Appendix 3A

Groundwater Elevation 5-Year and 20-Year Linear Regressions for RMS Wells



This Periodic Evaluation includes data from Water Year (WY) 2019 to WY 2023. However, WY 2023 was a very wet year that may not be reflective of average groundwater conditions in the 180/400-Foot Aquifer Subbasin (Subbasin) during the evaluation period. To assess groundwater elevation trends in the Subbasin, 5-year and 20-year linear regressions of groundwater elevations in representative monitoring sites (RMS) were prepared. Table 1 includes a summary of the 5-year and 20-year rate of groundwater elevations change at RMS wells. The 5-year and 20-year hydrographs that correspond with Table 1 showing the minimum threshold, 2025 interim milestone, measurable objective, and linear regression trendline are included in Sections 3A-1 and 3A-2, respectively. The groundwater elevation scale on the Y-axis differs by well to be able to clearly see all the relevant information for that respective well. Three wells that did not have at least 3 years of data were excluded from the table and hydrographs of 5-year trendlines, and 16 wells that did not have at least 15 years of data were excluded from the 20-year trendlines.

The rates of change in the 180-Foot and 400-Foot Aquifer wells were very similar during both the 5-year and 20-year periods. In both the 180-Foot and 400-Foot Aquifers the average 5-year trends are slightly increasing at 0.1 feet/year, while the average 20-year trends are decreasing at -0.4 and -0.3 feet/year in the aquifers, respectively. The increasing 5-year trends in these aquifers are primarily due to high groundwater elevations in WY 2023, compared to the 4 prior years. The wet water year was not enough to result in an increasing 5-year trend in the Deep Aquifers, which show a general decrease of approximately -0.1 feet/year. The average 20-year trend in the Deep Aquifers is decreasing at a greater rate than the 5-year trend at -1.2 feet/year. During both periods, the Deep Aquifers had the greatest decline in groundwater elevations compared to the other principal aquifers.

Table 3-5 of the main text of the Periodic Evaluation compares the sustainable management criteria (SMC) to the observed fall 2023 groundwater elevations and the 5-year trendline at fall 2023.

Table 1. Summary of 5-Year and 20-Year Linear Regression of Groundwater Elevations

| | 5-Year | Trend | 20-Year Trend | | | | |
|------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|--|--|
| Well Name | Rate of Change (feet/year) | Number of Data Points Used | Rate of Change (feet/year) | Number of Data Points Used | | | |
| 180-Foot Aquifer | | | | | | | |
| 13S/02E-21Q01 | -2.309 | 5 | -0.094 | 20 | | | |
| 13S/02E-26L01 | 3.067 | 3 | 0.391 | 18 | | | |
| 13S/02E-33R01 | 1.616 | 5 | 0.148 | 20 | | | |
| 14S/02E-03F04 | 0.733 | 4 | -0.007 | 19 | | | |
| 14S/02E-10P01 | 2.098 | 5 | -0.169 | 20 | | | |
| 14S/02E-11A02 | 0.031 | 5 | 0.041 | 20 | | | |
| 14S/02E-12B02 | -0.657 | 5 | 0.127 | 20 | | | |
| 14S/02E-13F03 | 0.672 | 5 | -0.020 | 20 | | | |
| 14S/02E-17C02 | -1.847 | 5 | | 9 | | | |
| 14S/02E-21L01 | -0.493 | 5 | 0.000 | 19 | | | |
| 14S/02E-26H01 | 0.139 | 4 | -0.060 | 18 | | | |
| 14S/02E-27A01 | -1.143 | 4 | -0.067 | 19 | | | |
| 14S/02E-34B03 | 0.544 | 5 | -0.297 | 20 | | | |
| 14S/02E-36E01 | -0.339 | 5 | -0.199 | 20 | | | |
| 14S/03E-18C01 | 0.596 | 4 | 0.327 | 18 | | | |
| 14S/03E-19G01 | -0.241 | 5 | -0.220 | 20 | | | |
| 14S/03E-30G08 | -0.435 | 3 | -0.175 | 18 | | | |
| 14S/03E-31F01 | 0.416 | 5 | -0.087 | 20 | | | |
| 15S/02E-12C01 | 1.690 | 5 | | 7 | | | |
| 15S/03E-09E03 | -0.860 | 5 | -0.503 | 20 | | | |
| 15S/03E-13N01 | 0.302 | 5 | -0.762 | 18 | | | |
| 15S/03E-16M01 | -0.907 | 5 | -0.608 | 20 | | | |
| 15S/03E-17M01 | -0.612 | 5 | -0.539 | 20 | | | |
| 15S/03E-25L01 | -0.155 | 5 | -0.752 | 20 | | | |
| 15S/03E-26F01 | 1.362 | 5 | -0.535 | 20 | | | |
| 15S/04E-31A02 | -1.528 | 5 | -1.020 | 19 | | | |
| 16S/04E-05M02 | -1.005 | 5 | -0.910 | 20 | | | |
| 16S/04E-13R02 | -4.547 | 5 | -1.087 | 20 | | | |
| 16S/04E-15D01 | 0.249 | 4 | -0.739 | 19 | | | |
| 16S/04E-15R02 | 2.549 | 5 | -0.453 | 19 | | | |
| 16S/04E-25C01 | -0.362 | 5 | -0.526 | 20 | | | |
| 16S/05E-30E01 | 0.267 | 5 | -0.559 | 20 | | | |
| 16S/05E-31M01 | -1.380 | 5 | -0.717 | 20 | | | |
| 17S/04E-01D01 | 2.175 | 5 | -1.601 | 20 | | | |
| 17S/05E-06C02 | 2.157 | 4 | -0.648 | 18 | | | |
| | | 400-Foot Aquifer | | | | | |
| 12S/02E-33H02 | 0.094 | 4 | | 8 | | | |

| Well Name | 5-Year Trend | | 20-Year Trend | |
|---------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | Rate of Change (feet/year) | Number of Data Points Used | Rate of Change (feet/year) | Number of Data Points Used |
| 13S/02E-10K01 | 4.558 | 4 | 0.630 | 15 |
| 13S/02E-21N01 | 0.281 | 5 | 0.154 | 20 |
| 13S/02E-24N01 | 0.050 | 4 | 0.272 | 15 |
| 13S/02E-27P01 | 2.046 | 5 | -0.001 | 20 |
| 13S/02E-31N02 | 0.370 | 5 | 0.087 | 20 |
| 13S/02E-32J03 | 1.615 | 5 | 0.136 | 19 |
| 14S/02E-02C03 | 0.686 | 5 | -0.158 | 17 |
| 14S/02E-03F03 | -1.439 | 4 | 0.091 | 18 |
| 14S/02E-05K01 | -1.034 | 5 | 0.132 | 20 |
| 14S/02E-08M02 | -0.643 | 5 | 0.070 | 20 |
| 14S/02E-11A04 | -0.840 | 5 | -0.038 | 20 |
| 14S/02E-11M03 | 2.025 | 5 | 0.241 | 17 |
| 14S/02E-12B03 | -1.897 | 5 | -0.243 | 20 |
| 14S/02E-12Q01 | 1.580 | 5 | 0.092 | 20 |
| 14S/02E-15K01 | -1.205 | 5 | -0.110 | 19 |
| 14S/02E-16A02 | 0.836 | 5 | 0.096 | 20 |
| 14S/02E-27G03 | 1.023 | 4 | -0.105 | 19 |
| 14S/02E-34A03 | 0.499 | 5 | 0.063 | 20 |
| 14S/02E-36G01 | -1.036 | 5 | -0.207 | 20 |
| 14S/03E-18C02 | 2.526 | 4 | -0.098 | 19 |
| 14S/03E-20C01 | 1.099 | 4 | 0.074 | 16 |
| 14S/03E-29F03 | 2.098 | 5 | -1.813 | 16 |
| 14S/03E-31L01 | 0.399 | 5 | -0.423 | 16 |
| 15S/02E-01A03 | -1,411 | 5 | -0.276 | 20 |
| 15S/02E-02G01 | -0.333 | 5 | -0.257 | 19 |
| 15S/02E-12A01 | 0.617 | 5 | -0.384 | 19 |
| 15S/03E-03R02 | -0.201 | 5 | -0.649 | 17 |
| 15S/03E-04Q01 | 0.199 | 5 | -0.515 | 17 |
| 15S/03E-05C02 | -0.999 | 3 | | 14 |
| 15S/03E-08F01 | -0.793 | 4 | -0.505 | 19 |
| 15S/03E-14P02 | 0.979 | 5 | -0.709 | 20 |
| 15S/03E-15B01 | 0.864 | 5 | -0.502 | 19 |
| 15S/03E-16F02 | -1.081 | 5 | -0.731 | 20 |
| 15S/03E-17P02 | -2.499 | 5 | -0.477 | 16 |
| 15S/03E-26A01 | -0.393 | 5 | -0.599 | 19 |
| 15S/03E-28B02 | -1.700 | 5 | 0.097 | 16 |
| 15S/04E-29Q02 | 1.119 | 5 | -0.847 | 20 |
| 16S/04E-04C01 | 3.667 | 5 | -0.969 | 18 |
| 16S/04E-08H03 | -1.220 | 4 | -0.844 | 19 |
| 16S/04E-10R02 | -2.518 | 5 | -1.064 | 20 |

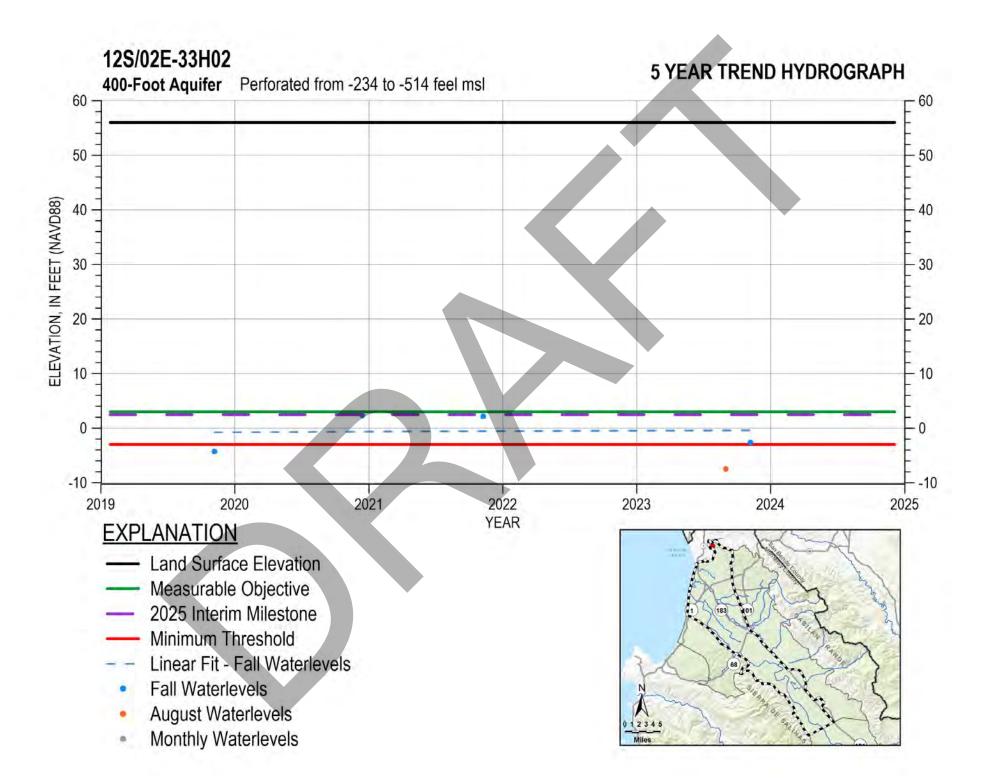
| | 5-Year Trend | | 20-Year Trend | | | | |
|---------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|--|--|
| Well Name | Rate of Change (feet/year) | Number of Data Points Used | Rate of Change (feet/year) | Number of Data Points Used | | | |
| 16S/04E-25G01 | -0.166 | 5 | -0.670 | 20 | | | |
| 16S/05E-30J02 | -3.878 | 4 | -0.718 | 19 | | | |
| Deep Aquifers | | | | | | | |
| 13S/01E-36J02 | -0.767 | 5 | -0.949 | 16 | | | |
| 13S/02E-19Q03 | -0.803 | 5 | -0.949 | 20 | | | |
| 13S/02E-28L03 | -0.730 | 5 | | 8 | | | |
| 13S/02E-32E05 | -0.540 | 4 | -1.052 | 20 | | | |
| 14S/02E-06L01 | 0.000 | 5 | -1.106 | 19 | | | |
| 14S/02E-07J03 | 0.757 | 5 | - | 5 | | | |
| 14S/02E-14R02 | | 2 | <i></i> | 2 | | | |
| 14S/02E-20E01 | -0.562 | 4 | | 5 | | | |
| 14S/02E-21K04 | 5.990 | 4 | | 4 | | | |
| 14S/02E-22A03 | -2.827 | 5 | | 7 | | | |
| 14S/02E-23J02 | -4.161 | 3 | - | 3 | | | |
| 14S/02E-25A03 | 5.122 | 3 | | 2 | | | |
| 14S/02E-26G01 | | 2 | | 2 | | | |
| 14S/02E-27K02 | -3.804 | 4 | - | 4 | | | |
| 14S/02E-28H04 | 1.789 | 5 | -2.190 | 16 | | | |
| 14S/02E-35B01 | | 2 | | 2 | | | |
| 14S/03E-19C01 | -0.696 | 4 | | 4 | | | |

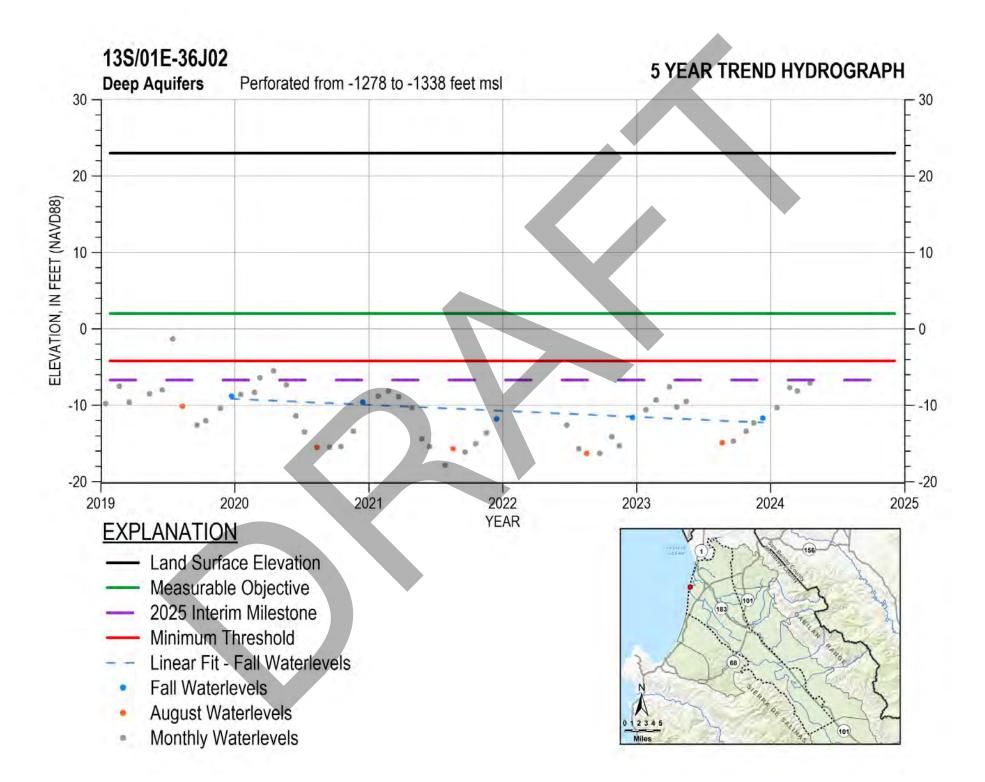
Note: Wells not included in the trend analyses are denoted by dashes.

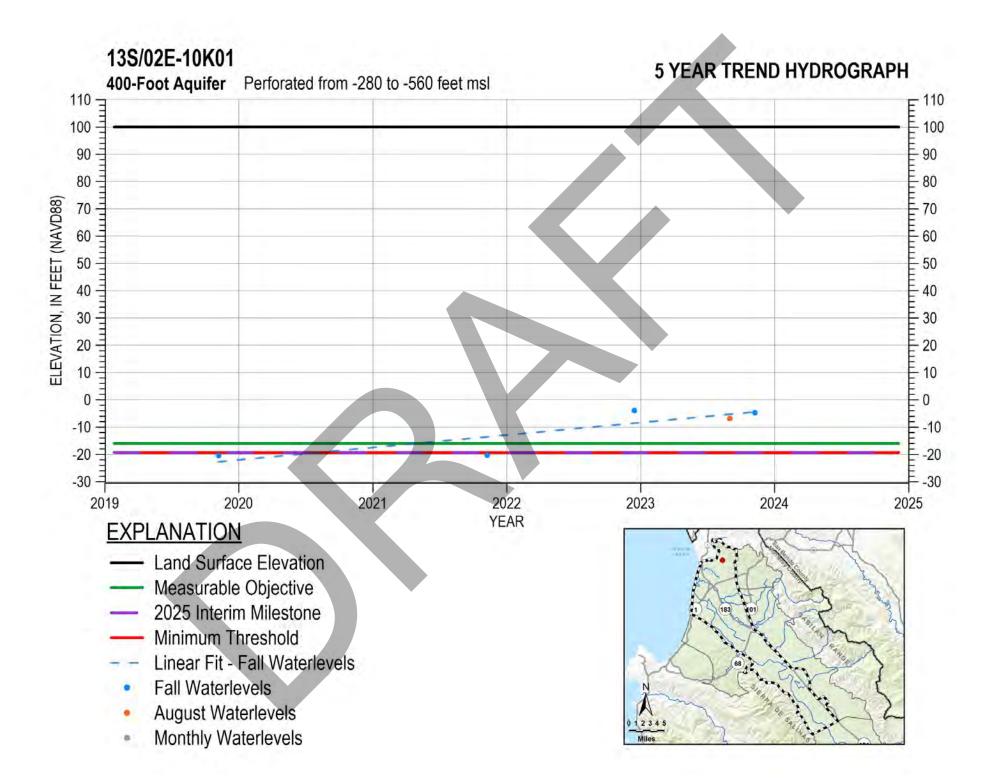


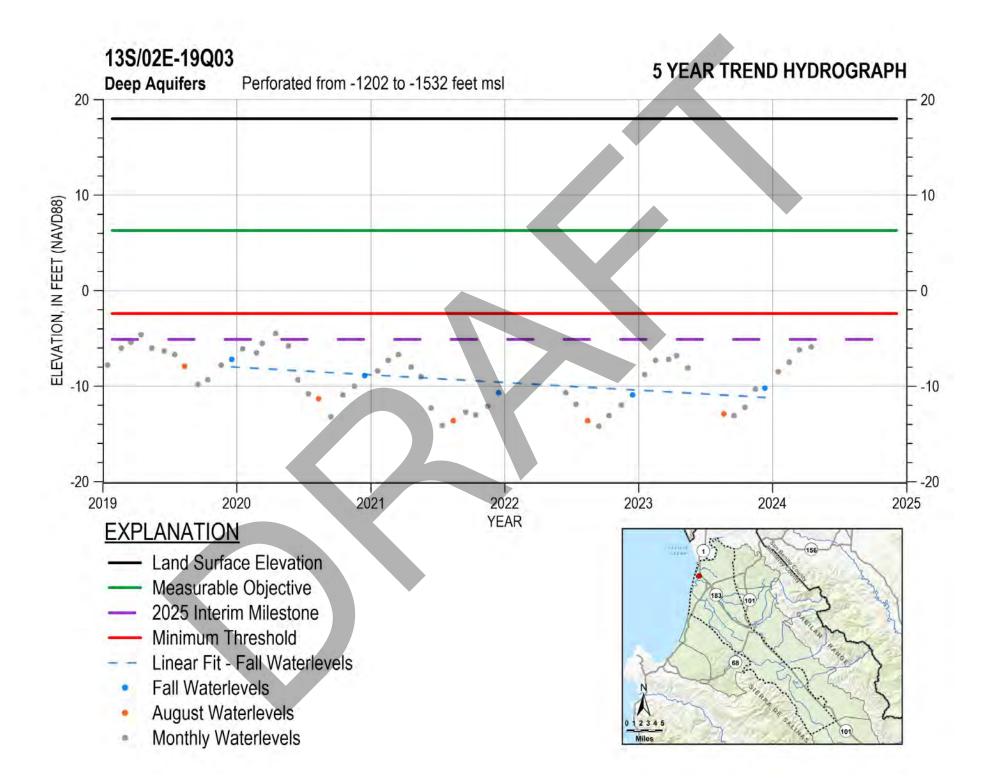
3A-1 Hydrographs with 5-Year Linear Regressions

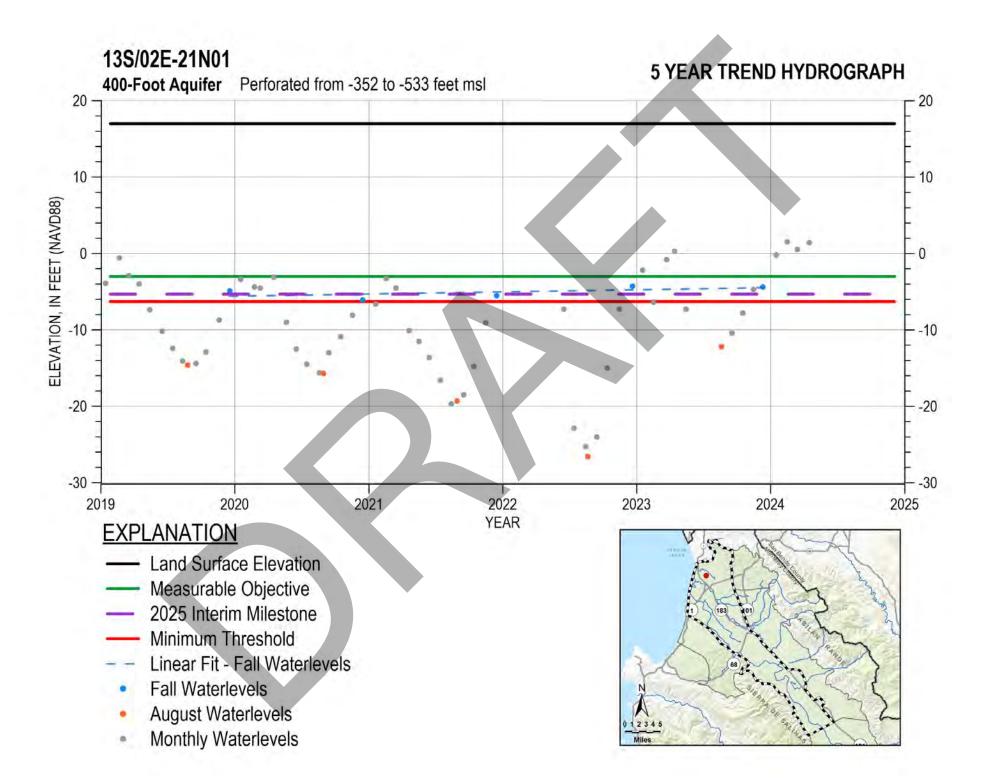


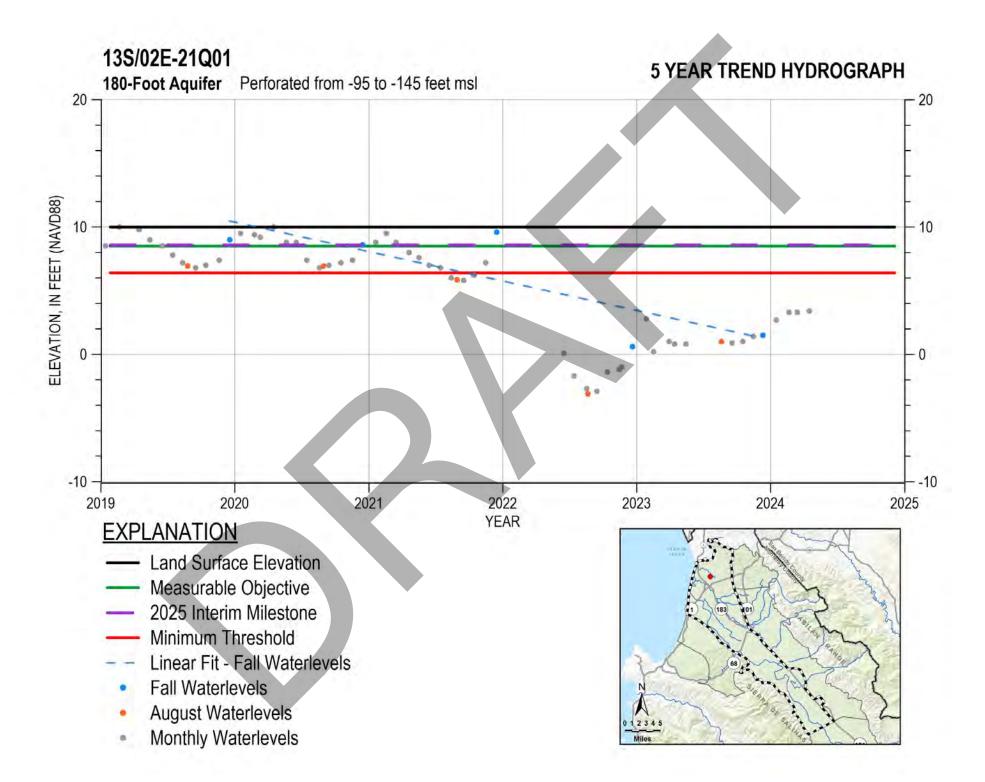


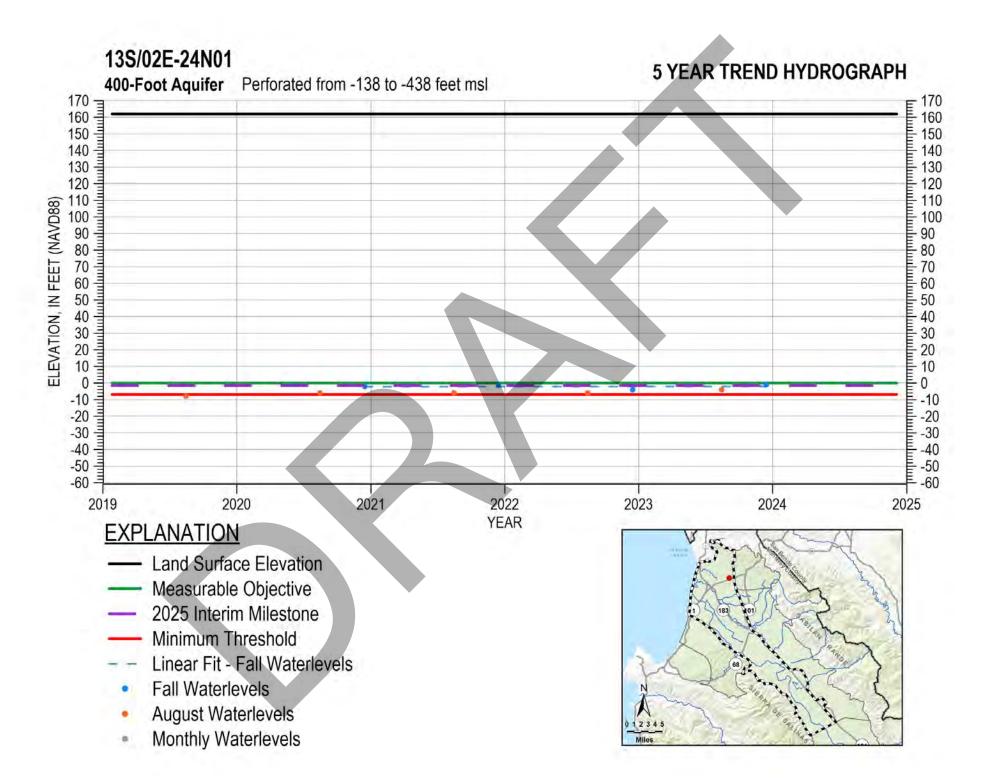


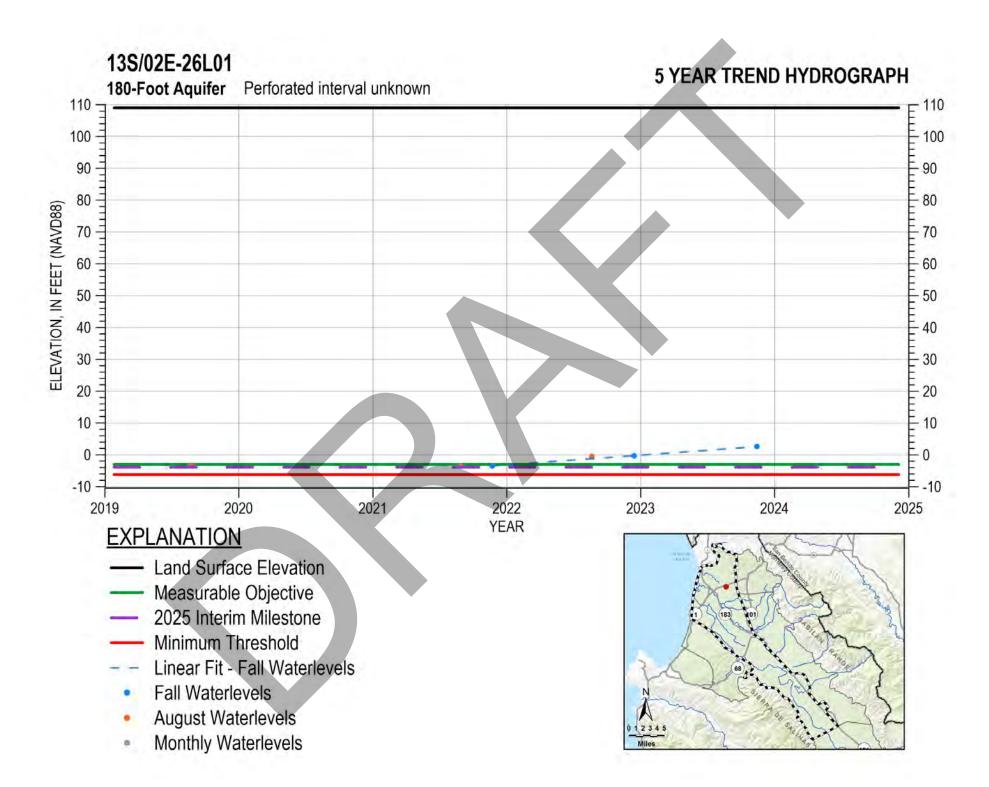


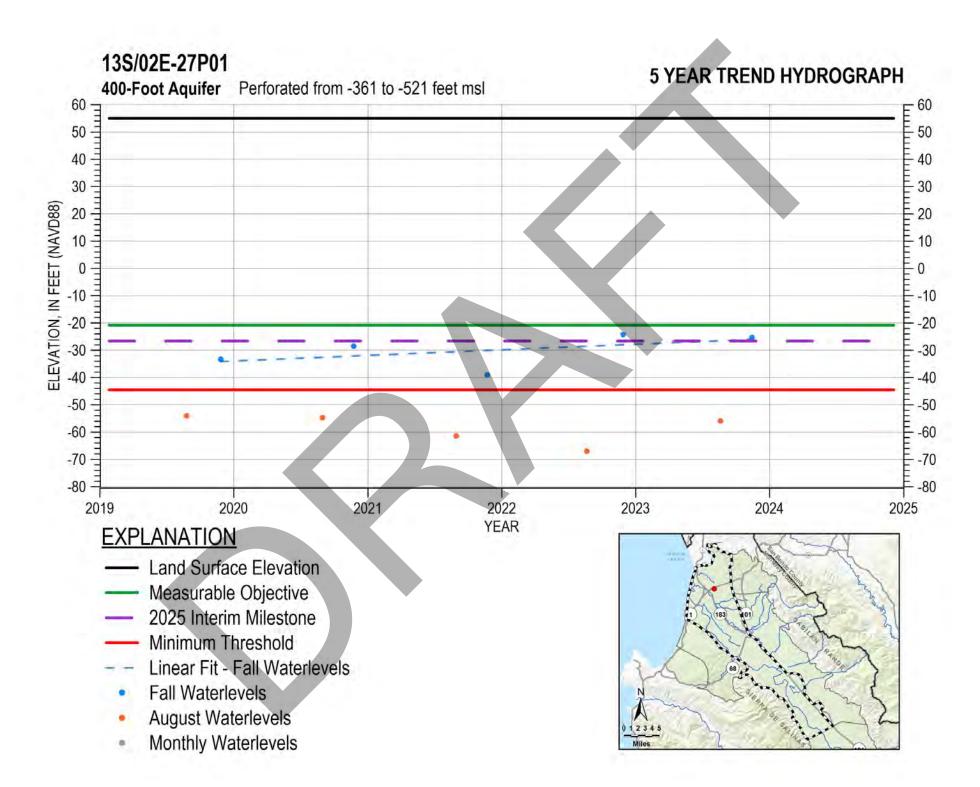


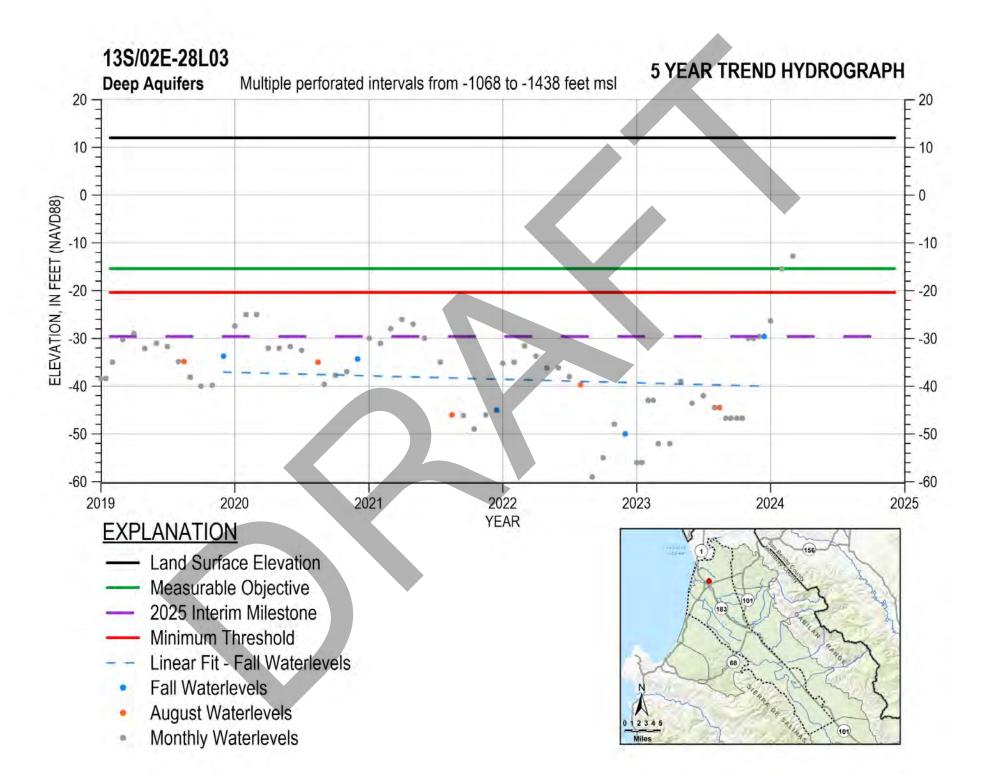


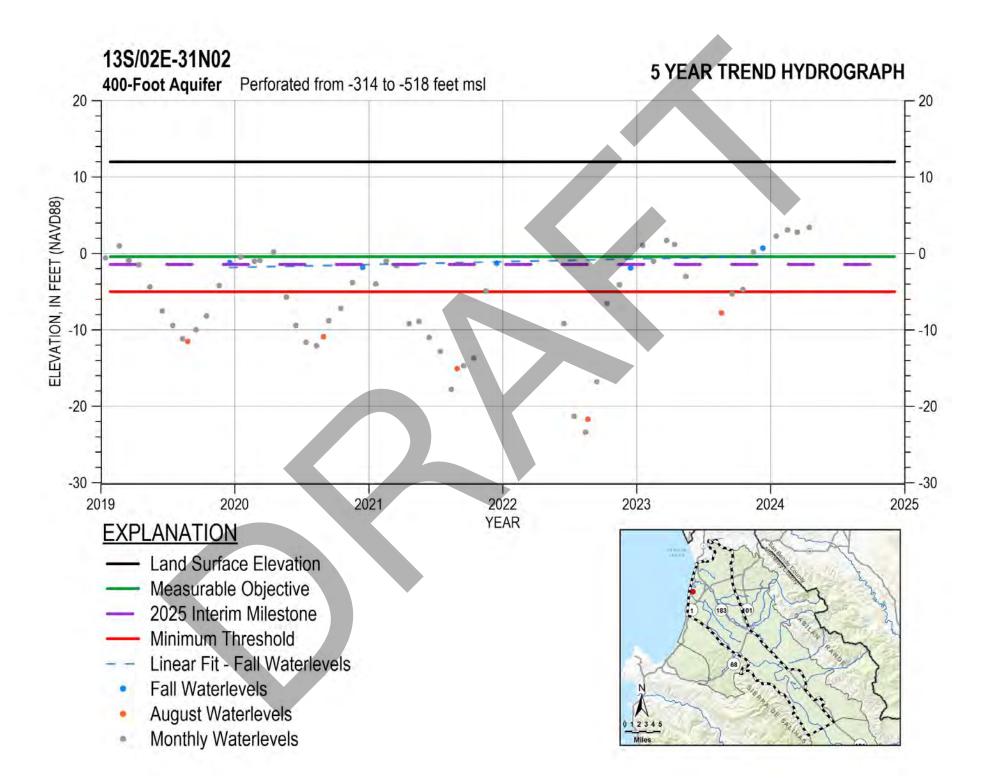


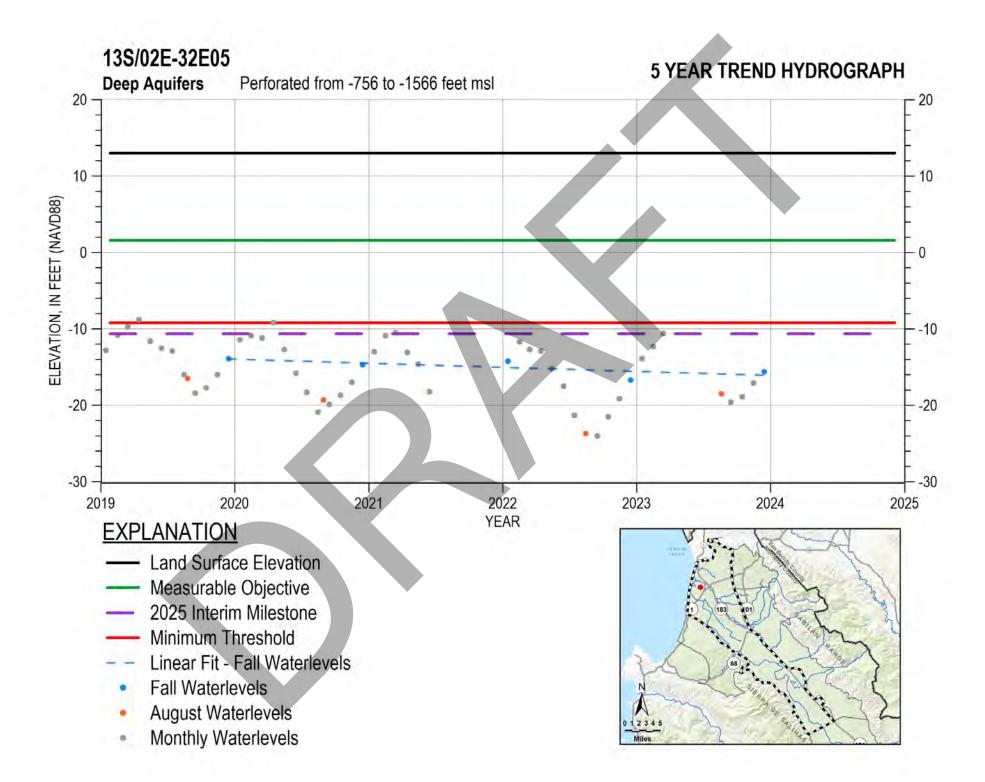


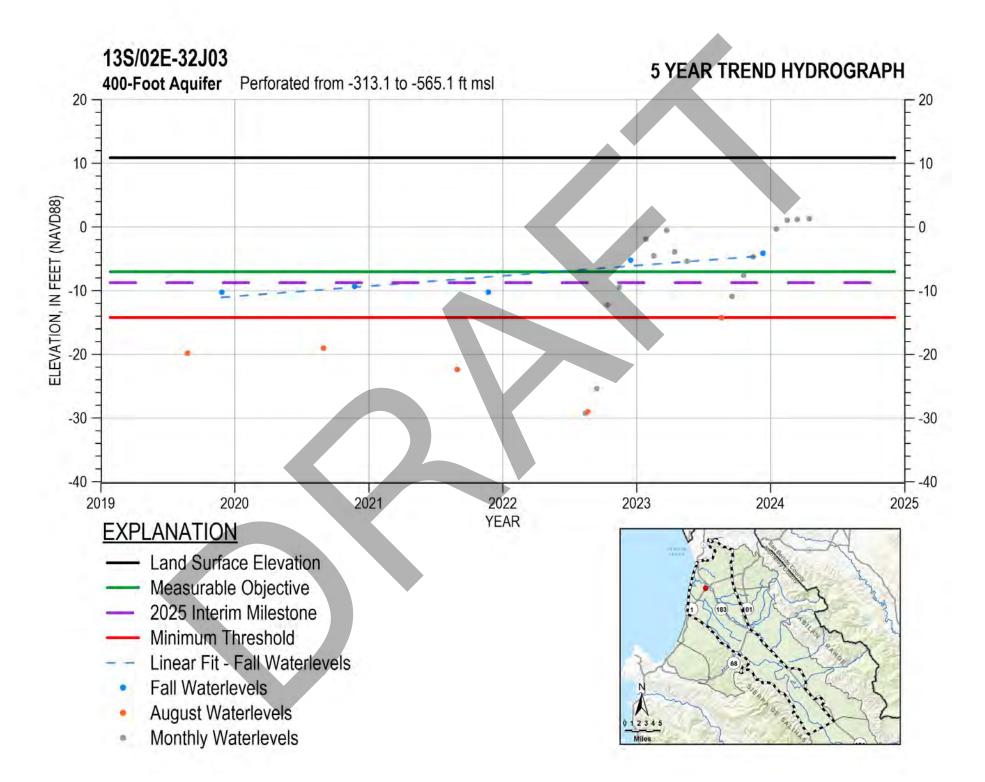


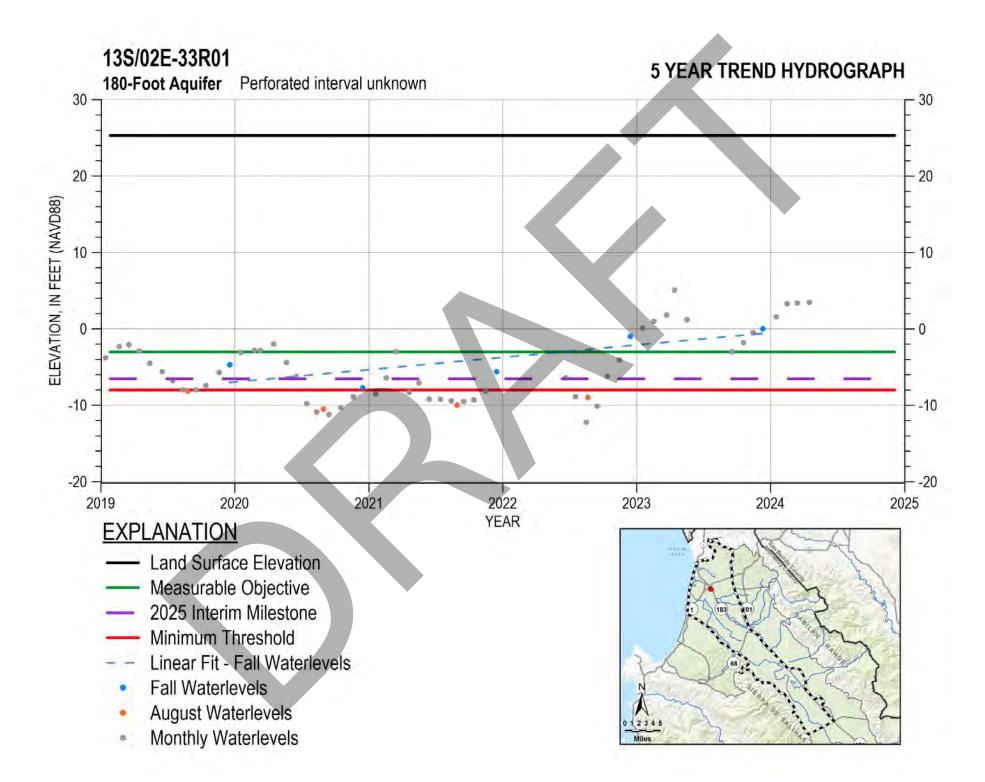


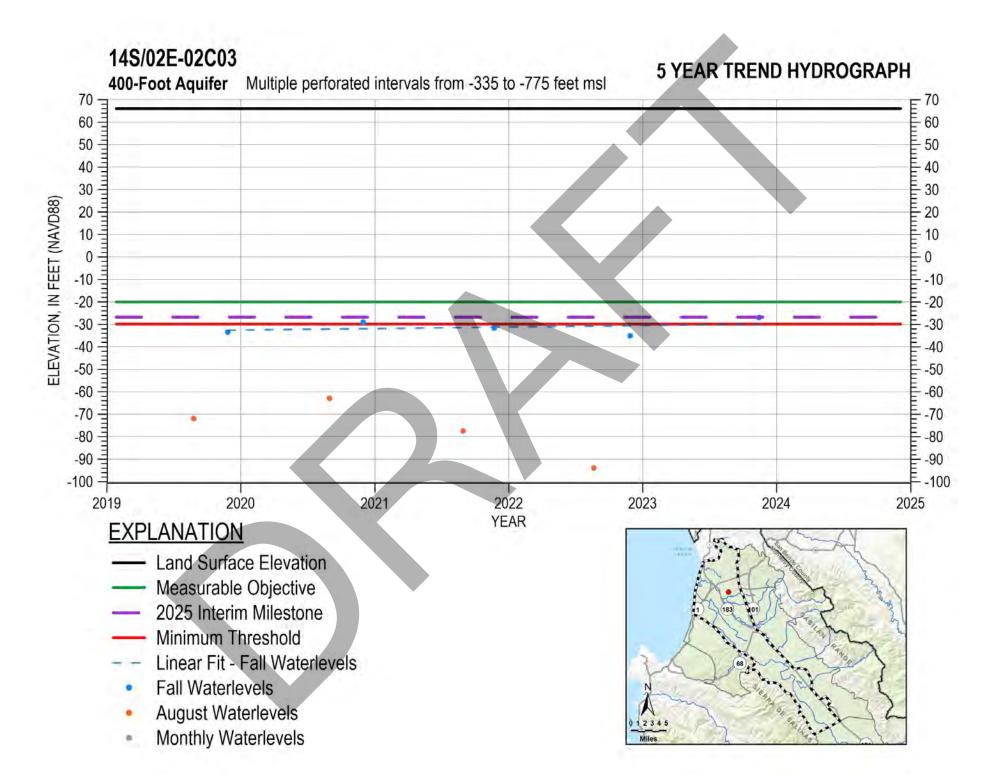


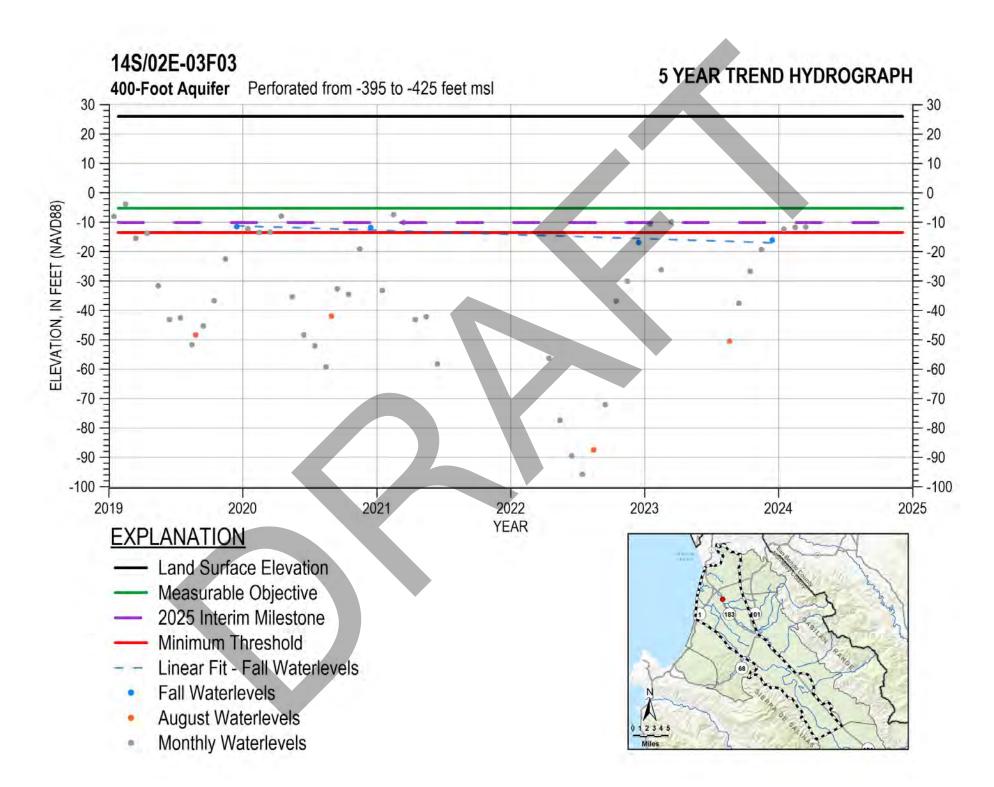


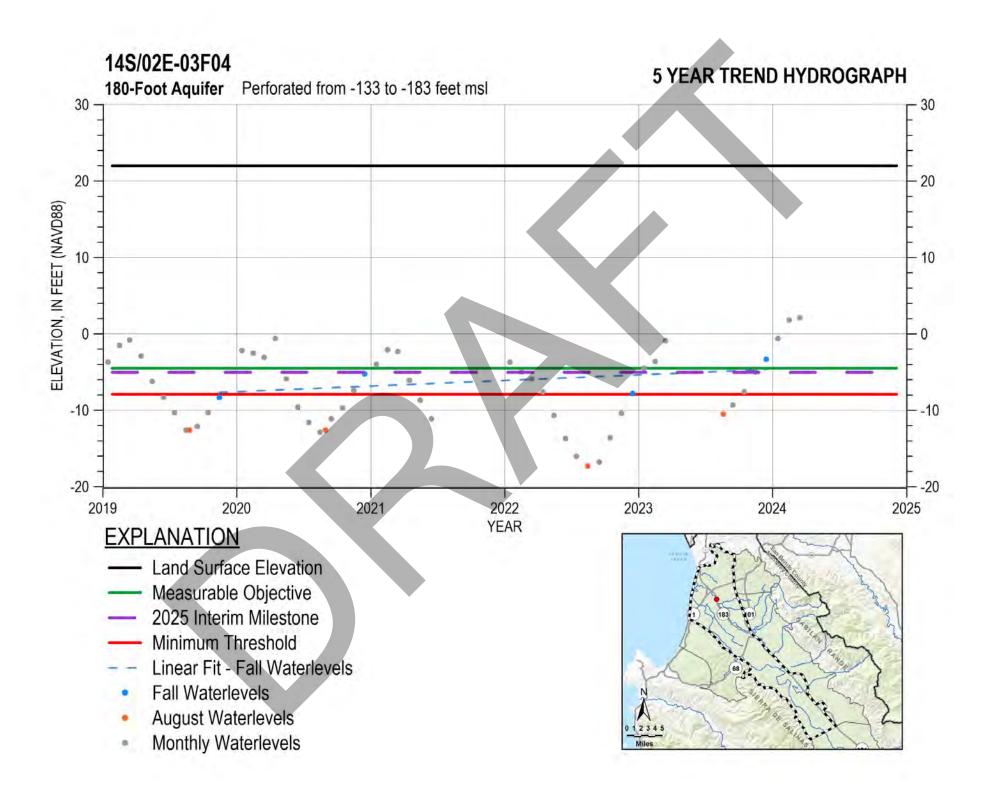


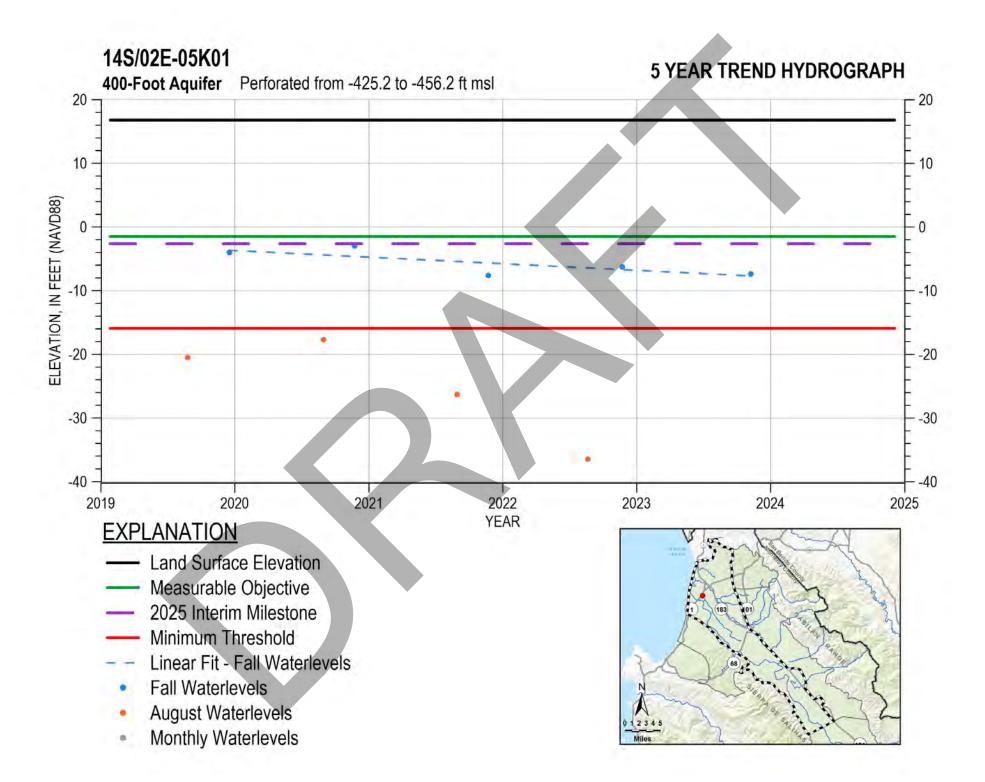


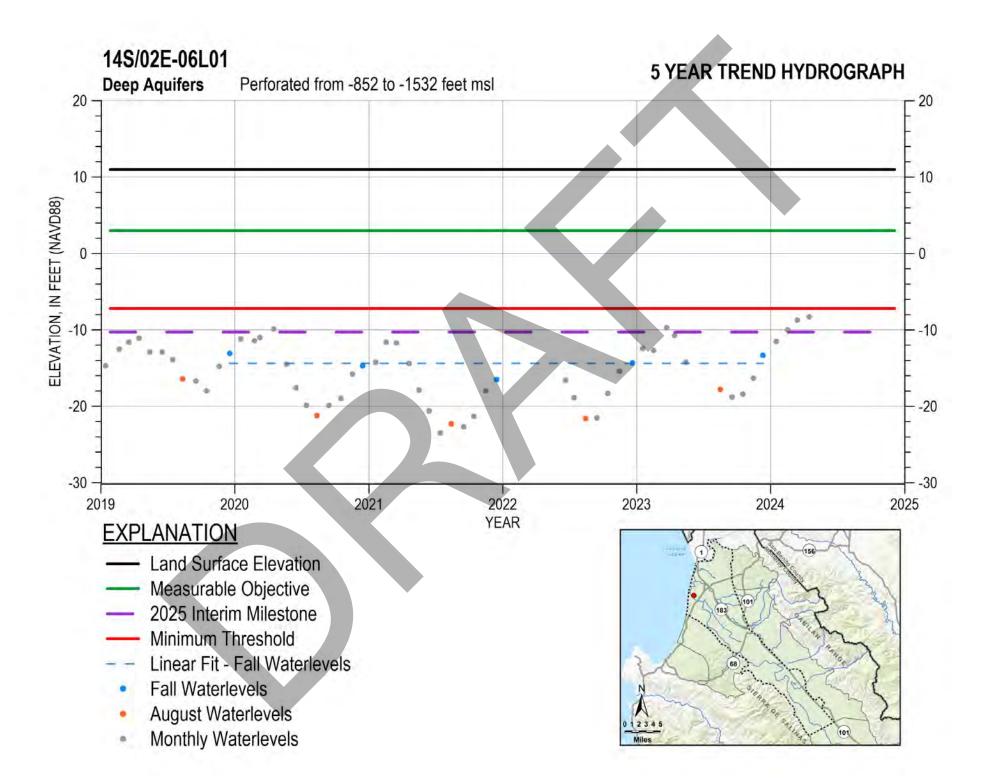


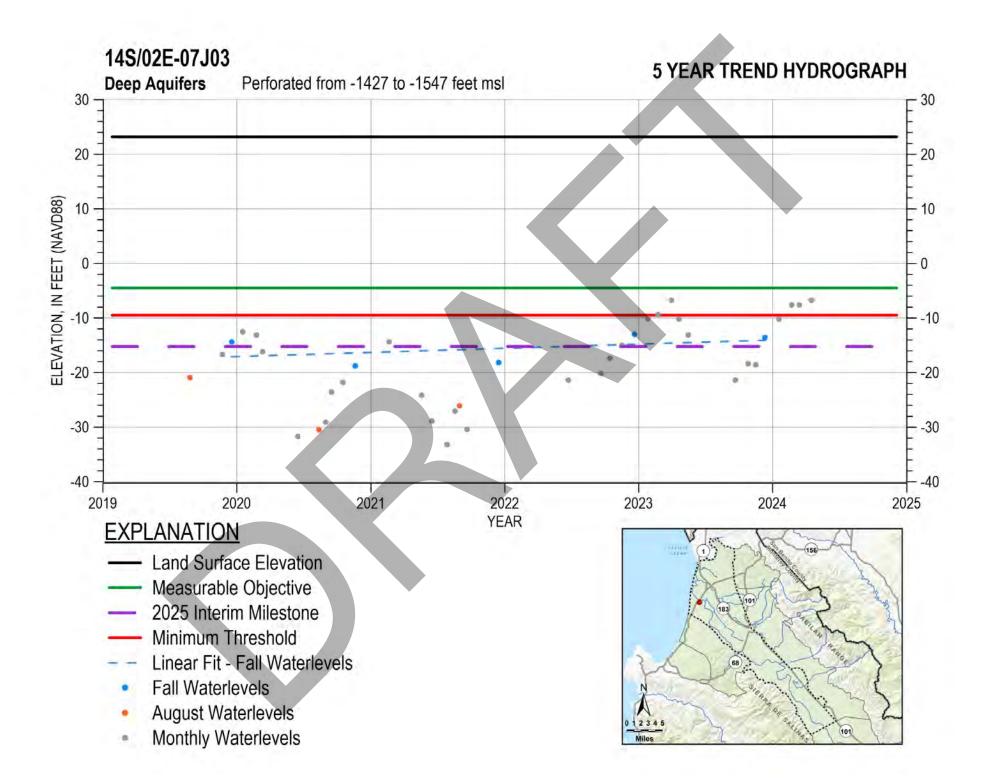


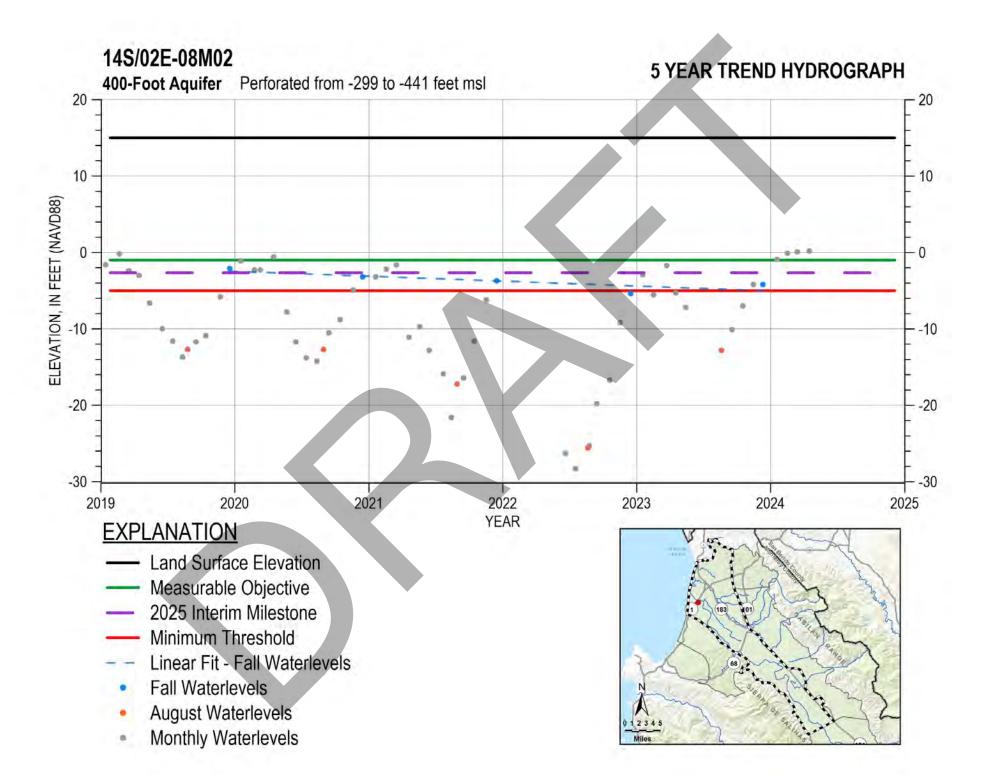


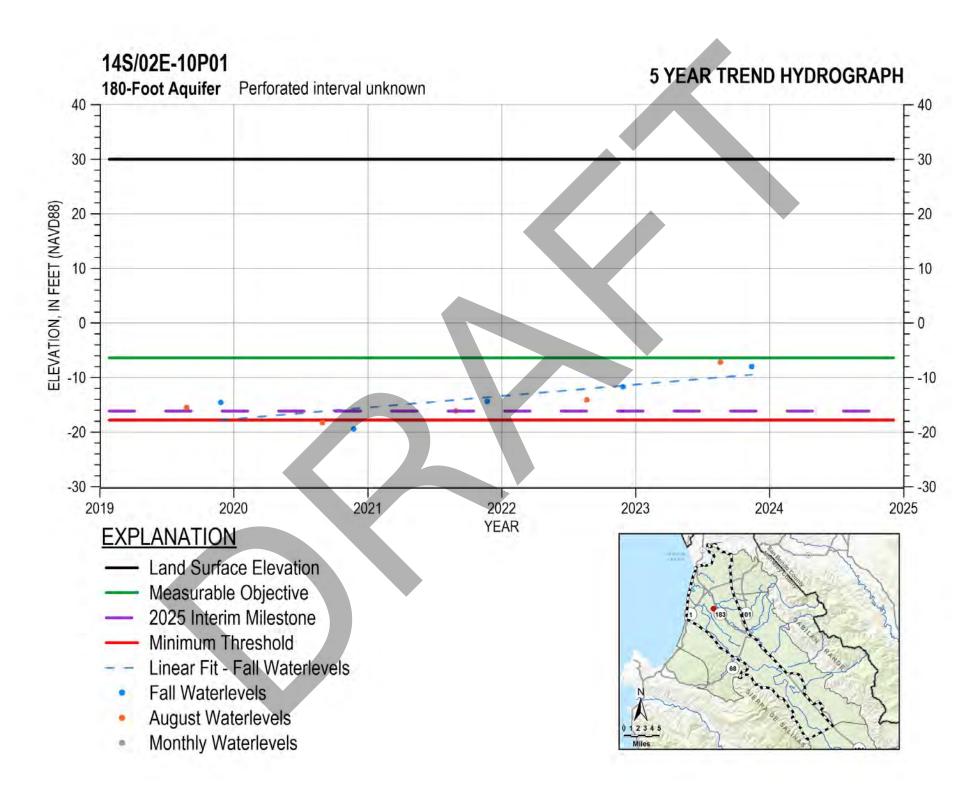


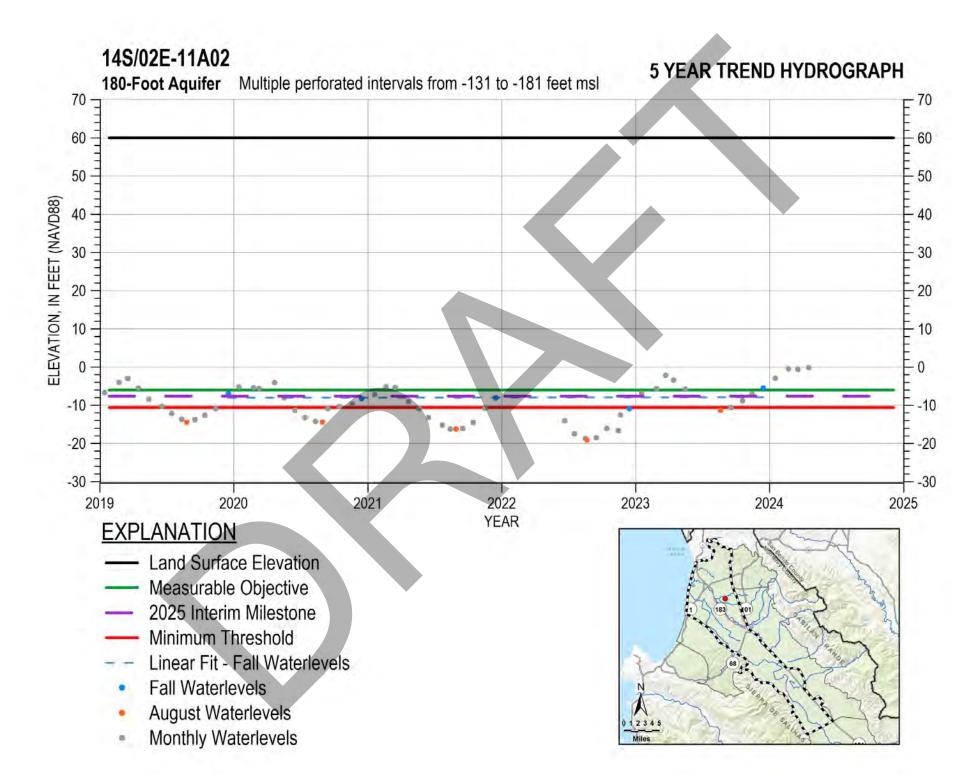


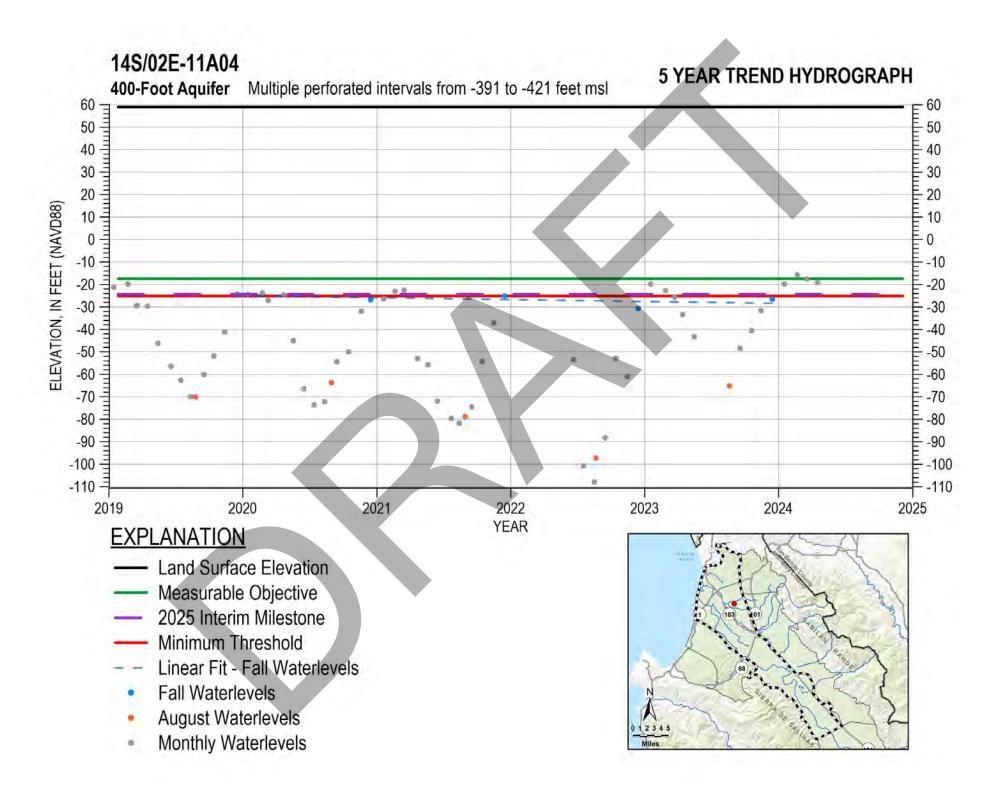


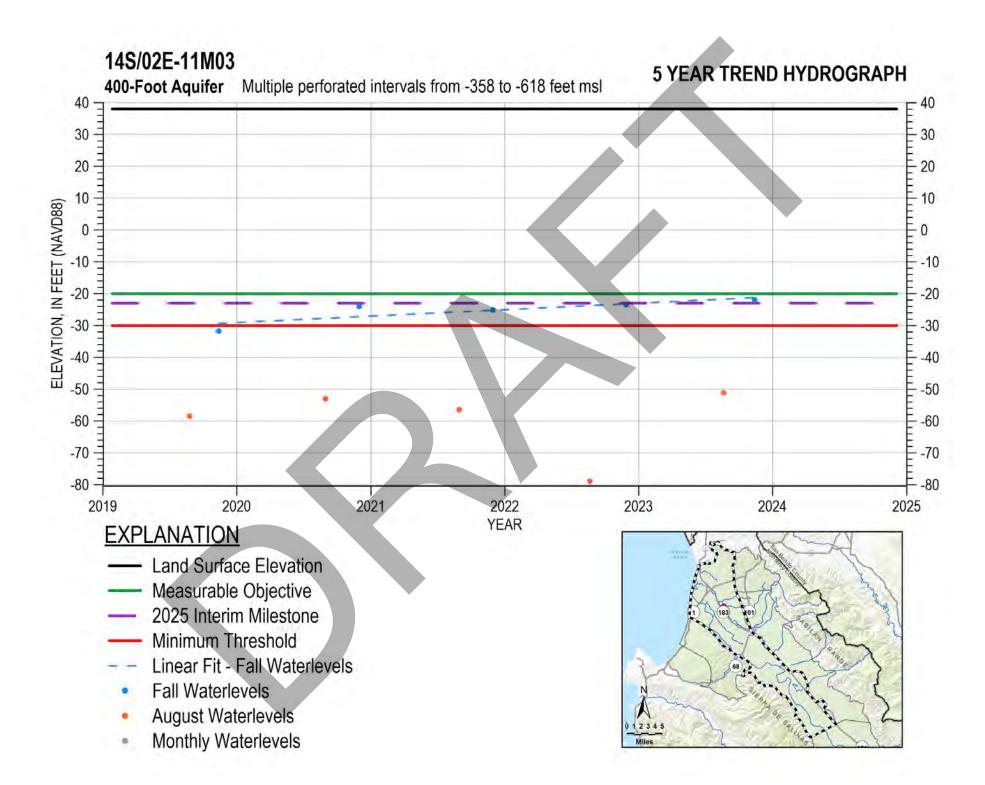


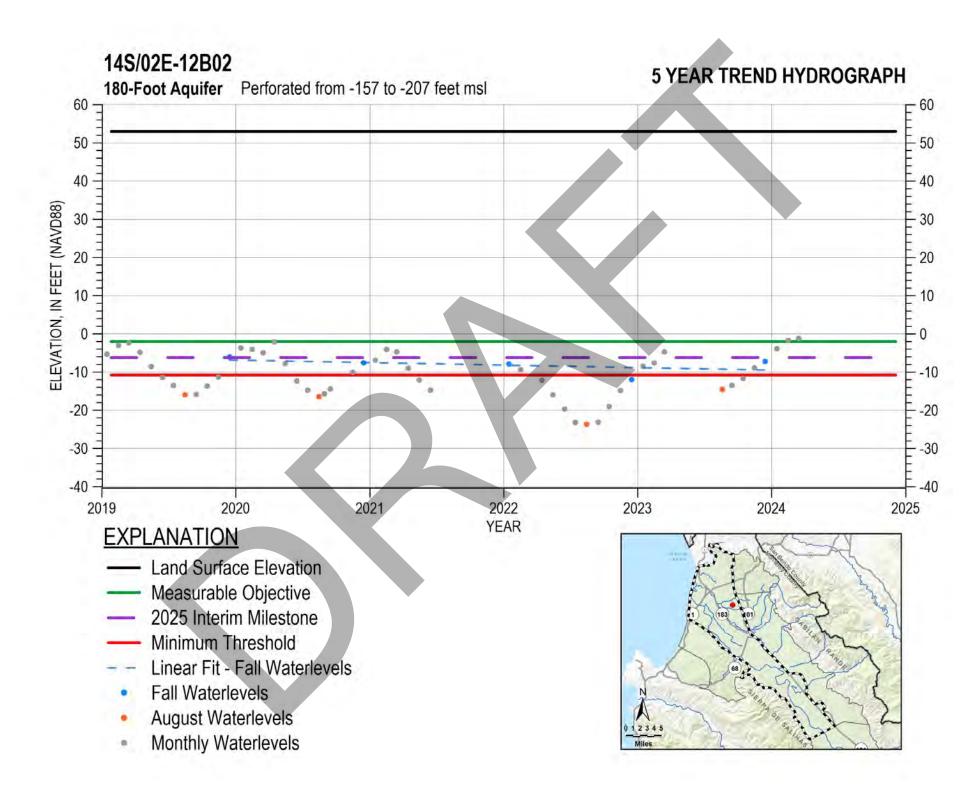


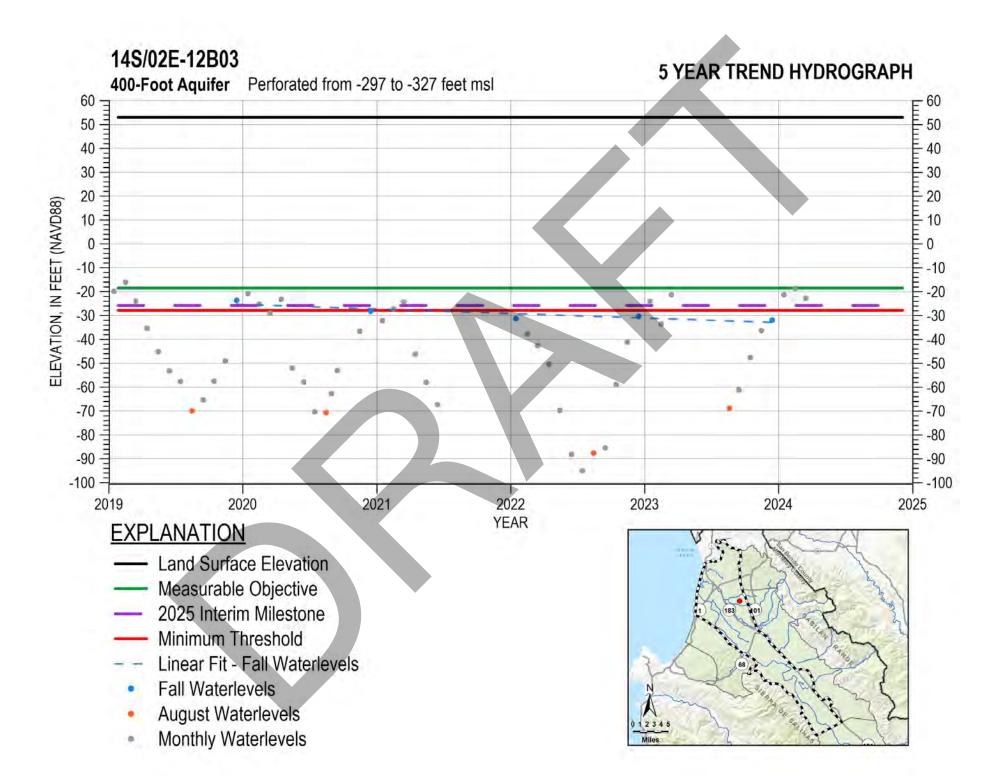


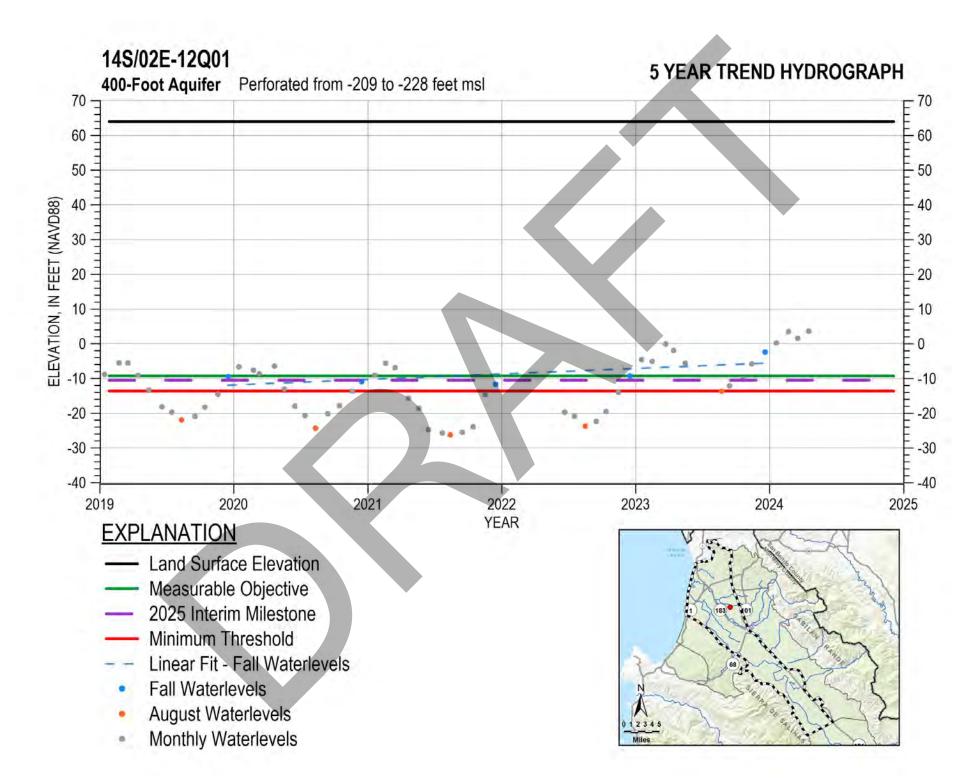


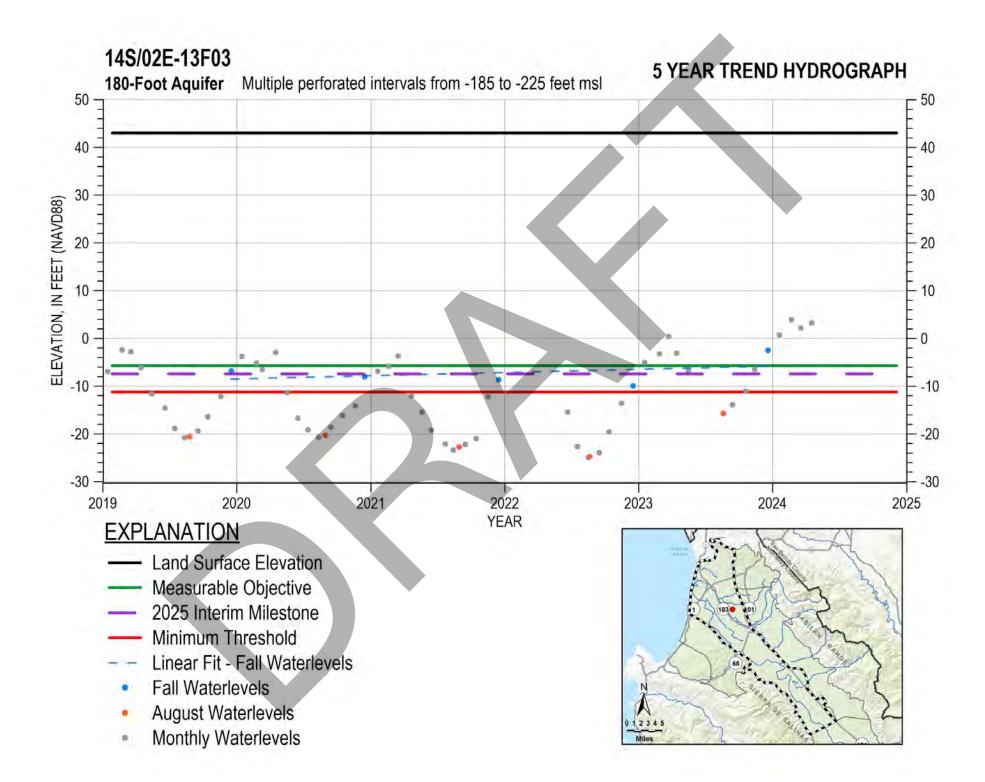


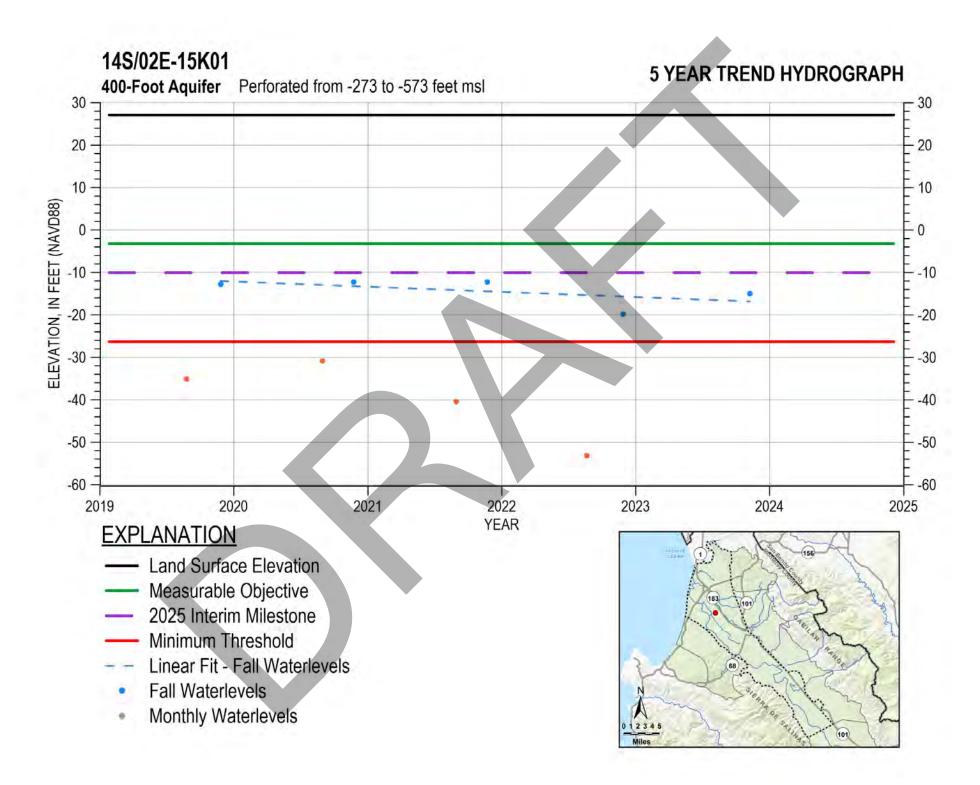


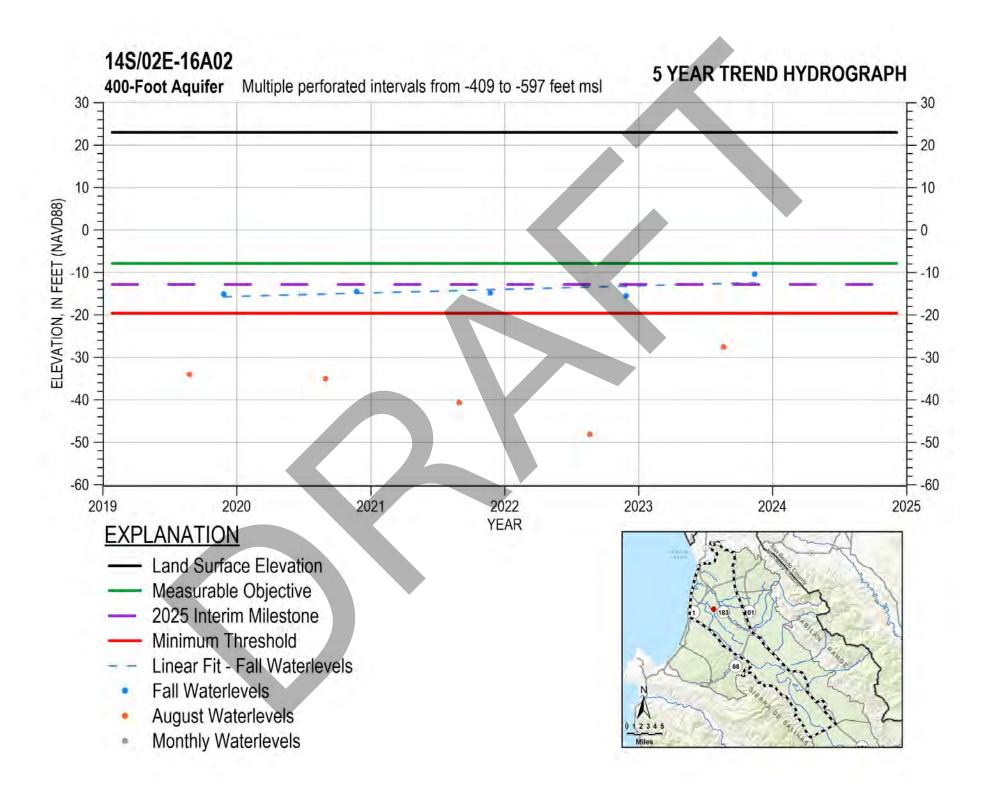


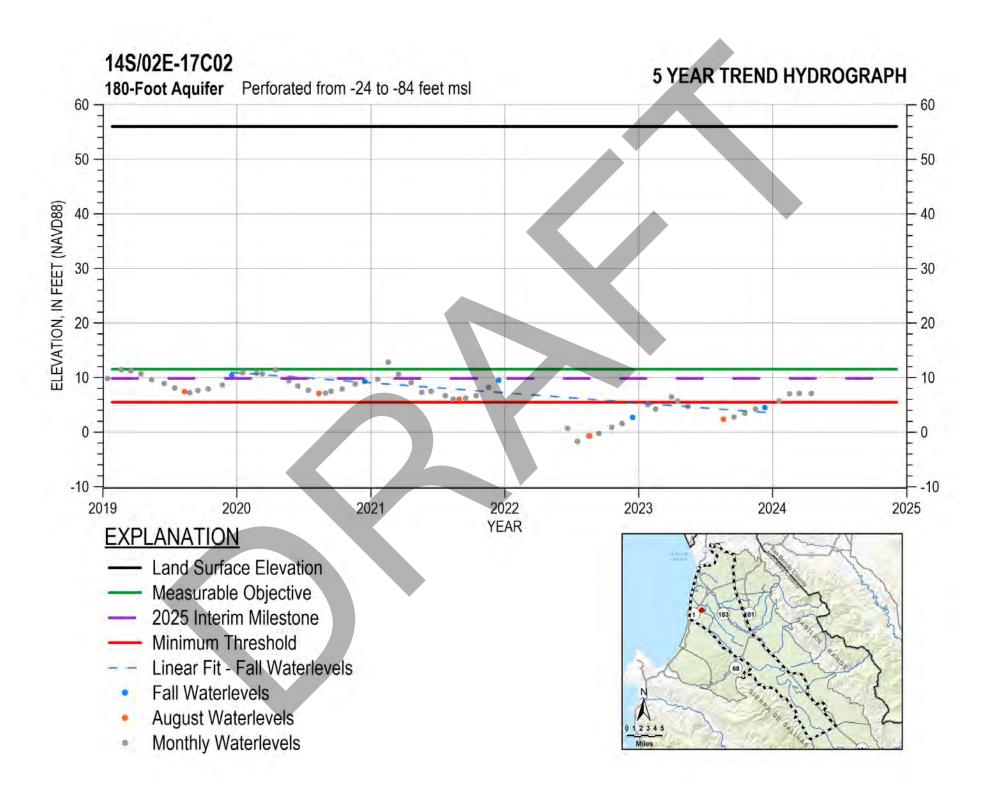


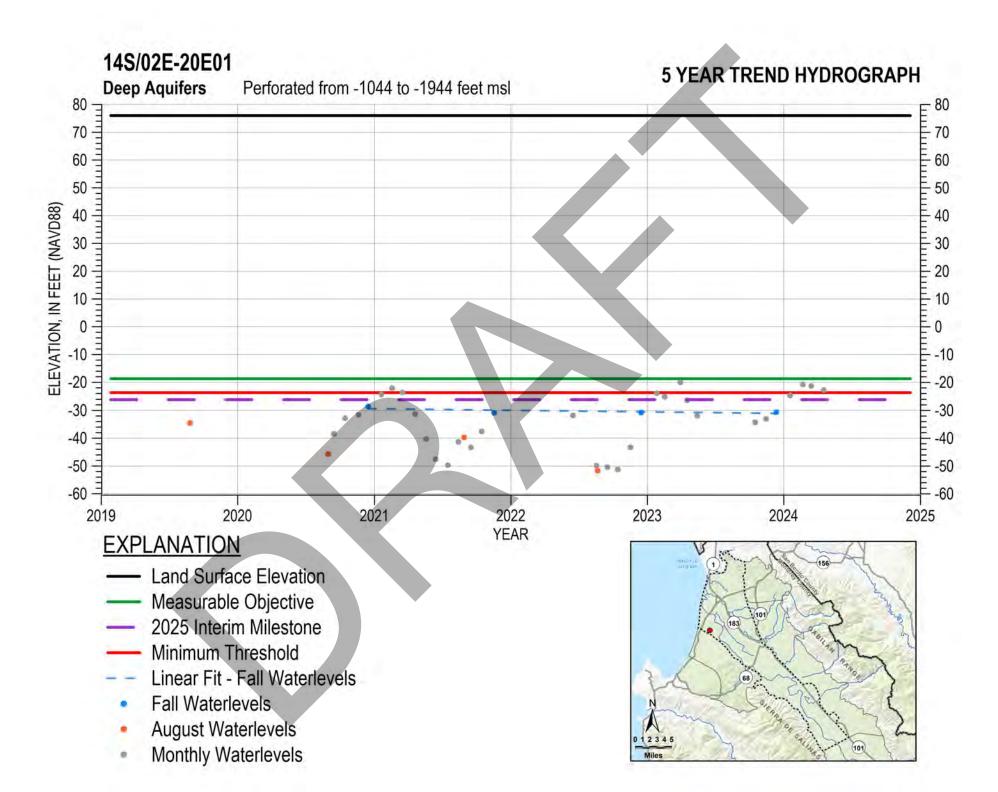


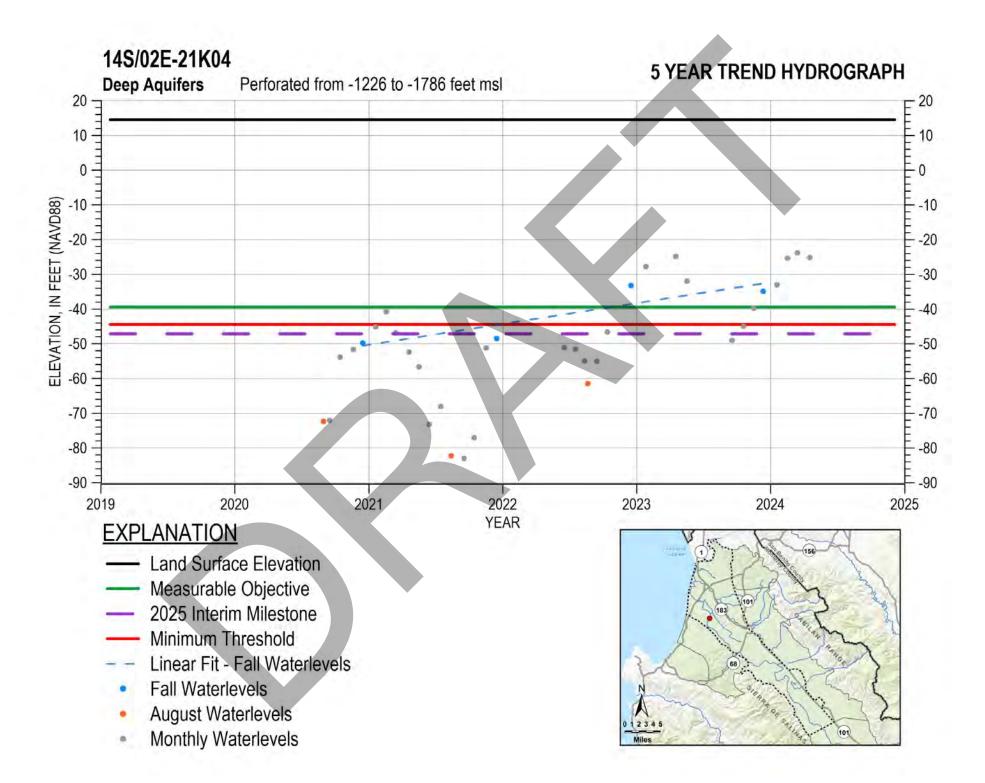


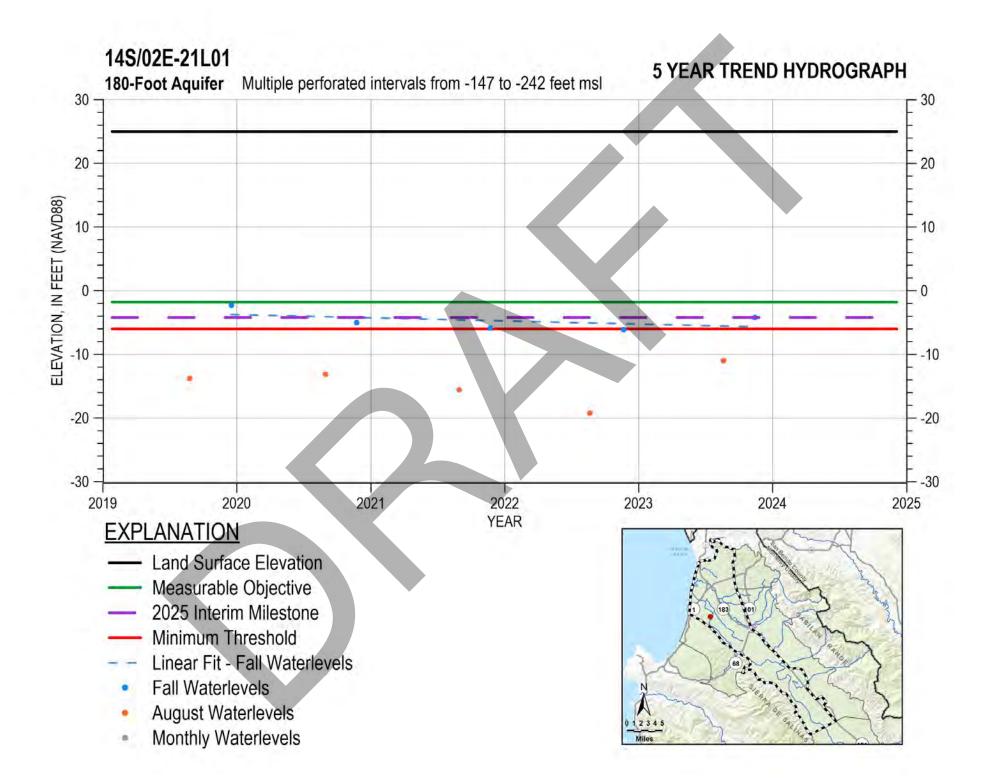


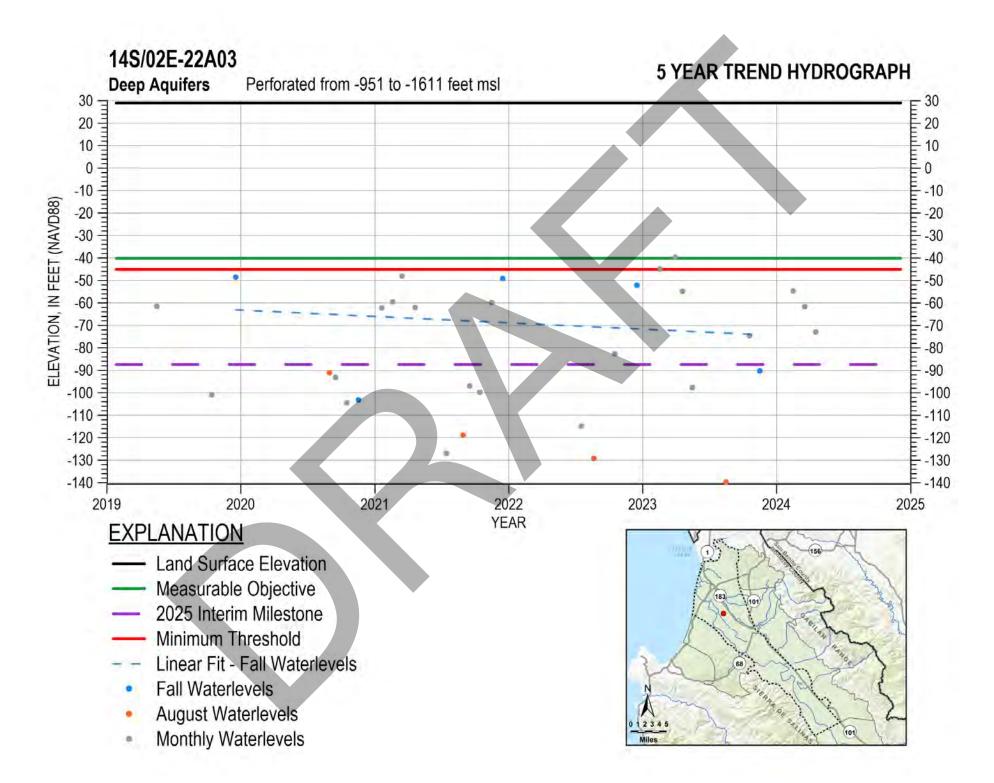


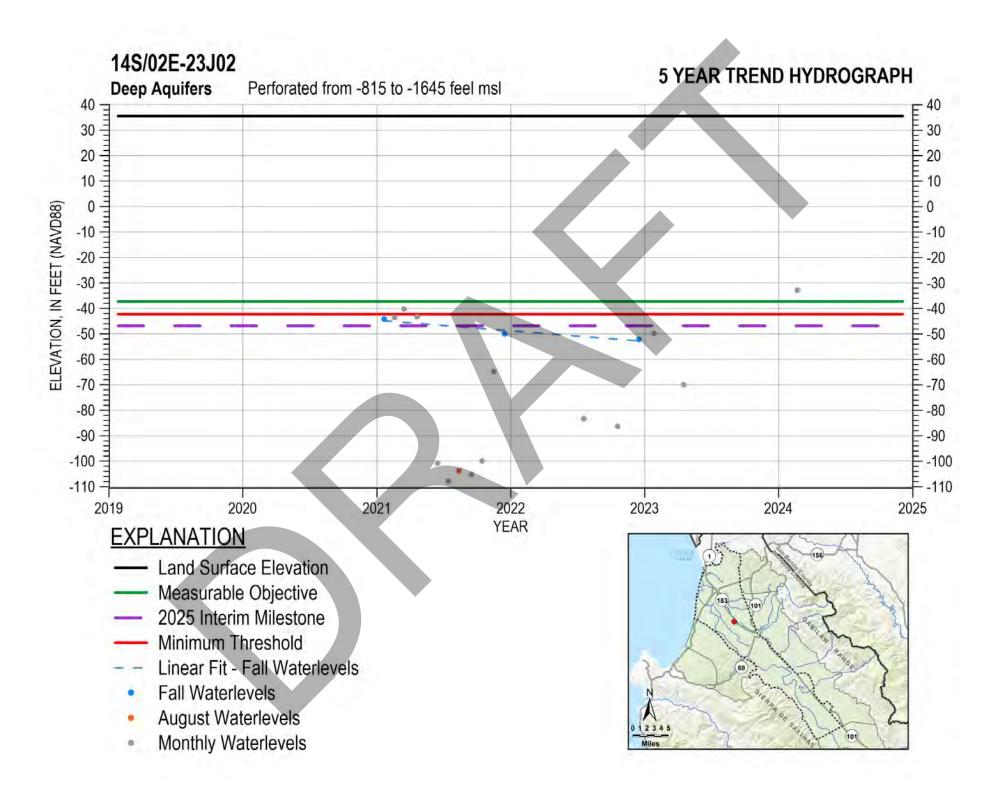


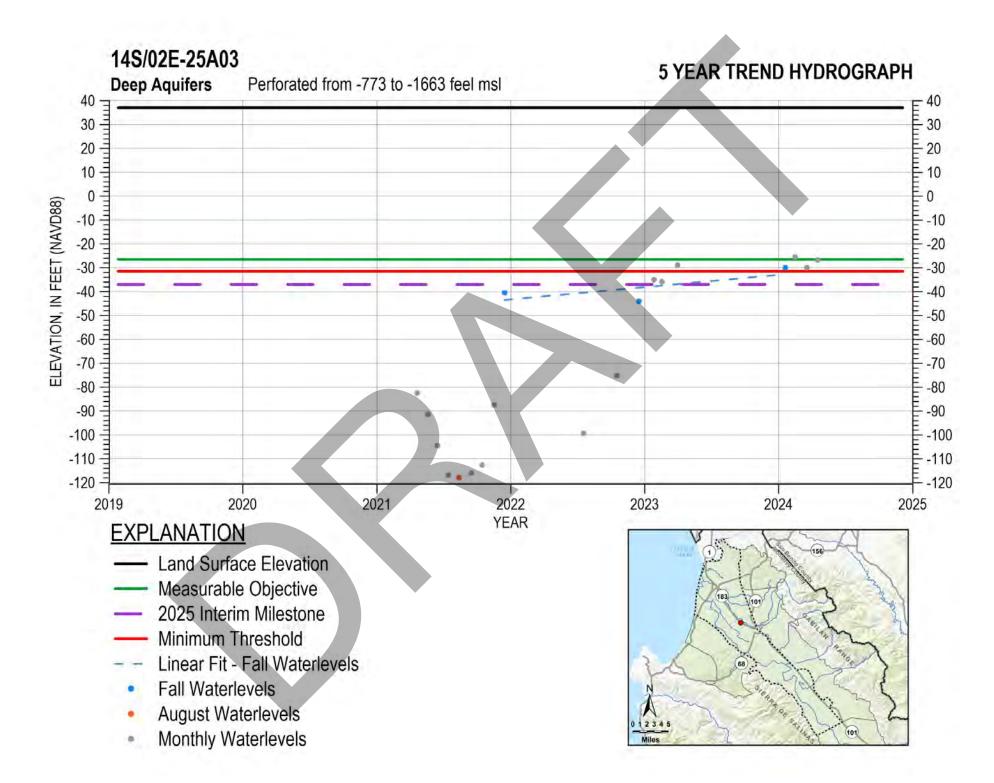


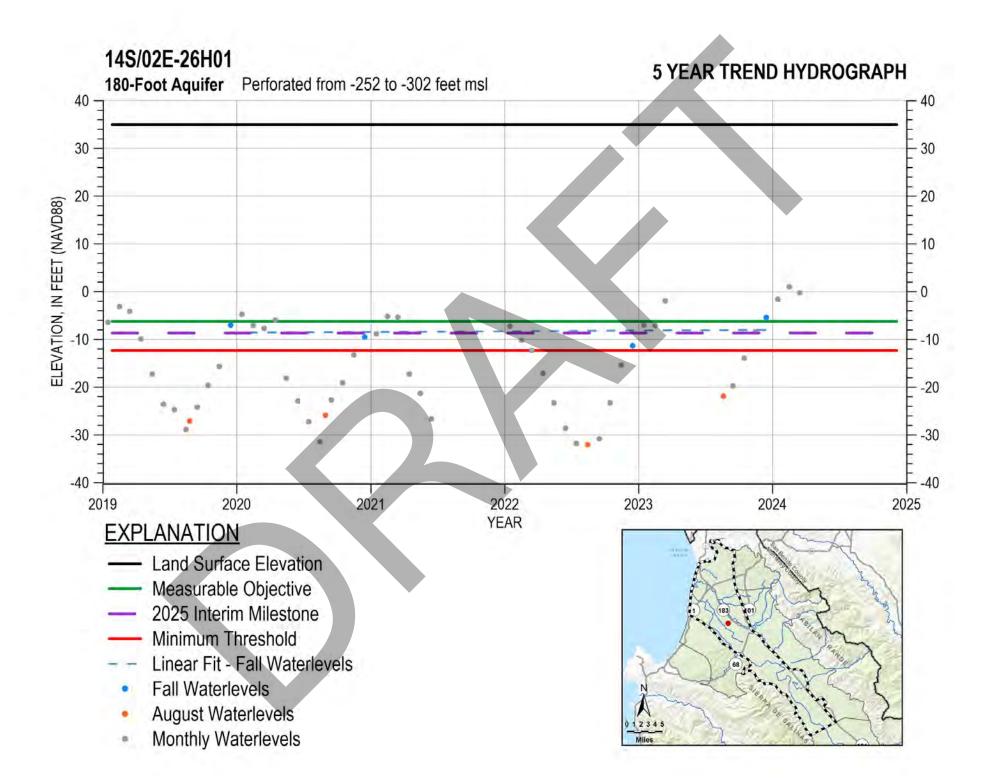


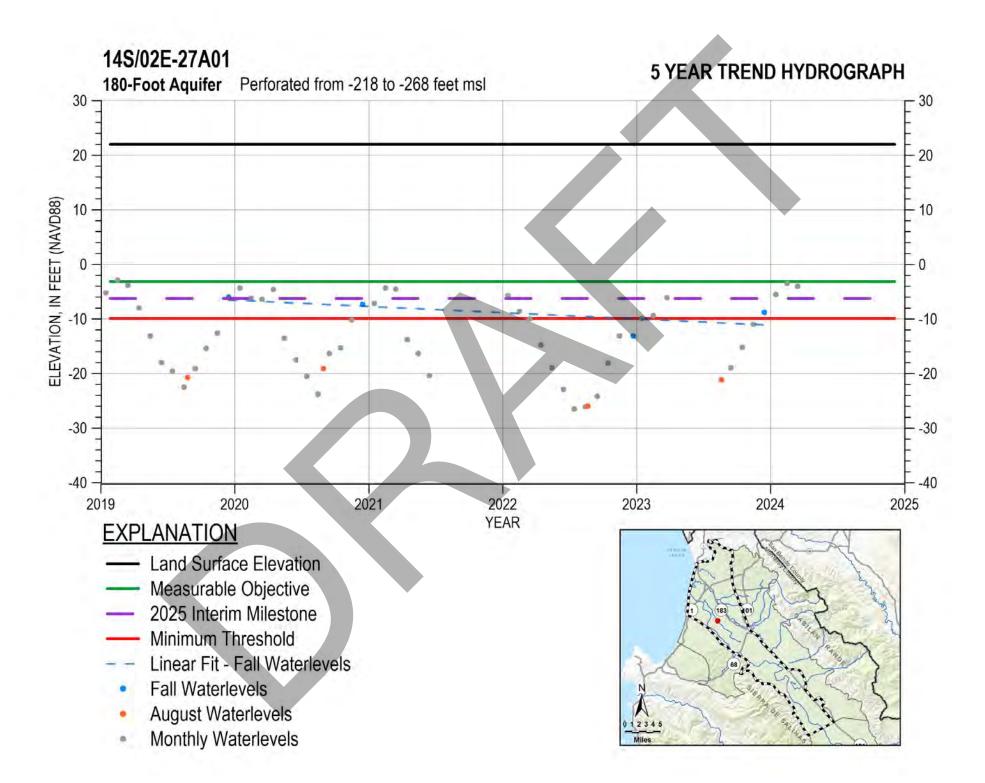


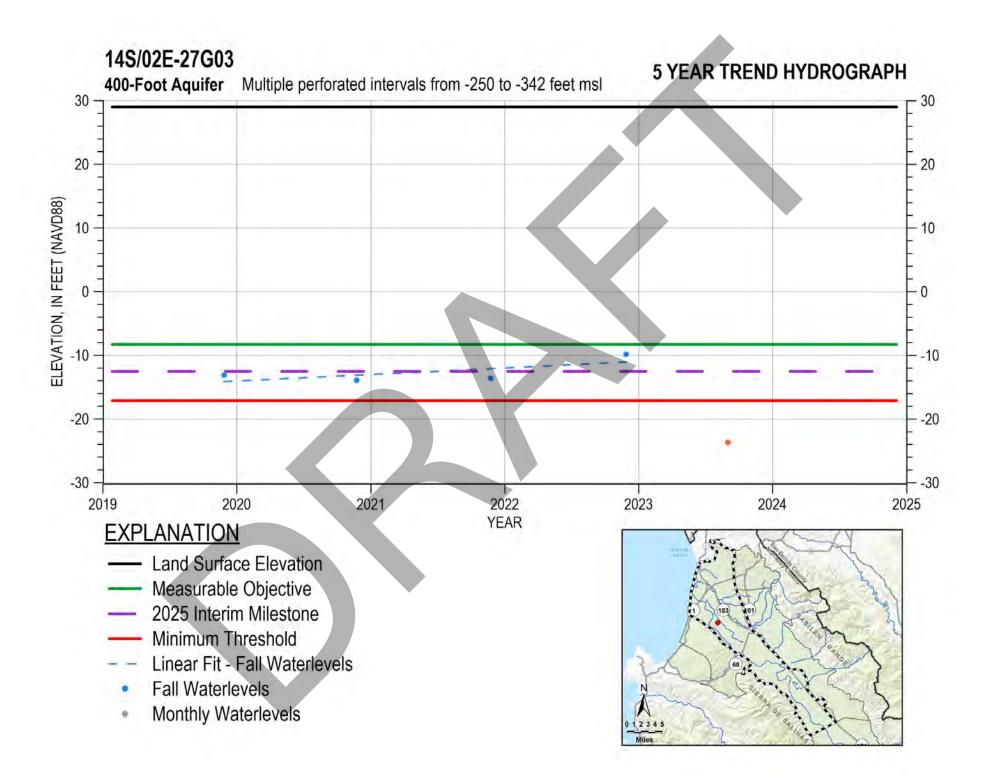


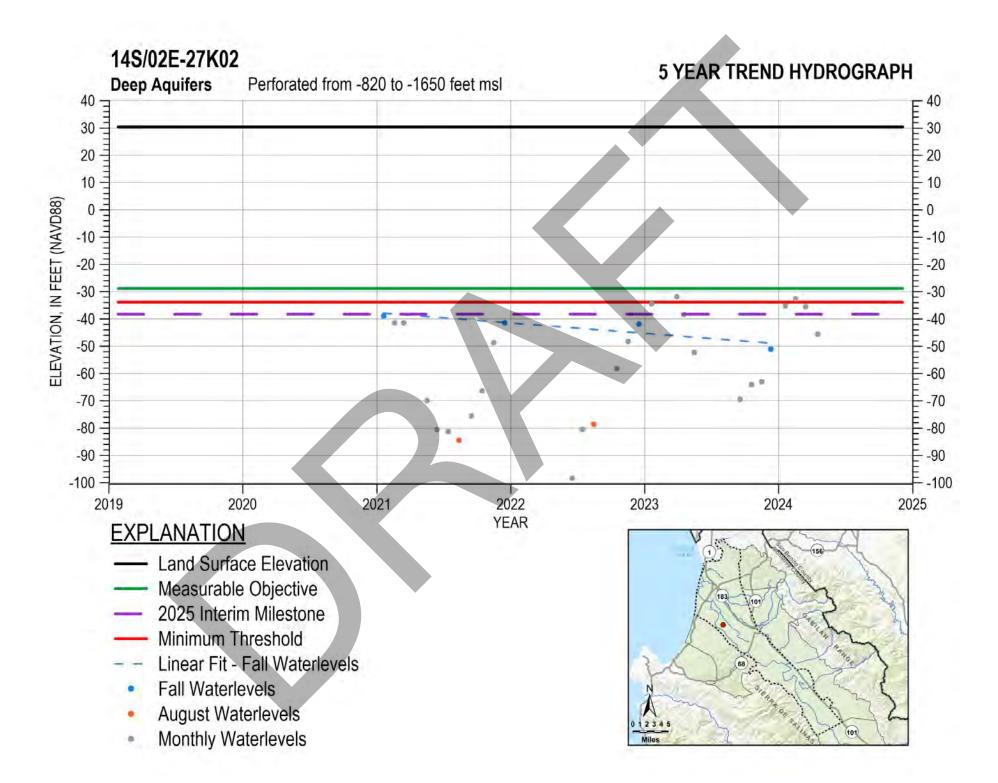


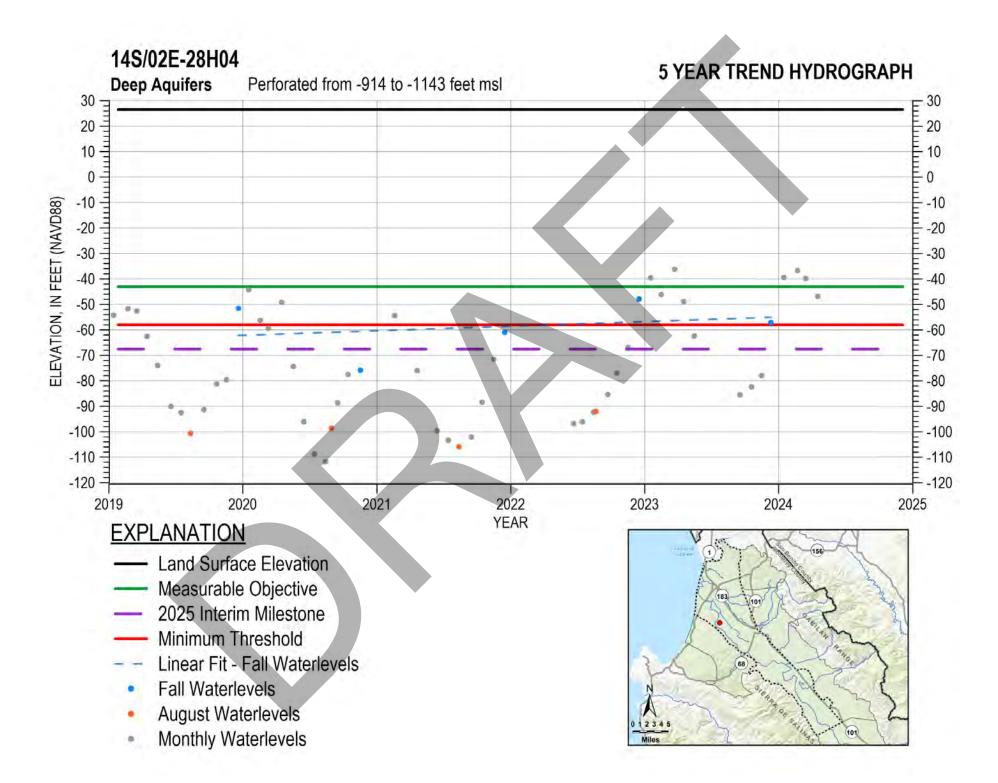


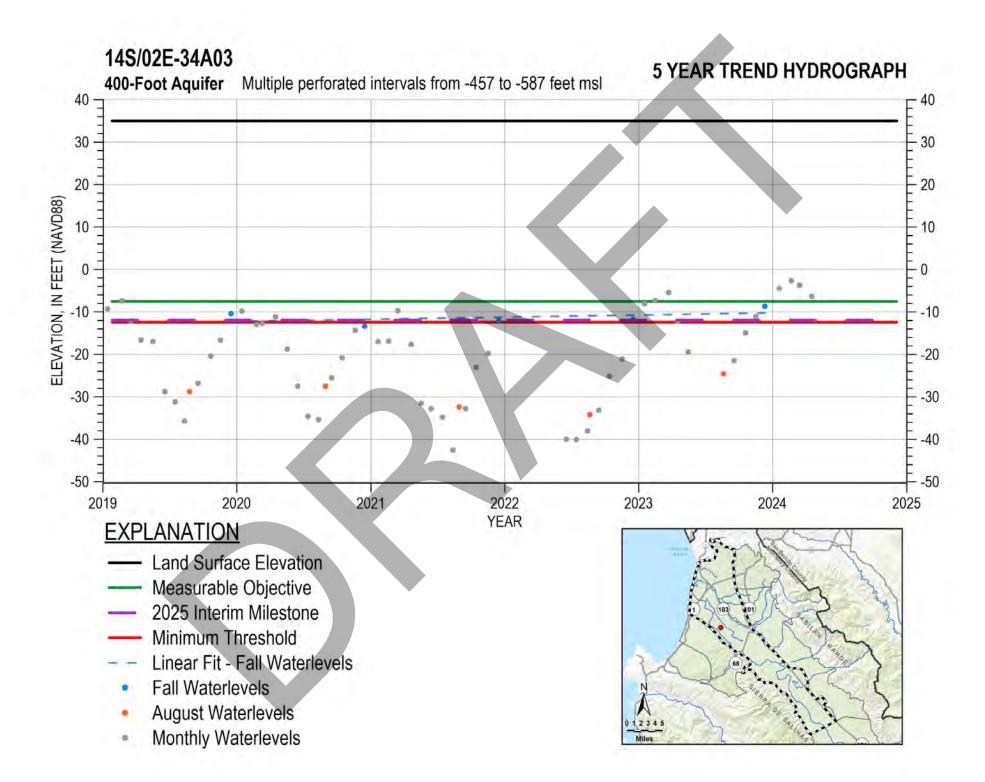


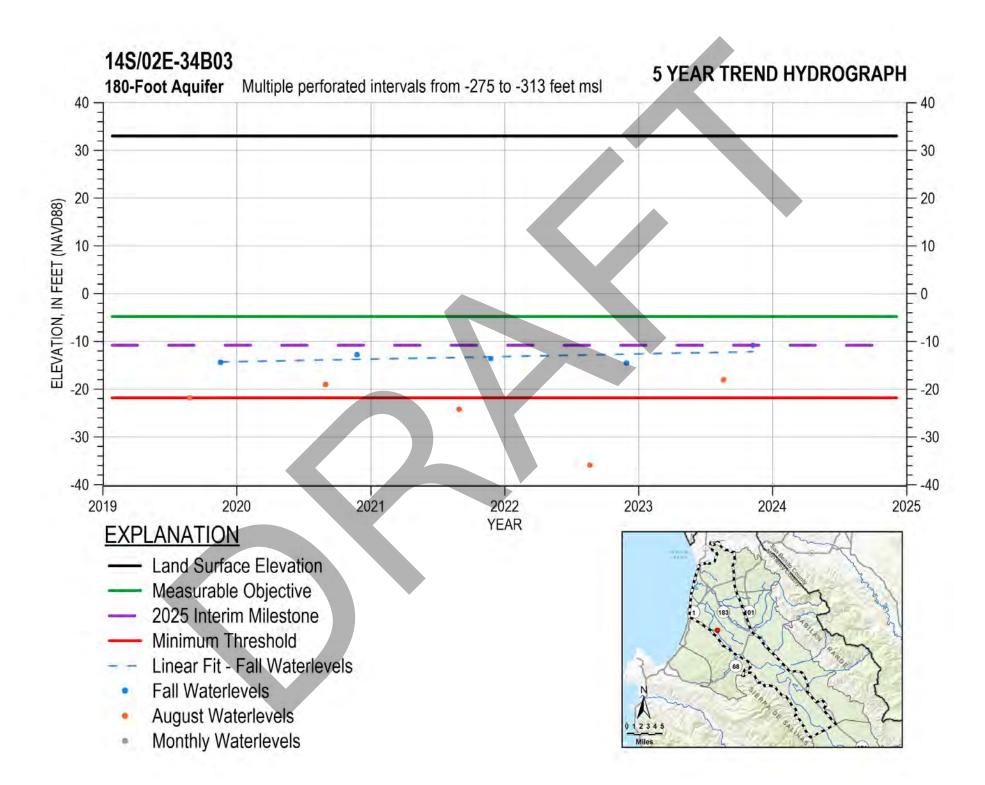


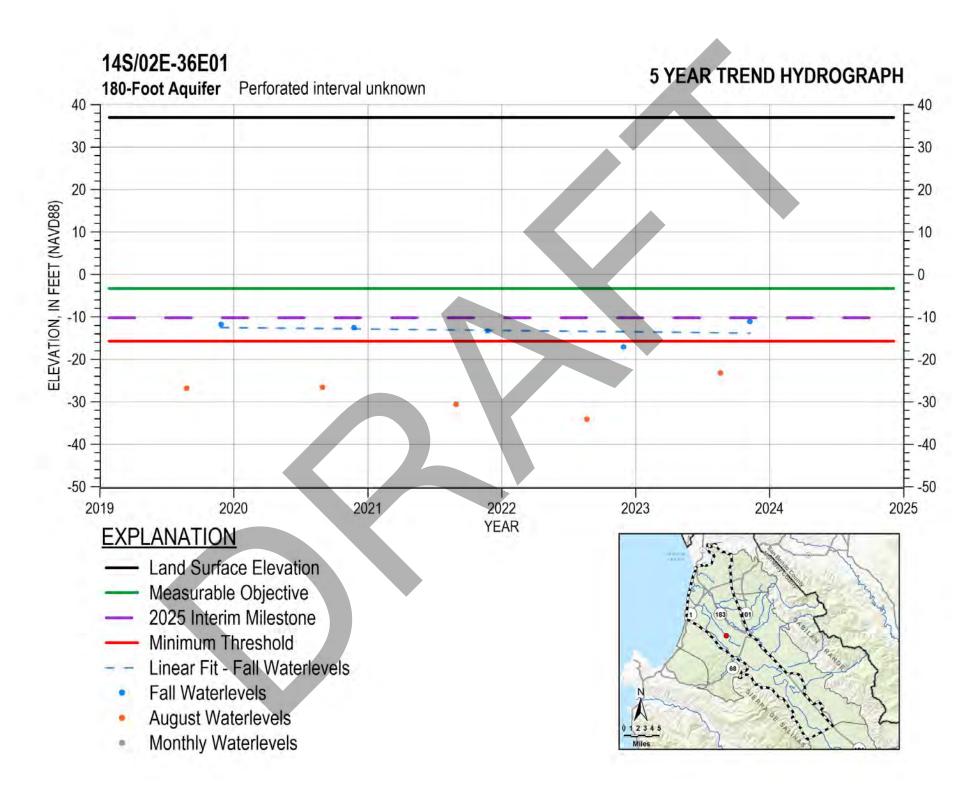


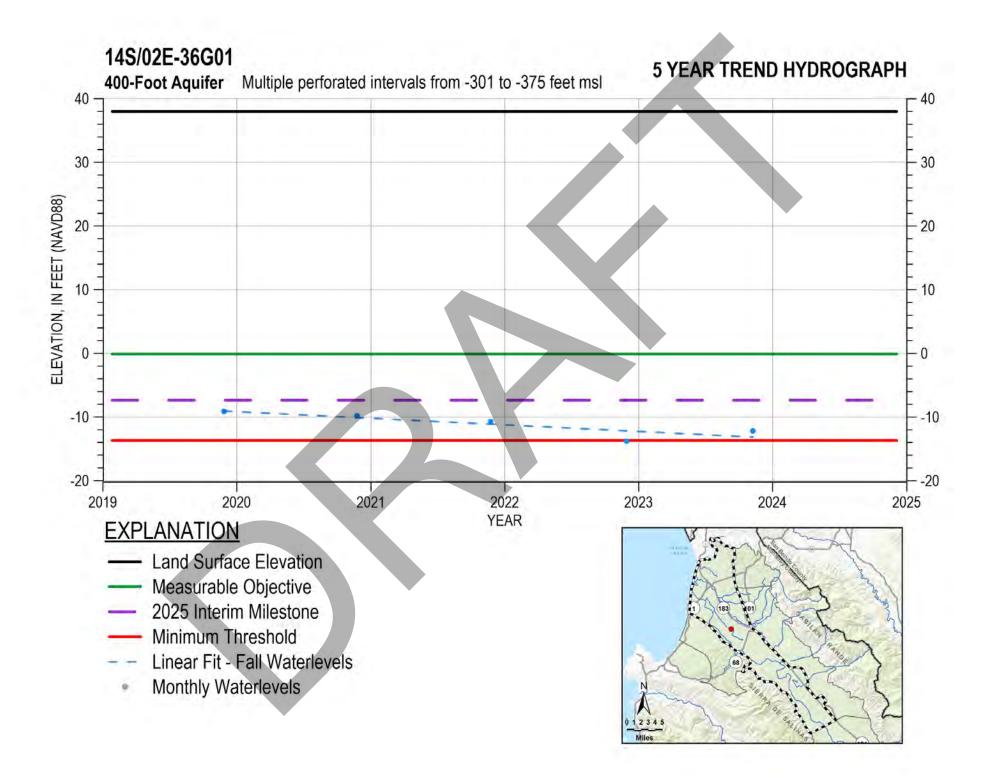


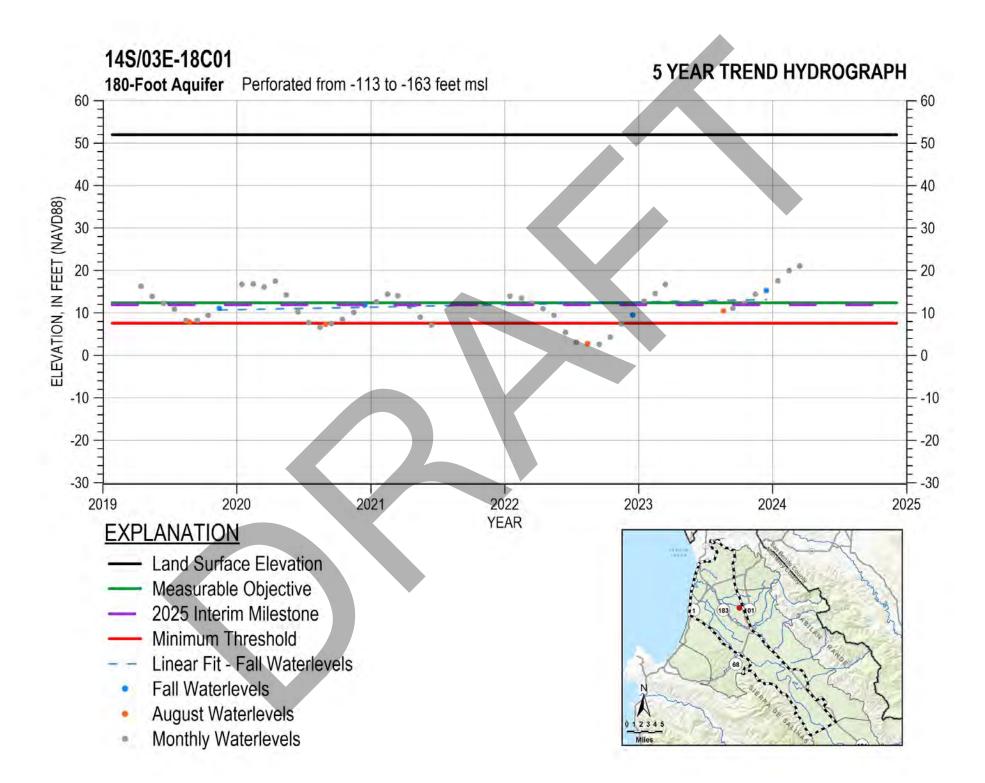


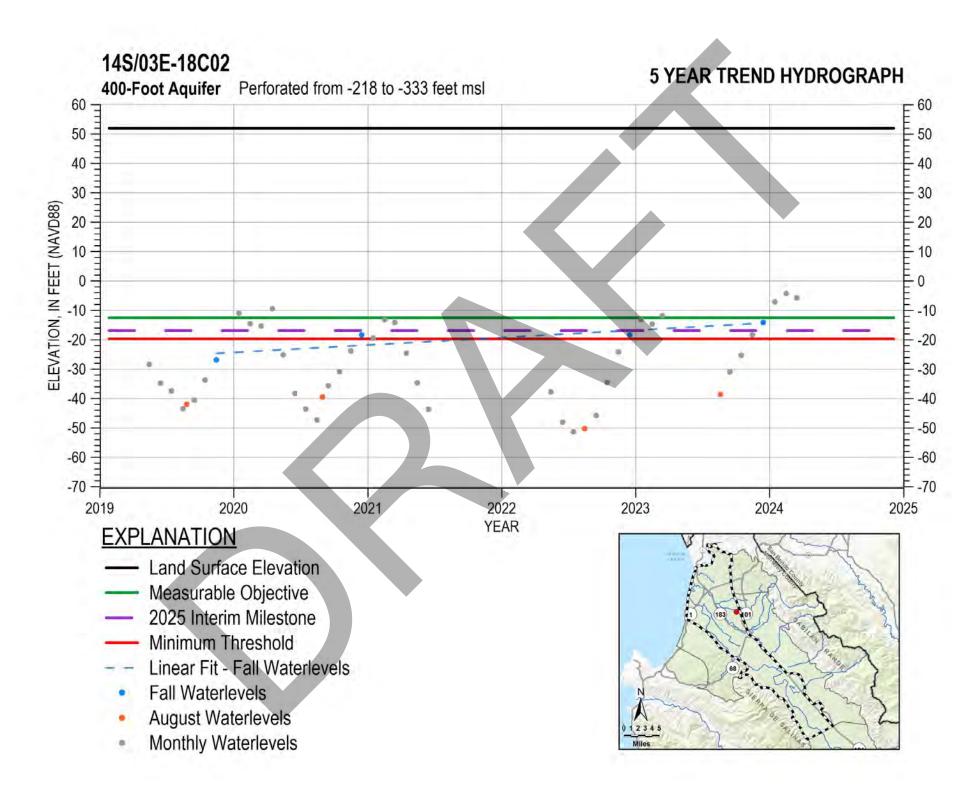


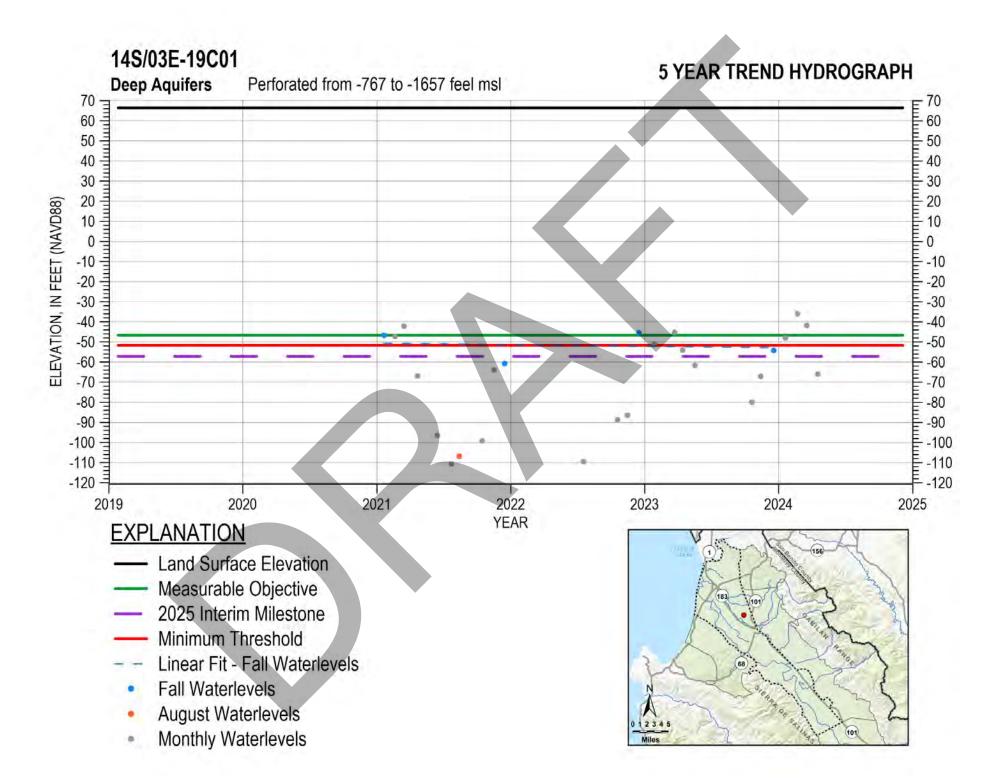


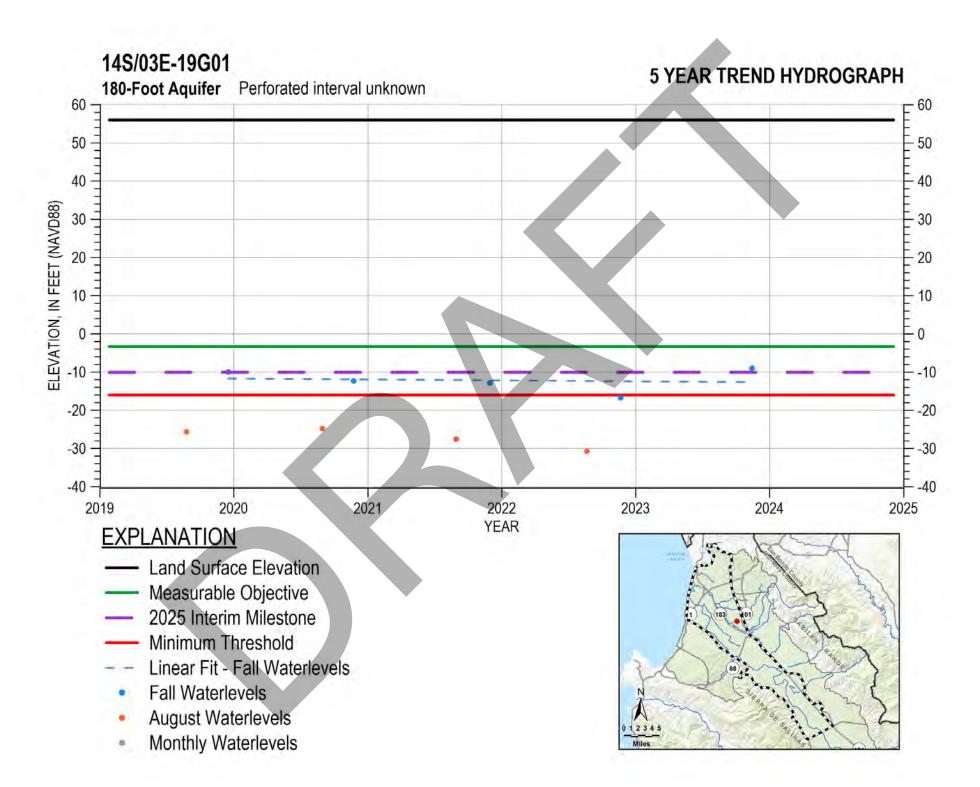


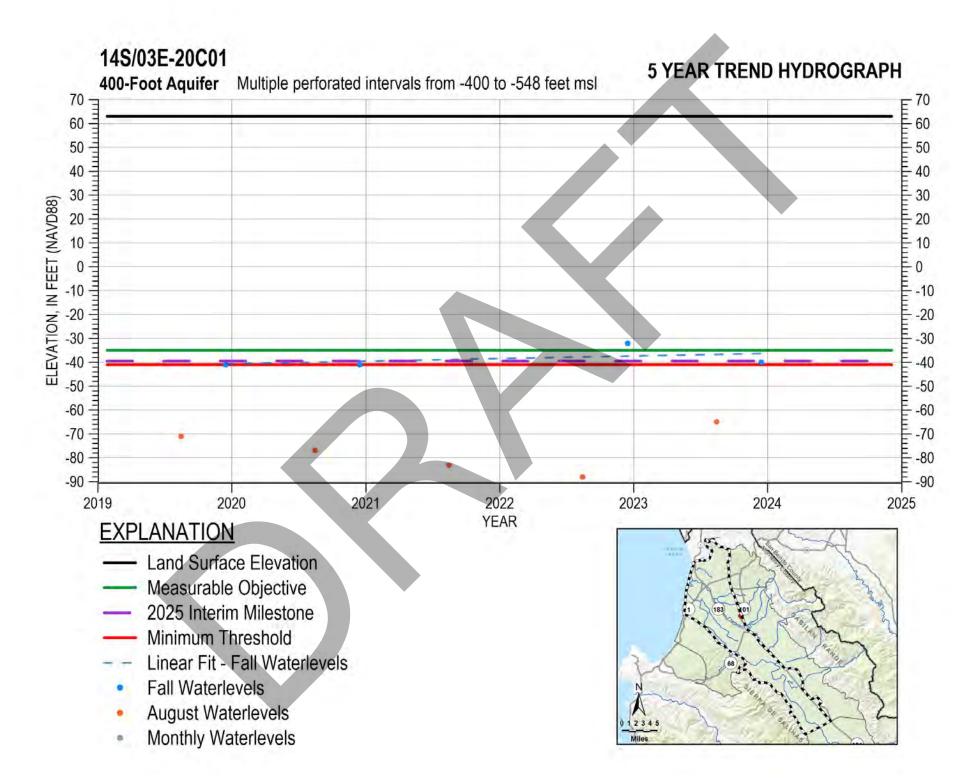


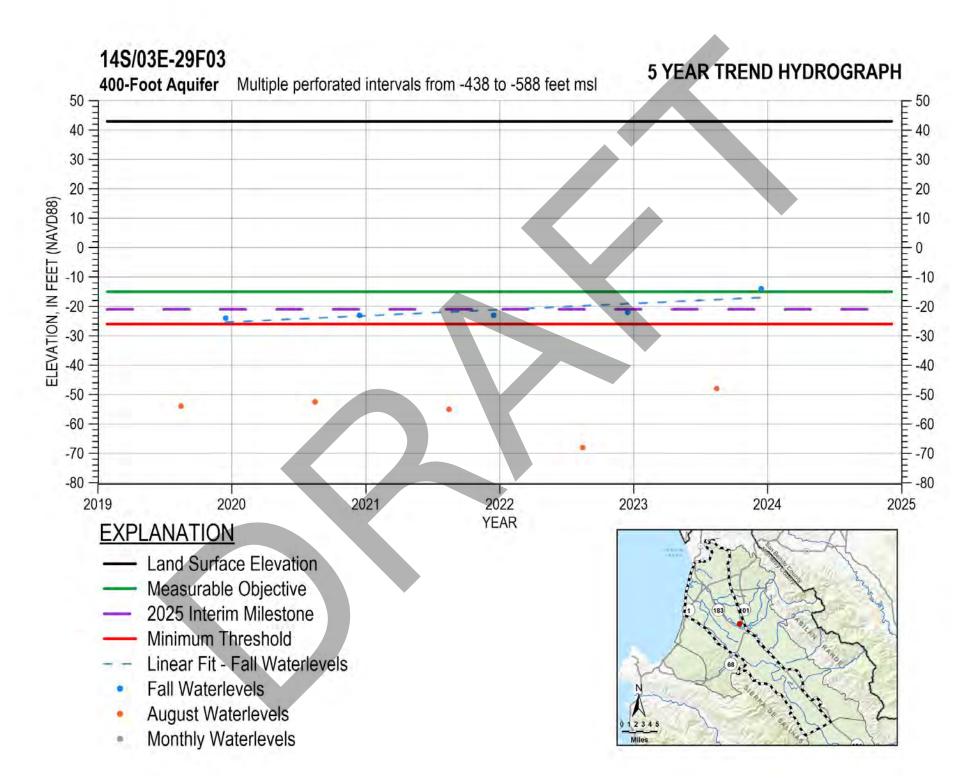


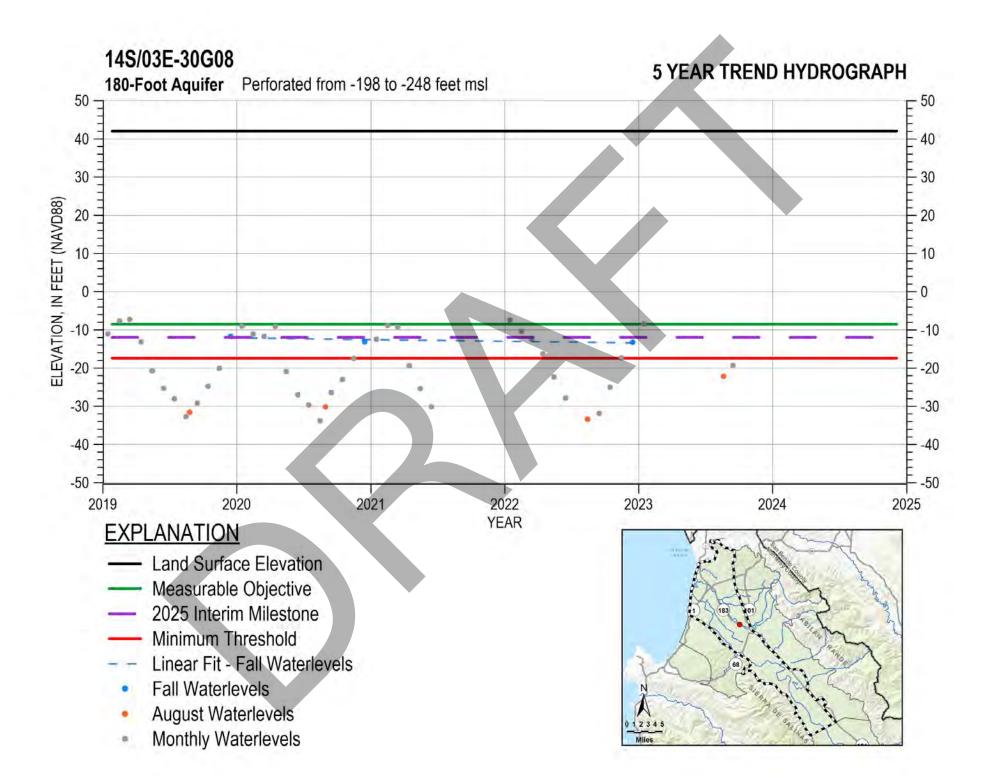


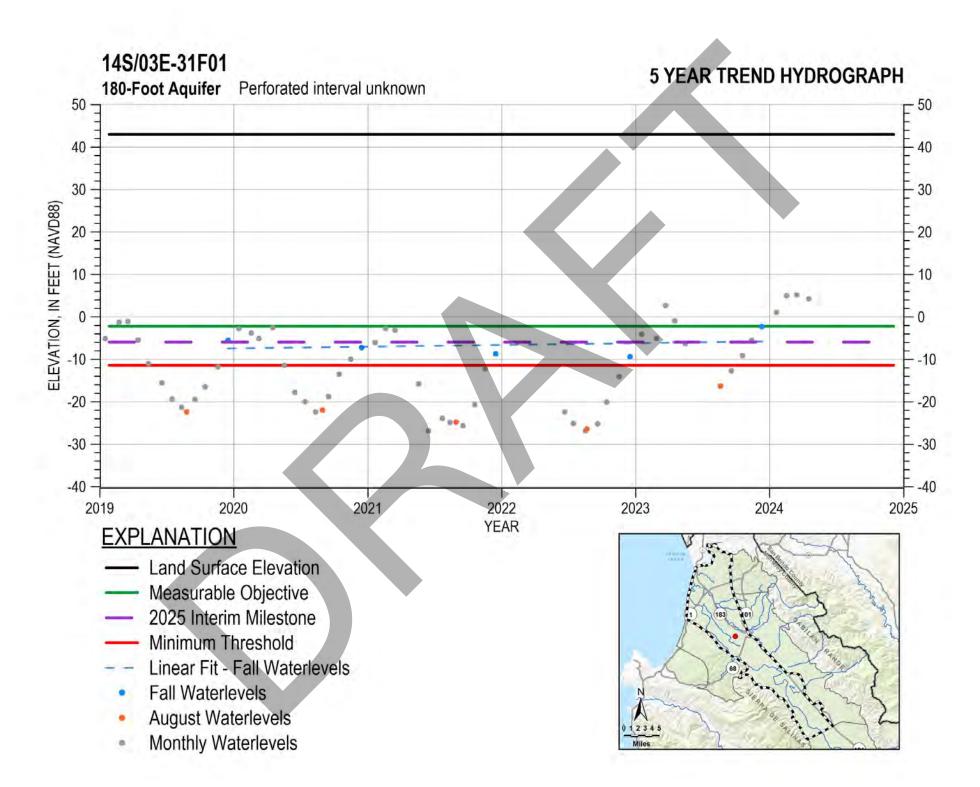


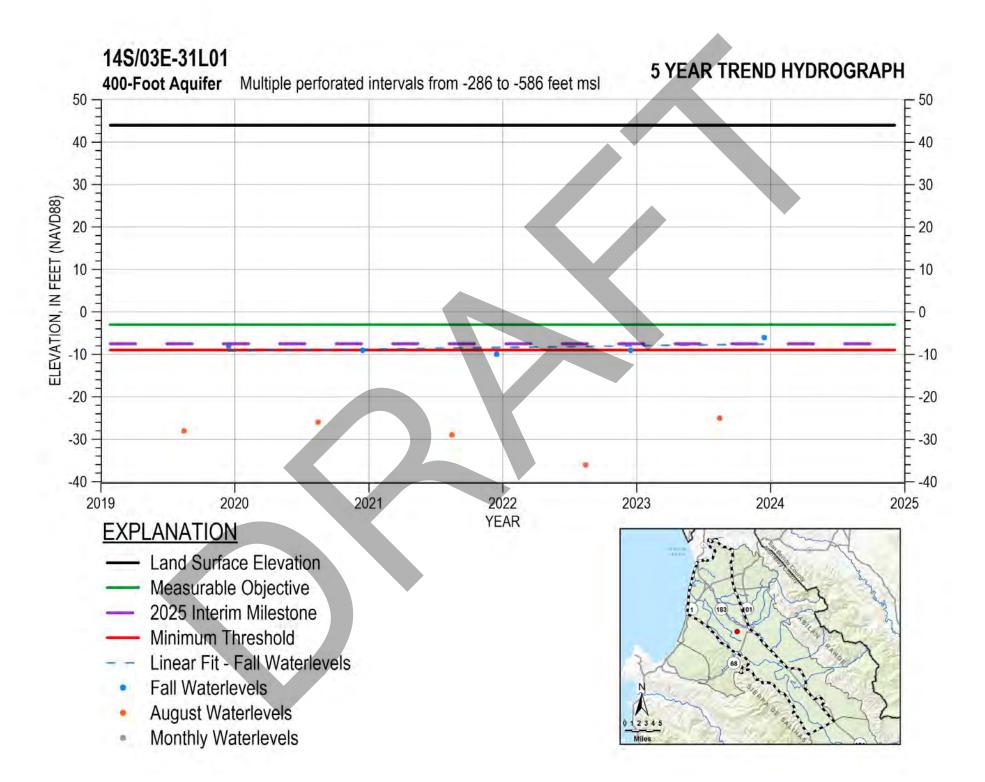


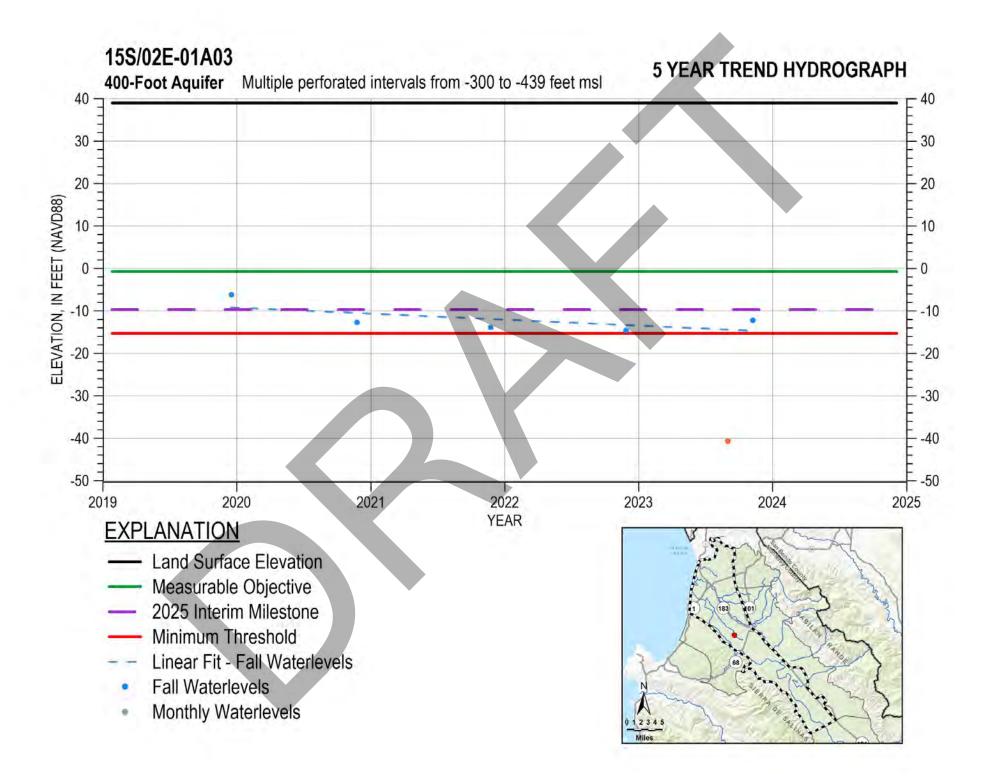


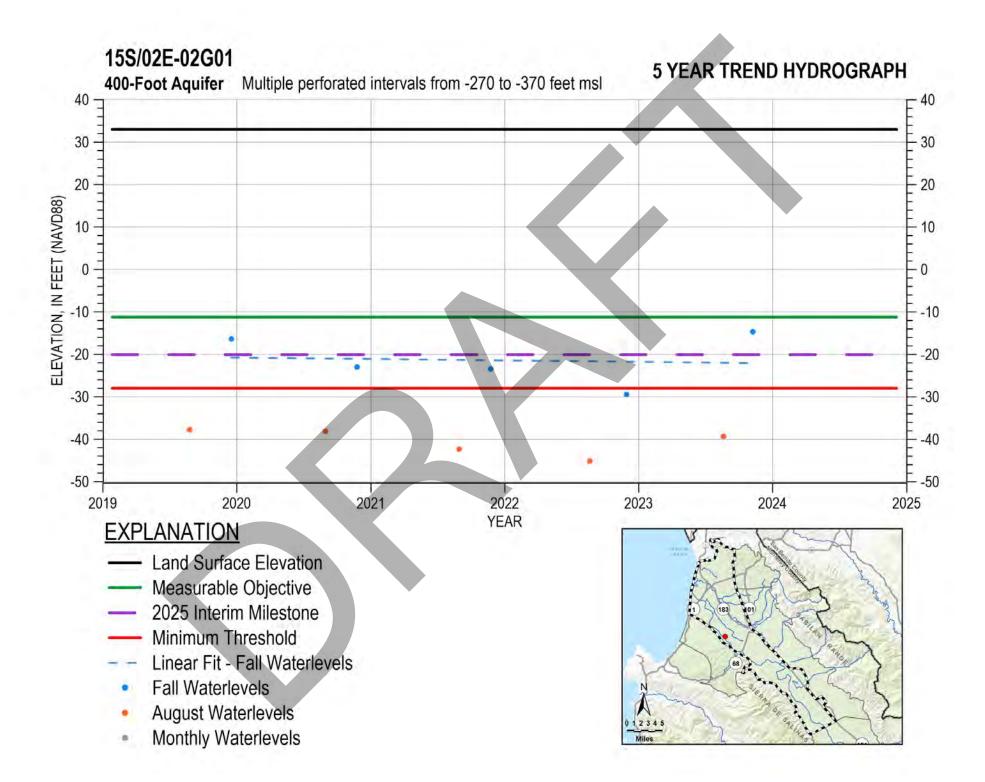


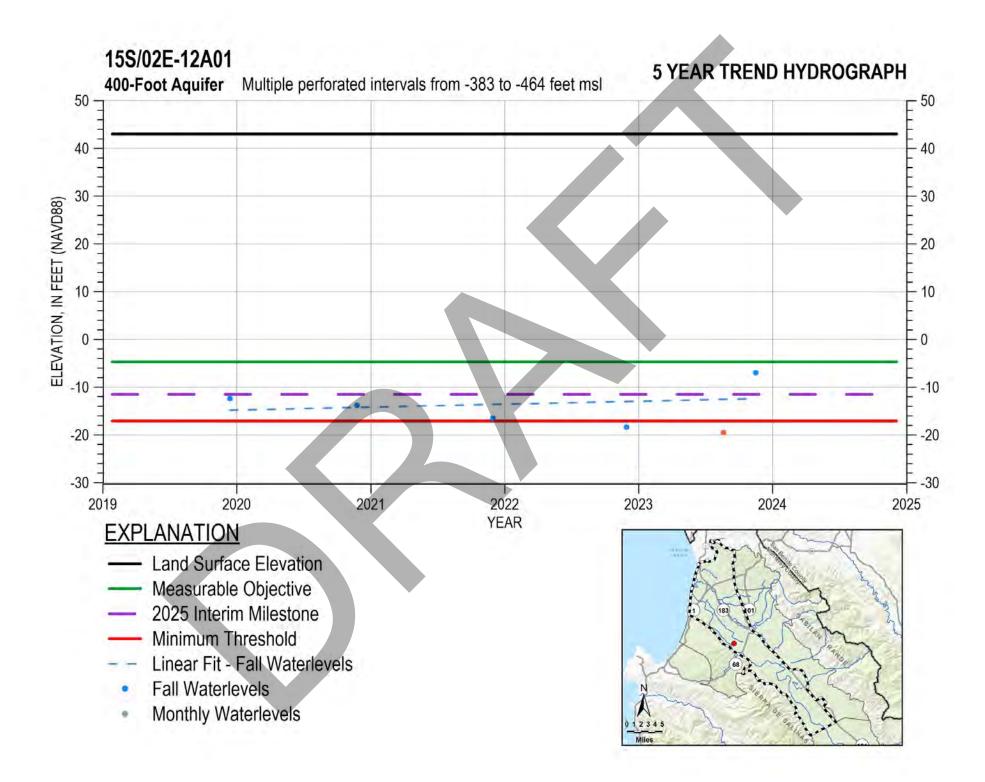


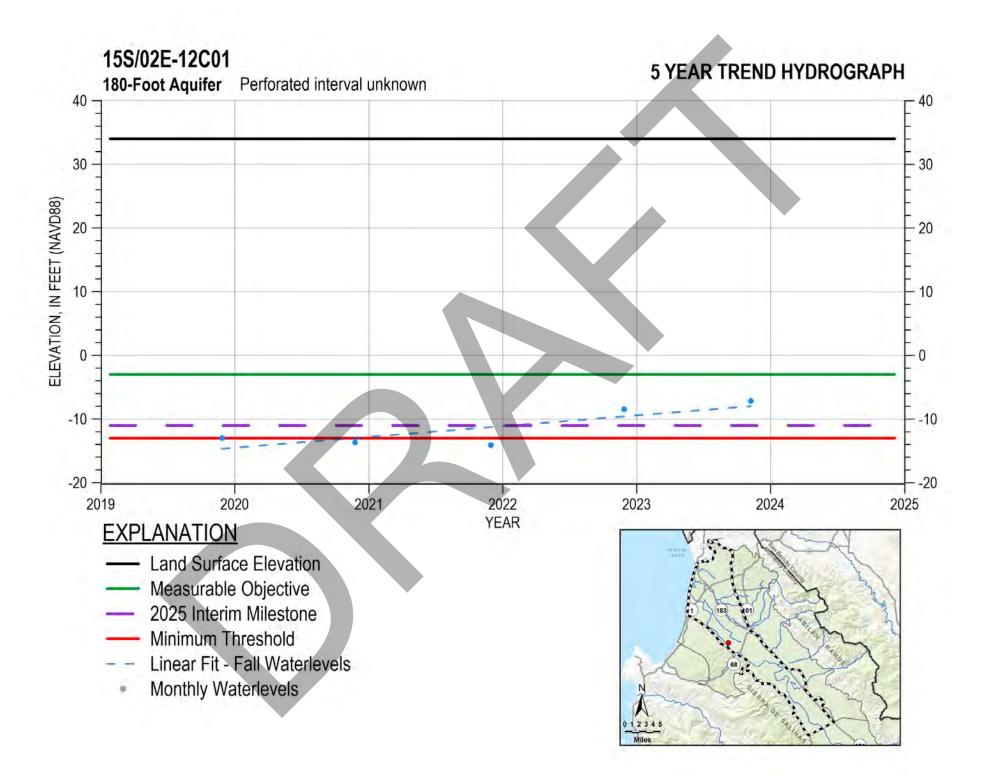


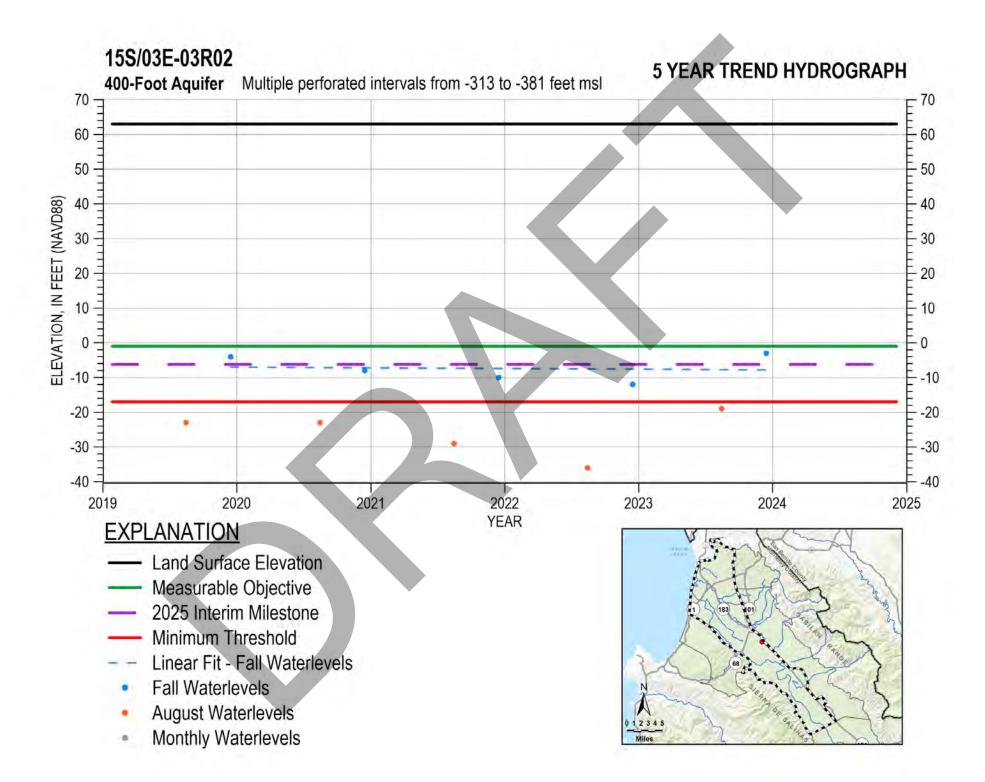


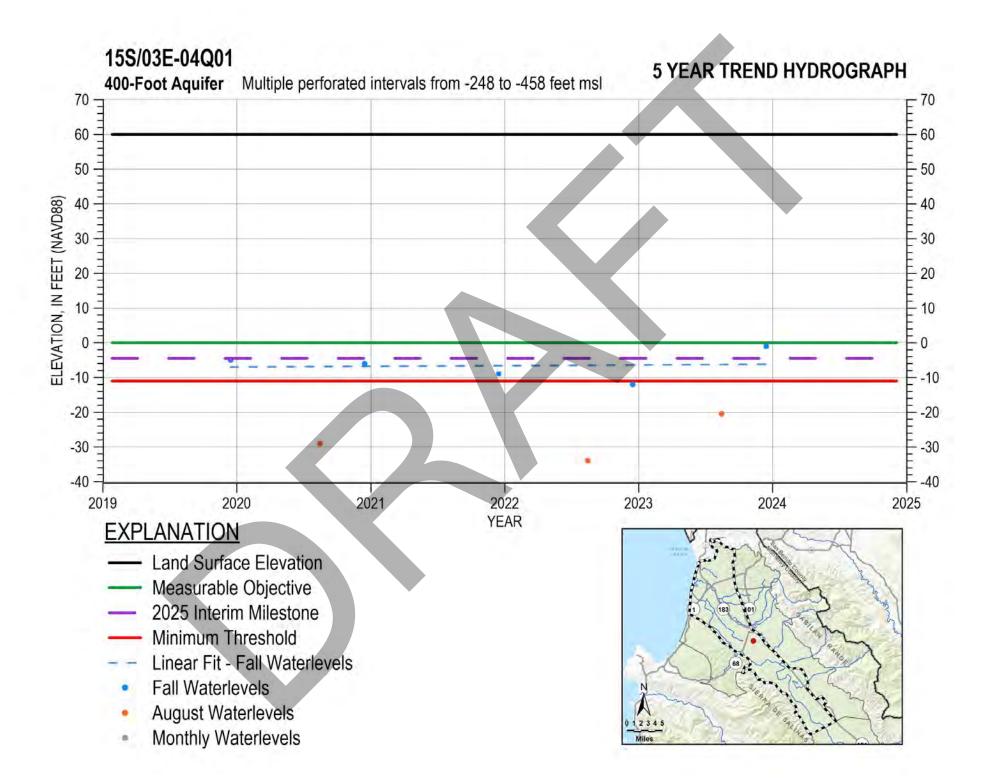


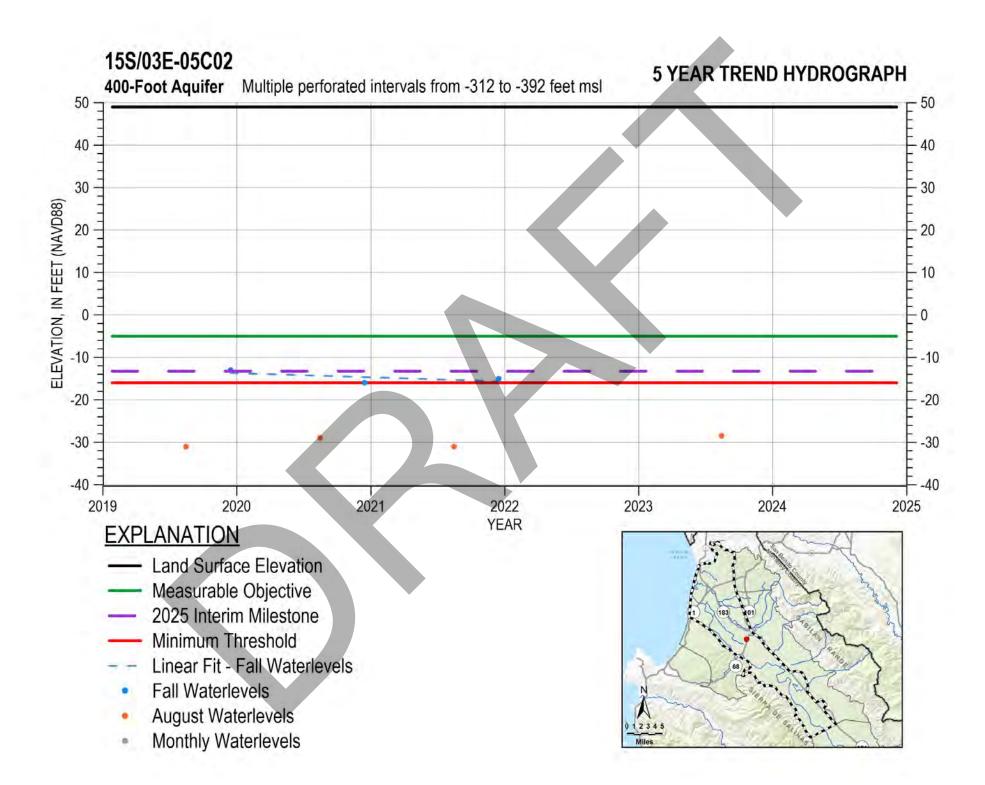


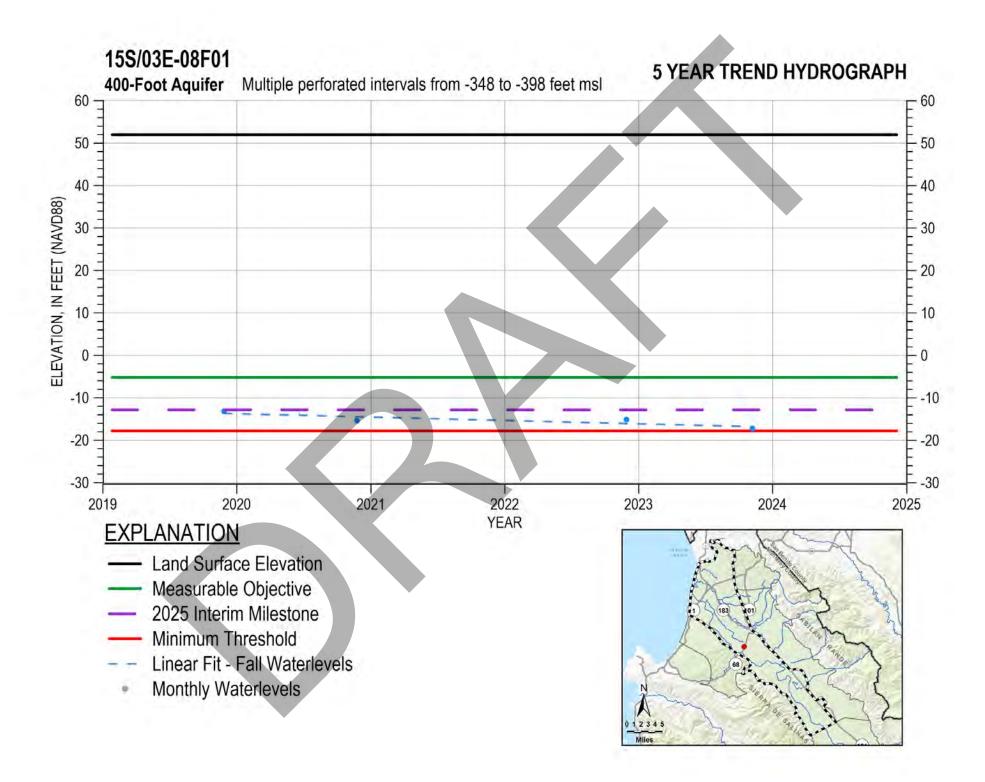


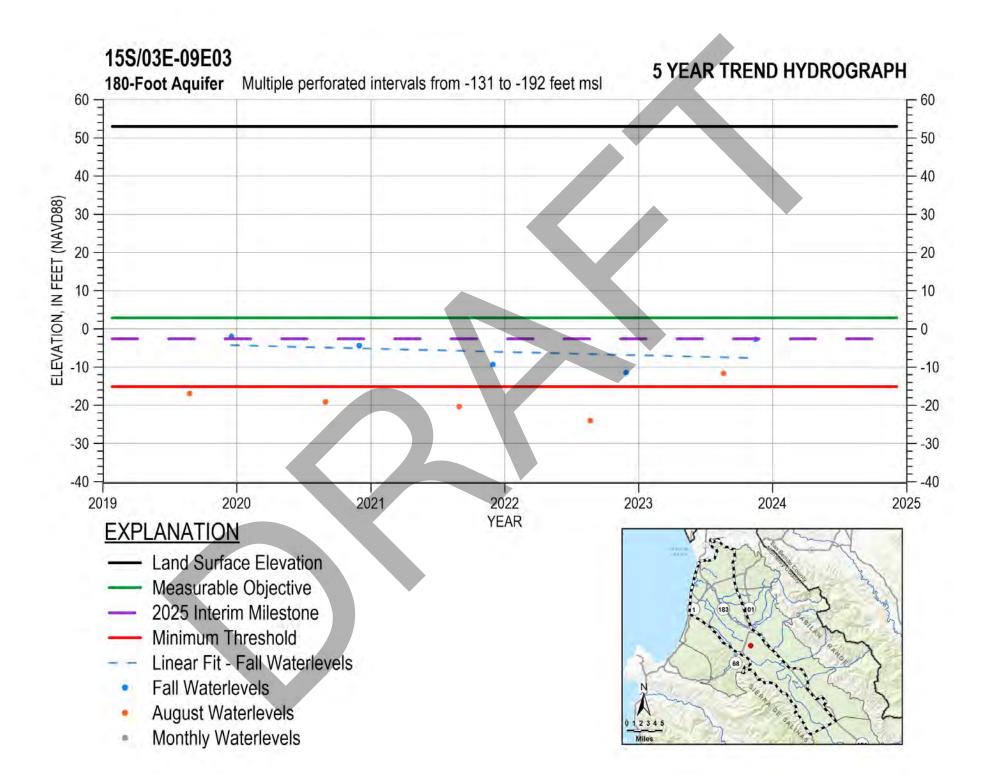


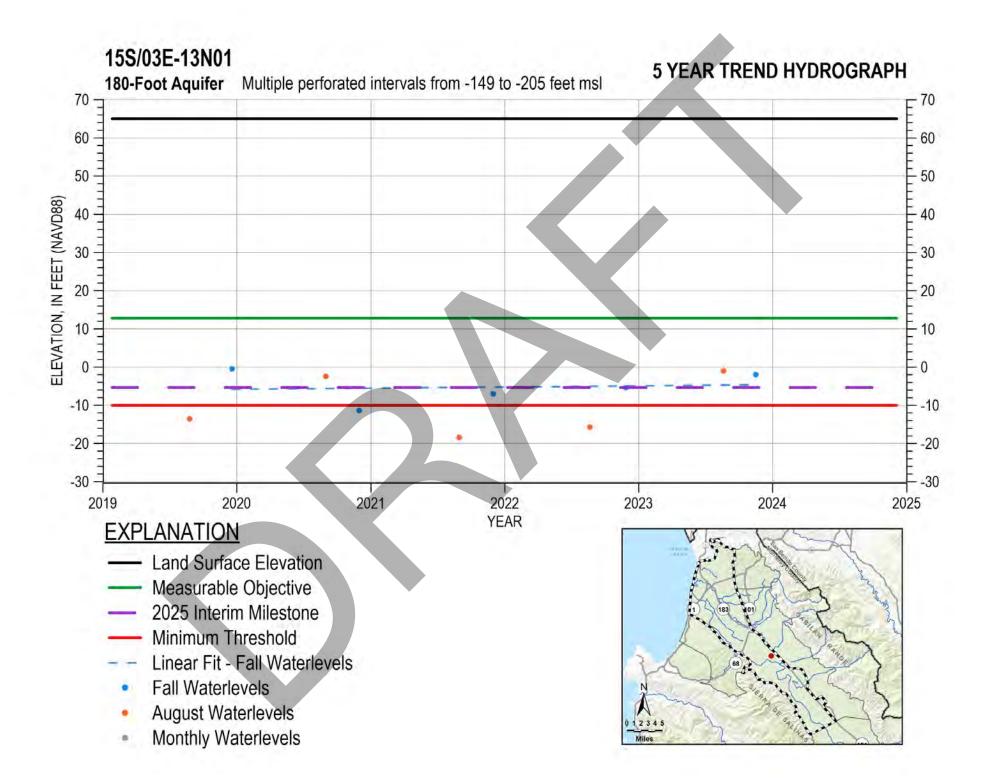


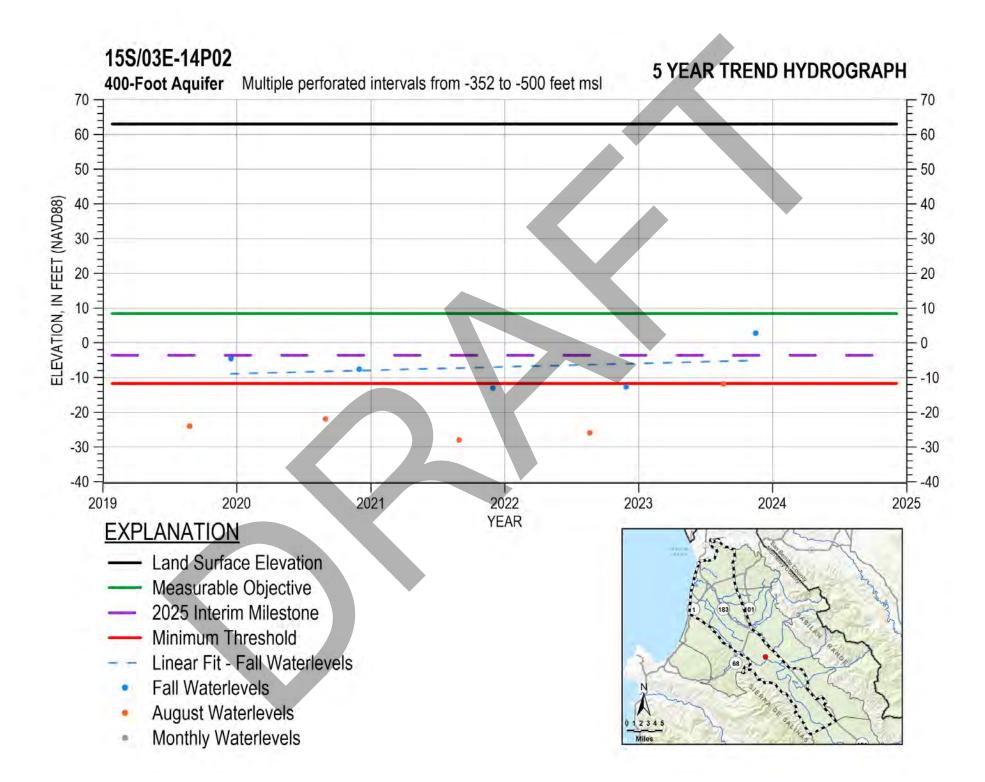


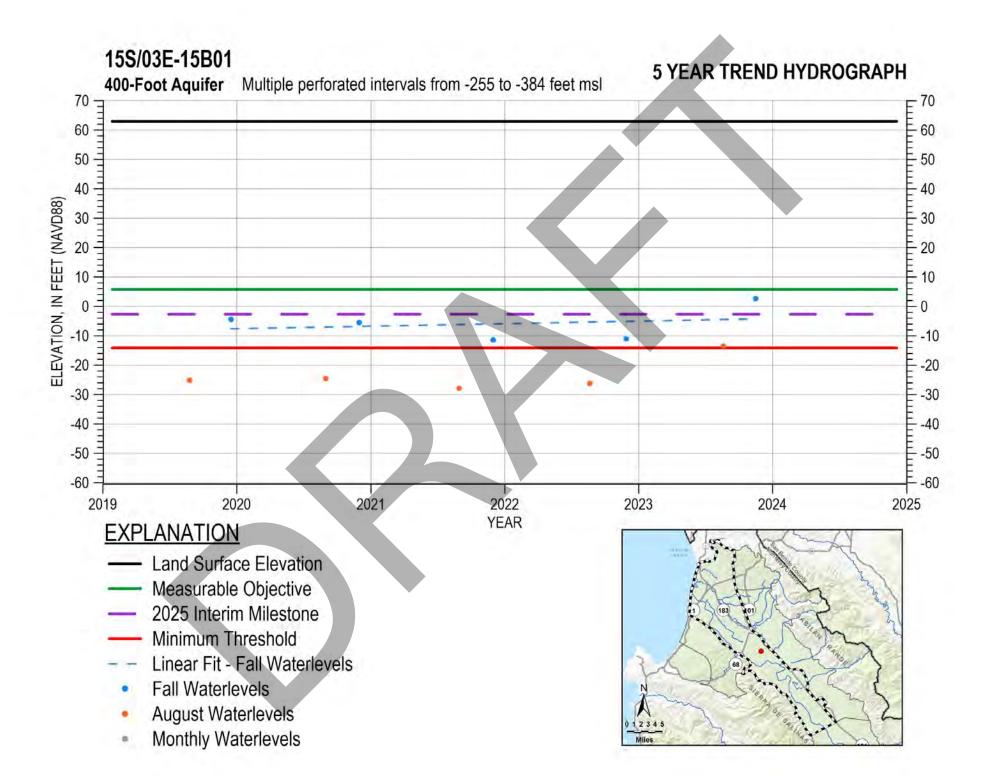


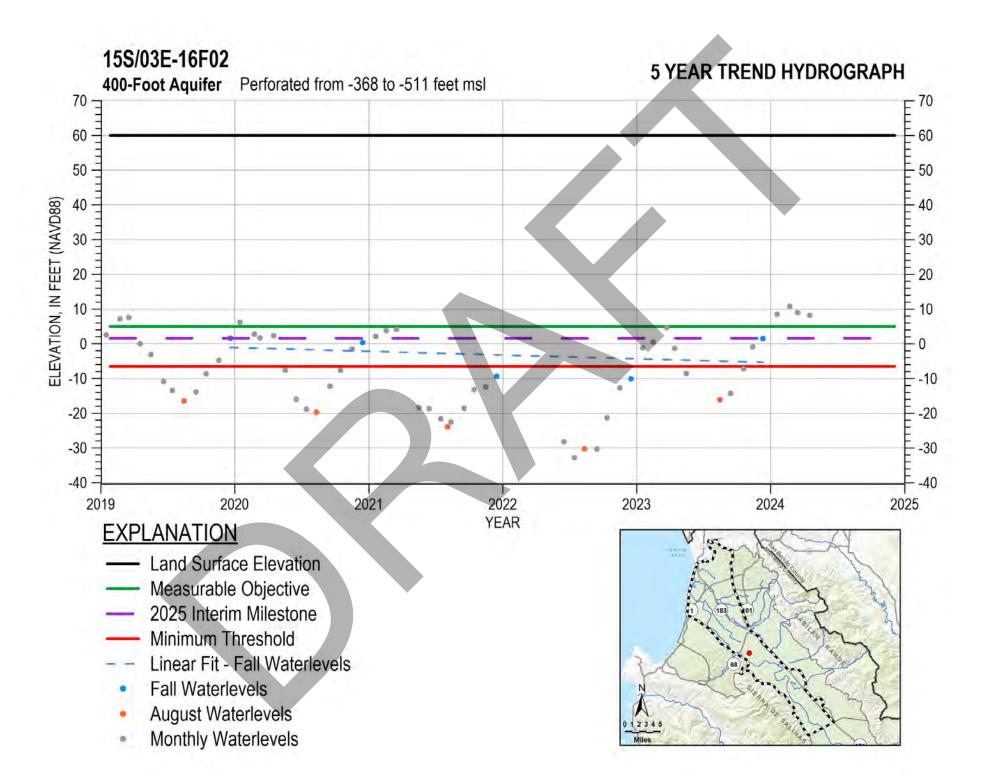


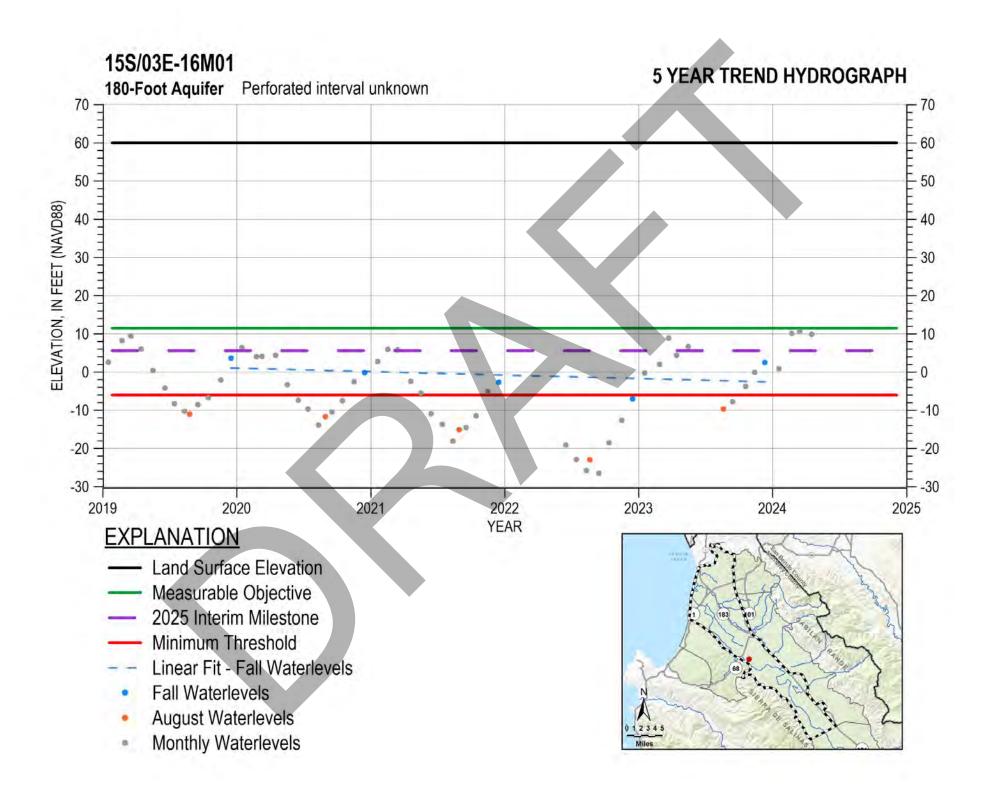


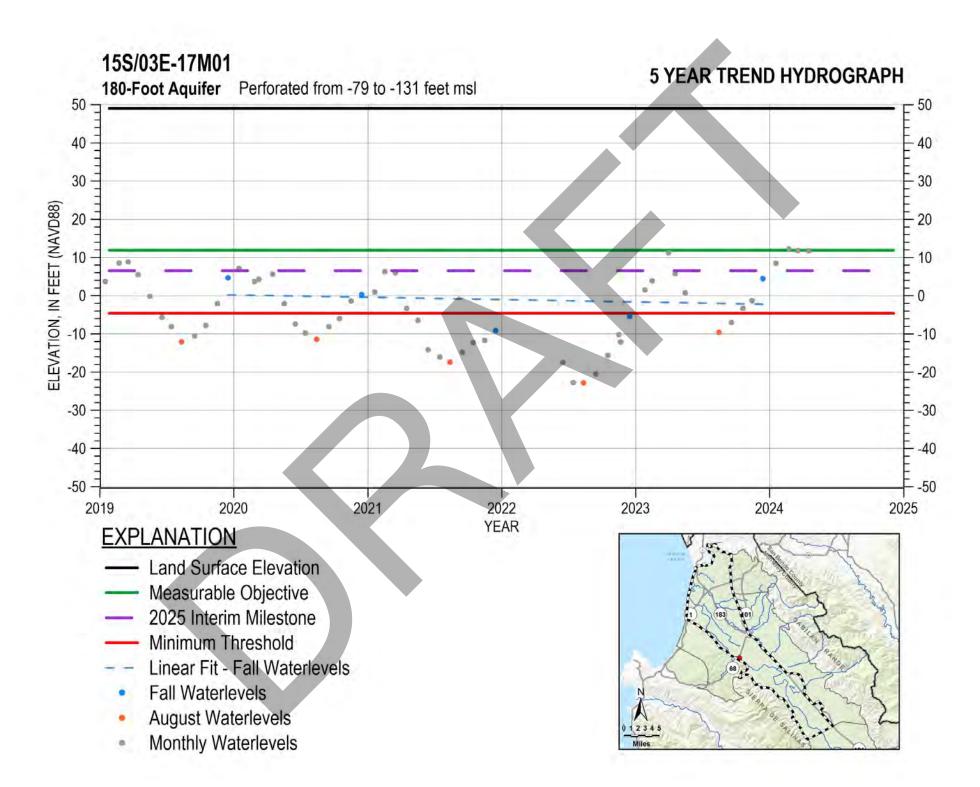


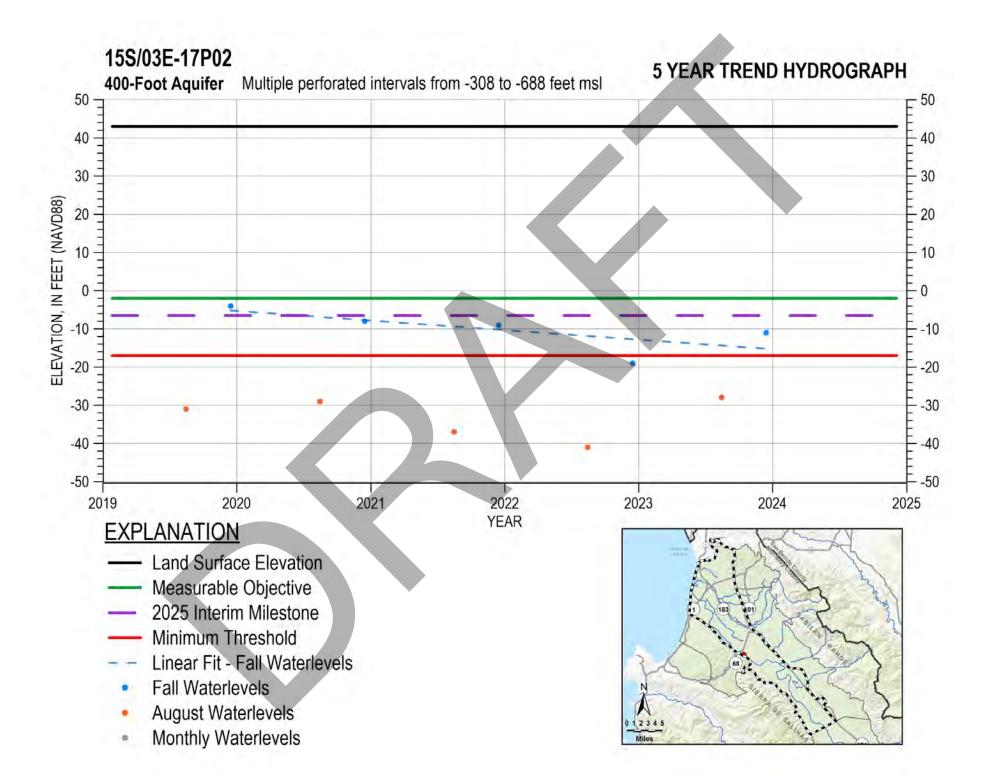


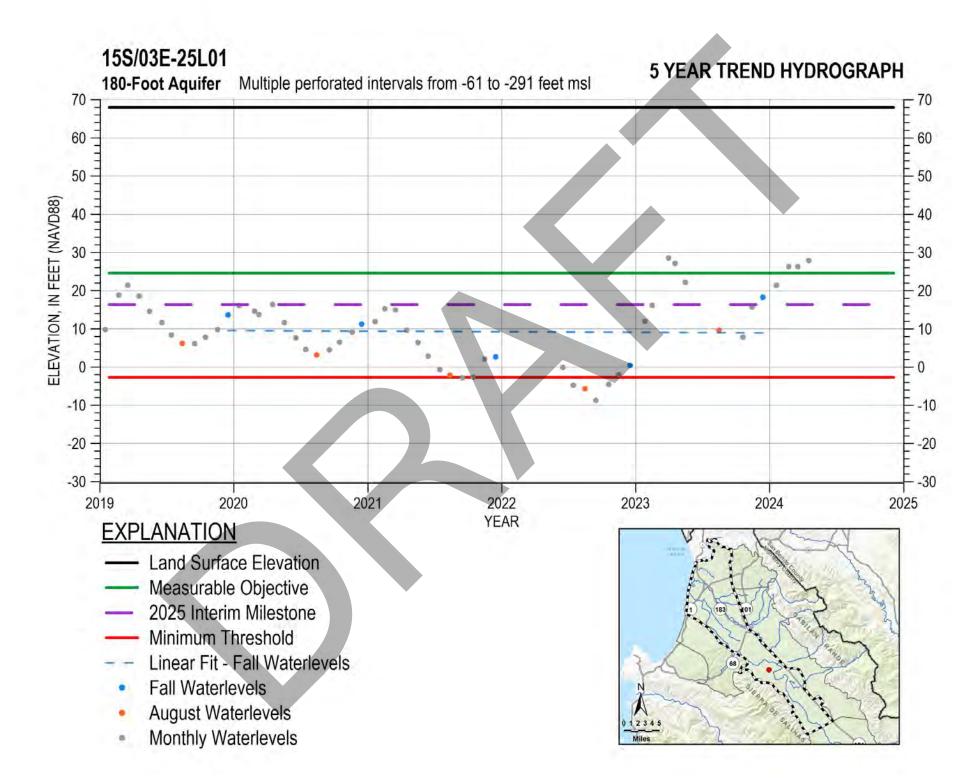


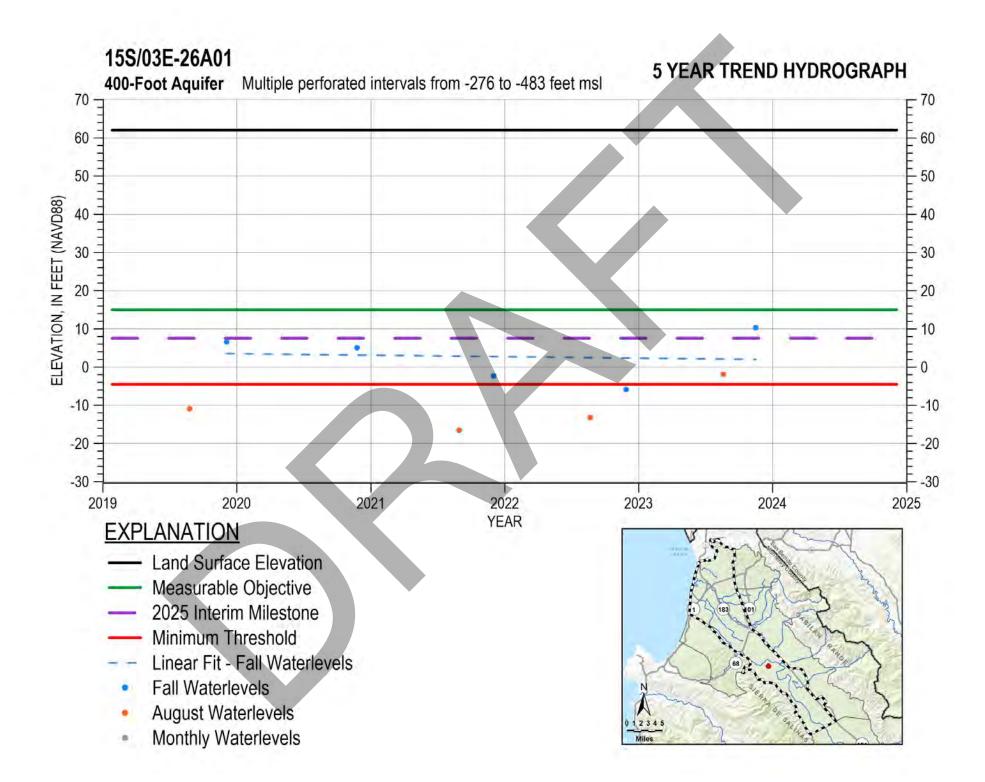


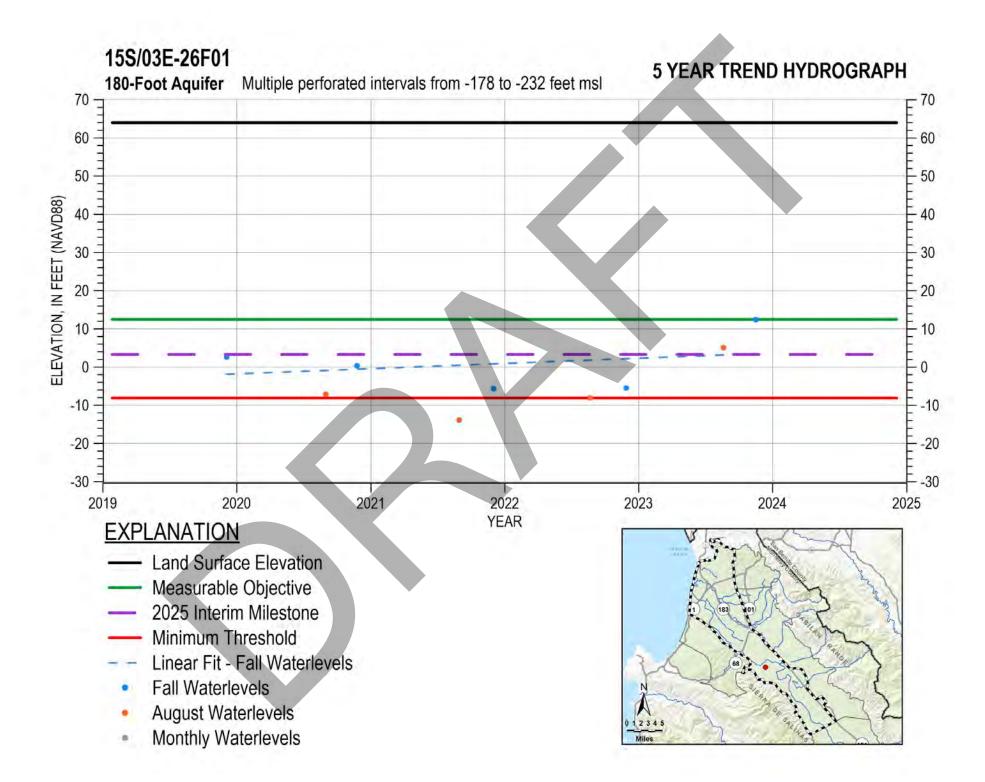


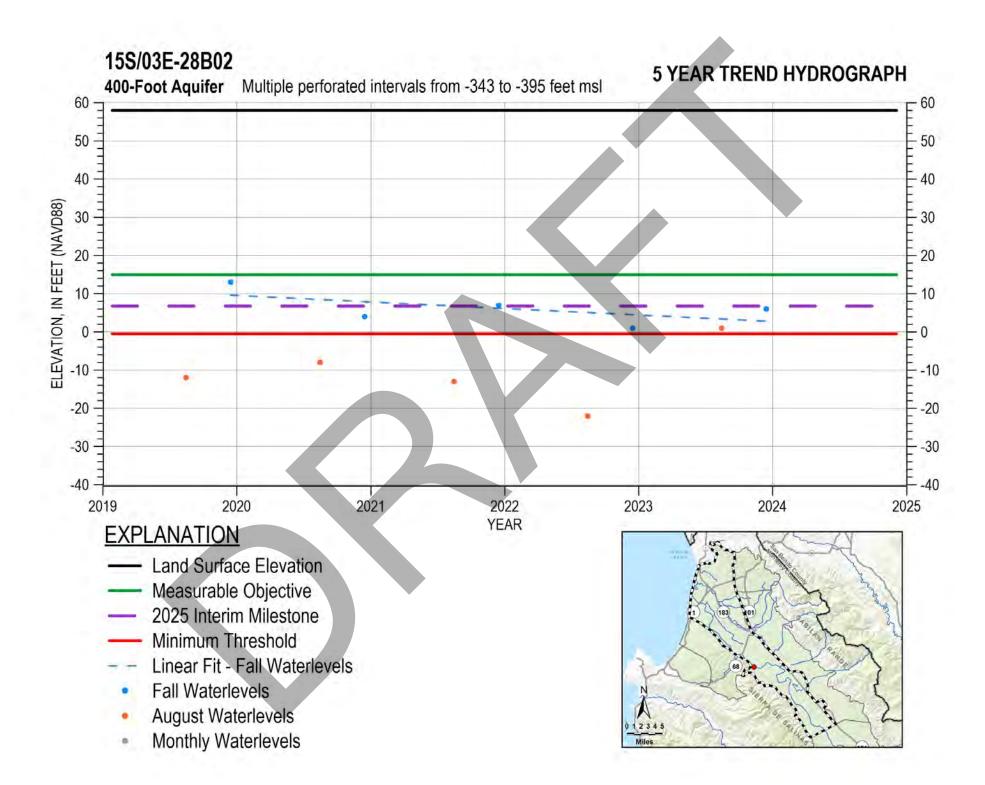


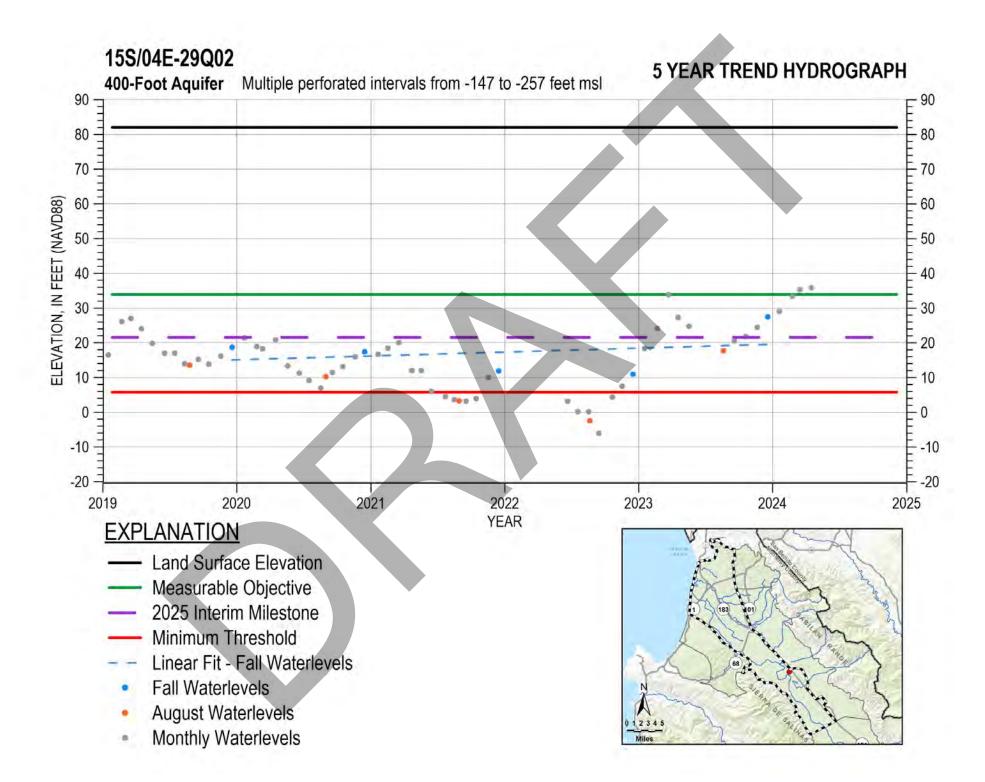


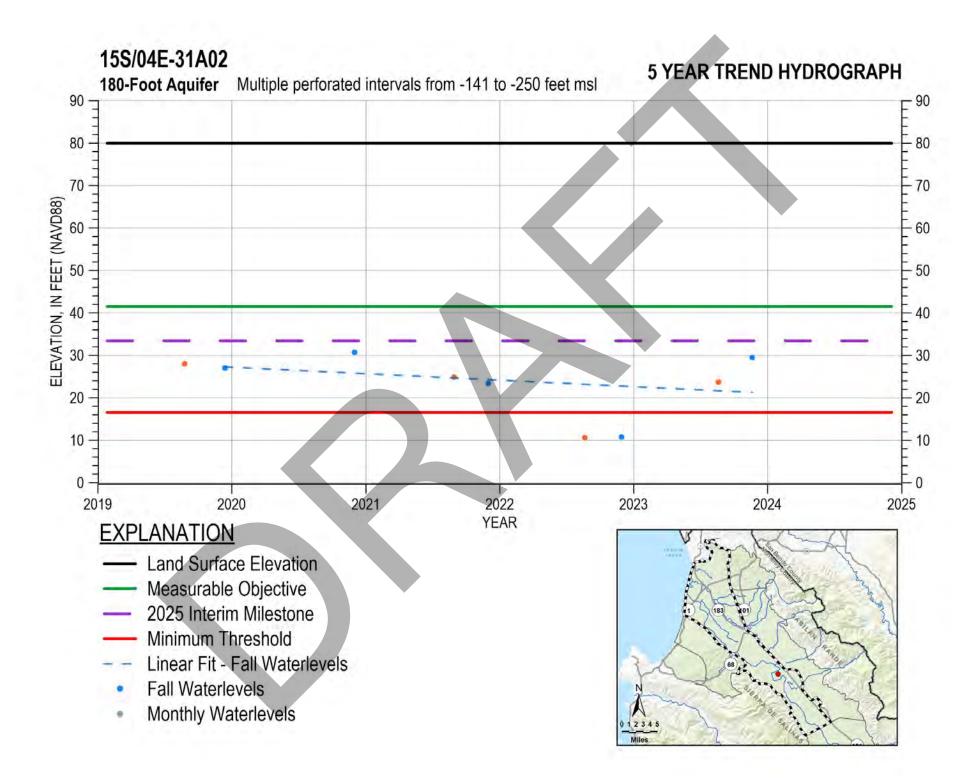


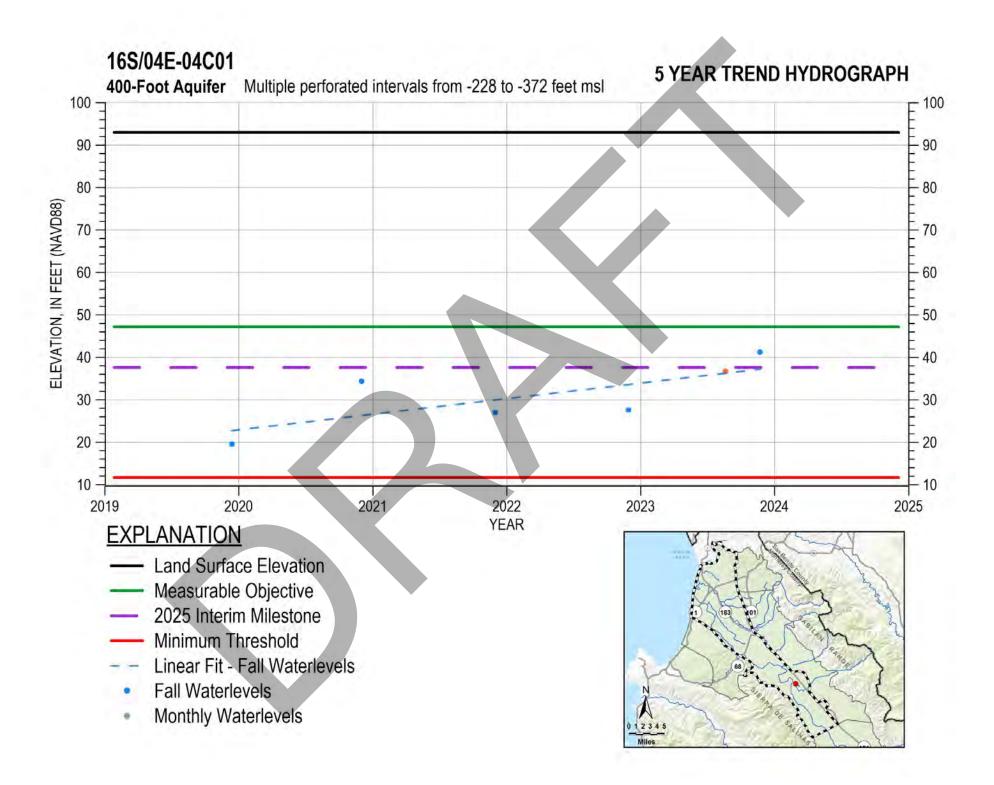


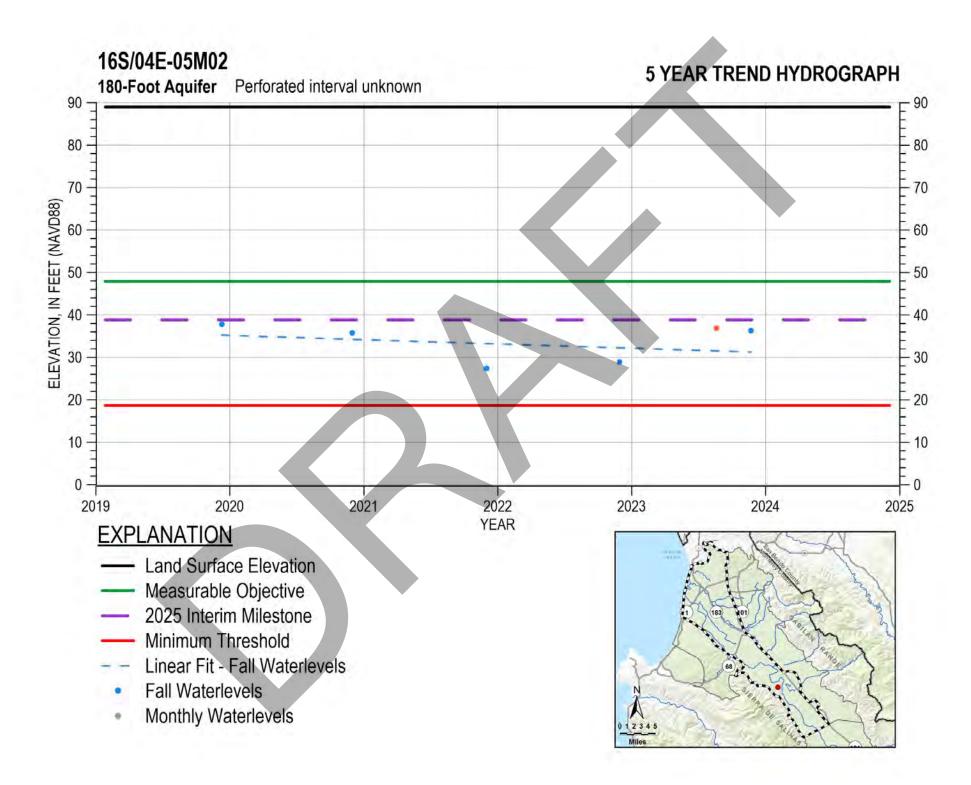


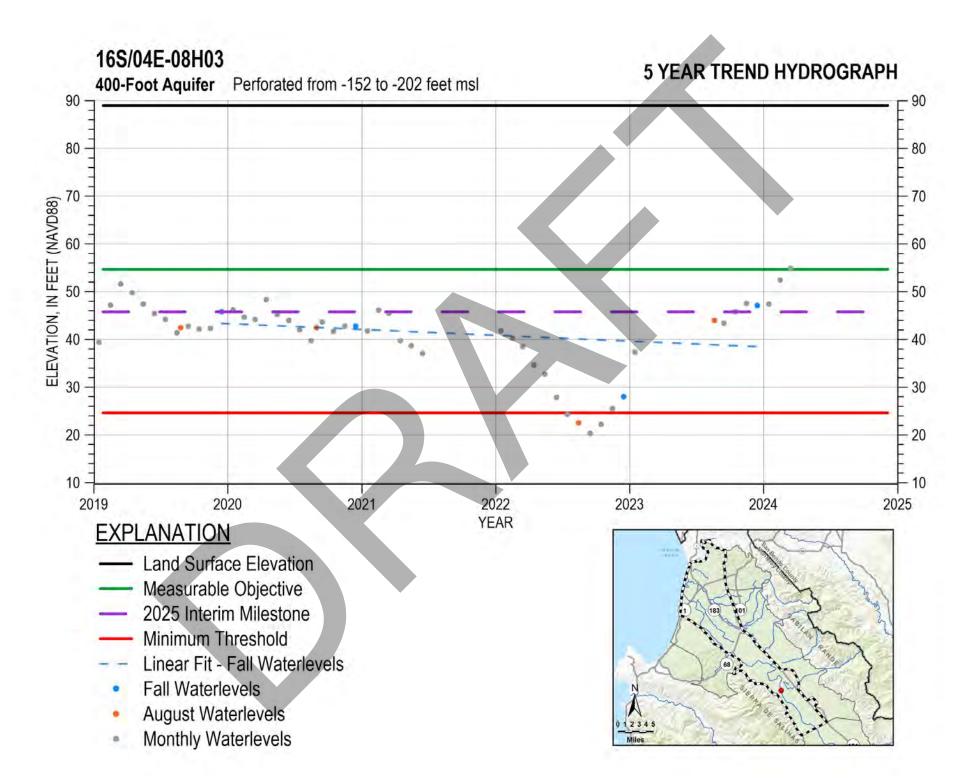


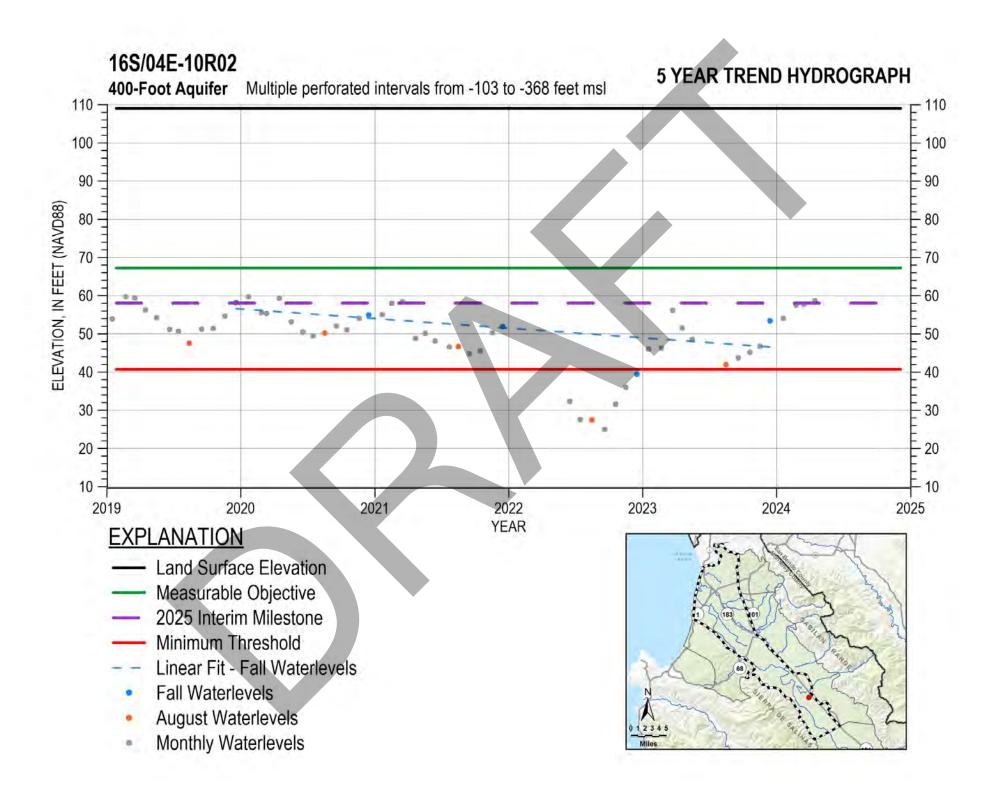


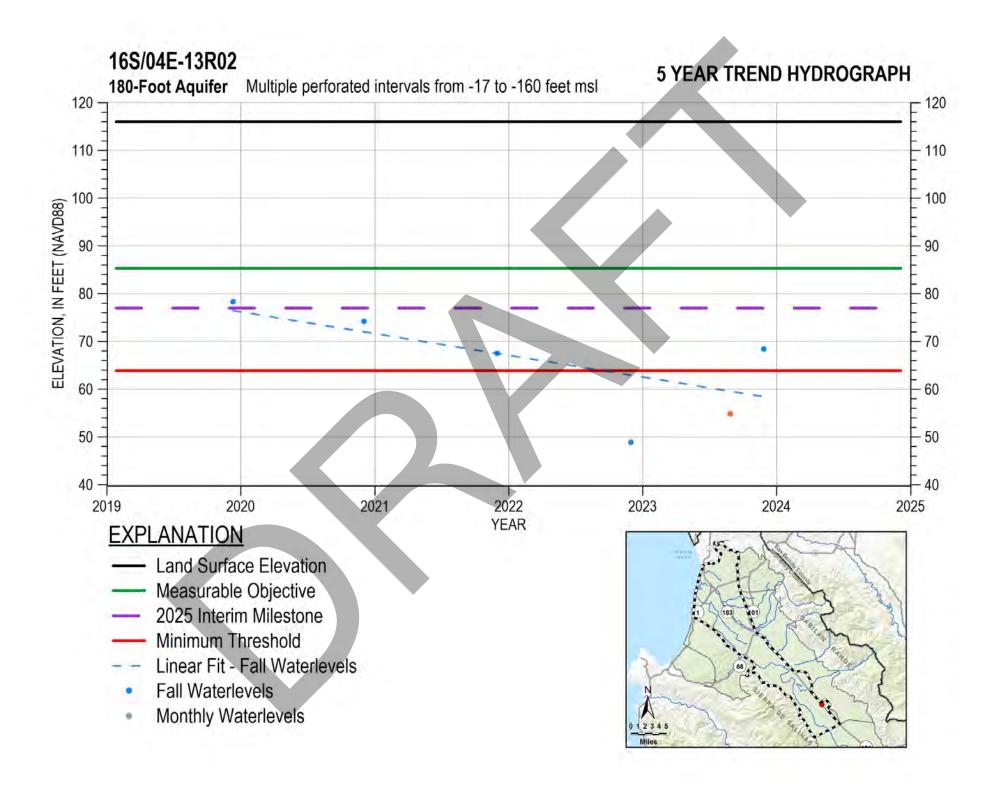


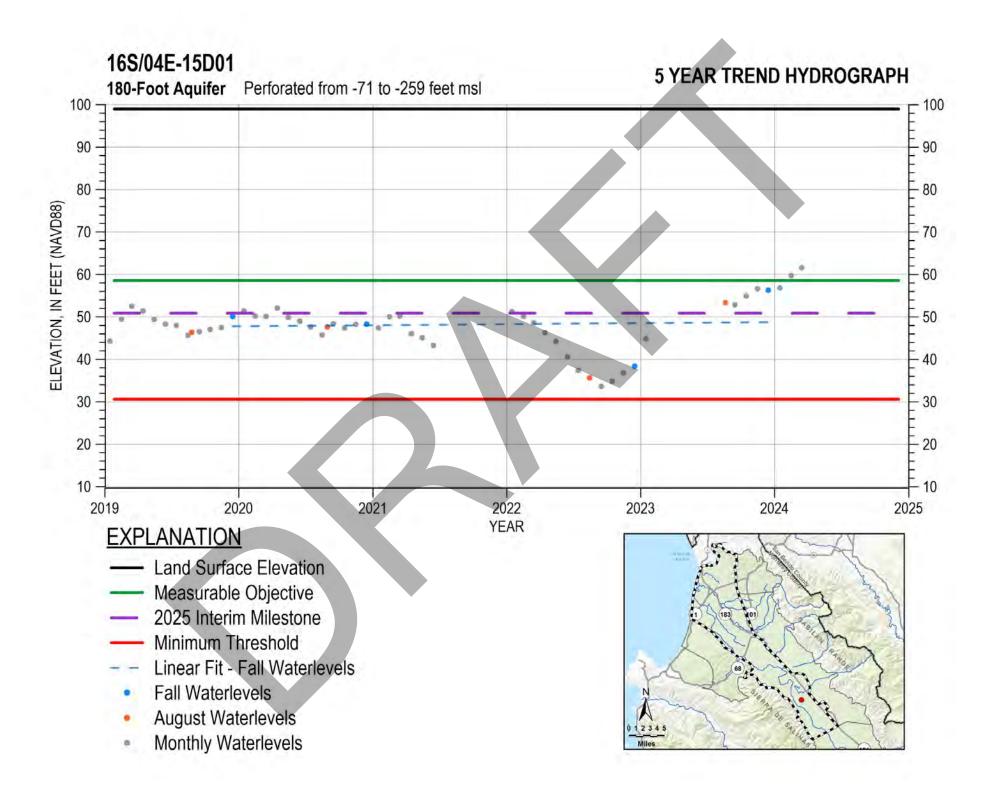


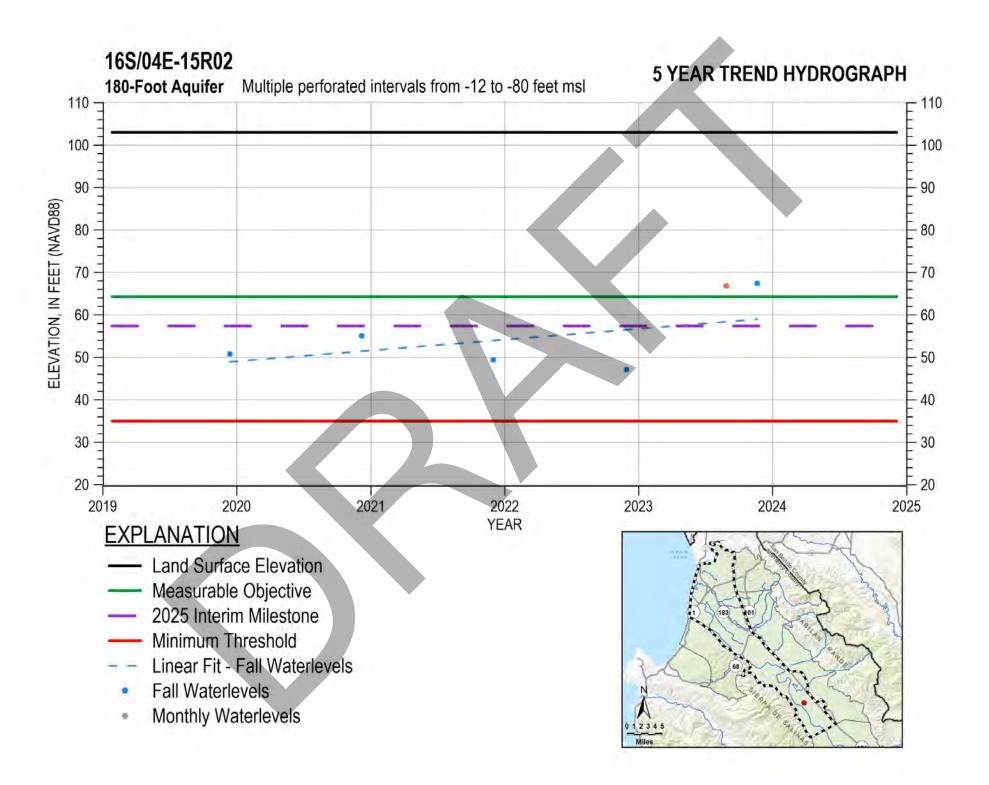


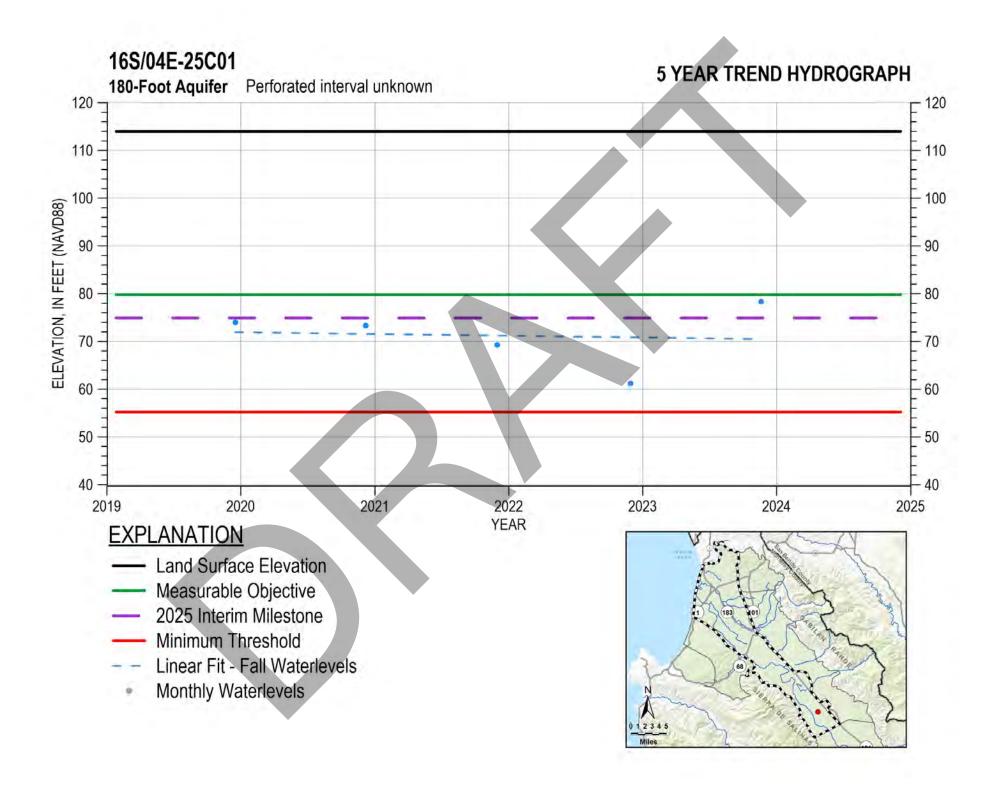


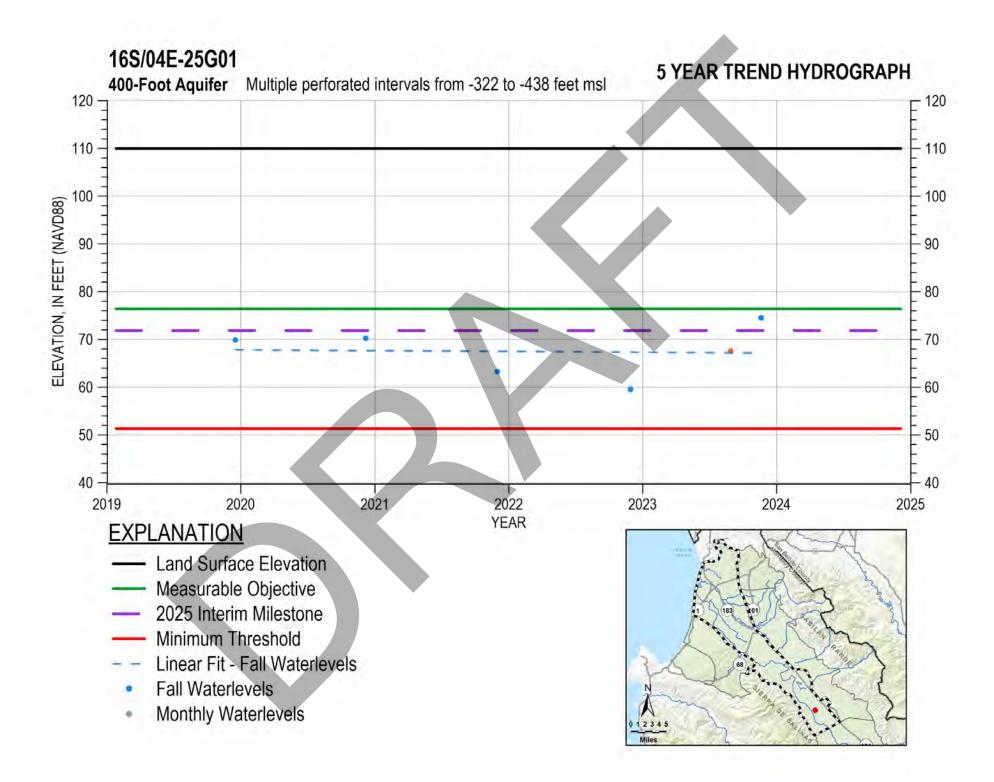


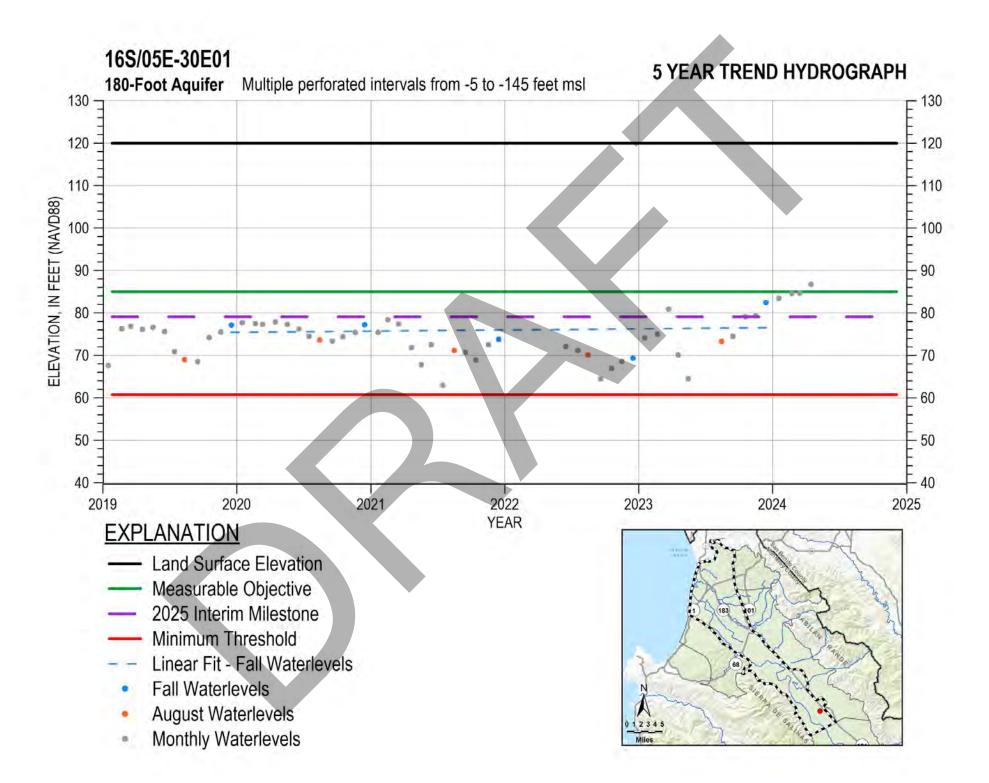


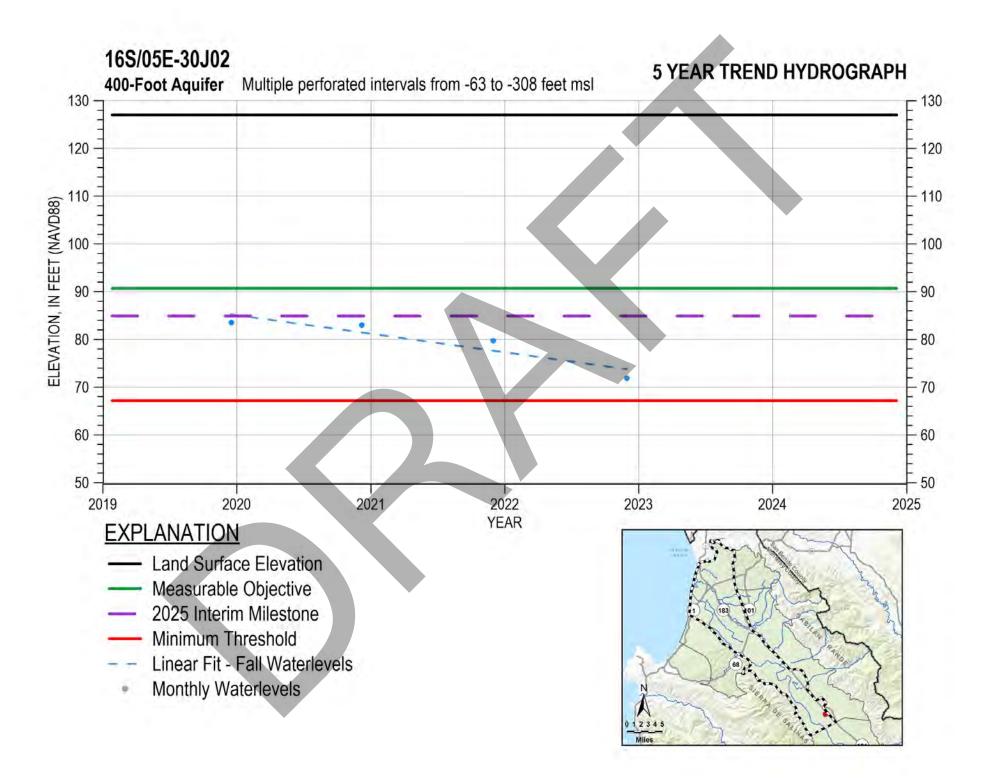


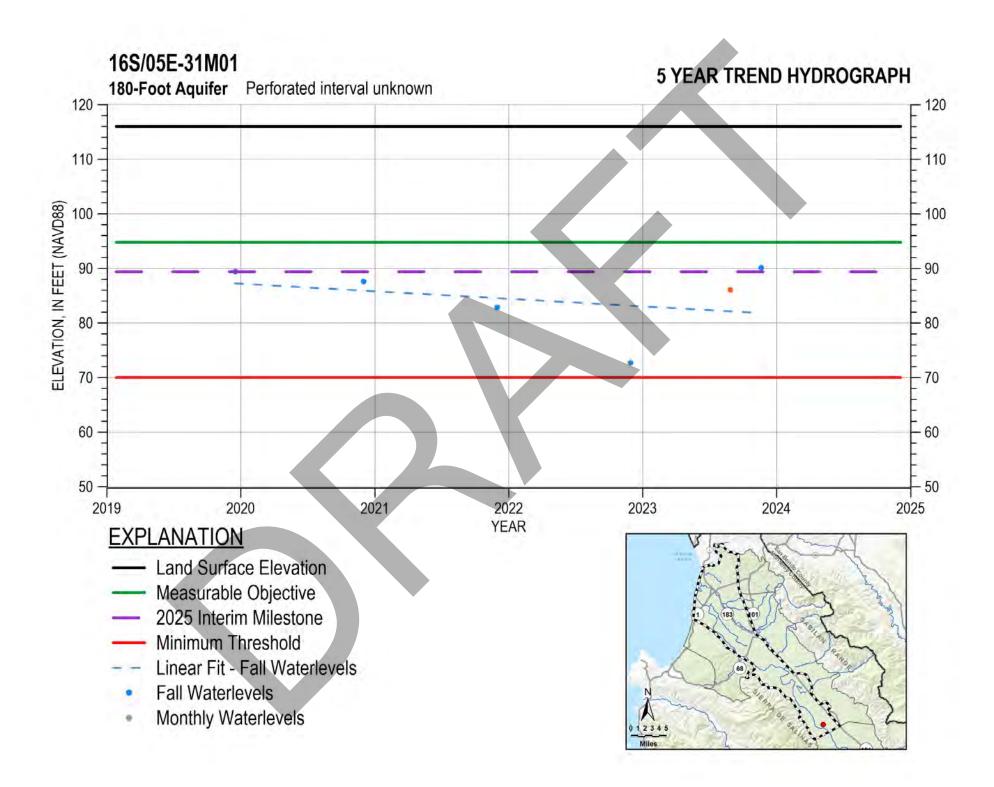


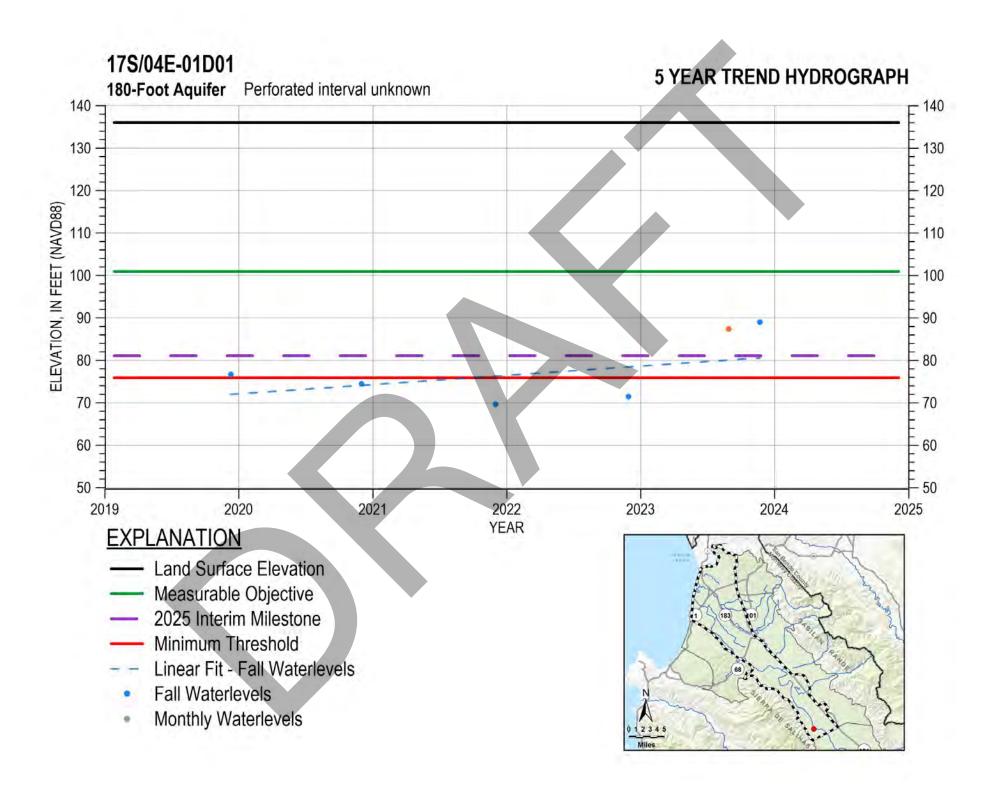


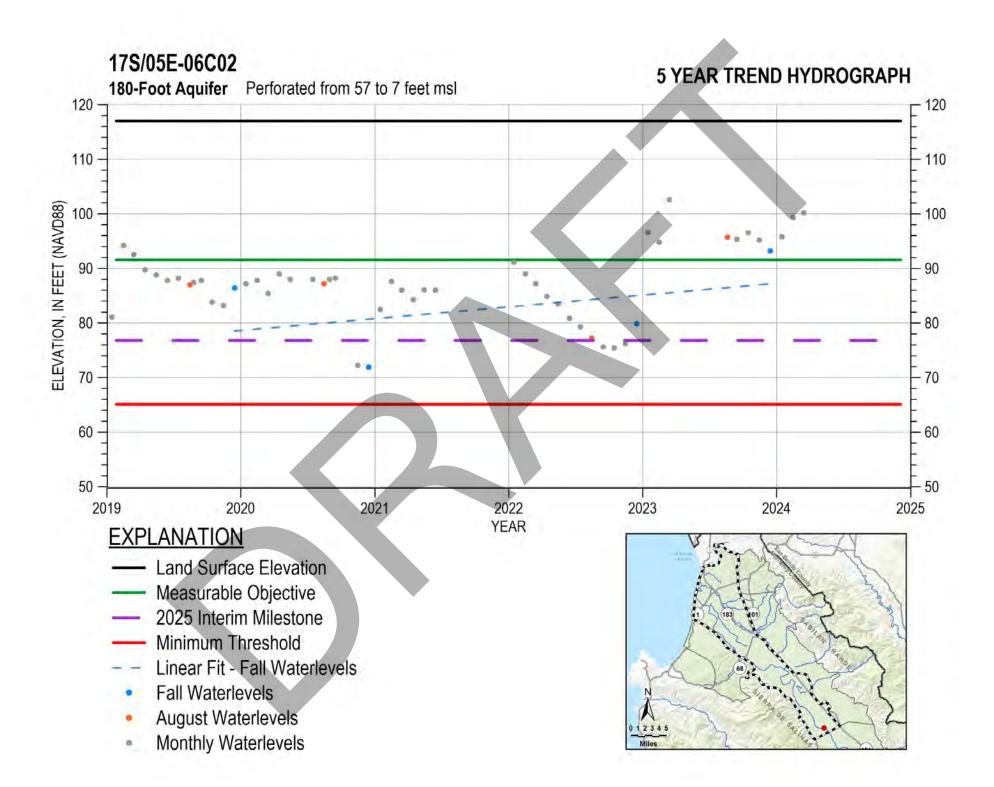


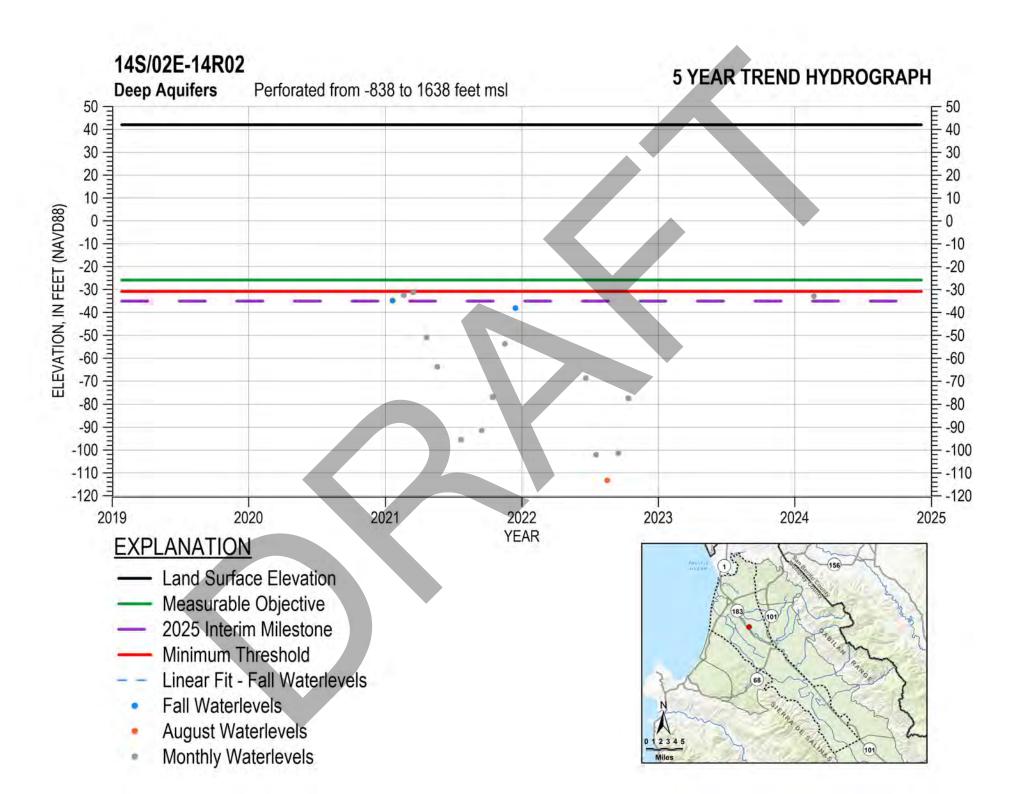


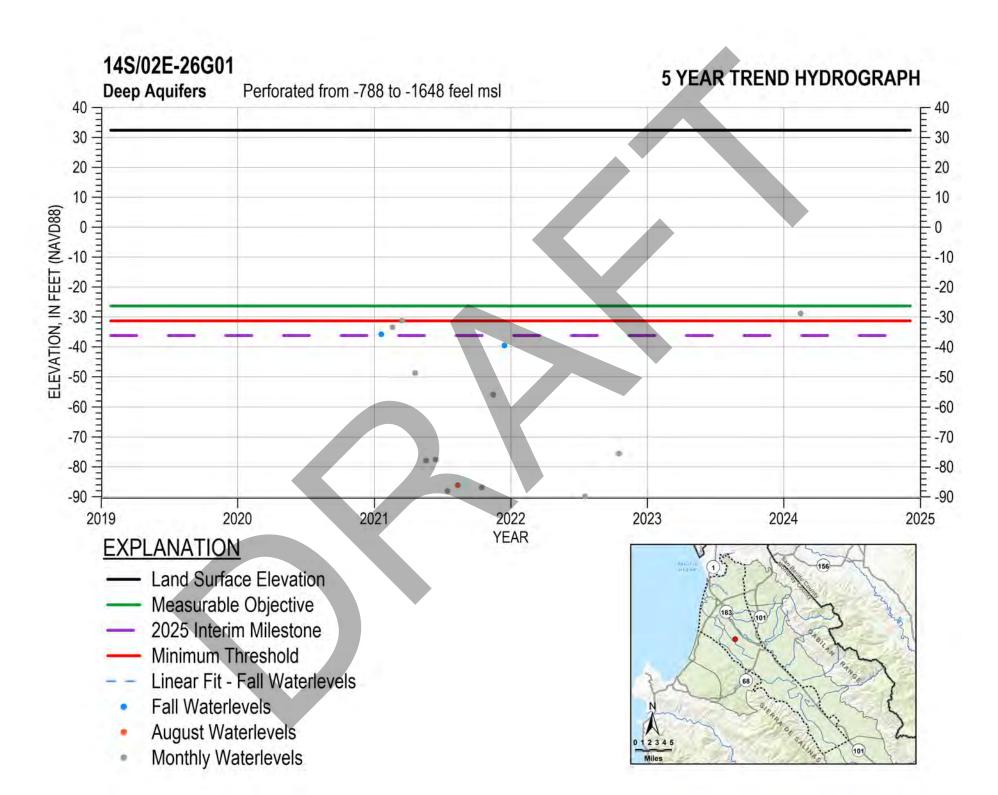


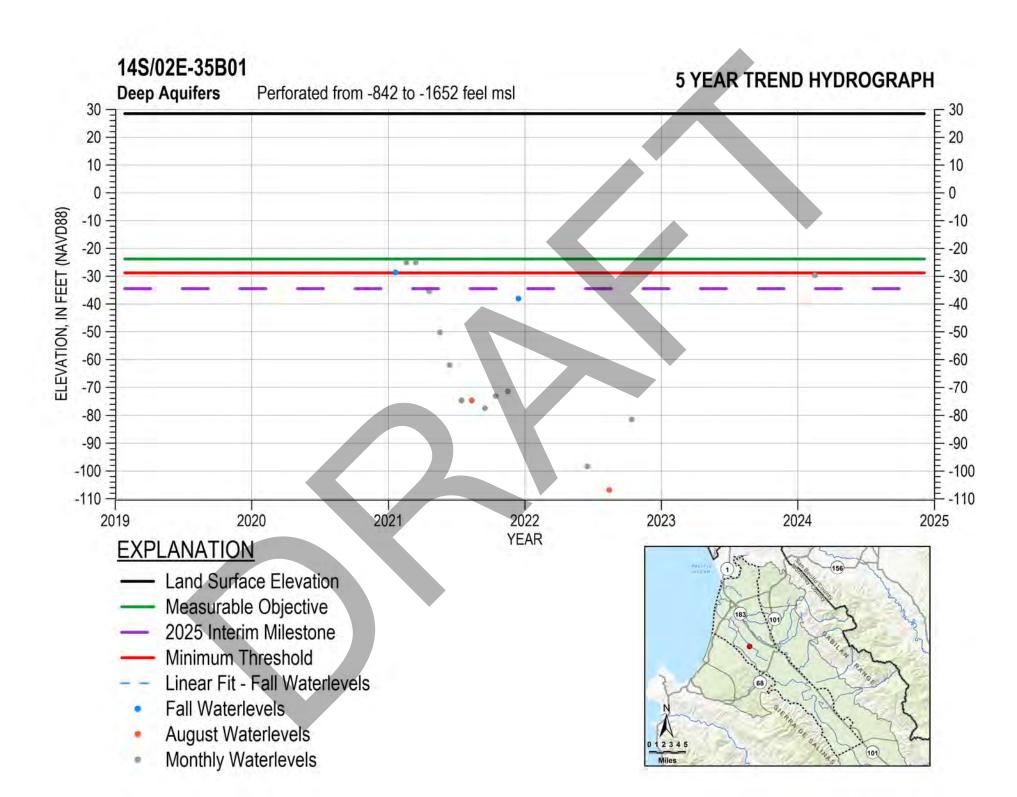












3A-2 Hydrographs with 20-Year Linear Regressions



