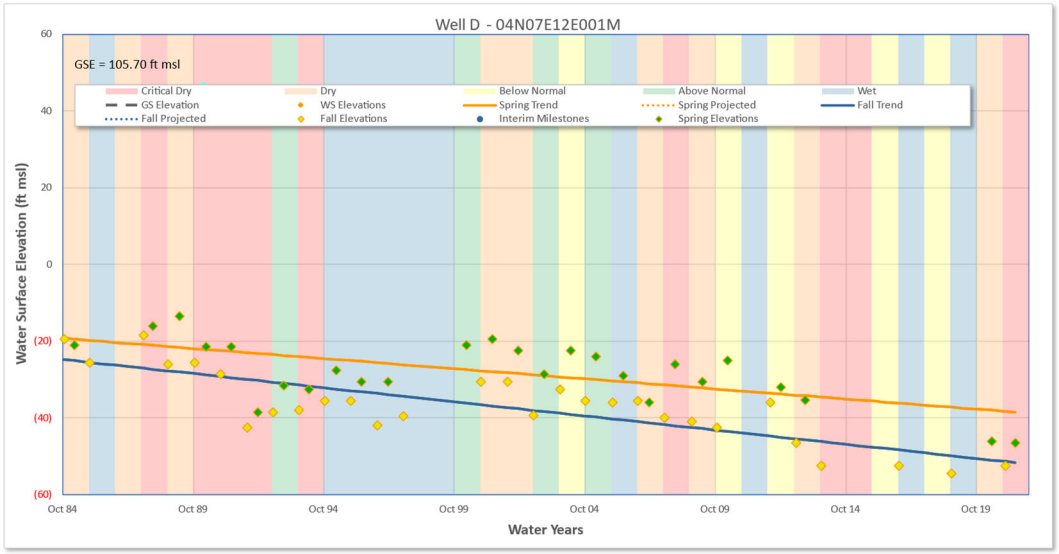


Figure 4-5 Fall Hydrograph Well D - West of Elliotto Rd. & North of Jahant Rd.

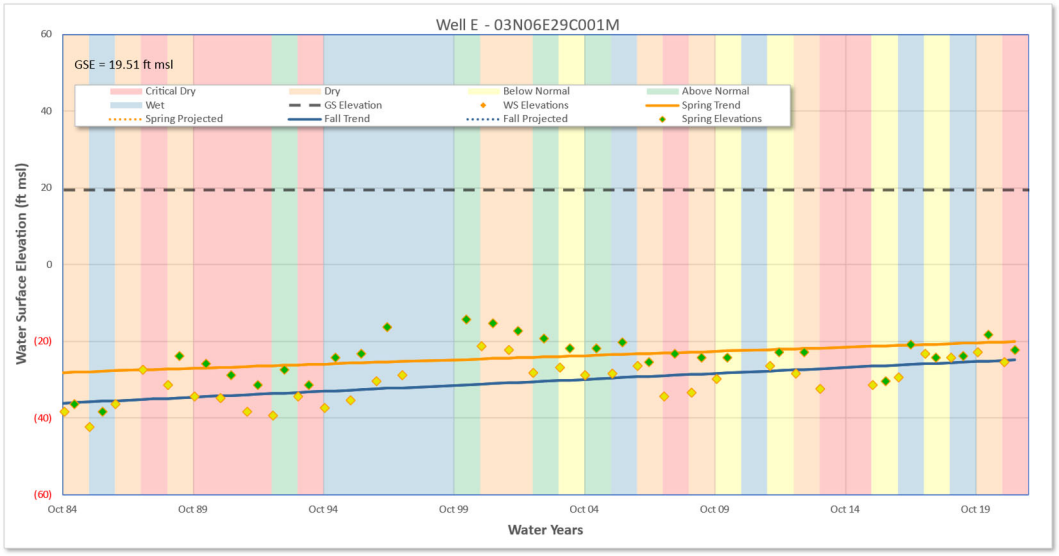


Figure 4-6 Fall Hydrograph Well E - East of Davis R. & South of Armstrong Rd.

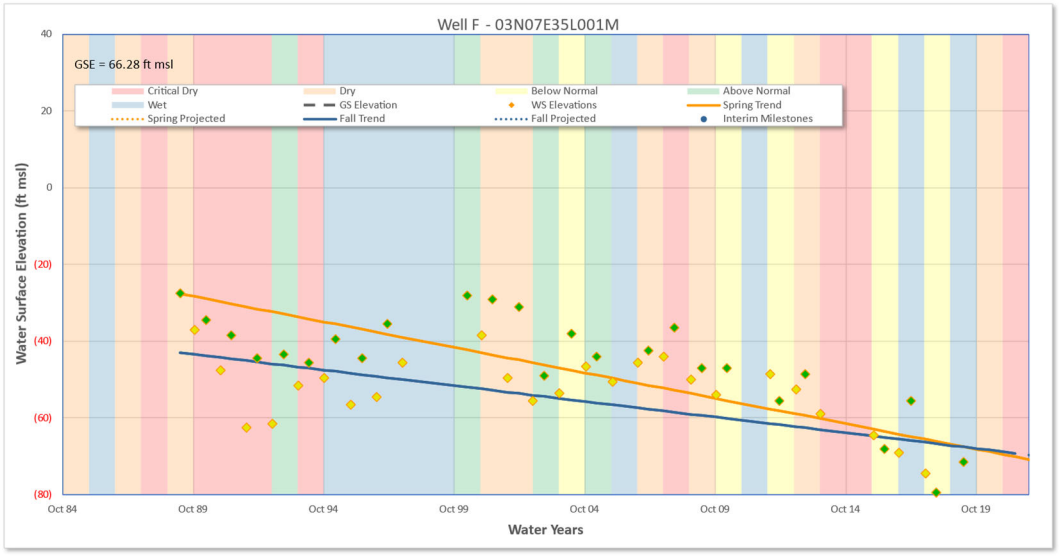


Figure 4-7 Fall Hydrograph Well F - West of Route 88 & North of Eight Mile Rd.

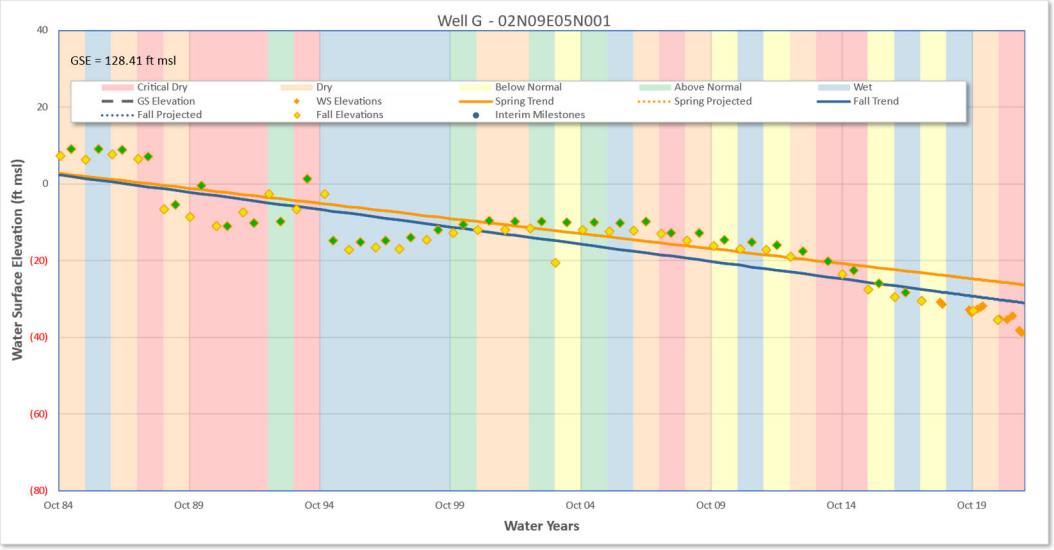


Figure 4-8 Fall Hydrograph Well G - West of Route 26 & South of Shelton Rd.

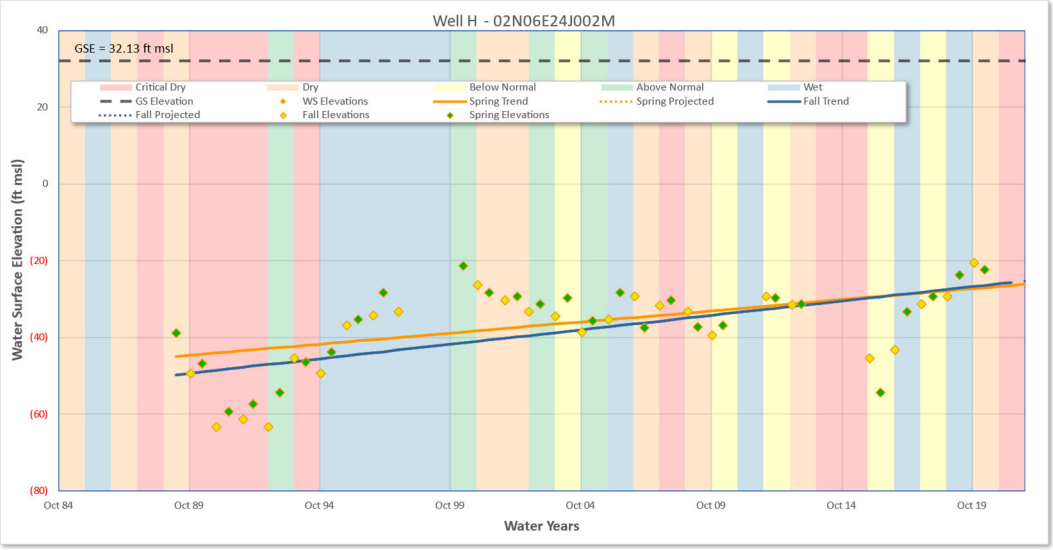


Figure 4-9 Fall Hydrograph Well H - East of Ijams Rd. & North of McAllen Rd.

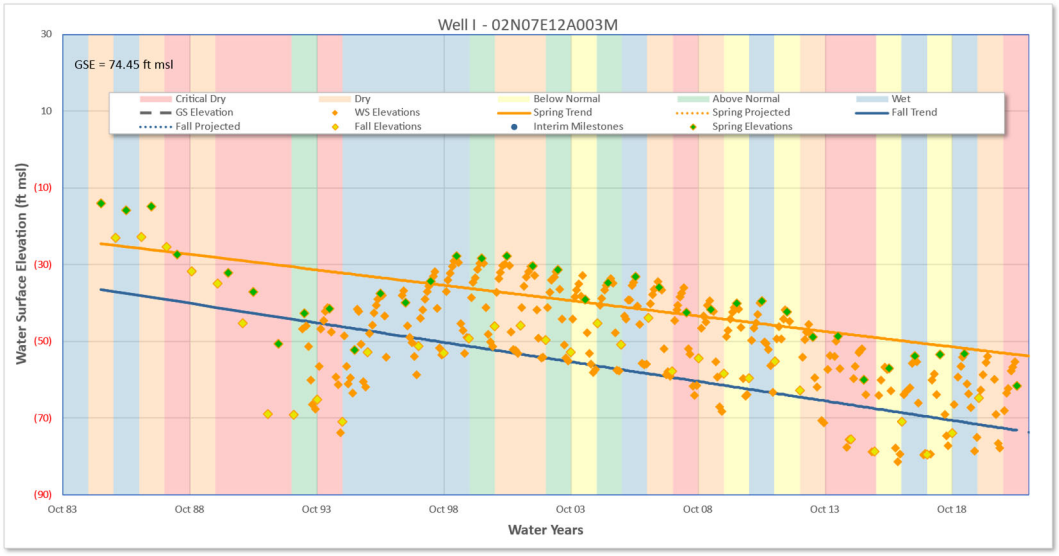


Figure 4-10 Fall Hydrograph Well I - West of Gogna Rd. & North of Route 26

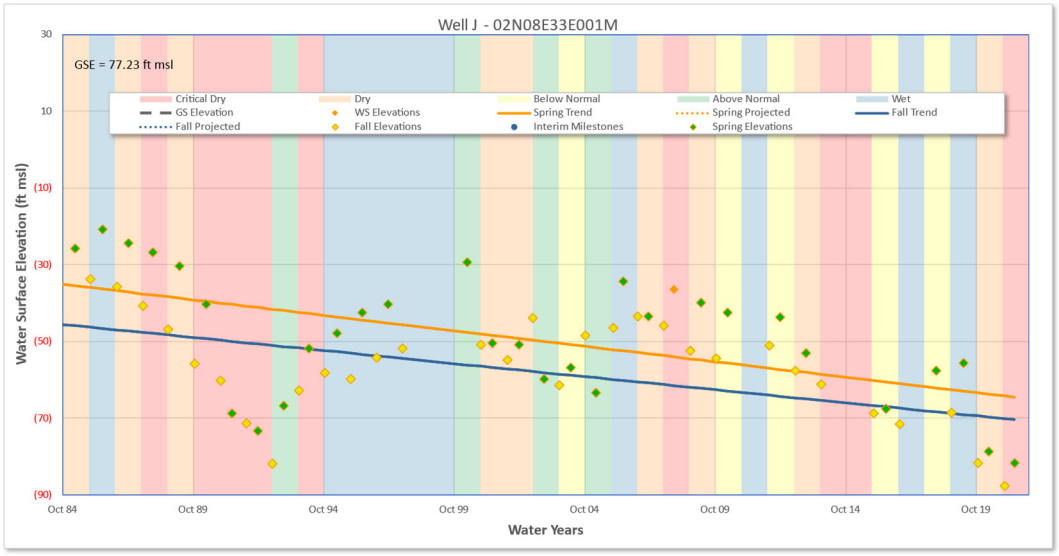


Figure 4-11 Fall Hydrograph Well J - East of Duncan Rd. & South of Milton Rd.

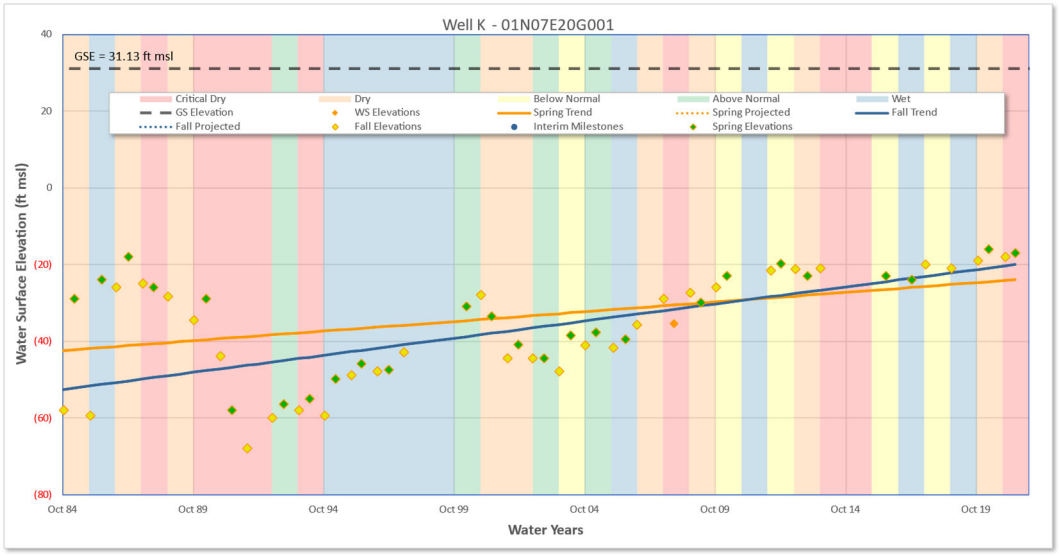


Figure 4-12 Fall Hydrograph Well K - East of Ash Rd. & North of Carpenter Rd.

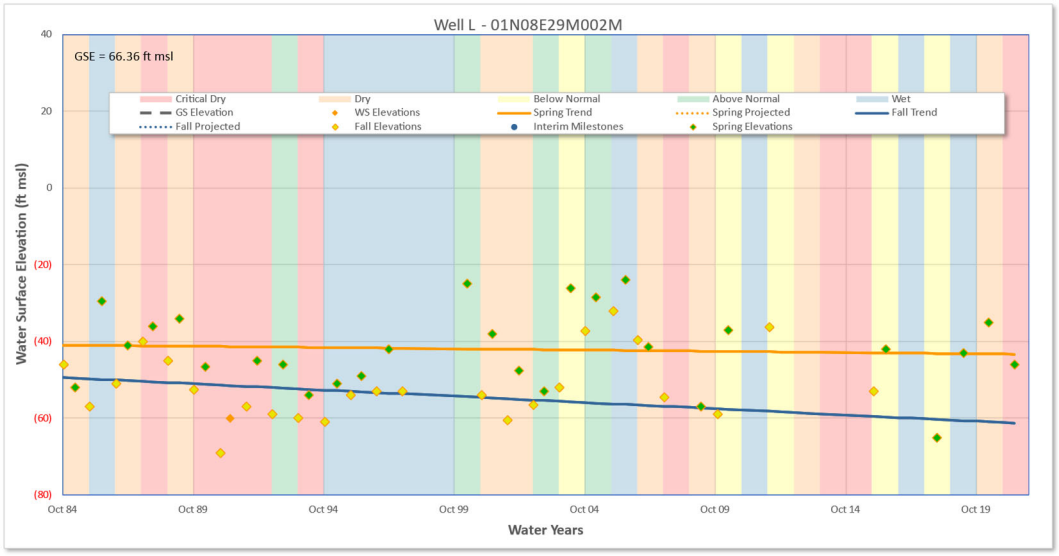


Figure 4-13 Fall Hydrograph Well L - West of Jack Tone Rd. & North of Mariposa Rd.

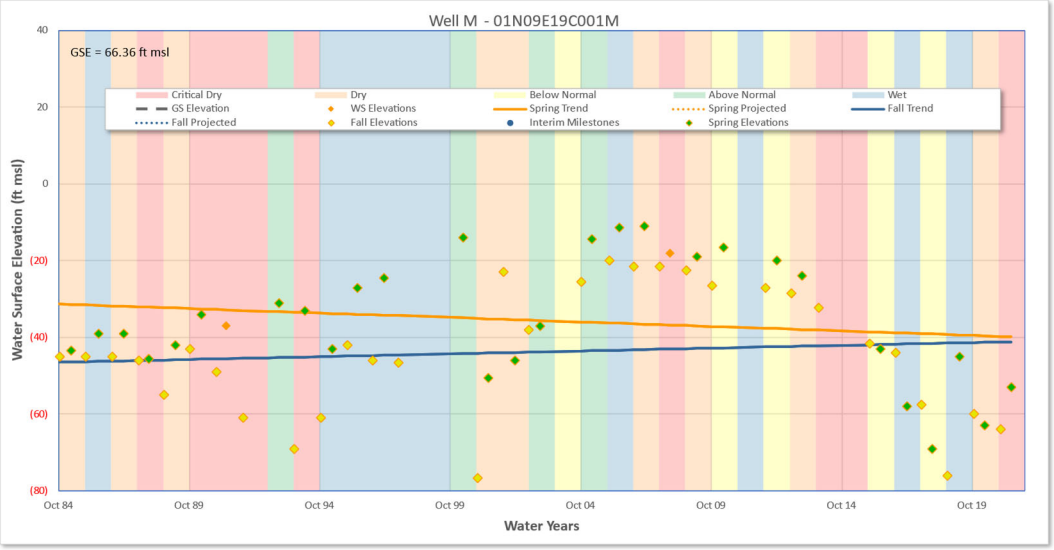


Figure 4-14 Fall Hydrograph Well M - West of Hewitt Rd. & South of Hwy. 4

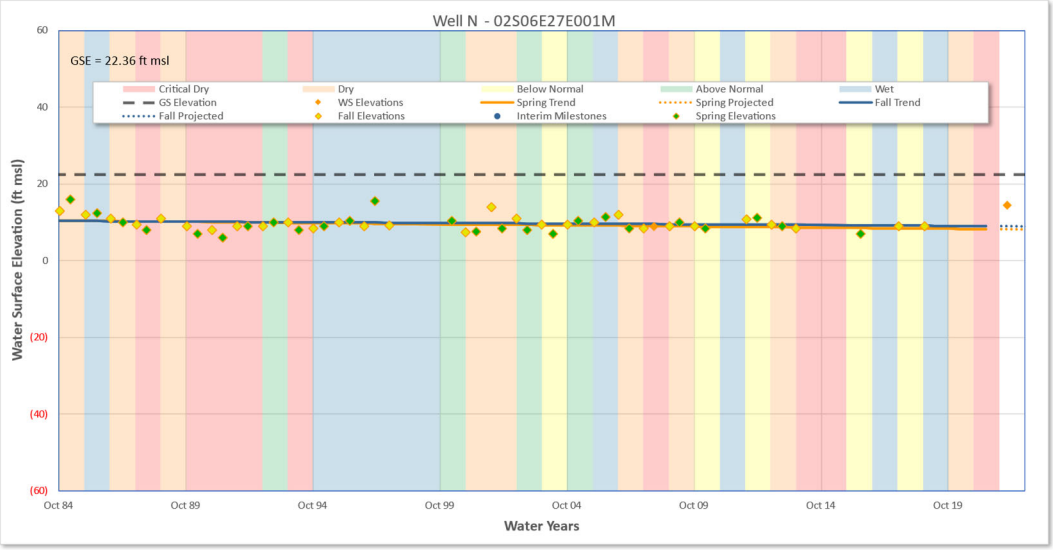


Figure 4-15 Fall Hydrograph Well N - West of Wright Rd. & North of Kasson Rd.

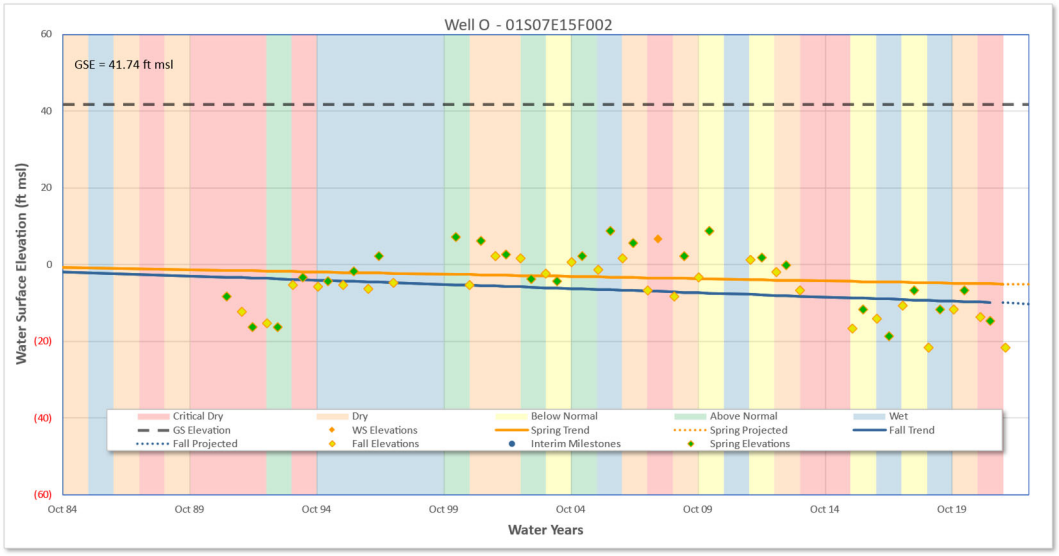


Figure 4-16 Fall Hydrograph Well O – West of Austin Rd. & North of French Camp Rd.

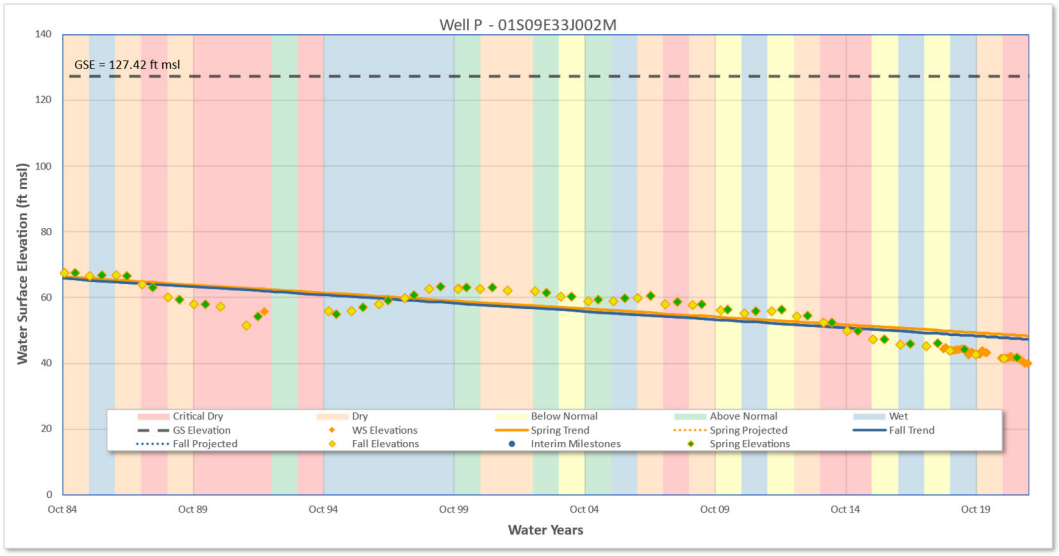


Figure 4-17 Fall Hydrograph Well P - West of Campbell Ave. & North of Hwy 120.

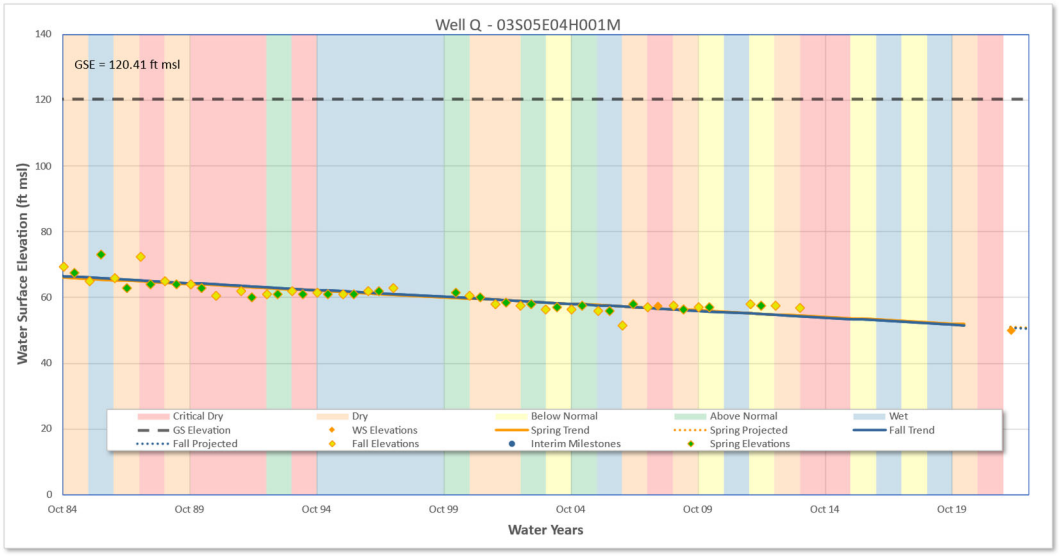


Figure 4-18 Fall Hydrograph Well Q - East of McArthur Rd. & North of Darlene Rd.

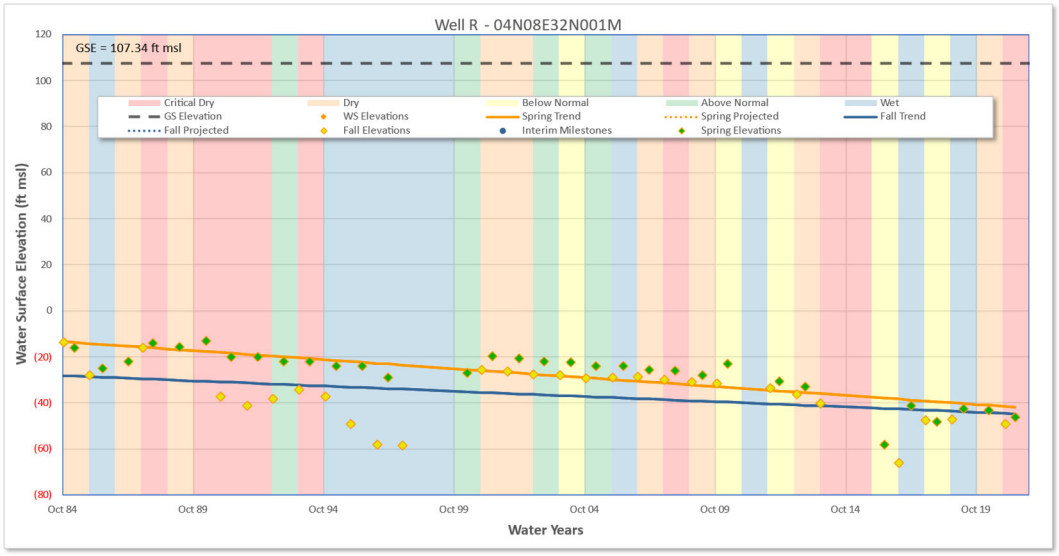


Figure 4-19 Fall Hydrograph Well R - West of Tully Rd. & North of Brandt Rd.

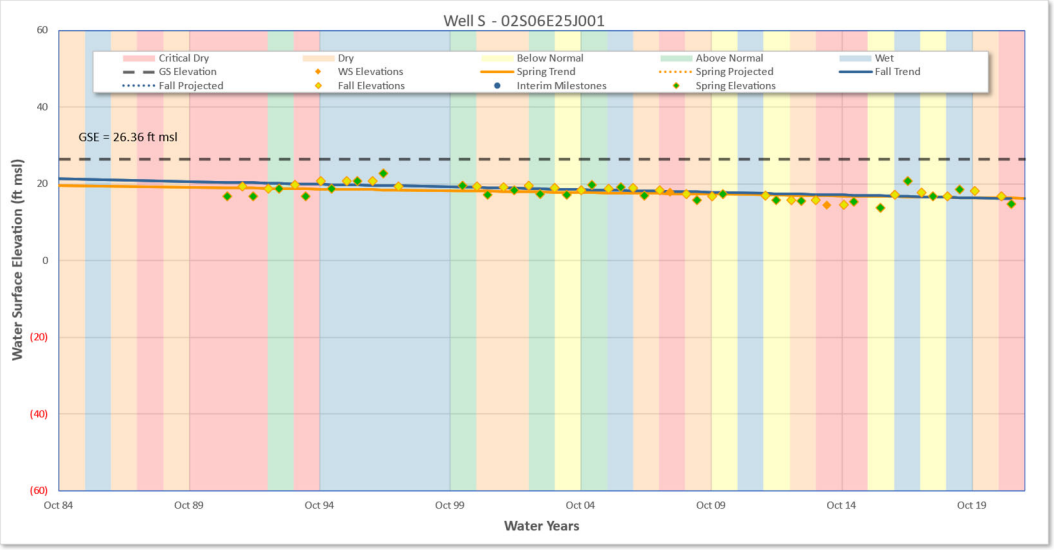


Figure 4-20 Fall Hydrograph Well S - East of Hays Rd. & North of Mullin Rd.

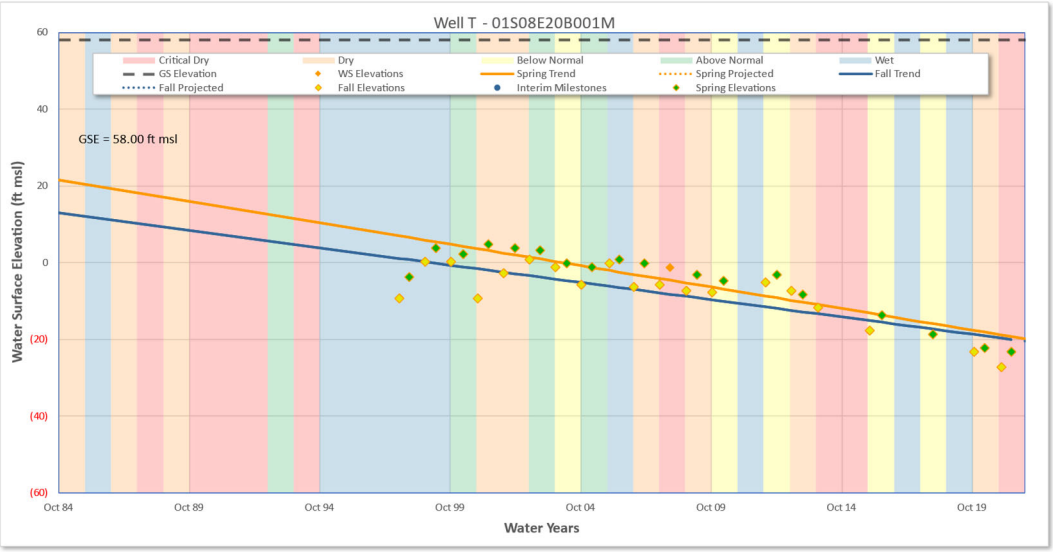


Figure 4-21 Fall Hydrograph Well T - West of Murphy Rd. & South of Avena Rd.

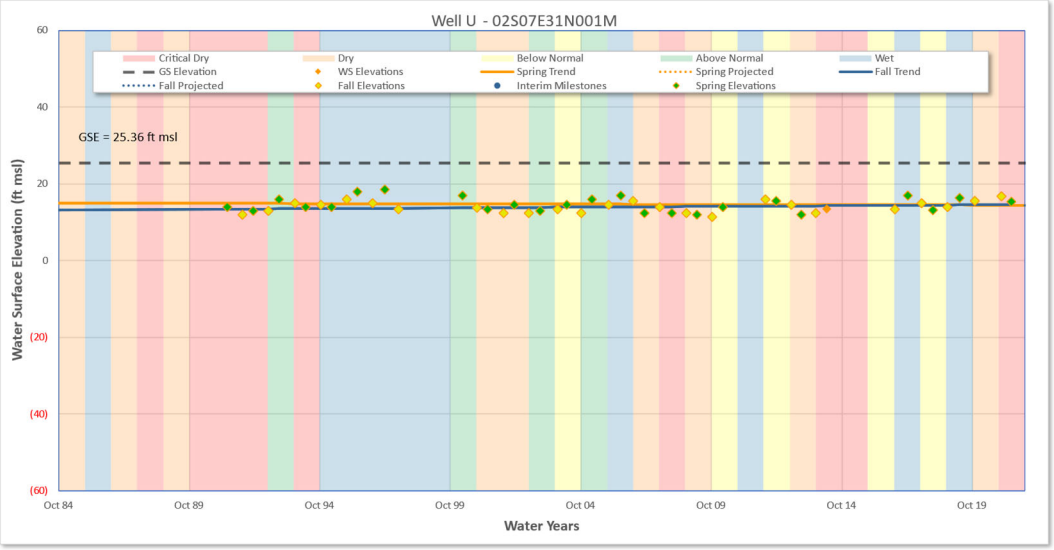


Figure 4-22 Fall Hydrograph Well U - East of Airport Rd. & South of Perrin Rd.

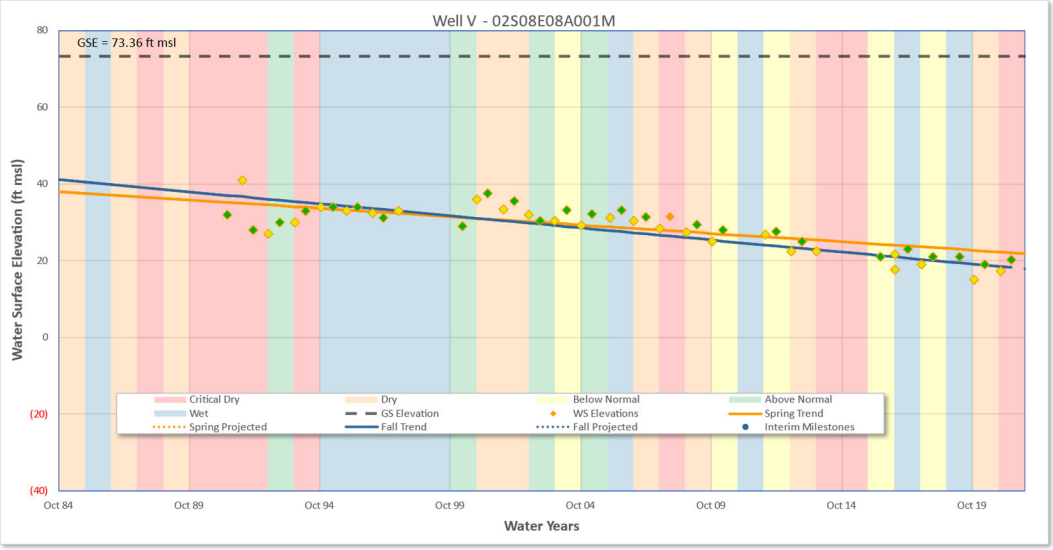


Figure 4-23 Fall Hydrograph Well V - East of Murphy Rd. & South of Cedar Ln.

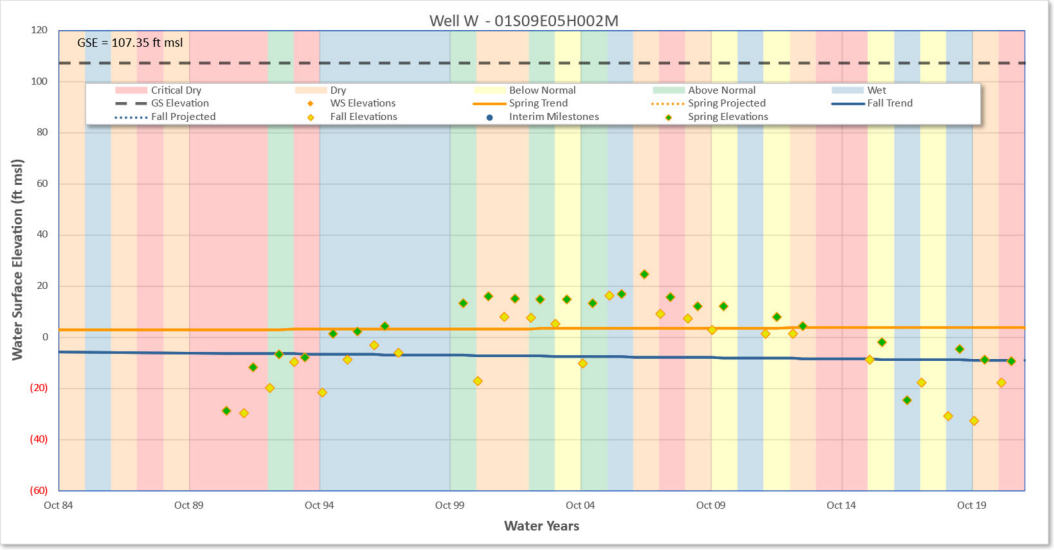


Figure 4-24 Fall Hydrograph Well W - West of Henry Rd. & South of Sonora Rd.

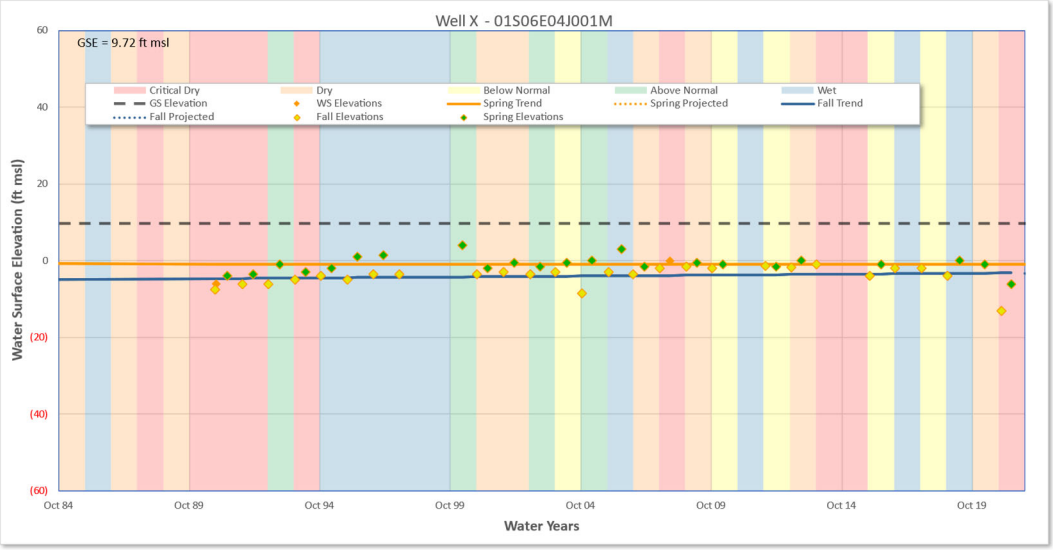


Figure 4-25 Fall Hydrograph Well X - East of Wolfe Rd. & South of Howard Rd.

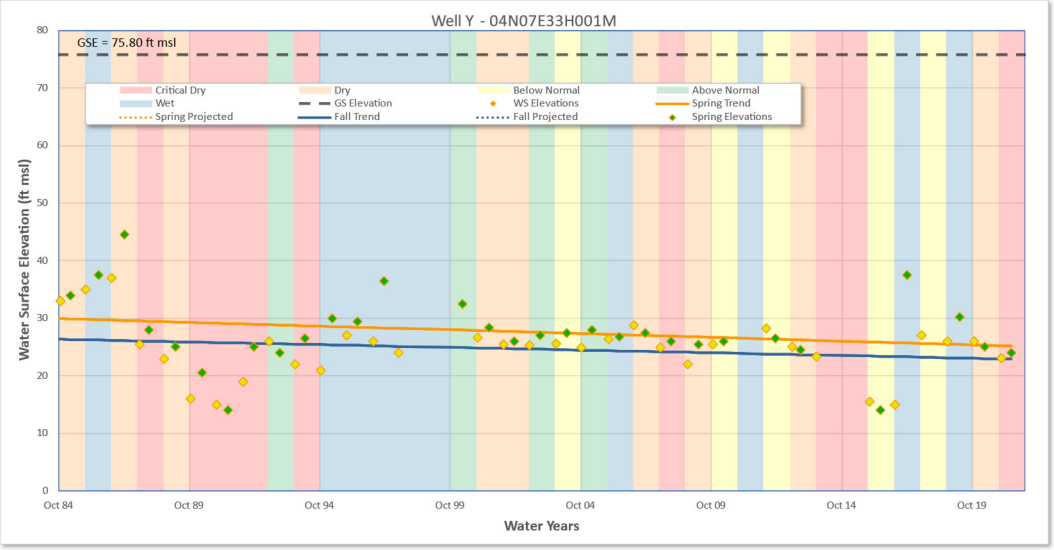


Figure 4-26 Fall Hydrograph Well Y - East of Bruella Rd. & North of Schmiedt Rd.

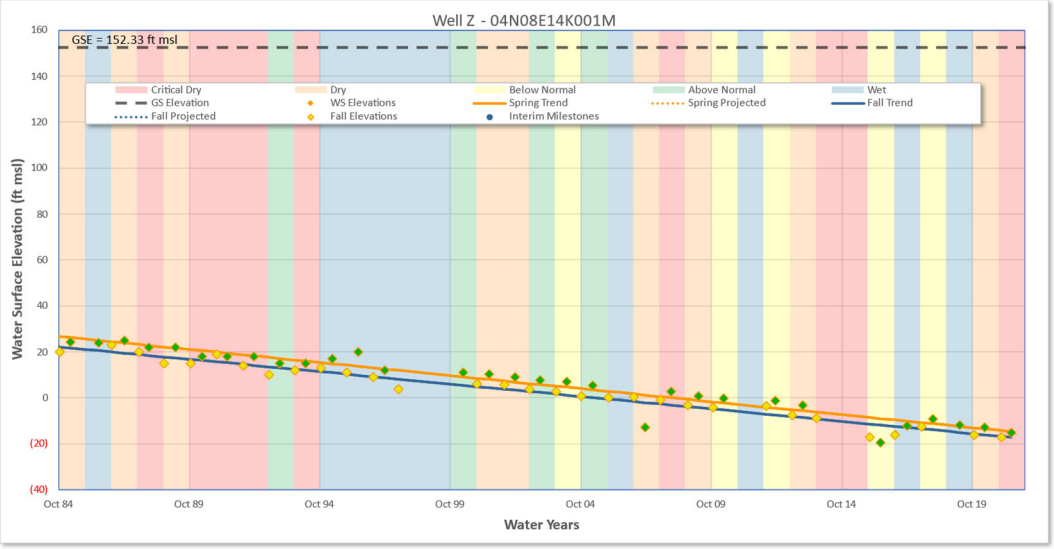


Figure 4-27 Fall Hydrograph Well Z - East of Johnson Rd. & South of Route 12

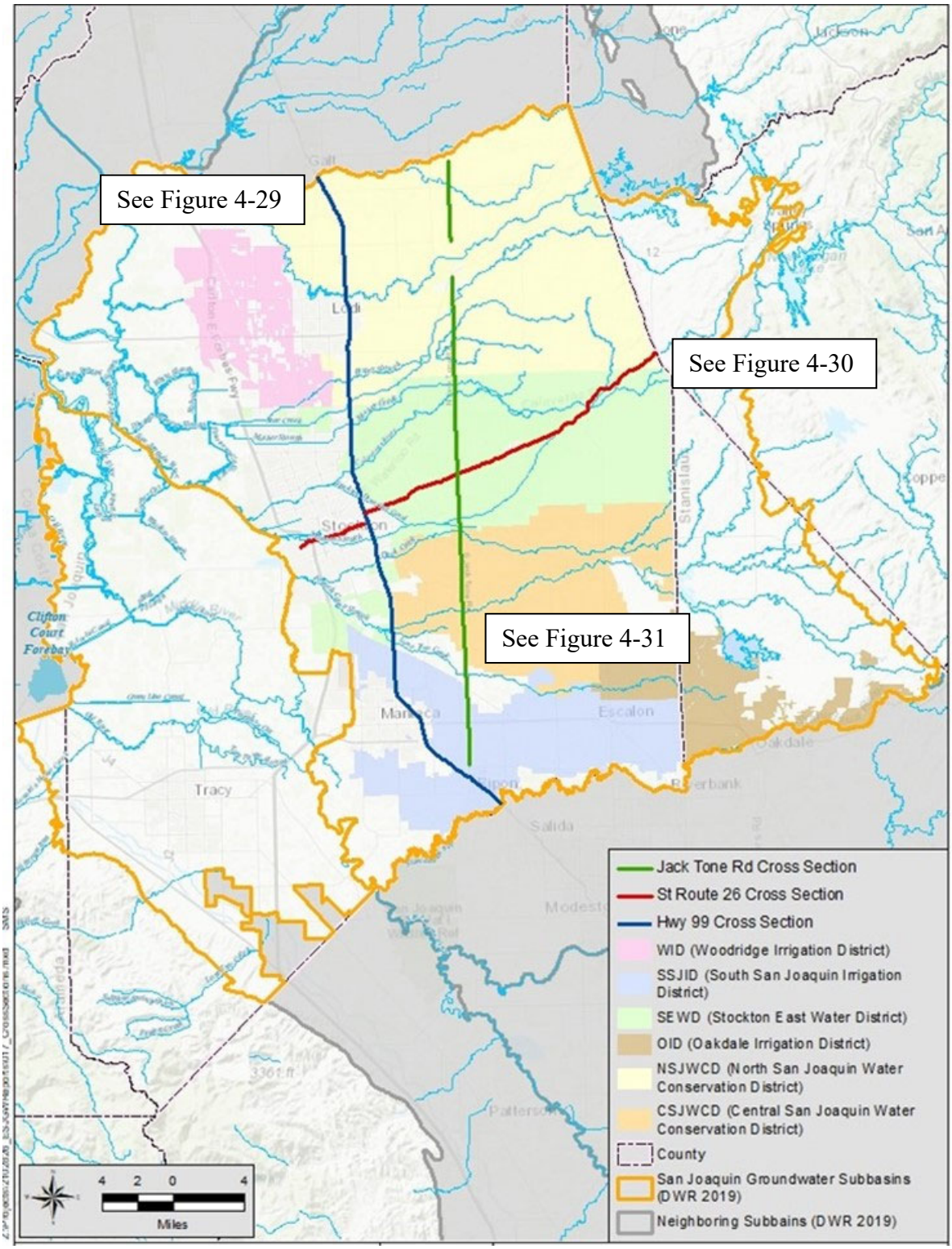
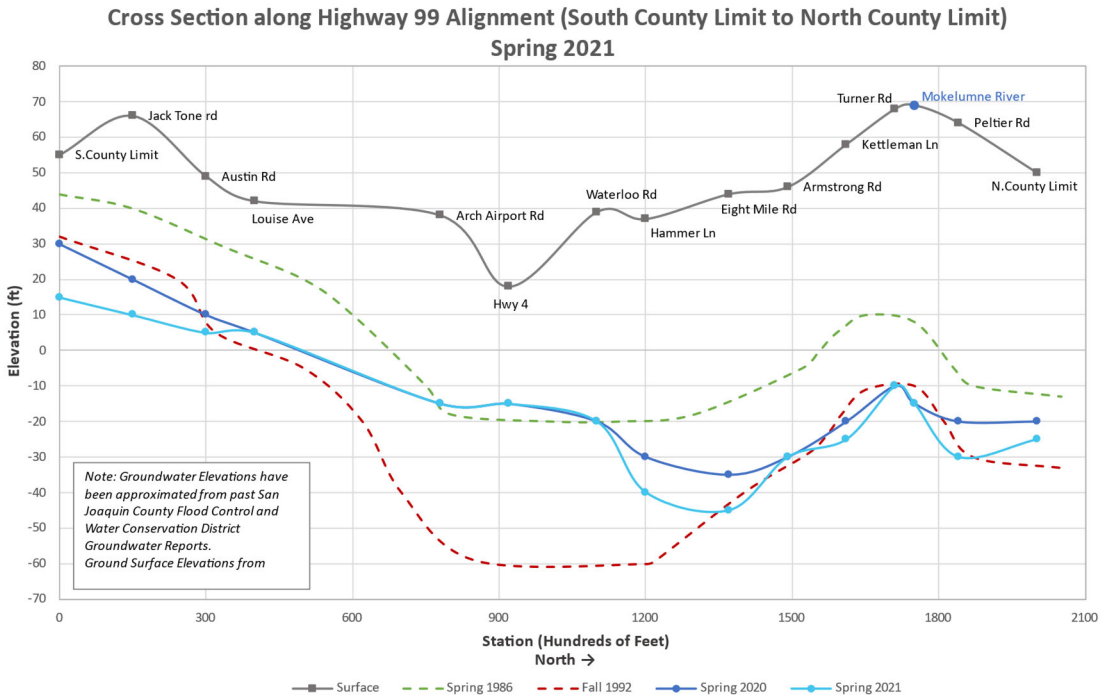


Figure 4-28 Water Surface Cross Sections



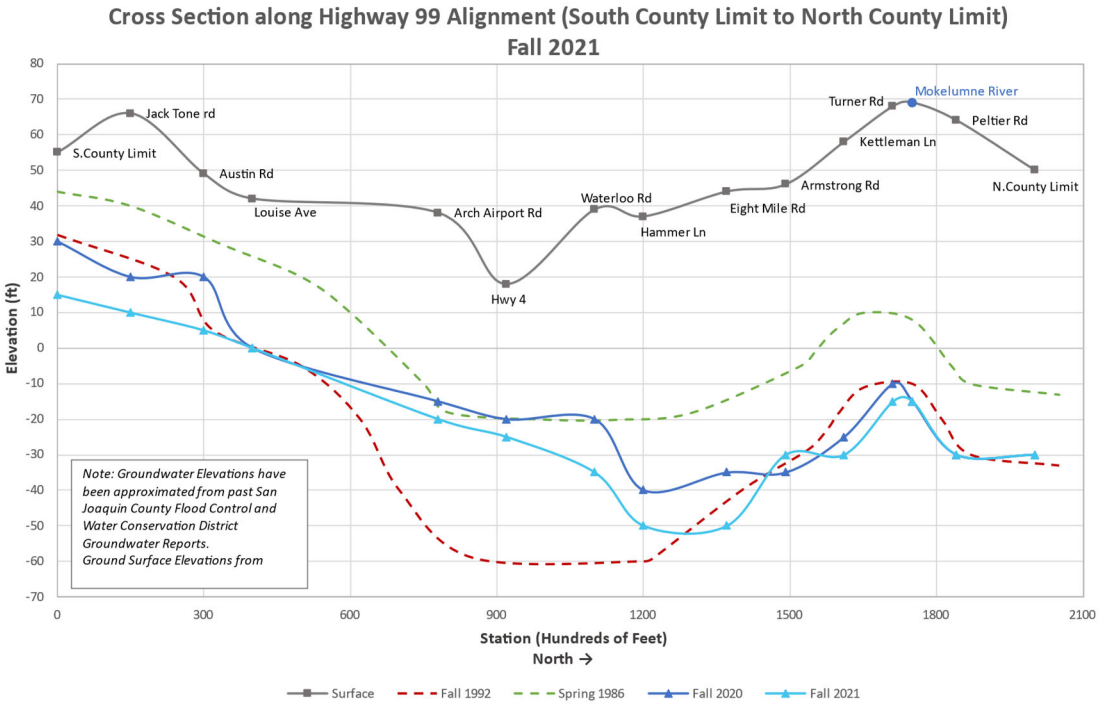
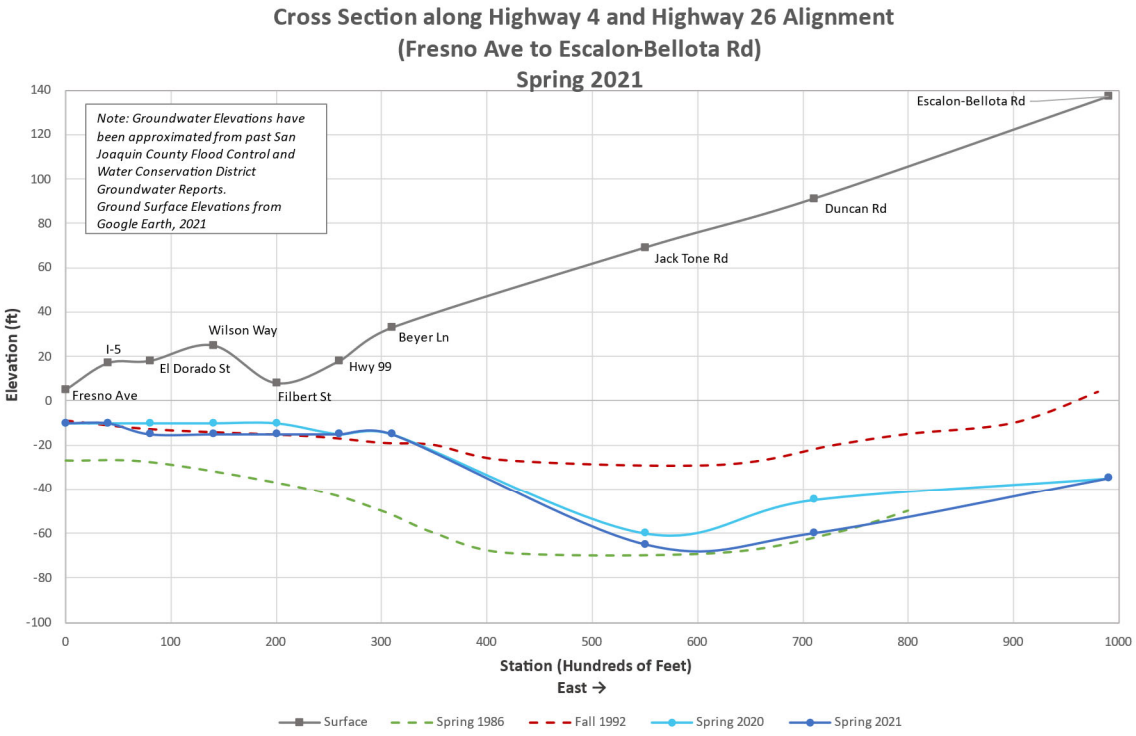


Figure 4-29 Highway 99 Cross Section Spring & Fall 2021



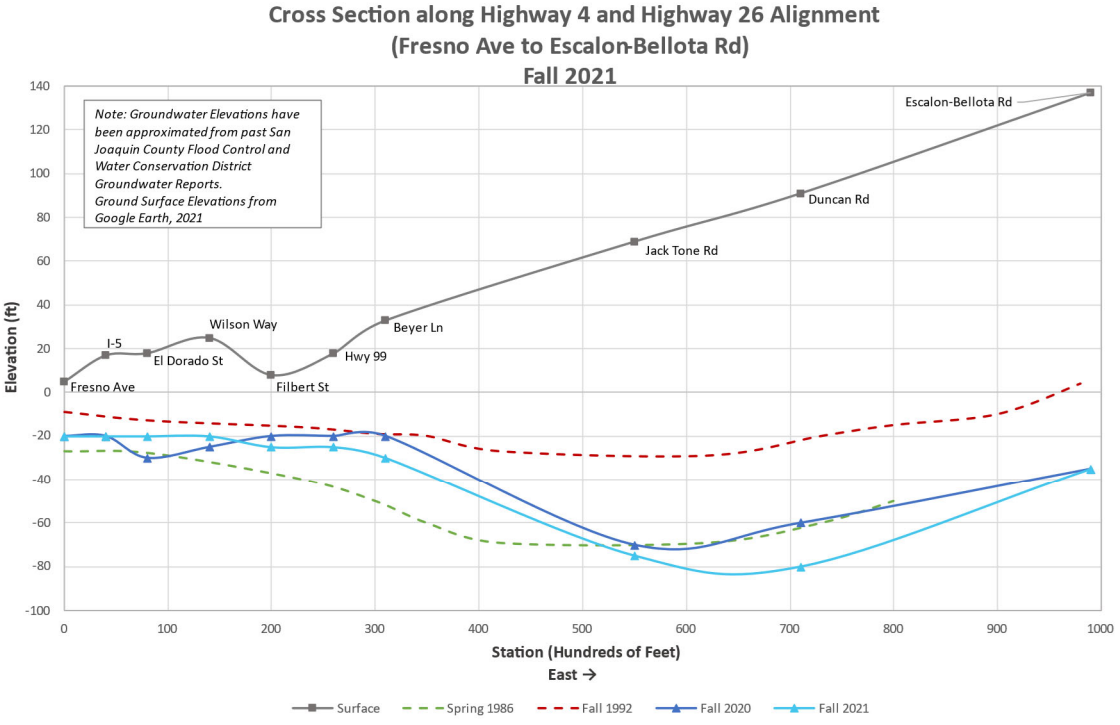
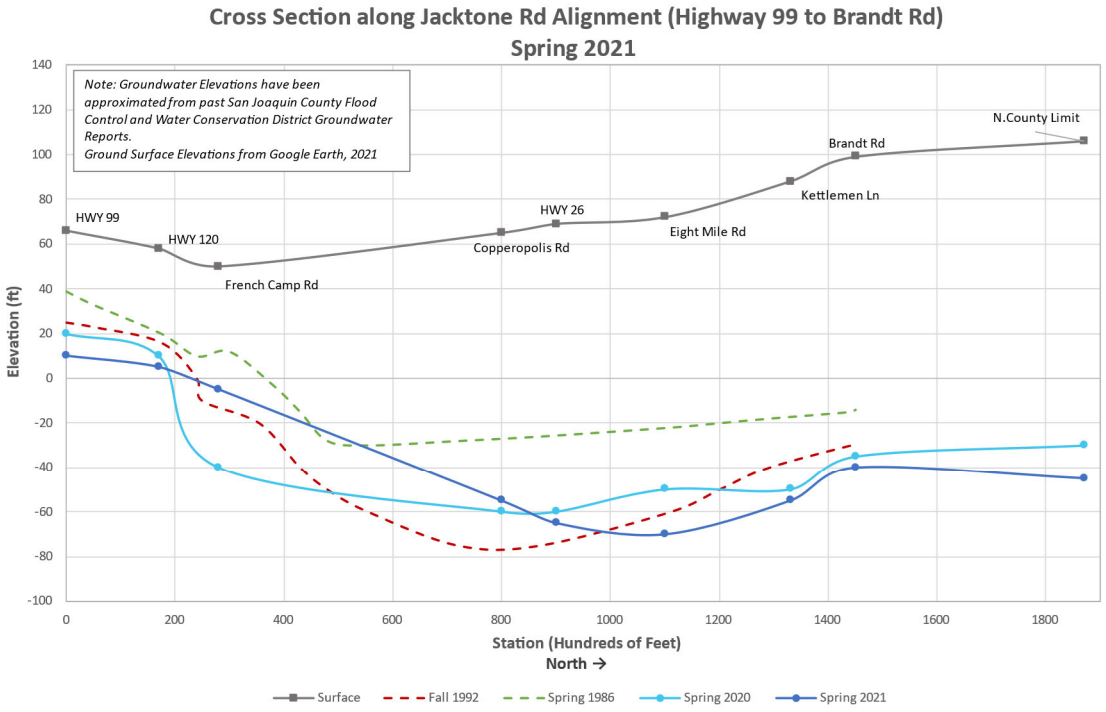


Figure 4-30 Highway 4 & Highway 26 Cross Section Spring & Fall 2021



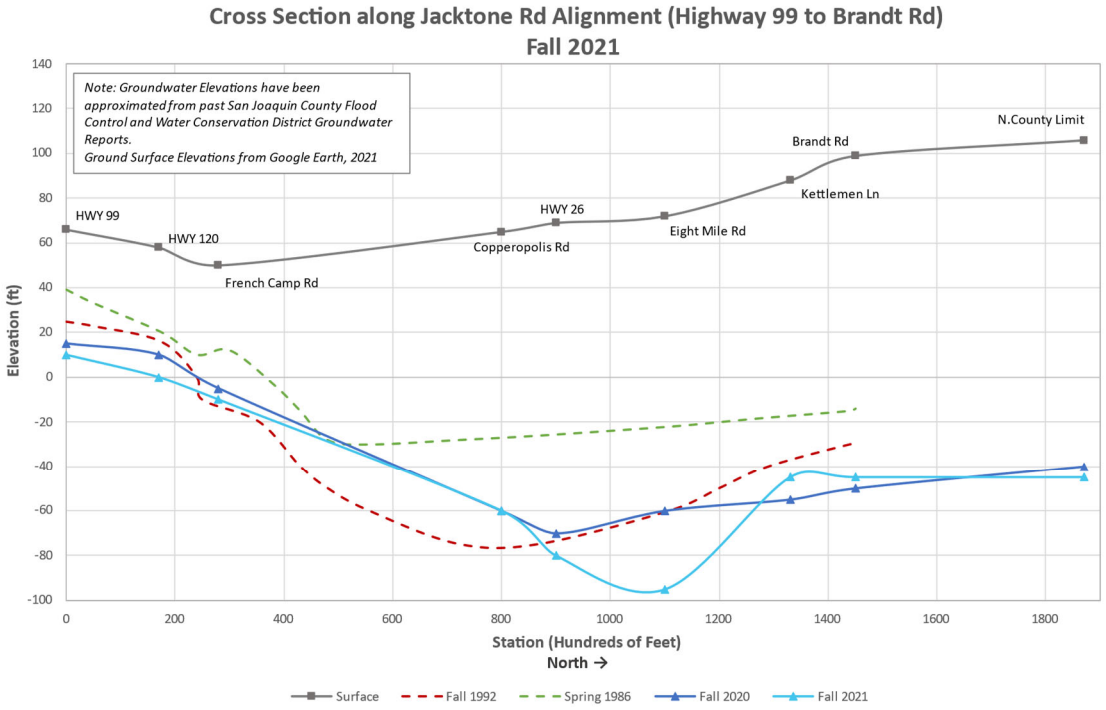


Figure 4-31 Jack Tone Rd Cross Section Spring & Fall 2021

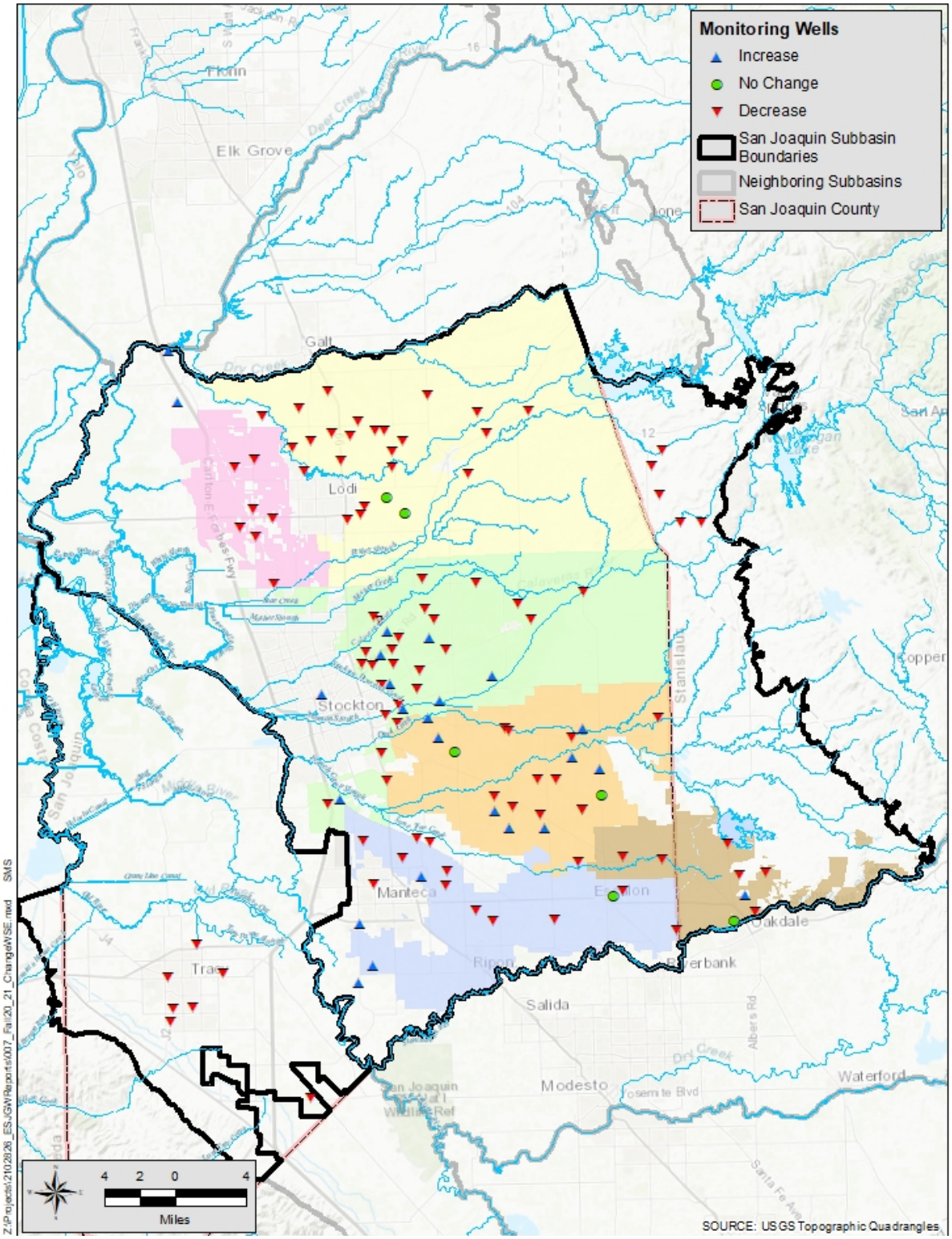


Figure 4-32 Change in Groundwater Elevation – Fall 2020 to Fall 2021

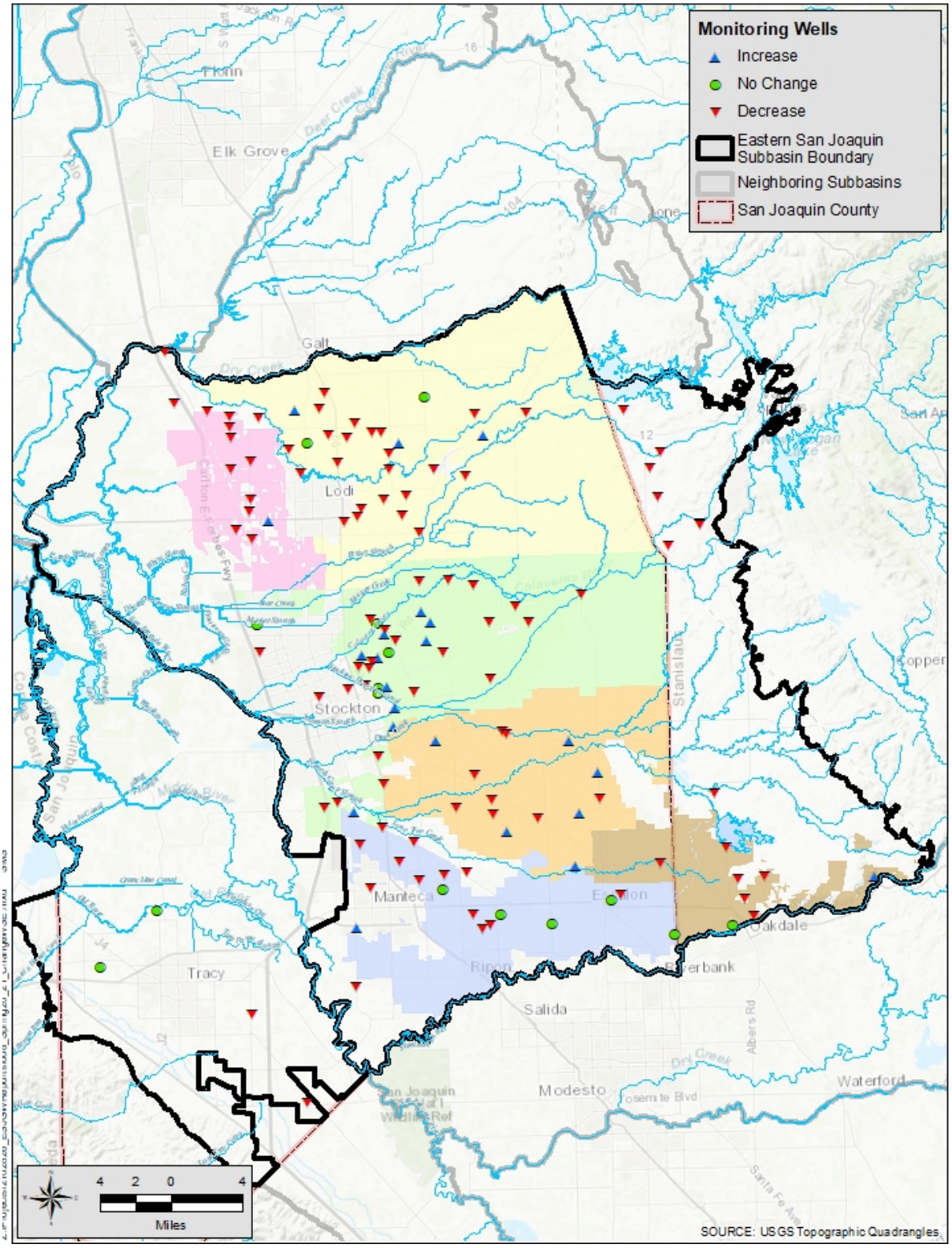


Figure 4-33 Change in Groundwater Elevation – Spring 2020 to Spring 2021

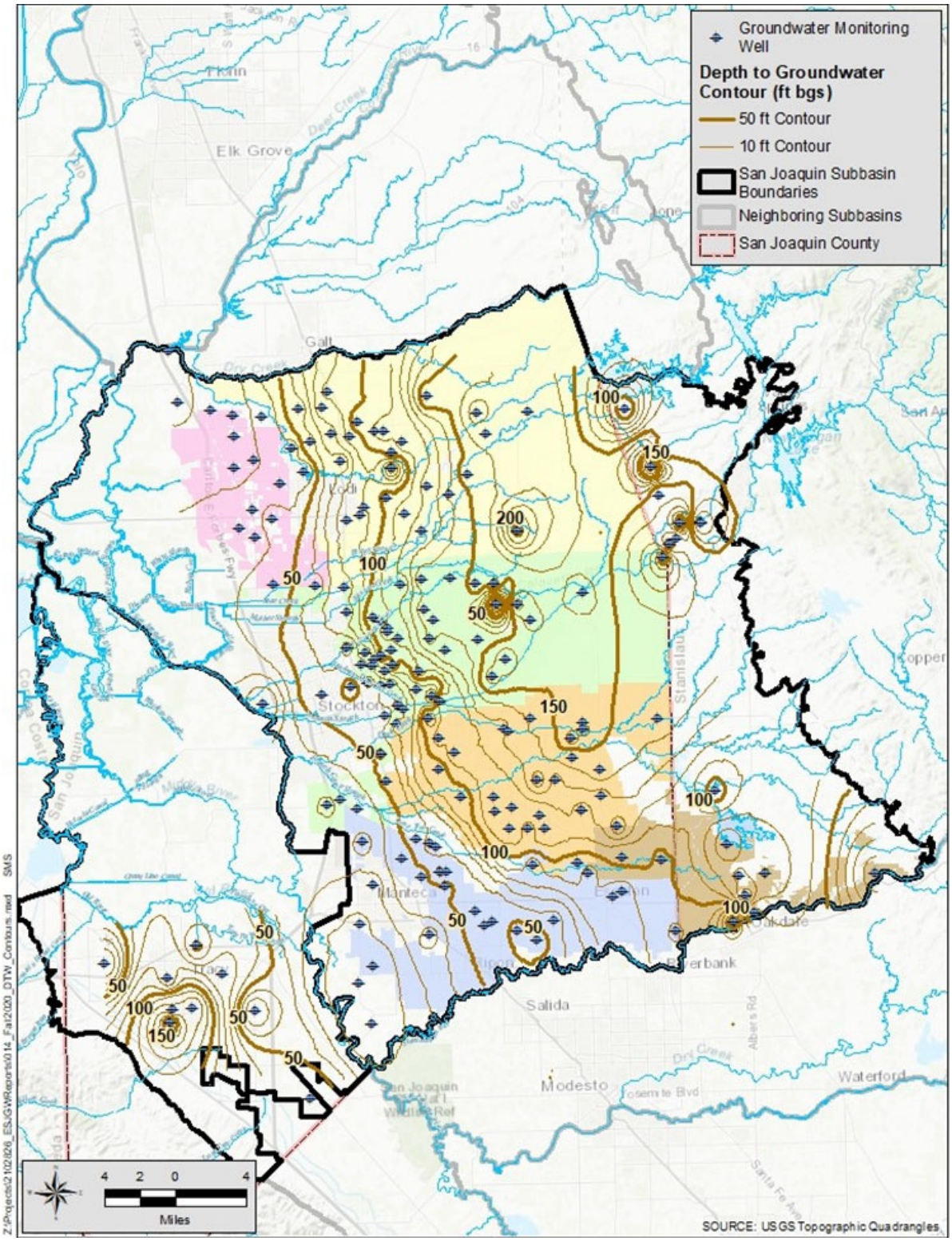


Figure 4-34 Depth to Groundwater – Fall 2020

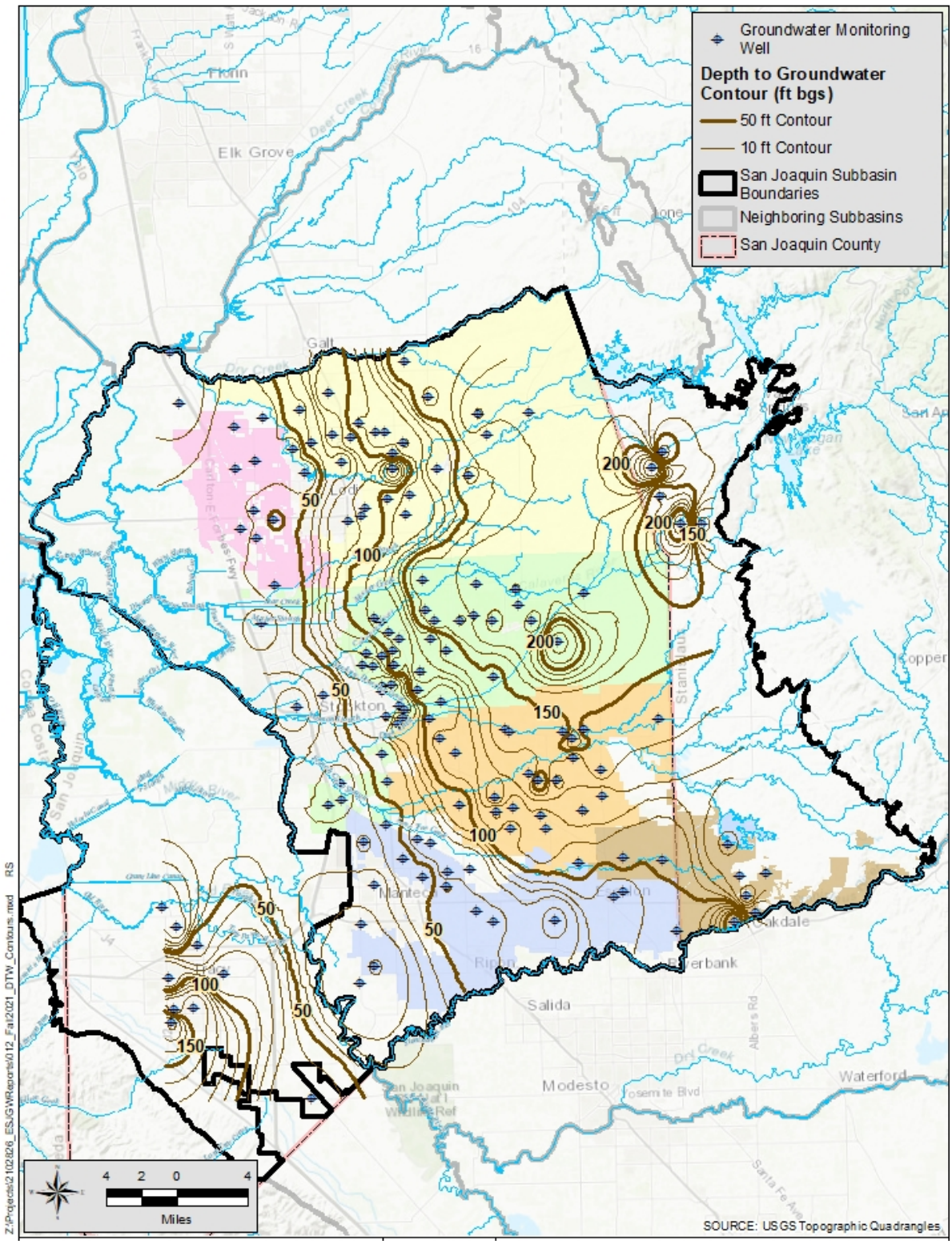


Figure 4-345 Depth to Groundwater – Fall 2021

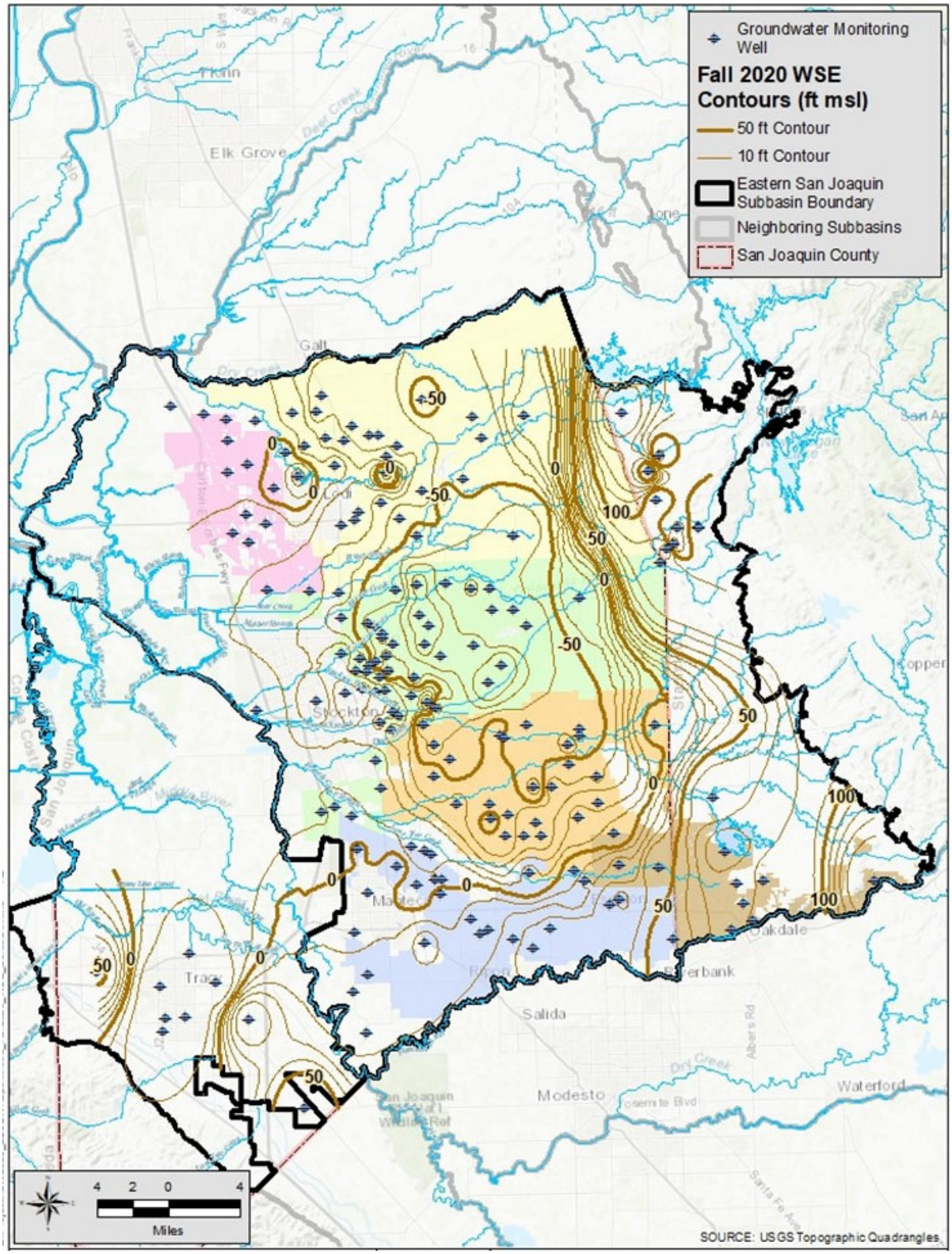


Figure 4-36 Groundwater Surface Elevation – Fall 2020

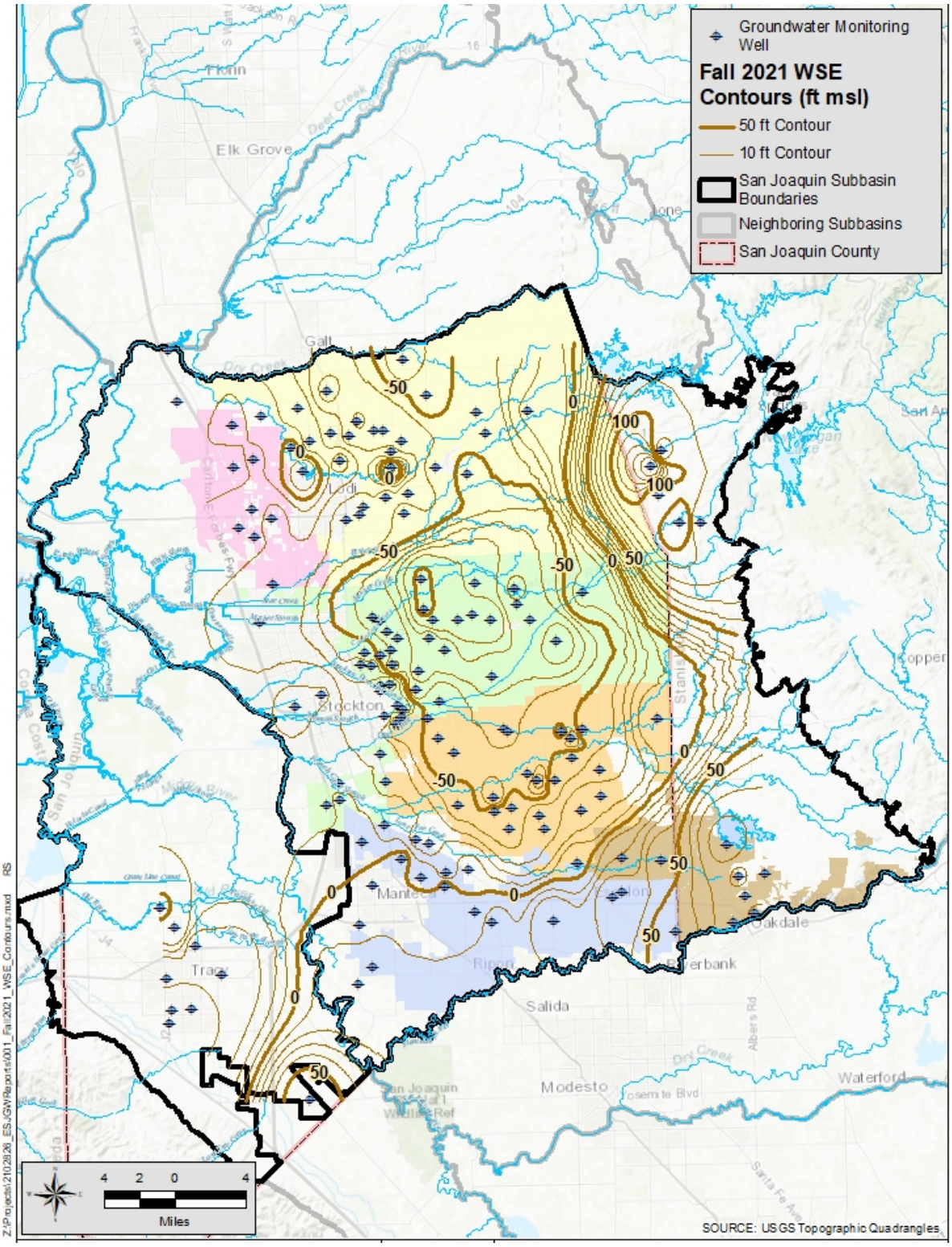


Figure 4-37 Groundwater Surface Elevation – Fall 2021

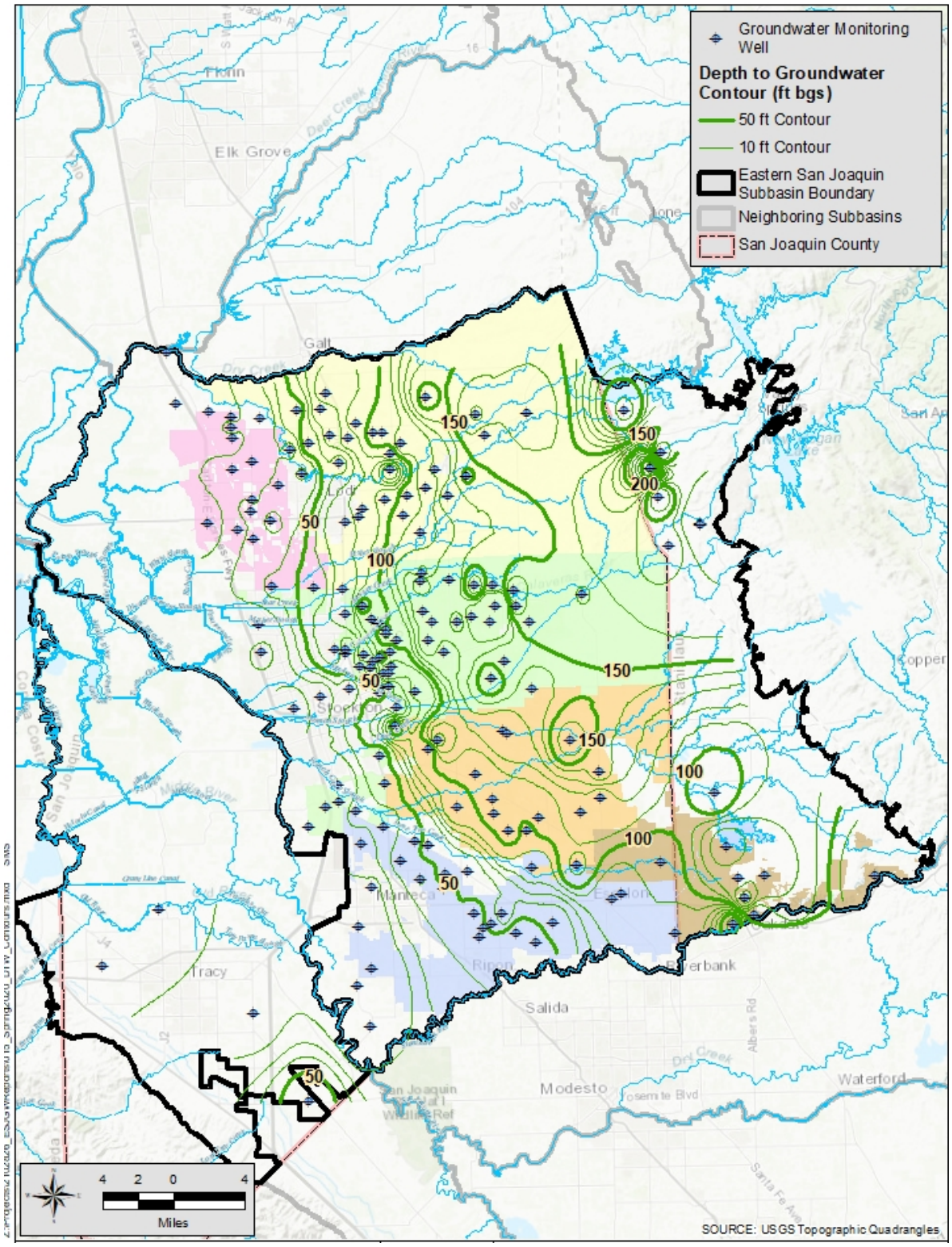


Figure 4-38 Depth to Groundwater – Spring 2020

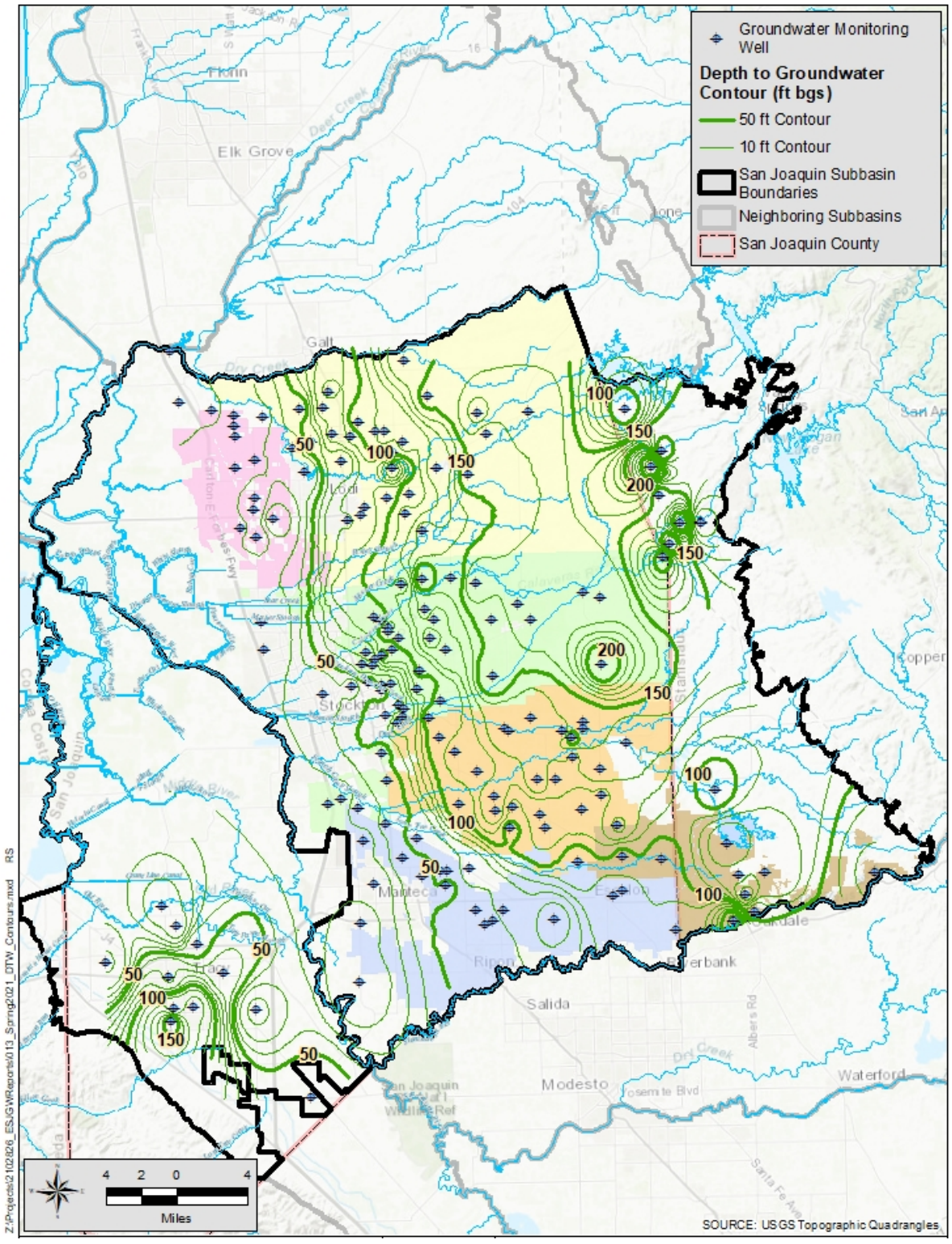


Figure 4-39 Depth to Groundwater – Spring 2021

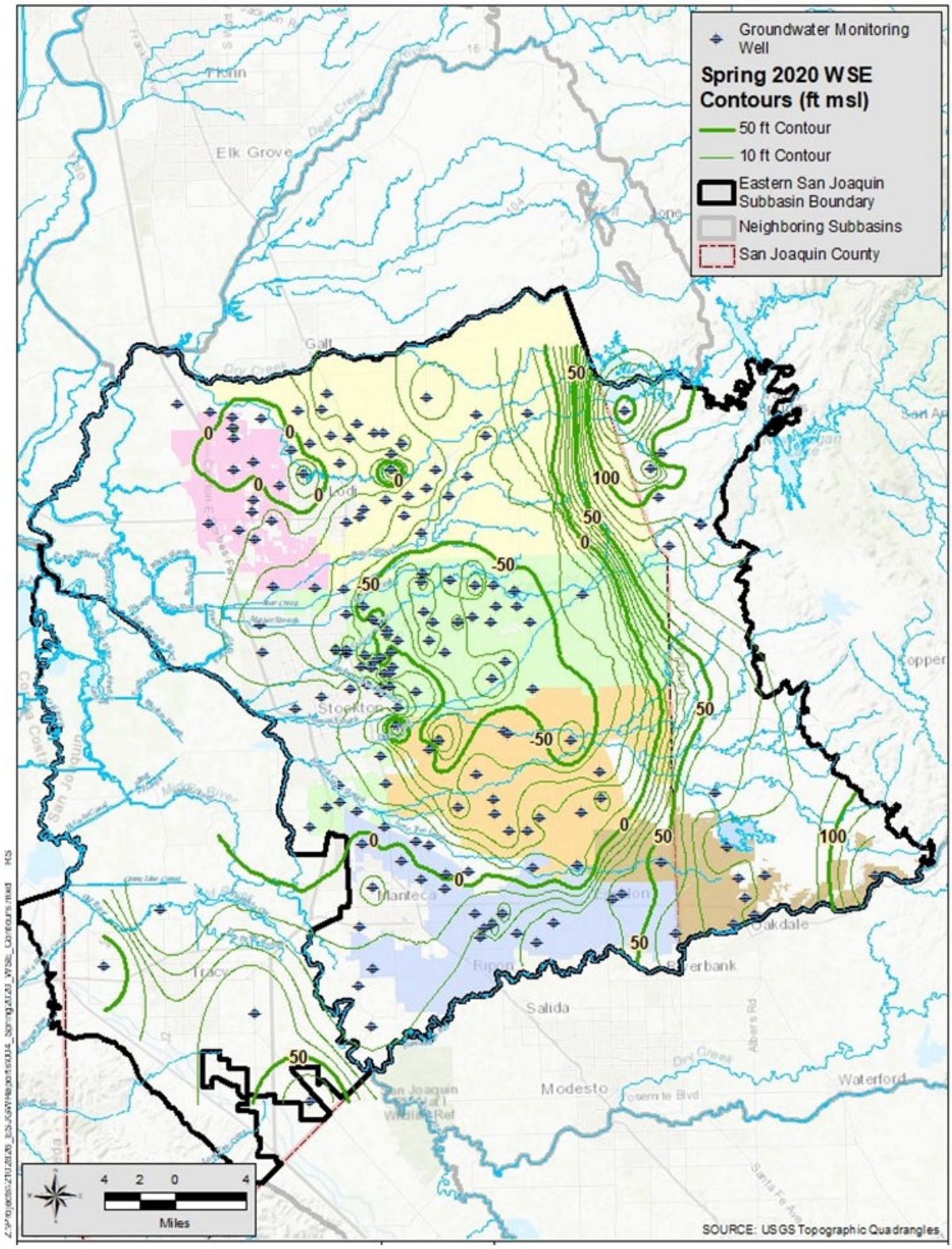


Figure 4-40 Groundwater Surface Elevation – Spring 2020

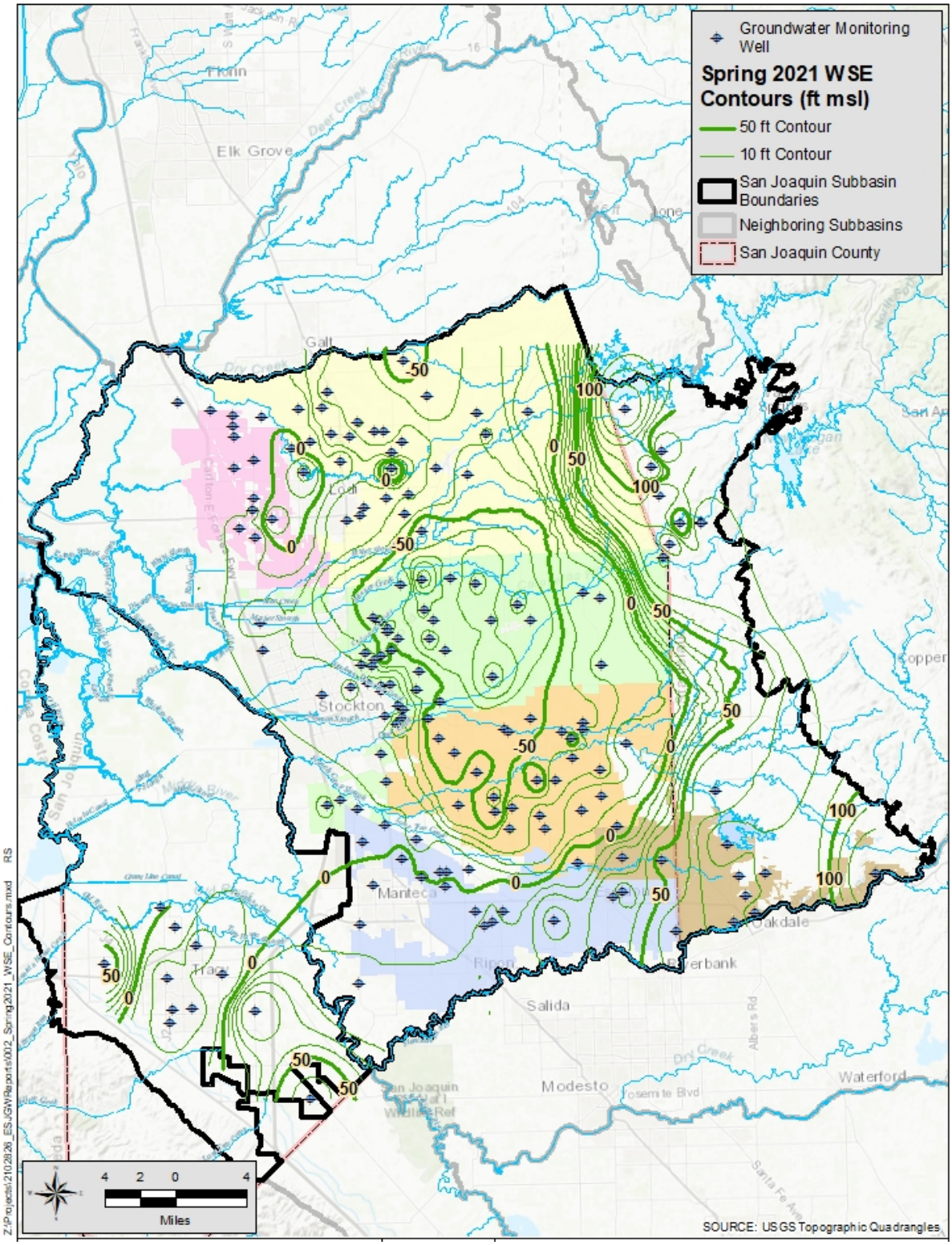


Figure 4-41 Groundwater Surface Elevation – Spring 2021

5 Groundwater Quality Monitoring

County personnel did not collect water quality samples in Fall of 2020 or 2021. One sample was collected by a water agency for Title 22 drinking water compliance in February 2021. The information for water quality in the Fall 2021 in comparison to 2020 concentrations are summarized as follows:

North Stockton – Three wells (4E1, 8C1, & 7D2) were sampled in North Stockton this year. Concentrations of chloride, TDS and EC decreased.

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

Lathrop – Due to access constraints no wells were tested in this area this year.

Water quality sampling locations are shown on Figure 5-1. Water quality concentration trends are shown on Figures 5-2 through 5-13.

Table 5-1 Comparison of Water Quality Results

Well	Fall 2020			Fall 2021		
	Chloride (ppm)	EC (umhos/cm)	TDS (ppm)	Chloride (ppm)	EC (umhos/cm)	TDS (ppm)
North Stockton						
4E1	47	832	540	33	753	470
8C1	46	931	740	10	314	210
8Q2	--	--	--	--	--	--
29M1	--	--	--	--	--	--
7D2	--	--	--	6	409	270
County Hospital Area						
35G2	--	--	--	--	--	--
35N1	--	--	--	--	--	--
Lathrop Area						
25M3	59	732	470	--	--	--
25M4	33	607	380	--	--	--
New Wells						
1	4	184	130	2	161	120
2	--	--	--	7	288	200
3	--	--	--	--	--	--

Notes: Water quality from Drinking Water Watch

Well 4E1 sample collected 2/20/20

Well 8C1 sample collected 2/12/20

Wells 25M3 and 25M4 samples collected 4/6/20

Well 1 sample collected 7/15/20

Well 7D2 sample collected 2/23/21

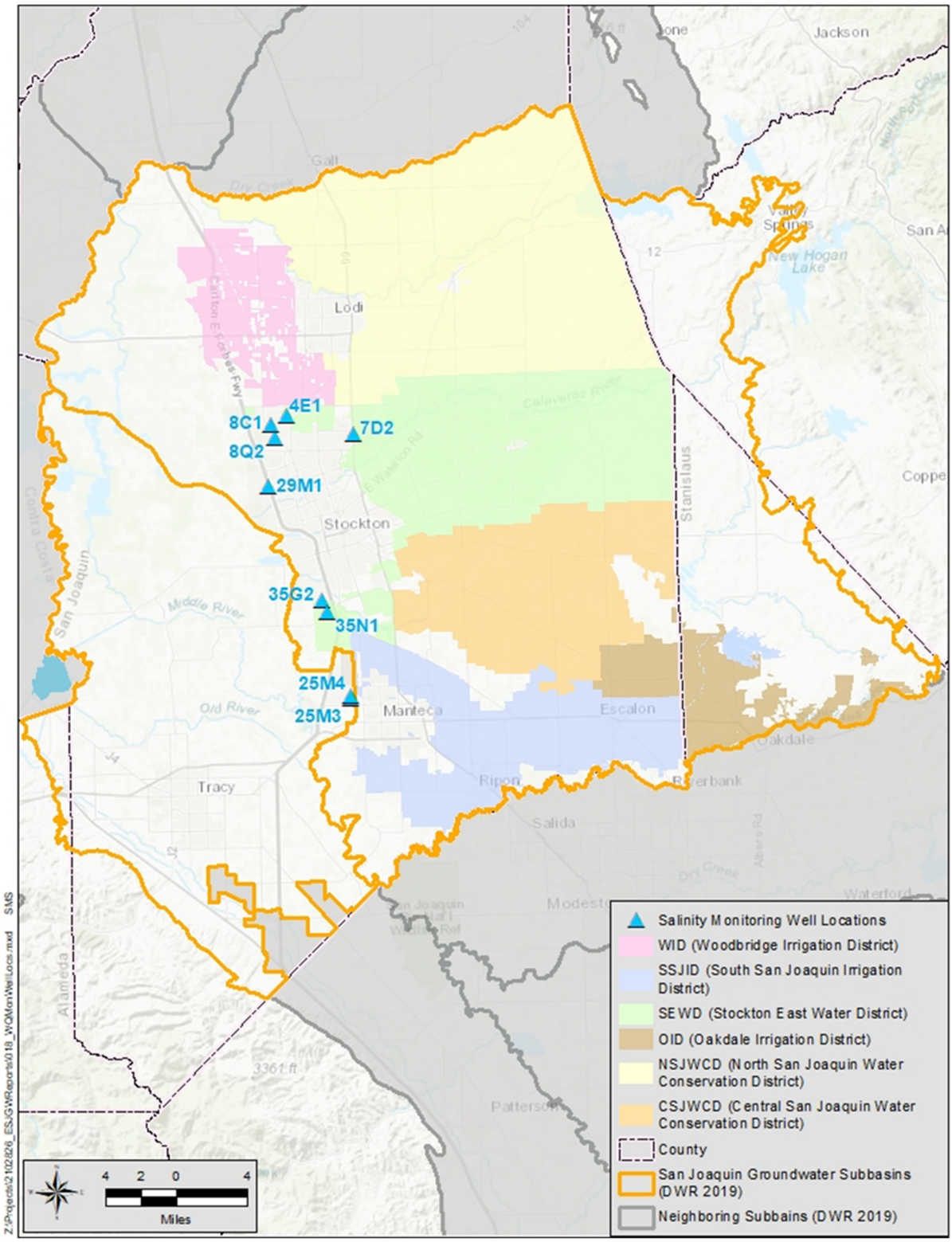


Figure 5-1 Salinity Monitoring Well Locations

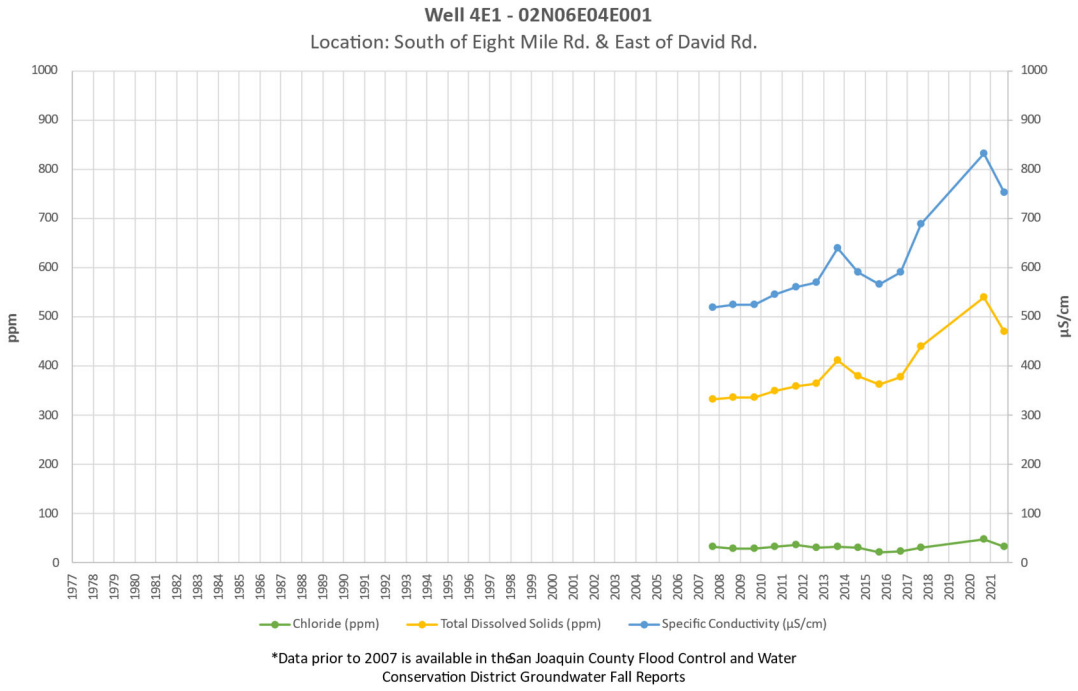


Figure 5-2 Water Quality Comparison Graph Well 4E1

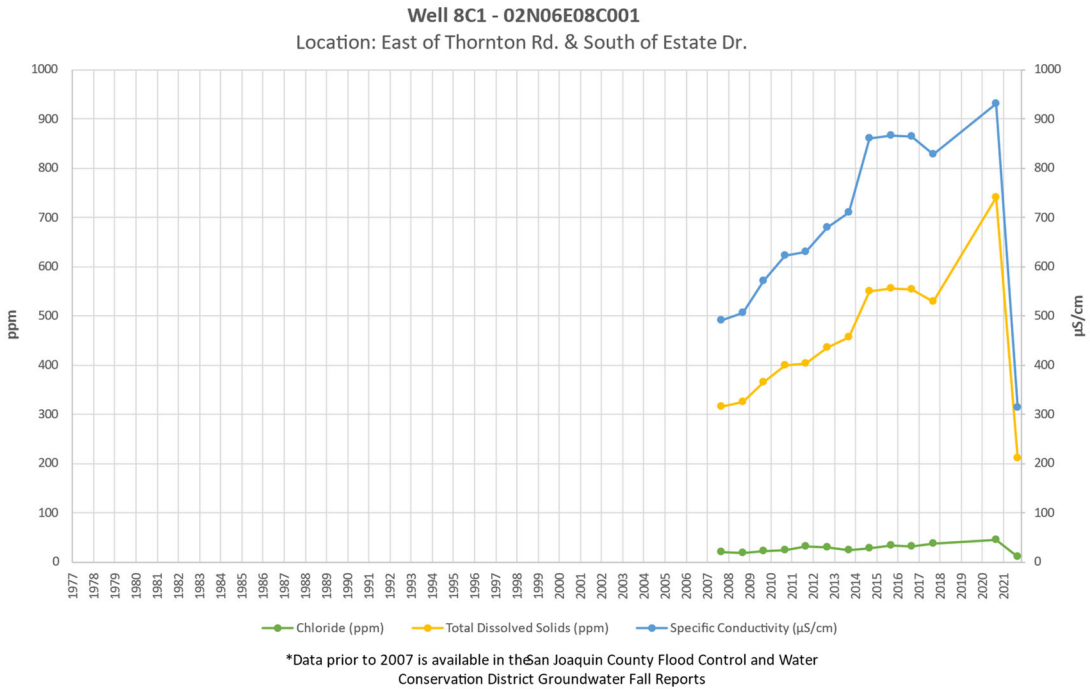


Figure 5-3 Water Quality Comparison Graph Well 8C1

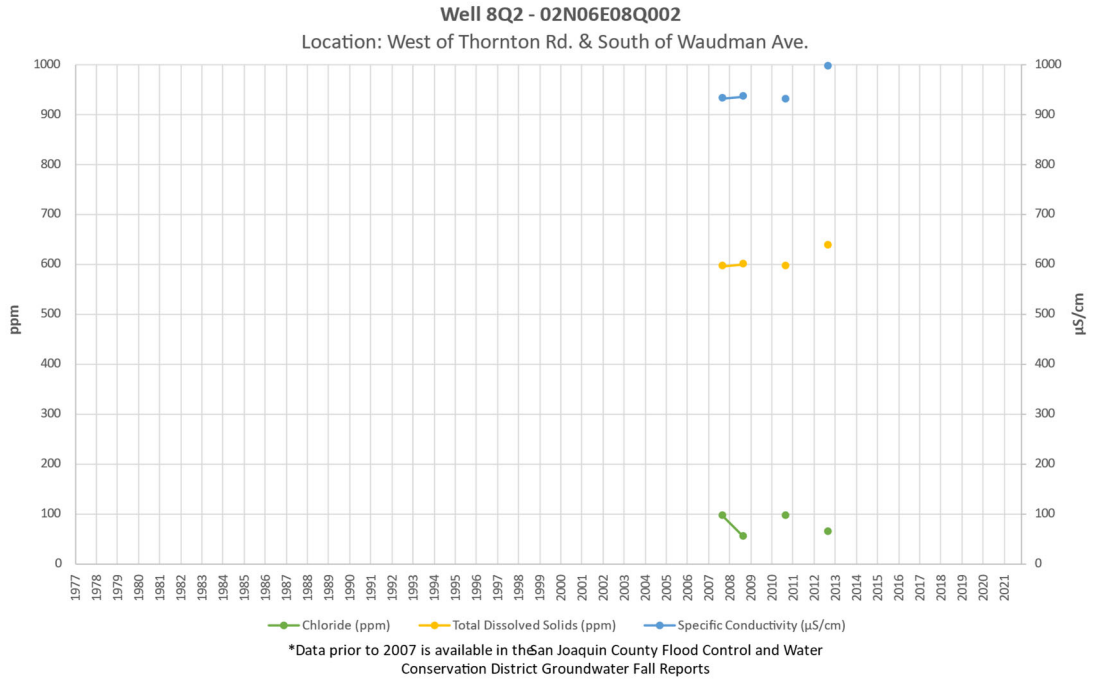


Figure 5-4 Water Quality Comparison Graph Well 8Q2

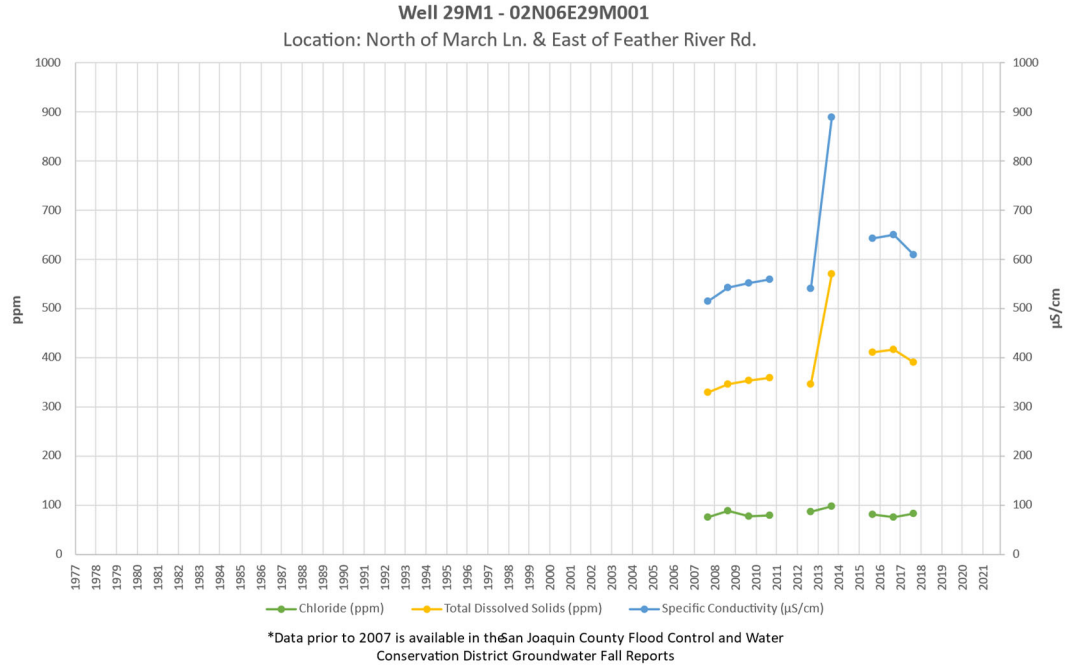


Figure 5-5 Water Quality Comparison Graph Well 29M1

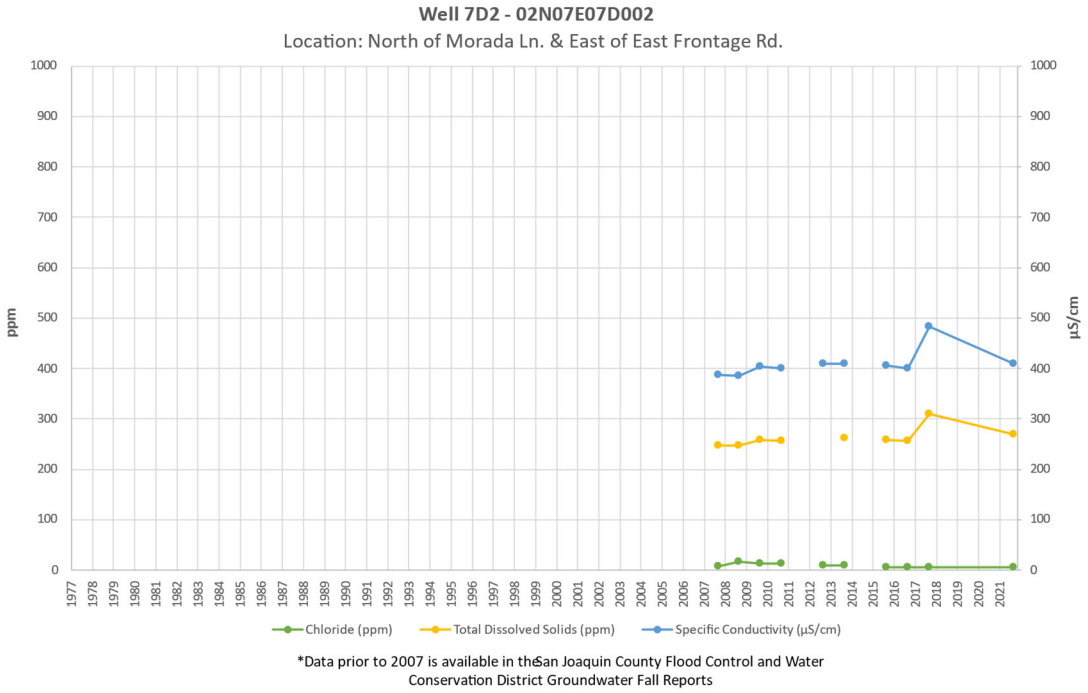


Figure 5-6 Water Quality Comparison Graph Well 7D2

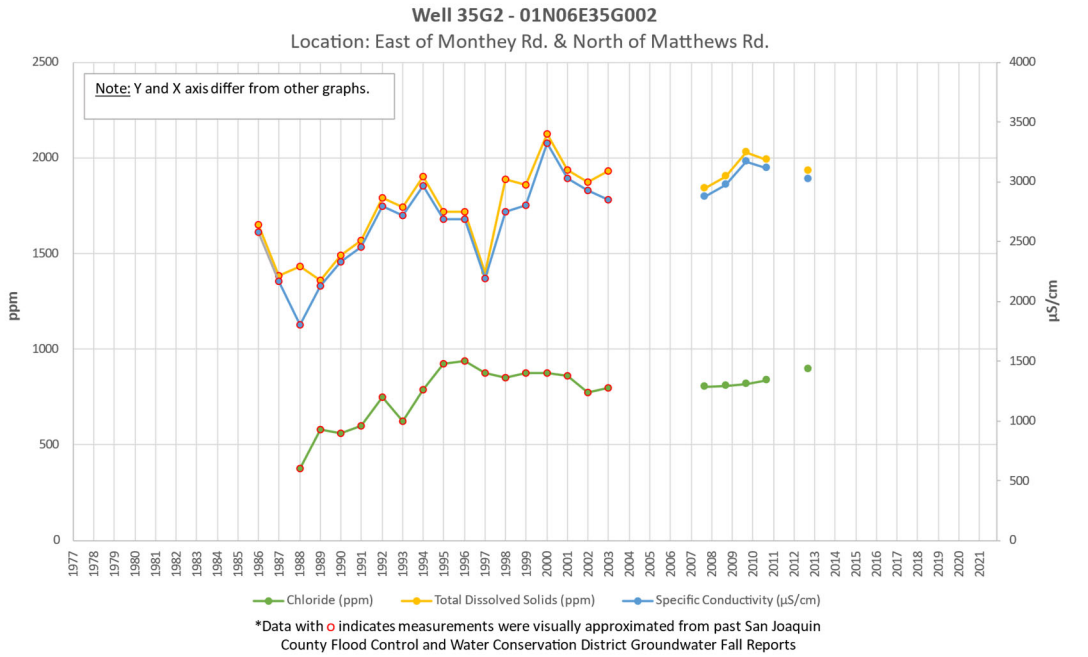


Figure 5-7 Water Quality Comparison Graph Well 35G2

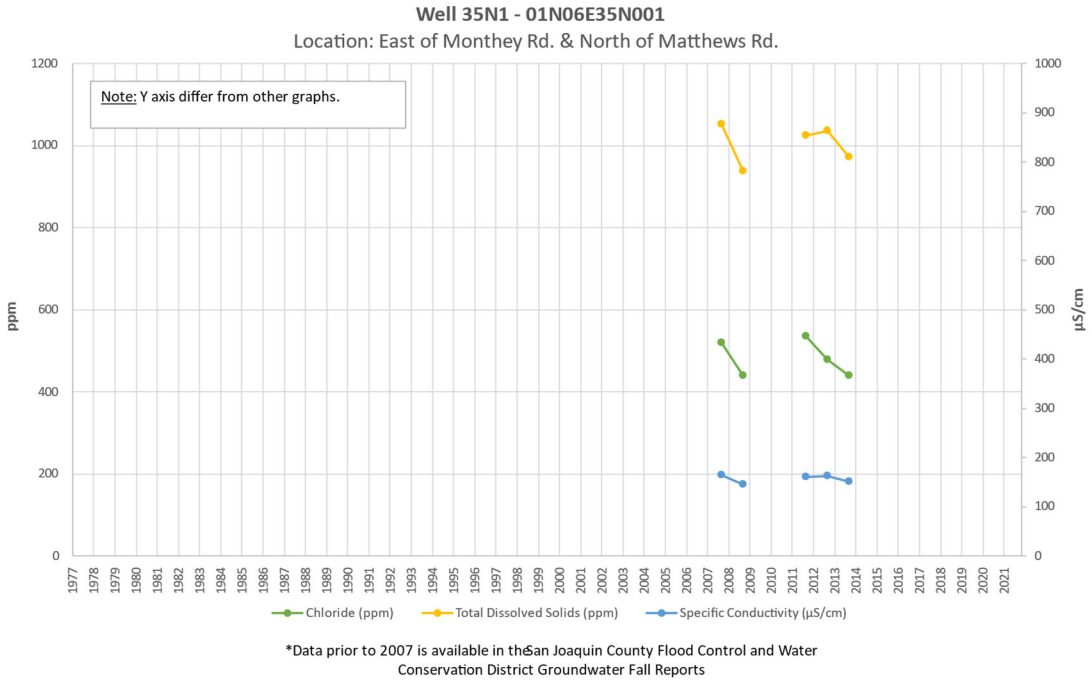


Figure 5-8 Water Quality Comparison Graph Well 35N1

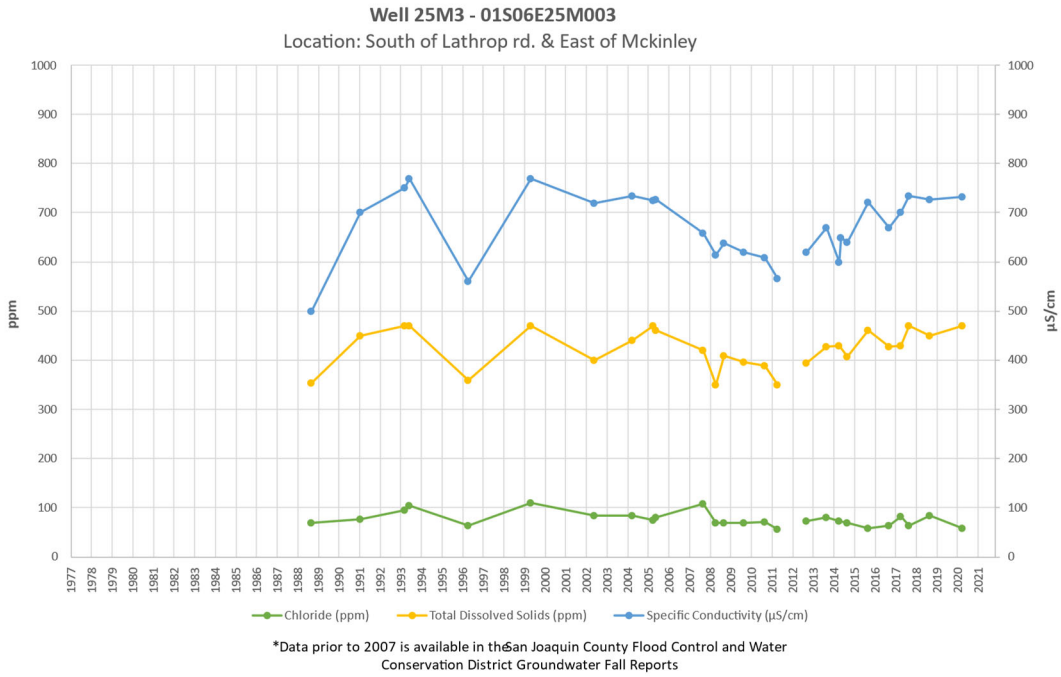


Figure 5-9 Water Quality Comparison Graph Well 25M3

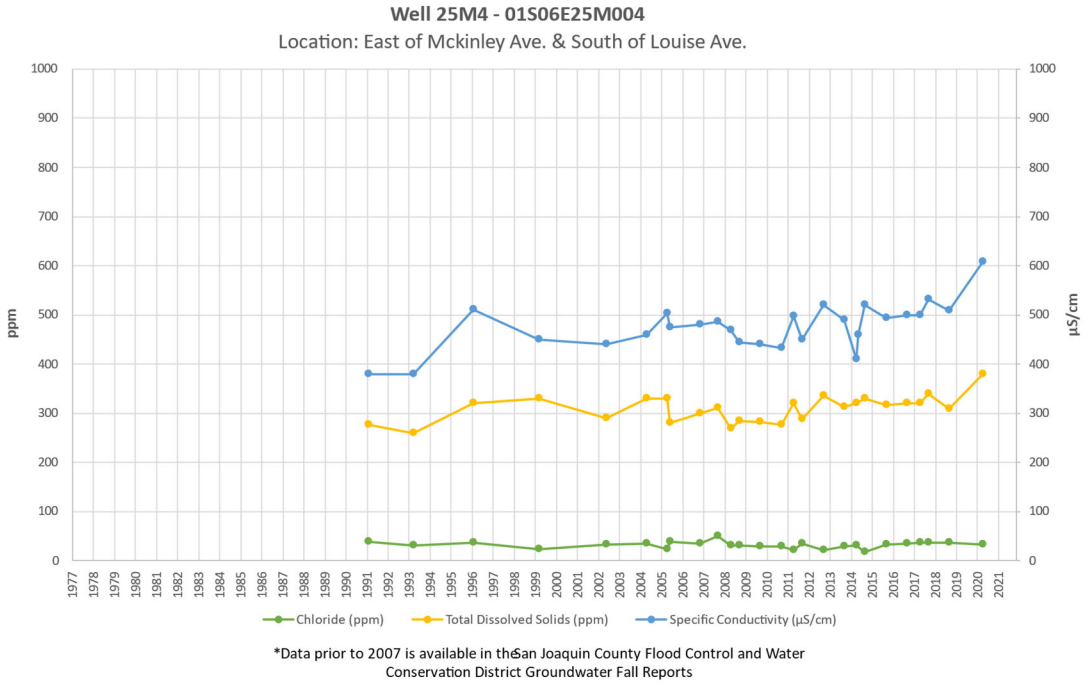


Figure 5-10 Water Quality Comparison Graph Well 25M4

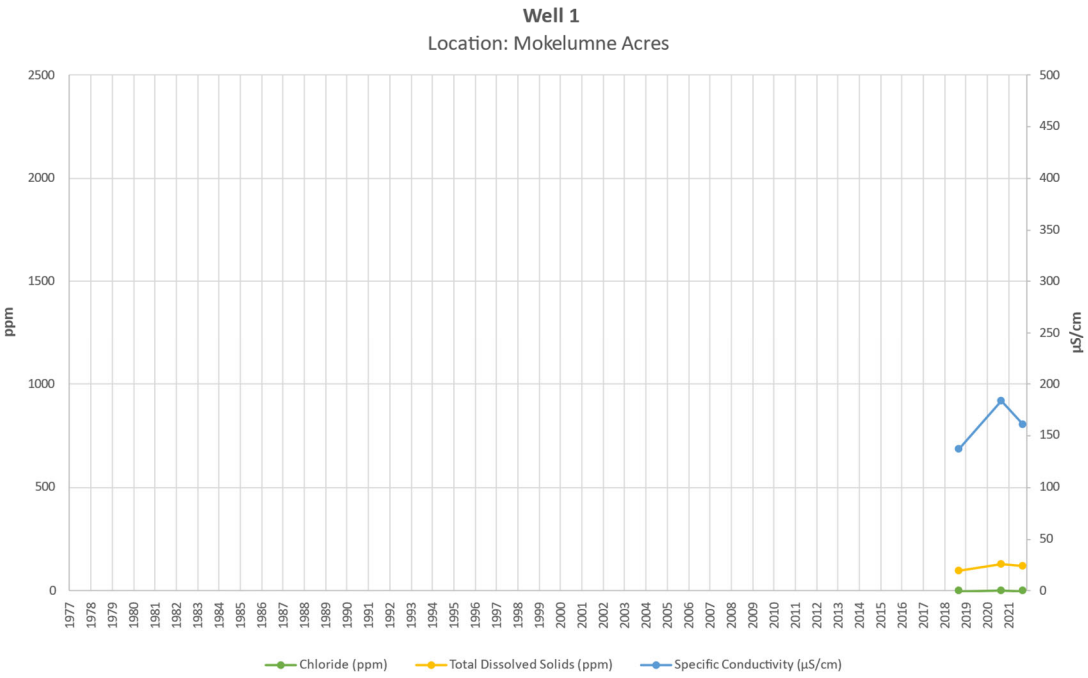


Figure 5-11 Water Quality Comparison Graph Well 1

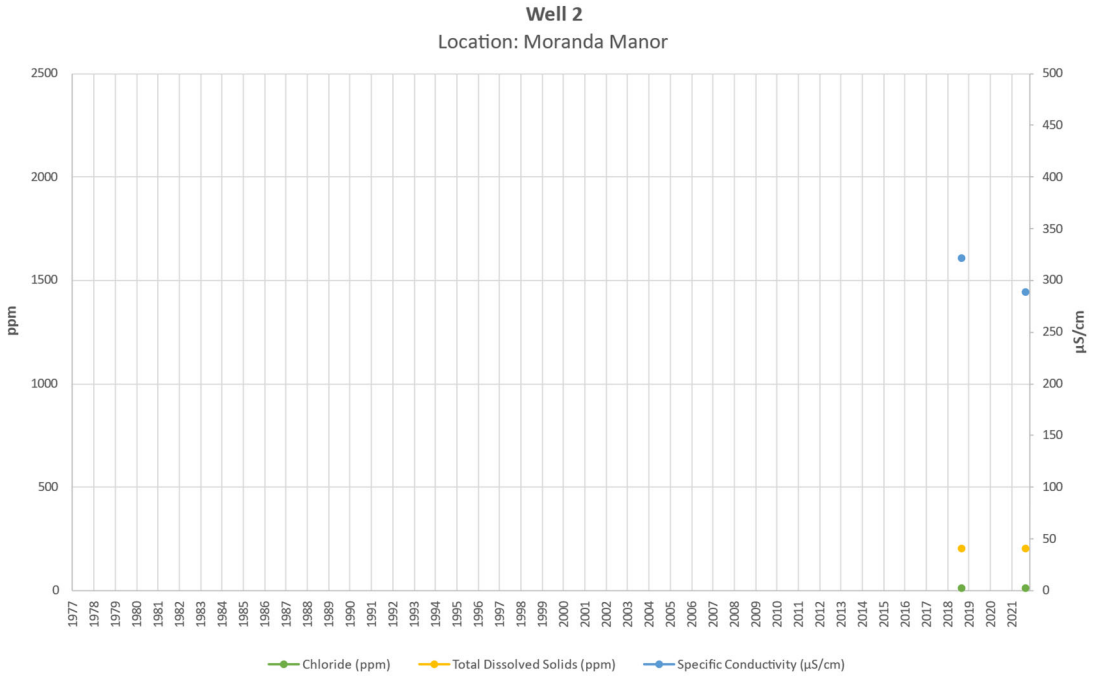


Figure 5-12 Water Quality Comparison Graph Well 2

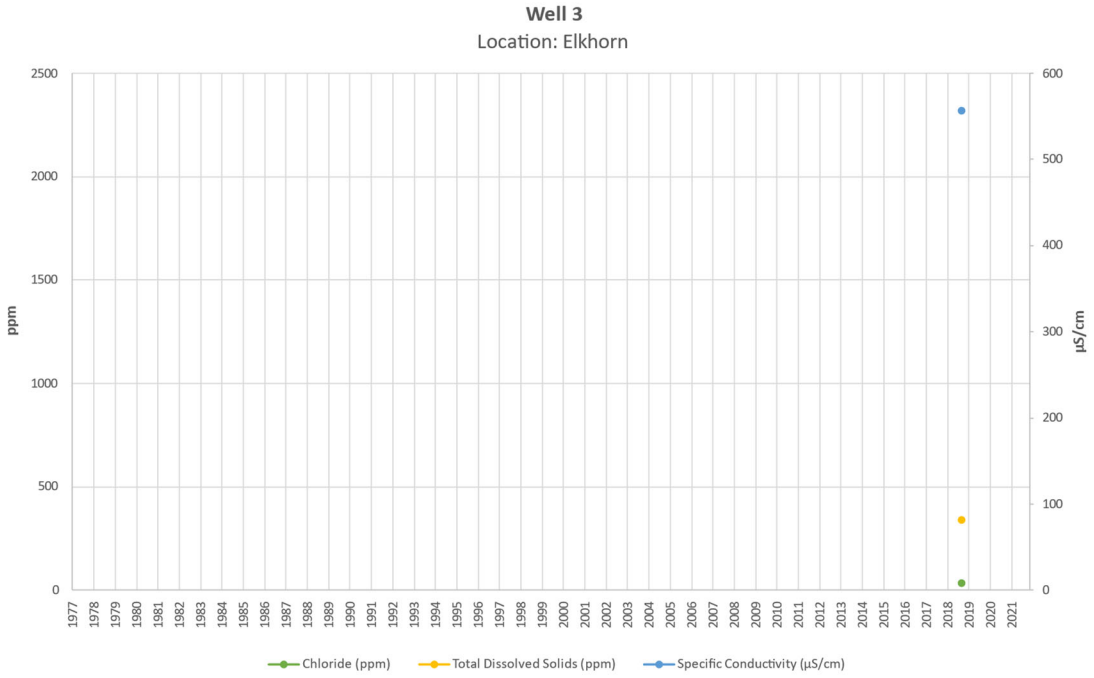


Figure 5-13 Water Quality Comparison Graph Well 3