Groundwater Report

Fall 2019

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 Fall 2019 Groundwater Report may be available upon request from:

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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

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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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Appendices

Appendix A Changes to Groundwater Report

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 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 March and October, to observe groundwater levels before and after peak groundwater pumping conditions. Over 250 wells, most of which are measured by San Joaquin County (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.

For this year's fall semi-annual report, a thorough review of the monitoring wells was performed to eliminate wells that are no longer monitored or destroyed. Appendix A contains a description of these revisions and a current table of wells used for the future reports. These revisions also included selecting new wells for plotting hydrographs, presented in Section 3.2, as some of the wells were no longer being monitored. New wells selected to replace previously used well for hydrographs are Wells C, I, K, O, P, S, T, and W. In addition to these efforts Figure 4-31, Jack Tone Rd Cross Section Fall 2019, was extended to cross the entire county, north to south.

1.1 Purpose

The purpose of the semi-annual Groundwater Reports is to provide information on groundwater conditions in 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 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 County. 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 Microsoft Excel® spreadsheet for accessibility and reporting requirements.

Groundwater quality sampling is typically 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) was not available. Figure 2-1 shows the location of the stations. The precipitation data from west to east, is presented in 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.

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 2019, is the end of the 2019 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 2019 Water Year was classified as a Wet Year with 4.94 maf.

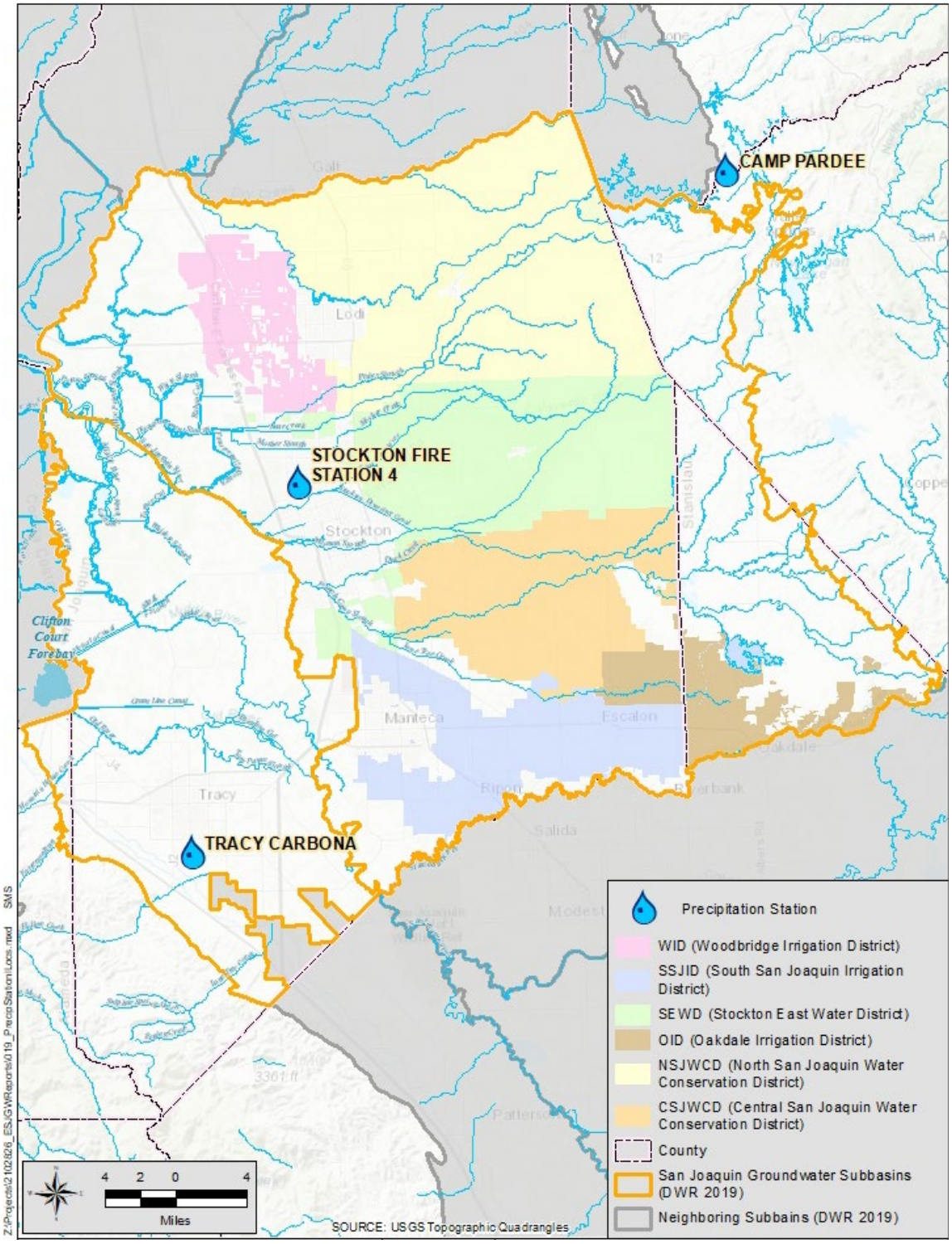

Figure 2-1 Precipitation Station Locations

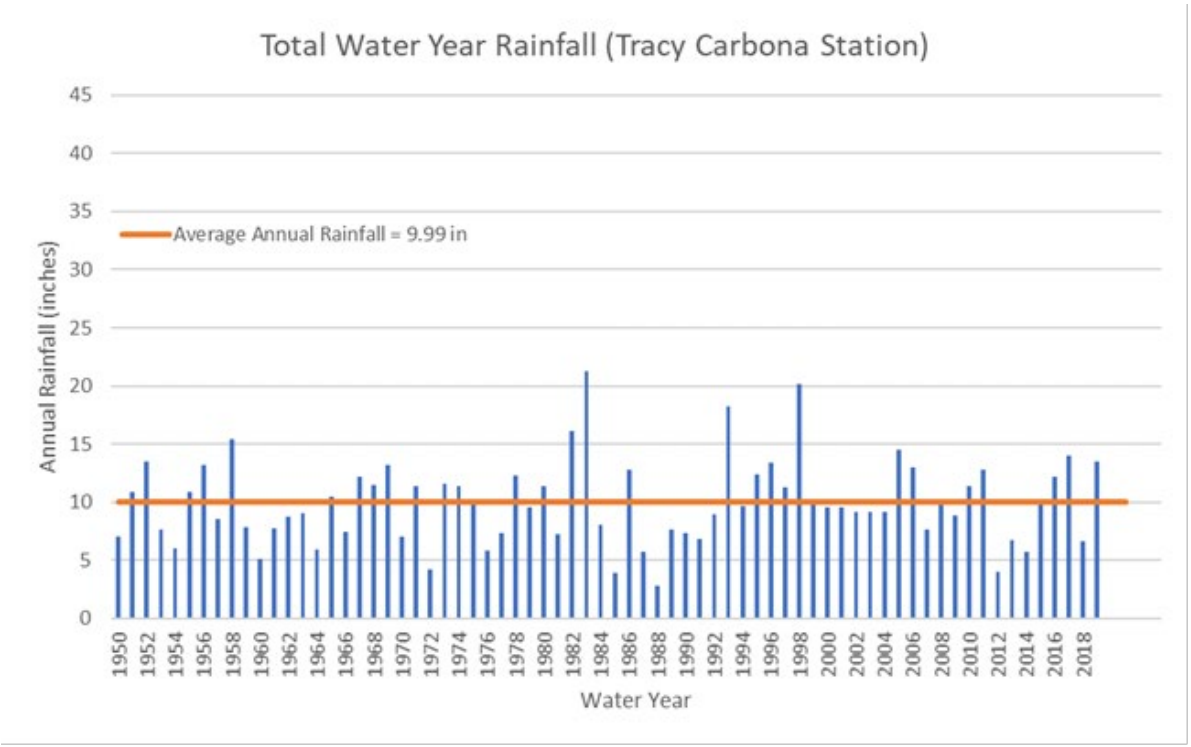

Figure 2-2 Total Annual Rainfall (Tracy Carbona Station)

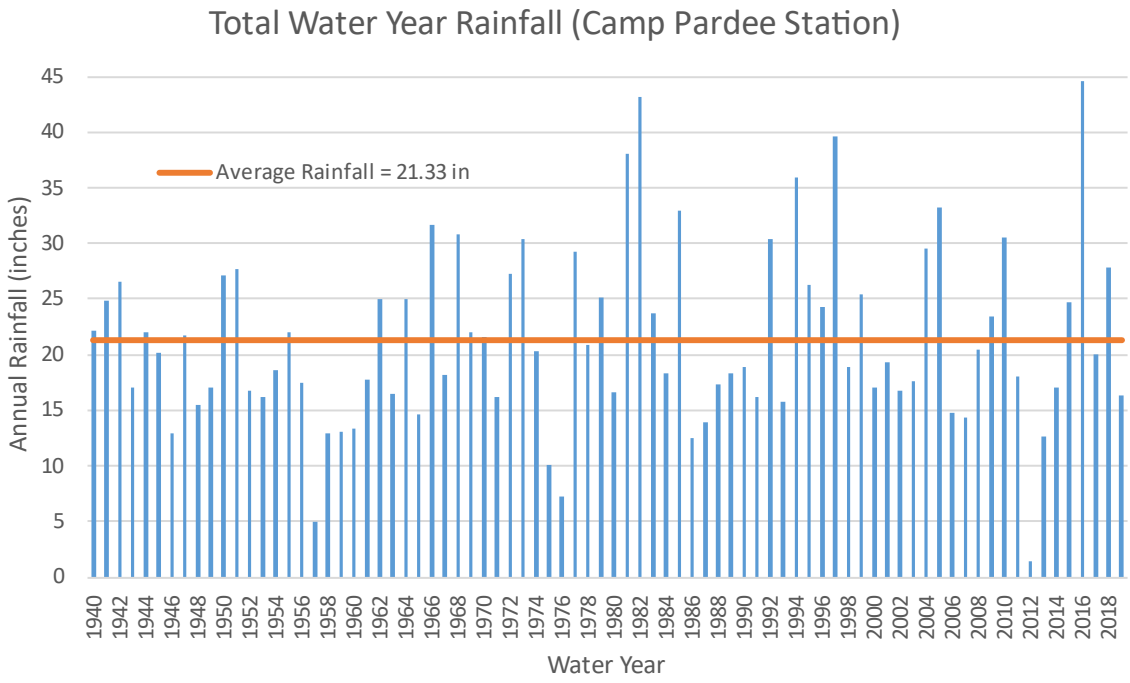

Figure 2-3 Total Annual Rainfall (Camp Pardee Station)

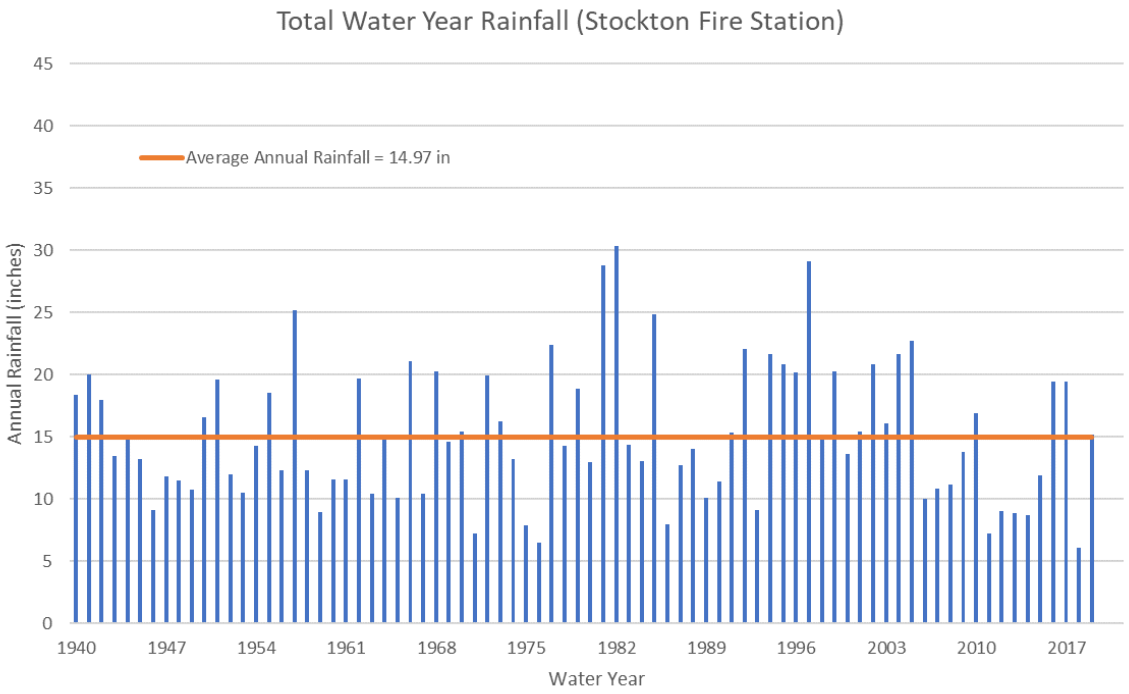

Figure 2-4 Total Annual Rainfall (Stockton Fire Station)

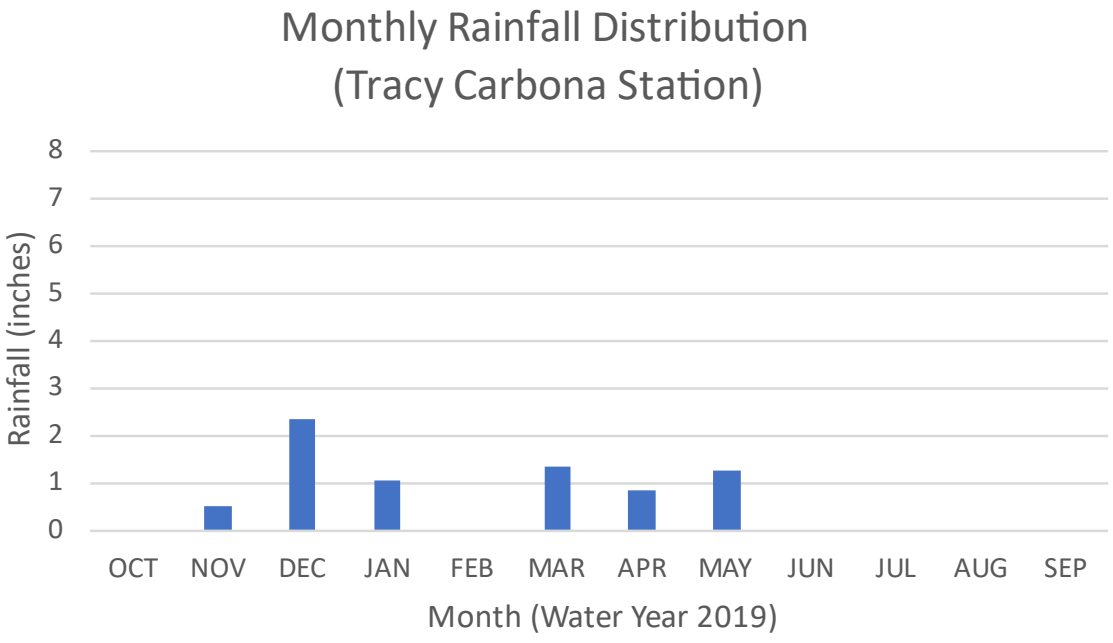

Figure 2-5 Monthly Rainfall Distribution (Tracy Carbona Station)

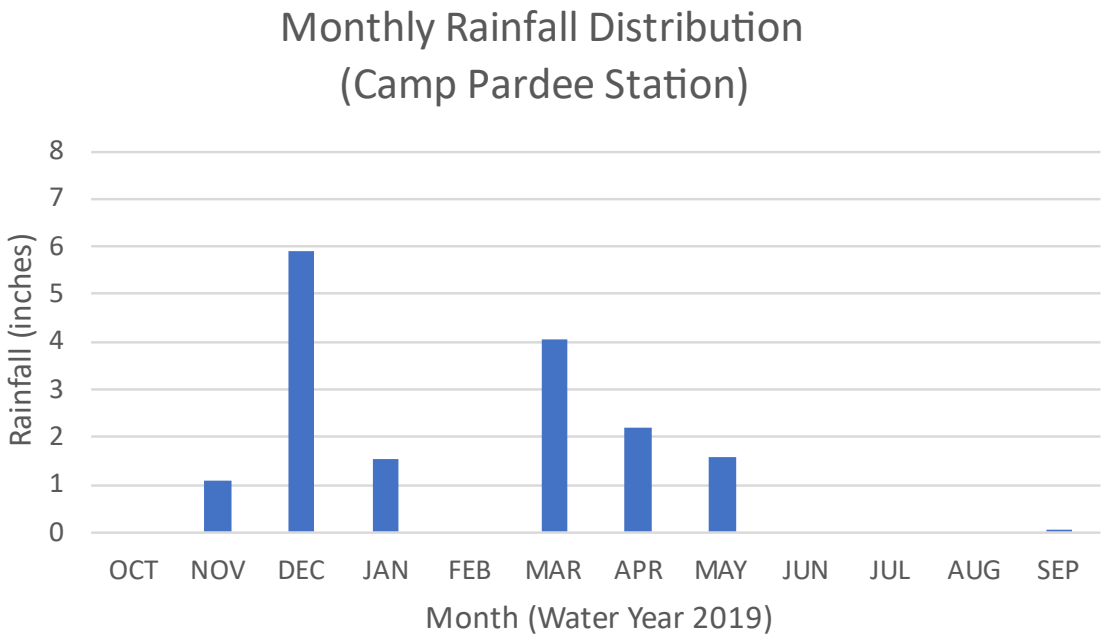

Figure 2-6 Monthly Rainfall Distribution (Camp Pardee Station)

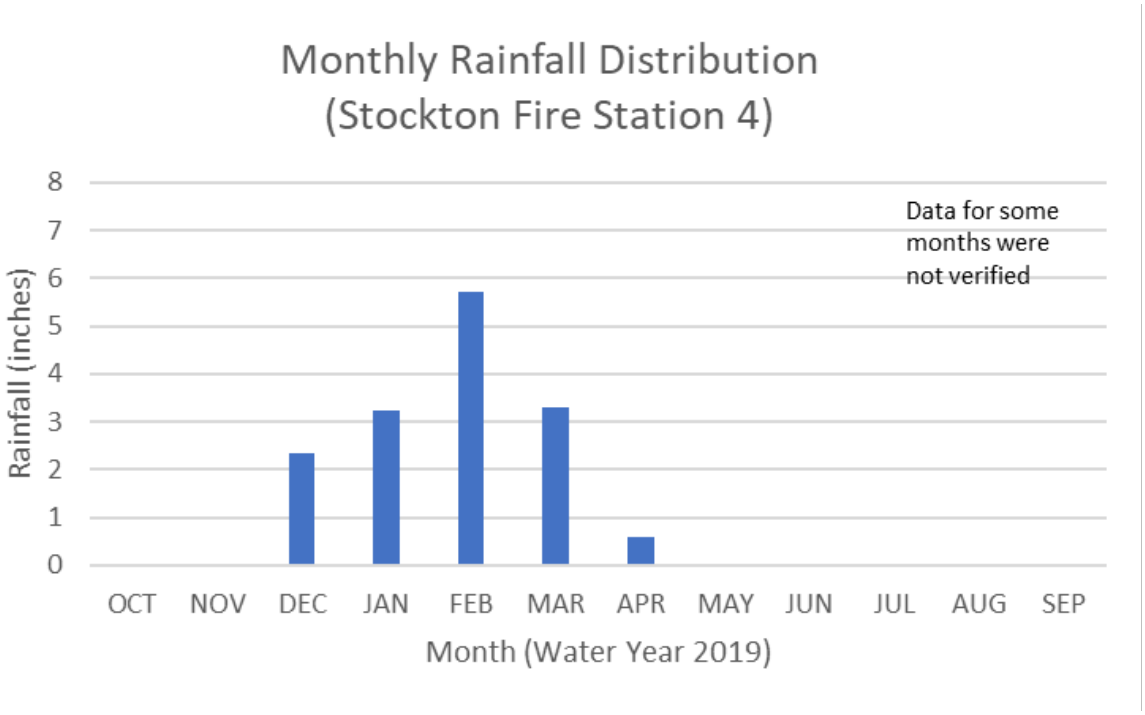

Figure 2-7 Monthly Rainfall Distribution (Stockton Fire Station)

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 current and historic stages.

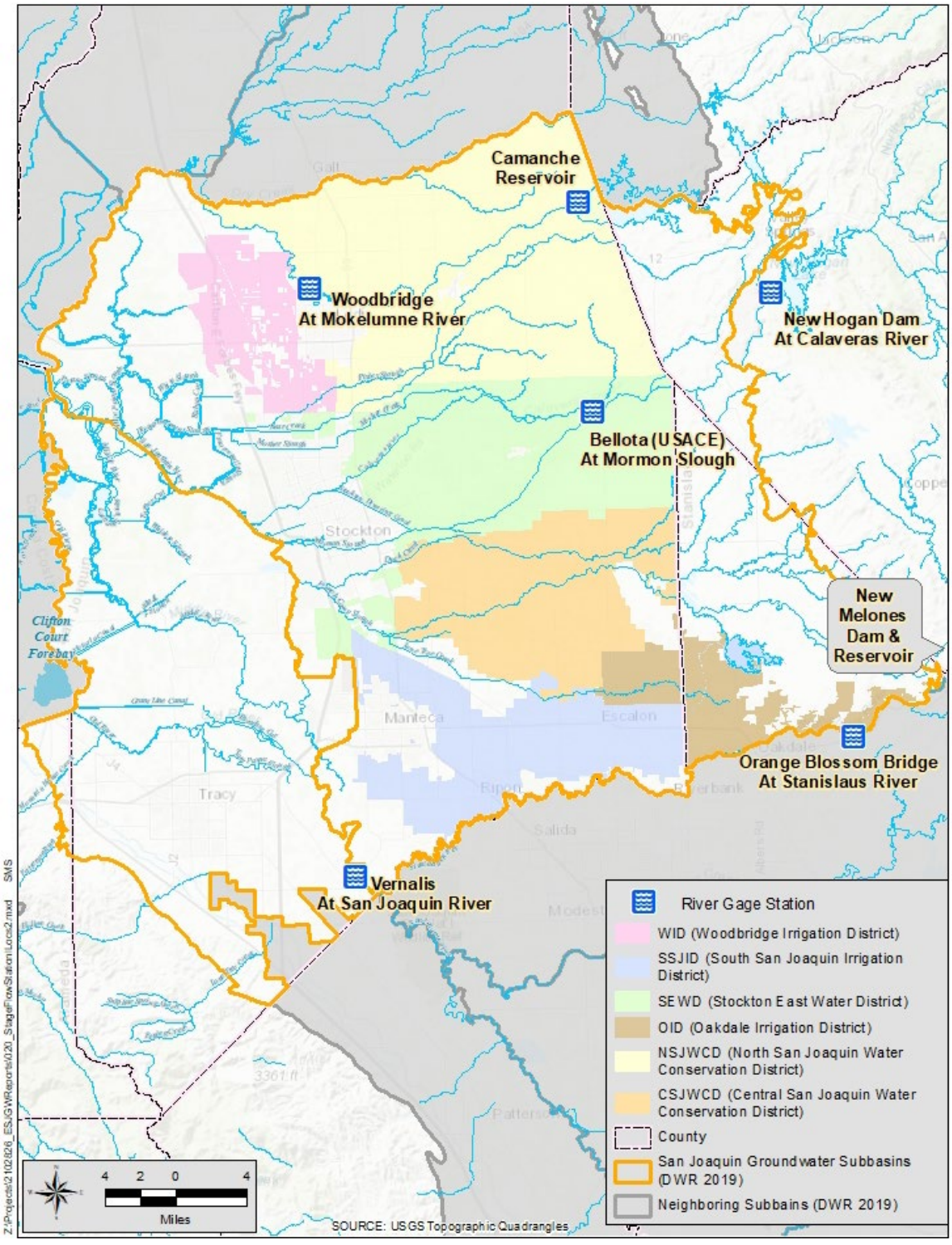

Figure 3-1 Surface Water Station Locations

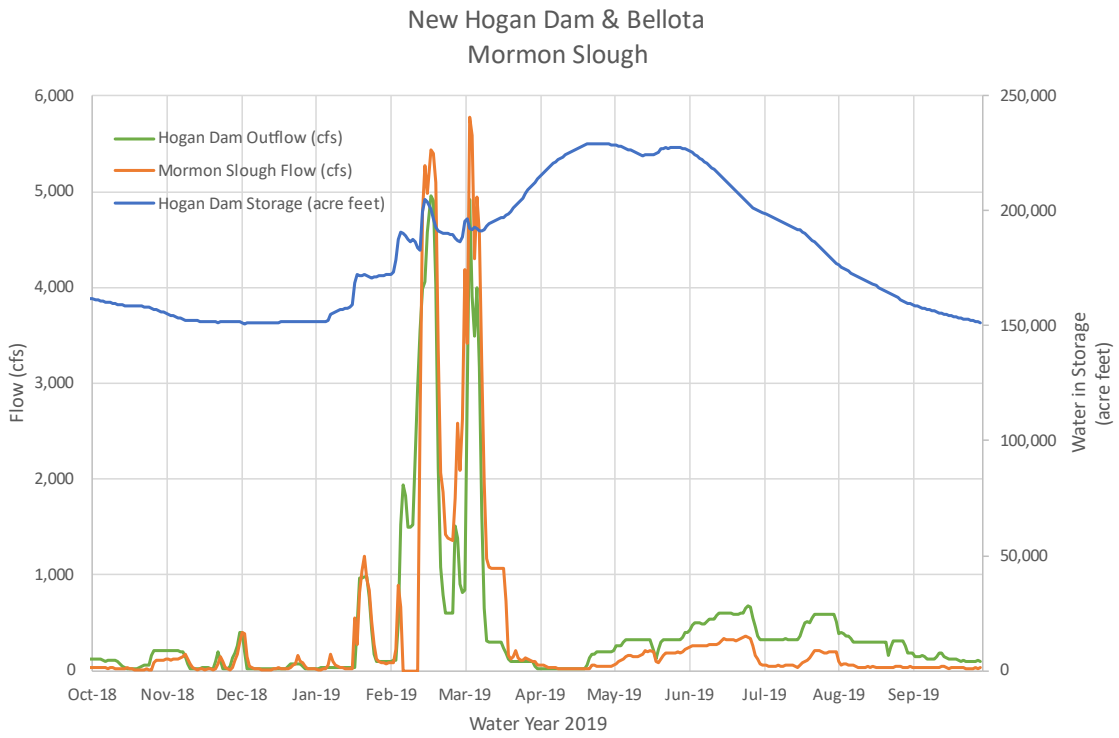

Figure 3-2 New Hogan Dam & Mormon Slough

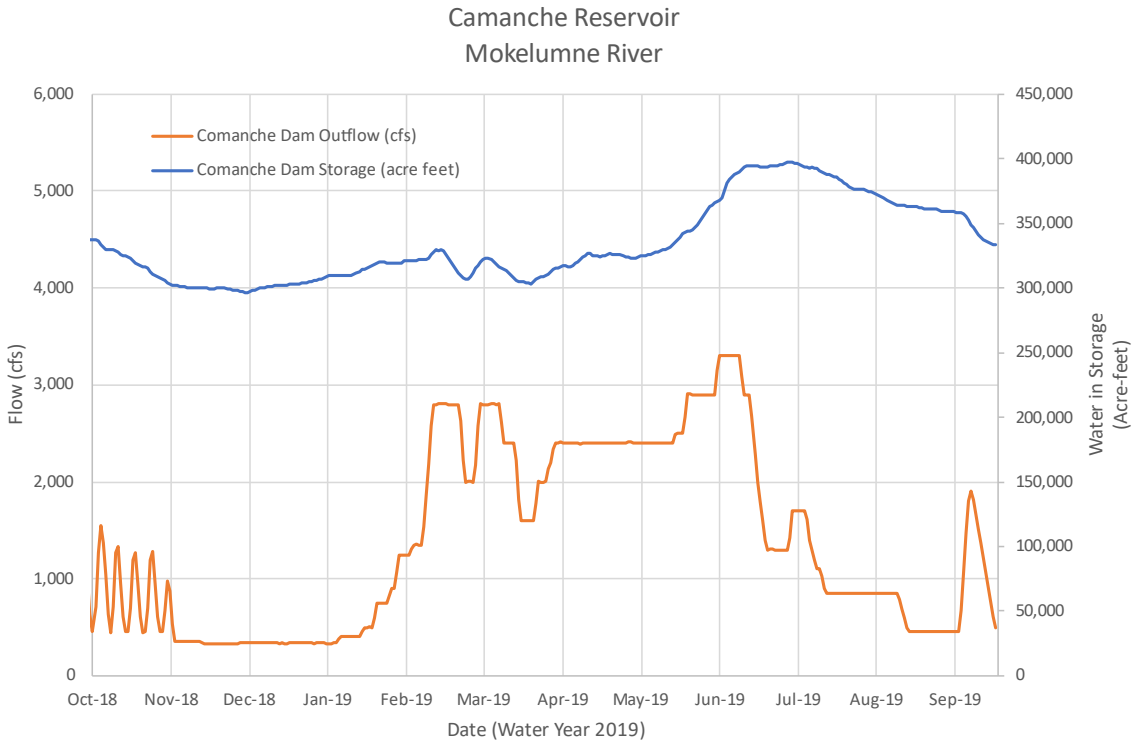

Figure 3-3 Camanche Dam

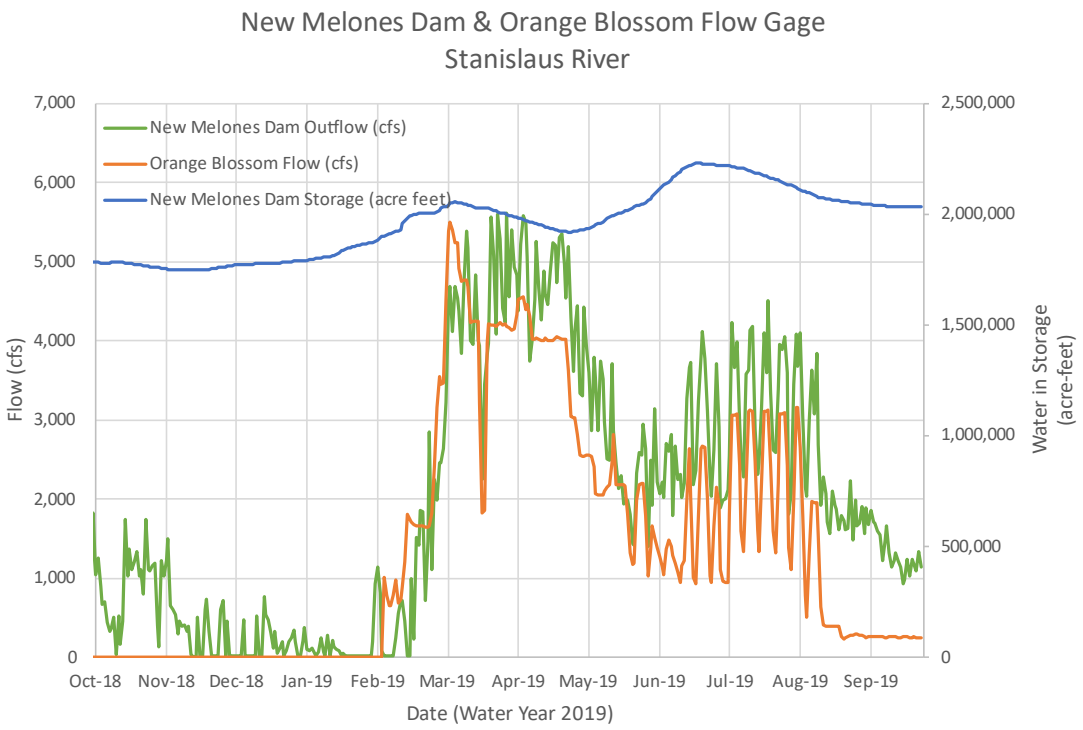

Figure 3-4 New Melones Dam & Orange Blossom Bridge

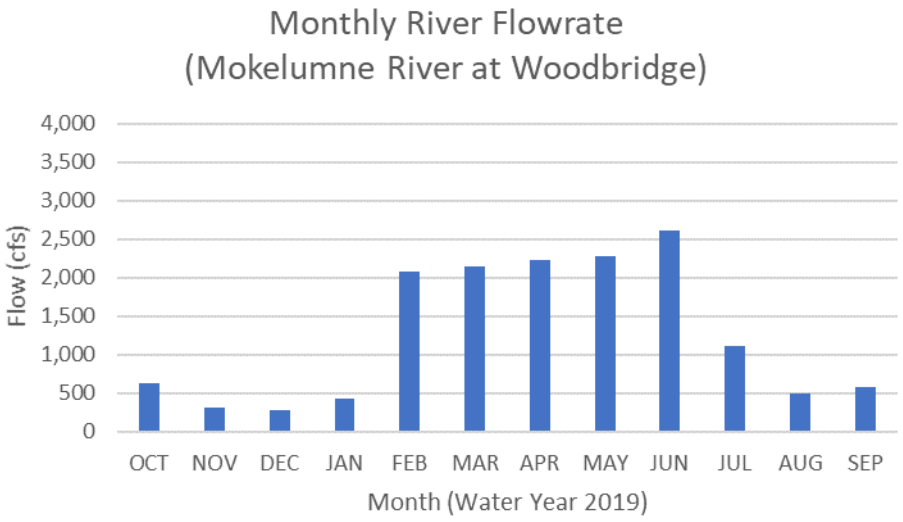

Figure 3-5 Mokelumne River Flow (Woodbridge Station) Monthly Average

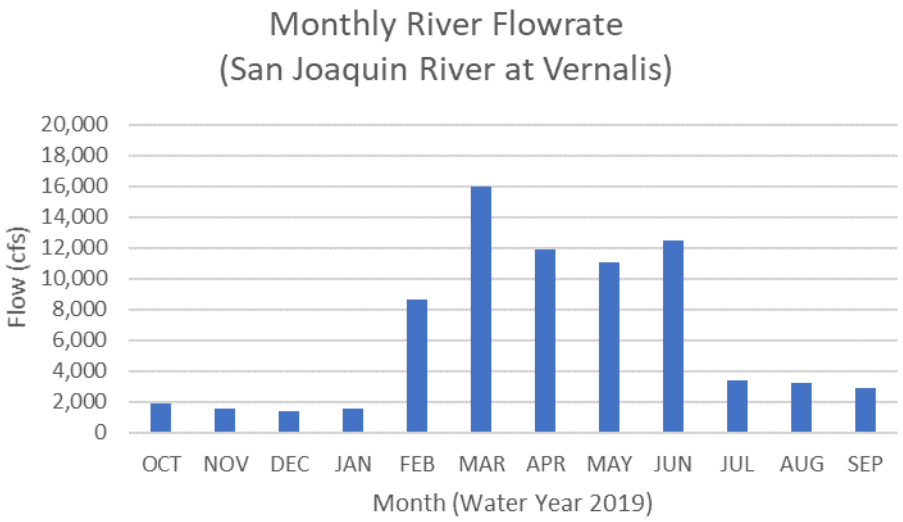

Figure 3-6 San Joaquin River Flow (Vernalis Station) Monthly Average

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 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 Fall 2018 and in Fall 2019.

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.

The information gathered is summarized as follows:

Central San Joaquin Water Conservation District (CSJWCD) – Thirty-nine (39) wells were monitored, with twenty-five (25) wells able to be compared (Table 4-1). Twelve (12) wells show decreases in groundwater levels. Thirteen (13) 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) – Thirty-three (33) wells were monitored, twenty-seven (27) wells were compared in NSJWCD (Table 4-2). Seven (7) wells decreased in groundwater levels. Eighteen (18) wells increased in groundwater levels. There were two (2) wells that had no change in groundwater elevation.

Oakdale Irrigation District (OID) – Out of the two (2) wells in OID, both were comparable wells for groundwater levels (Table 4-3). One well had an increased groundwater level, while the other had decreased.

Stockton East Water District (SEWD) – Ninety-one (91) wells were monitored, with seventy-three (73) wells are comparable in SEWD (Table 4-4). Thirteen (13) wells decreased in groundwater levels. Fifty-eight (58) wells show increases in groundwater levels. One (1) well had no change in groundwater elevation.

South San Joaquin Irrigation District (SSJID) – Twenty-seven (27) wells were monitored, while seventeen (17) wells were compared in the SSJID area (Table 4-5). Two (2) wells

declined in groundwater elevation. Fourteen (14) increased in groundwater elevation. One (1) well had no change in groundwater elevation.

Southwest County Area in the Tracy Subbasin – Twenty-eight (28) wells monitored, all twenty-eight (28) were comparable in the southwestern portion of the County (Table 4-6). Seven (7) wells declined in groundwater elevation. Nineteen (19) increased in groundwater elevation. Two (2) wells had no change in groundwater elevation.

Woodbridge Irrigation District (WID) – Nineteen (19) total wells were monitored, and all Nineteen (19) wells were able to be compared in WID (table 4-7). Two (2) wells decreased in groundwater levels. Seventeen (17) wells showed an increase in groundwater levels. There were no wells with no change in groundwater elevation.

Calaveras County – Fifteen (15) wells were monitored, with Eleven (11) able to be compared (table 4-8). Six (6) wells showed decreases in groundwater levels. Five (5) wells showed an increase. There were no wells with no change in groundwater level.

Stanislaus County – Eight (8) wells were monitored and compared in this area (table 4-9). Six (6) wells showed a decrease in groundwater levels. Two (2) showed an increase. No wells 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, 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 Fall 2018 through Fall 2019 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 2019	Fall 2018	Change (Feet)
01N07E11L001	-53.86	--	--
01N07E14J002	--	-50.6	--
01N07E14L001	-49.91	-49.21	-0.7
01N07E24R001	--	-53.5	--
01N07E26H003	--	-47	--
01N07E32A001	-16.89	-21.59	4.7
01N08E02B001	-57.14	-57.24	0.1
01N08E11L001	-78	-61	-17
01N08E13J001	-35.7	-67.7	32
01N08E16G001	--	-58.45	--
01N08E16H002	-65.25	-105.25	40
01N08E22J001	NM	-49.5	--
01N08E27R002	-48	-67	19
01N08E29M002	NM	-111	--
01N08E35F001	-55.9	-86.9	31
01N08E36F001	-51	-71	20
01N09E13D001	--	-9	--
01N09E15B002	-24.5	-23.5	-1
01N09E17D001	NM	-53.5	--
01N09E17M001	-53.19	-43.5	-9.69
01N09E19C001	-60	-76	16
01N09E22G002	NM	NM	--
01N09E29R001	-36.16	-35.5	-0.66
01N09E30C005	-41.2	-43.2	2
01S07E01J001	-37.6	-41.6	4
01S07E12H001	NM	-32	--
01S08E04R001	NM	-60	--
01S08E05A001	NM	-91.4	--
01S08E09Q001	-61.9	-46.9	-15
01S08E11F001	-31.9	-43.9	12
01S08E14B001	-27.36	-26.36	-1
01S08E15A001	-29.47	-30.57	1.1
01S08E23A001	14.5	25.5	-11
01S08E27A001	-7.05	-6.45	-0.6
01S09E05H002	-32.65	-30.65	-2
01S09E07A001	-23.3	-21.3	-2
01S09E07N001	-28.3	-32.3	4
01S09E09R001	NM	-20.7	--
01S09E19Q002	2	3	-1

Number of Wells 2019-2018					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
39	25	12	13	0	-17 to 40	4.97

Table 4-2 Comparison of NSJWCD Water Surface Elevations

State Well ID	Fall 2019	Fall 2018	Change (Feet)
03N06E04C001	8.56	6.76	1.8
03N07E02G003	-35.74	-34.64	-1.1
03N07E03R001	-32.8	-32.8	0
03N07E08E002	-25	-27	2
03N07E09C001	-30.2	-30.7	0.5
03N07E15C004	-44	-46.5	2.5
03N07E17D004	-26.4	-27.9	1.5
03N07E18D012	-26.5	-29	2.5
03N07E19J004	-67	NM	--
03N07E23C002	-156.63	-48.63	-108
03N08E07D002	-50.56	-51.66	1.1
03N08E22A001	-63.9	-62.5	-1.4
04N06E12C004	-36	-37	1
04N06E12N002	-26.32	--	--
04N06E15B002	-12.2	-10.7	-1.5
04N06E23K00	-6	-6.5	0.5
04N06E24F001	-19	-21	2
04N06E25R001	-2	-3.5	1.5
04N06E27D002	8.2	5.2	3
04N07E12E001	NM	-54.5	--
04N07E17N001	-34.3	-36.3	2
04N07E19K001	-24.6	-26.1	1.5
04N07E20H003	-29.74	-31.44	1.7
04N07E21F001	-33.3	-35.3	2
04N07E27C002	-33.5	-30	-3.5
04N07E28J002	-24.4	-25.2	0.8
04N07E33H001	26	26	0
04N07E36L001	-28.75	-29.75	1
04N08E14K001	-16.1	--	--
04N08E17J001	NM	-40.5	--
04N08E21M001	-42.1	-39.1	-3
04N08E32N001	NM	-47.1	--
05N07E34G001	-59.6	-59.1	-0.5

Number of Wells 2019-2018					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
33	27	7	18	2	-108 to 2.5	-3.34

Table 4-3 Comparison of OID Water Levels

State Well ID	Fall 2019	Fall 2018	Change (feet)
01S09E21J002	25.9	24.5	1.4
01S09E24R001	51.5	52.1	-0.6

Number of Wells 2019-2018					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
2	2	1	1	0	-0.6 to 1.4	0.40

Table 4-4 Comparison of SEWD Water Levels

State Well ID	Fall 2019	Fall 2018	Change (feet)
01N06E02C001	-6.13	-10.23	4.1
01N06E04J003	-9.73	-12.63	2.9
01N06E04J004	-5.77	-8.17	2.4
01N06E04J005	-2.41	-3.81	1.4
01N06E05M004	NM	-10.5	--
01N06E36C003	-13	-16.4	3.4
01N06E36C004	-9.7	-12.3	2.6
01N06E36C005	3	-13	16
01N07E01M002	NM	-74	--
01N07E02G001	NM	-18.5	--
01N07E03D002	NM	-53.06	--
01N07E03M001	-23	-29	6
01N07E04R001	-26	-20	-6
01N07E09E004	-17	-24	7
01N07E09H001	-27.5	-32.5	5
01N07E09Q003	-34	-36	2
01N07E10D001	NM	-35	--
01N07E10G001	NM	-42	--
01N07E20G001	-19	-21	2
01S06E01C002	-9	-8	-1
01S06E02G002	-6.77	-8.57	1.8
01S06E10G001	-11.8	-7.8	-4
01S07E06M002	-6	-8	2
01S07E08J002	-8	-14	6
02N05E01A002	-25.64	-27.64	2
02N05E01A003	-16.21	-17.71	1.5
02N05E01A004	-13.76	-14.96	1.2
02N05E01A005	-11.94	-10.14	-1.8
02N05E01A006	-8.98	-10.08	1.1
02N06E01A001	-33.42	-36.32	2.9
02N06E08N001	-22.88	-24.68	1.8
02N06E08N002	-21.32	-22.82	1.5
02N06E08N003	-18.61	-20.11	1.5
02N06E12H001	-35.89	-38.69	2.8
02N06E20E001	-15.2	-17	1.8
02N06E20E003	NM	-14.9	--

State Well ID	Fall 2019	Fall 2018	Change (feet)
02N06E24F001	-26.5	-28.5	2
02N06E24J002	-20.6	-29.3	8.7
02N06E24J003	-19.87	-28.27	8.4
02N07E03D001	-59.73	-65	5.3
02N07E08D001	-74.2	-71.2	-3
02N07E08K003	-56.7	-64	7.3
02N07E08R002	-52.44	-59.24	6.8
02N07E10F002	-63.2	-65.8	2.6
02N07E11F001	-78	-98	20
02N07E11R002	-69	-68	-1
02N07E15C001	--	-64.3	--
02N07E16F002	-54.29	-64.44	10.15
02N07E16L001	-71.3	-62.3	-9
02N07E20N002	-40	-39	-1
02N07E21A002	-64.01	-43.81	-20.2
02N07E21K002	-56.2	-62	5.8
02N07E21N001	-64	-107	43
02N07E23B001	-65	-88	23
02N07E24B001	NM	-75.1	--
02N07E24Q001	-72.6	-84	11.4
02N07E26N001	NM	-93.2	--
02N07E28K002	-60	-64	4
02N07E28N004	-46	-43	-3
02N07E28P001	-54	-77	23
02N07E29B001	-41.43	-46.5	5.07
02N07E29M002	-27.4	-38	10.6
02N07E30H001	-26.8	-34.5	7.7
02N07E31M001	-2.8	-4.8	2
02N07E32J002	-18.6	-32	13.4
02N07E32M002	-10.86	-7	-3.86
02N07E32R001	NM	-14.6	--
02N07E33L001	-26	-39	13
02N07E34R001	-65	-67	2
02N08E03G002	NM	-64.7	--
02N08E04C001	-50.5	-73.4	22.9
02N08E05C001	-62.5	-70.5	8
02N08E08N001	-68.5	-83.5	15
02N08E09G002	49.4	35	14.4
02N08E10H002	-64.1	-93.1	29

State Well ID	Fall 2019	Fall 2018	Change (feet)
02N08E14C001	-62	-66	4
02N08E16D001	-50.1	-88.1	38
02N08E18C001	-76.7	NM	--
02N08E20F001	NM	-76.8	--
02N08E24J001	NM	-62.1	--
02N08E32L002	NM	-62.2	--
02N08E33E001	-81.6	-68.6	-13
02N09E05N001	-32.99	-31.29	-1.7
02N09E09D001	-21.8	-21.8	0
02N09E28N001	NM	-23.1	--
03N06E35P002	-22.14	-25.34	3.2
03N07E35C002	-60.7	-78.8	18.1
03N07E35L001	-81.5	-84.5	3
03N07E36J001	-70.3	-69.3	-1
03N09E25R001	84.6	80.5	4.1
03N09E36G001	NM	68.2	--

Number of Wells 2019-2018					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
91	73	13	58	1	-53.06 to 22.9	5.59

Table 4-5 Comparison of SSJID Water Levels

State Well ID	Fall 2019	Fall 2018	Change (feet)
01S07E14M001	--	-19.1	--
01S07E14P003	--	-33.8	--
01S07E15F002	-11.6	-21.6	10
01S07E18L001	2.77	1.57	1.2
01S07E21G001	6.65	7.35	-0.7
01S07E25E001	NM	-7	--
01S07E26G001	NM	-11	--
01S07E27K001	1.6	-0.5	2.1
01S07E30R001	9.16	7.06	2.1
01S07E36D001	8.25	8.05	0.2
01S08E19R001	--	-12.7	--
01S08E30C002	-7	-11	4
01S08E35R002	--	21.27	--
01S09E33J002	42.72	43.92	-1.2
01S09E33P001	37.91	34.71	3.2
02S07E07D002	NM	6	--
02S07E11N002	26.35	23	3.35
02S07E19H001	--	21	--
02S08E04M001	5.5	-5.5	11
02S08E06J001	13	3	10
02S08E07R001	--	20	--
02S08E08A001	17.36	--	--
02S08E08E001	17.2	12.2	5
02S08E09J001	29.06	29.06	0
02S08E12D001	32.27	32.07	0.2
02S08E14E001	41.47	41.27	0.2
02S09E12R001	61.05	60.95	0.1

Number of Wells 2019-2018					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
27	17	2	14	1	-1.2 to 11	2.99

Table 4-6 Comparison of Southwest Area Water Levels

State Well ID	Fall 2019	Fall 2018	Change (feet)
01S05E31R002	0.6	0.6	0
01S06E12P001	53.41	52.41	1
01S06E15F001	-1.9	-1.8	-0.1
02S04E15R001	18.26	16.86	1.4
02S05E08B001	49.28	49.78	-0.5
02S06E11J001	62.73	63.03	-0.3
02S06E25J001	19.76	18.26	1.5
02S06E31N001	-14.46	-16.34	1.88
03S06E27N001	-27.42	-24.8	-2.62
03S07E06Q001	-25.94	-25.07	-0.87
MW-1A	-20.39	-22.31	1.92
MW-1B	-24.59	-26.39	1.8
MW-1C	-24.7	-26.47	1.77
MW-2A	-17.18	-20.28	3.1
MW-2B	-23.98	-26.84	2.86
MW-2C	-24.42	-27.55	3.13
MW-3A	-21.01	-22.35	1.34
MW-3B	-25.35	-26.33	0.98
MW-3C	-25.37	-26.54	1.17
MW-4A	-21.75	-22.12	0.37
MW-4B	-23.21	-22.98	-0.23
MW-4C	-21.77	-22.59	0.82
MW-5A	-17.85	-19.41	1.56
MW-5B	-24.43	-24.43	0
MW-5C	-21.59	-20.98	-0.61
MW-6A	-19.41	-21.85	2.44
MW-6B	-22.47	-25.05	2.58
MW-6C	-20.98	-23.58	2.6

Number of Wells 2019-2018					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
28	28	7	19	2	-2.62 to 3.13	1.04

Table 4-7 Comparison of WID Water Levels

State Well ID	Fall 2019	Fall 2018	Change (feet)
03N05E14C001	-3.23	-2.23	-1
03N06E05N003	-3.07	-4.07	1
03N06E07H003	-9.5	-10	0.5
03N06E10D001	3.1	3.6	-0.5
03N06E17A004	-16.7	-19.7	3
03N06E18M003	-10.6	-12.1	1.5
03N06E20D002	-13	-15	2
03N06E32R001	-21	-23	2
04N05E10K001	-2.64	-6.5	3.86
04N05E13H001	2.88	-1	3.88
04N05E13R004	-1.5	-4	2.5
04N05E14B002	-2.4	-6.9	4.5
04N05E24J004	5.8	0.9	4.9
04N05E36H003	5.43	1.5	3.93
04N06E17G004	4	0	4
04N06E29N002	2.4	0	2.4
04N06E30E001	5.7	4.7	1
04N06E34J002	25.4	23.9	1.5
05N05E28L003	-5.5	-6	0.5

Number of Wells 2019-2018					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
19	19	2	17	0	-1 to 4.9	2.18

Table 4-8 Comparison of Calaveras County Water Levels

Local Well ID	Fall 2019	Fall 2018	Change (feet)
CCWD 001	86.84	--	--
CCWD 002	88.91	--	--
CCWD 003	131.91	129.23	2.68
CCWD 004	96.7	99.62	-2.92
CCWD 005	100.67	101.63	-0.96
CCWD 006	105.09	107.17	-2.08
CCWD 007	DRY	DRY	--
CCWD 008	75.86	73.74	2.12
CCWD 009	111.97	111.74	0.23
CCWD 010	94.18	94.77	-0.59
CCWD 011	88.92	88.49	0.43
CCWD 012	149.6	152.52	-2.92
CCWD 014	160.1	159.95	0.15
CCWD 015	151.27	152.17	-0.9
CCWD 016	NM	NM	--

Number of Wells 2019-2018					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
15	11	6	5	0	-2.92 to 2.68	-0.43

Table 4-9 Comparison of Stanislaus Area Water Levels

State Well ID	Fall 2019	Fall 2018	Change (feet)
01S10E04C001	54.32	69.72	-15.40
01S10E21A001	90.82	93.74	-2.92
01S10E26J001	83.98	73.70	10.28
01S10E27Q001	73.15	74.80	-1.65
01S10E34R001	73.29	73.74	-0.45
01S11E25N001	139.51	115.01	24.50
02S10E02P001	85.6	85.90	-0.30
02S10E10M002	72.62	73.65	-1.03

Number of Wells 2019-2018					Change in Storage	
Total	Comparable	Decrease	Increase	No Change	Range	Average
8	8	6	2	0	-15.4 to 24.5	1.63

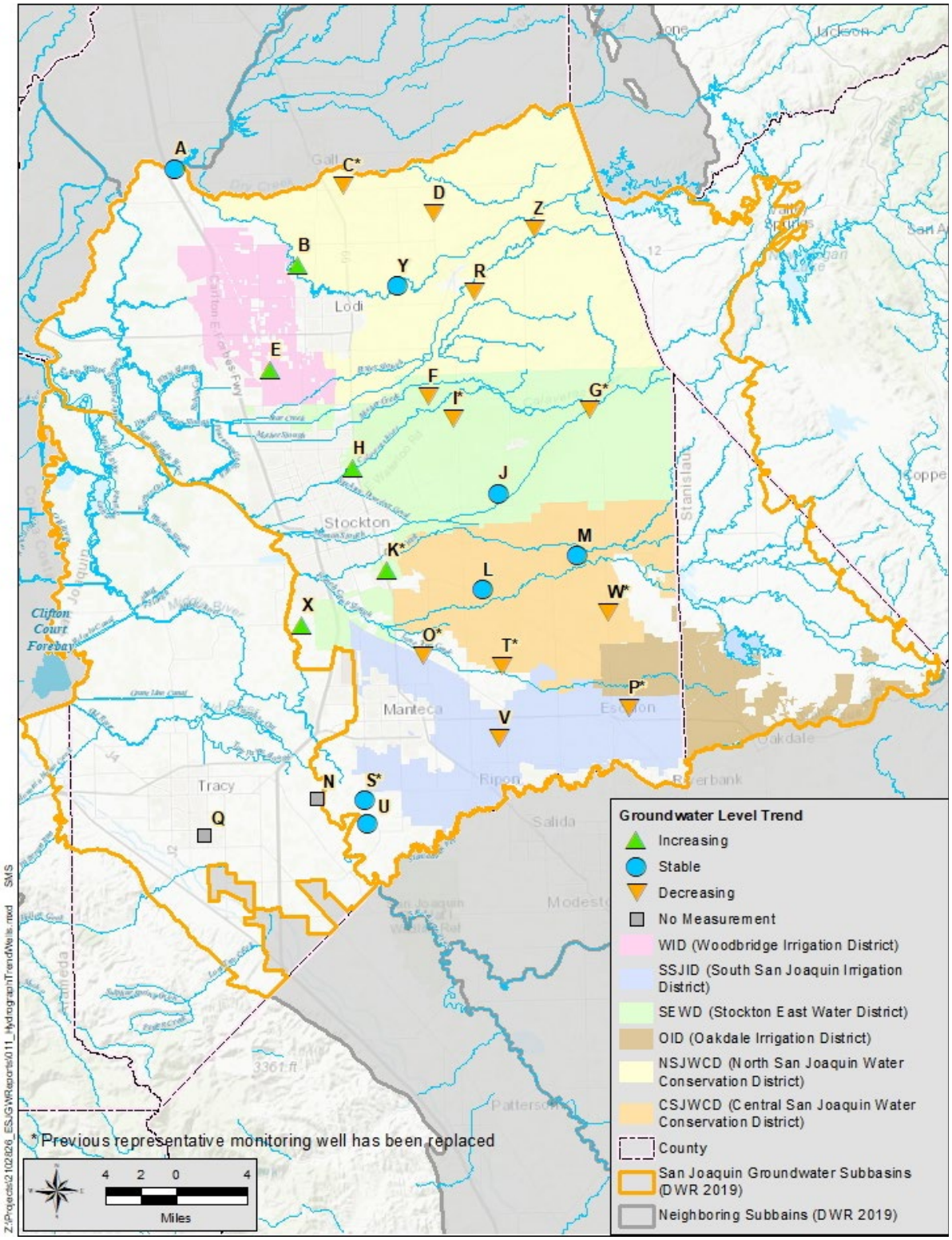

Figure 4-1 Hydrograph Well Locations

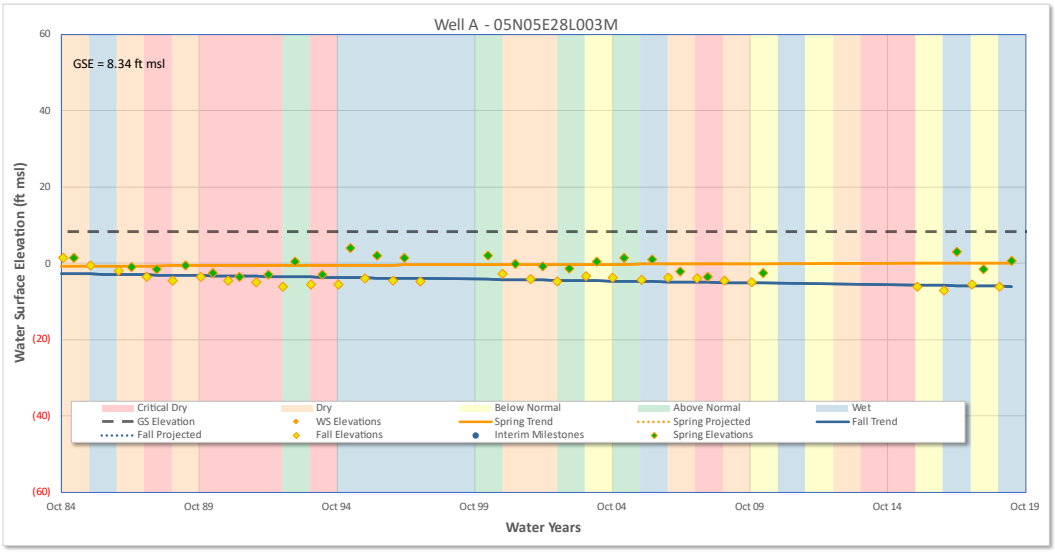

Figure 4-2 Fall Hydrograph Well A - East of Thornton Rd & South of Benson Ferry Rd.

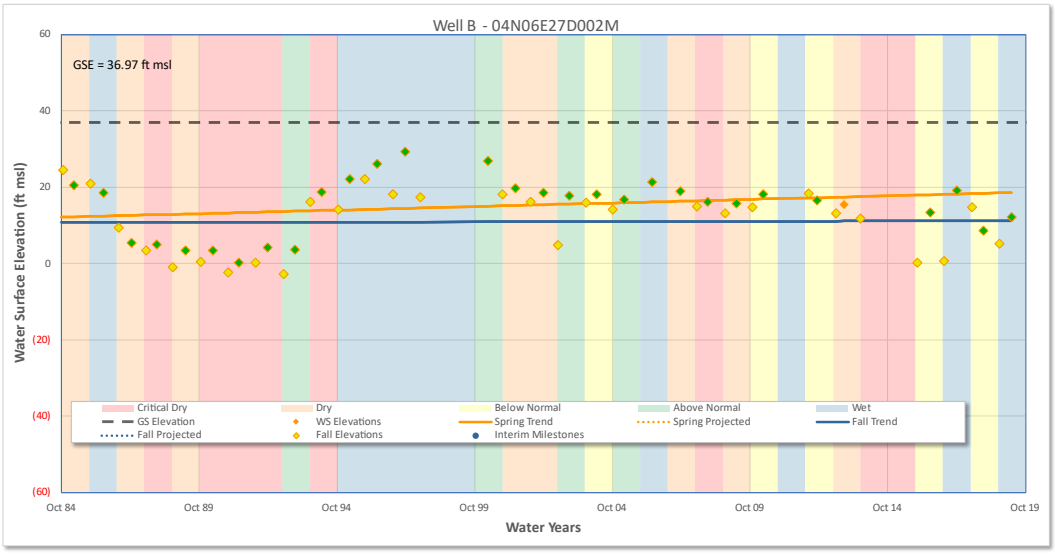

Figure 4-3 Fall Hydrograph Well B - East of Lower Sac Rd. & South of Acampo Rd.

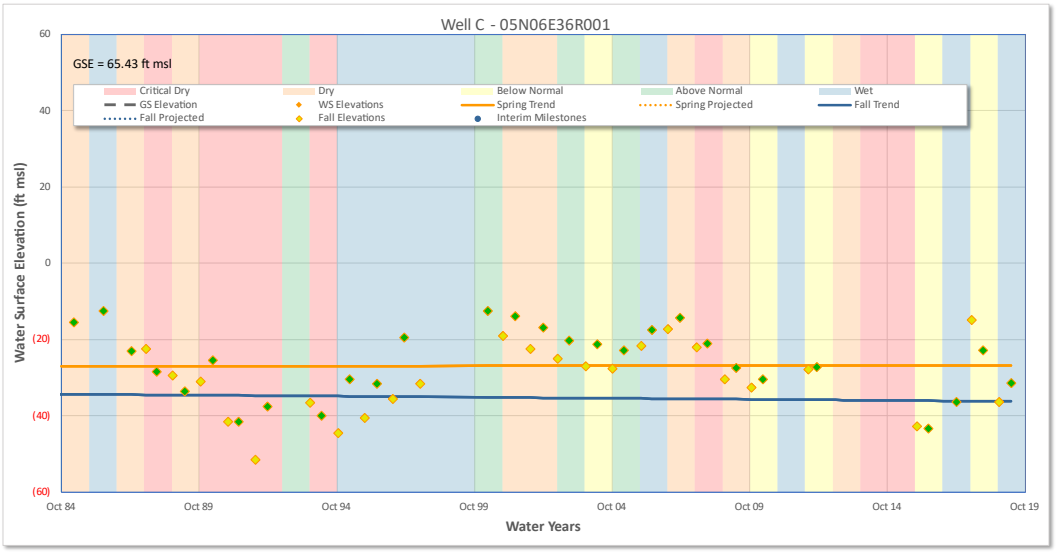

Figure 4-4 Fall Hydrograph Well C - North of Liberty Rd. & West of North Cherokee Ln.

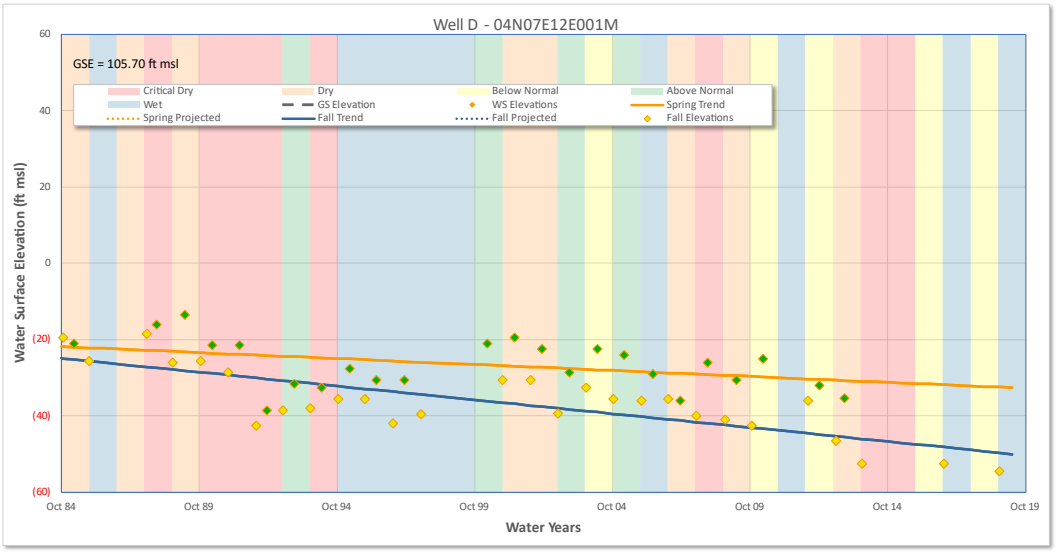

Figure 4-5 Fall Hydrograph Well D - West of Elliotto Rd. & North of Jahant Rd.

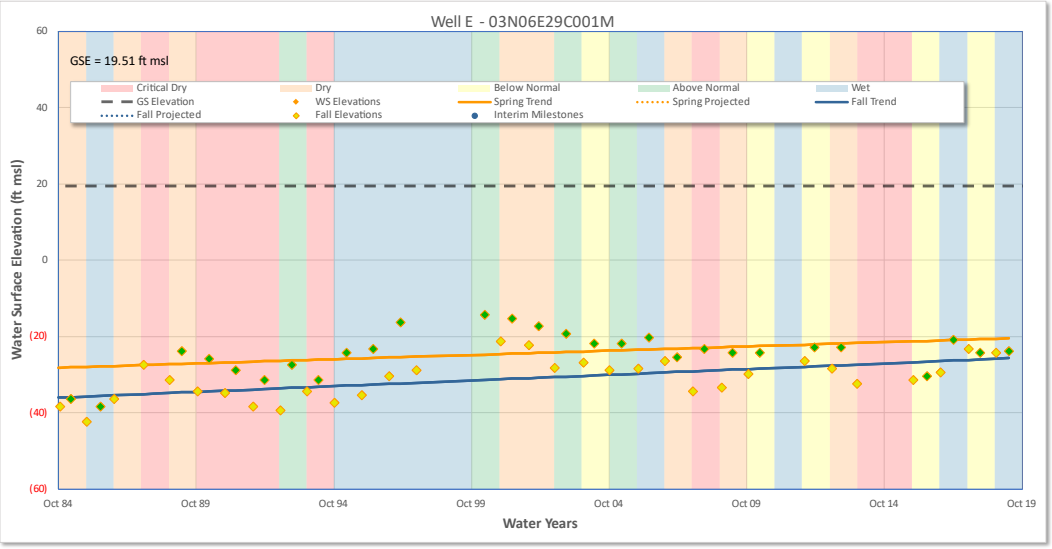

Figure 4-6 Fall Hydrograph Well E - East of Davis R. & South of Armstrong Rd.

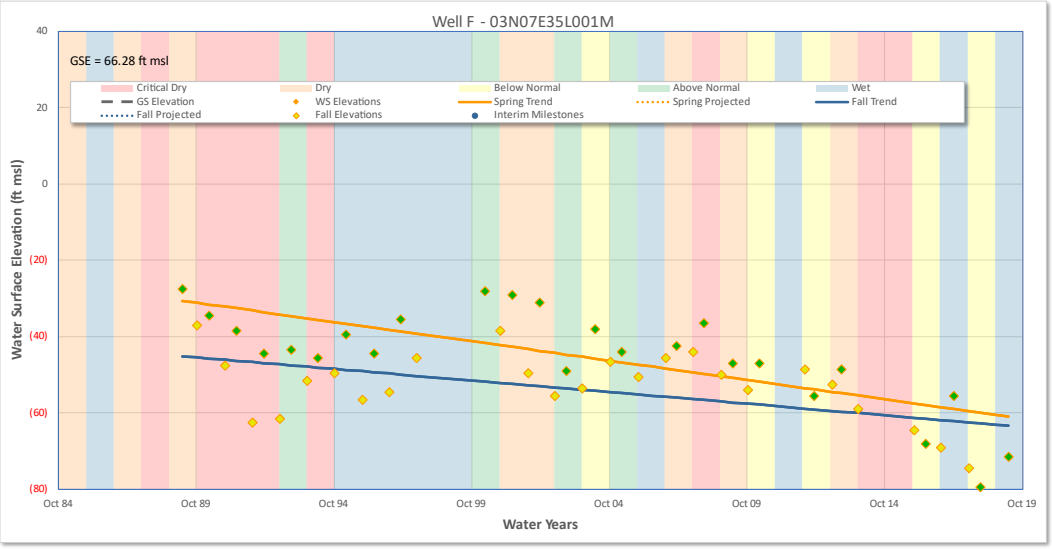

Figure 4-7 Fall Hydrograph Well F - West of Route 88 & North of Eight Mile Rd.

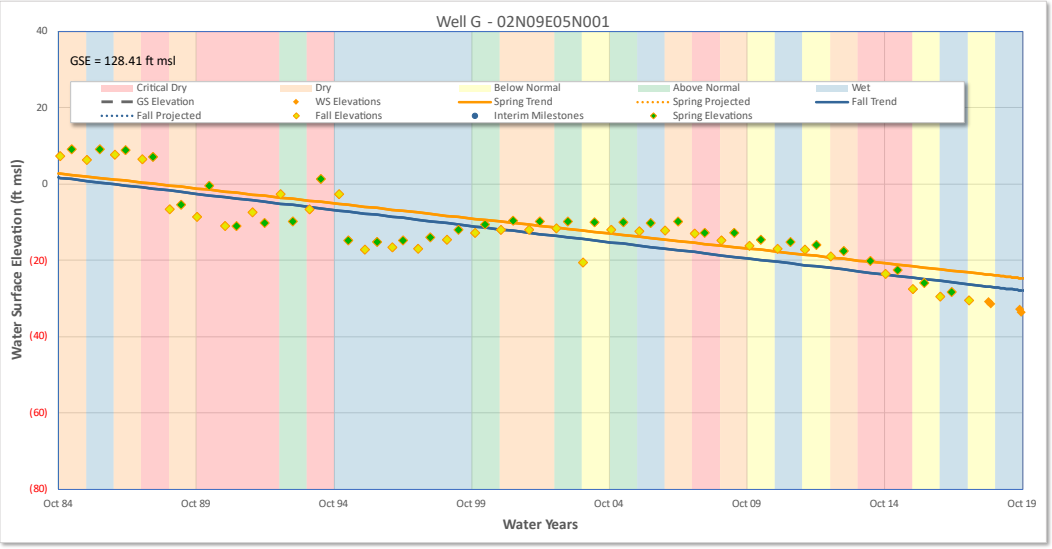

Figure 4-8 Fall Hydrograph Well G - West of Route 26 & South of Shelton Rd.

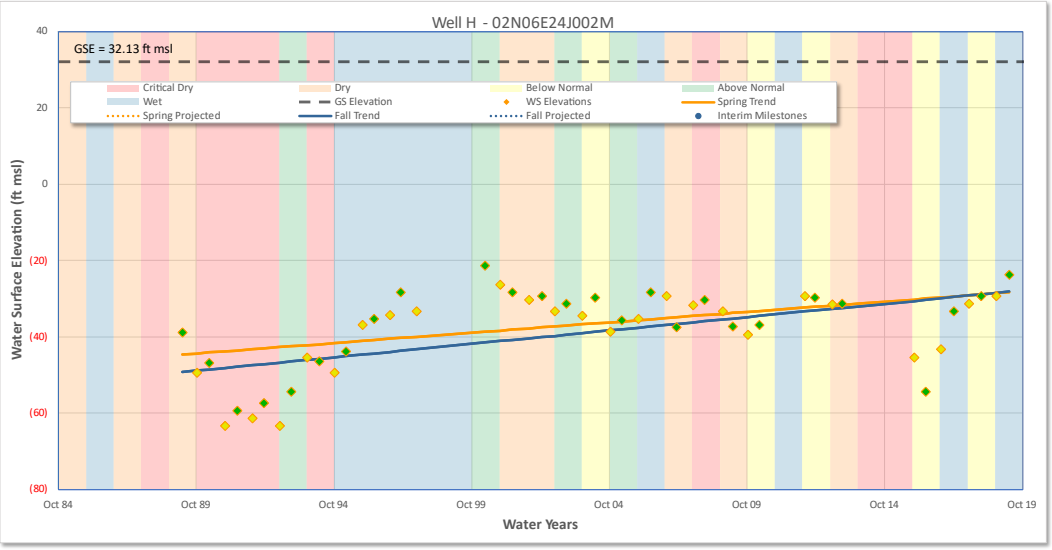

Figure 4-9 Fall Hydrograph Well H - East of Ijams Rd. & North of McAllen Rd.

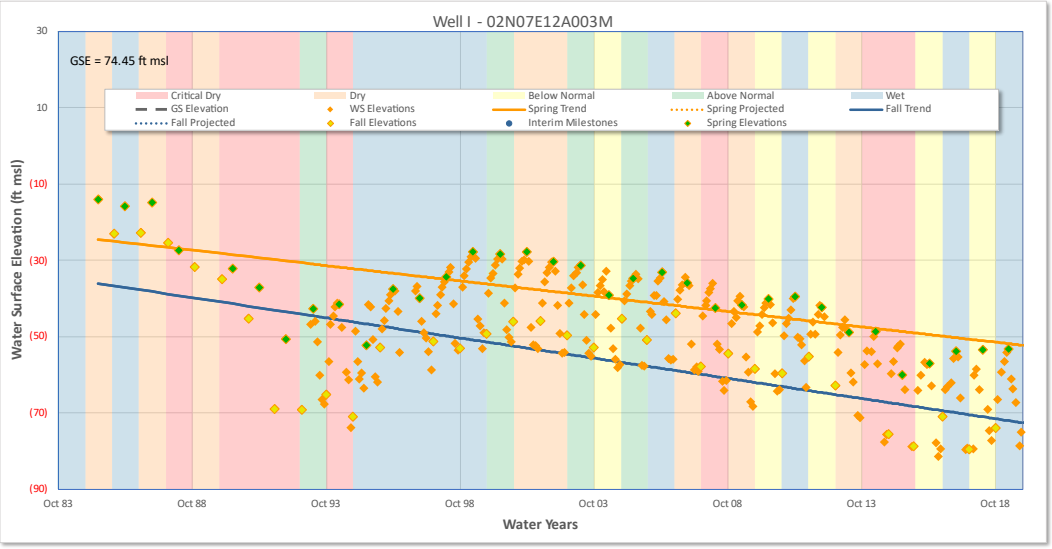

Figure 4-10 Fall Hydrograph Well I - West of Gogna Rd. & North of Route 26

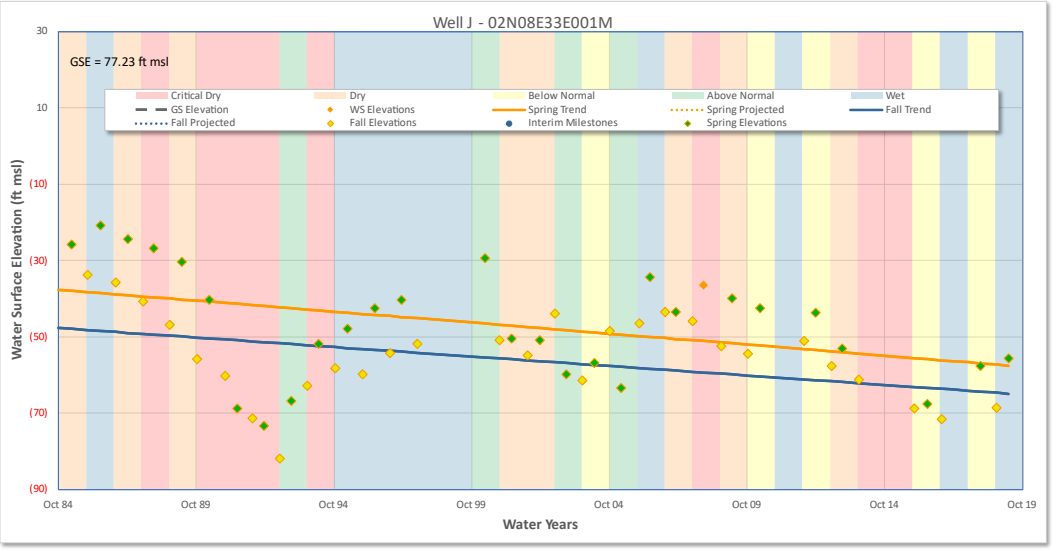

Figure 4-11 Fall Hydrograph Well J - East of Duncan Rd. & South of Milton Rd.

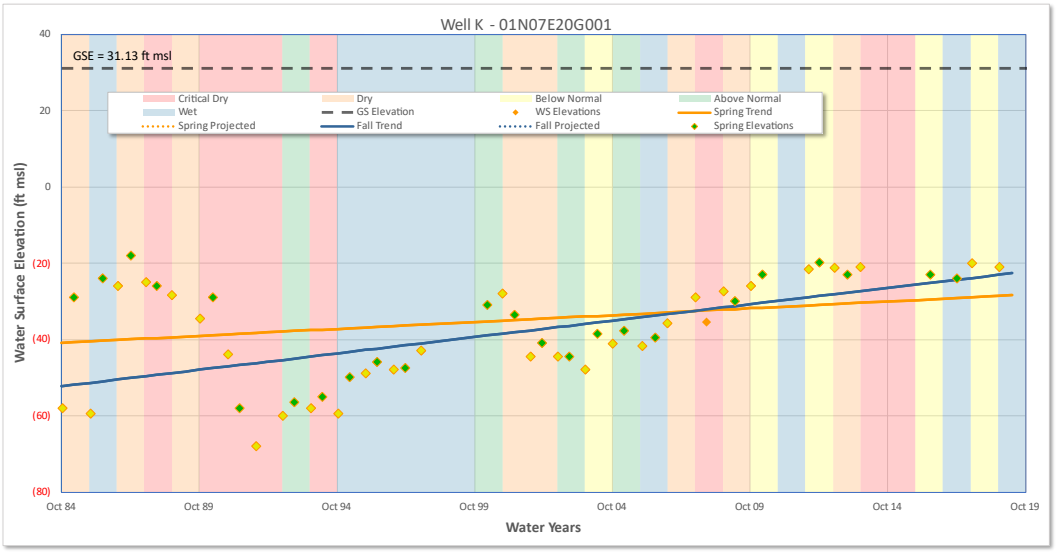

Figure 4-12 Fall Hydrograph Well K - East of Ash Rd. & North of Carpenter Rd.

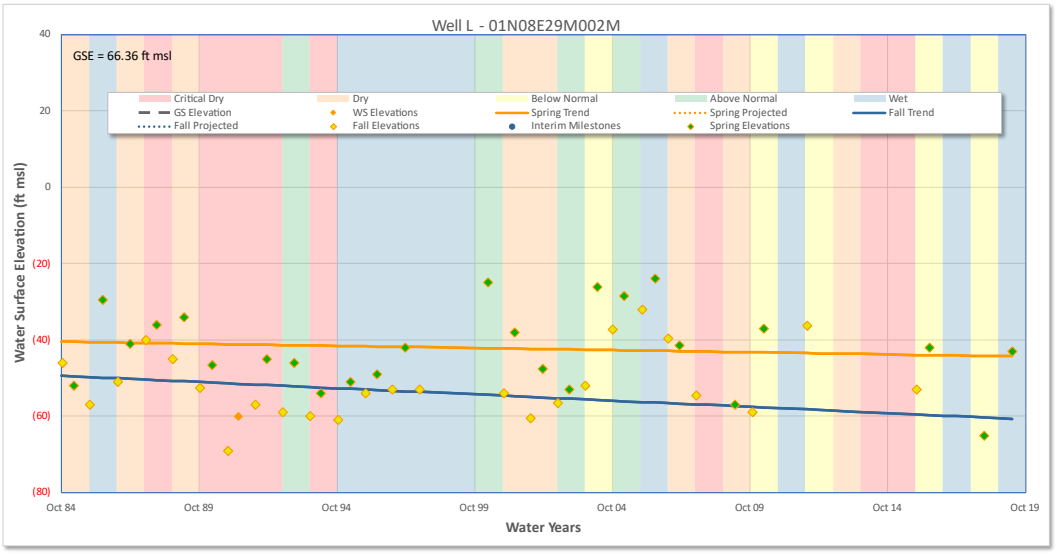

Figure 4-13 Fall Hydrograph Well L - West of Jack Tone Rd. & North of Mariposa Rd.

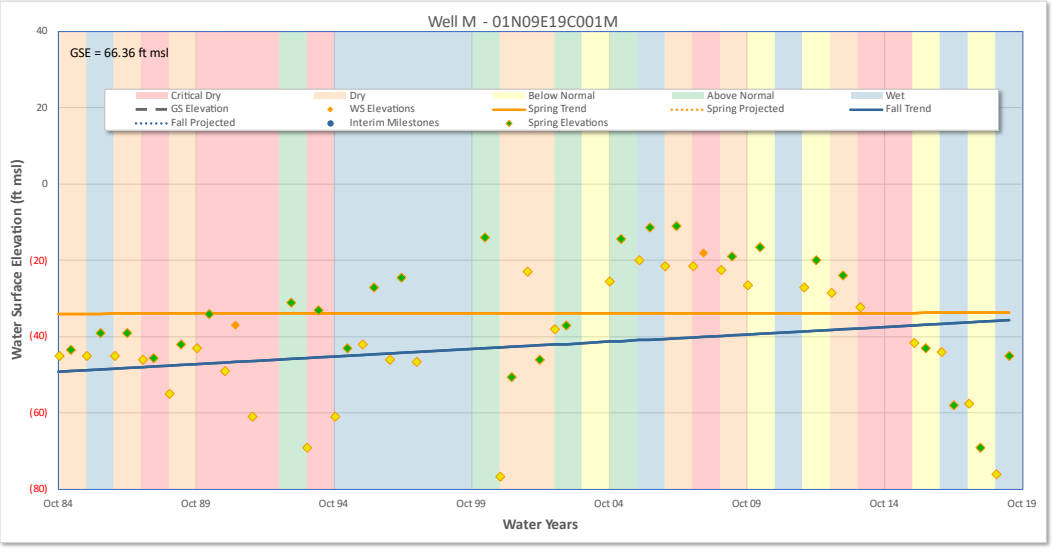

Figure 4-14 Fall Hydrograph Well M - West of Hewitt Rd. & South of Hwy. 4

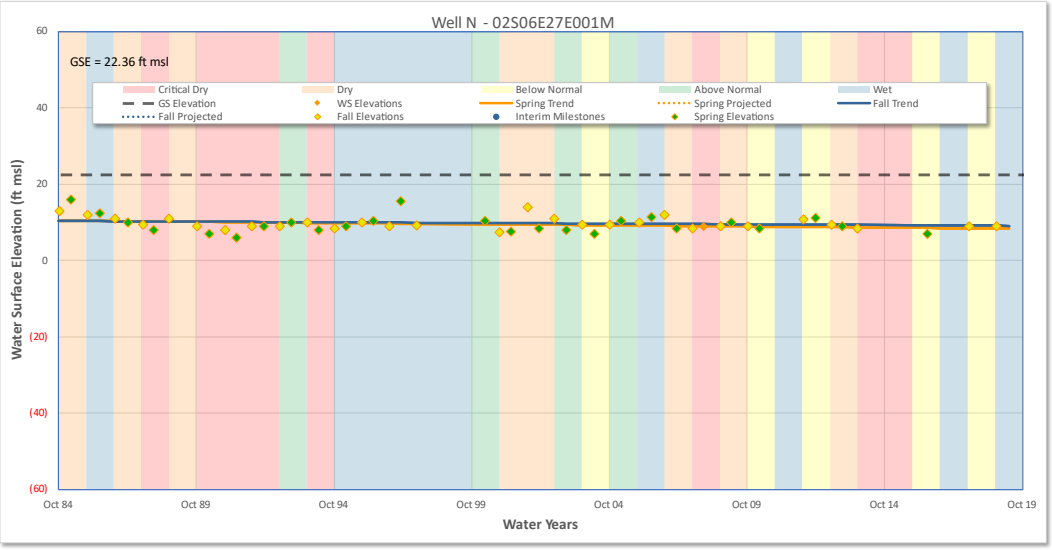

Figure 4-15 Fall Hydrograph Well N - West of Wright Rd. & North of Kasson Rd.

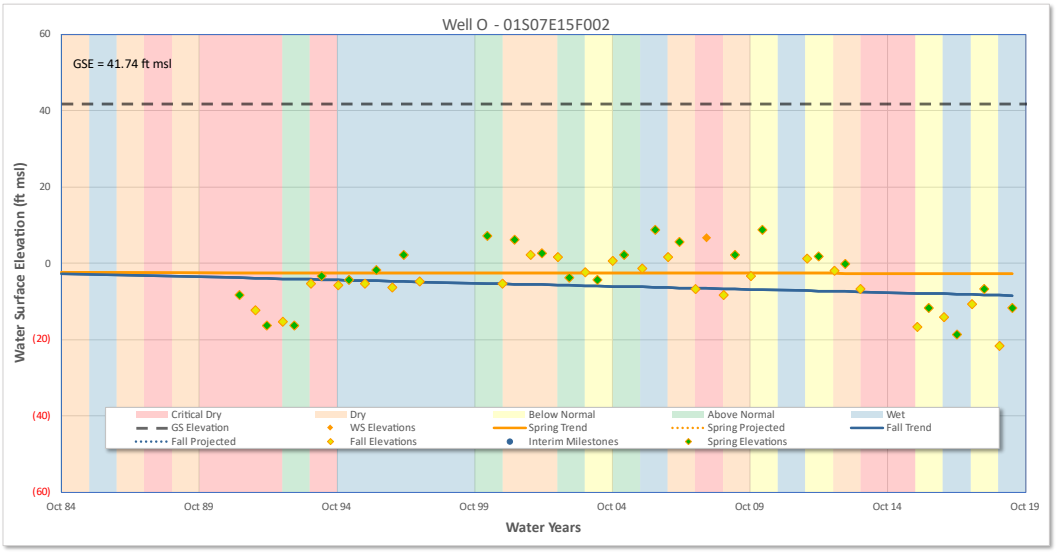

Figure 4-16 Fall Hydrograph Well O – West of Austin Rd. & North of French Camp Rd.

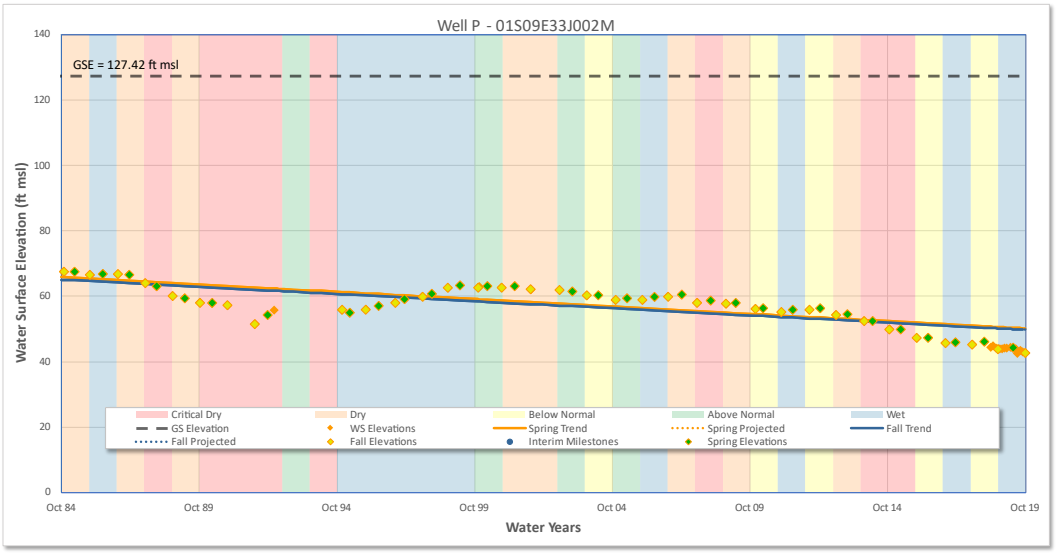

Figure 4-17 Fall Hydrograph Well P - West of Campbell Ave. & North of Hwy 120.

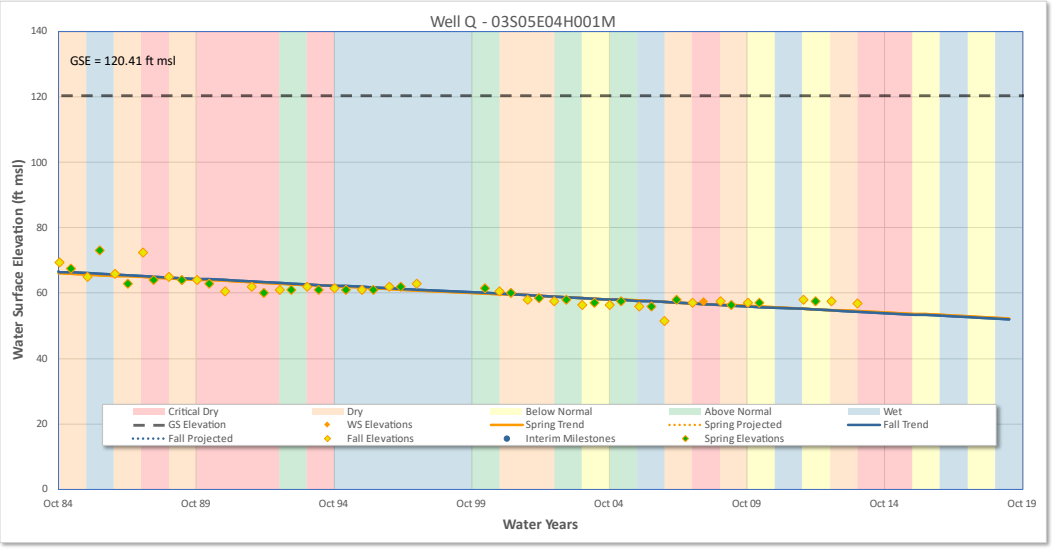

Figure 4-18 Fall Hydrograph Well Q - East of McArthur Rd. & North of Darlene Rd.

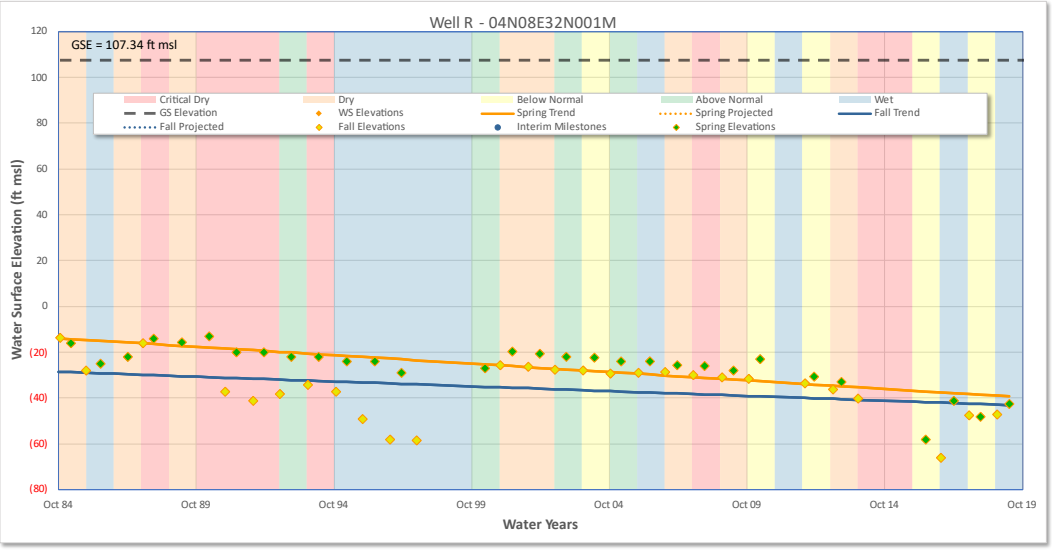

Figure 4-19 Fall Hydrograph Well R - West of Tully Rd. & North of Brandt Rd.

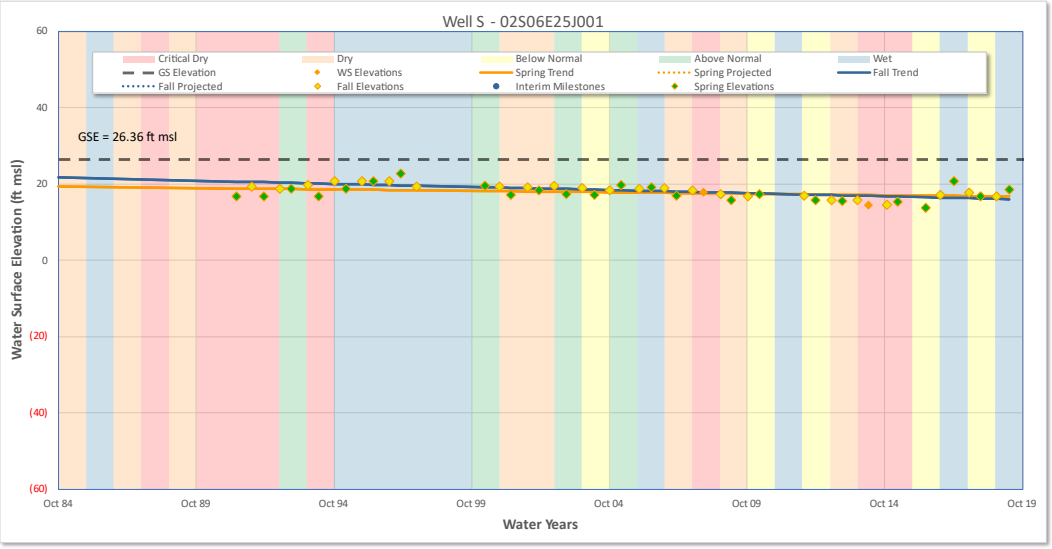

Figure 4-20 Fall Hydrograph Well S - East of Hays Rd. & North of Mullin Rd.

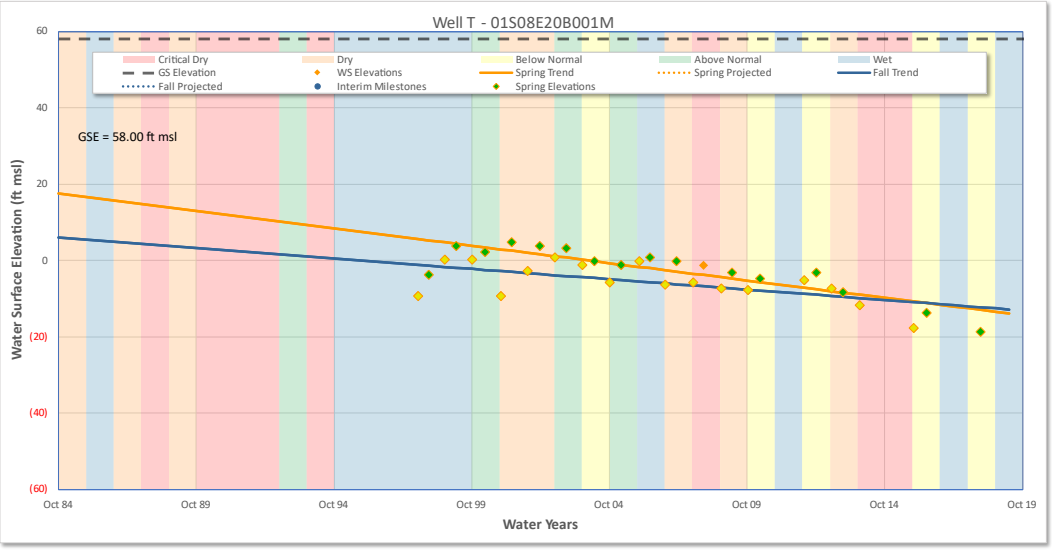

Figure 4-21 Fall Hydrograph Well T - West of Murphy Rd. & South of Avena Rd.

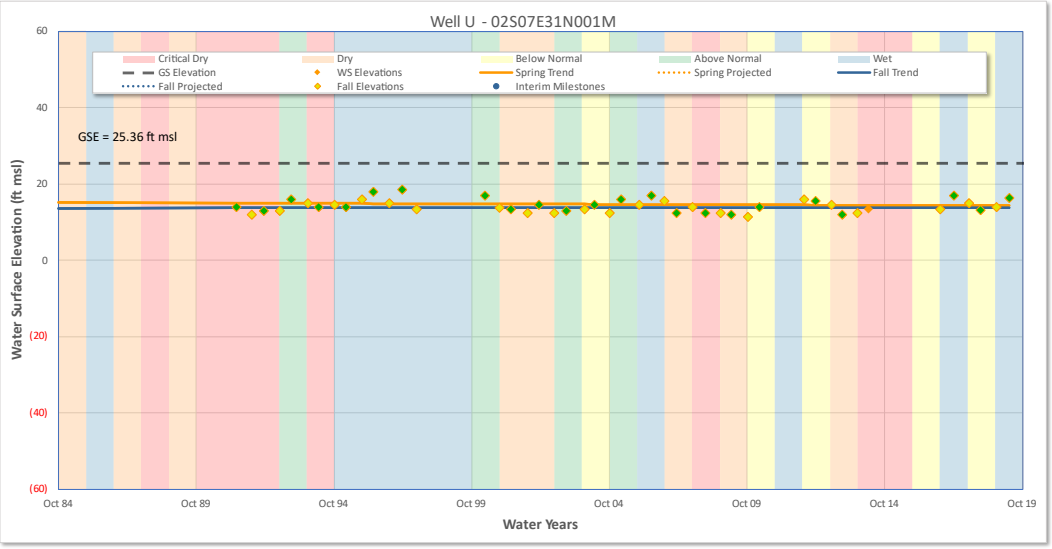

Figure 4-22 Fall Hydrograph Well U - East of Airport Rd. & South of Perrin Rd.

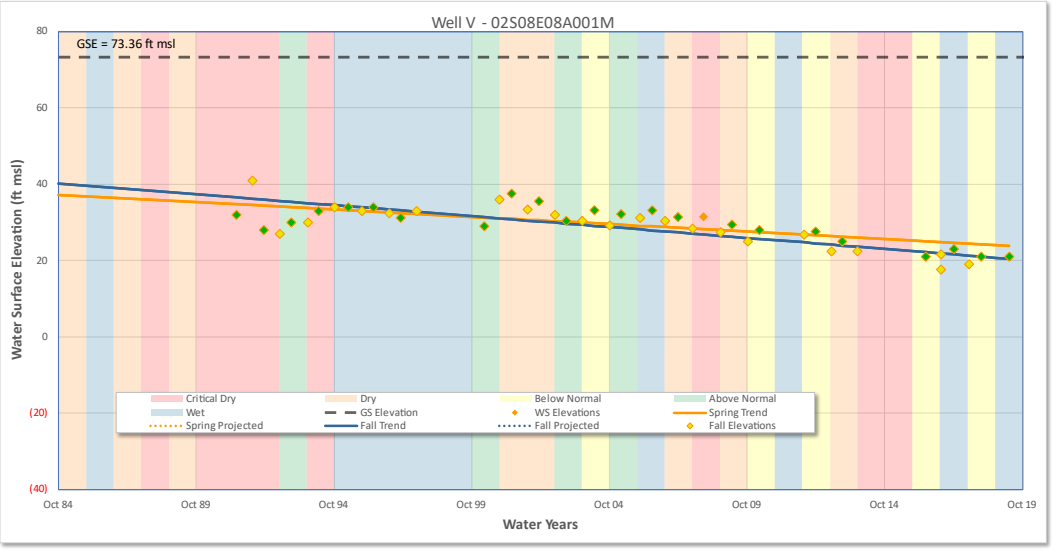

Figure 4-23 Fall Hydrograph Well V - East of Murphy Rd. & South of Cedar Ln.

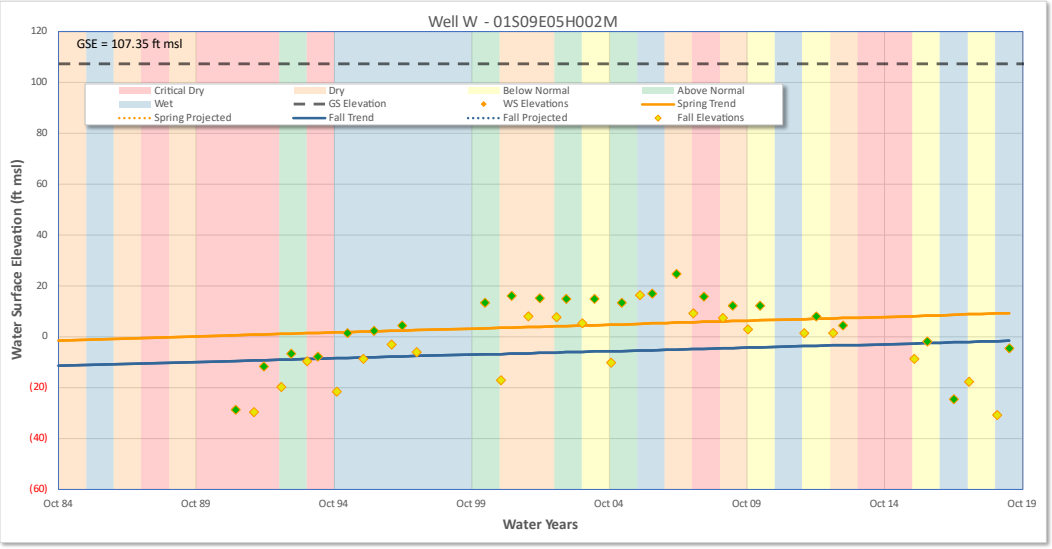

Figure 4-24 Fall Hydrograph Well W - West of Henry Rd. & South of Sonora Rd.

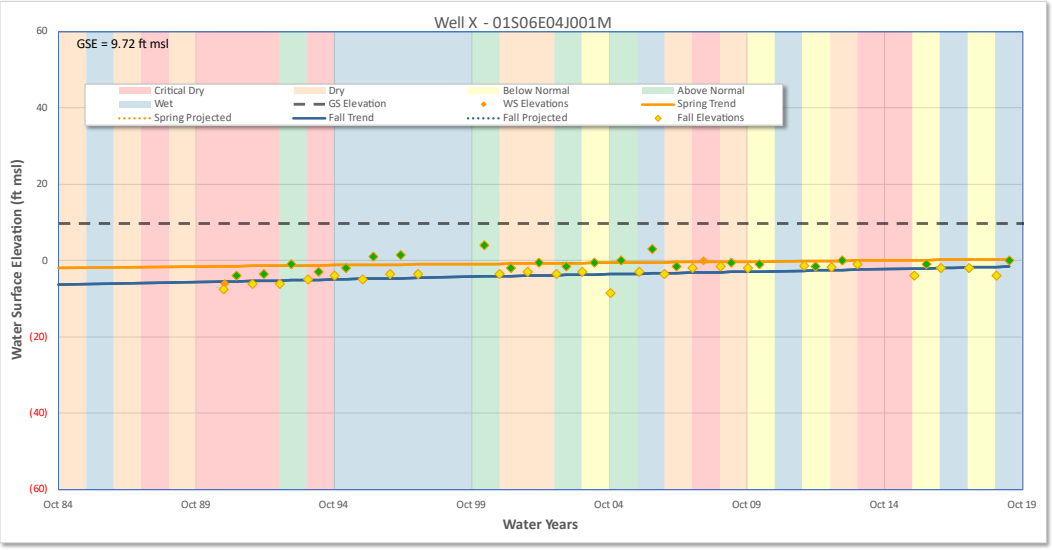

Figure 4-25 Fall Hydrograph Well X - East of Wolfe Rd. & South of Howard Rd.

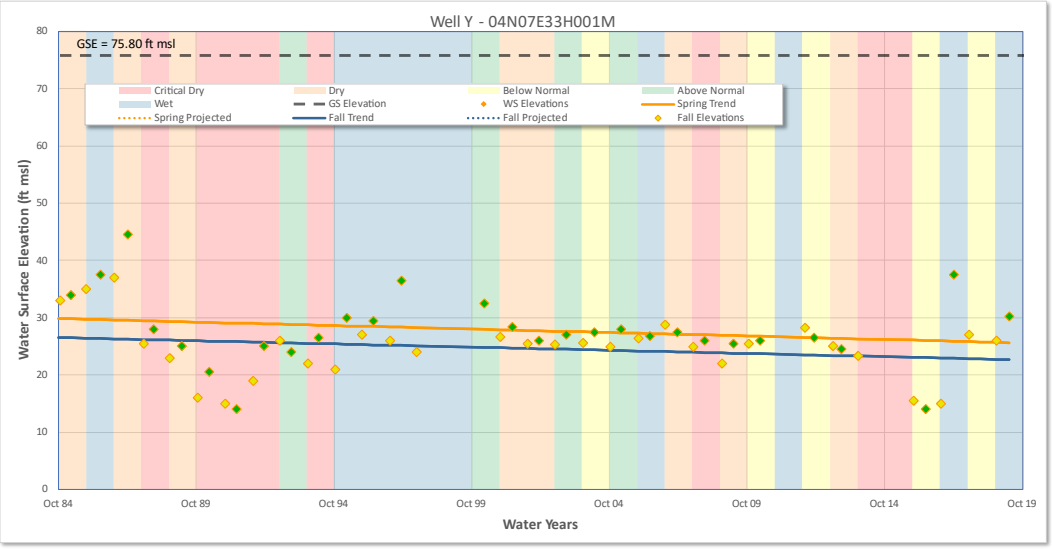

Figure 4-26 Fall Hydrograph Well Y - East of Bruella Rd. & North of Schmiedt Rd.

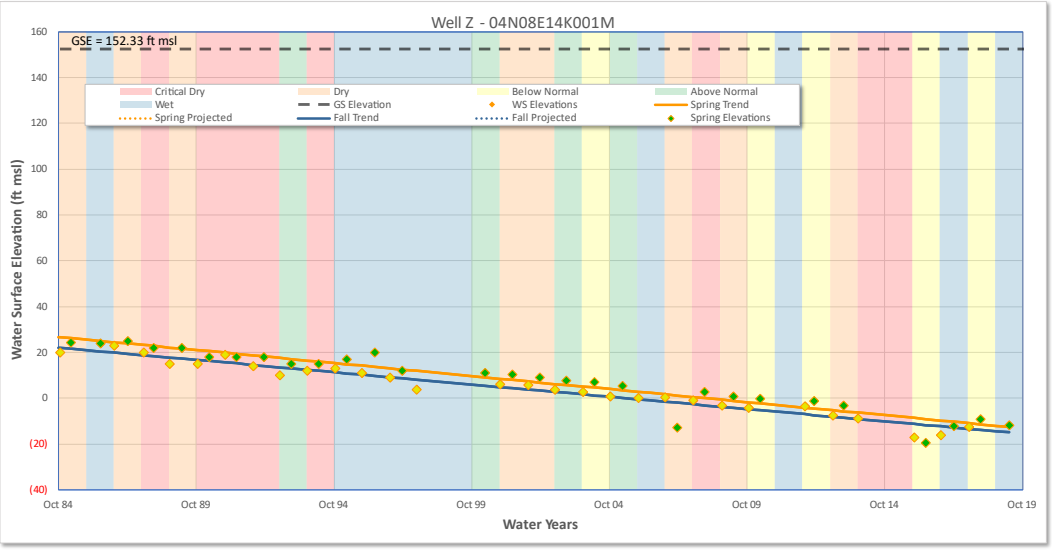

Figure 4-27 Fall Hydrograph Well Z - East of Johnson Rd. & South of Route 12

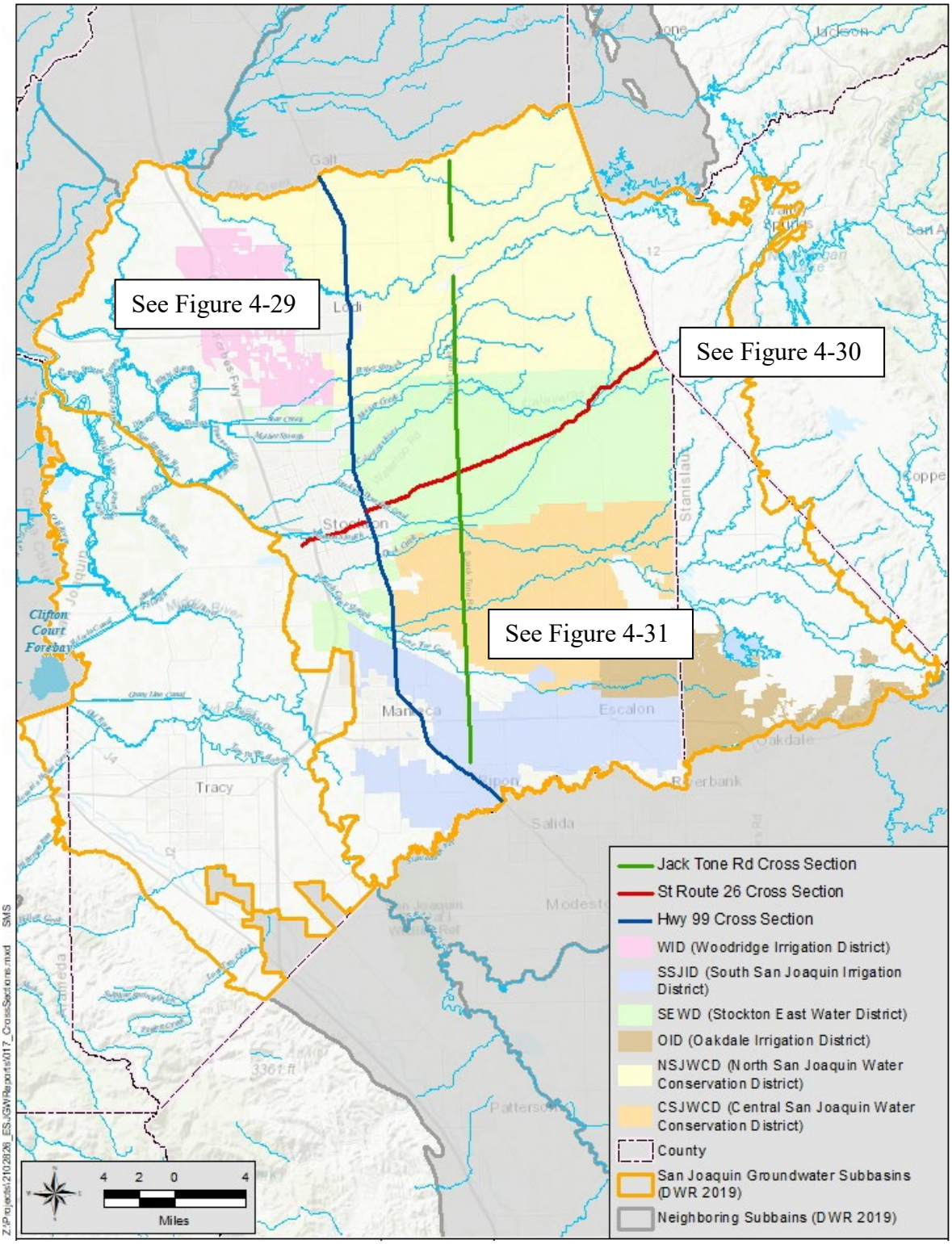

Figure 4-28 Water Surface Cross Sections

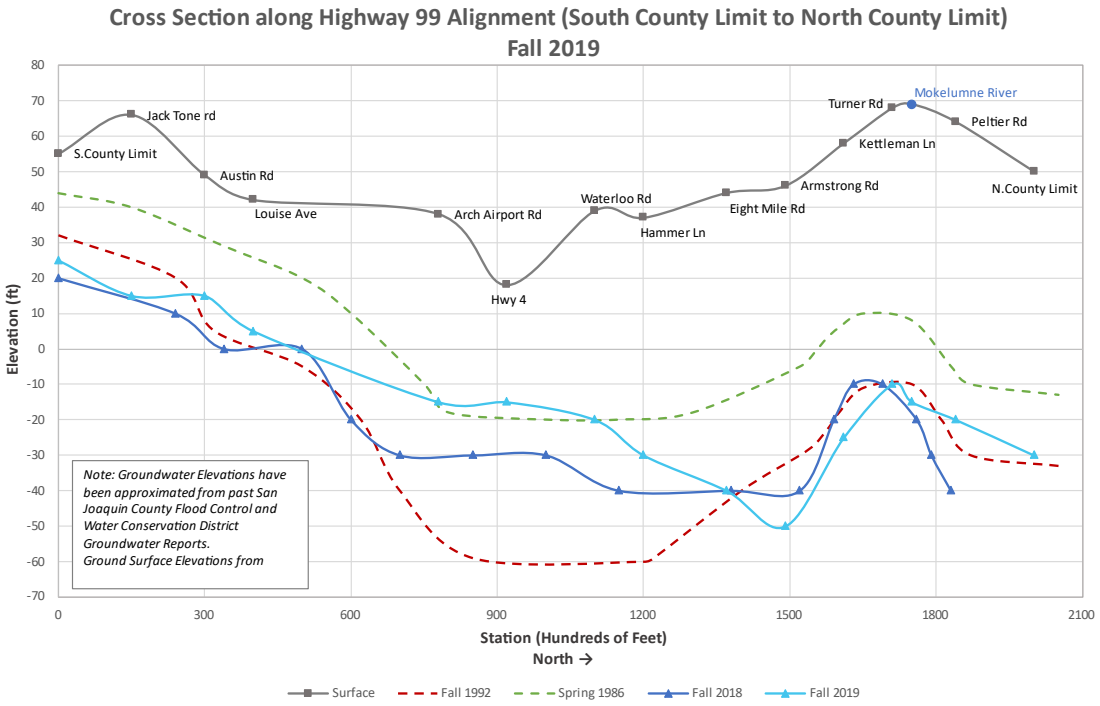

Figure 4-29 Highway 99 Cross Section Fall 2019

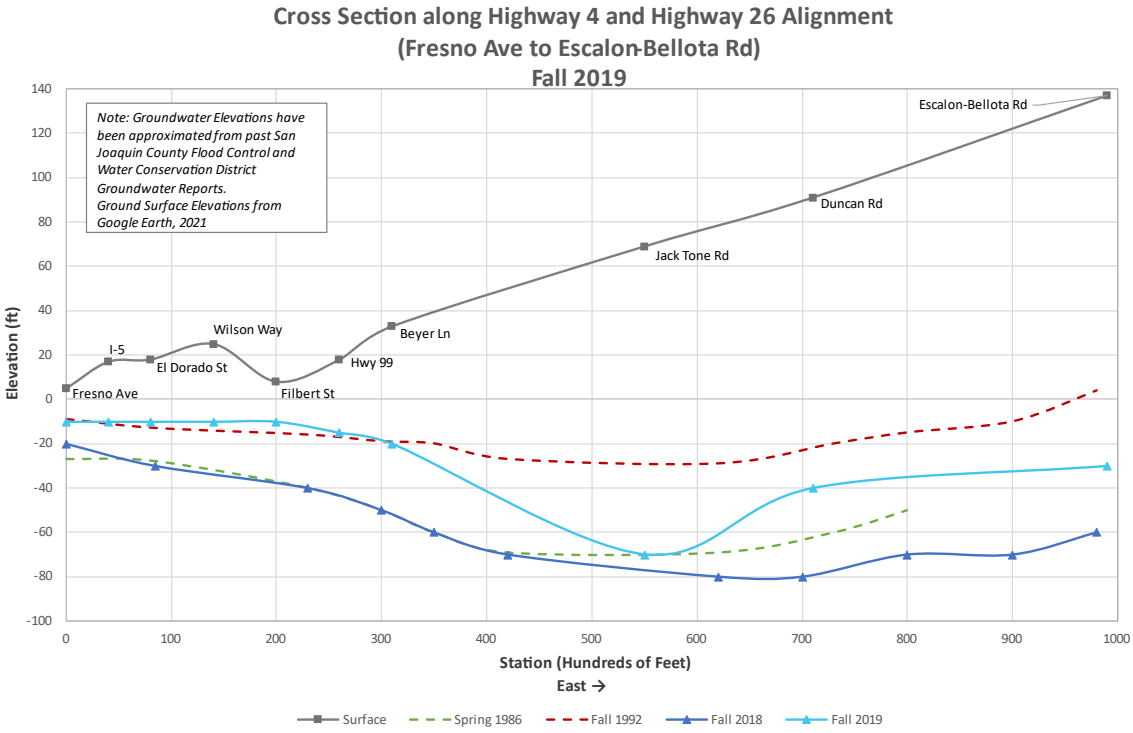

Figure 4-30 Highway 4 & Highway 26 Cross Section Fall 2019

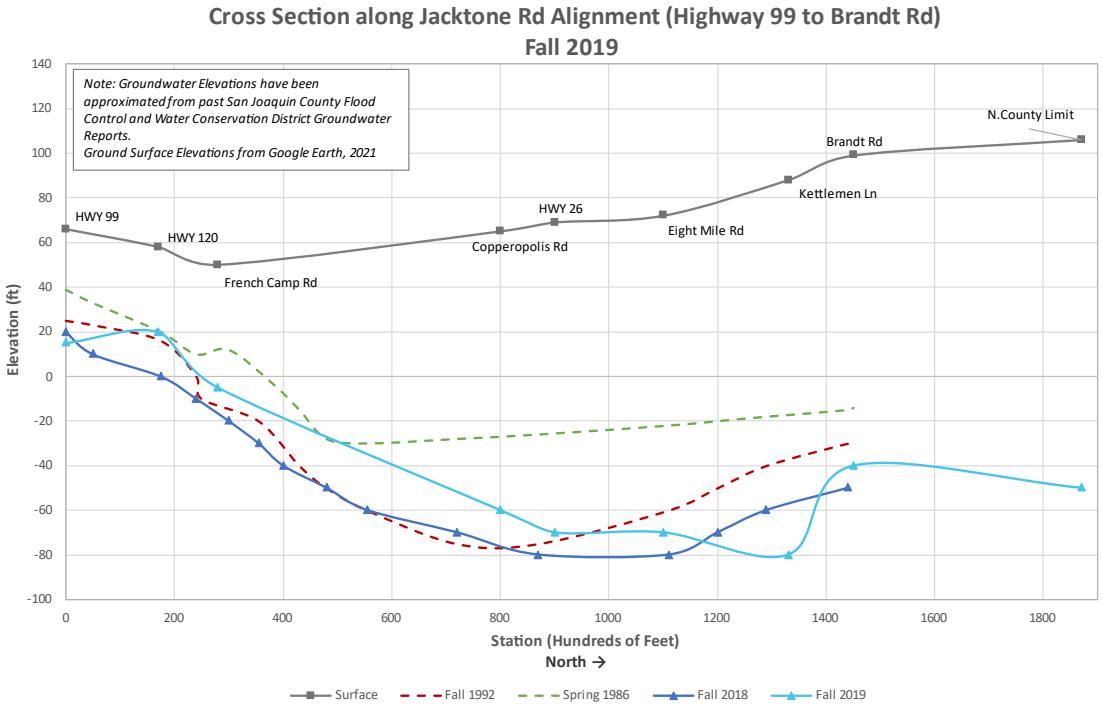

Figure 4-31 Jack Tone Rd Cross Section Fall 2019

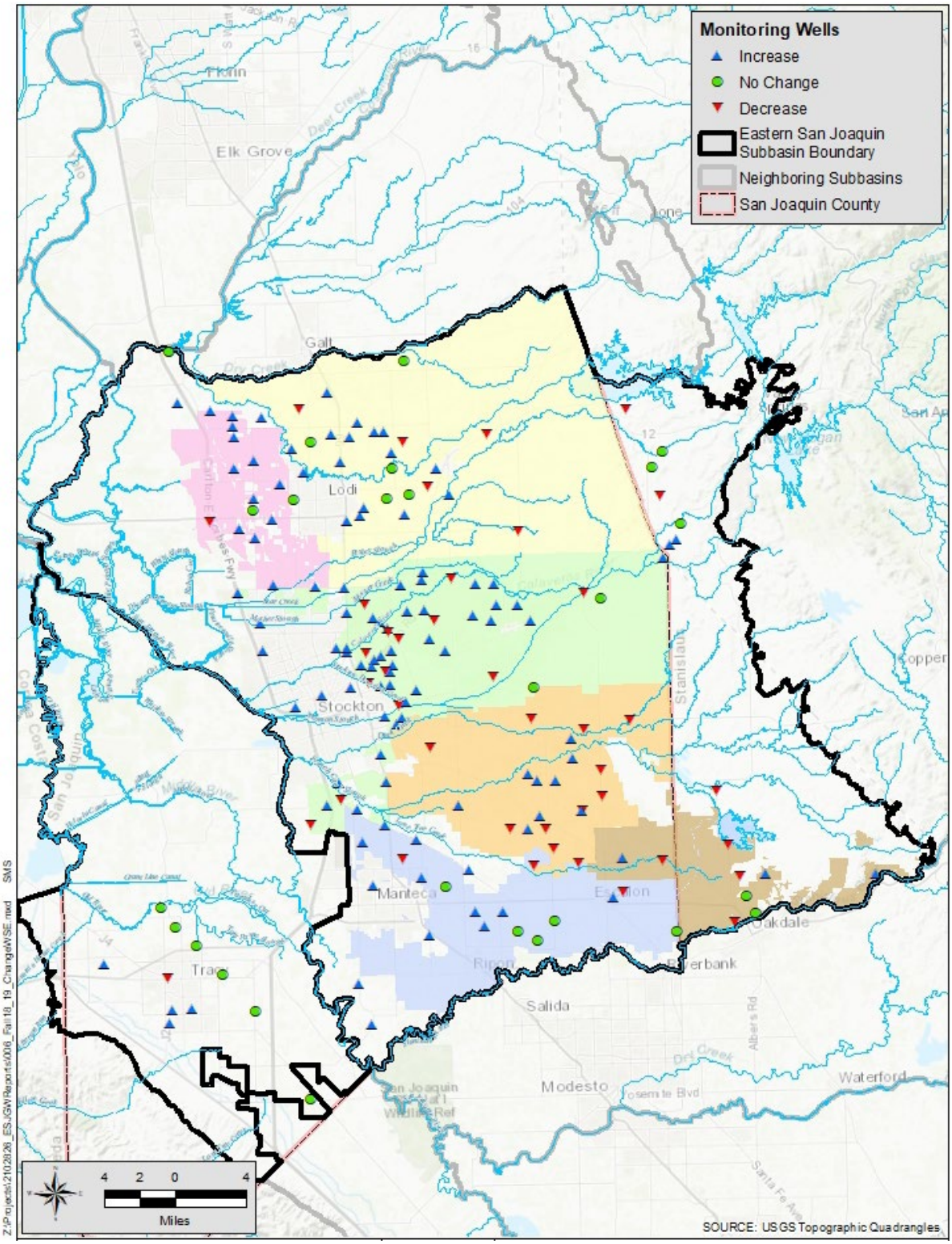

Figure 4-32 Change in Groundwater Elevation – Fall 2018 to Fall 2019

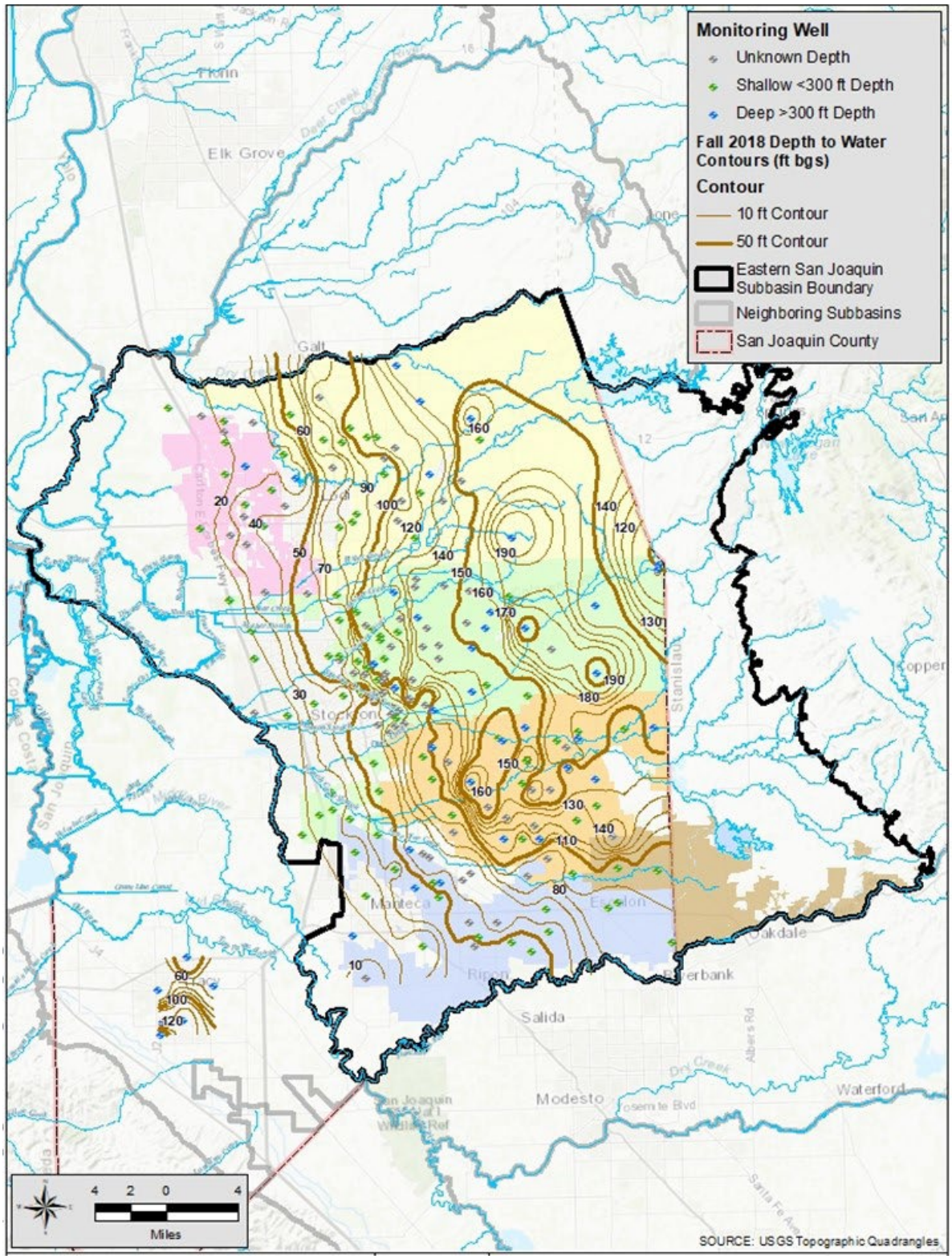

Figure 4-33 Depth to Groundwater – Fall 2018

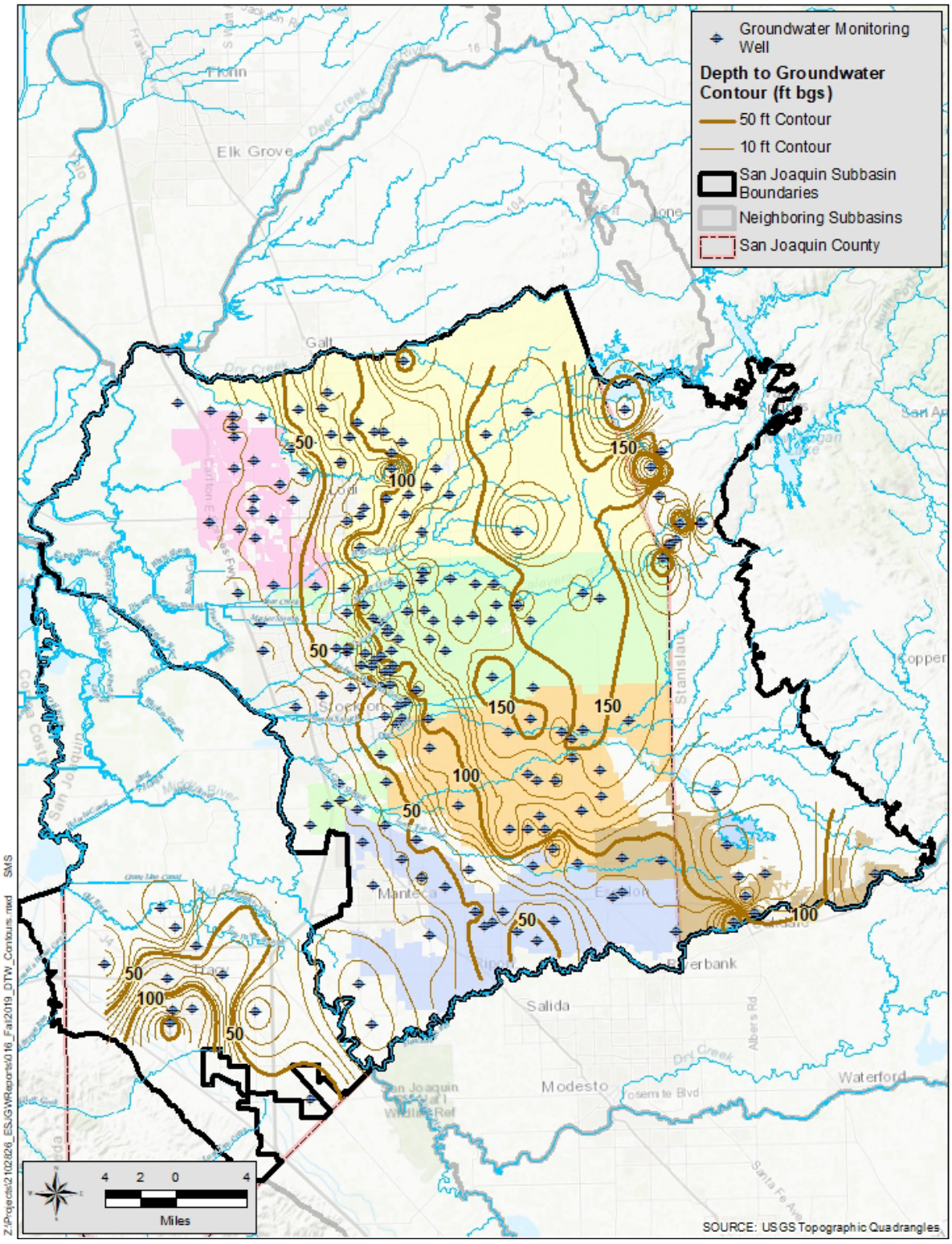

Figure 4-34 Depth to Groundwater – Fall 2019

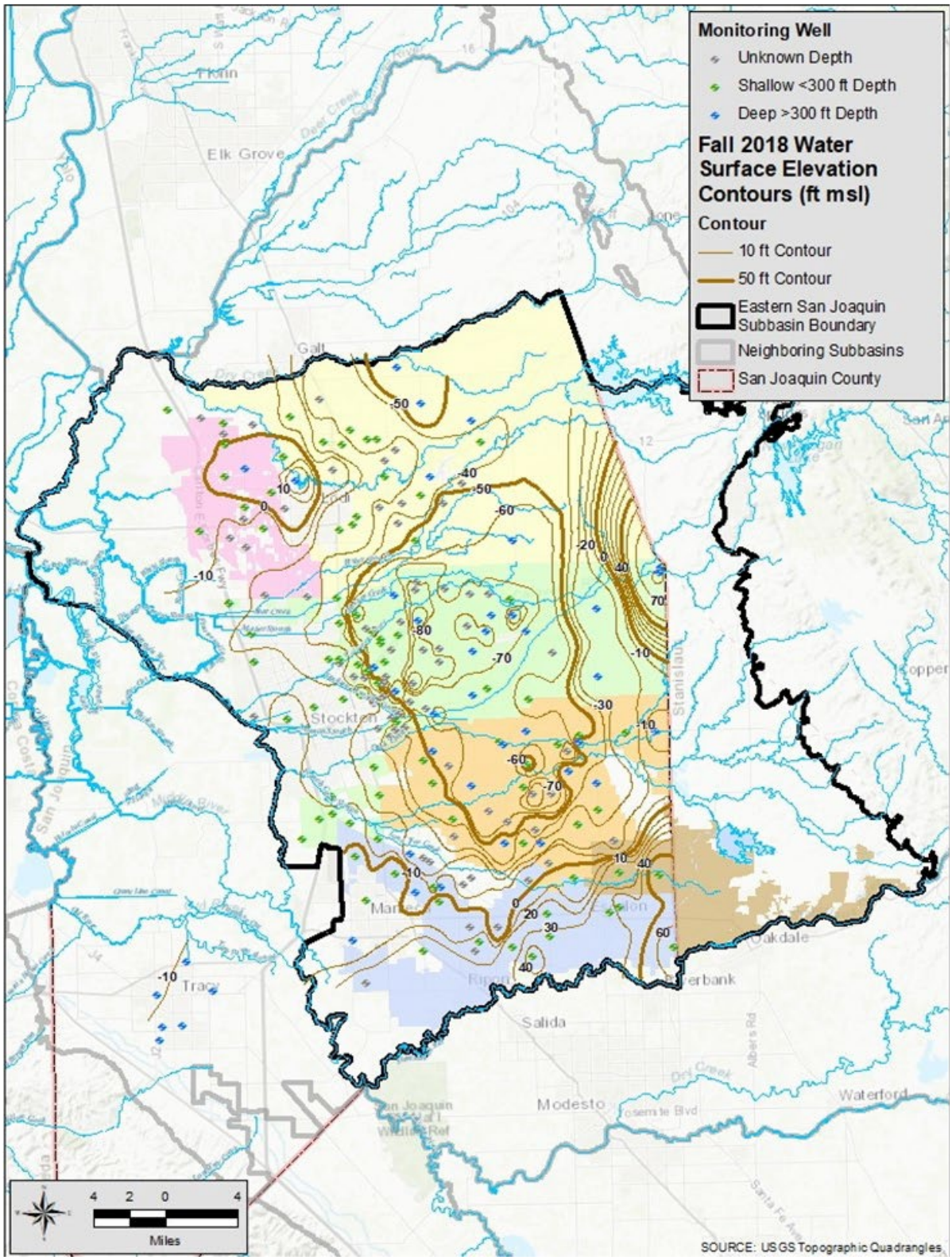

Figure 4-35 Groundwater Surface Elevation – Fall 2018

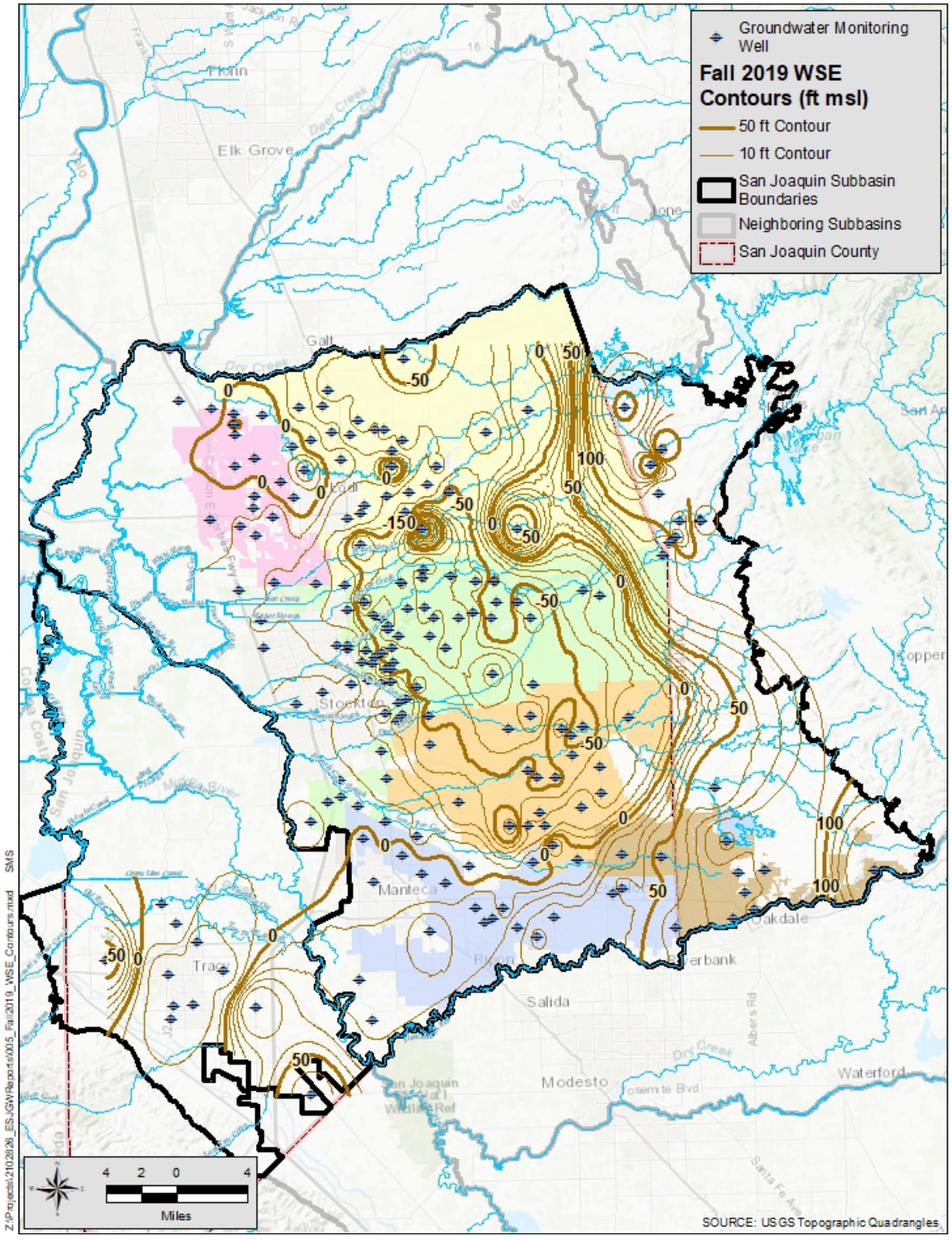

Figure 4-36 Groundwater Surface Elevation – Fall 2019

5 Groundwater Quality Monitoring

County personnel did not collect water quality samples in Fall of 2019. No samples were collected for Title 22 drinking water compliance for these analytes.

Table 5-1 Comparison of Water Quality Results

Well	Fall 2018			Fall 2019		
	Chloride (ppm)	EC (umhos/cm)	TDS (ppm)	Chloride (ppm)	EC (umhos/cm)	TDS (ppm)
North Stockton						
4E1	--	--	--	--	--	--
8C1	46	865	550	--	--	--
8Q2	--	--	--	--	--	--
29M1	--	--	--	--	--	--
7D2	--	--	--	--	--	--
County Hospital Area						
35G2	--	--	--	--	--	--
35N1	--	--	--	--	--	--
Lathrop Area						
25M3	84	726	450	--	--	--
25M4	37	509	310	--	--	--
New Wells						
1	2	137	100	--	--	--
2	9	321	200	--	--	--
3	32	556	340	--	--	--

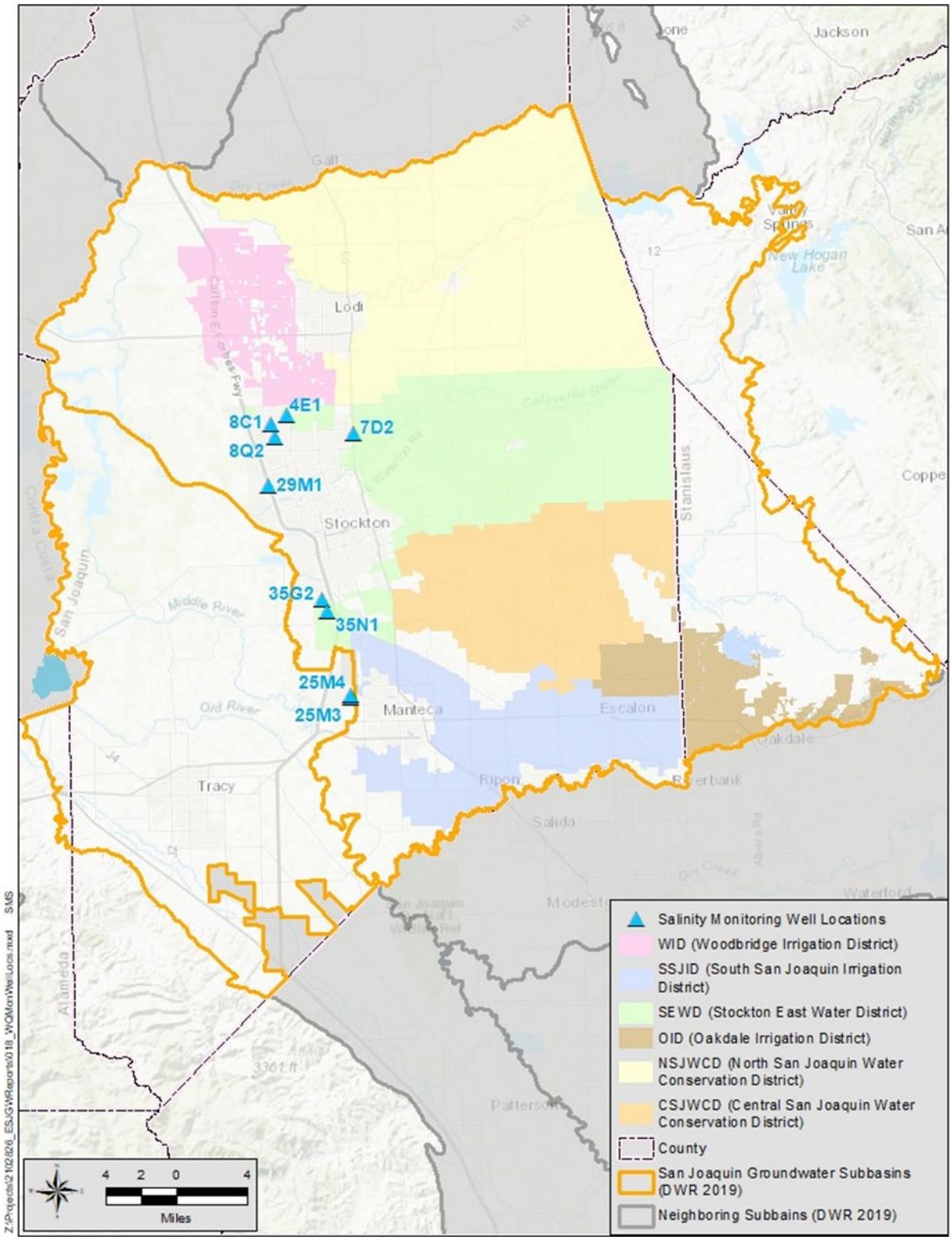

Figure 5-1 Salinity Monitoring Well Locations

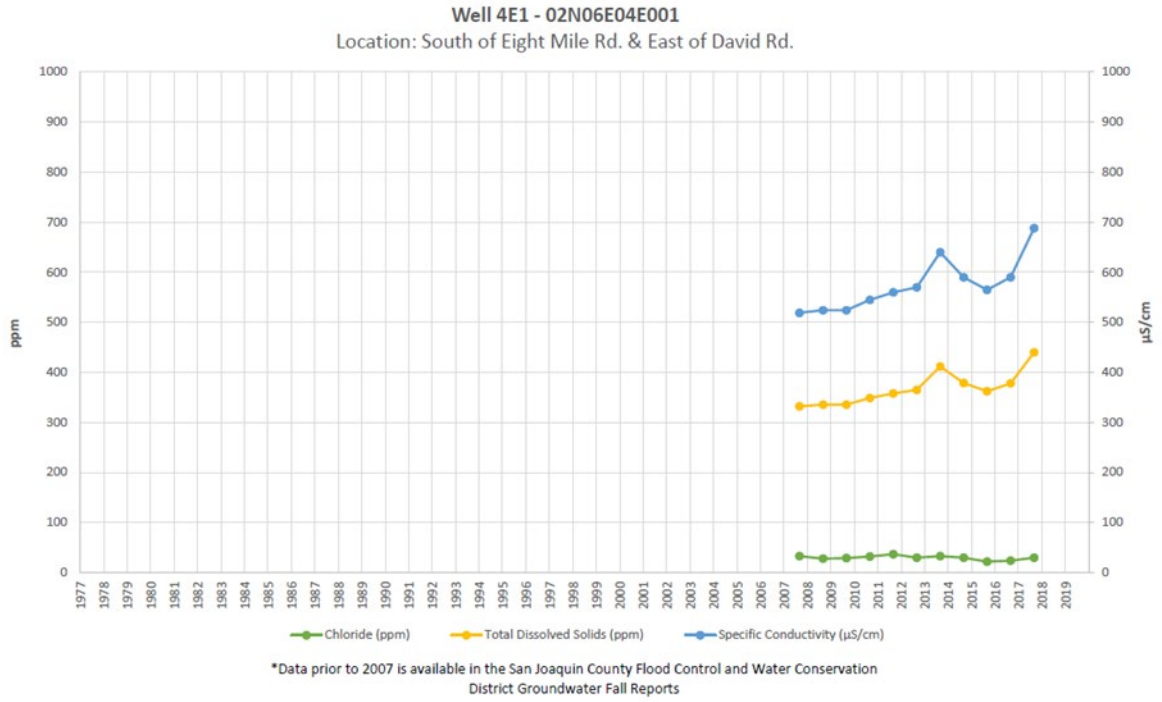

Figure 5-2 Water Quality Comparison Graph Well 4E1

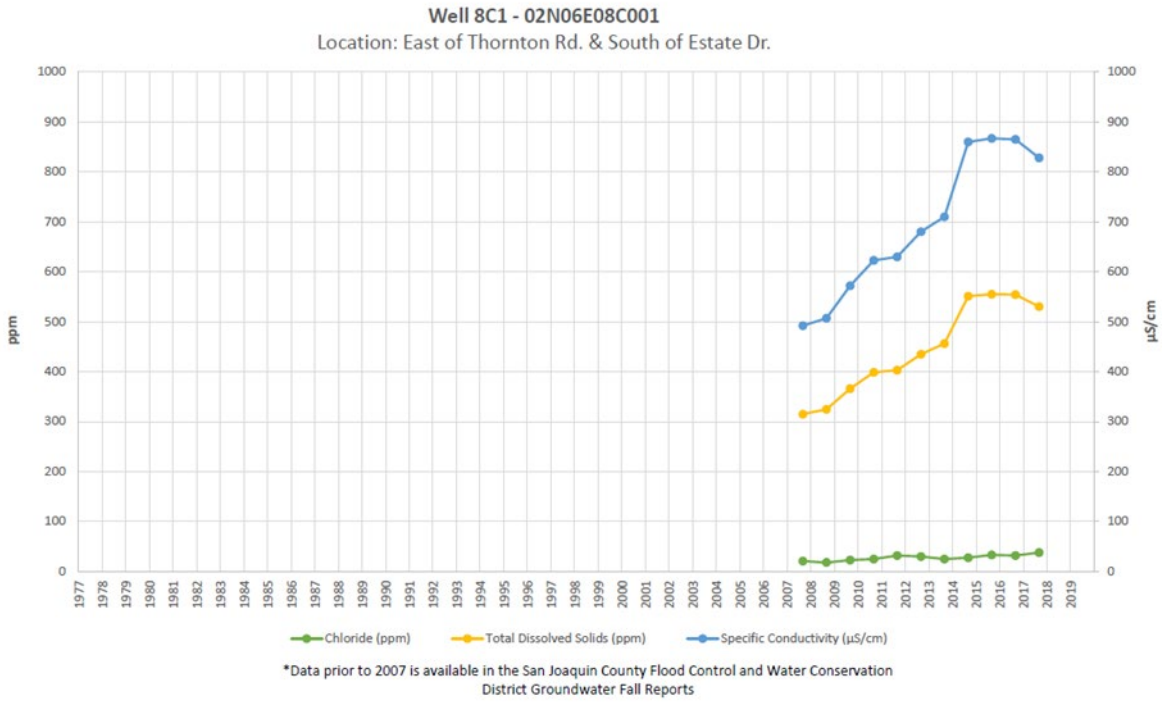

Figure 5-3 Water Quality Comparison Graph Well 8C1

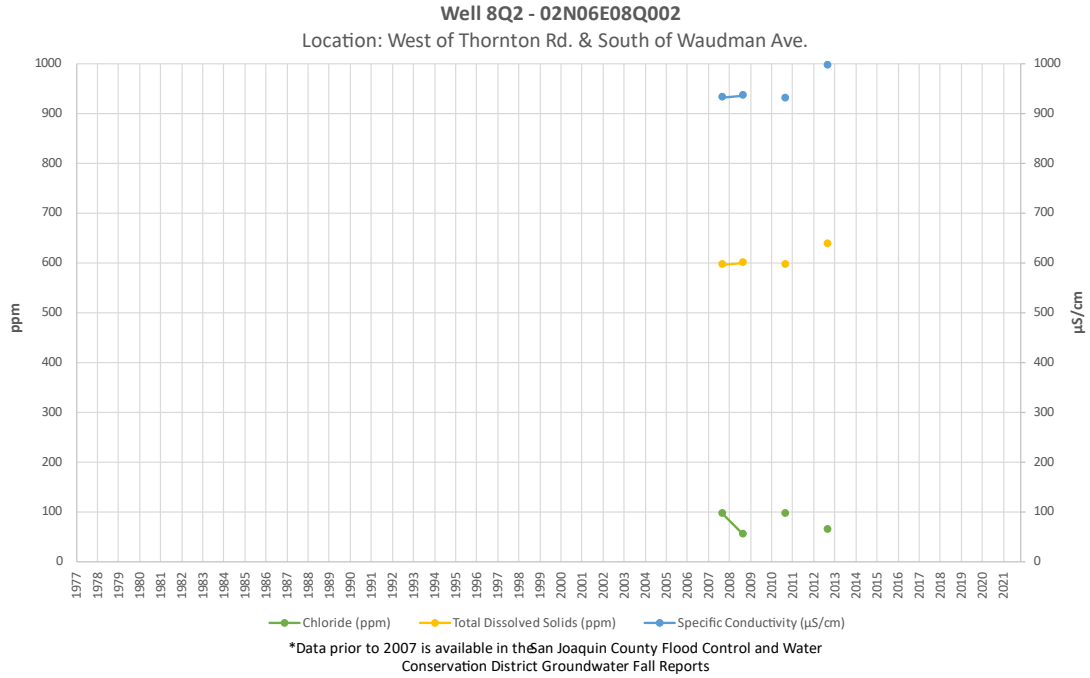

Figure 5-4 Water Quality Comparison Graph Well 8Q2

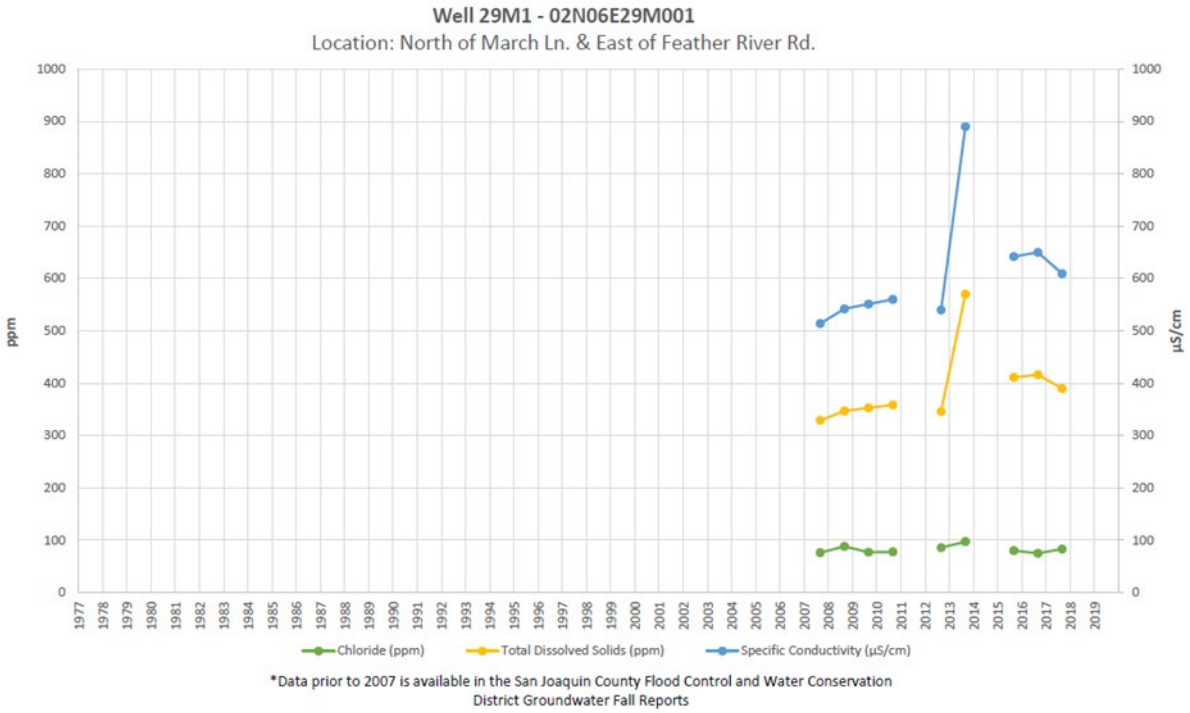

Figure 5-5 Water Quality Comparison Graph Well 29M1

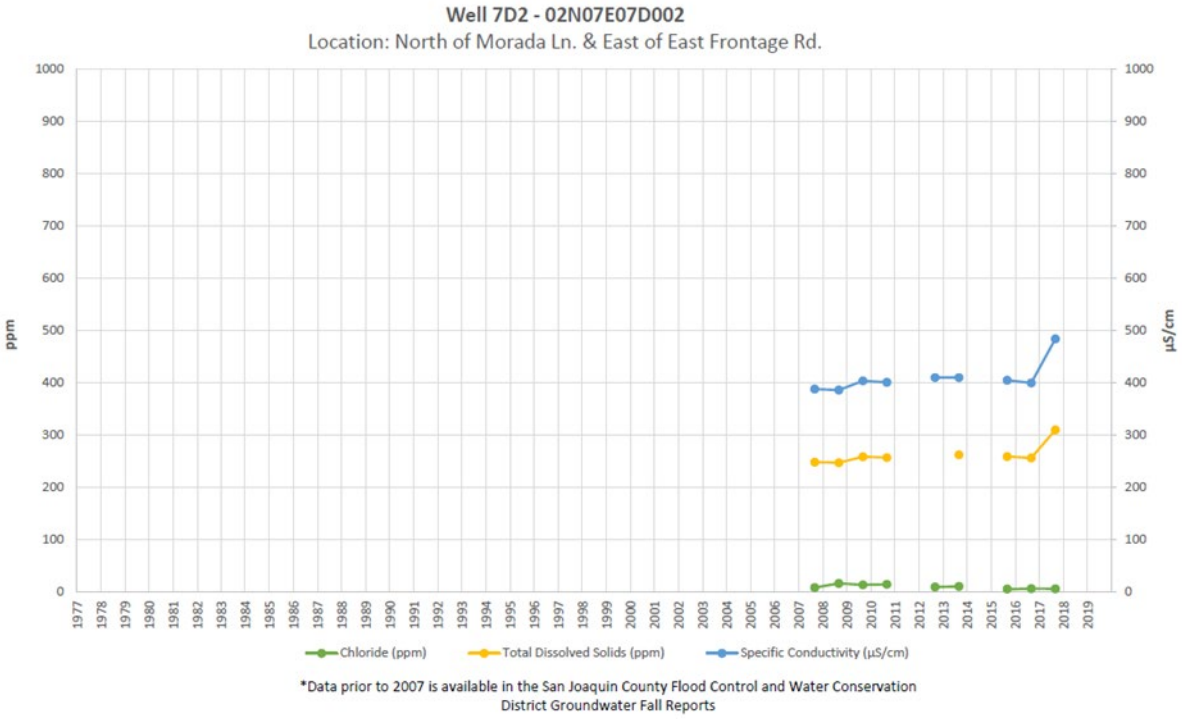

Figure 5-6 Water Quality Comparison Graph Well 7D2

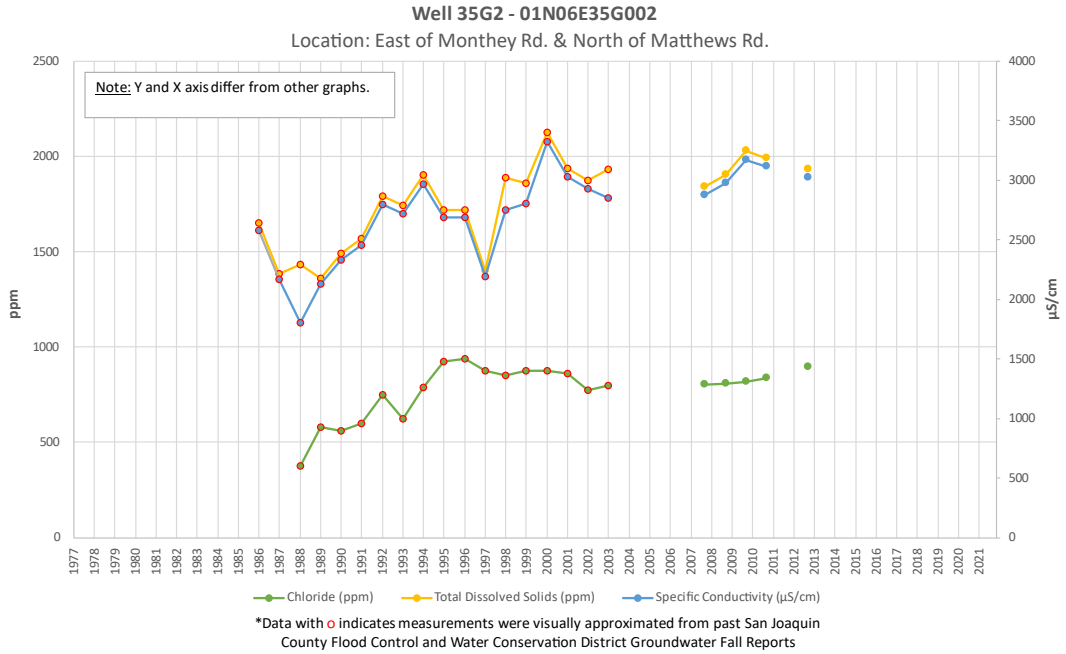

Figure 5-7 Water Quality Comparison Graph Well 35G2

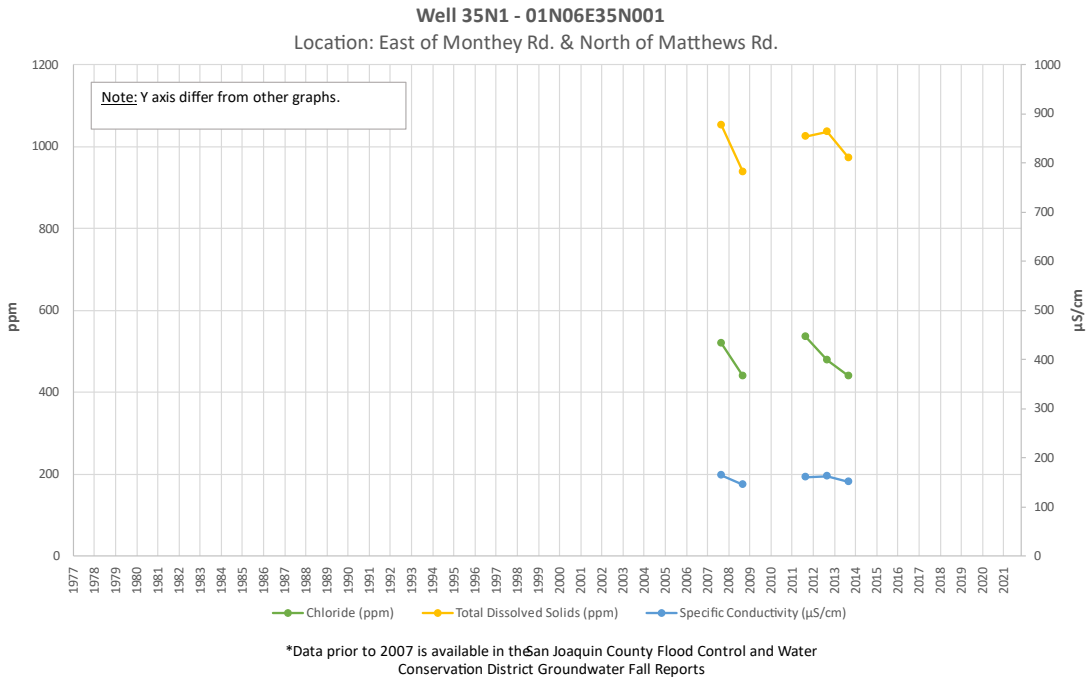

Figure 5-8 Water Quality Comparison Graph Well 35N1

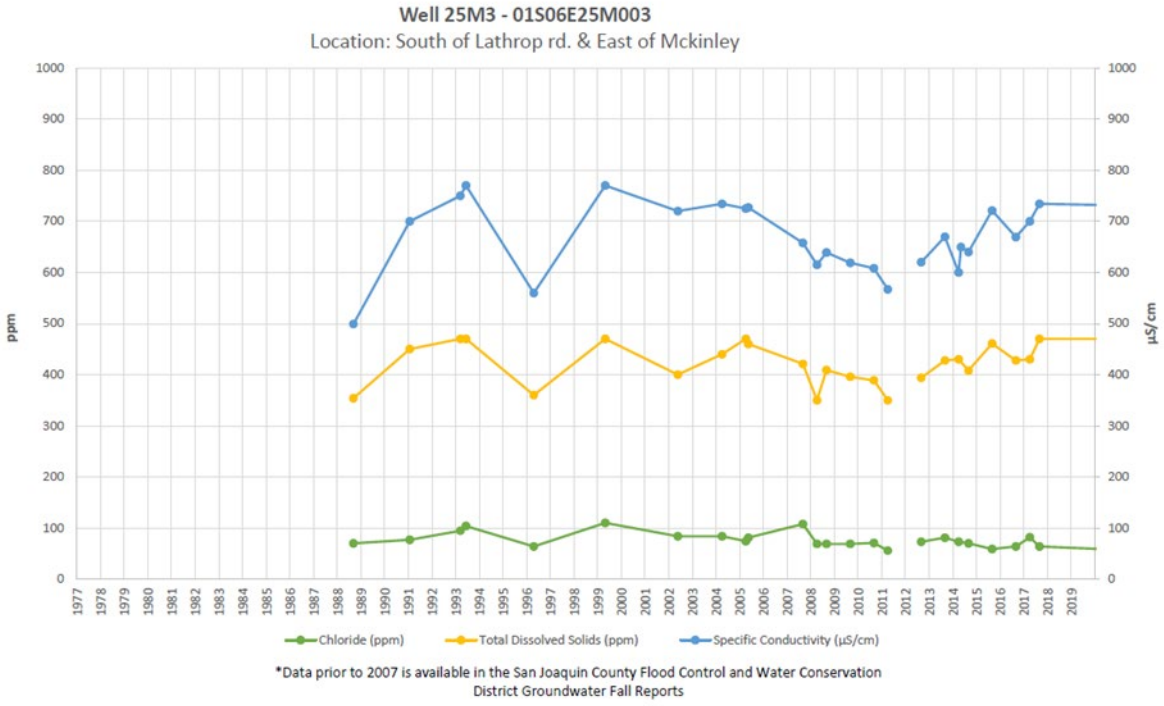

Figure 5-9 Water Quality Comparison Graph Well 25M3

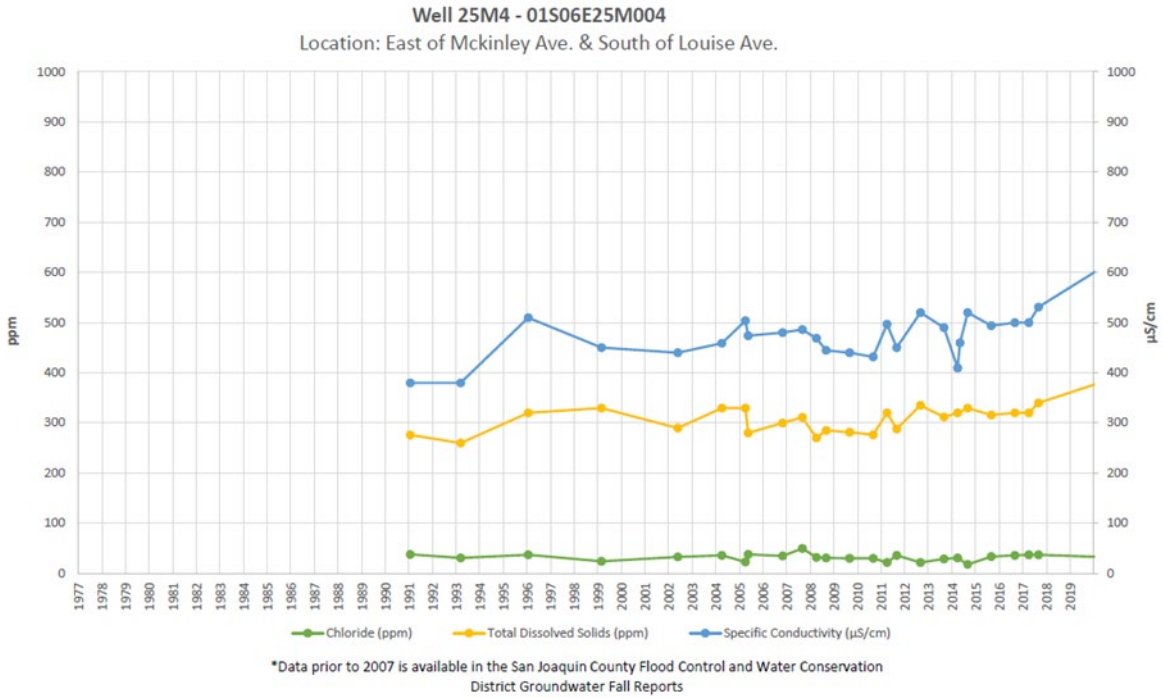

Figure 5-10 Water Quality Comparison Graph Well 25M4

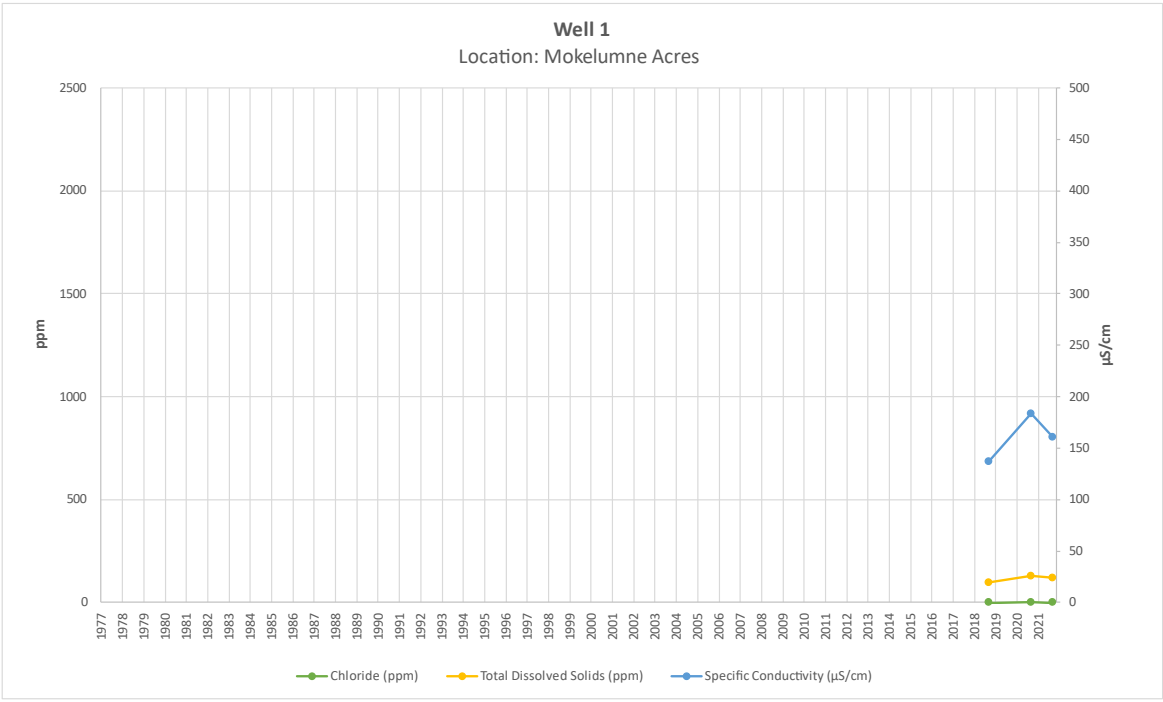

Figure 5-11 Water Quality Comparison Graph Well 1

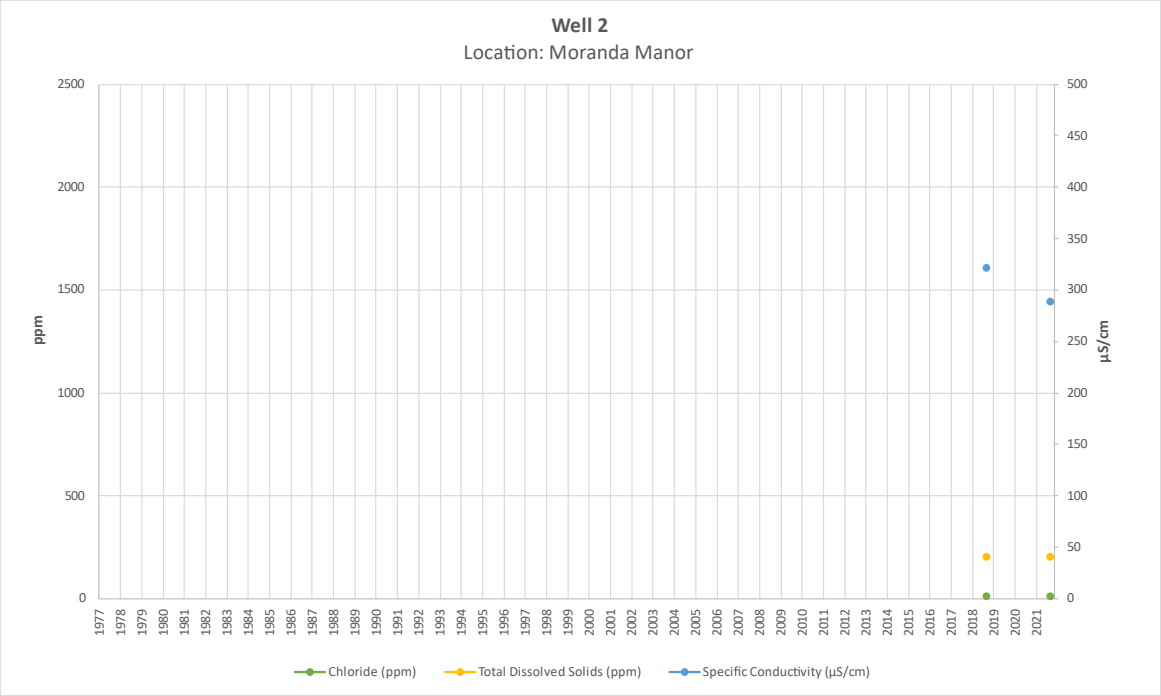

Figure 5-12 Water Quality Comparison Graph Well 2

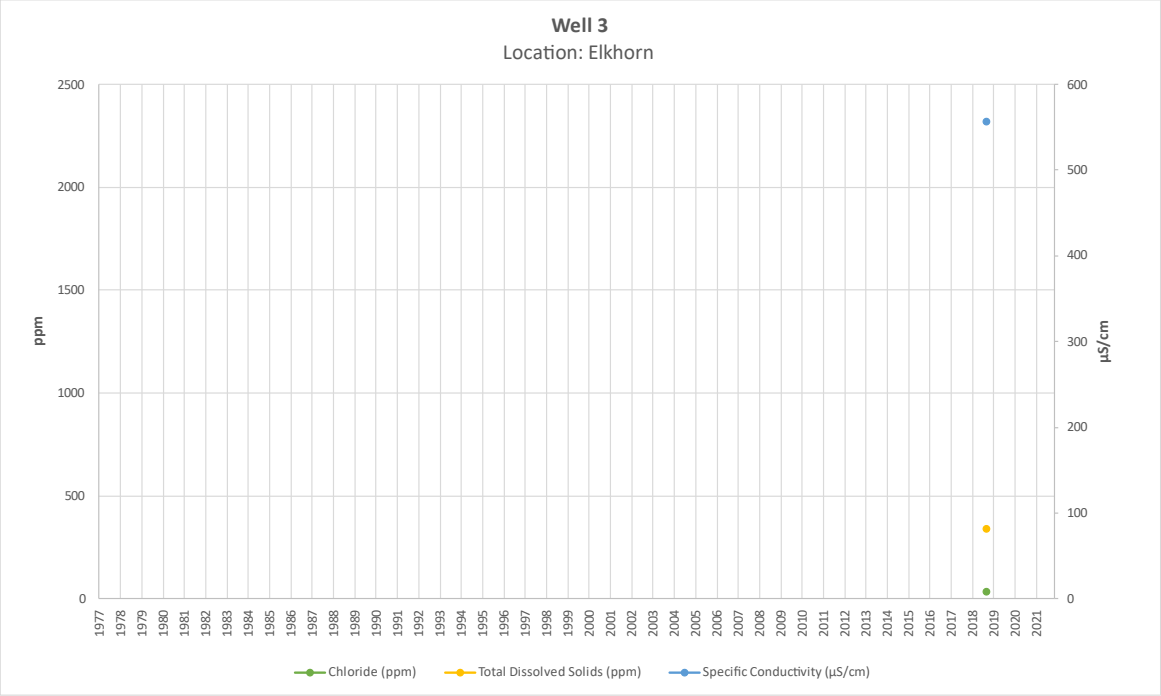

Figure 5-13 Water Quality Comparison Graph Well 3