Cuyama Basin
Groundwater Sustainability Plan—
Annual Report for 2021-2022 Water Year

Prepared by:

Woodard & Curran

March 2023

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Abbreviations and Acronyms

AF	acre-feet
CBGSA	Cuyama Basin Groundwater Sustainability Agency
CBWD	Cuyama Basin Water District
CBWRM	Cuyama Basin Water Resources Model
CCSD	Cuyama Community Services District
DMS	Data Management System
DWR	California Department of Water Resources
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
SAC	Standing Advisory Committee
SBCWA	Santa Barbara County Water Agency
SGMA	Sustainability Groundwater Management Act
SR	State Route
TSS	Technical Support Services
USGS	United States Geological Survey

Executive Summary

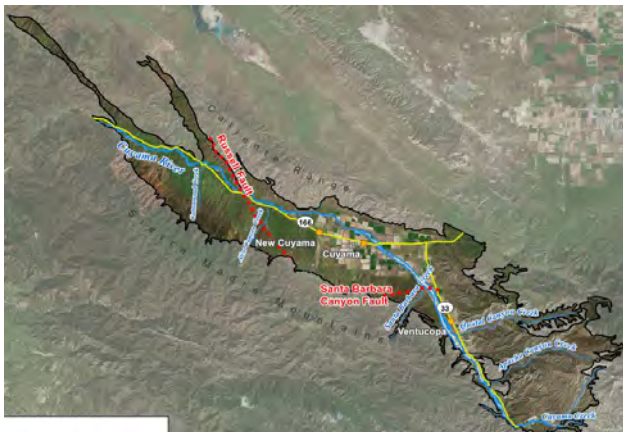
§356.2 (a)	General information, including an executive summary and a location map depicting the basin covered by the report.

ES-1 Introduction

In 2014, the California legislature enacted the Sustainable Groundwater Management Act (SGMA) in response to continued overdraft of California's groundwater resources. The Cuyama Groundwater Basin (Basin) is one of 21 basins and subbasins identified by the California Department of Water Resources (DWR) as being in a state of critical overdraft. SGMA requires that a Groundwater Sustainability Plan (GSP) be prepared to address the measures necessary to attain sustainable conditions in the Cuyama Groundwater Basin. Within the framework of SGMA, sustainability is generally defined as the conditions that result in long-term reliability of groundwater supply and the absence of undesirable results.

In response to SGMA, the Cuyama Basin Groundwater Sustainability Agency (CBGSA) was formed in 2017. The CBGSA is a joint-powers agency that is comprised of Kern, Santa Barbara, San Luis Obispo and Ventura Counties, plus the Cuyama Community Services District and the Cuyama Basin Water District. The CBGSA is governed by an 11-member Board of Directors, with one representative from Kern, San Luis Obispo and Ventura counties, two representatives from Santa Barbara County, one member from the Cuyama Community Services District, and five members from the Cuyama Basin Water District.

Figure ES-1: GSP Plan Area



The Draft Cuyama Basin GSP was adopted on December 4, 2019 by the CBGSA and submitted to DWR on January 28, 2020. SGMA requires that the CBGSA develop a GSP that achieves groundwater sustainability in the Basin by the year 2040.

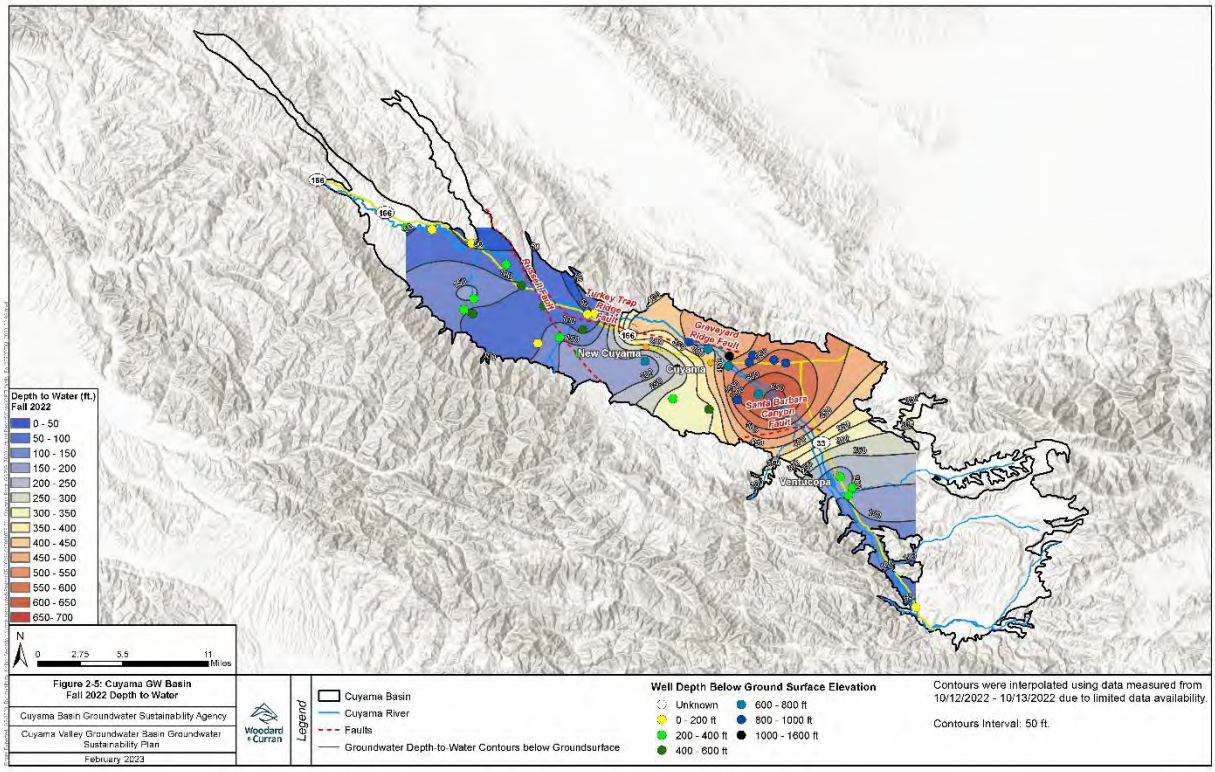
On January 21, 2021, DWR determined that the GSP was "incomplete" and recommended CBGSA to amend the GSP to address four corrective actions. To address these corrective actions, CBGSA developed supplemental sections to the GSP and resubmitted to DWR on July 18, 2022. On March 2, 2023, DWR announced that the Revised GSP had been Approved.

The jurisdictional area of the CBGSA is defined by DWR's Bulletin 118, 2013, the 2016 Interim Update, and the latest 2020 update. The Cuyama Groundwater Basin generally underlies the Cuyama Valley, as shown in **Figure ES-1**.

ES-2 Groundwater Levels

The Annual Report for the 2022 water year includes groundwater contours for Spring and Fall of 2022, and updated hydrographs for the groundwater level monitoring network identified in the Cuyama Basin GSP. The Cuyama Basin consists of a single principal aquifer, and water levels in Basin monitoring wells are considered representative of conditions in that aquifer. Groundwater levels in some portions of the Basin have been declining for many years while other areas of the Basin have experienced no significant change in groundwater levels. Groundwater levels vary across the Basin, with the highest depth to water occurring in the central portion of the Basin (**Figure ES-2**). The western and eastern portions of the Basin have generally shallower depth to water. Generally, depth to water and groundwater elevation in 2022 have changed a small amount in the central basin compared to 2021 levels with little change in other parts of the basin.

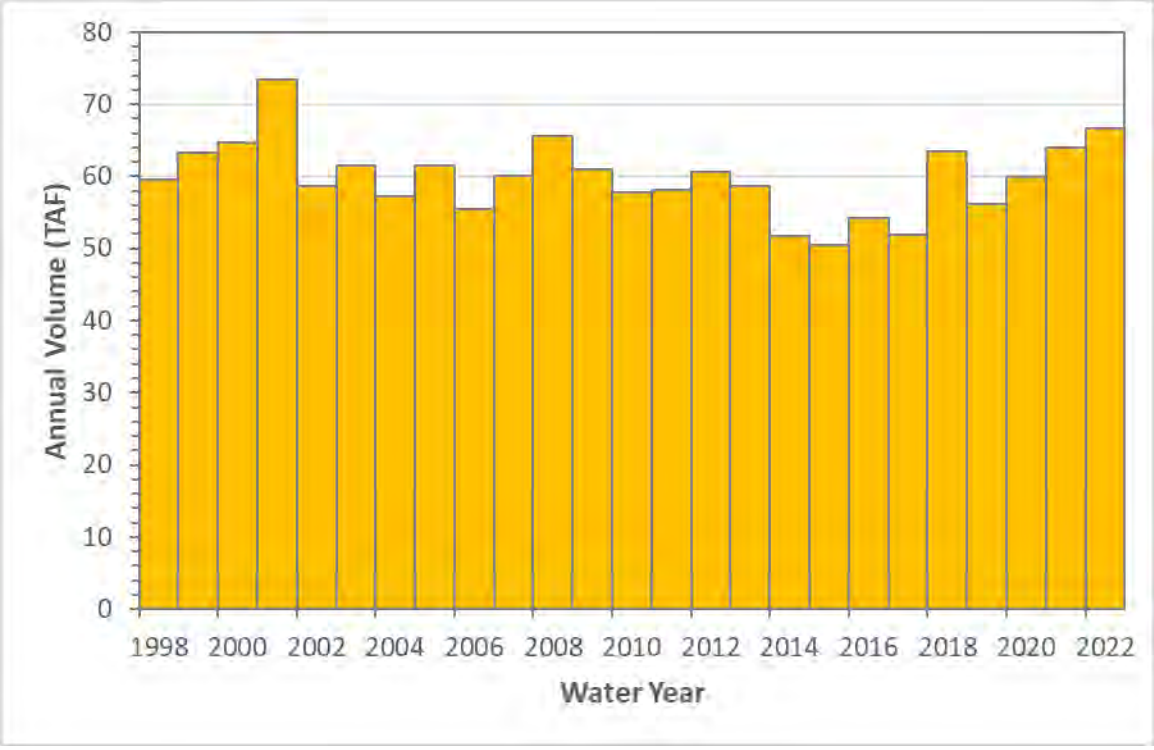
Figure ES-2: Cuyama Basin Depth to Water Contour Map (Fall 2022)



ES-3 Water Use

The Cuyama Groundwater Basin is supplied entirely by groundwater, with virtually no surface water use. Groundwater pumping in the Basin is estimated to have been about 66,700 AF in 2022. This reflects an increase of about 2,700 AF as compared to 2021. (See **Figure ES-3**).

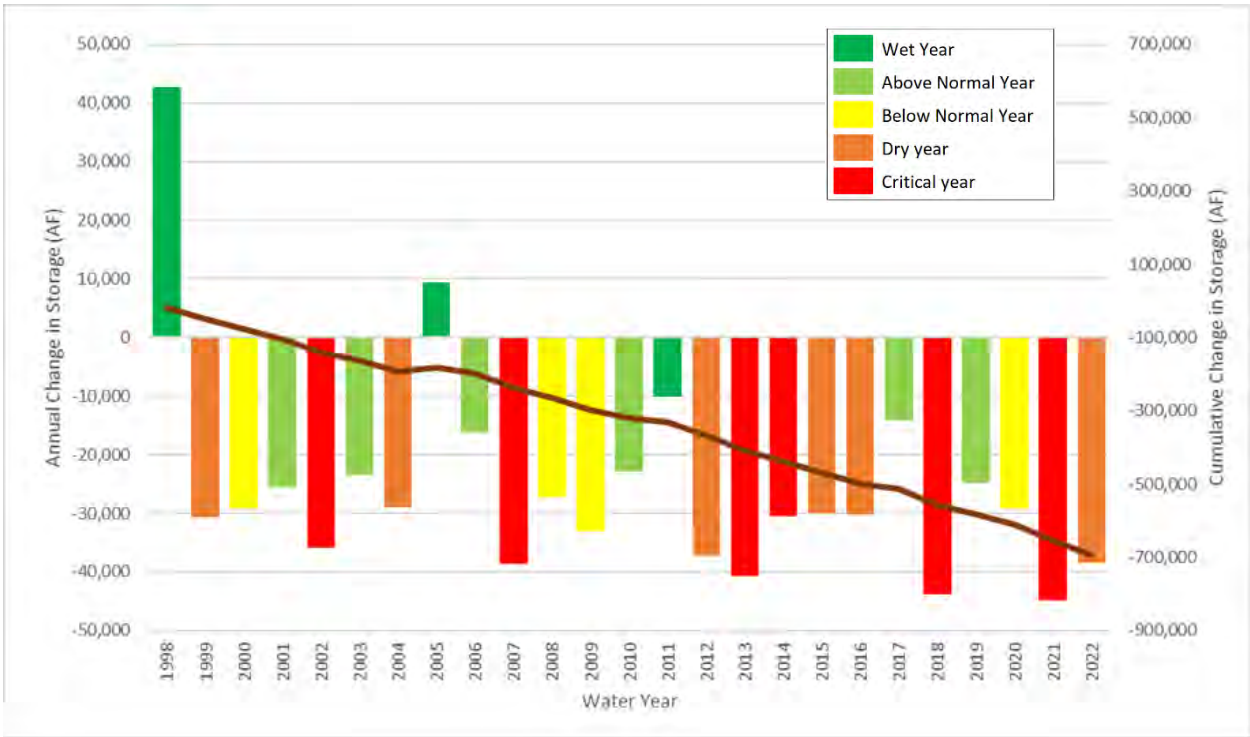
Figure ES-3: Annual Groundwater Extraction in the Cuyama Basin in Water Years 1998-2021



ES-4 Change in Groundwater Storage

It is estimated that there was a reduction in Basin groundwater storage of 38,500 AF in 2022. This continues the long-term trend in groundwater storage reduction in the Basin since 1999. **Figure ES-4** shows the historical change in groundwater storage by year, water year type,[1] and cumulative water volume in each year for the period from 1998 through 2022.

Figure ES-4: Change in Groundwater Storage by Year, Water Year Type, and Cumulative Water Volume



ES-5 Groundwater Quality

Only 28% of monitoring wells were sampled for total dissolved solids (TDS) in 2022 due to limitations in gaining access to well sites. Approximately 50% of measured wells exceeded their measurable objective and 22% exceeded their minimum threshold for TDS. However, due to questions about the quality of the data, the CBGSA considers it premature to use this data to evaluate the performance of groundwater quality at this time. Approximately 17% of monitoring wells were also sampled for nitrate, and 11% of monitoring wells were sampled for arsenic during the water year. The CBGSA intends to reevaluate the groundwater quality representative monitoring network going forward.

[1] Water year types are customized for the Basin watershed based on annual precipitation as follows:

- Wet year = more than 19.6 inches
- Above normal year = 13.1 to 19.6 inches
- Below normal year = 9.85 to 13.1 inches
- Dry year = 6.6 to 9.85 inches
- Critical year = less than 6.6 inches.

ES-6 Land Subsidence

Observed subsidence rates in the Basin are well below the minimum threshold, and thus undesirable results for subsidence are not occurring in the Basin.

ES-7 Plan Implementation

The following plan implementation activities were accomplished in 2022:

- Approval of a groundwater extraction fee and supplemental fee, which is expected to generate revenue to cover the administrative costs of the CBGSA for the period from January 1, 2023, through December 31, 2023.
- A total of 13 public meetings were conducted at which GSP development and implementation was discussed.
- The Cuyama Basin Groundwater Sustainability Agency (CBGSA) Board continued implementation of the groundwater levels monitoring network, includes quarterly monitoring at each monitoring well.
- The CBGSA was awarded a COD SGMA Implementation Grant for $7.6 million in funding for implementation activities over the next 3 years.
- The CBGSA and Cuyama Basin Water District (CBWD) continued implementation of management actions in the Central management area.

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Section 1. Introduction

§356.2 (a)	General information, including an executive summary and a location map depicting the basin covered by the report.

1.1 Introduction and Agency Information

This section describes the Cuyama Basin Groundwater Sustainability Agency (CBGSA), its authority in relation to the Sustainable Groundwater Management Act (SGMA), and the purpose of this Annual Report.

This Annual Report meets regulatory requirements established by the California Department of Water Resources (DWR) as provided in Article 7 of the California Code of Regulations, Title 23, Division 2, Chapter 1.5, Subchapter 2.

The CBGSA was created by a Joint Exercise of Powers Agreement among the following agencies:

- Counties of Kern, San Luis Obispo, and Ventura
- Santa Barbara County Water Agency (SBCWA), representing the County of Santa Barbara
- Cuyama Basin Water District (CBWD)
- Cuyama Community Services District (CCSD)

The CBGSA Board of Directors includes the following individuals:

- Cory Bantilan – Chairperson, SBCWA
- Matt Vickery – Vice Chairperson, CBWD
- Derek Yurosek –CBWD
- Deborah Williams –CCSD
- Byron Albano – CBWD
- Jimmy Paulding – County of San Luis Obispo
- Zack Scrivner – County of Kern
- Arne Anselm – County of Ventura
- Rick Burnes – CBWD
- Das Williams – SBCWA
- Jane Wooster – CBWD

The CBGSA's established boundary corresponds to DWR's California's Groundwater Bulletin 118 – Update 2003 (Bulletin 118) groundwater basin boundary for the Cuyama Valley Groundwater Basin (Basin) (DWR, 2003). No additional areas were incorporated.

1.1.1 Management Structure

The CBGSA is governed by an 11-member Board of Directors that meets bi-monthly (i.e. six-times a year). A General Manager manages day-to-day operations of the CBWD, while Board Members vote on actions of the CBGSA; the Board is the CBGSA's decision-making body. The Board also formed a Standing Advisory Committee comprised of nine stakeholders to provide recommendations to the Board on key technical issues which also meets regularly.

1.1.2 Legal Authority

Per Section 10723.8(a) of the California Water Code, the Santa Barbara County Water Agency (SBCWA) gave notice to DWR on behalf of the CBGSA of its decision to form a GSA, which is Basin 3-013, per DWR's Bulletin 118.

1.1.3 Groundwater Sustainability Plan

The CBGSA Board of Directors approved the first iteration of the Cuyama Groundwater Sustainability Plan (GSP) on December 4, 2019. The GSP was submitted to DWR for approval on January 28, 2020.

On January 21, 2021, DWR determined that the GSP was "incomplete" and recommended CBGSA amend the GSP to address the following four corrective actions:

- Provide justification for, and effects associated with, the sustainable management criteria;
- Use of groundwater levels as a proxy for depletion of interconnected surface water;
- Further address degraded water quality; and
- Provide explanation for how overdraft will be mitigated in the basin.

To address these corrective actions, the CBGSA developed the following supplement sections to the GSP and resubmitted to DWR on July 18, 2022:

- Supplemental Section 2.2.7: Basin Settings, Groundwater Conditions, Groundwater Quality performed additional data collection efforts for nitrate and arsenic measurements.
- Supplemental Section 3.3: Undesirable Results, Evaluation of the Presence of Undesirable Results provided additional information regarding the rationale for the criteria used in the GSP to define the point at which Basin conditions cause significant and unreasonable effects to occur.
- Supplemental Section 4.10: Monitoring Networks, Depletions of Interconnected Surface Water Monitoring Network identifies a subset of groundwater level representative monitoring wells for use in ISW monitoring and provides a rational for their selection and adequate data collection and monitoring for ISWs.
- Supplemental Section 5.2: Minimum Thresholds, Measurable Objectives, and Interim Milestones, Chronic Lowering of Groundwater Levels performed two technical analyses to provide additional information related to the effects of the GSP's groundwater levels minimum thresholds and undesirable results on well infrastructure and on environmental uses of groundwater.
- Supplemental Section 5.5: Minimum Thresholds, Measurable Objectives, and Interim Milestones, Degraded Water Quality provides information on why groundwater management is unlikely to affect nitrate and arsenic concentrations.
- Supplemental Section 7.2: Projects and Management Actions, Management Areas provide additional information regarding the Ventucopa management area and the northwestern region of the Basin.
- Supplemental Section 7.6: Projects and Management Actions, Adaptive Management explains the circumstances of when adaptative management strategies may be also triggered for other reasons.

The resubmitted and updated GSP is available for viewing online at http://cuyamabasin.org/. On March 2, 2023, DWR announced that the Revised GSP had been Approved.

1.2 Plan Area

Figure 1-1 shows the Basin and its key geographic features. The Basin encompasses an area of about 378 square miles[2] and includes the communities of New Cuyama and Cuyama, which are located along State Route (SR) 166, and Ventucopa, which is located along SR 33. The Basin encompasses an approximately 55-mile stretch of the Cuyama River, which runs through the Basin for much of its extent before leaving the Basin to the northwest and flowing toward the Pacific Ocean. The Basin also encompasses stretches of Wells Creek in its north-central area, Santa Barbara Creek in the south-central area, the Quatal Canyon drainage and Cuyama Creek in the southern area of the Basin. Most of the agriculture in the Basin occurs in the central portion east of New Cuyama, and along the Cuyama River near SR 33 through Ventucopa.

Figure 1-2 shows the CBGSA boundary. The CBGSA boundary covers all of the Cuyama Valley Groundwater Basin.

[2] The 2003 version of Bulletin 118 section on the Cuyama Valley Groundwater Basin incorrectly stated that the Basin area is 230 square miles. The estimate of 378 square miles shown here and in the GSP is consistent with the mapping shown on DWR's GSA Map Viewer.

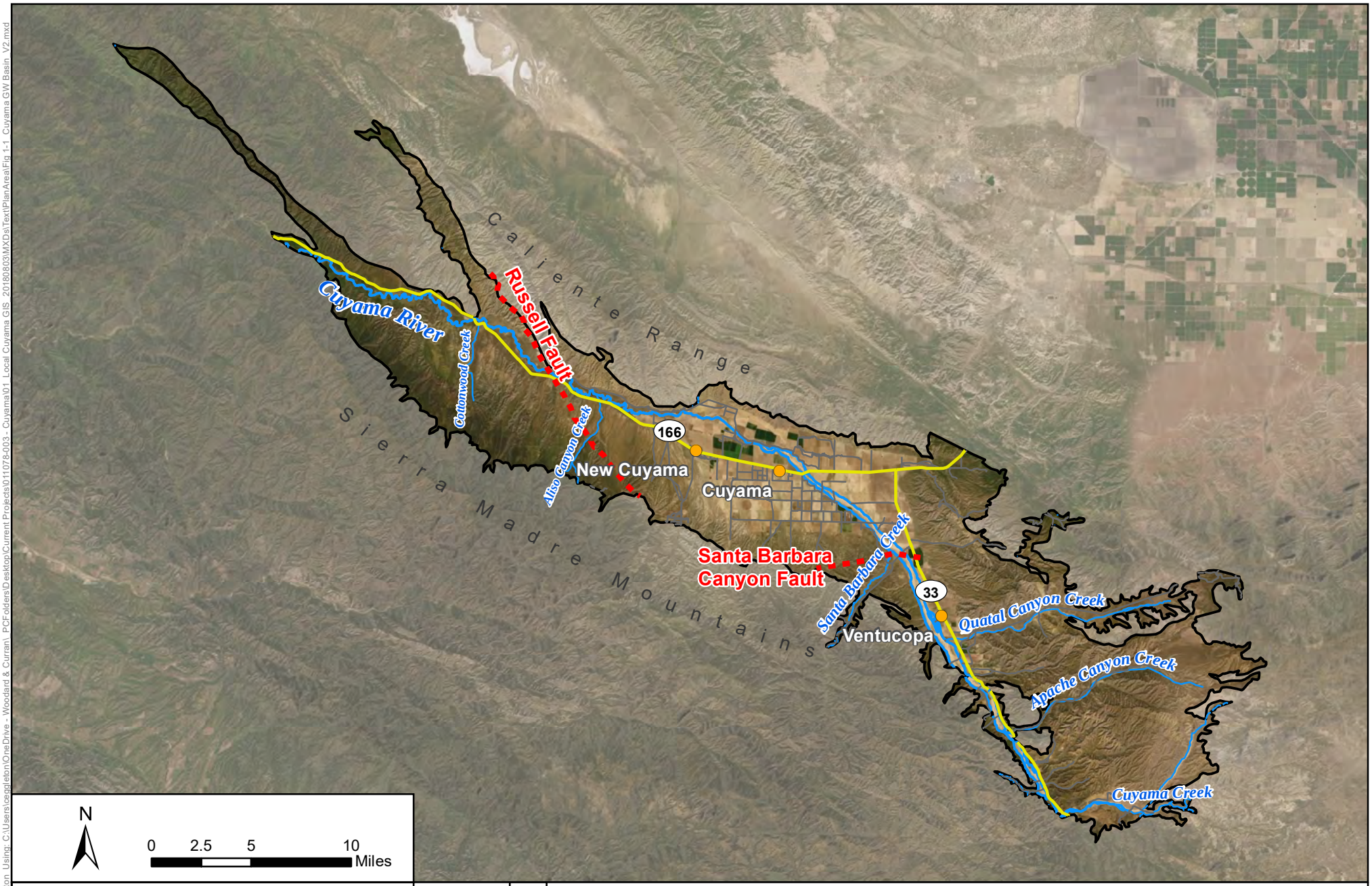


Figure 1-1 - Cuyama Valley Groundwater Basin

Cuyama Basin Groundwater Sustainability Agency

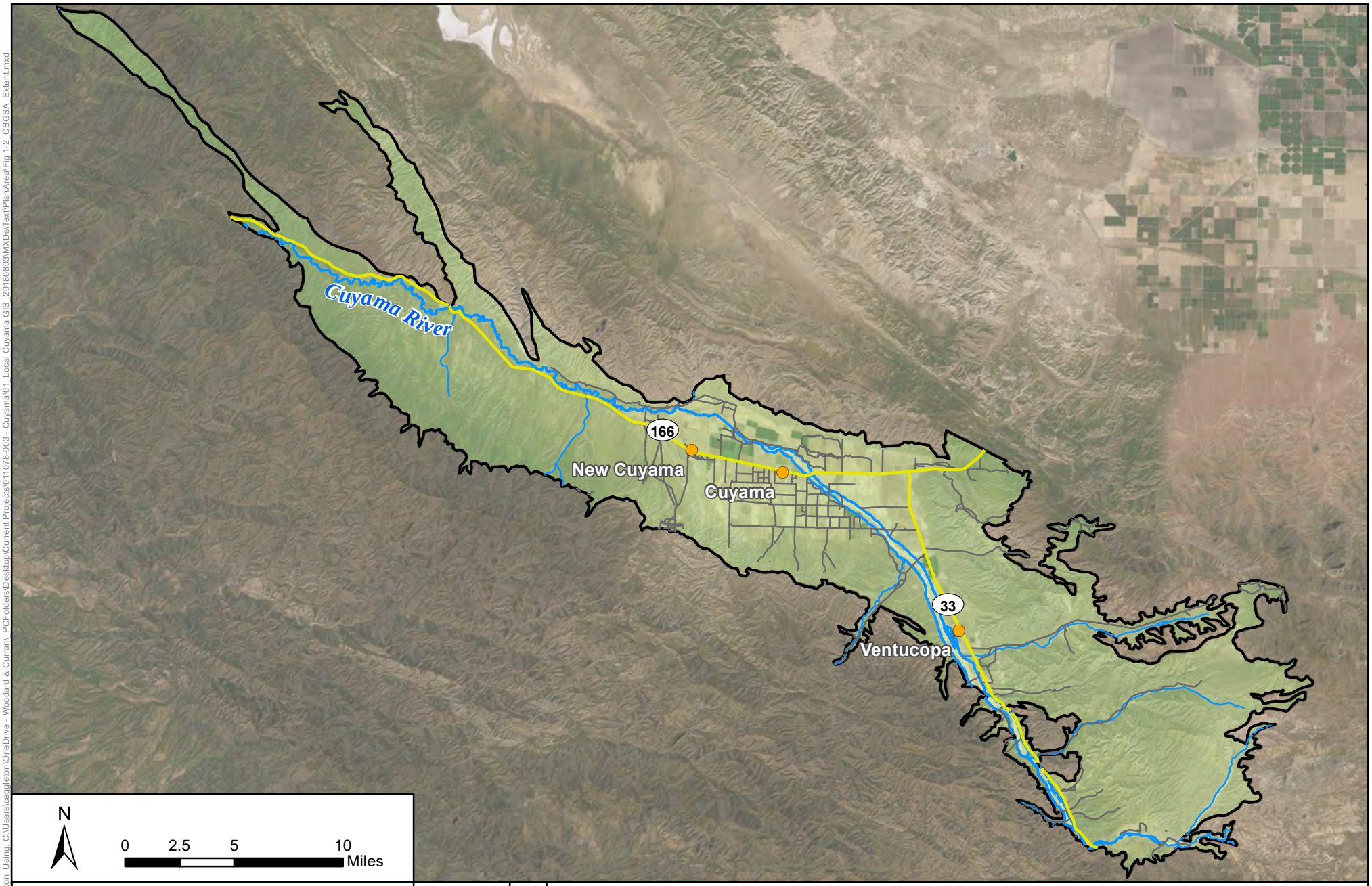
Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

March 2021

WOODARD &CURRAN

Legend

- Cuyama Basin
- Towns
- Faults
- Highways
- Local Roads
- Cuyama River
- Streams/Creeks



N

0 2.5 5 10 Miles

Figure 1-2 - Cuyama Valley Groundwater Sustainability Agency Boundary

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

March 2021

WOODARD &CURRAN

Legend

- Towns
- Cuyama Basin GSA
- Highways
- Local Roads
- Cuyama River
- Streams/Creeks

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Section 2. Groundwater Levels

§356.2 (b)(1)	Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:
§356.2 (b)(1)(A)	Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.
§356.2 (b)(1)(B)	Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.

2.1 Groundwater Levels Representative Monitoring Network

As required by DWR's SGMA regulations, a monitoring network and representative monitoring network were identified in the Cuyama Basin GSP utilizing existing wells. The current groundwater levels representative monitoring network that was approved by the CBGSA Board is shown on **Figure 2-1**: . The Cuyama Basin consists of a single principal aquifer, and water levels in monitoring network wells are considered representative of conditions in that aquifer. The objective of the representative monitoring network is to detect undesirable results in the Basin related to groundwater levels using the sustainability thresholds described in the GSP. Other related objectives of the monitoring network are defined via the SGMA regulations as follows:

- Demonstrate progress toward achieving measurable objectives described in the GSP.
- Monitor impacts to the beneficial uses or users of groundwater.
- Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds.
- Quantify annual changes in water budget components.
- Monitoring that has occurred on the groundwater level monitoring network since the development of the Cuyama Basin GSP is included in this Annual Report. Collected groundwater level data has been analyzed to prepare contour maps and updated hydrographs, which are presented in the following sections.

Figure 2-1: Cuyama GW Basin - Groundwater Monitoring Network

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

March 2023

Woodard & Curran

Legend

- Cuyama Basin
- Cuyama River
- Highways
- Representative Wells
- Representative Well with Transducer
- Monitoring Network Well

N

0 1.75 3.5 7 Miles

2.2 Groundwater Contour Maps

The submitted GSP included contour maps up through the spring of 2018. The previous Annual Report included contour maps for spring and fall of 2019 through 2021. For this Annual Report, analysis was conducted to incorporate data through October 2022 that was collected by the CBGSA and local landowners. Data was then added to the Data Management System (DMS) and processed to analyze the current groundwater conditions by creating seasonal groundwater contour/raster maps for the spring and fall of 2022 and hydrographs of Basin monitoring wells.

A contour map shows changes in groundwater elevations by interpolating groundwater elevations between monitoring sites. The elevations are shown on the map with the use of a contour line, which indicates that at all locations that line is drawn, the line represents groundwater at the elevation indicated. There are two versions of contour maps used in this section: one that shows the elevation of groundwater above mean sea level, which is useful because it can be used to identify the horizontal gradients of groundwater, and one that shows contours of depth to water, the distance from the ground surface to groundwater, which is useful because it can identify areas of shallow or deep groundwater.

Analysts prepared groundwater contour maps under the supervision of a Certified Hydrogeologist in the State of California for both groundwater elevation and depth to water for both spring and fall of 2022.

Each contour map is contoured at a 50-foot contour interval, with contour elevations indicated in white numeric label. The groundwater contours were also based on assumptions in order to accumulate enough data points to generate useful contour maps. Assumptions are as follows:

- Measurements from wells of different depths are representative of conditions at that location and there are no significant known vertical gradients. Due to the limited spatial amount of monitoring points, data from wells of a wide variety of depths were used to generate the contours.
- Measurements collected by the CBGSA monitoring program in January-April 2022 were used to develop the spring contours and from October 2022 to develop the fall contours. It is assumed that these measurements are representative of conditions during the spring or fall season, and conditions have not changed substantially from the time of the earliest measurement used to the latest.

These assumptions generate contours that are useful at the planning level for understanding groundwater levels across the Basin, and to identify general horizontal gradients and regional groundwater level trends. The contour maps are not indicative of exact values across the Basin because groundwater contour maps approximate conditions between measurement points, and do not account for topography. Therefore, a well on a ridge may be farther from groundwater than one in a canyon, and the contour map will not reflect that level of detail.

Figure 2-2 shows groundwater elevation contours for Spring of 2022 Based on data that was collected by local landowners and the CBGSA. The contours developed using the available data show two general trends in the Basin. First, in most of the Basin, groundwater generally reflects the topography of the Basin. For example, groundwater elevations decrease moving from the highest portions of the Valley in the Southeastern portion of the Basin towards the central portion, and groundwater also travels down slope in a northern direction off of the southern foothills towards the Cuyama River. The second trend and potential exception to the first, is the central portion of the Basin where there is a clear depression and deviation from the topography (more clearly seen in the following figure). Groundwater levels near the town of Cuyama and slightly towards the east are much deeper and do not match the surface topography. There is also a greater decline in groundwater elevations between the Ventucopa area and the central portion of the Basin.

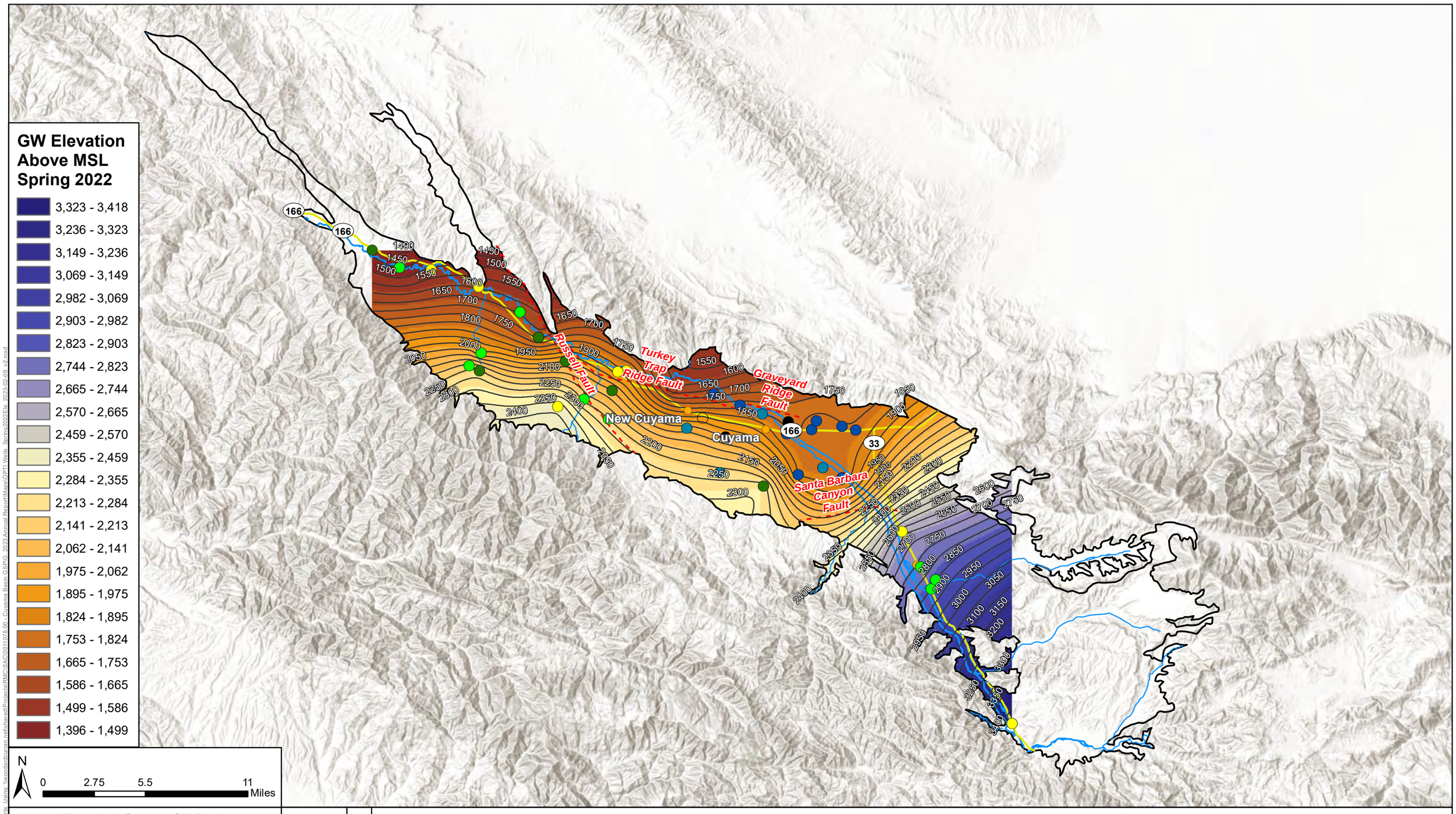
Figure 2-3 shows the depth to groundwater contours for Spring 2022 and more clearly shows a depression in the central portion of the Basin greater than 600 ft below ground surface. Groundwater levels then increase toward the west reaching depths above 100 ft in the western portion of the Basin. These levels align with trends seen in previous contour maps provided in previous Annual Reports.

Figure 2-4 shows the groundwater elevation contours for Fall of 2022. Groundwater elevations show a depression in the central portion of the Basin and a steep gradient between the central portion of the Basin and the Ventucopa area, which is consistent with contour maps for 2015 through 2021 conditions and previous Annual Reports. Contours indicate a groundwater flow down the Basin from east to west, with a decrease in gradient through the central portion of the Basin.

Figure 2-5 shows the depth to groundwater contours for the fall of 2022. Depth to water contours indicate a depression in the central portion of the Basin, and a steep gradient between the central portion of the Basin and the Ventucopa area, which is consistent with contour maps for 2015 through 2021 conditions and previous Annual Reports.

GW Elevation Above MSL Spring 2022

- 3,323 - 3,418
- 3,236 - 3,323
- 3,149 - 3,236
- 3,069 - 3,149
- 2,982 - 3,069
- 2,903 - 2,982
- 2,823 - 2,903
- 2,744 - 2,823
- 2,665 - 2,744
- 2,570 - 2,665
- 2,459 - 2,570
- 2,355 - 2,459
- 2,284 - 2,355
- 2,213 - 2,284
- 2,141 - 2,213
- 2,062 - 2,141
- 1,975 - 2,062
- 1,895 - 1,975
- 1,824 - 1,895
- 1,753 - 1,824
- 1,665 - 1,753
- 1,586 - 1,665
- 1,499 - 1,586
- 1,396 - 1,499



N

0 2.75 5.5 11 Miles

Figure 2-2: Cuyama GW Basin Spring 2022 Groundwater Elevation

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

February 2023

Woodard & Curran

Legend

- Cuyama Basin
- Cuyama River
- Faults
- Groundwater Elevation Above MSL

Well Depth Below Ground Surface Elevation

- Unknown
- 0 - 200 ft
- 200 - 400 ft
- 400 - 600 ft
- 600 - 800 ft
- 800 - 1000 ft
- 1000 - 1600 ft

Contours were interpolated using data measured from 1/18/2022 - 4/19/2022 due to limited data availability.

Contours Interval: 50 ft.

Plot Exported: 3/2023 By: mvallarta Using: Woodard&Curran\sharedProjects\RMC\SACR\001078.00_Cuyama Basin GSPG_2023 Annual Report\Maps\GPR Wells_Spring2022Ele_2023-02-09_v2.mxd

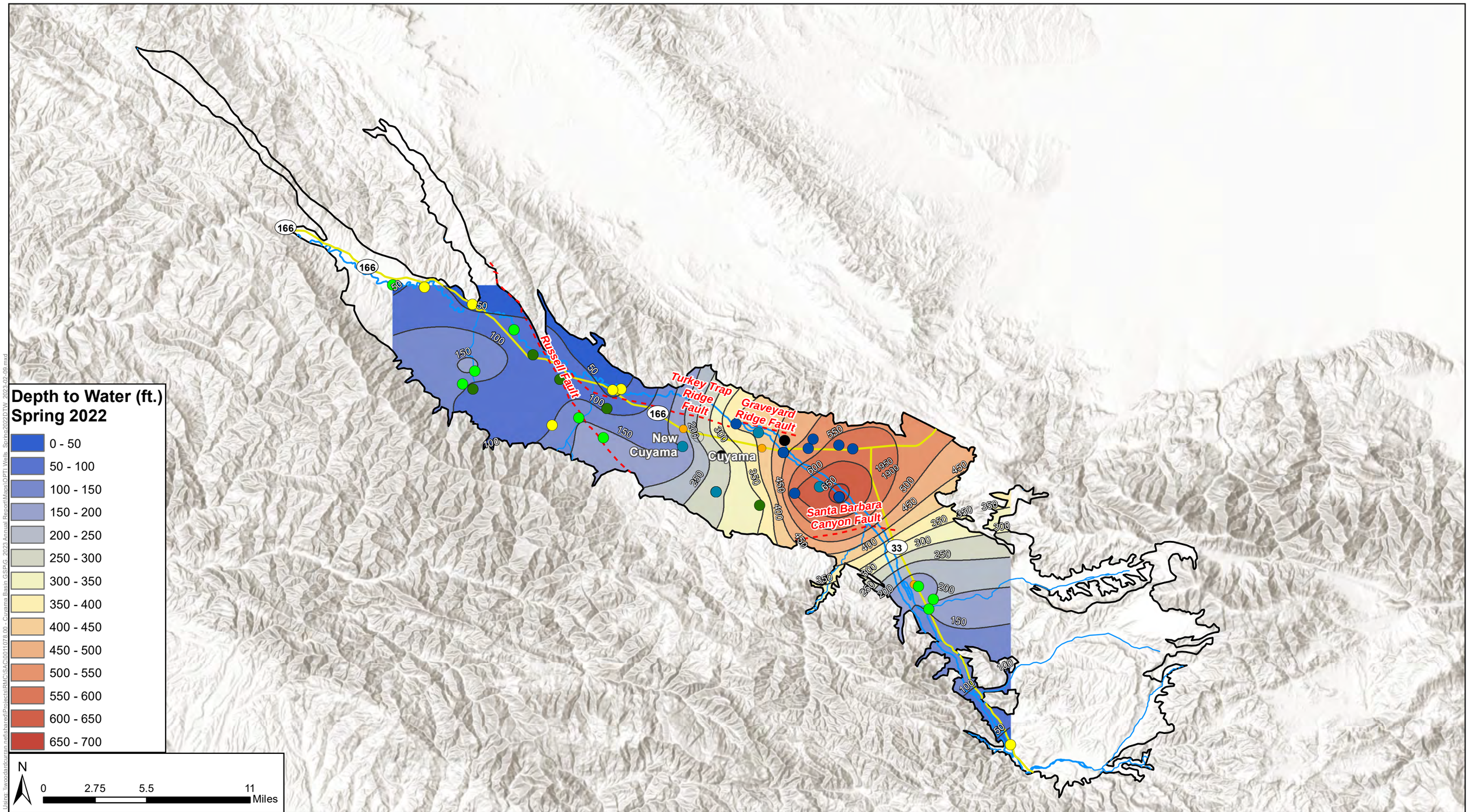


Figure 2-3: Cuyama GW Basin Spring 2022 Depth to Water

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

February 2023

Woodard & Curran

Legend

- Cuyama Basin
- Cuyama River
- Faults
- Groundwater Depth-to-Water Contours below Groundsurface

Well Depth Below Ground Surface Elevation

- Unknown
- 0 - 200 ft
- 200 - 400 ft
- 400 - 600 ft
- 600 - 800 ft
- 800 - 1000 ft
- 1000 - 1600 ft

Contours were interpolated using data measured from 1/18/2022 - 4/19/2022 due to limited data availability.

Contours Interval: 50 ft.

GW Elevation Above MSL Fall 2022

- 3,319 - 3,421
- 3,225 - 3,319
- 3,131 - 3,225
- 3,053 - 3,131
- 2,975 - 3,053
- 2,897 - 2,975
- 2,819 - 2,897
- 2,748 - 2,819
- 2,670 - 2,748
- 2,584 - 2,670
- 2,482 - 2,584
- 2,389 - 2,482
- 2,310 - 2,389
- 2,240 - 2,310
- 2,170 - 2,240
- 2,091 - 2,170
- 2,005 - 2,091
- 1,919 - 2,005
- 1,841 - 1,919
- 1,763 - 1,841
- 1,685 - 1,763
- 1,614 - 1,685
- 1,544 - 1,614
- 1,427 - 1,544

N

0 2.75 5.5 11 Miles

Russell Fault

Turkey Trap Ridge Fault

Santa Barbara Canyon Fault

New Cuyama

Cuyama

166

33

Figure 2-4: Cuyama GW Basin Fall 2022 Groundwater Elevation

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

February 2023

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Legend

- Cuyama Basin
- Cuyama River
- Faults
- Groundwater Elevation Above MSL

Well Depth Below Ground Surface Elevation

- Unknown
- 0 - 200 ft
- 200 - 400 ft
- 400 - 600 ft
- 600 - 800 ft
- 800 - 1000 ft
- 1000 - 1600 ft

Contours were interpolated using data measured from 10/12/2022 - 10/13/2022 due to limited data availability.

Contours Interval: 50 ft.

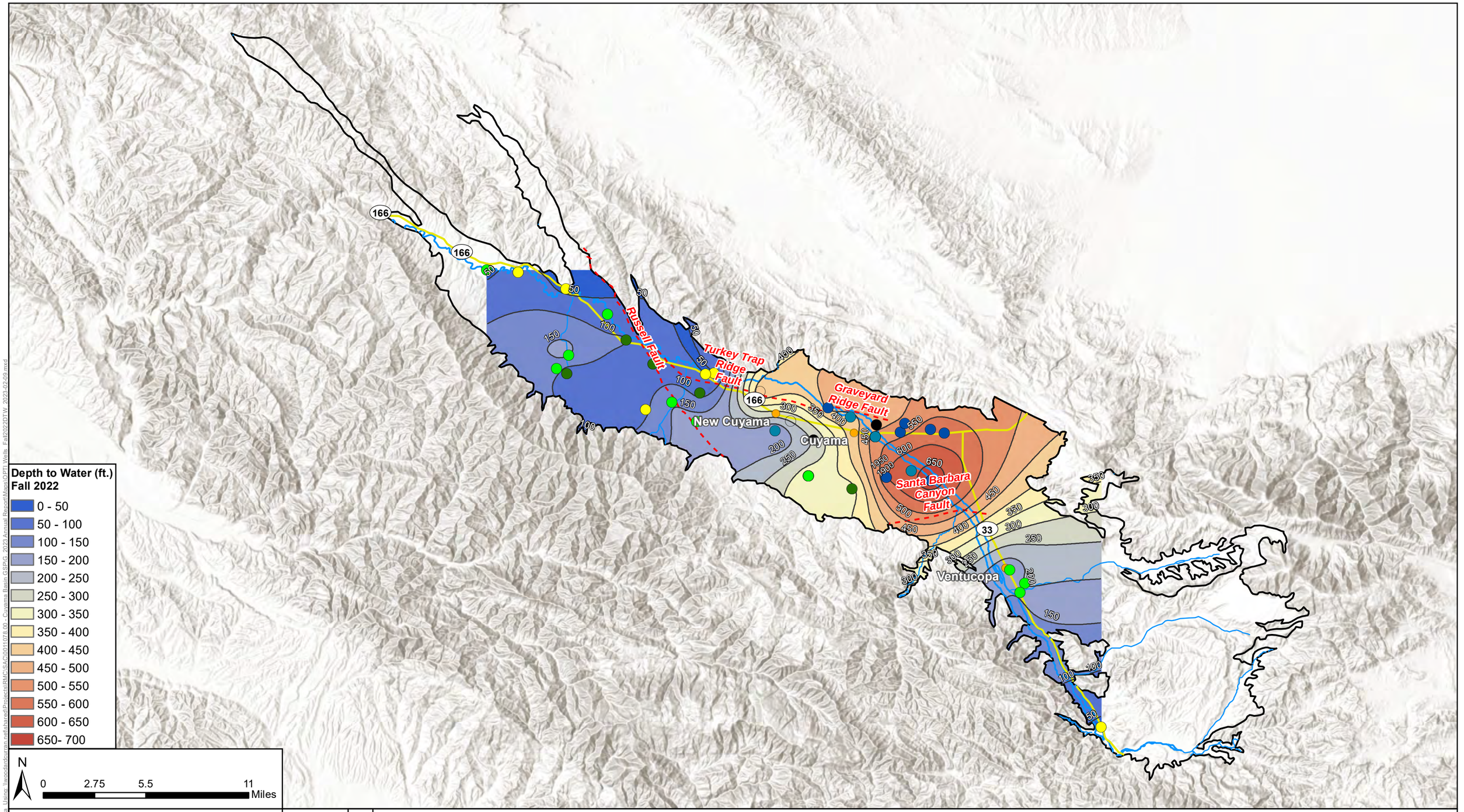


Figure 2-5: Cuyama GW Basin Fall 2022 Depth to Water

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

February 2023

Woodard & Curran

Legend

- Cuyama Basin
- Cuyama River
- Faults
- Groundwater Depth-to-Water Contours below Groundsurface

Well Depth Below Ground Surface Elevation

- Unknown
- 0 - 200 ft
- 200 - 400 ft
- 400 - 600 ft
- 600 - 800 ft
- 800 - 1000 ft
- 1000 - 1600 ft

Contours were interpolated using data measured from 10/12/2022 - 10/13/2022 due to limited data availability.

Contours Interval: 50 ft.

2.3 Hydrographs

Groundwater hydrographs were developed for each representative monitoring network well to provide indicators of groundwater trends throughout the Basin. Measurements from each well with historical monitoring data were compiled into one hydrograph for each well. A selection of wells from each threshold region are provided below, while hydrographs for every groundwater level representative network well are presented in Appendix A.

In many cases, changes in historical groundwater conditions at particular wells have been influenced by climactic patterns in the Basin. Historical precipitation is highly variable, with several relatively wet years and some multi-year droughts.

Groundwater conditions generally vary in different parts of the Basin. To provide a comparative analysis general groundwater trends are provided in **Table 2-1** and are accompanied by hydrographs for an example well in each threshold regions. A map of threshold regions is provided in **Figure 2-6**, which also shows the locations of example wells used in each threshold region.

Table 2-1: Groundwater Trends by Threshold Regions

Threshold Region	Groundwater Trend	Example Well(s)
Northwestern Region	A downward trend influenced by seasonal fluctuations. This is expected as recent changes in land use have begun to pump groundwater. Levels are still approximately 100 ft above the Measurable Objective.	841 (**Figure 2-7**)
Western Region	Levels in this region are slightly above the Measurable Objective or slightly below the Measurable Objective.	571 (**Figure 2-8**)
Central Region	Levels have historically had a steady downward trend with some seasonal fluctuations. This pattern remains with trends continuing downward and, in some cases, levels surpassing minimum thresholds. There is some indication of recovery in some wells, but more time is needed to determined if this is due to pumping pattern changes or is a broader trend for this region.	74 and 91 (**Figure 2-9 & Figure 2-10**)
Eastern Region	This region has seen an overall decline over several decades. Recent groundwater trends appear to be approaching Measurable Objective	62 (**Figure 2-11**)
Southeastern Region	Levels in this relatively small region decreased slightly during the last drought but have recovered over the past few years and are well above the Measurable Objective.	89 (**Figure 2-12**)

Northwestern Region

Central Region

Western Region

Badlands Region

Eastern Region

Southeastern Region

Russell Fault

Graveyard Ridge Fault

Santa Barbara Canyon Fault

Ventucopa

833 836 830 832 119 845 841 17 571 118 123 573 110 568 114 102 604 609 608 612 615 633 629 74 72 103 77 613 115 107 106 112 474 324 325 99 96 95 610 317 91 101 62 85 100 89

Figure 2-6: Cuyama GW Basin Groundwater Level Representative Wells & Thresholds Regions

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

March 2023

Woodard & Curran

Legend

- Cuyama Basin
- Representative Wells
- Towns
- Faults
- Highways
- Cuyama River
- Streams

Threshold Regions

- Badlands Region
- Central Region
- Eastern Region
- Northwestern Region
- Southeastern Region
- Western Region

N

0 2.75 5.5 11 Miles

Print Exported: 3/9/2023 By: mvallejo Using: \\woodardcuran.net\shared\Projects\RIC\SAC\001078.00 - Cuyama Basin GSPG - 2023 Annual Report\Maps\Figure 2-6 Thresholds.mxd

Figure 2-7: Example Well Hydrographs – Northwestern Region

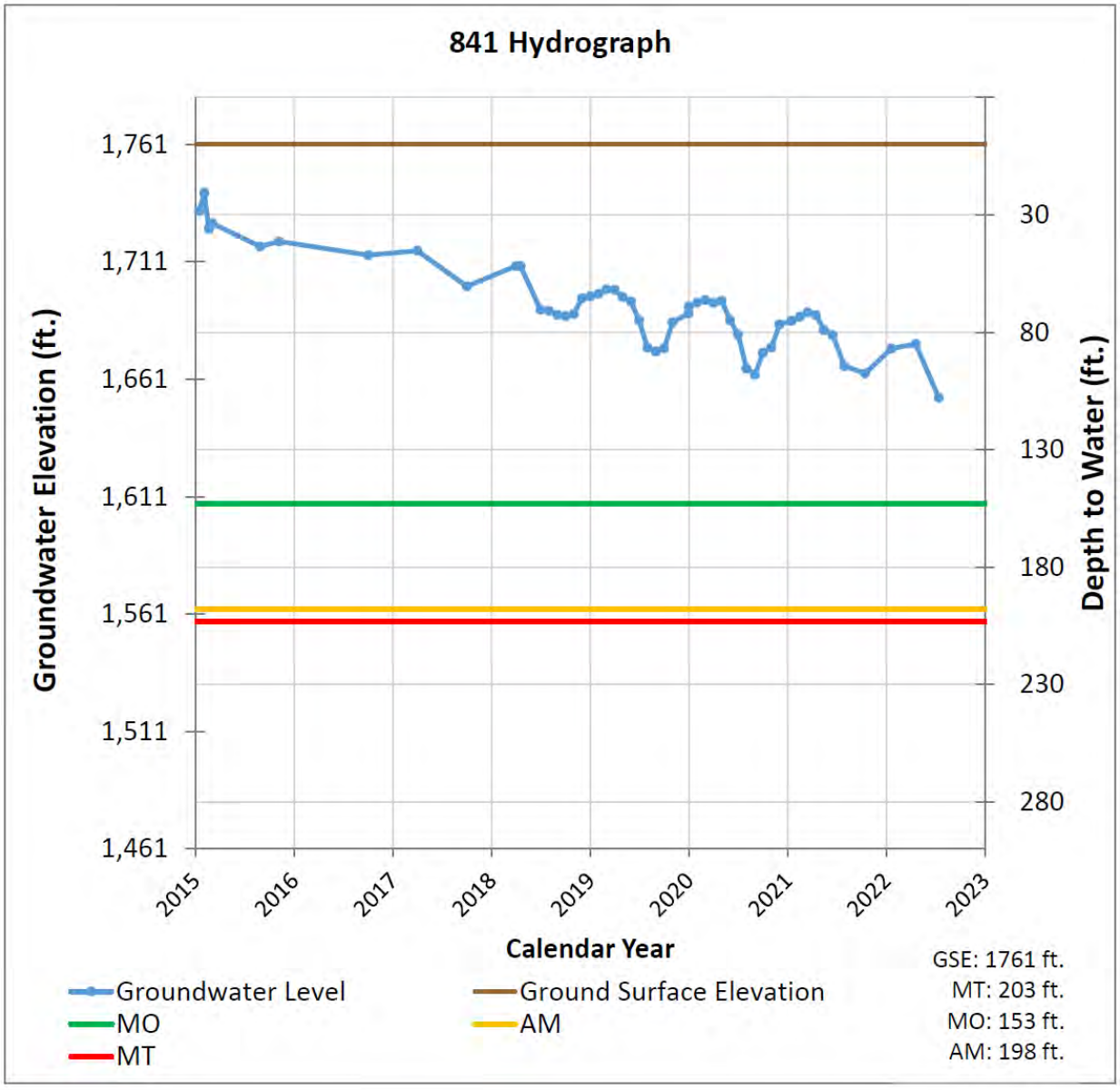


Figure 2-8: Example Well Hydrographs – Western Region

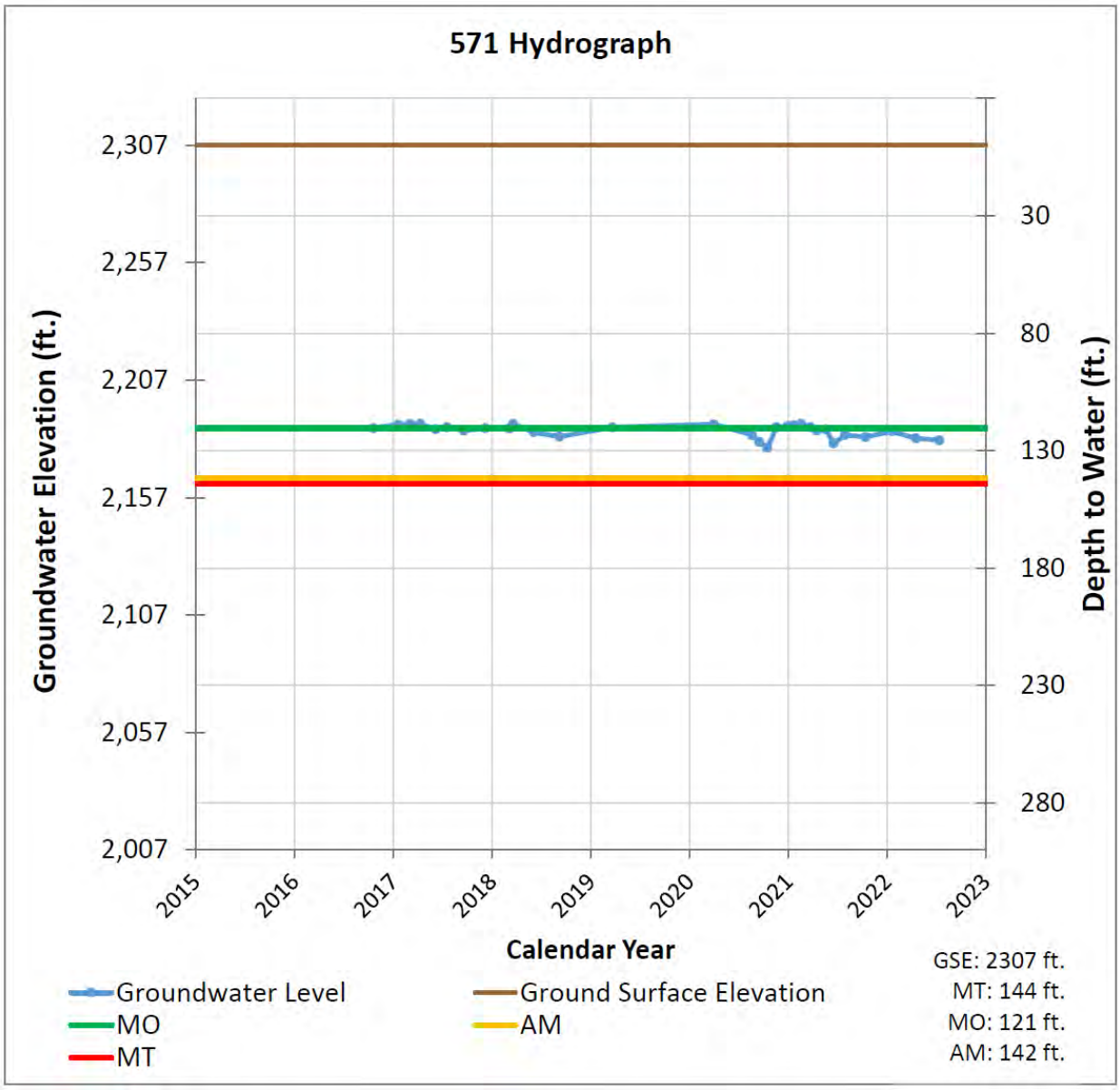


Figure 2-9: Example Well Hydrographs – Central Region

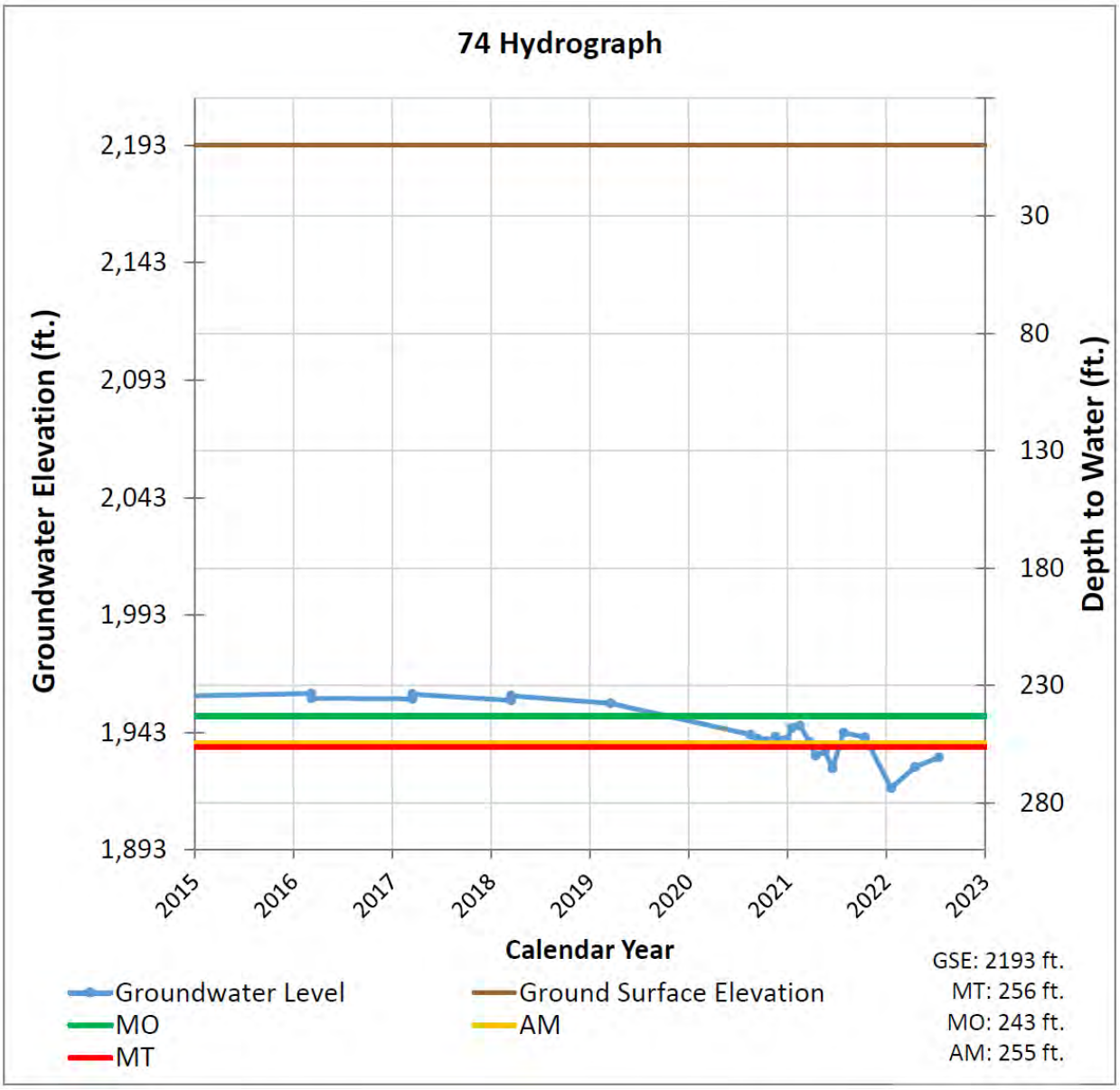


Figure 2-10: Example Well Hydrographs – Central Region

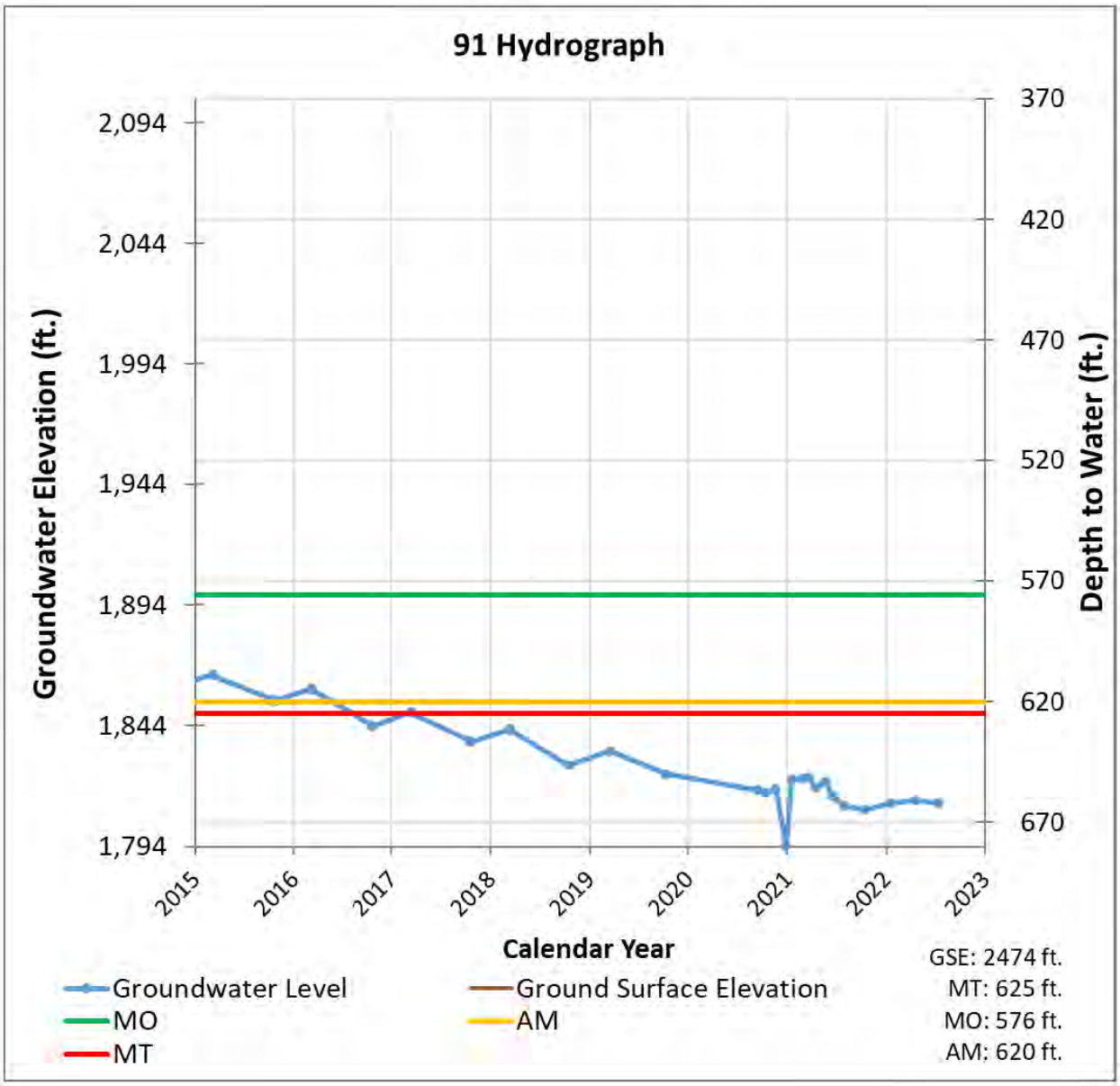


Figure 2-11: Example Well Hydrographs – Eastern Region

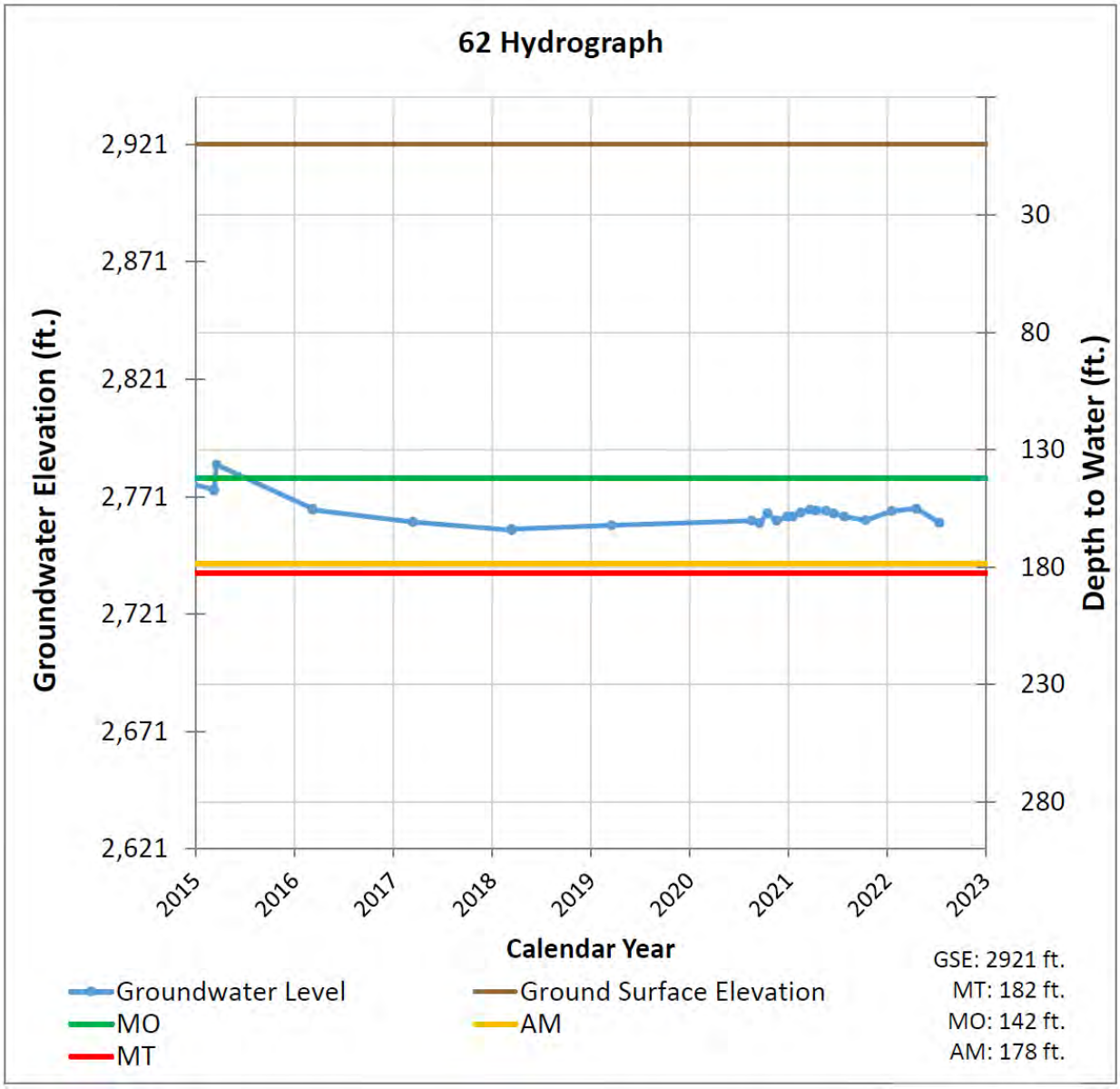
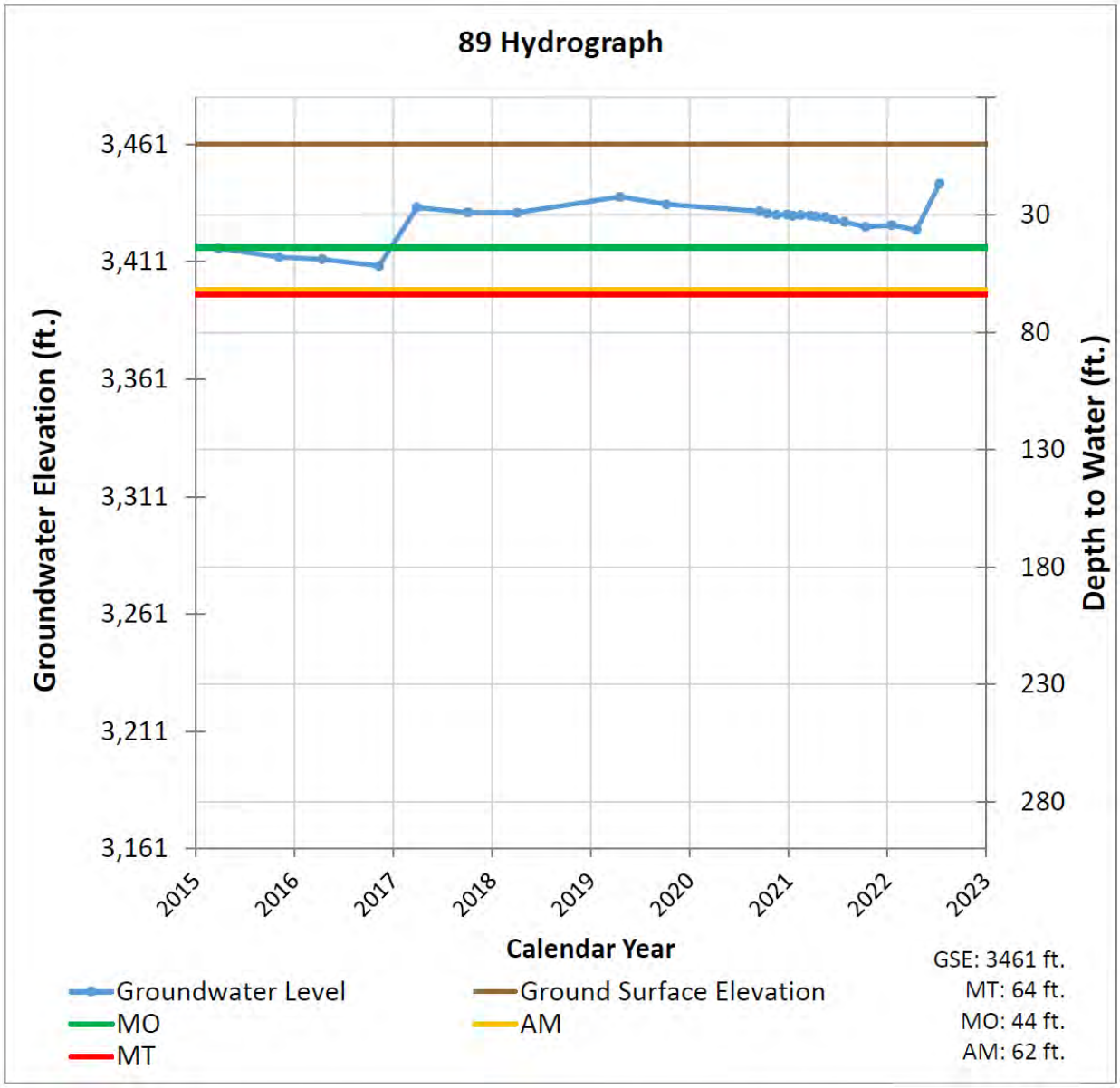


Figure 2-12: Example Well Hydrographs – Southeastern Region



Section 3. Water Use

§356.2 (b) (2)	Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.
§356.2 (b) (3)	Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.
§356.2 (b) (4)	Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.

3.1 Groundwater Extraction

Water budgets in the Cuyama Basin GSP were developed using the Cuyama Basin Water Resources Model (CBWRM) model, which is a fully integrated surface and groundwater flow model covering the Basin. The CBWRM was used to develop a historical water budget that evaluated the availability and reliability of past surface water supply deliveries, aquifer response to water supply, and demand trends relative to water year type. For the GSP, the CBWRM was used to develop water budget estimates for the hydrologic period of 1998 through 2017. As discussed in the GSP, the model was developed based on the best available data and information as of June 2018. An assessment of model uncertainty included in the GSP estimated an error range in overall model results of about +/- 10%. An update of the model, including re-calibration based on recently available data, was completed in June 2022. It is expected that the model will be refined in the future as improved and updated monitoring information becomes available for the Basin. For the current Annual Report, the CBWRM model was extended to include the 2022 water year, utilizing updated land use, temperature, and precipitation[3] data from those years.

Figure 3-1 shows the annual time series of groundwater pumping for the water years 1998 through 2022.[4] The CBWRM estimates a total groundwater extraction amount of 66,700 AF in the Cuyama Basin in the 2022 water year. This reflects an increase of about 2,700 AF as compared to 2021. Almost all groundwater extraction in the Basin is for agriculture use. There is approximately 300 AF of domestic use in each year, with the remainder in each year being for agricultural use.

[3] Precipitation data provided by PRISM was updated and there are minor changes to some historical (pre-2020) data reflected in the water budget results when compared to previous reports.

[4] Groundwater extraction estimates for years 1998 through 2021 differ from estimates reported in previous Cuyama Basin Annual Reports due to model updates using the most recent land use data.

Figure 3-1: Annual Groundwater Extraction in the Cuyama Basin in Water Years 1998-2022

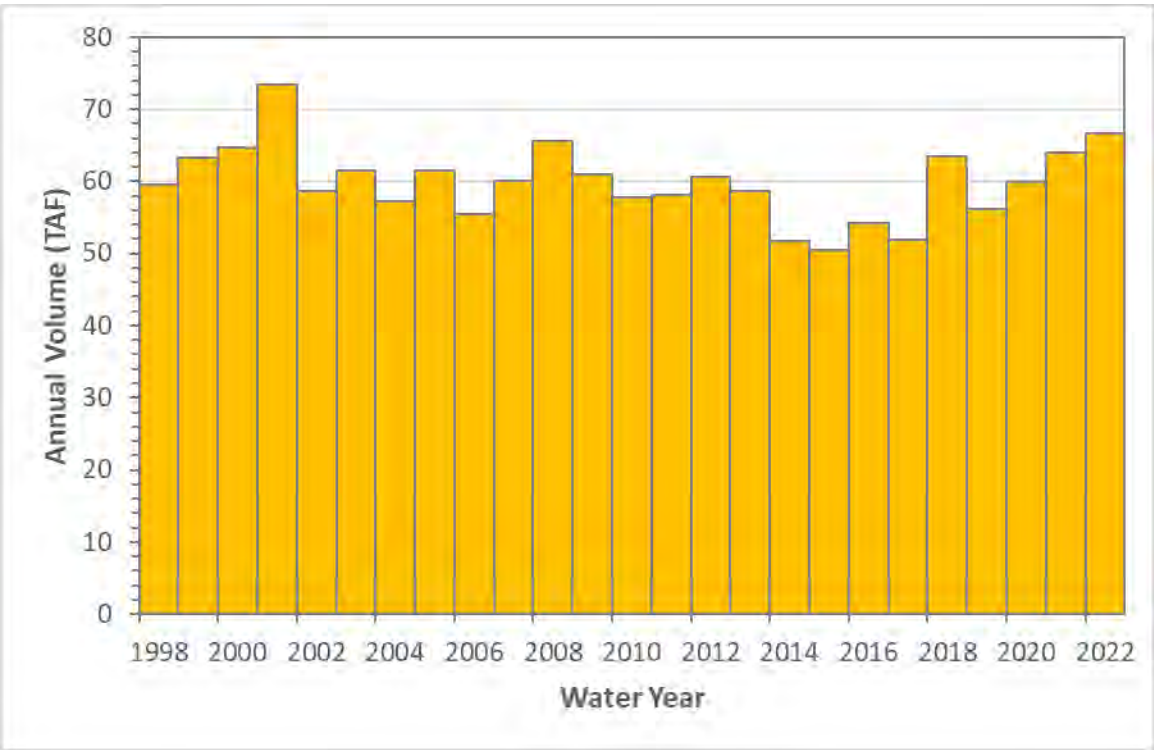


Figure 3-2 shows the locations where groundwater is applied in the Basin. The locations of groundwater use have not changed since completion of the GSP.

3.2 Surface Water Use

No surface water was used in the Cuyama Basin during the reporting period.

3.3 Total Water Use

Since there is no surface water use in the Cuyama Basin, the total water use equals the groundwater extraction in each year, as shown in Section 3.1.

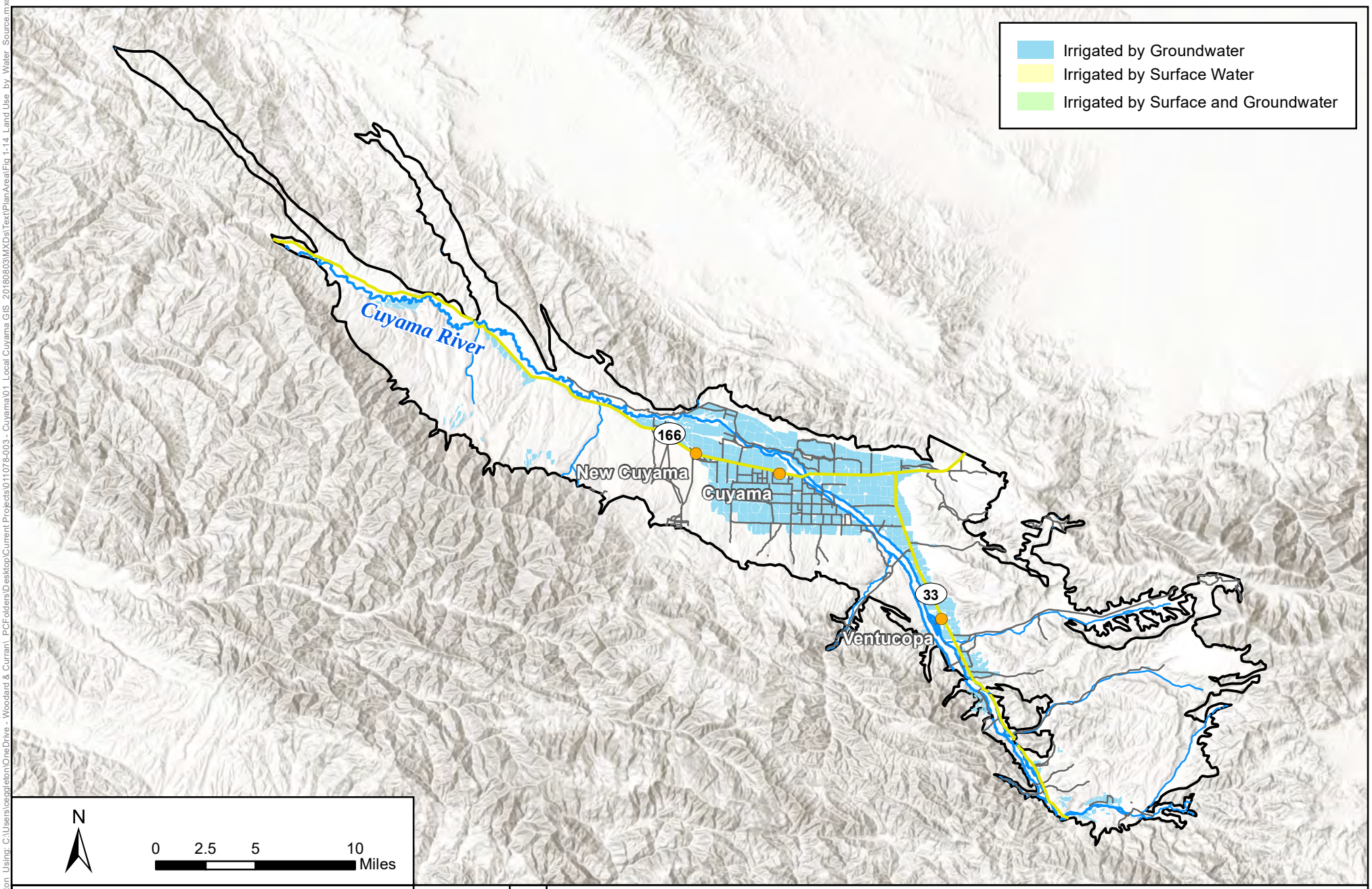


Figure 3-2 - Land Use by Water Source

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

March 2021

WOODARD &CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Local Roads
- Cuyama River
- Streams/Creeks

Source: California Department of Water Resources Statewide Crop Mapping, 2016 dataset.
https://gis.water.ca.gov/app/CADWRLandUseViewer/

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Section 4. Change in Groundwater Storage

§356.2 (b) (5)	Change in groundwater in storage shall include the following:
§356.2 (b) (5) (A)	Change in groundwater in storage maps for each principal aquifer in the basin.
§356.2 (b) (5) (B)	A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.

Figure 4-1 shows contours of the estimated change in groundwater levels in the Cuyama Basin between fall 2021 and fall 2022. The changes shown are based on historical measurements of groundwater elevations in Cuyama Basin representative wells that have recorded measurements in the fall period of each year. These contours are useful at the planning level for understanding groundwater levels across the Basin, and to identify general horizontal gradients and regional groundwater level trends. The contour map is not indicative of exact values across the Basin because groundwater contour maps approximate conditions between measurement points, and do not account for topography.

A quantitative estimate of the annual change in groundwater storage was estimated using the CBWRM model, which was extended to include the 2022 water year as described in the groundwater extraction section above. The CBWRM was used to estimate the full groundwater budget for each year in the Cuyama Basin, which consists of a single principal aquifer. The estimated values for each water budget component in each of the past three years are shown in **Table 4-1**. The CBWRM estimates reductions in groundwater storage of 29,100 AF in 2020, 44,800 AF in 2021, and 38,500 AF in 2022.[5]

Table 4-1: Groundwater Budget Estimates for Water Years 2020, 2021, and 2022

Component	Water Year 2020 (AFY)	Water Year 2021 (AFY)	Water Year 2022 (AFY)
Inflows			
Deep percolation	26,200	17,500	21,900
Stream seepage	3,700	800	4,900
Subsurface inflow	900	900	1,400
Total Inflow	30,800	19,200	28,200
Outflows			
Groundwater pumping	59,900	64,000	66,700
Total Outflow	59,900	64,000	66,700
Change in Storage	**-29,100**	**-44,800**	**-38,500**

[5] Groundwater budget estimates for years 2020 and 2021 differ from estimates reported in previous Cuyama Basin Annual Reports due to model updates using the most recent land use data.

Figure 4-1: Estimated Groundwater Level Storage Change Between Fall 2021 and Fall 2022

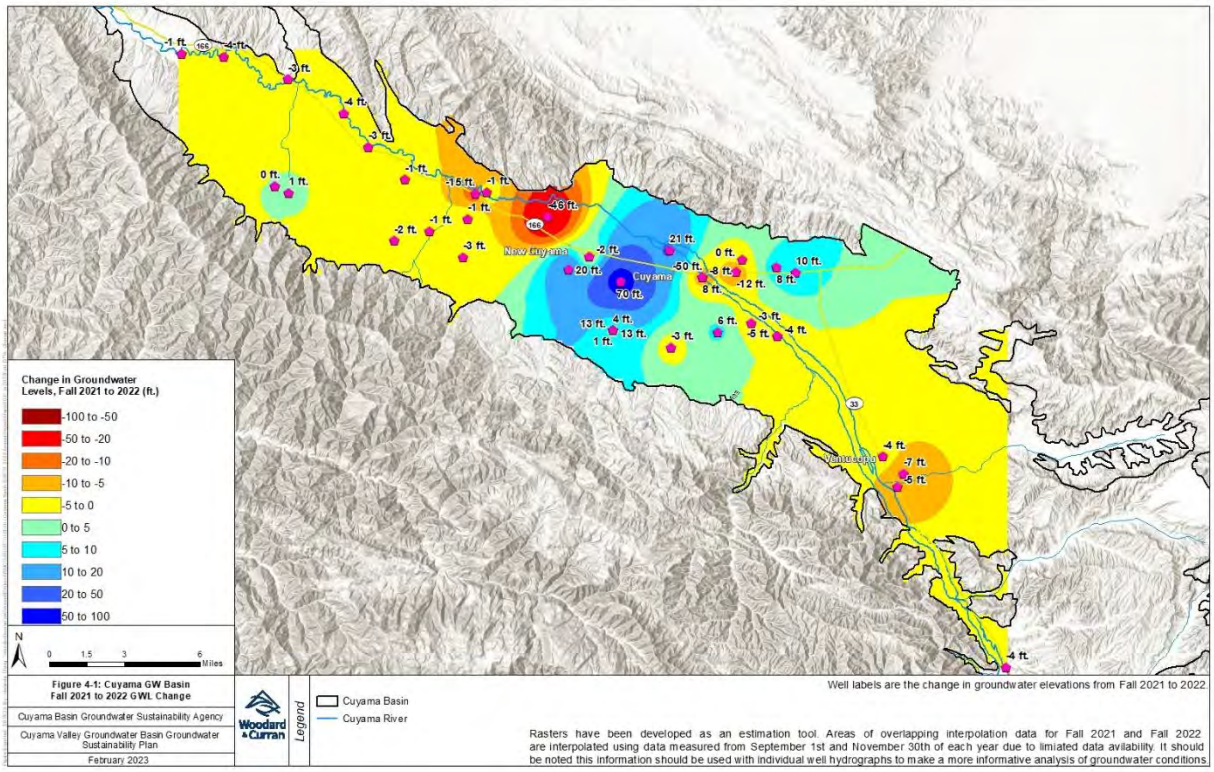


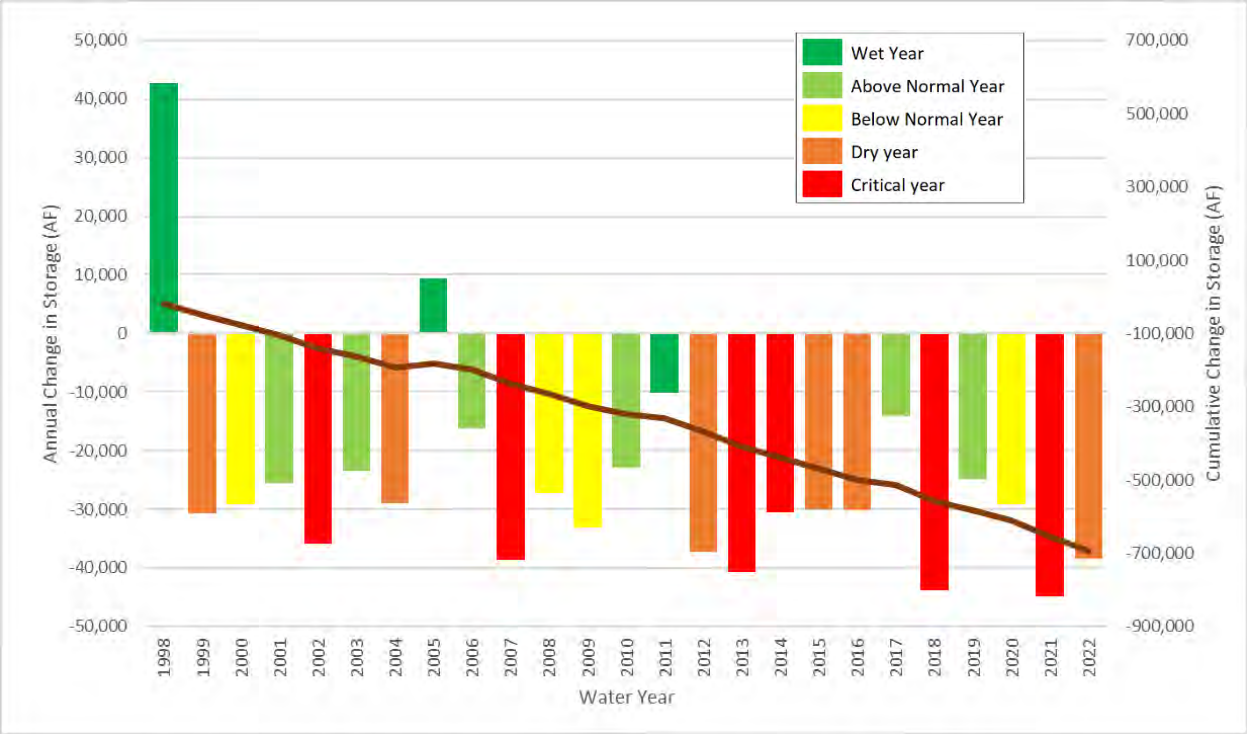
Figure 4-2 shows the historical change in groundwater storage by year, water year type,[6] and cumulative water volume in each year for the period from 1998 through 2022.[7] The change in groundwater storage in each year was estimated by the CBWRM model. The color of bar for each year of change in storage correlates a water year type defined by Basin precipitation.

[6] Water year types are customized for the Basin watershed based on annual precipitation as follows:

- Wet year = more than 19.6 inches
- Above normal year = 13.1 to 19.6 inches
- Below normal year = 9.85 to 13.1 inches
- Dry year = 6.6 to 9.85 inches
- Critical year = less than 6.6 inches.

[7] Groundwater storage change estimates for years 1998 through 2021 differ from estimates reported in previous Cuyama Basin Annual Reports due to model updates using the most recent land use data.

Figure 4-2: Change in Groundwater Storage by Year, Water Year Type, and Cumulative Water Volume



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Section 5. Groundwater Quality

As discussed in Section 4.8 of the Cuyama GSP, the CBGSA's groundwater quality network is designed to monitor salinity levels (as total dissolved solids (TDS)). The groundwater quality network is composed of 64 wells, all of which are representative, and are listed in **Table 5-1** and shown on **Figure 5-1**.

In 2022, the CBGSA collected TDS measurements at 18 of the 64 wells (28%) in the groundwater quality representative monitoring network. In addition, measurements were taken at 8 additional monitoring wells. The results are listed in **Table 5-1** and shown on **Figure 5-2**. Of the 18 representative wells measured in water year 2022, nine wells exceeded their measurable objective, and four wells exceeded the minimum threshold and 2025 interim milestone. Therefore, 50% of measured wells exceeded their measurable objective and 22% exceeded their minimum threshold. However, 72% of wells were not sampled due to limitations in gaining access to well sites. TDS measurements were also not reported in the DWR's Groundwater Ambient Monitoring and Assessment Program (GAMA) or the USGS's National Water Information System (NWIS) platforms for these wells. Furthermore, since the measurement at many of these wells was the first or second measurement taken in many years, and significant differences were noted relative to previous measurements (in both a positive and negative direction), the CBGSA considers it premature to use this data to evaluate the performance of groundwater quality at this time. The CBGSA intends to reevaluate the groundwater quality representative monitoring network for the 2025 GSP Update based on the well information, site access, and landowner participation moving forward to ensure that the representative monitoring network both provides adequate coverage and representative data for the Basin while ensuring continued and consistent monitoring is conducted over the implementation horizon. This may also include reassessing threshold values and consideration of the proper translation of measured electrical conductivity (EC) versus TDS.

The CBGSA intends to leverage and make use of existing monitoring programs for nitrates and arsenic (in particular the Central Coast Water Board's Irrigated Lands Program for nitrates and USGS for arsenic). To supplement the understanding of nitrate and arsenic concentrations in the basin, the CBGSA performed additional measurements of nitrate and arsenic at several water quality wells identified in the GSP (GSP Figure 4-20) during calendar year 2022. Nitrate and arsenic measurements collected at 27 wells in the groundwater quality monitoring network are listed in **Table 5-1** and shown on **Figure 5-3** (for nitrate) and **Figure 5-4** (for arsenic).

These results provide a baseline constituent level in all groundwater quality representative monitoring network locations that can be utilized for future basin planning. Additional measurements may be considered by the GSA in the future in anticipation of future five-year updates.

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Table 5-1: Groundwater Quality Monitoring Network Well List and TDS, Nitrate, and Arsenic Results

	TDS					Nitrate		Arsenic	
Opti ID	Date	Measurement (mg/L)	MO (mg/L)	MT (mg/L)	2025 Interim Milestone (mg/L)	Date	Measurement (mg/L)	Date	Measurement (µg/L)
61	-	-	585	615	615	-	-	-	-
72	8/18/22	980	996	1,023	1,023	8/18/22	ND	8/18/22	42
73	-	-	805	856	856	-	-	-	-
74	8/18/22	1,700	1,500	1,833	1,833	8/18/22	0.61	8/18/22	3.4
76	-	-	1,500	2,307	2,307	-	-	-	-
77	-	-	1,500	1,592	1,592	-	-	-	-
79	-	-	1,500	2,320	2,320	-	-	-	-
81	-	-	1,500	2,788	2,788	-	-	-	-
83	8/18/22	1,400	1,500	1,726	1,726	8/18/22	0.88	8/18/22	ND
85	-	-	618	1,391	1,391	-	-	-	-
86	-	-	969	975	975	-	-	-	-
87	-	-	1,090	1,165	1,165	-	-	-	-
88	8/17/22	300	302	302	302	8/17/22	0.31	8/17/22	ND
90	8/18/22	1,400	1,500	1,593	1,593	8/18/22	2	8/18/22	ND
91	-	-	1,410	1,487	1,487	-	-	-	-
94	-	-	1,050	1,245	1,245	-	-	-	-
95	8/23/22	1,700	1,500	1,866	1,866	8/23/22	ND	8/23/22	ND
96	8/17/22	1,500	1,500	1,632	1,632	8/17/22	0.39	8/17/22	ND
98	-	-	1,500	2,400	2,400	-	-	-	-
99	9/8/22	1,300	1,490	1,562	1,562	9/8/22	ND	9/8/22	33
101	8/17/22	1,400	1,500	1,693	1,693	8/17/22	8.1	8/17/22	ND
102	8/17/22	2,100	1,500	2,351	2,351	8/17/22	3.5	8/17/22	ND
130	-	-	1,500	1,855	1,855	-	-	-	-
131	-	-	1,500	1,982	1,982	-	-	-	-
157	-	-	1,500	2,360	2,360	-	-	-	-
196	-	-	851	904	904	-	-	-	-
204	8/17/22	340	253	269	269	8/18/22	7.8	8/31/22	ND
226	-	-	1,500	1,844	1,844	-	-	-	-

	TDS					Nitrate		Arsenic	
Opti ID	Date	Measurement (mg/L)	MO (mg/L)	MT (mg/L)	2025 Interim Milestone (mg/L)	Date	Measurement (mg/L)	Date	Measurement (µg/L)
227	-	-	1,500	2,230	2,230	-	-	-	-
242	8/17/22	1,100	1,470	1,518	1,518	8/17/22	7.8	8/17/22	ND
269	-	-	1,500	1,702	1,702	-	-	-	-
309	-	-	1,410	1,509	1,509	-	-	-	-
316	-	-	1,380	1,468	1,468	-	-	-	-
317	-	-	1,260	1,337	1,337	-	-	-	-
318	-	-	1,080	1,152	1,152	-	-	-	-
322	9/8/22	1,500	1,350	1,386	1,386	9/8/22	0.35	9/8/22	49
324	9/8/22	850	746	777	777	9/8/22	ND	9/8/22	9.5
325	9/8/22	1,400	1,470	1,569	1,569	9/8/22	ND	9/8/22	2.6
400	-	-	918	976	976	-	-	-	-
420	-	-	1,430	1,490	1,490	-	-	-	-
421	-	-	1,500	1,616	1,616	-	-	-	-
422	-	-	1,500	1,942	1,942	-	-	-	-
424	8/18/22	1,600	1,500	1,588	1,588	8/18/22	3.1	8/18/22	ND
467	8/18/22	1,400	1,500	1,764	1,764	8/18/22	ND	8/18/22	25
568	8/17/22	920	871	1,191	1,191	8/17/22	1.9	8/17/22	ND
702	-	-	110	2,074	2,074	-	-	-	-
703	-	-	400	4,097	4,097	-	-	-	-
710	-	-	1,040	1,040	1,040	-	-	-	-
711	-	-	928	928	928	-	-	-	-
712	-	-	977	978	978	-	-	-	-
713	-	-	1,200	1,200	1,200	-	-	-	-
721	-	-	1,500	2,170	2,170	-	-	-	-
758	-	-	900	954	954	-	-	-	-
836*	-	-	-	-	-	8/19/22	0.76	9/1/22	ND
840	-	-	559	559	559	-	-	-	-
841	-	-	561	561	561	-	-	-	-
842	-	-	547	547	547	-	-	-	-

	TDS					Nitrate		Arsenic	
Opti ID	Date	Measurement (mg/L)	MO (mg/L)	MT (mg/L)	2025 Interim Milestone (mg/L)	Date	Measurement (mg/L)	Date	Measurement (µg/L)
843	-	-	569	569	569	-	-	-	-
844	-	-	481	481	481	-	-	-	-
845	-	-	1,250	1,250	1,250	-	-	-	-
846	-	-	918	918	918	-	-	-	-
847	-	-	480	480	480	-	-	-	-
848	-	-	674	674	674	-	-	-	-
849	-	-	1,500	1,780	1,780	-	-	-	-
850	-	-	472	472	472	-	-	-	-
900*	8/17/2022	6200	-	-	-	8/17/2022	ND	8/17/2022	6.3
901*	8/23/2022	6700	-	-	-	8/23/2022	ND	8/23/2022	4.2
902*	8/23/2022	9200	-	-	-	8/23/2022	ND	8/23/2022	6
903*	8/23/2022	1500	-	-	-	8/23/2022	1.1	8/23/2022	ND
904*	8/23/2022	1500	-	-	-	8/23/2022	1.1	8/23/2022	ND
905*	8/23/2022	1400	-	-	-	8/23/2022	1.1	8/23/2022	ND
907*	8/23/2022	1600	-	-	-	8/23/2022	ND	8/23/2022	54
908*	8/23/2022	2400	-	-	-	8/23/2022	ND	8/23/2022	45

Note: Shaded cells represent sustainable management criteria exceedances. “ND” indicates that a measurement was taken, but no constituent was detected. “*” indicates well is not part of the Groundwater Quality Representative Monitoring Network.

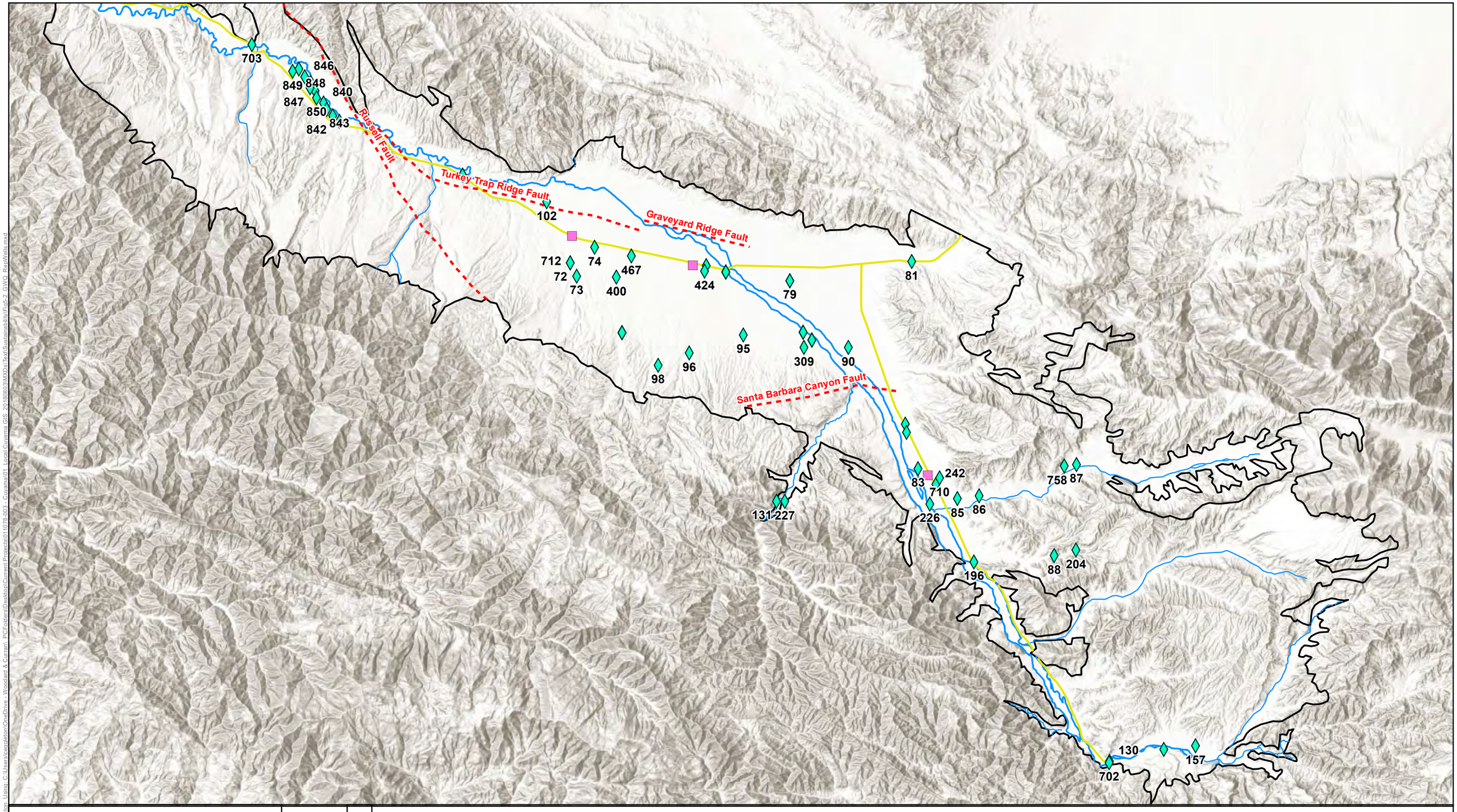


Figure 5-1: Cuyama GW Basin Groundwater Quality Representative Wells

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

December 2019

WOODARD &CURRAN

Legend

- Cuyama Basin
- Towns
- Faults
- Highways
- Cuyama River
- Streams
- Representative Groundwater Quality Wells

N

0 1.75 3.5 7 Miles

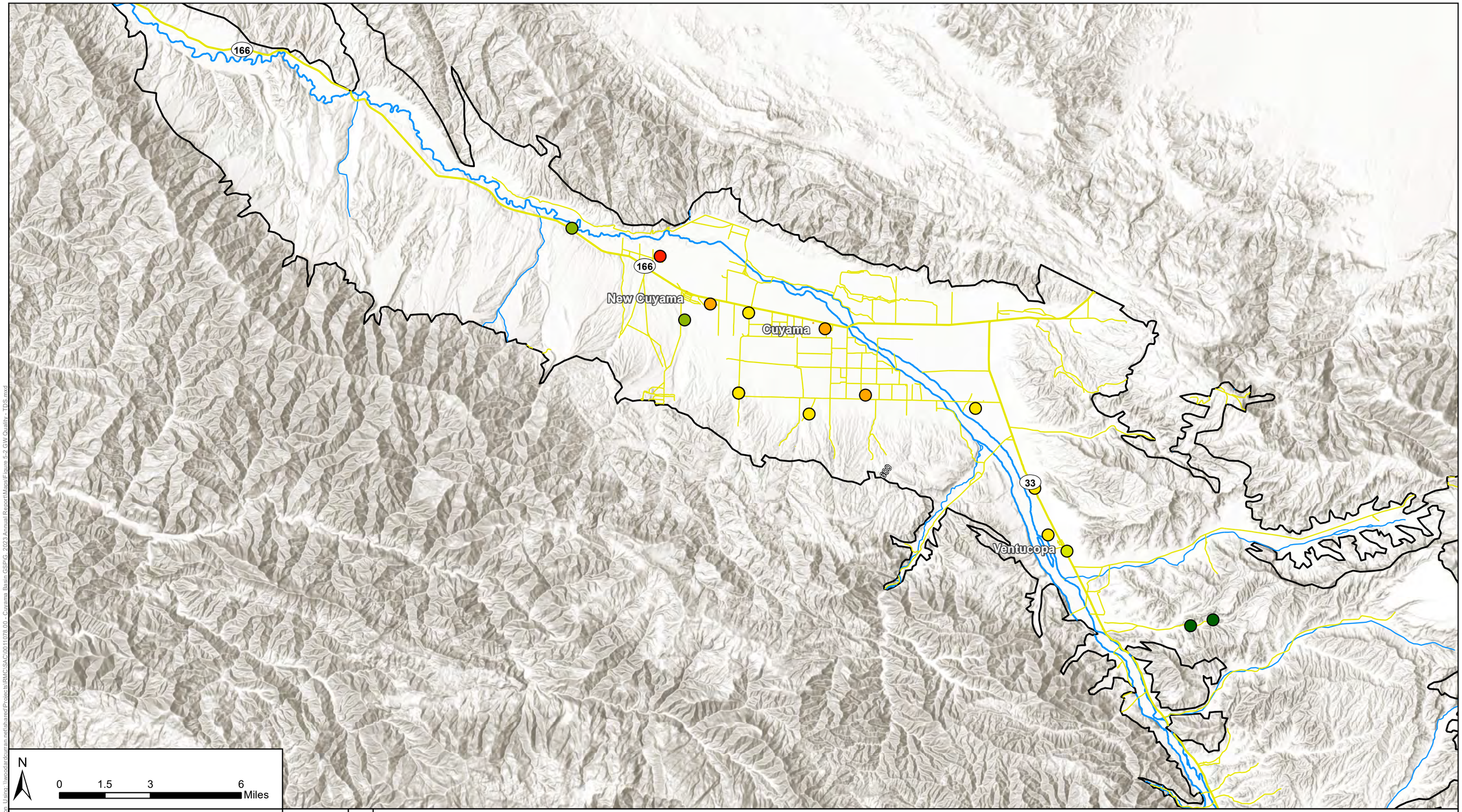


Figure 5-2: 2022 Groundwater Quality Measurements - TDS

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

February 2023

Woodard & Curran

Legend

Total Dissolved Solids (TDS) (mg/L)

- < 500
- 501 - 750
- 751 - 1,000
- 1,001 - 1,250
- 1,251 - 1,500
- 1,501 - 1,750
- 1,751 - 2,000
- 2,001 - 2,250

Figure Exported: 9/7/2023 By: cepelton Using: \\woodardcurran.net\shared\Projects\IRVC\SACV001\11078.00 - Cuyama Basin GSP\G. 2023 Annual Report\Maps\Figure 5-2 GW Quality - TDS.mxd

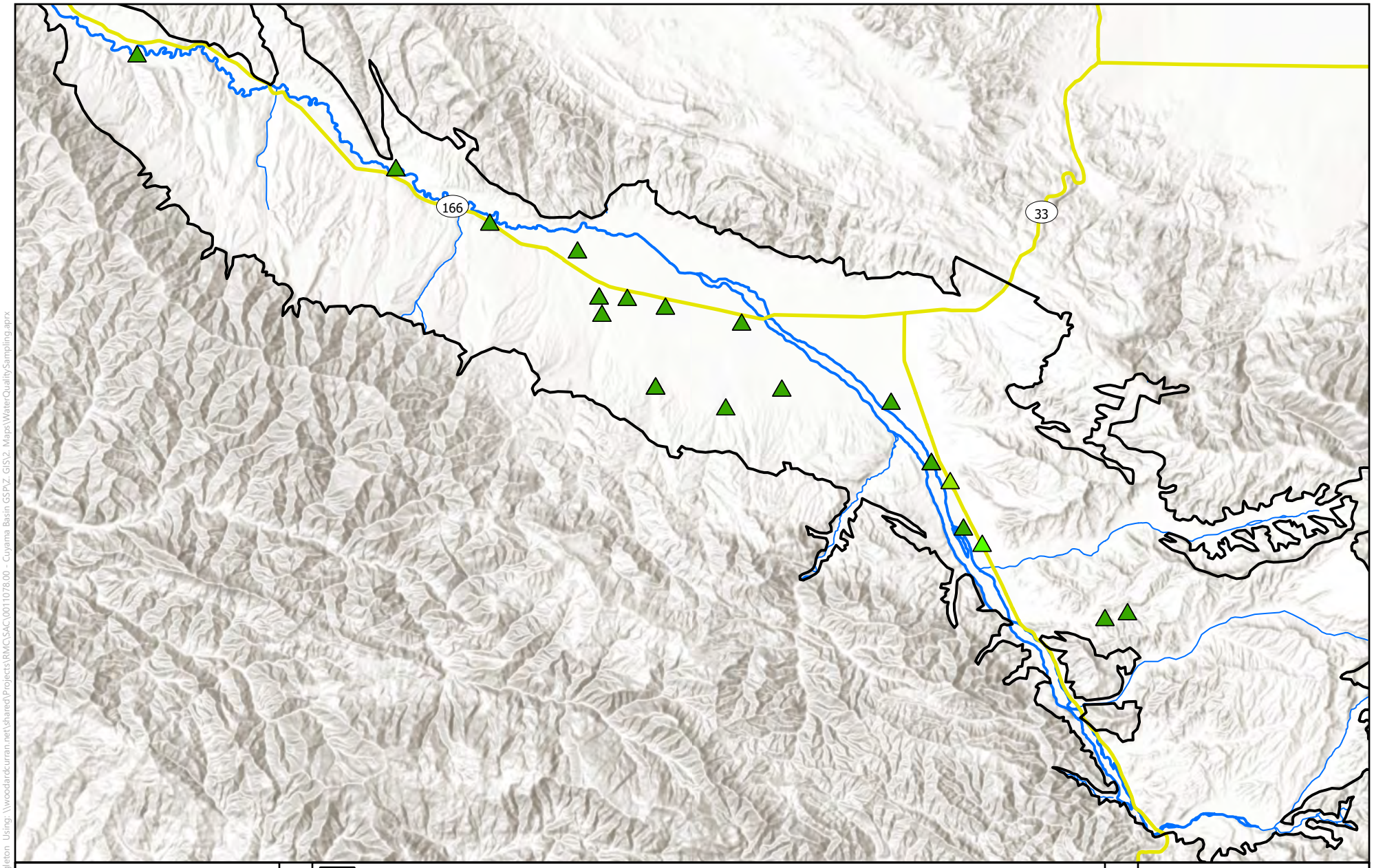


Figure 5-3: Groundwater Quality 2022 Measurements Nitrate

Cuyama Valley Groundwater Basin

Legend

- Cuyama Basin
- Highways
- Cuyama River
- Streams/Creeks

Nitrate

- < 5 mg/L
- 5 - 8 mg/L
- 8 - 10 mg/L
- 10 - 15 mg/L
- 15 - 20 mg/L
- > 20 mg/L

N

Woodard & Curran

0 1 2 4 Miles

Map Created: June 2023

Figure Exported: 6/8/2023 By: ceggleton Using: \\woodardcurran.net\shared\Projects\RMC\SAC\001107800 - Cuyama Basin GSPs\2. GIS\2. Maps\WaterQuality\Sampling.aprx

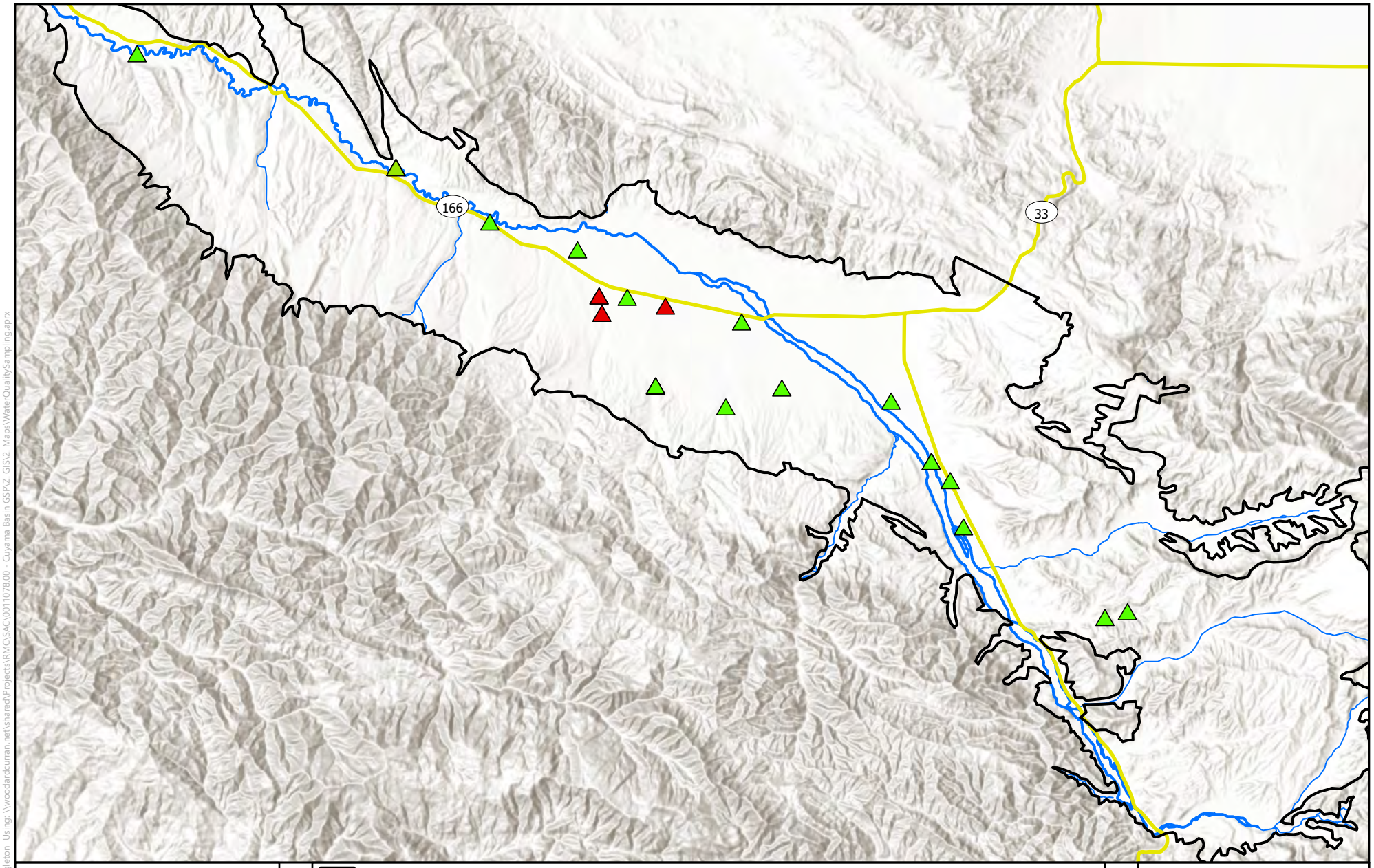


Figure 5-4: Groundwater Quality 2022 Measurements Arsenic

Cuyama Valley Groundwater Basin

Legend

- Cuyama Basin
- Highways
- Cuyama River
- Streams/Creeks

Arsenic Measured in 2022

- < 5 ug/L
- 5 - 10 ug/L
- 10 - 20 ug/L
- > 20 ug/L

N

Woodard & Curran

0 1 2 4 Miles

Map Created: June 2023

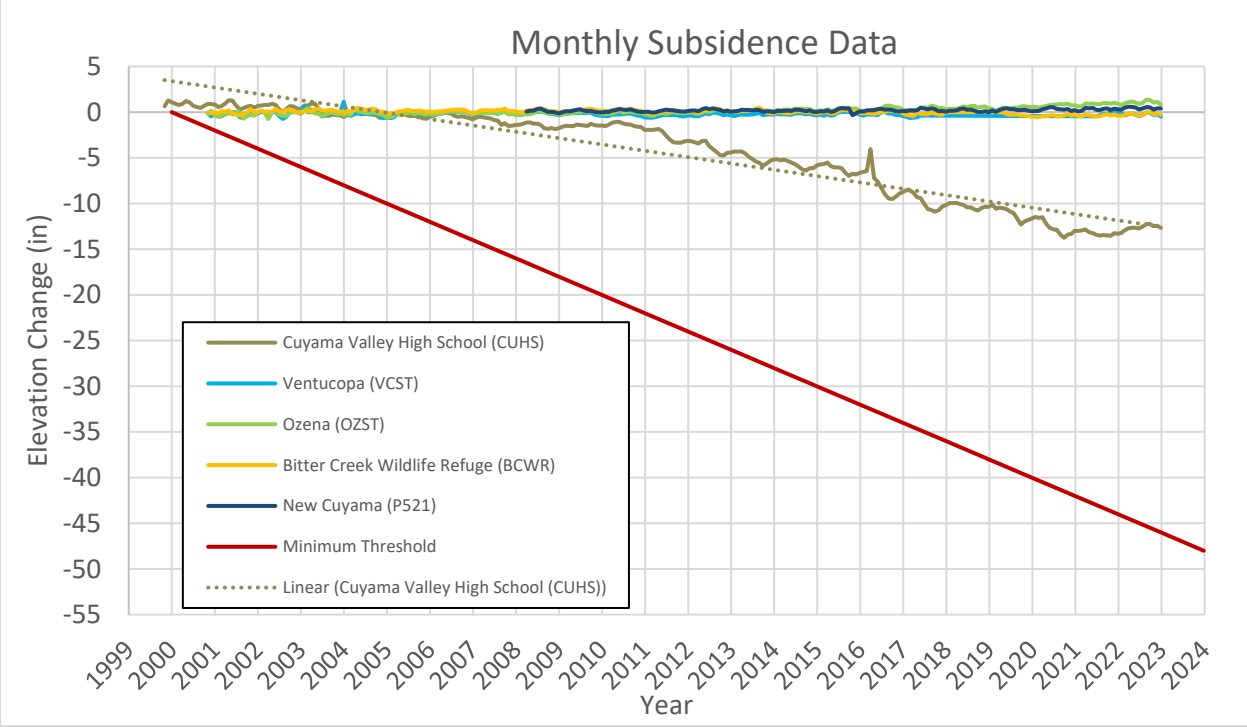
Section 6. Land Subsidence

Section 4.9 of the Cuyama GSP describes the monitoring network for land subsidence in the Basin, which is composed of five continuous geographic positioning system (CGPS) stations in and around the Basin to monitor lateral and vertical ground movements. Two of the five stations, the Cuyama Valley High School (CUHS) and the Ventucopa (VCST) stations are within the Basin boundary. The other three stations are outside of the Basin and provide data comparative data for vertical movements that are more likely related to tectonic displacement rather than land subsidence.

The undesirable result for subsidence, as described in Section 3.2.5, is detected when 30 percent of representative subsidence monitoring sites (i.e. 1 of 2 sites) exceed the minimum threshold for subsidence over two years. The minimum threshold for subsidence, as defined in GSP Section 5.6.3, is 2 inches per year.

At the time the GSP was submitted in 2020, subsidence rates for the CUHS station were -0.56 inches per year. As shown in **Figure 6-1**, data through 2022 was downloaded from UNAVCO[8] and the subsidence trend for CUHS was recalculated. Subsidence rates during 2021 and 2022 actually reflected a positive change in ground surface elevation, and current subsidence rates in the central portion of the Basin are 34.02mm per year or 1.34 inches per year. (for WY 2022). This is rate is below the minimum threshold, and thus undesirable results for subsidence are not occurring in the Basin.

Figure 6-1: Subsidence Monitoring Data



[8] https://www.unavco.org/data/web-services/documentation/documentation.html#!/GNSS47GPS/getPositionByStationId

Section 7. Plan Implementation

§356.2 (c)	A description of progress toward implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.

This section describes management activities taken by the CBGSA to implement the Cuyama Basin GSP from adoption of the GSP through preparation of this Annual Report.

7.1 Progress Toward Achieving Interim Milestones

Since the GSP was adopted by the CBGSA Board recently and CBGSA data collection efforts began in the second half of 2020, progress toward achieving interim milestones is in its early stages.

To track changes in groundwater conditions and the Basins progress towards sustainability, the GSA compiles a quarterly groundwater condition reports based on the data collected to monitoring groundwater levels. Current data collection occurs quarterly with corresponding reports. Data collection prior to 2022 was conducted monthly, but the CBGSA determined quarterly data collection was sufficient after a full year of monthly monitoring had been performed.

As described in Section 5 of the GSP (Minimum Thresholds, Measurable Objectives, and Interim Milestones), all interim milestones (IMs) are calculated the same way in each threshold region. IMs are equal to the MT in 2025, with a projected improvement to one-third the distance between the MT and MO in 2030 and half the distance between the MT and MO in 2035. **Table 7-1** includes measurements of depth to water (DTW) at each well and compares them to their respective 2025 IMs. For each well, the groundwater level measurement taken in October 2022 is used if available; otherwise, the most recent measurement taken in January, April, or July 2022 is used instead. As is shown in the table, 21 wells are currently above their IM, while 25 are below, relative to the most recent measurement. Three wells did not have measurements taken during the water year, either because an access agreement has not granted, or the well was inaccessible.

As outlined in the GSP, undesirable results for the chronic lowering of groundwater levels occurs, “when 30 percent of representative monitoring wells… fall below their minimum groundwater elevation threshold for two consecutive years.” (Cuyama GSP, pg. 3-2). As of October 2022, 51% of representative wells (25 of 49) were below the minimum threshold. (Cuyama Groundwater Conditions Report, pg. 1). At least 30% of representative monitoring wells (i.e. 16 wells) had been below the minimum threshold for 17 or more consecutive months, which indicated that undesirable results for the chronic lower of groundwater levels would be observed during the July 2023 groundwater levels monitoring if conditions in one or more wells did not improve before then. Steps that the CBGSA Board has taken in response to these observed basin conditions are described in Section 7.6 Adaptive Management, below.

Table 7-1: Measured Depths to Groundwater Compared to 2025 Interim Milestones

Well	Region	Depth to Water (feet)	Measurement Month	2025 IM (feet)	Status
72	Central	157	Oct 2022	169	Above IM
74	Central	254	Oct 2022	256	Above IM
77	Central	507	Oct 2022	450	Below IM
91	Central	669	Oct 2022	625	Below IM
95	Central	598	Oct 2022	573	Below IM
96	Central	337	Oct 2022	333	Below IM
98	Central	-	N/A	450	Unknown
99	Central	355	Oct 2022	311	Below IM
102	Central	425	Apr 2022	235	Below IM
103	Central	257	Oct 2022	290	Above IM
112	Central	86	Oct 2022	87	Above IM
114	Central	48	Oct 2022	47	Below IM
316	Central	671	Oct 2022	623	Below IM
317	Central	661	Jul 2022	623	Below IM
322	Central	356	Oct 2022	307	Below IM
324	Central	335	Oct 2022	311	Below IM
325	Central	313	Oct 2022	300	Below IM
420	Central	561	Oct 2022	450	Below IM
421	Central	499	Oct 2022	444	Below IM
474	Central	166	Oct 2022	188	Above IM
568	Central	54	Oct 2022	37	Below IM
604	Central	450	Jan 2022	526	Above IM
608	Central	441	Oct 2022	436	Below IM
609	Central	460	Oct 2022	458	Below IM
610	Central	634	Oct 2022	621	Below IM
612	Central	480	Oct 2022	463	Below IM
613	Central	536	Oct 2022	503	Below IM
615	Central	513	Oct 2022	500	Below IM
629	Central	567	Oct 2022	559	Below IM
633	Central	572	Oct 2022	547	Below IM
62	Eastern	164	Oct 2022	182	Above IM
85	Eastern	206	Oct 2022	233	Above IM
100	Eastern	158	Oct 2022	181	Above IM
101	Eastern	106	Jan 2022	111	Above IM
841	Northwestern	100	Oct 2022	203	Above IM
845	Northwestern	74	Oct 2022	203	Above IM
2	Southeastern	-	N/A	72	Unknown

89	Southeastern	39	Oct 2022	64	Above IM
106	Western	144	Oct 2022	154	Above IM
107	Western	92	Oct 2022	91	Below IM
117	Western	153	Oct 2022	160	Above IM
118	Western	58	Oct 2022	124	Above IM
124	Western	-	N/A	73	Unknown
571	Western	124	Oct 2022	144	Above IM
573	Western	72	Oct 2022	118	Above IM
830	Far-West Northwestern	63	Oct 2022	59	Below IM
832	Far-West Northwestern	42	Oct 2022	45	Above IM
833	Far-West Northwestern	34	Jul 2022	96	Above IM
836	Far-West Northwestern	39	Oct 2022	79	Above IM

7.2 Funding to Support GSP Implementation

On May 4, 2022, the CBGSA Board held a rate hearing and set a groundwater extraction fee of $38 per acre-foot for FY 22-23. The fee was based on user-reported water usage totaling 28,000 acre-feet and the Fiscal Year 2022-2023 budget and cash flow projection.

Additionally, the CBGSA has recently been awarded a $7.6 million in grant fund under the Critically Overdrafted Basin (COD) SGMA Implementation Round 1 grant opportunity, with funding requested for the following activities through 2026:

- Ongoing Monitoring and Enhancements
    - Installation of Piezometers
    - installation of dedicated monitoring wells
    - DMS maintenance and enhancements
    - Groundwater level and quality monitoring
    - USGS stream gage maintenance
- Project and Management Action Implementation
    - CBWRM model update and re-calibration
    - Develop and implement framework for pumping allocations
    - Analysis of management actions implementation options
    - Adaptive management support
    - Precipitation enhancement technical analysis
    - Flood and stormwater capture technical analysis
- GSP Implementation and Outreach Activities
    - GSP implementation program management
    - Stakeholder engagement and community outreach

    - Prepare annual reports
    - Modify GSP in response to DWR determination
    - 5-year GSP update
- Improving Understanding of Basin Water Use
    - Perform updated land use survey
    - Perform river channel survey
    - Enhance existing CIMIS station and implement new stations

The CBGSA has also recently submitted a proposal to DWR for approximately $2 million under the SGMA Implementation Round 2 grant opportunity with funding to do additional implemenation tasks. These tasks directly support and expand on several tasks included in the Round 1 award.

7.3 Stakeholder Outreach Activities in Support of GSP Implementation

The following is a list of public meetings where GSP development and implementation was discussed during the 2021-2022 water year.

- CBGSA Board meetings: November 3, January 5, March 2, May 4, July 6, and September 7,
- Standing Advisory Committee (SAC) meetings: October 28, January 4, February 24, April 28, June 30, and September 1

7.4 Progress on Implementation of GSP Projects

Table 7-2 shows the projects and management actions that were included in the GSP. The following subsections describe the progress of implementation of each GSP project.

Table 7-2: Summary of Projects and Management Actions included in the GSP

Activity	Current Status	Anticipated Timing	Estimated Cost[a]
Project 1: Flood and Stormwater Capture	Conceptual project evaluated in 2015	• Feasibility study: 0 to 5 years • Design/Construction: 5 to 15 years	• Study: $1,000,000 • Flood and Stormwater Capture Project: $600-$800 per AF ($2,600,000 – 3,400,000 per year)
Project 2: Precipitation Enhancement	Initial Feasibility Study completed in 2016	• Refined project study: 0 to 2 years • Implementation of Precipitation Enhancement: 0 to 5 years	• Study: $200,000 • Precipitation Enhancement Project: $25 per AF ($150,000 per year)
Project 3: Water Supply Transfers/Exchanges	Not yet begun	• Feasibility study/planning: 0 to 5 years • Implementation in 5 to 15 years	• Study: $200,000 • Transfers/Exchanges: $600-$2,800 per AF (total cost TBD)
Project 4: Improve Reliability of Water Supplies for Local Communities	In progress for CCSD; not yet begun for other communities	• Feasibility studies: 0 to 2 years • Design/Construction: 1 to 5 years	• Study: $100,000 • Design/Construction: • $1,800,000
Management Action 1: Basin-Wide Economic Analysis	Completed	• December 2020	• $60,000
Management Action 2: Pumping Allocations in Central Basin Management Area	Preliminary allocations developed; to be implemented in 2023 calendar year	• Pumping Allocation Study completed: 2022 • Allocations implemented: 2023 through 2040	• Plan: $300,000 • Implementation: $150,000 per year
Adaptive Management	Not yet begun	Only implemented if triggered; timing would vary	TBD

[a] Estimated cost based on planning documents and professional judgment
AF = acre-feet

7.4.1 Project 1: Flood and Stormwater Capture

The CBGSA application for COD SGMA Implementation Grant funding from DWR includes a task to understand the feasibility of future flood and stormwater capture. Specifically, funding was sought to perform a water rights analysis on flood and stormwater capture flows in the Basin to understand the feasibility of further developing a stormwater capture project in the Basin given water availability and existing water rights. This water rights analysis has not yet been completed, but is expected to be completed in 2023.

7.4.2 Project 2: Precipitation Enhancement

The CBGSA application for COD SGMA Implementation Grant funding from DWR which includes a task to understand the feasibility of precipitation enhancements efforts. Specifically, funding was sought to perform a feasibility study of the precipitation enhancement action identified in the GSP to determine if this action should be pursued and implemented in the Basin. The precipitation enhancement feasibility study is planned to be initiated in 2023.

7.4.3 Project 3: Water Supply Transfers or Exchanges

No progress was made toward implementation of this project since completion of the GSP in January 2020.

7.4.4 Project 4: Improve Reliability of Water Supplies for Local Communities

DWR's IRWM program awarded CCSD a grant to install a new production well. Work by the CCSD to install the new well is ongoing.

7.5 Management Actions

Table 7-2 shows the projects and management actions that were included in the GSP. The following subsections describe the progress of implementation of each GSP management action.

7.5.1 Management Action 1: Basin-Wide Economic Analysis

A Basin-wide direct economic analysis of proposed GSP actions was completed. The results of this analysis were presented to the GSP Board on December 4, 2019, and the final report was completed in December 2019. The final Basin-wide economic analysis report was provided in the 2020 Annual Report. This management action is 100% complete.

7.5.2 Management Action 2: Pumping Allocations in Central Basin Management Area

CBGSA staff is working with the Board and stakeholders to implement pumping allocations in the Central Management Area starting in the 2023 calendar year. As directed by the Board, in July 2022, CBGSA staff developed preliminary pumping allocations for 2023 and 2024 for each parcel located within the Central Management Area. Following a variance request process, the Board directed CBGSA staff to develop revised pumping allocations, which were distributed in January 2023. A second variance process is currently underway; a final set of allocations for 2023 and 2024 are expected to be approved by the Board during the spring of 2023.

7.6 Adaptive Management

As discussed in the previous annual report, because several wells in the basin are trending towards undesirable results, the CBGSA Board undertook an effort to review wells that have exceeded minimum thresholds, investigate potential causes of the exceedances, and identify if any domestic or production wells are affected by declining groundwater levels. To support the understanding of potential impacts, a form was added to the CBGSA website to allow landowners to report issues that occur with wells due to groundwater level declines.

During the 2021-2022 water year, the CBGSA performed the following additional activities to better inform decision-making in response to the observed declines in groundwater levels:

- A survey was conducted of pumping wells in the Basin; the objective of the survey was to identify domestic and other de minimis wells so as to better evaluate potential impacts to those users

- An analysis was conducted to analyze water level trends at representative monitoring wells with respect to historical hydrology and groundwater extraction trends. The analysis found that groundwater levels wells in the Ventucopa region have historically recovered during historical wet periods. The analysis found that wells in the Central Region tended to maintain more stable groundwater levels during historical wet periods. These results suggest that there would likely be fewer wells exceeding minimum thresholds if the basin had experienced much wetter hydrology during recent historical years.
- The CBWRM model was used to simulate the pumping allocations management action according to the schedule included in the GSP for the Central Management Area and to compare the resulting groundwater levels in representative wells with the levels that would be experienced in the absence of pumping reductions. The results showed that the pumping allocation management action will likely result in improved groundwater elevations in 2040 as compared to the scenario where no pumping reductions are implemented, but that many wells will still be below minimum threshold levels.

The Board continues to consider potential actions to address minimum threshold exceedances, including restricting pumping in individual wells, adjusting minimum thresholds or the undesirable result criteria identified in the GSP, and accelerating basin-wide pumping reductions. Potential options for implementing these actions will be discussed by the Board during the upcoming water year.

7.7 Progress Toward Implementation of Monitoring Networks

This section provides updates about implementation of the monitoring networks identified during GSP development.

7.7.1 Groundwater Levels Monitoring Network

As described in the previous annual reports, on December 4, 2019, the CBGSA Board approved a task to begin implementation of the groundwater levels monitoring network. As part of this task, well information sheets were prepared for each well in the monitoring network to allow for implementation of regular monitoring at each well. This work was completed in early 2021, and monthly groundwater data were collected at each well in the monitoring network through July 2021. Starting in October 2021, the CBGSA transitioned to quarterly monitoring at each well, which continued through the 2021-2022 water year.

7.7.2 Surface Water Monitoring Network

Under a Category 1 grant from DWR, two new surface flow gages were installed on the Cuyama River during 2021. These gages are managed by the United States Geologic Survey (USGS), and data collected at the gage locations are available on the USGS website at the following links:

https://waterdata.usgs.gov/nwis/uv?site_no=11136500

https://waterdata.usgs.gov/ca/nwis/uv?site_no=11136710

Section 8. References

California Department of Water Resources (DWR). 2003. *California's Groundwater Bulletin 118—Update 2003*. https://water.ca.gov/LegacyFiles/groundwater/bulletin118/basindescriptions/3-13.pdf

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Appendix A
Updated Hydrographs for Representative Wells

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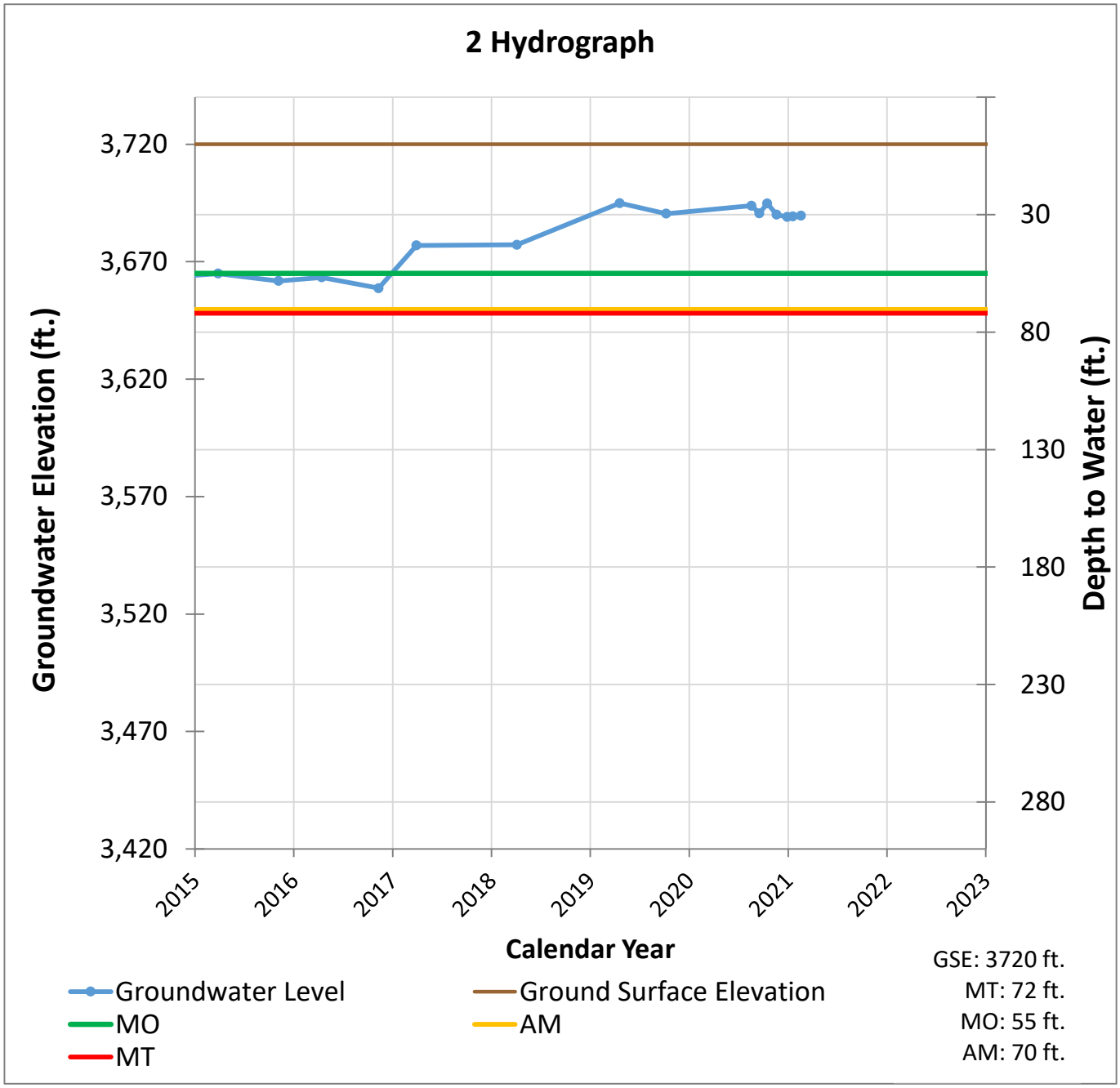
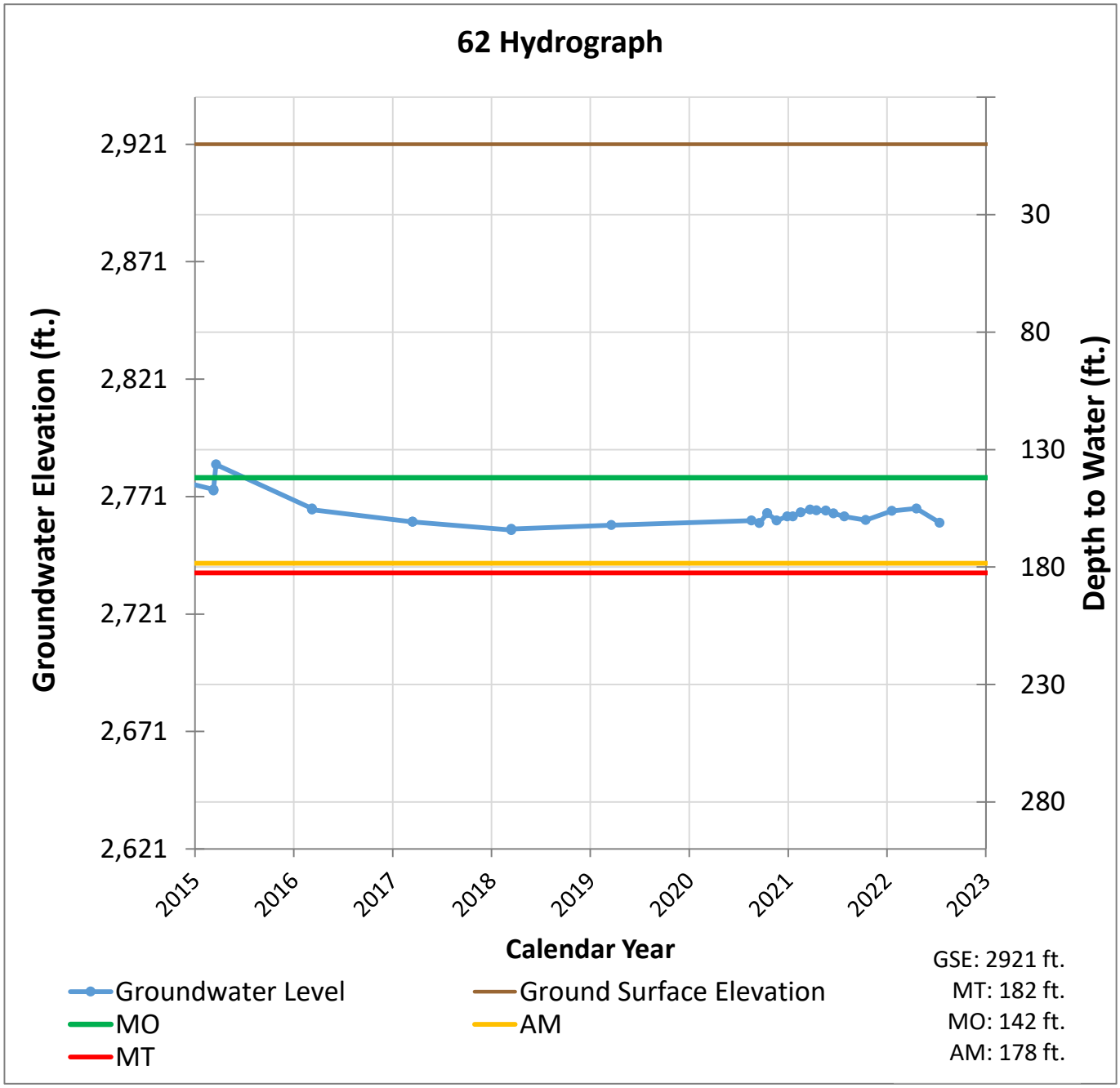
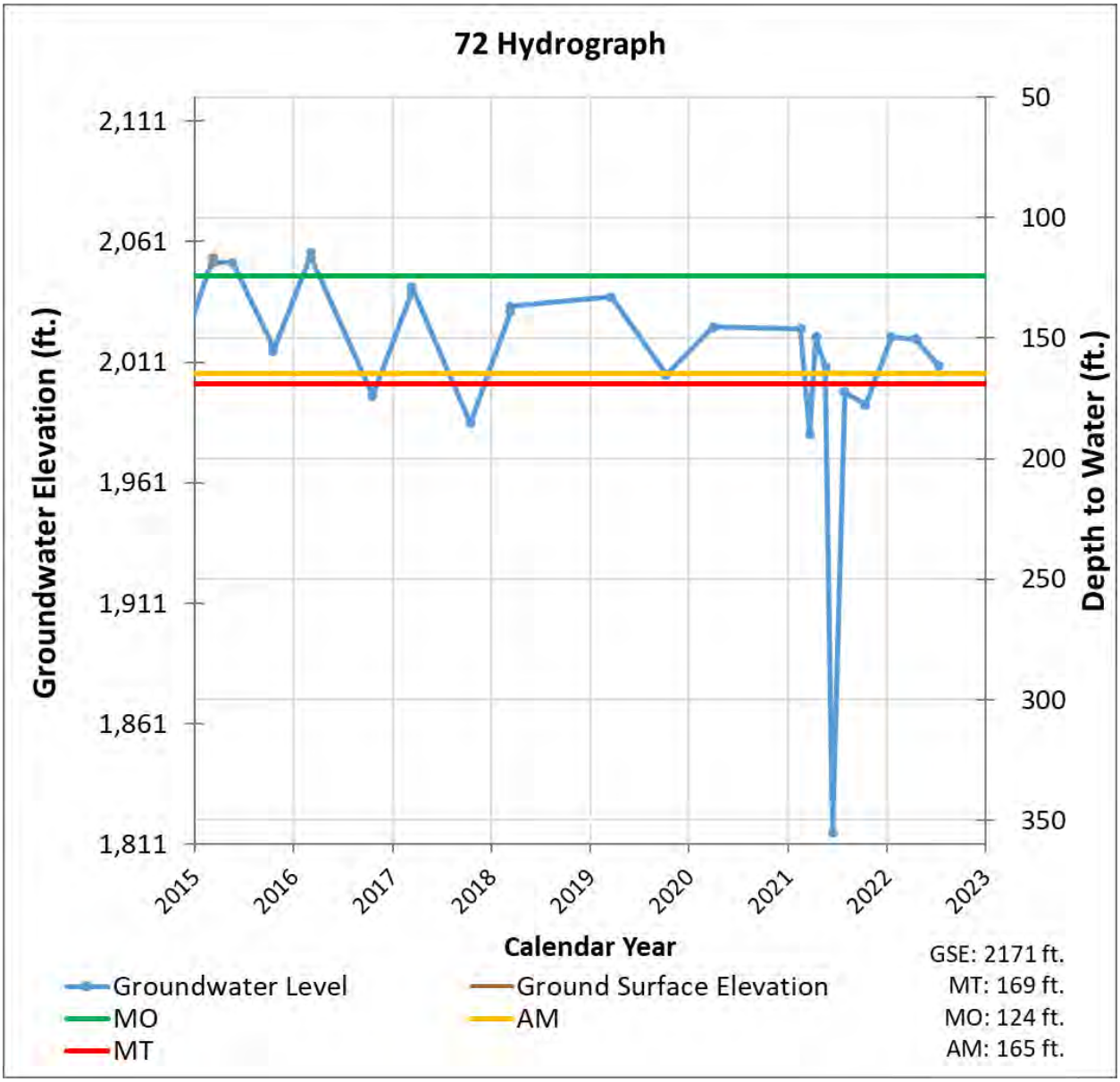
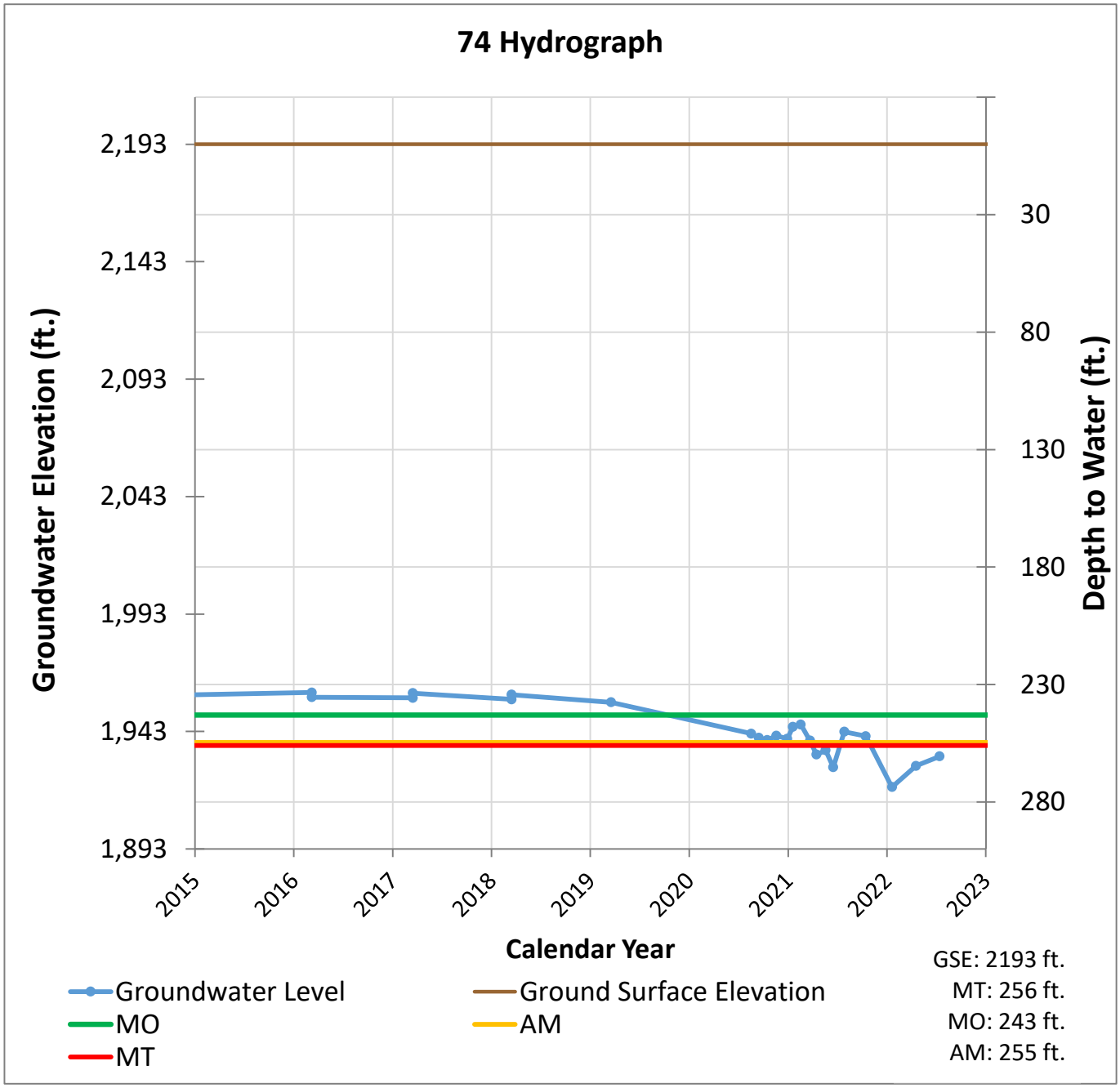
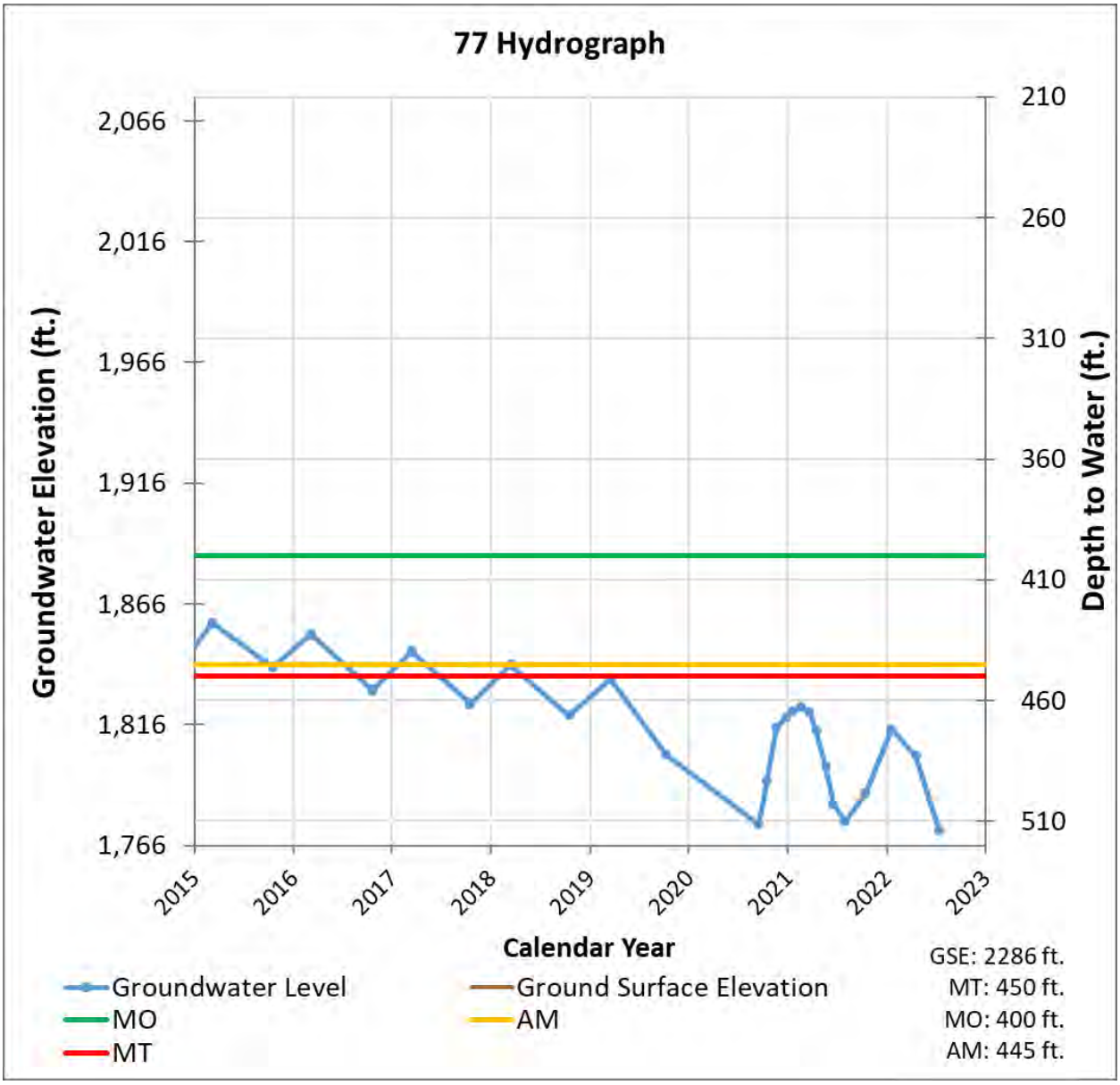
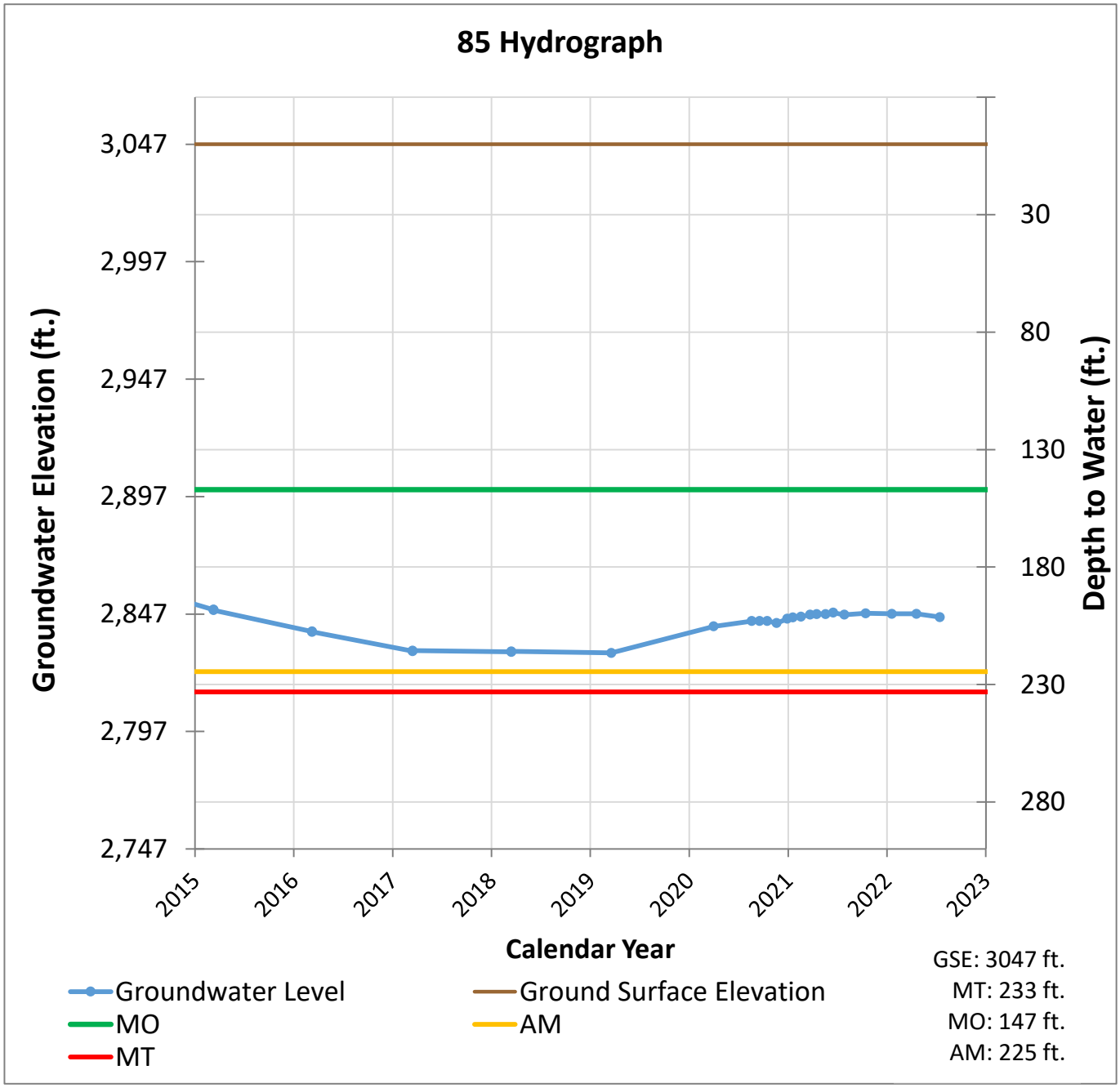

2 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
3,720
3,670
3,620
3,570
3,520
3,470
3,420
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 3720 ft.
MT: 72 ft.
MO: 55 ft.
AM: 70 ft.

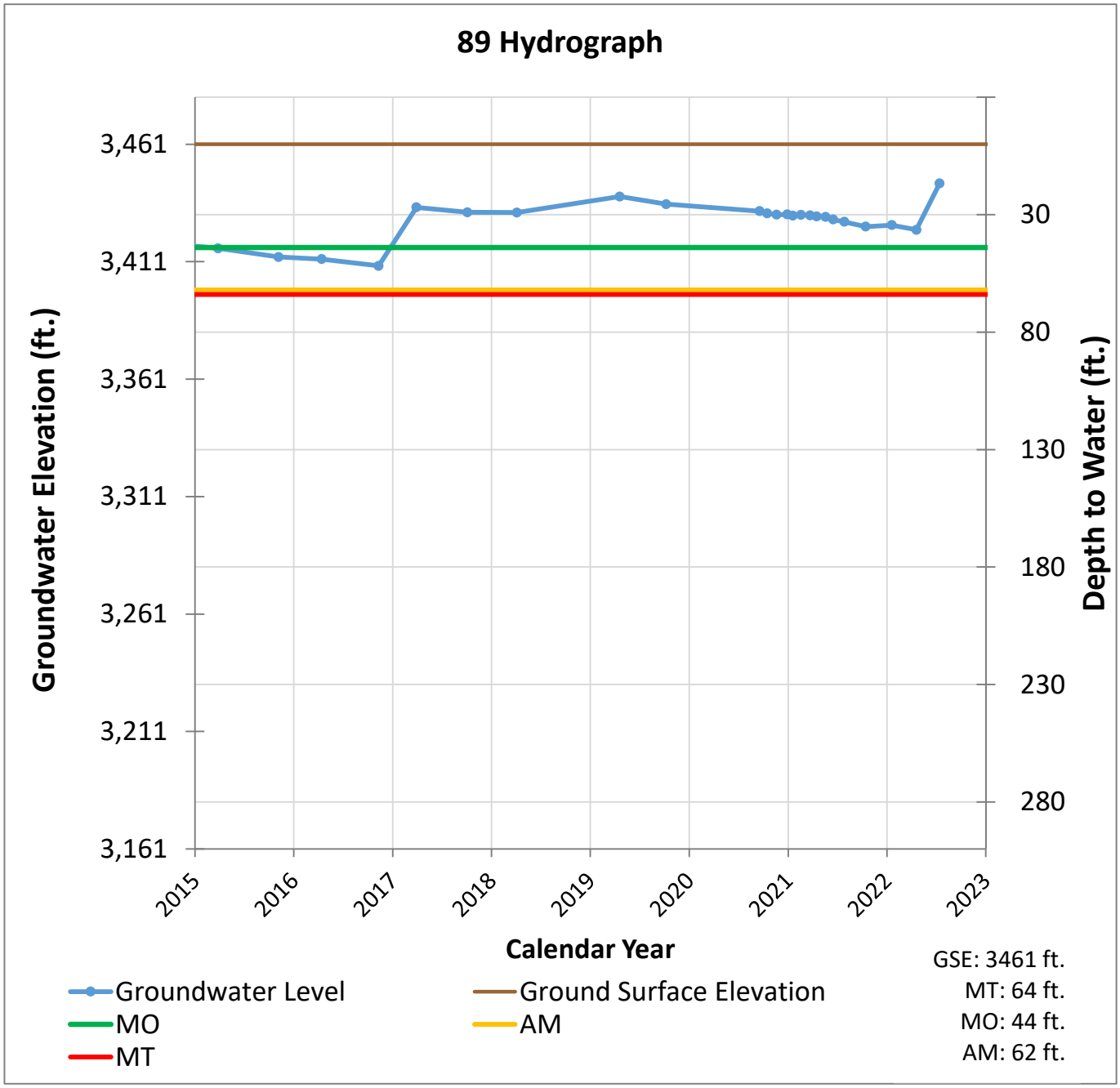

62 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,921
2,871
2,821
2,771
2,721
2,671
2,621
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2921 ft.
MT: 182 ft.
MO: 142 ft.
AM: 178 ft.

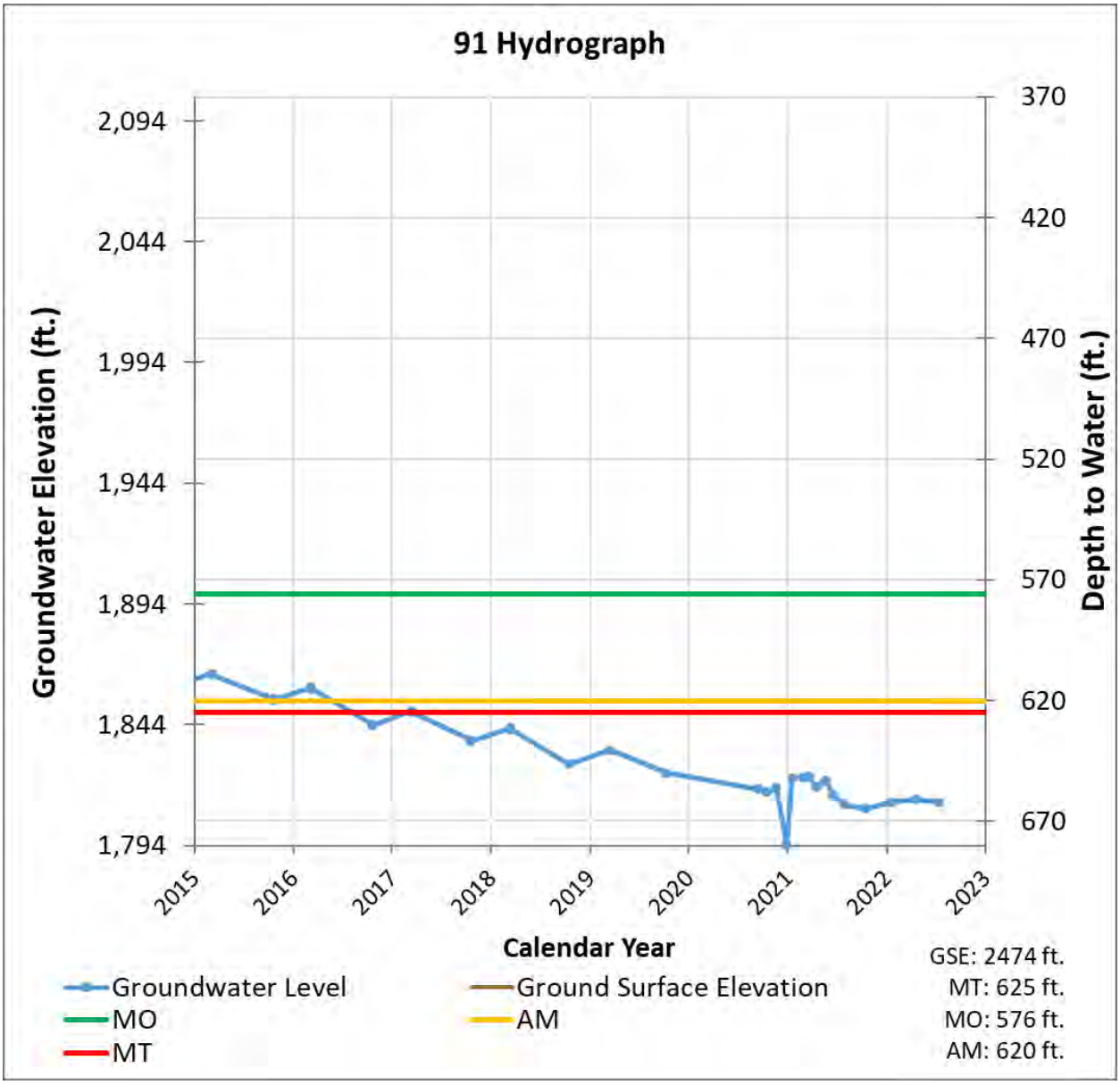

72 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,111
2,061
2,011
1,961
1,911
1,861
1,811
50
100
150
200
250
300
350
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2171 ft.
MT: 169 ft.
MO: 124 ft.
AM: 165 ft.

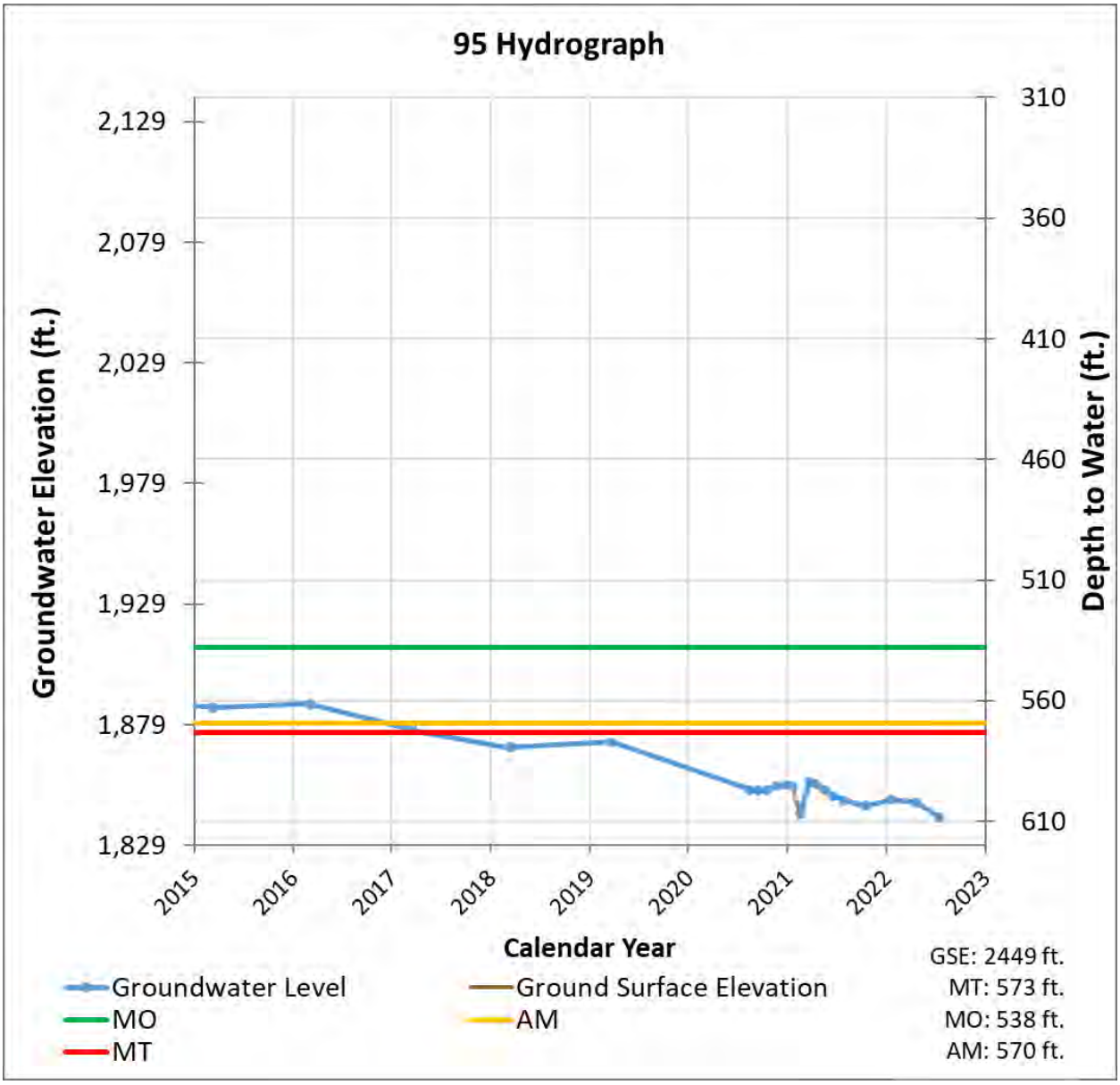

74 Hydrograph
Groundwater Elevation (ft.)
2,193
2,143
2,093
2,043
1,993
1,943
1,893
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2193 ft.
MT: 256 ft.
MO: 243 ft.
AM: 255 ft.

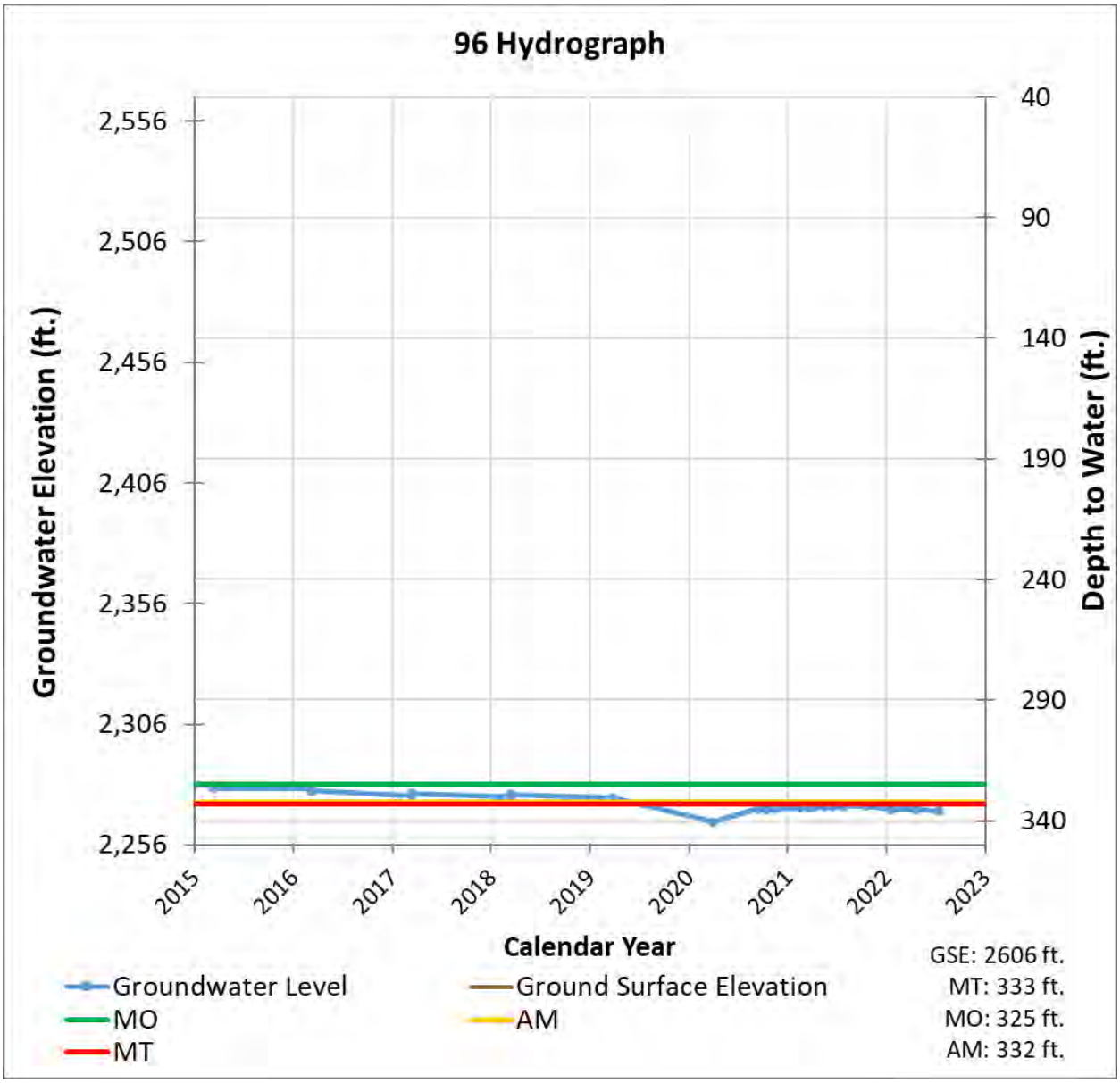

77 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,066
2,016
1,966
1,916
1,866
1,816
1,766
210
260
310
360
410
460
510
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2286 ft.
MT: 450 ft.
MO: 400 ft.
AM: 445 ft.

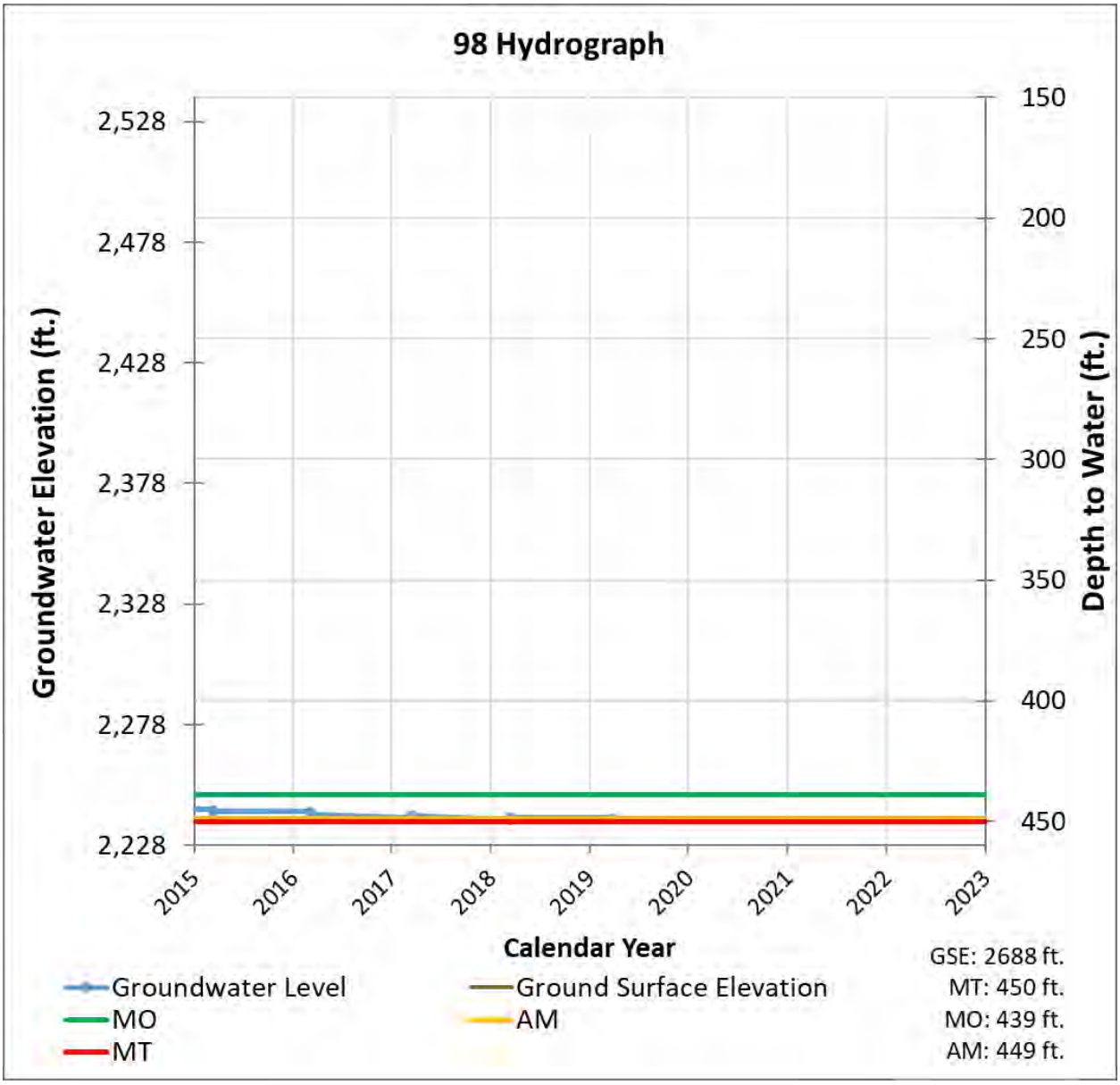

85 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
3,047
2,997
2,947
2,897
2,847
2,797
2,747
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 3047 ft.
MT: 233 ft.
MO: 147 ft.
AM: 225 ft.

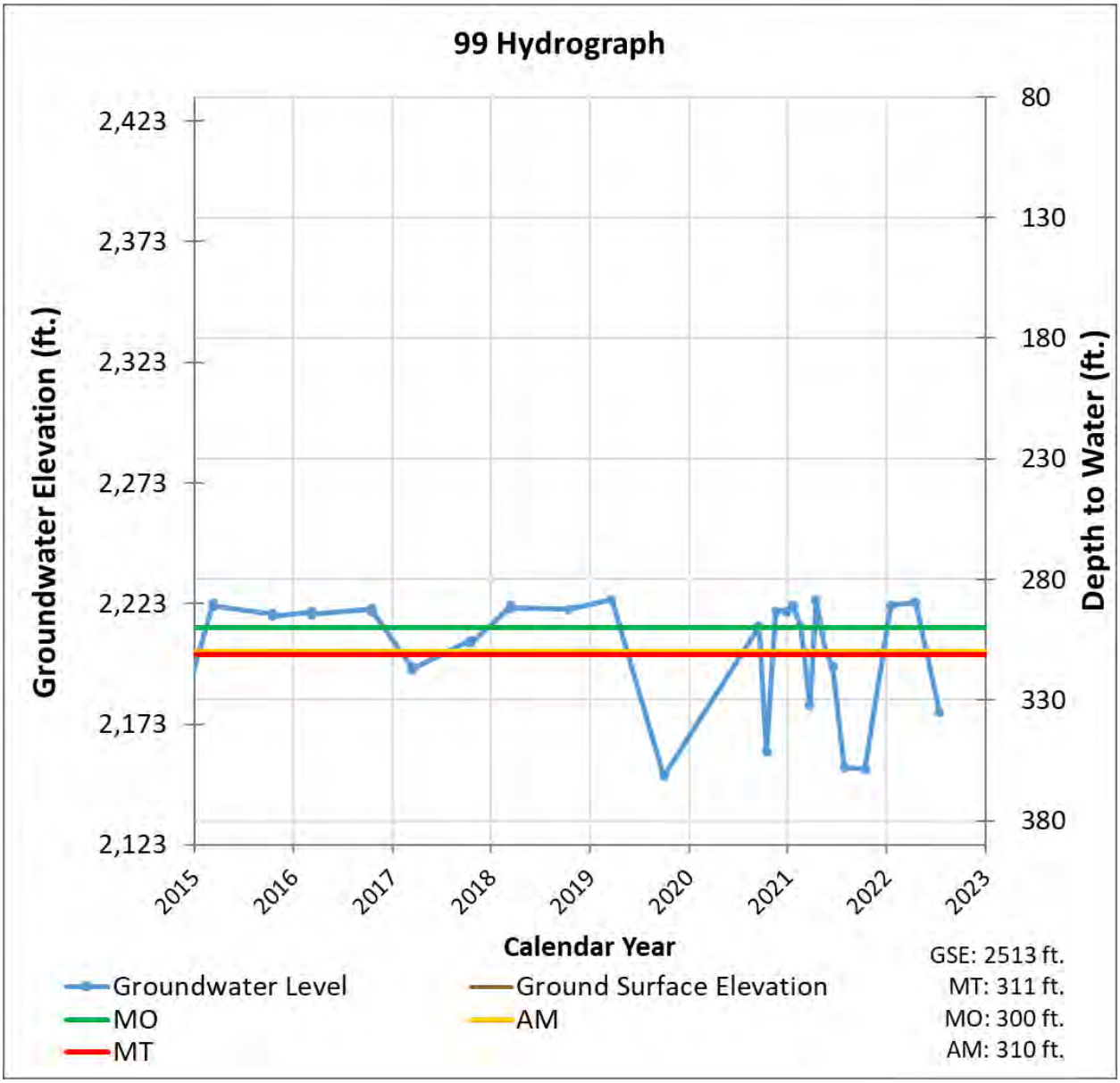

89 Hydrograph
Groundwater Elevation (ft.)
3,461
3,411
3,361
3,311
3,261
3,211
3,161
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 3461 ft.
MT: 64 ft.
MO: 44 ft.
AM: 62 ft.

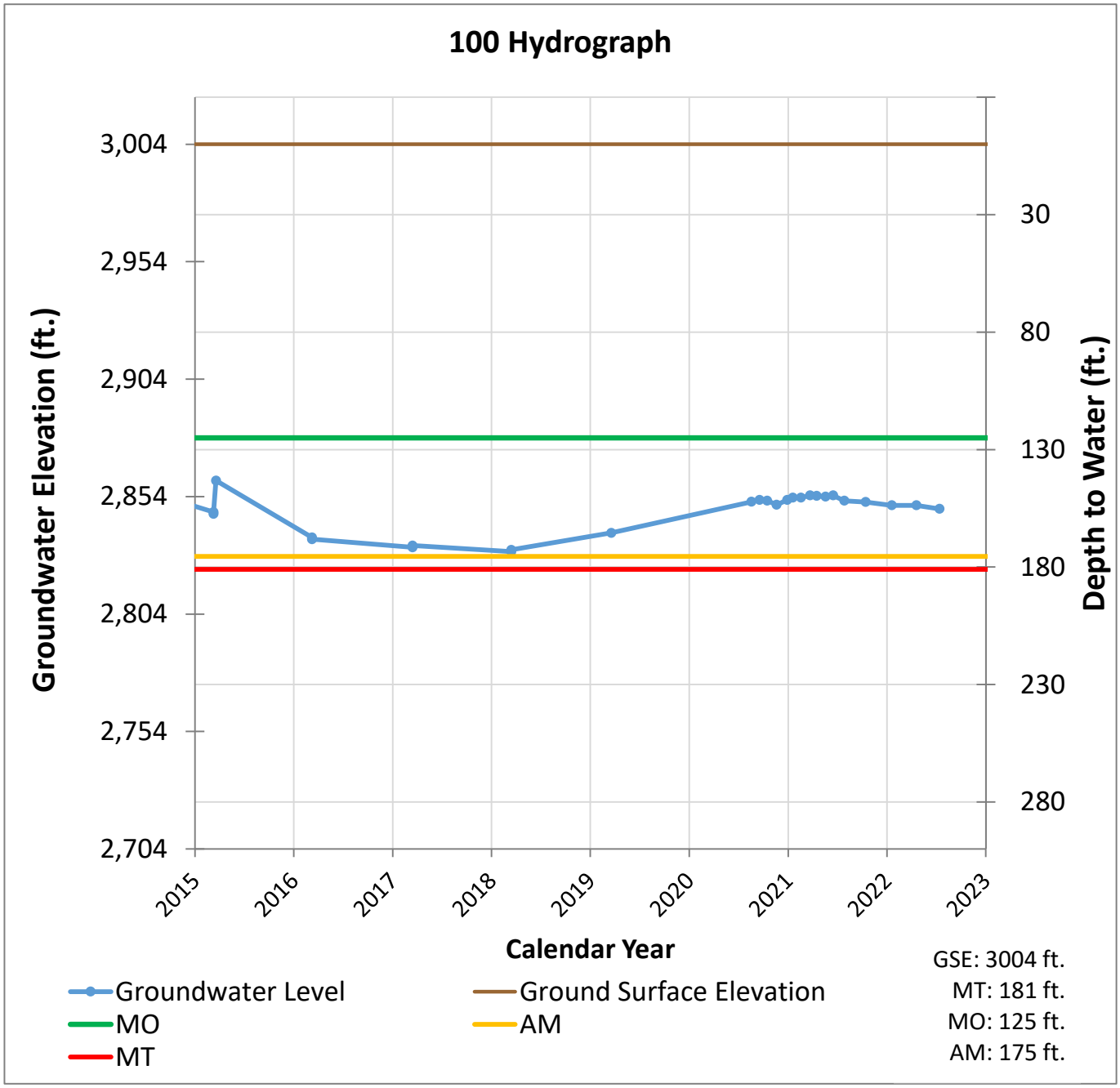

91 Hydrograph
Groundwater Elevation (ft.)
2,094
2,044
1,994
1,944
1,894
1,844
1,794
Depth to Water (ft.)
370
420
470
520
570
620
670
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2474 ft.
MT: 625 ft.
MO: 576 ft.
AM: 620 ft.

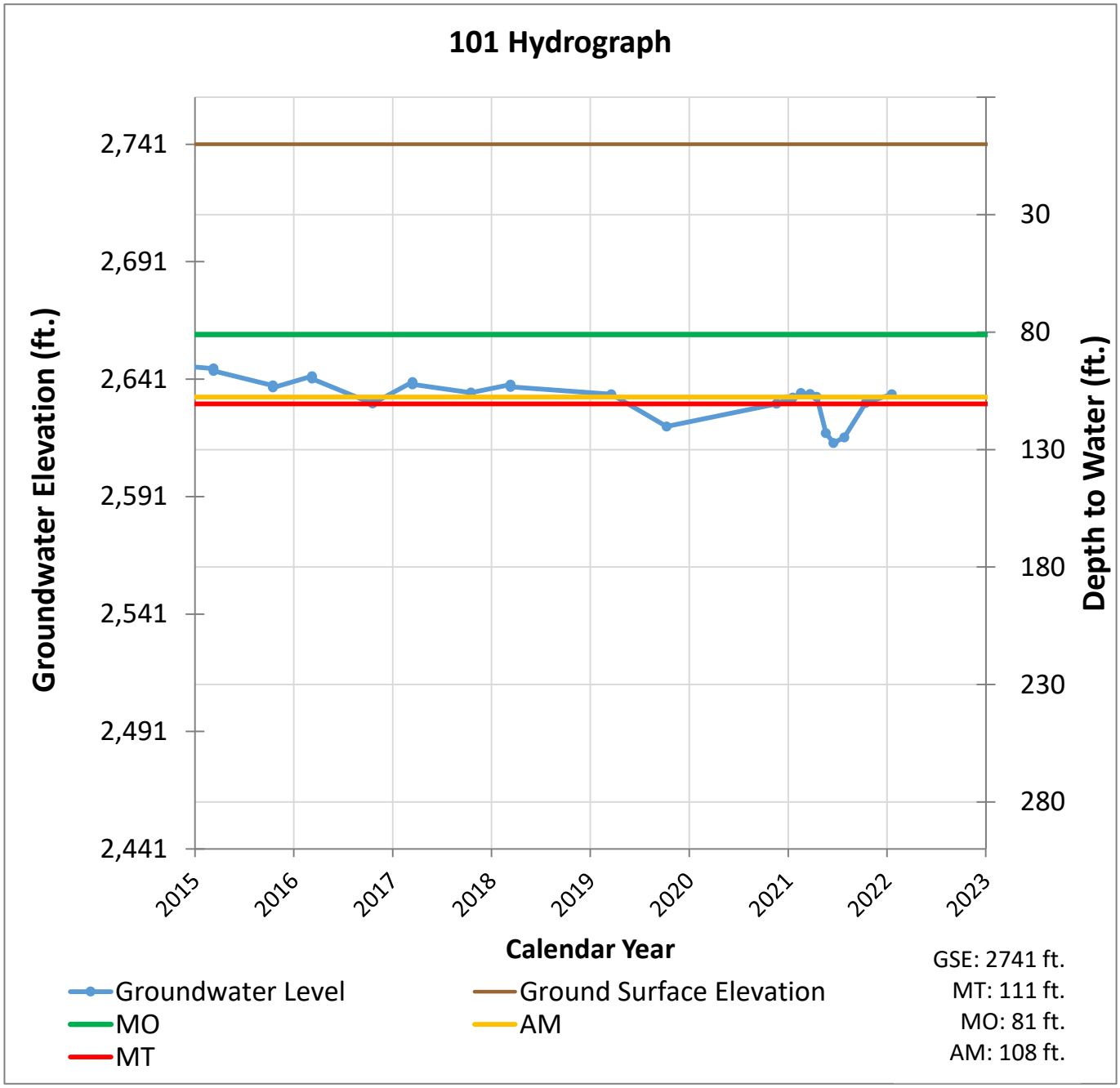

95 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,129
2,079
2,029
1,979
1,929
1,879
1,829
310
360
410
460
510
560
610
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2449 ft.
MT: 573 ft.
MO: 538 ft.
AM: 570 ft.

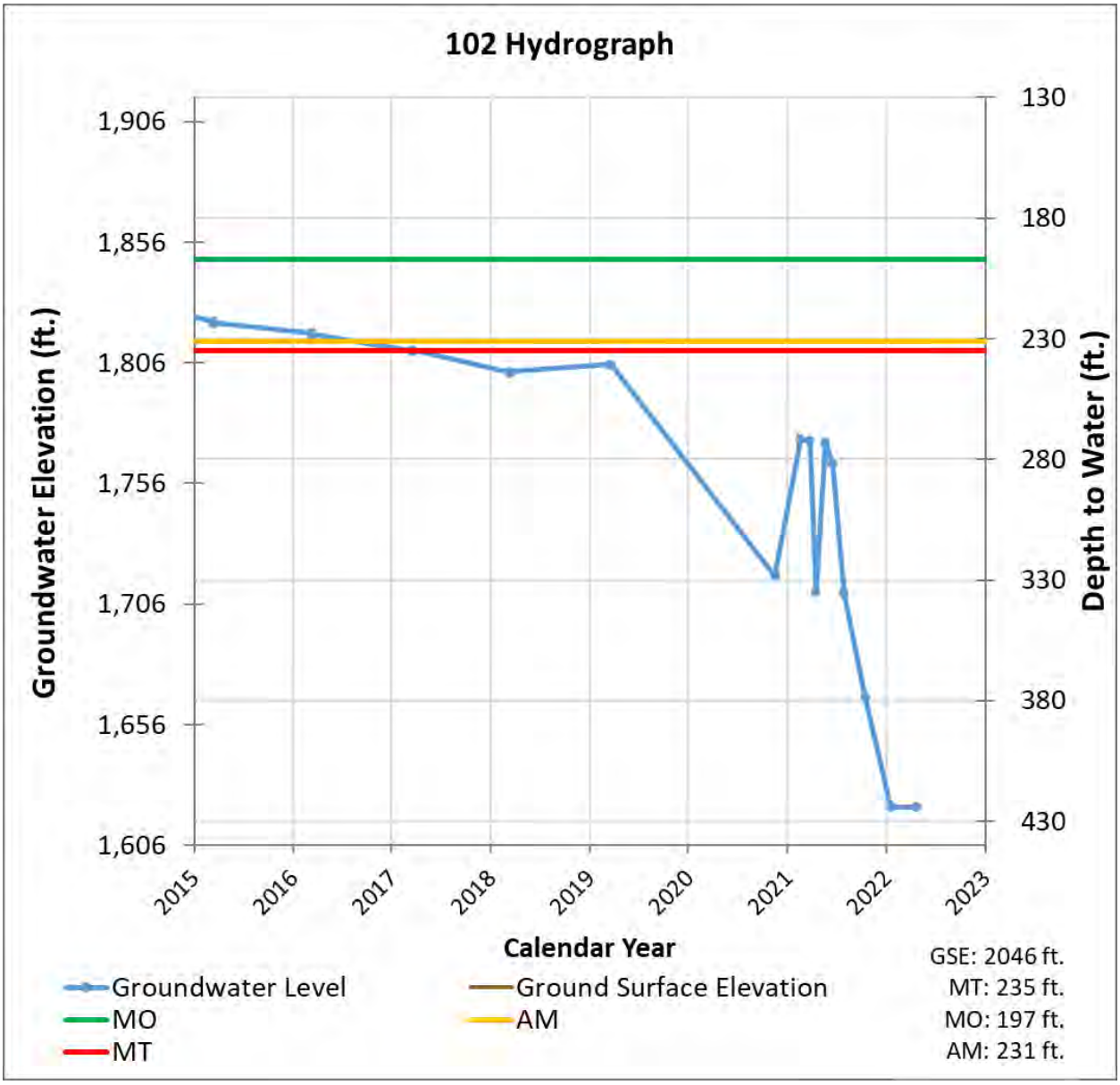

96 Hydrograph
Groundwater Elevation (ft.)
2,556
2,506
2,456
2,406
2,356
2,306
2,256
Depth to Water (ft.)
40
90
140
190
240
290
340
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2606 ft.
MT: 333 ft.
MO: 325 ft.
AM: 332 ft.

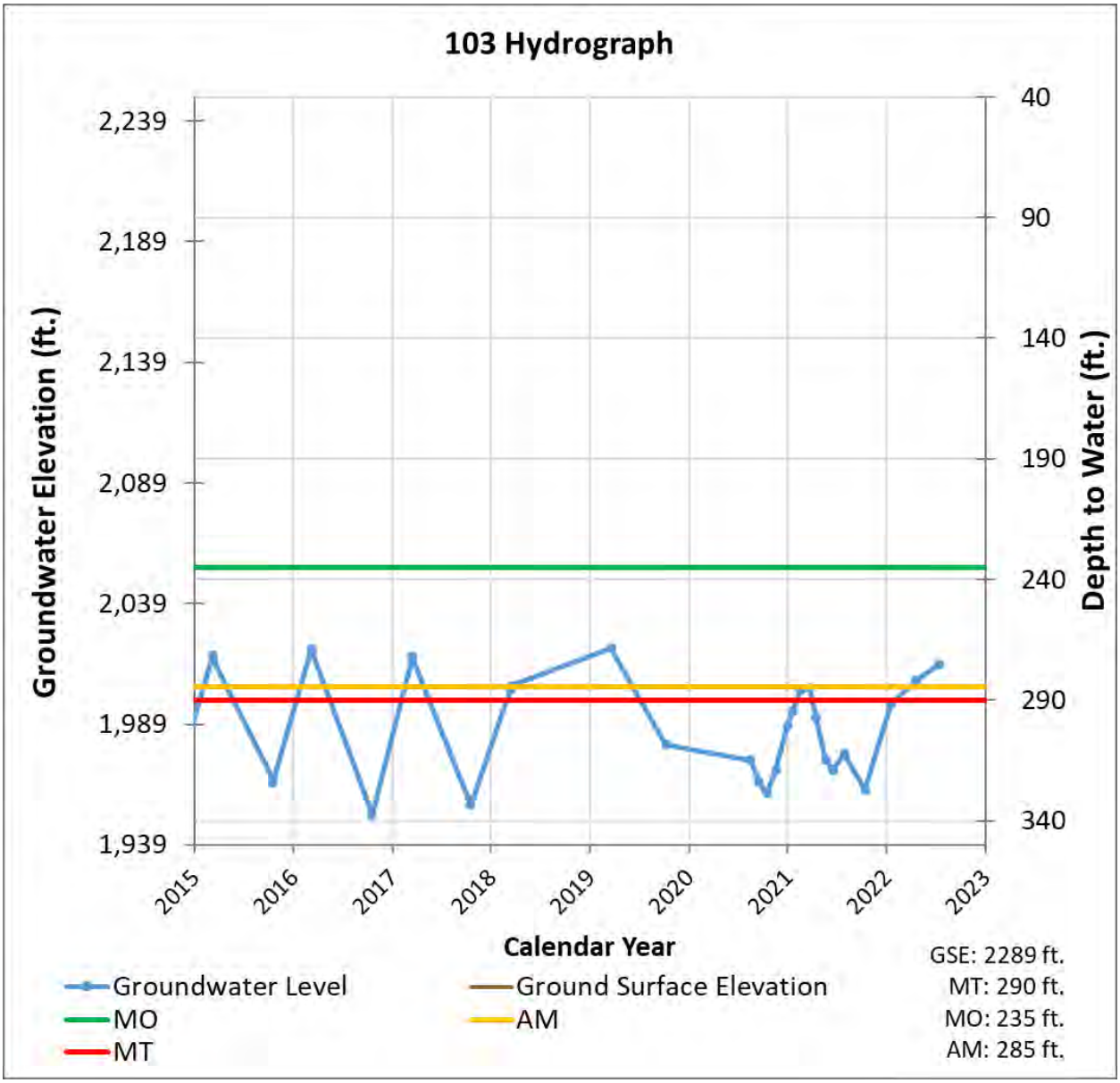

98 Hydrograph
Groundwater Elevation (ft.)
2,528
2,478
2,428
2,378
2,328
2,278
2,228
Depth to Water (ft.)
150
200
250
300
350
400
450
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2688 ft.
MT: 450 ft.
MO: 439 ft.
AM: 449 ft.

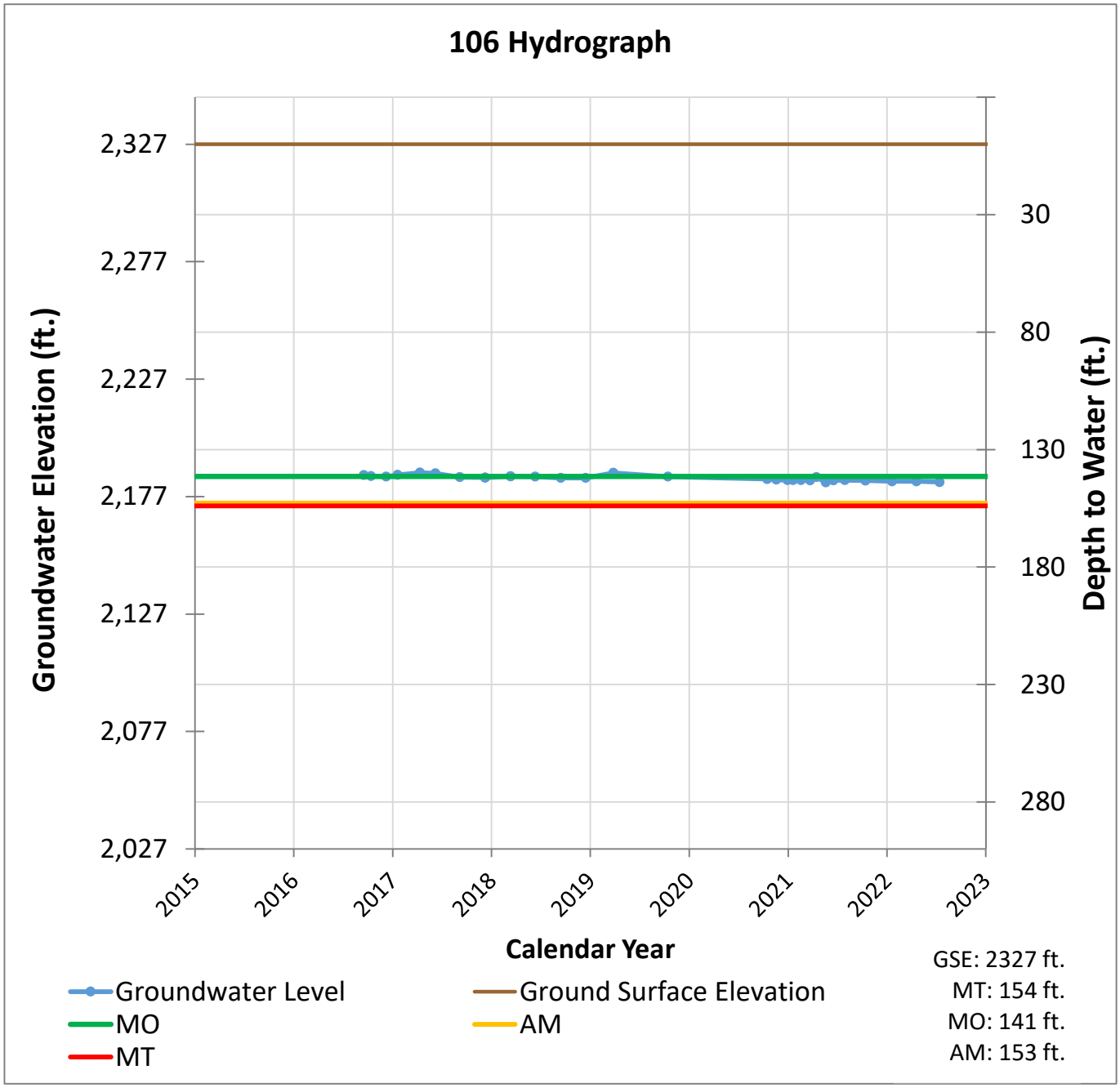

99 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,423
2,373
2,323
2,273
2,223
2,173
2,123
80
130
180
230
280
330
380
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2513 ft.
MT: 311 ft.
MO: 300 ft.
AM: 310 ft.

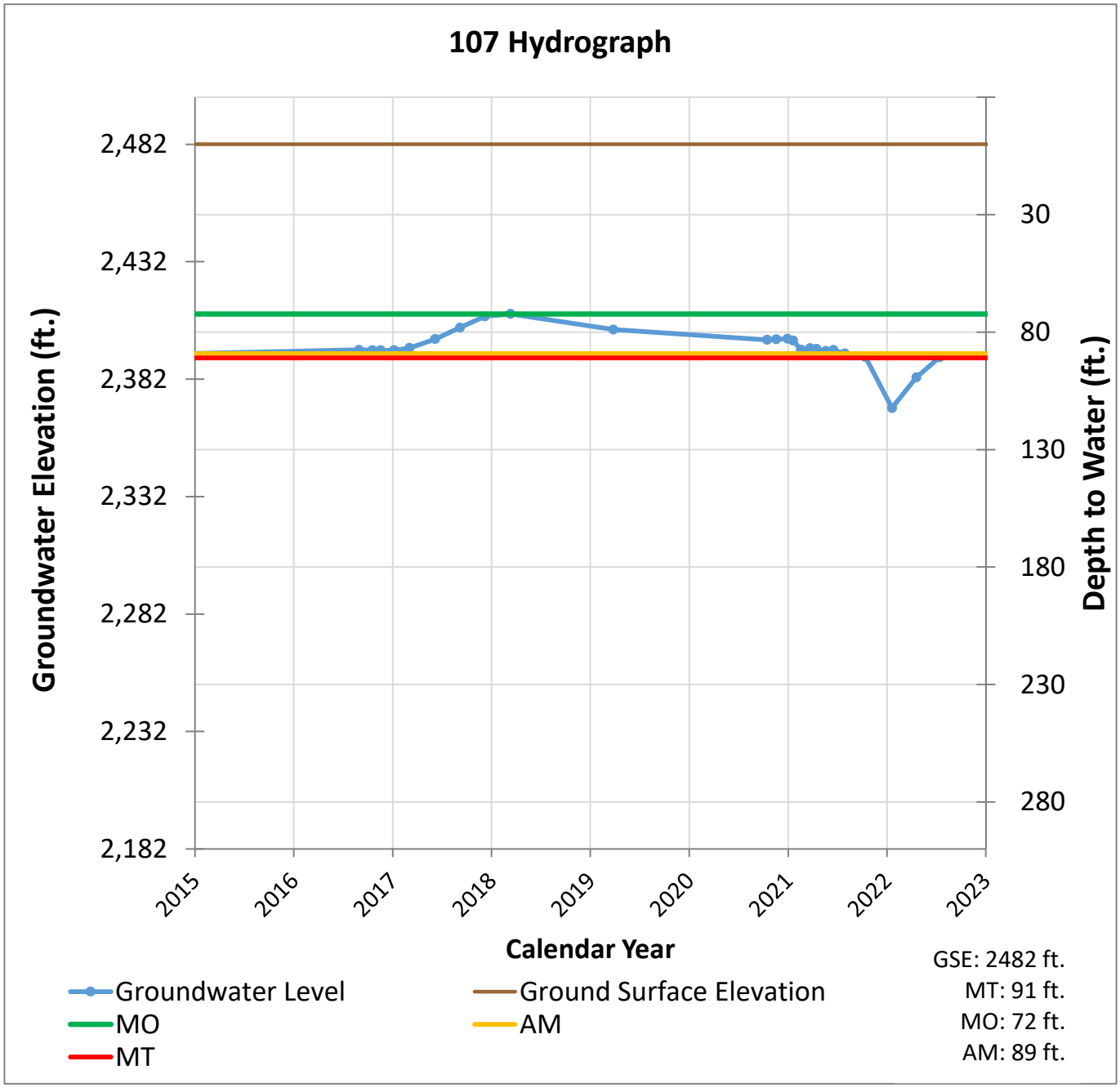

100 Hydrograph
Groundwater Elevation (ft.)
3,004
2,954
2,904
2,854
2,804
2,754
2,704
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 3004 ft.
MT: 181 ft.
MO: 125 ft.
AM: 175 ft.

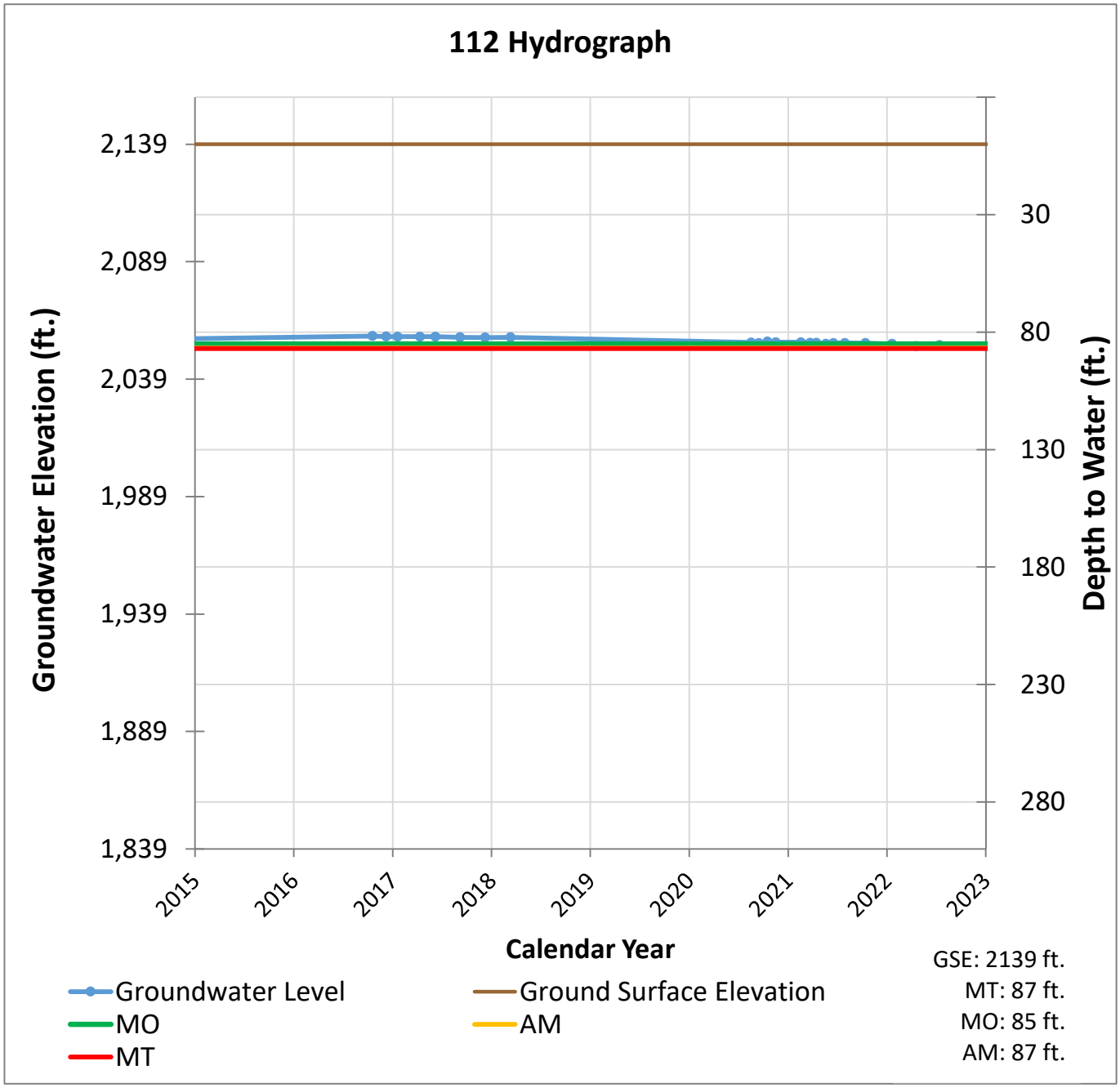

101 Hydrograph
Groundwater Elevation (ft.)
2,741
2,691
2,641
2,591
2,541
2,491
2,441
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2741 ft.
MT: 111 ft.
MO: 81 ft.
AM: 108 ft.

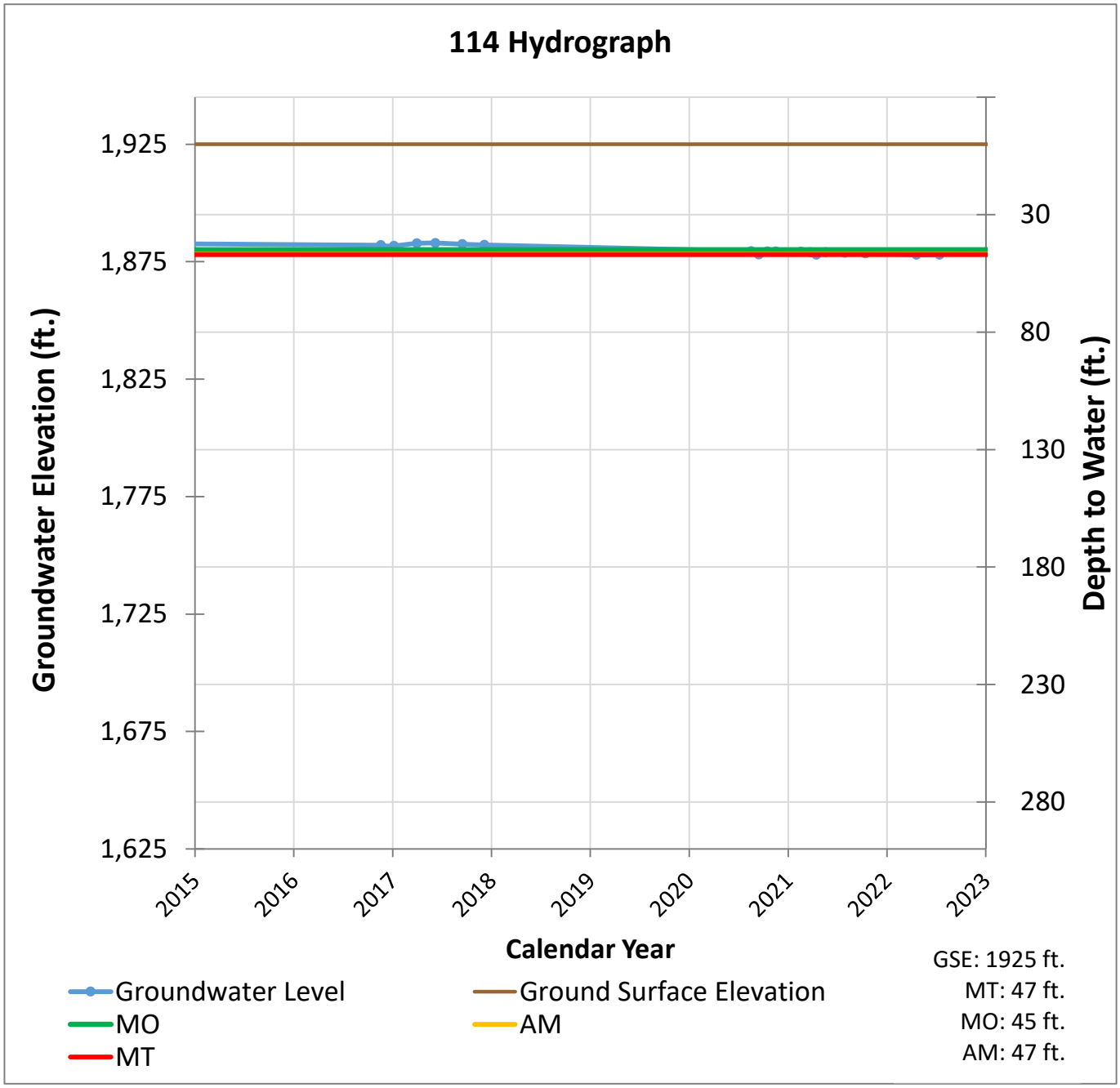

102 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
1,906
1,856
1,806
1,756
1,706
1,656
1,606
130
180
230
280
330
380
430
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2046 ft.
MT: 235 ft.
MO: 197 ft.
AM: 231 ft.

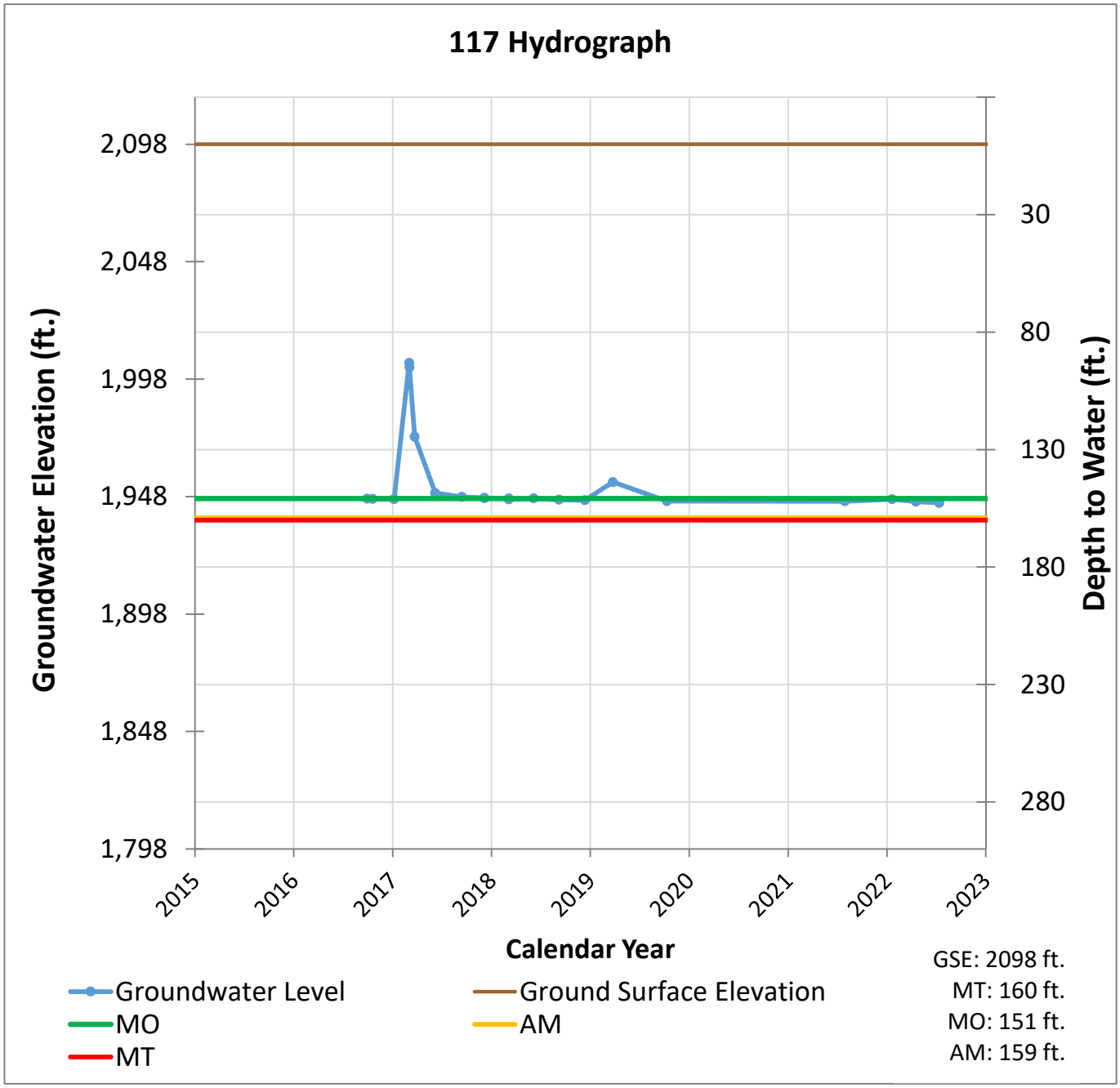

103 Hydrograph
Groundwater Elevation (ft.)
2,239
2,189
2,139
2,089
2,039
1,989
1,939
Depth to Water (ft.)
40
90
140
190
240
290
340
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2289 ft.
MT: 290 ft.
MO: 235 ft.
AM: 285 ft.

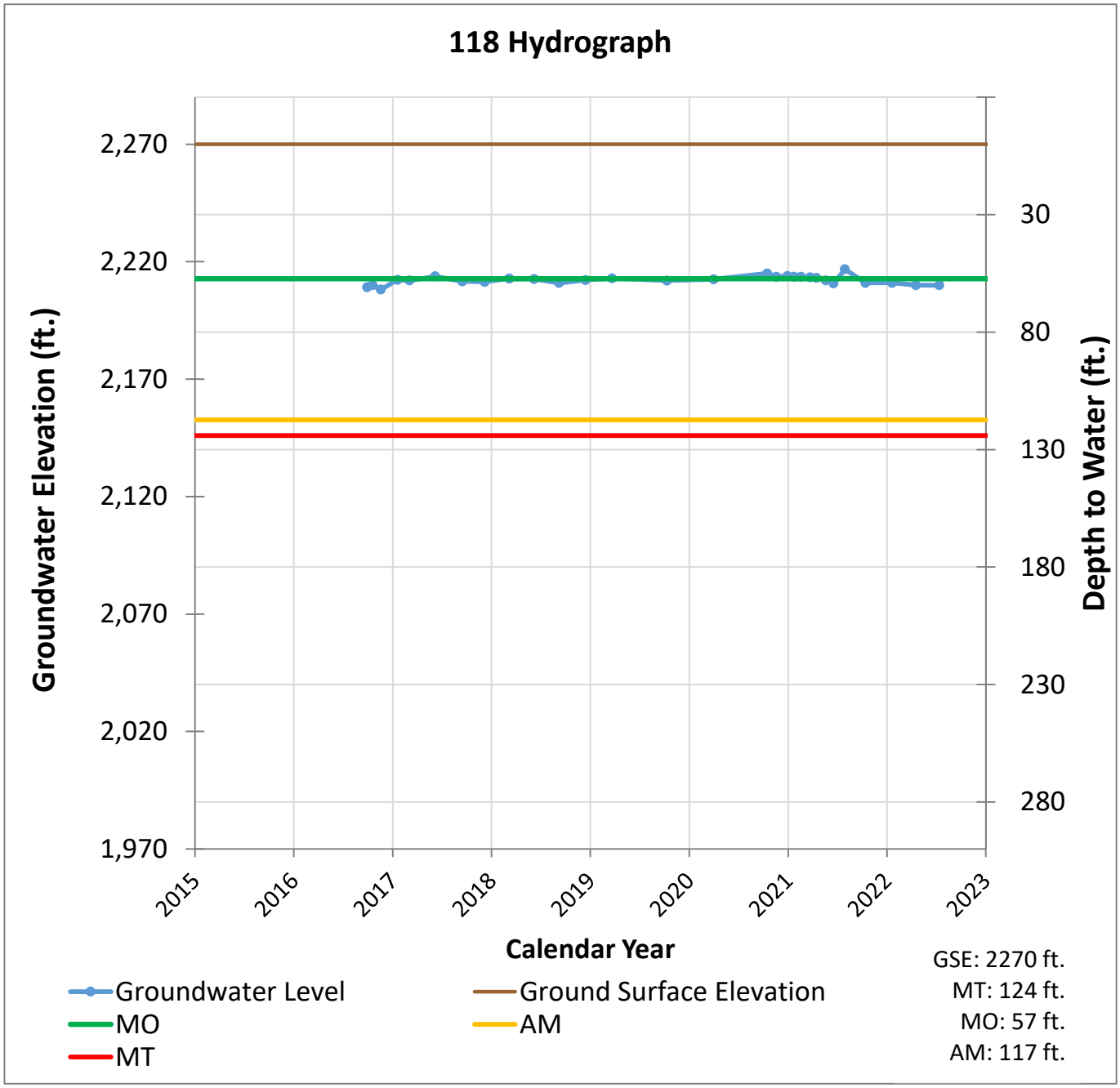

106 Hydrograph
Groundwater Elevation (ft.)
2,327
2,277
2,227
2,177
2,127
2,077
2,027
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2327 ft.
MT: 154 ft.
MO: 141 ft.
AM: 153 ft.

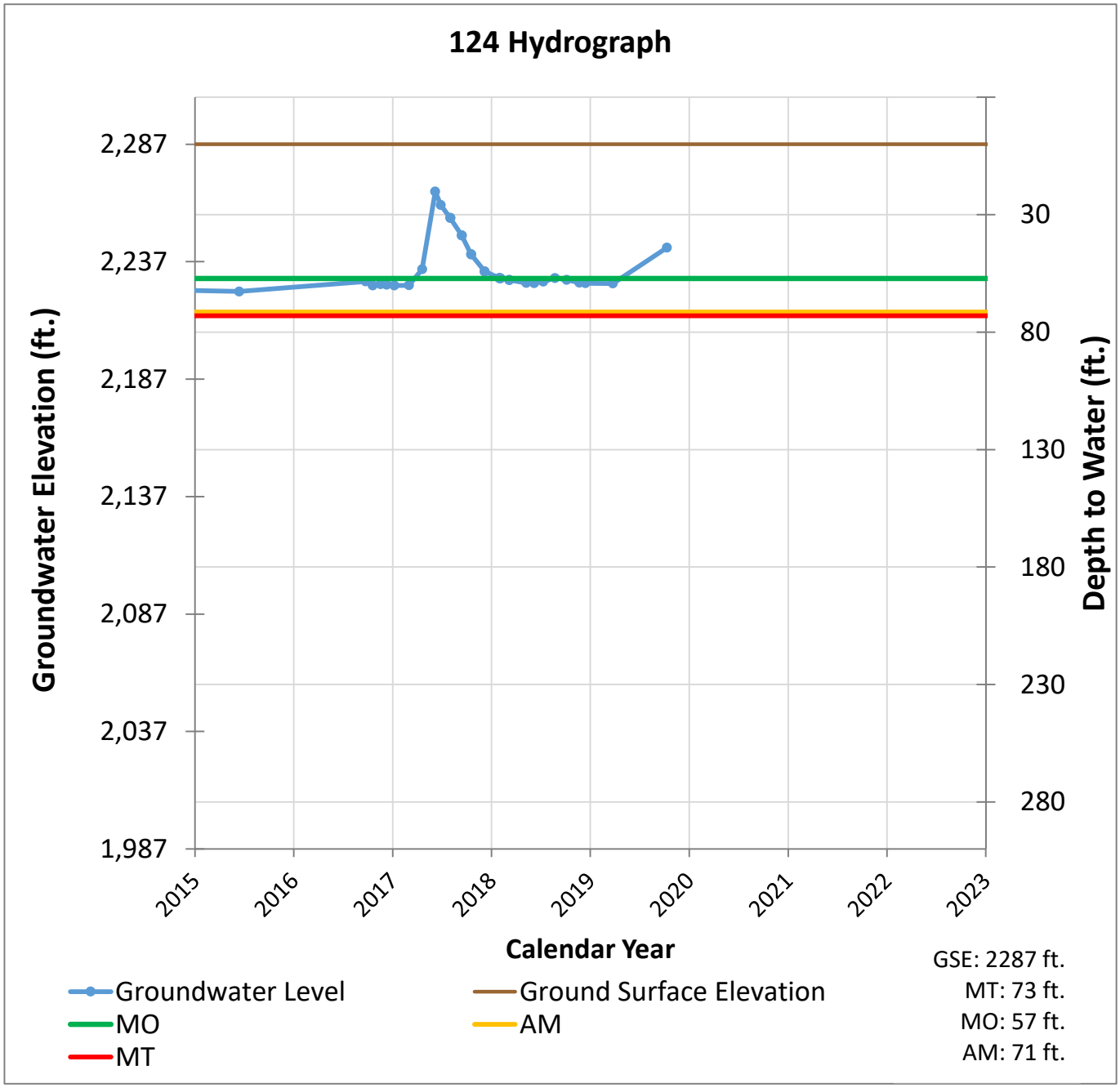

107 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,482
2,432
2,382
2,332
2,282
2,232
2,182
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2482 ft.
MT: 91 ft.
MO: 72 ft.
AM: 89 ft.

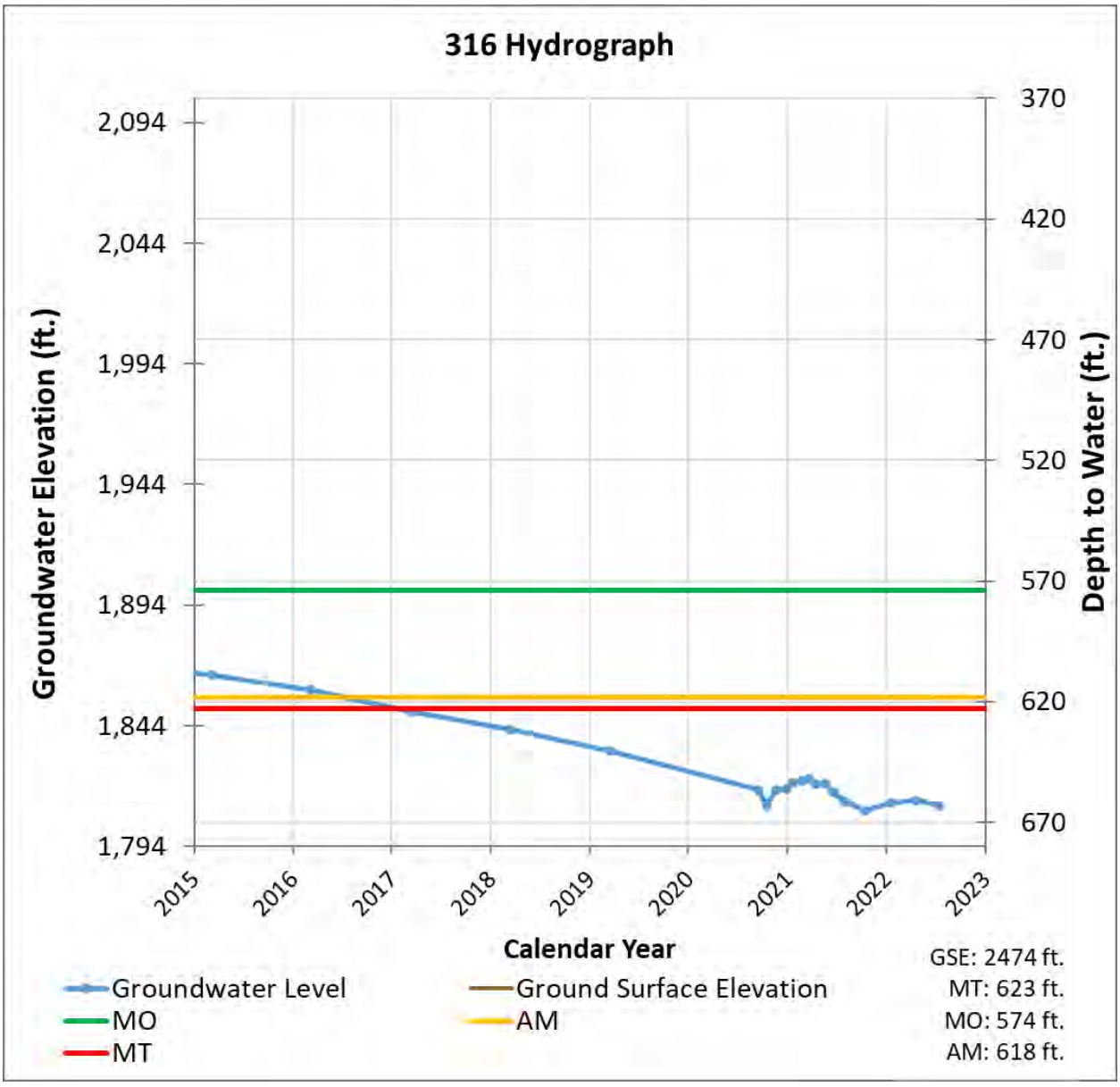

112 Hydrograph
Groundwater Elevation (ft.)
2,139
2,089
2,039
1,989
1,939
1,889
1,839
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2139 ft.
MT: 87 ft.
MO: 85 ft.
AM: 87 ft.

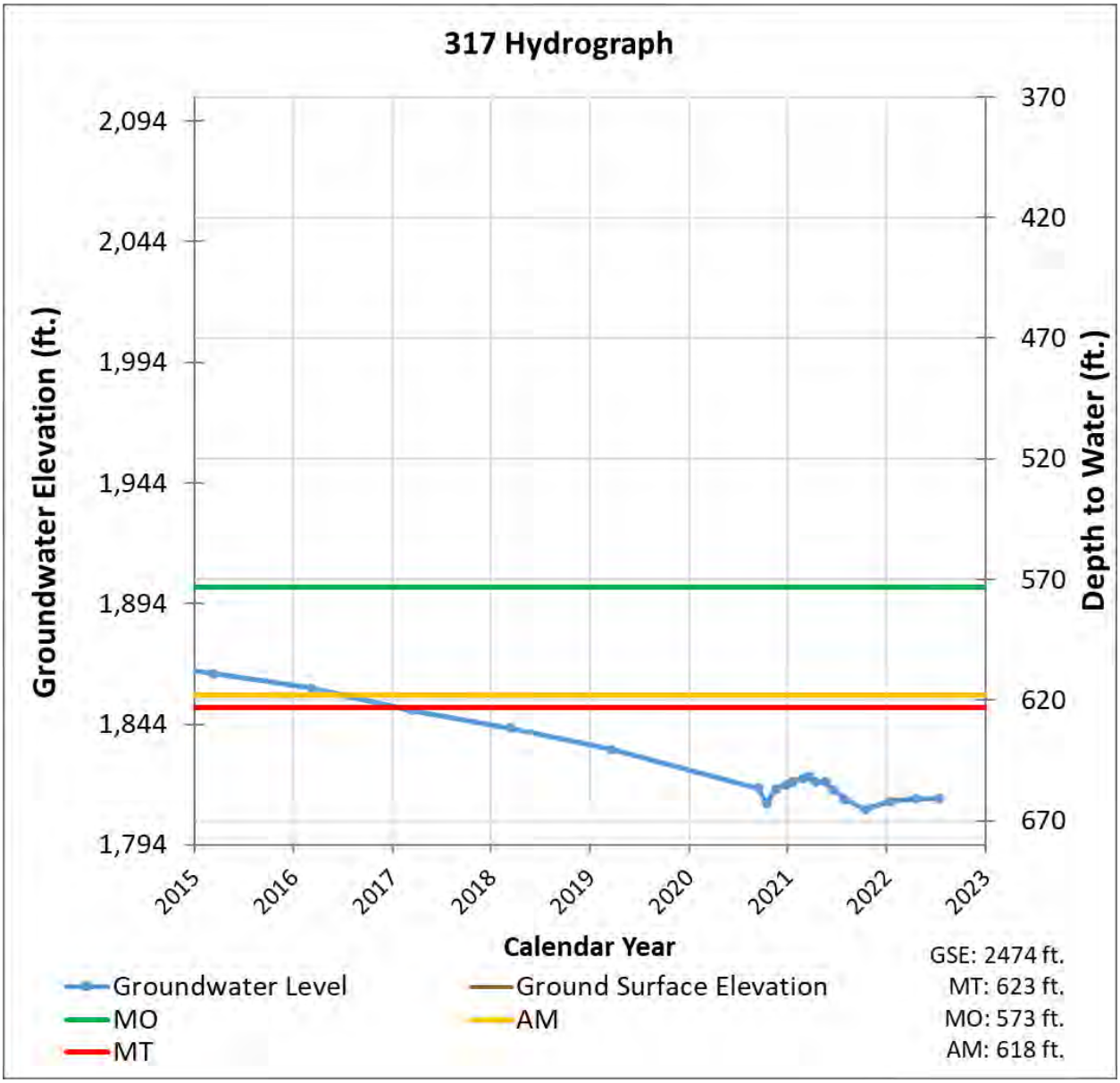

114 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
1,925
1,875
1,825
1,775
1,725
1,675
1,625
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 1925 ft.
MT: 47 ft.
MO: 45 ft.
AM: 47 ft.

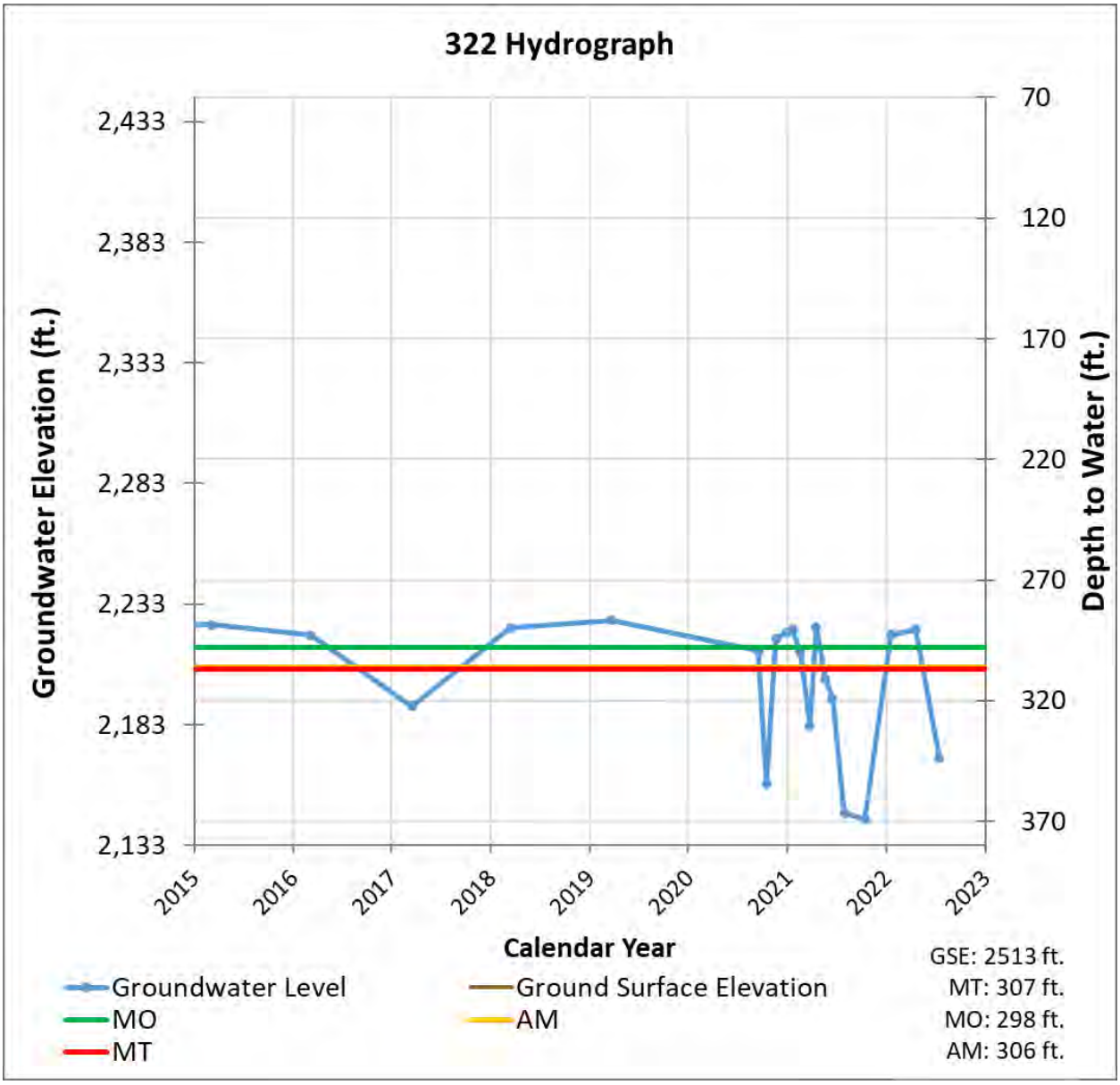

117 Hydrograph
Groundwater Elevation (ft.)
2,098
2,048
1,998
1,948
1,898
1,848
1,798
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2098 ft.
MT: 160 ft.
MO: 151 ft.
AM: 159 ft.

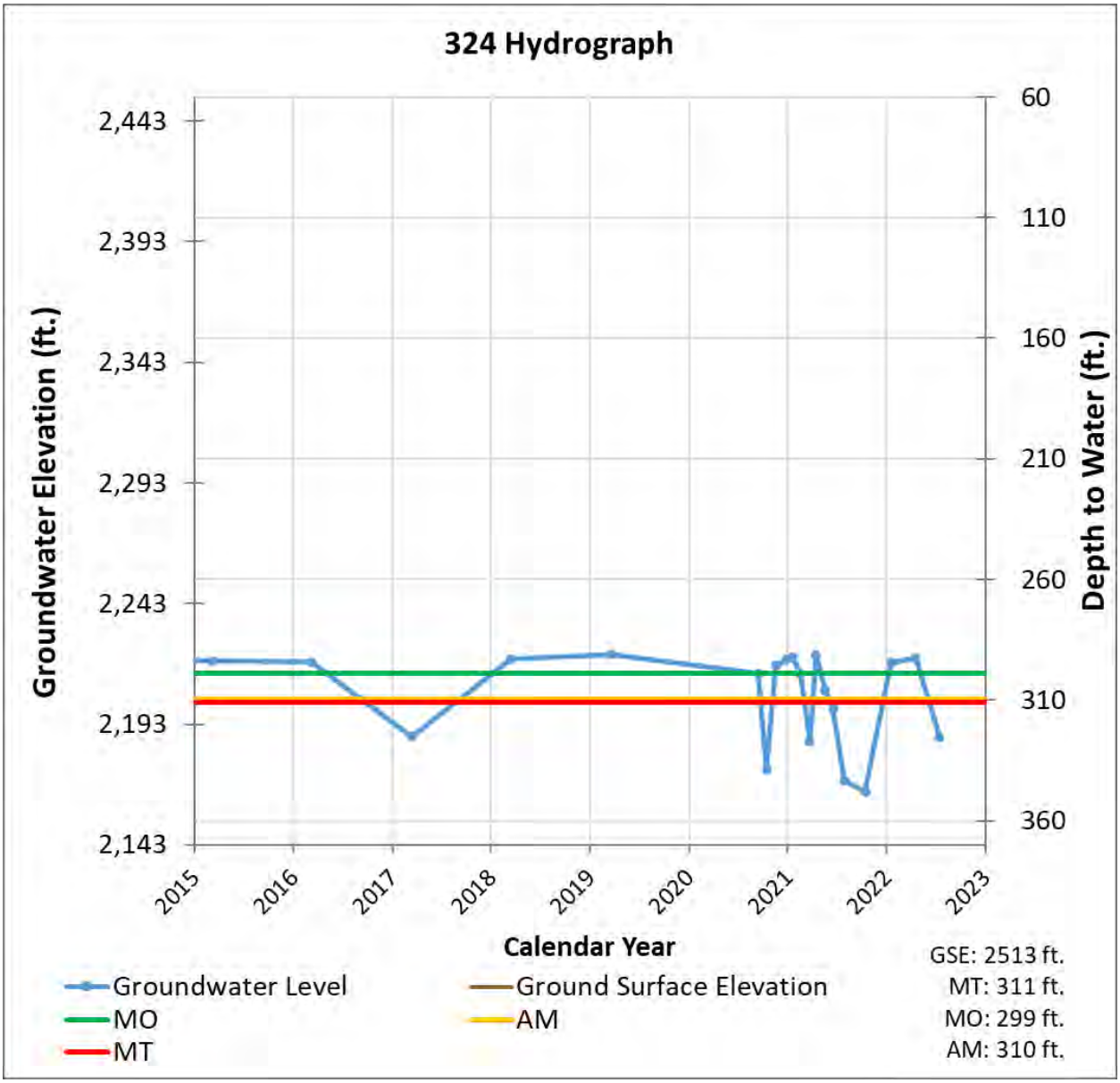

118 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,270
2,220
2,170
2,120
2,070
2,020
1,970
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2270 ft.
MT: 124 ft.
MO: 57 ft.
AM: 117 ft.

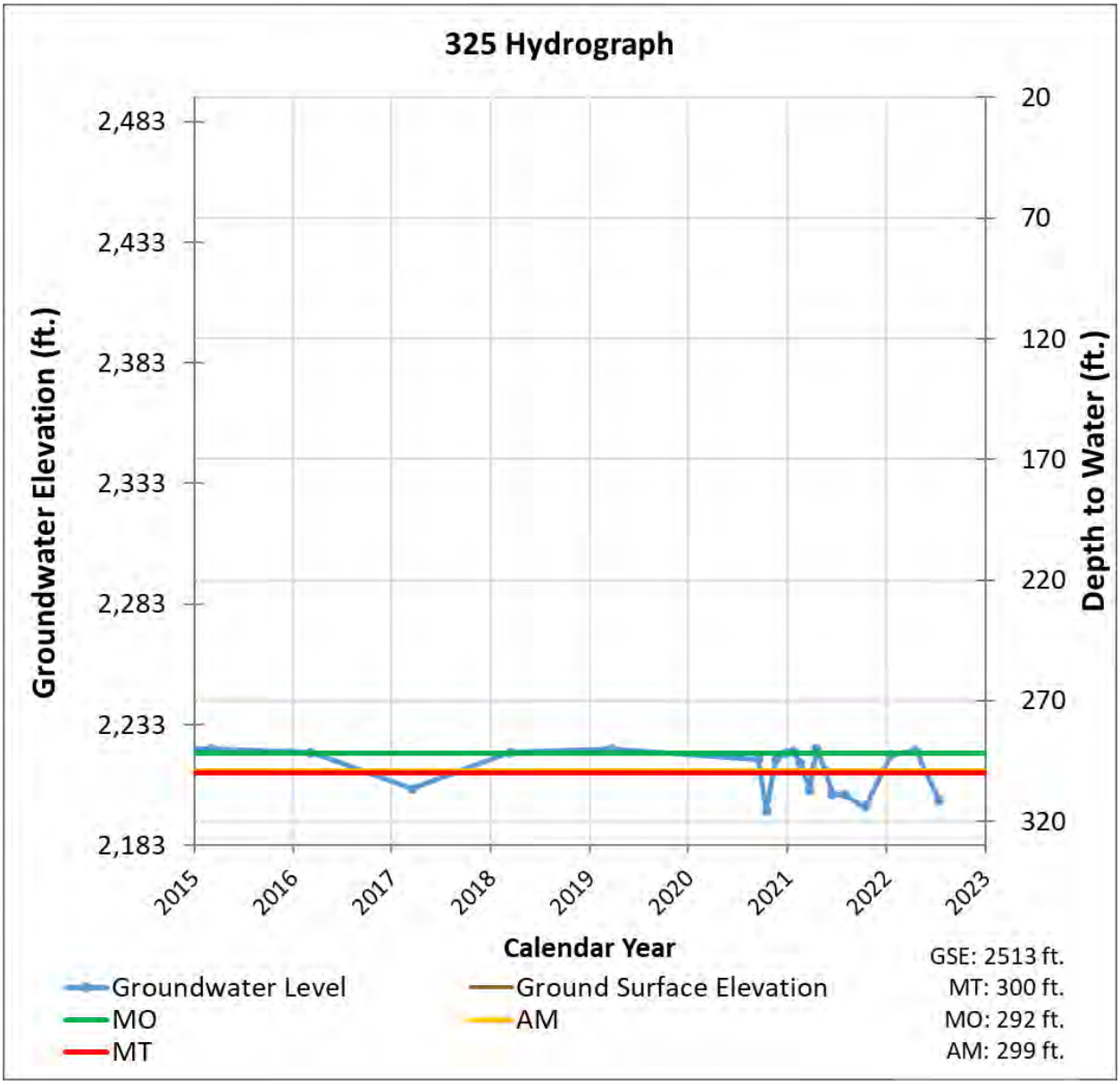

124 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,287
2,237
2,187
2,137
2,087
2,037
1,987
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2287 ft.
MT: 73 ft.
MO: 57 ft.
AM: 71 ft.

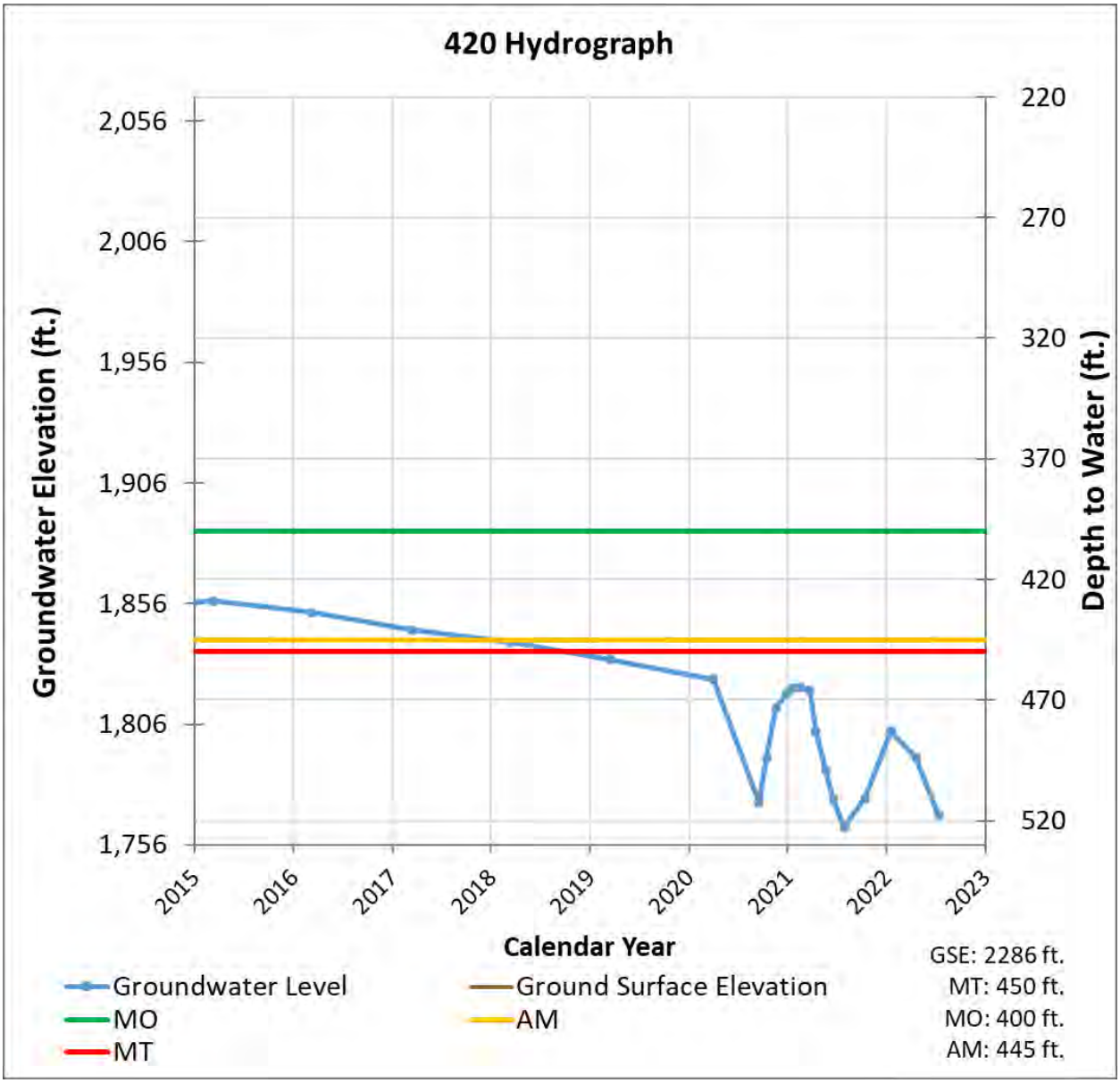

316 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,094
2,044
1,994
1,944
1,894
1,844
1,794
370
420
470
520
570
620
670
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2474 ft.
MT: 623 ft.
MO: 574 ft.
AM: 618 ft.

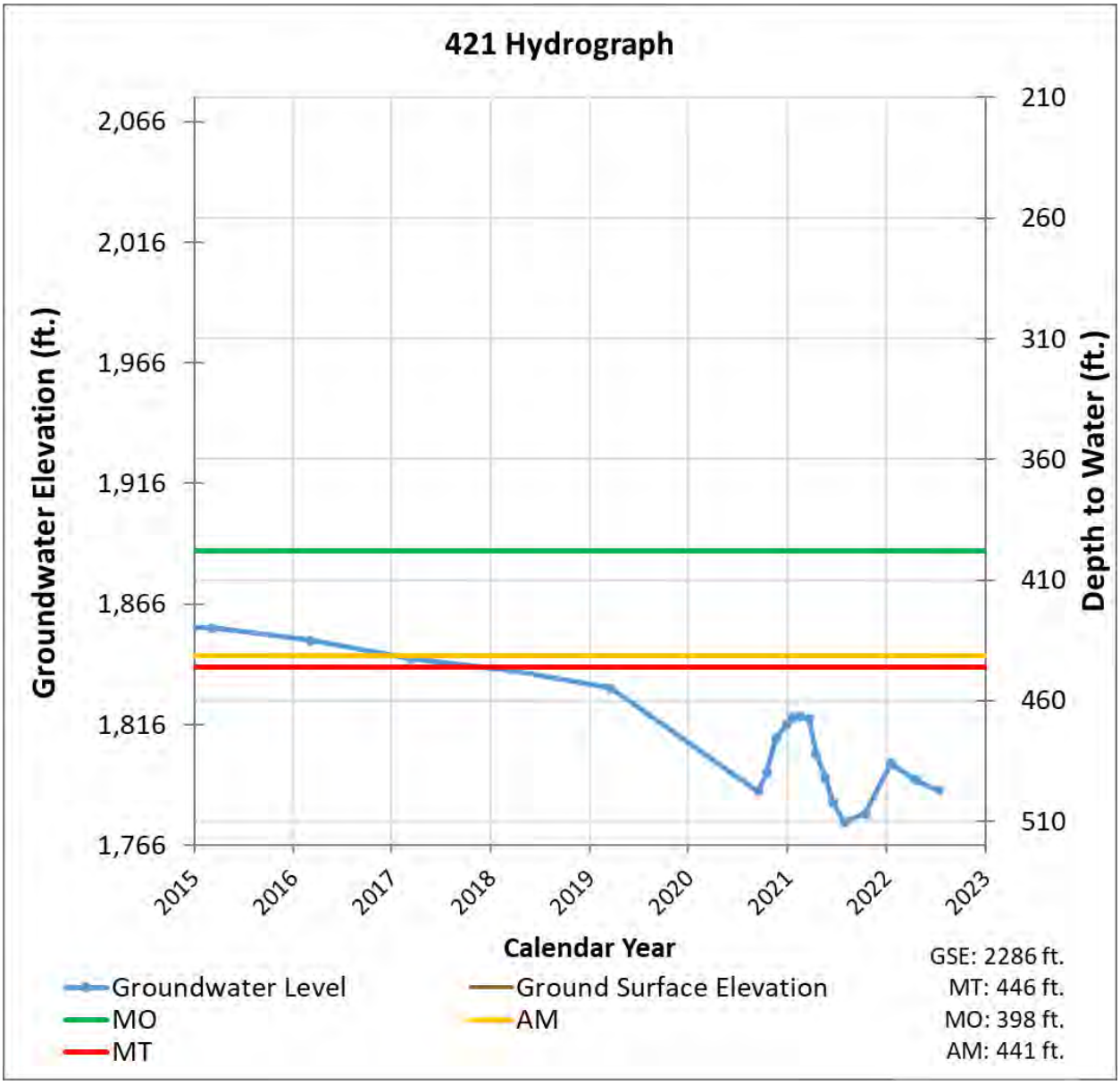

317 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,094
2,044
1,994
1,944
1,894
1,844
1,794
370
420
470
520
570
620
670
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2474 ft.
MT: 623 ft.
MO: 573 ft.
AM: 618 ft.

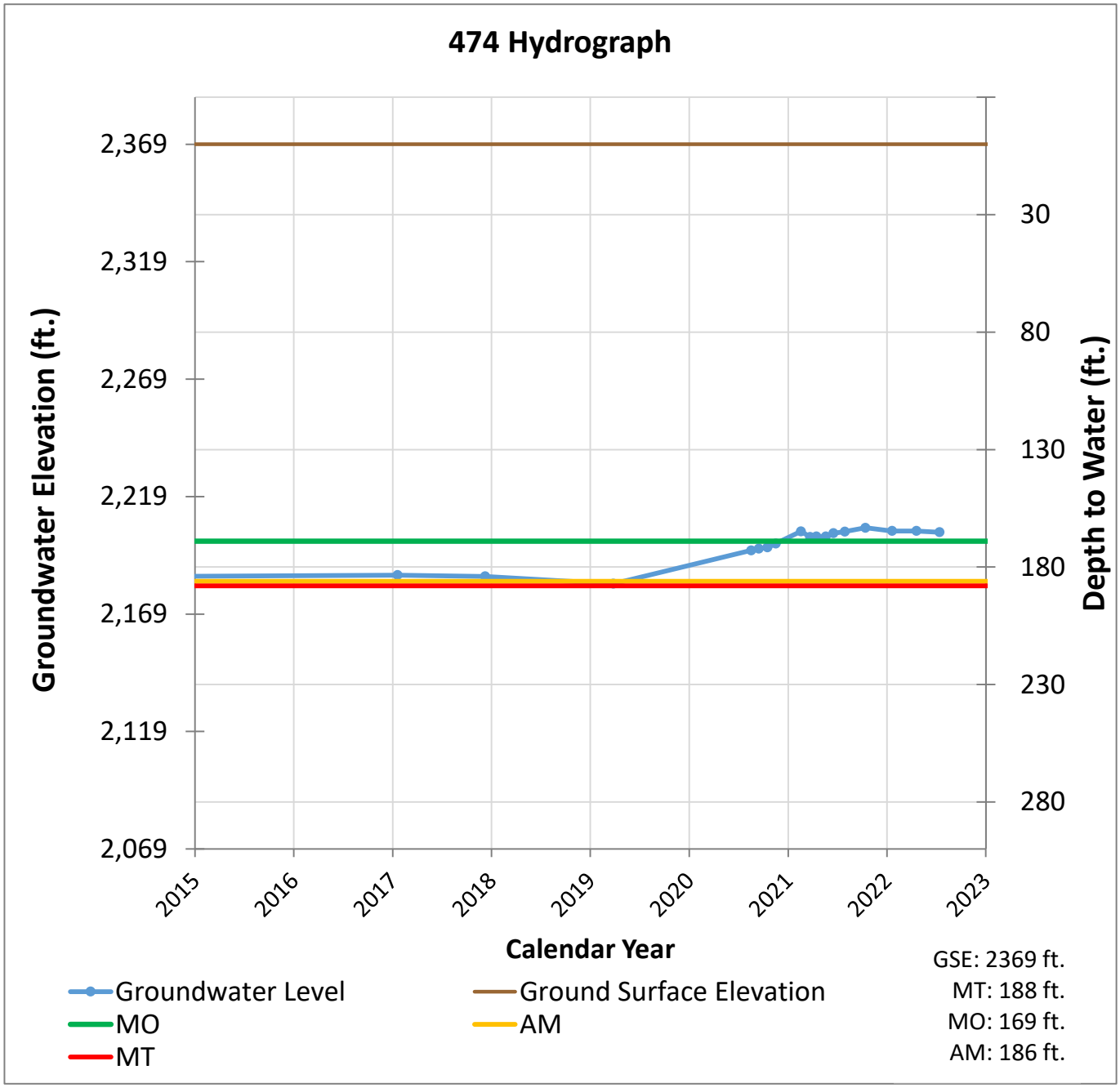

322 Hydrograph
Groundwater Elevation (ft.)
2,433
2,383
2,333
2,283
2,233
2,183
2,133
Depth to Water (ft.)
70
120
170
220
270
320
370
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2513 ft.
MT: 307 ft.
MO: 298 ft.
AM: 306 ft.

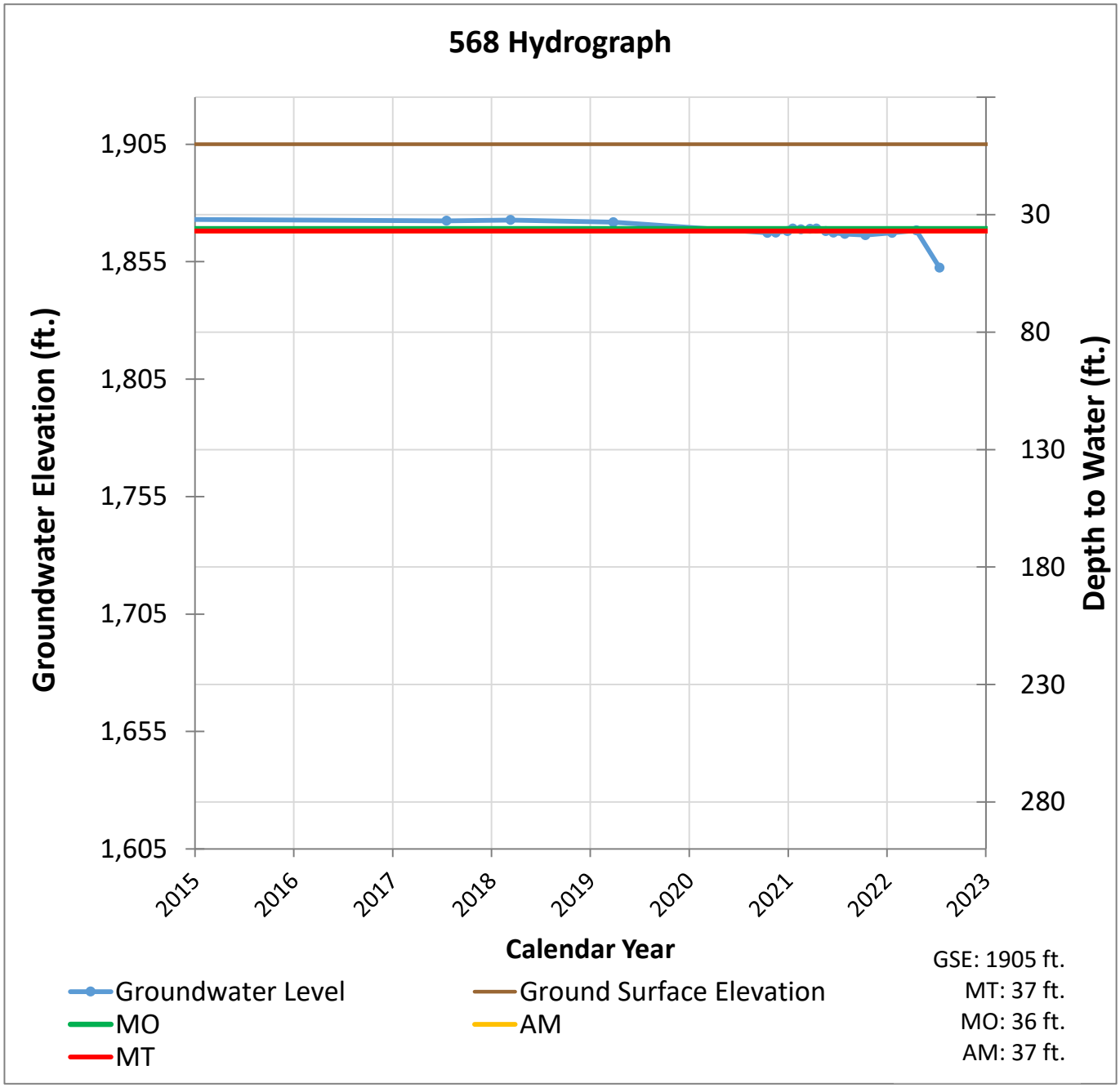

324 Hydrograph
Groundwater Elevation (ft.)
2,443
2,393
2,343
2,293
2,243
2,193
2,143
Depth to Water (ft.)
60
110
160
210
260
310
360
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2513 ft.
MT: 311 ft.
MO: 299 ft.
AM: 310 ft.

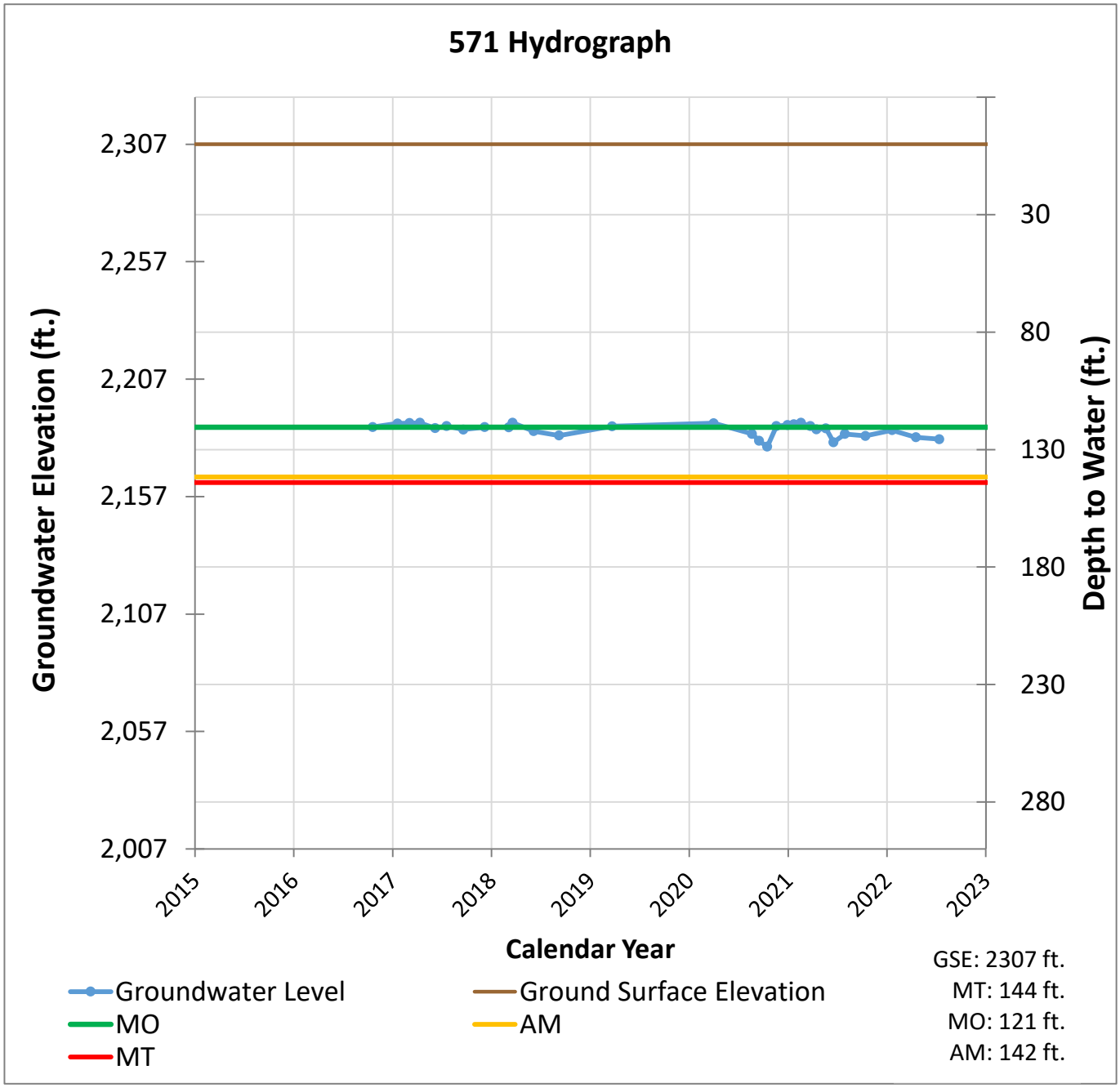

325 Hydrograph
Groundwater Elevation (ft.)
2,483
2,433
2,383
2,333
2,283
2,233
2,183
Depth to Water (ft.)
20
70
120
170
220
270
320
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2513 ft.
MT: 300 ft.
MO: 292 ft.
AM: 299 ft.

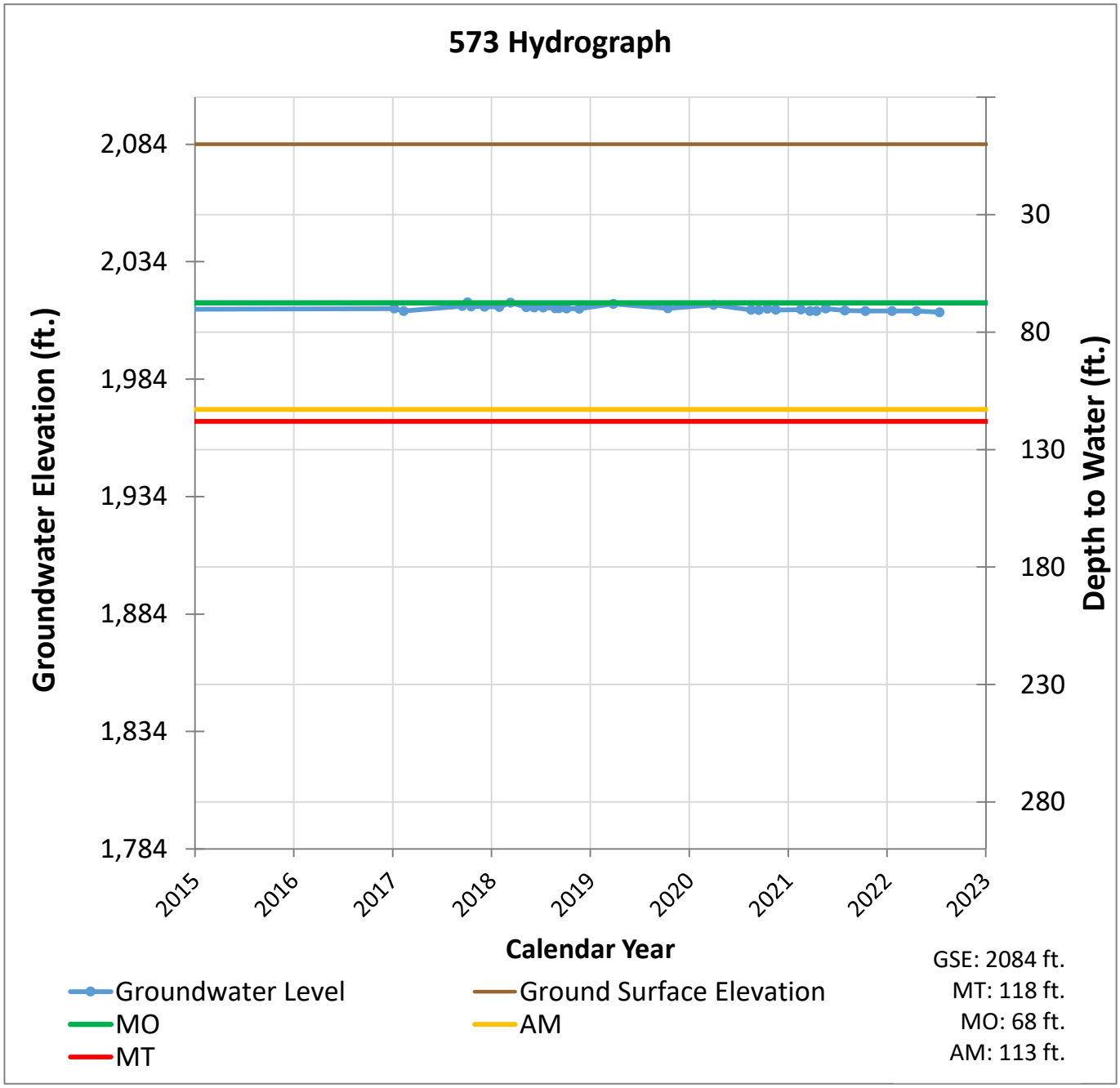

420 Hydrograph
Groundwater Elevation (ft.)
2,056
2,006
1,956
1,906
1,856
1,806
1,756
Depth to Water (ft.)
220
270
320
370
420
470
520
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2286 ft.
MT: 450 ft.
MO: 400 ft.
AM: 445 ft.

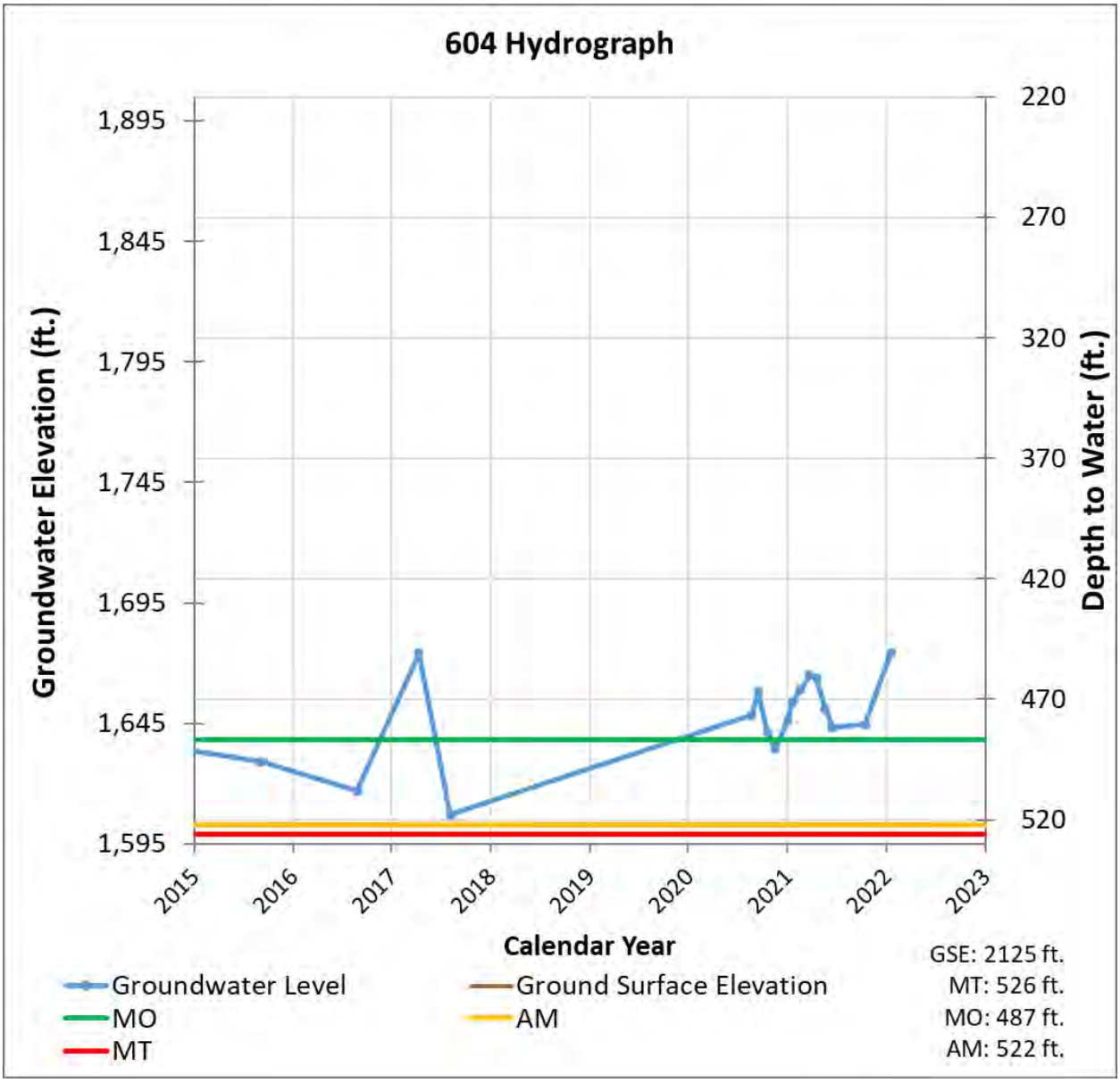

421 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,066
2,016
1,966
1,916
1,866
1,816
1,766
210
260
310
360
410
460
510
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2286 ft.
MT: 446 ft.
MO: 398 ft.
AM: 441 ft.

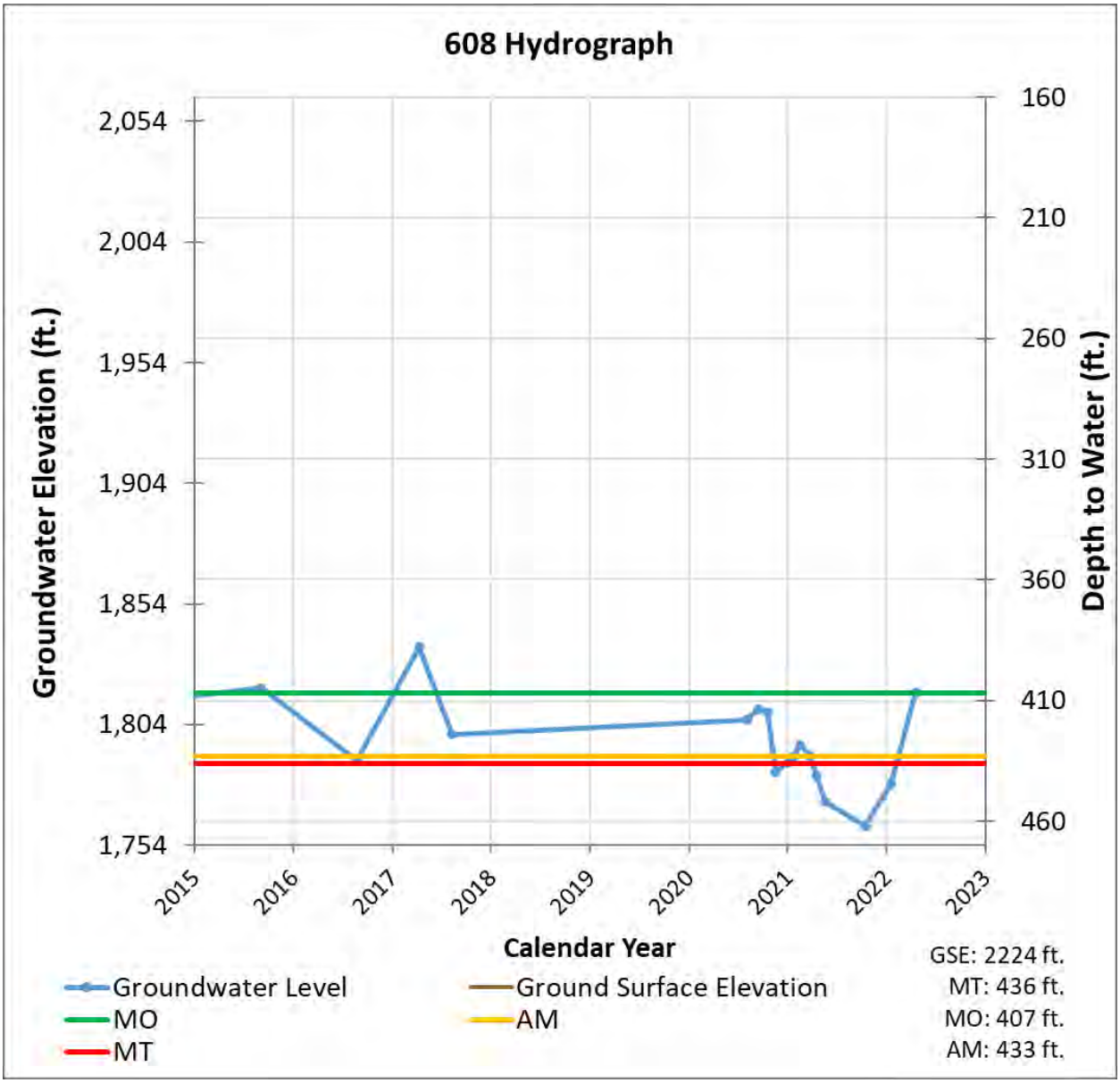

474 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,369
2,319
2,269
2,219
2,169
2,119
2,069
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2369 ft.
MT: 188 ft.
MO: 169 ft.
AM: 186 ft.

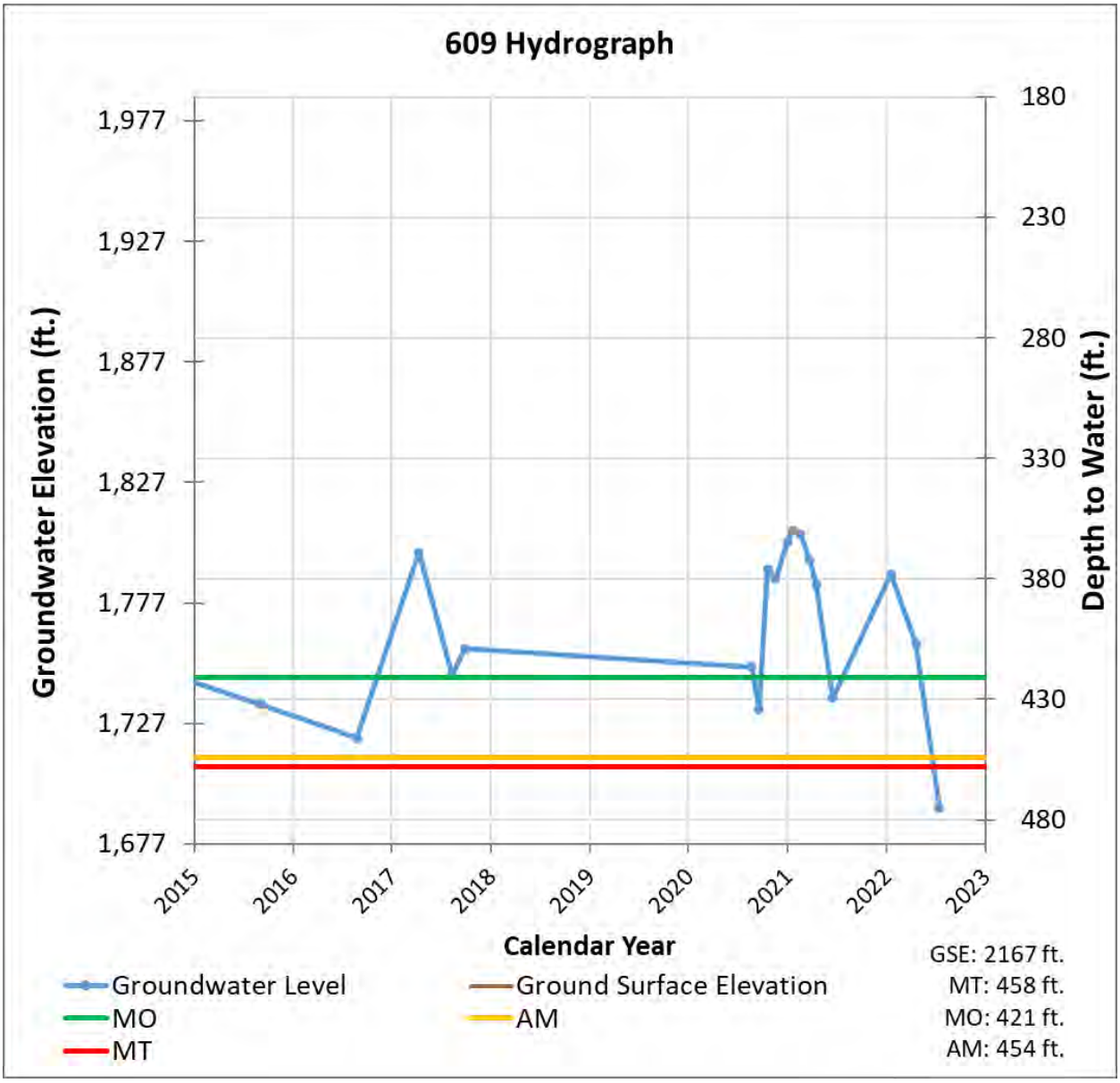

568 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
1,905
1,855
1,805
1,755
1,705
1,655
1,605
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 1905 ft.
MT: 37 ft.
MO: 36 ft.
AM: 37 ft.

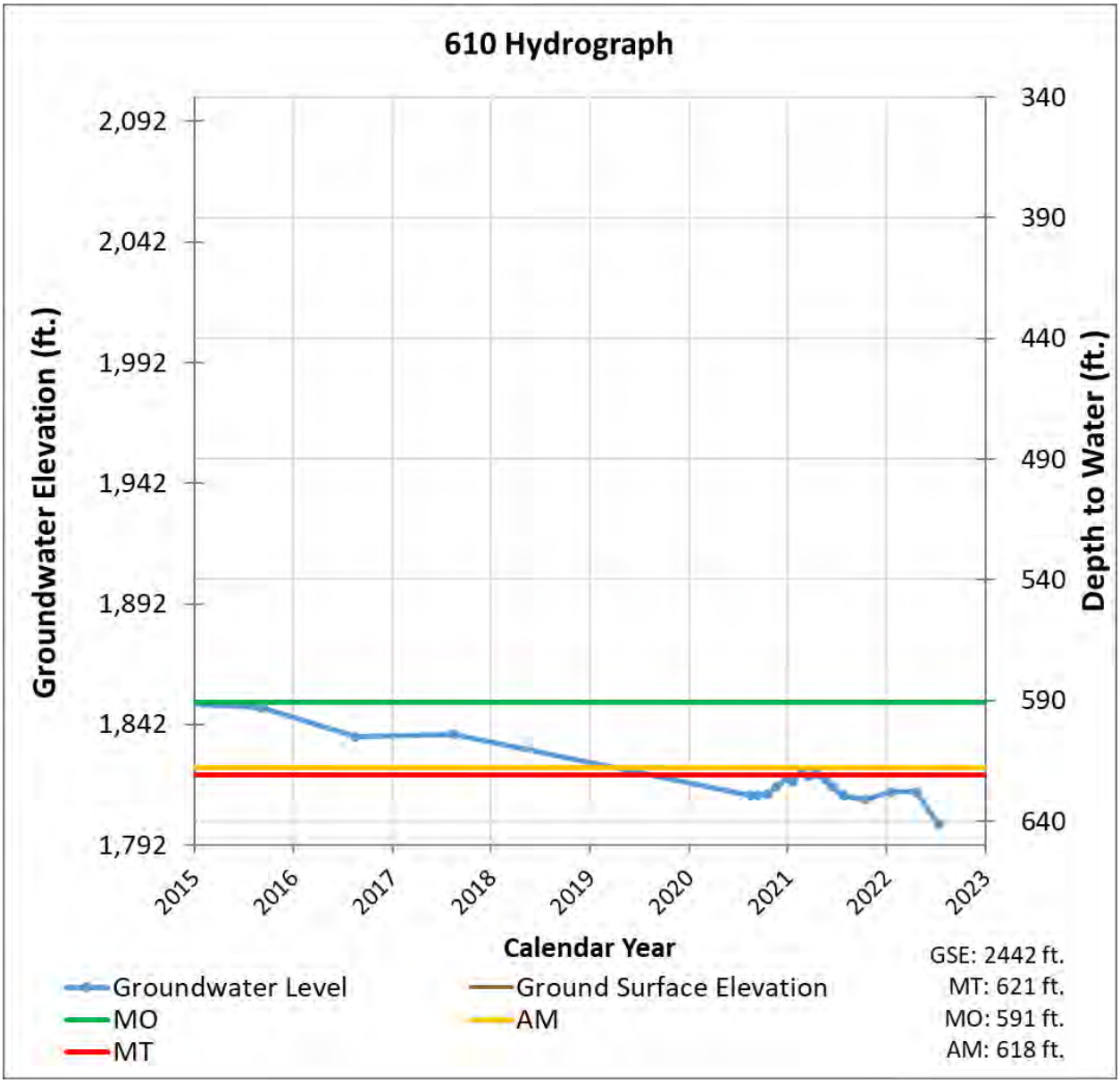

571 Hydrograph
Groundwater Elevation (ft.)
2,307
2,257
2,207
2,157
2,107
2,057
2,007
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2307 ft.
MT: 144 ft.
MO: 121 ft.
AM: 142 ft.

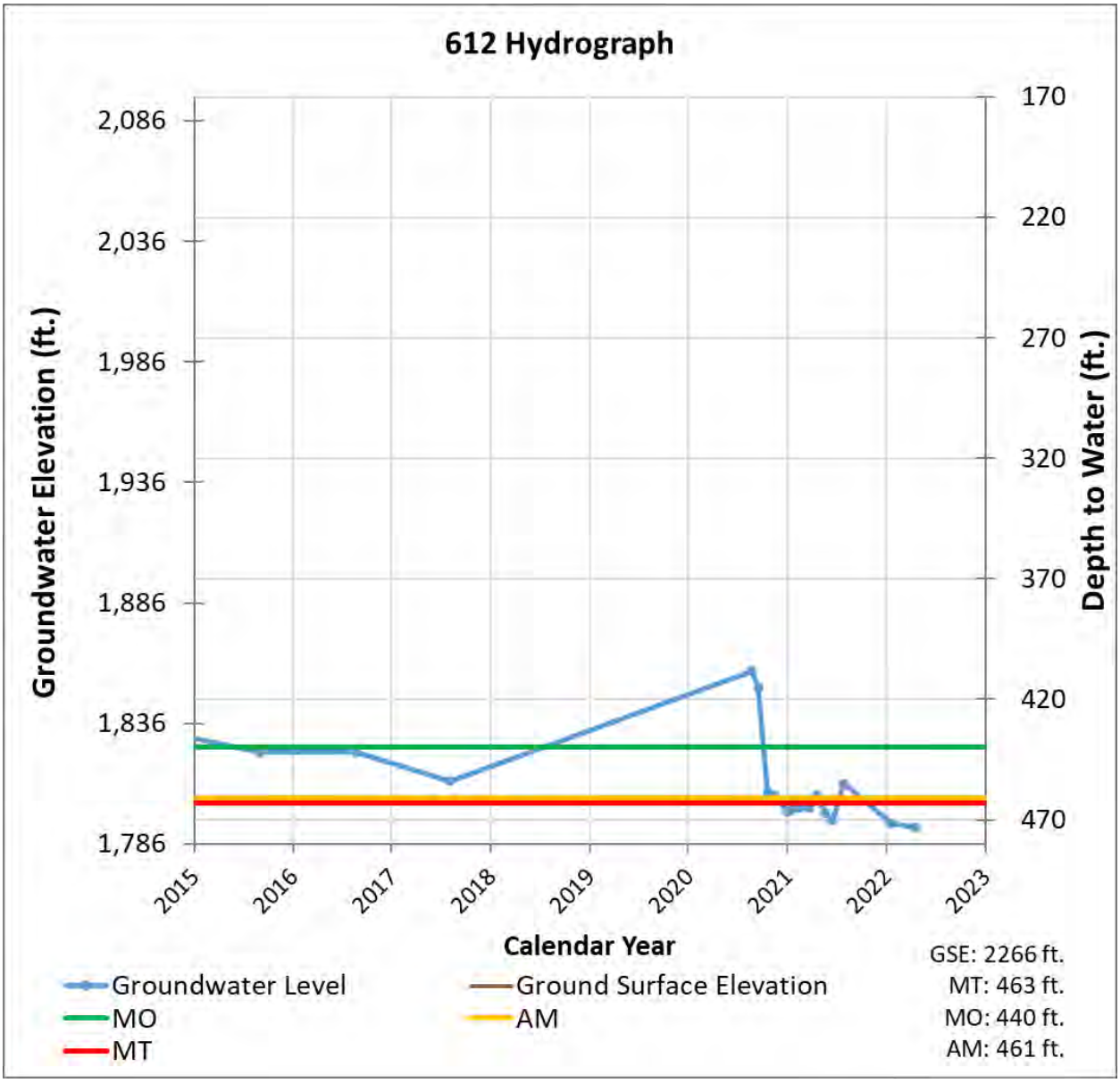

573 Hydrograph
Groundwater Elevation (ft.)
2,084
2,034
1,984
1,934
1,884
1,834
1,784
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2084 ft.
MT: 118 ft.
MO: 68 ft.
AM: 113 ft.

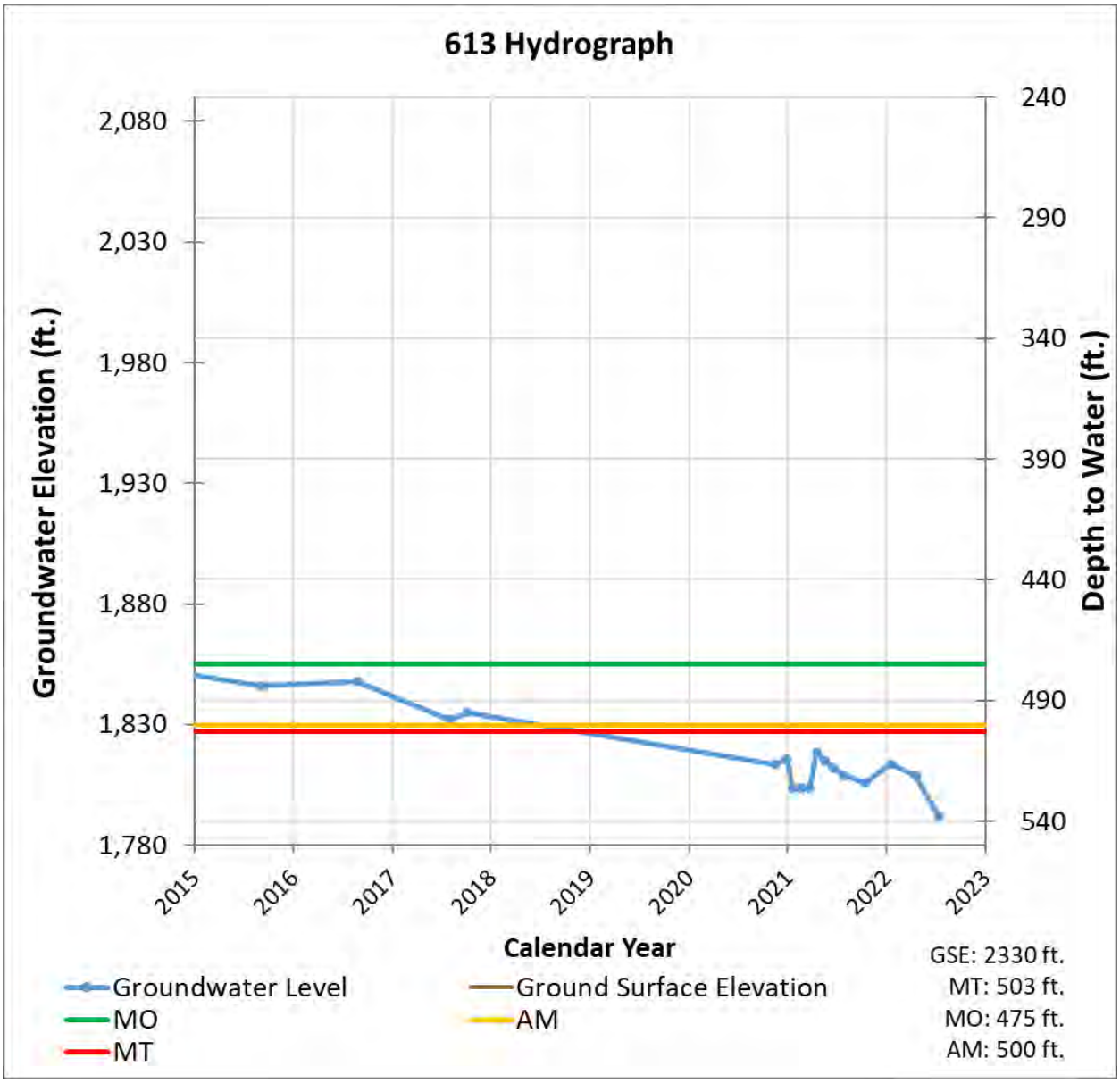

604 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
1,895
1,845
1,795
1,745
1,695
1,645
1,595
220
270
320
370
420
470
520
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2125 ft.
MT: 526 ft.
MO: 487 ft.
AM: 522 ft.

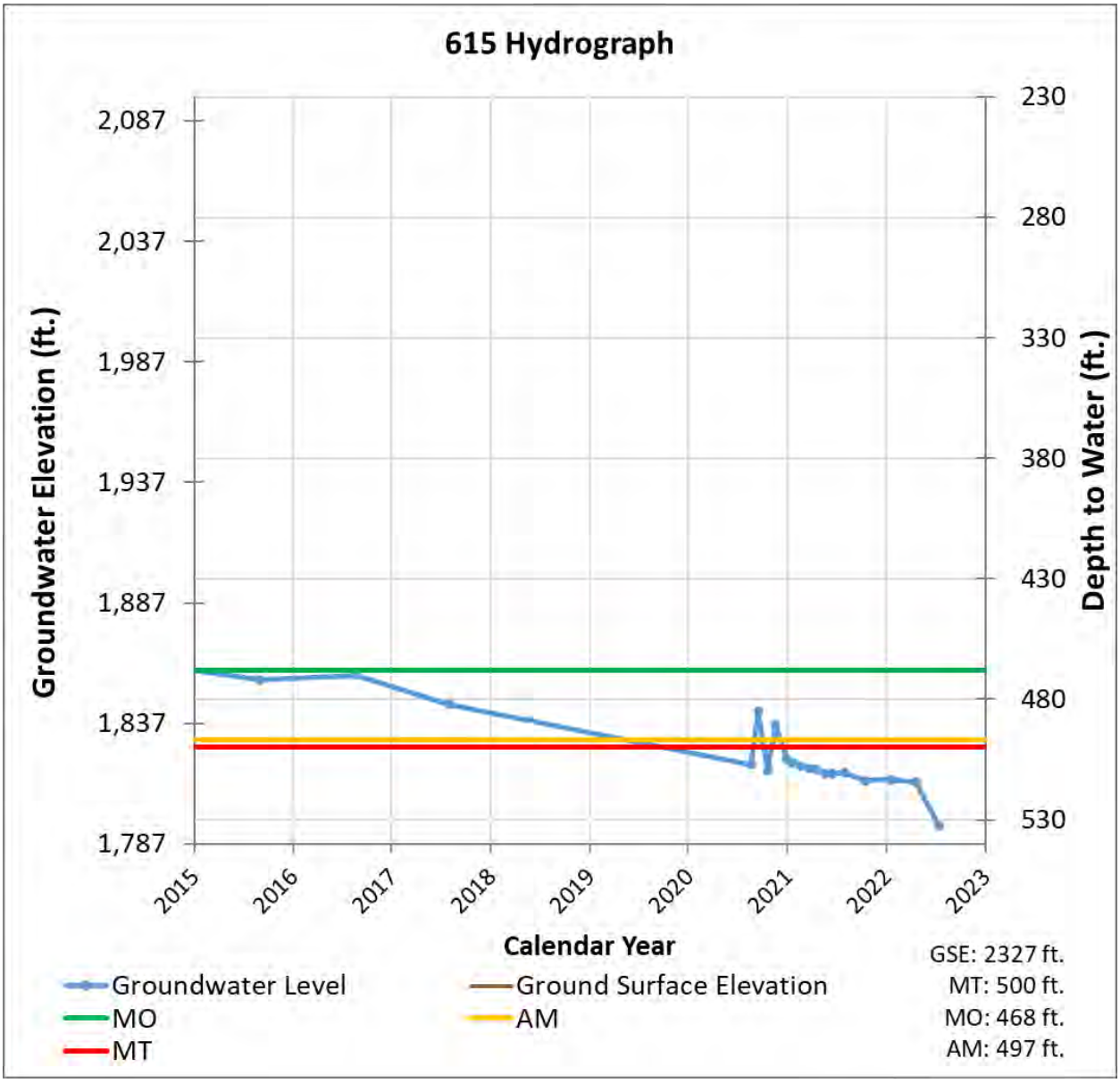

608 Hydrograph
Groundwater Elevation (ft.)
2,054
2,004
1,954
1,904
1,854
1,804
1,754
Depth to Water (ft.)
160
210
260
310
360
410
460
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2224 ft.
MT: 436 ft.
MO: 407 ft.
AM: 433 ft.

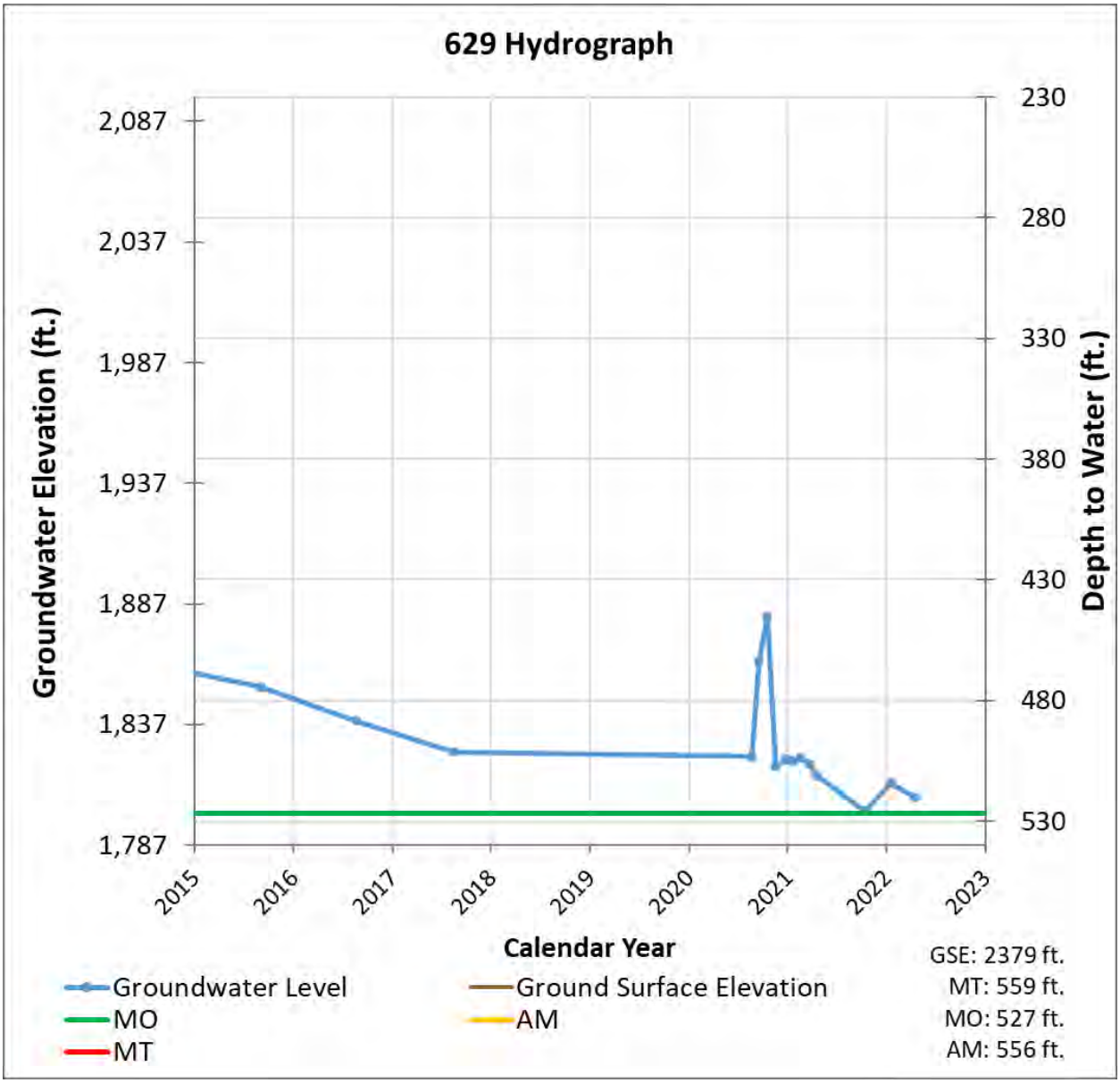

609 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
1,977
1,927
1,877
1,827
1,777
1,727
1,677
180
230
280
330
380
430
480
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2167 ft.
MT: 458 ft.
MO: 421 ft.
AM: 454 ft.

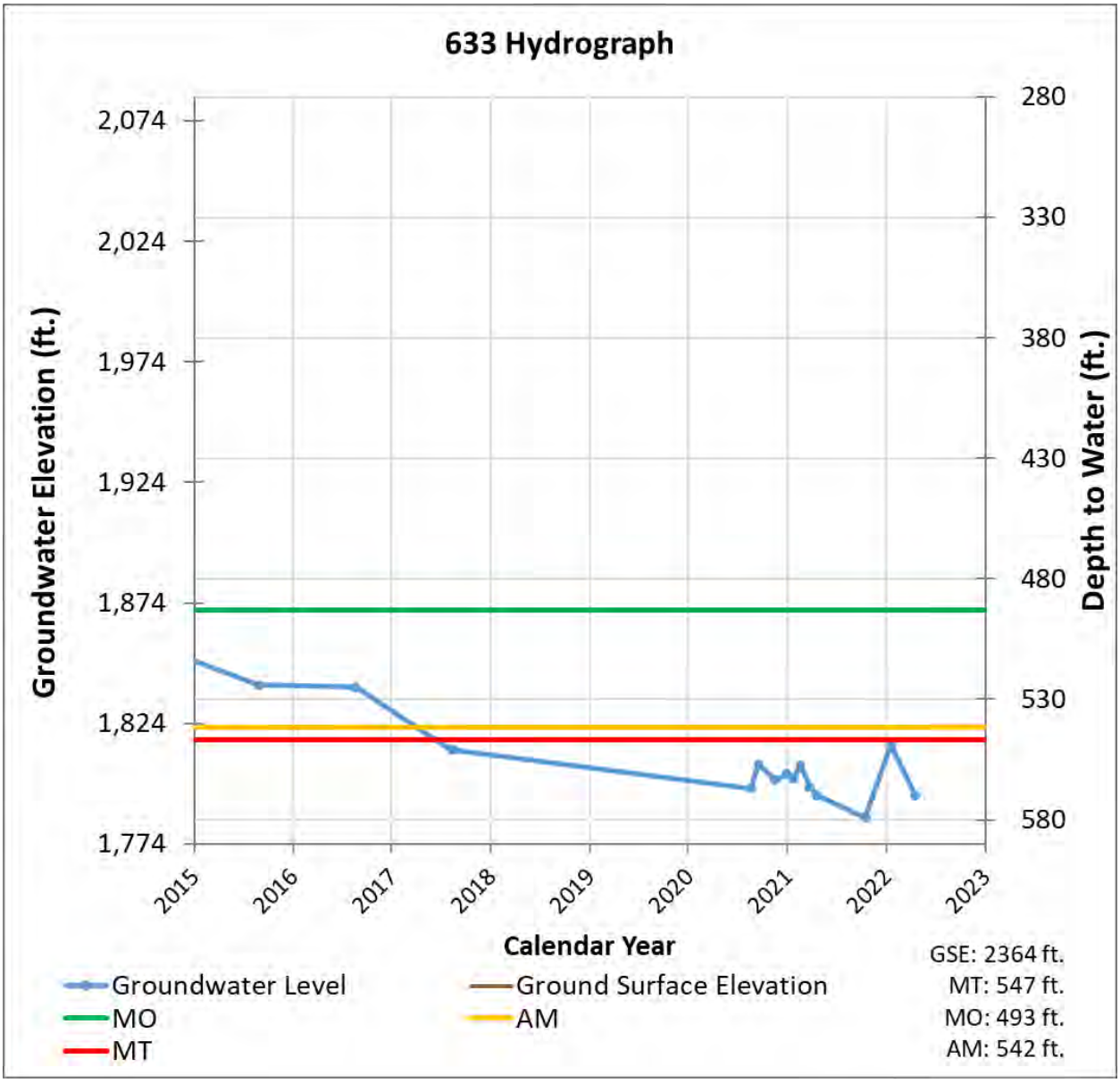

610 Hydrograph
Groundwater Elevation (ft.)
2,092
2,042
1,992
1,942
1,892
1,842
1,792
Depth to Water (ft.)
340
390
440
490
540
590
640
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2442 ft.
MT: 621 ft.
MO: 591 ft.
AM: 618 ft.

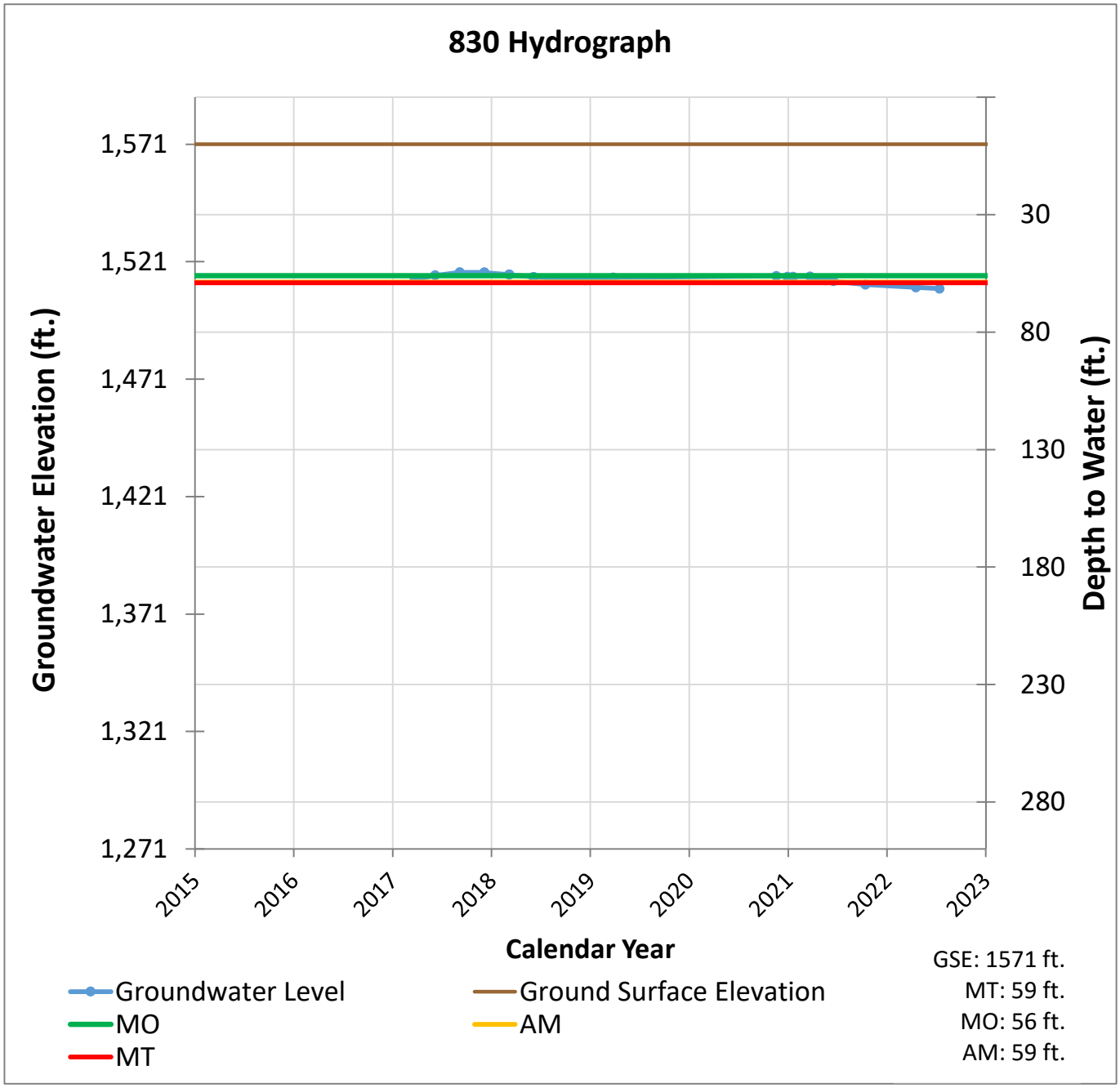

612 Hydrograph
Groundwater Elevation (ft.)
2,086
2,036
1,986
1,936
1,886
1,836
1,786
Depth to Water (ft.)
170
220
270
320
370
420
470
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2266 ft.
MT: 463 ft.
MO: 440 ft.
AM: 461 ft.

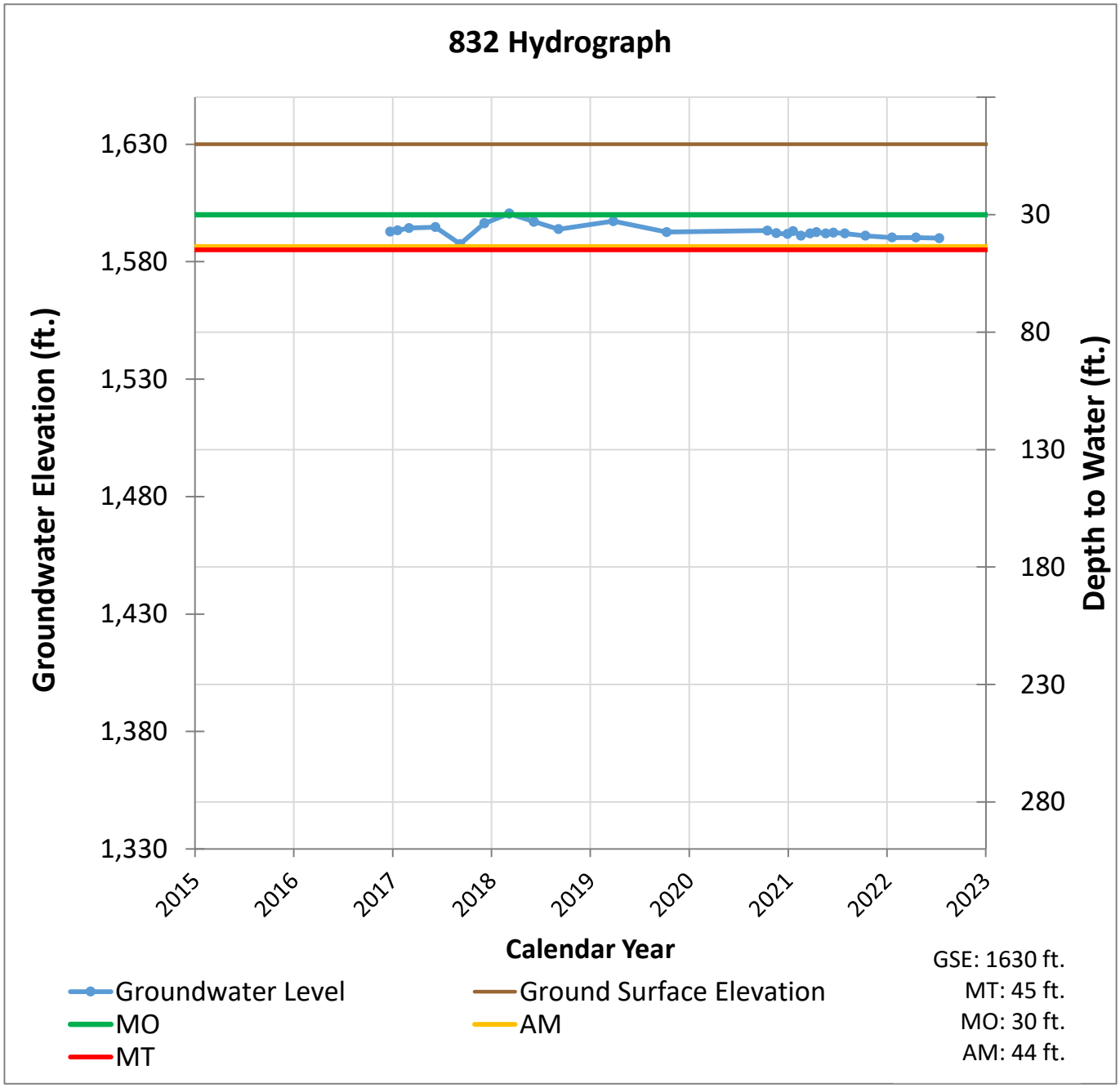

613 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,080
2,030
1,980
1,930
1,880
1,830
1,780
240
290
340
390
440
490
540
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2330 ft.
MT: 503 ft.
MO: 475 ft.
AM: 500 ft.

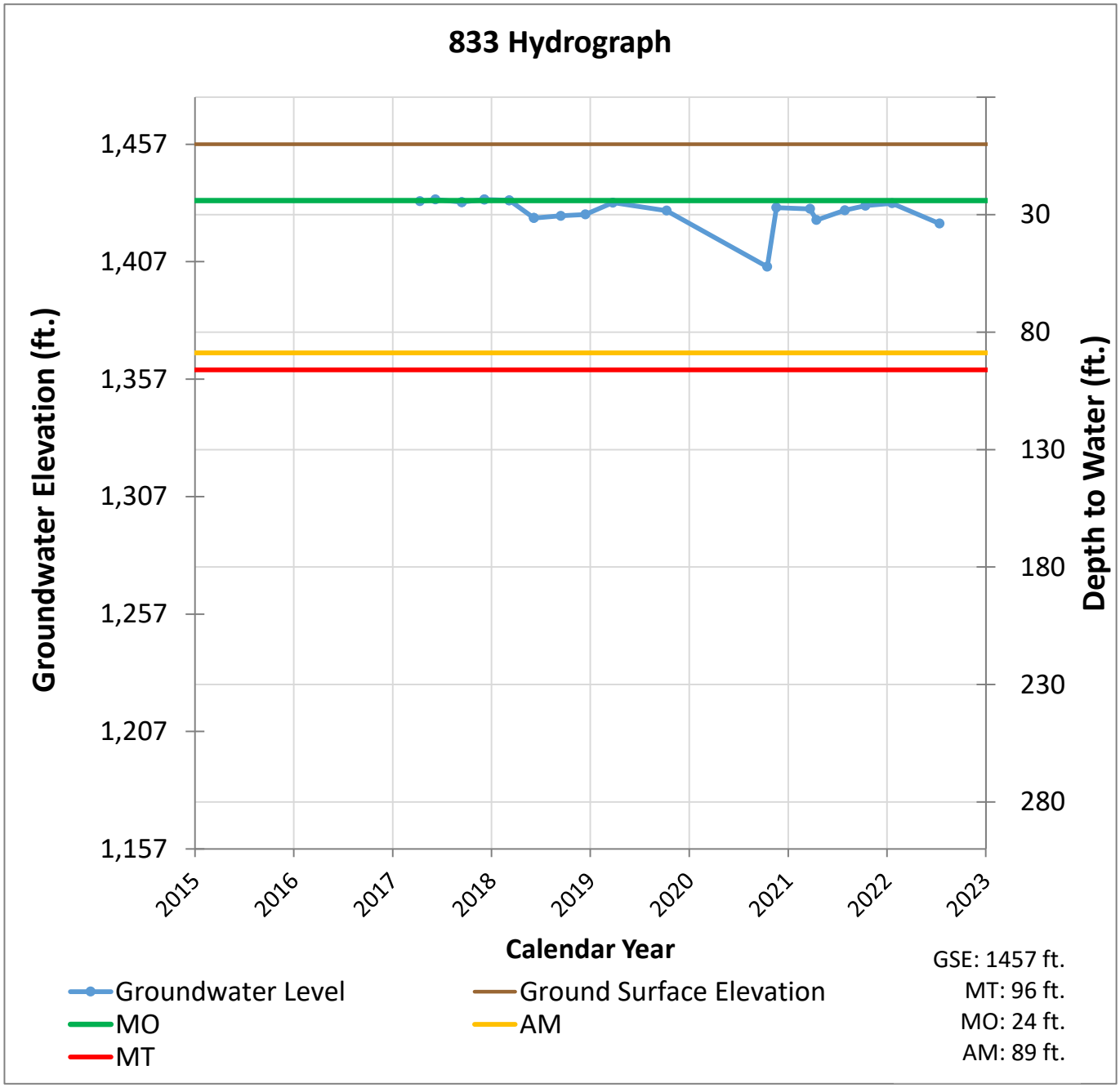

615 Hydrograph
Groundwater Elevation (ft.)
2,087
2,037
1,987
1,937
1,887
1,837
1,787
Depth to Water (ft.)
230
280
330
380
430
480
530
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2327 ft.
MT: 500 ft.
MO: 468 ft.
AM: 497 ft.

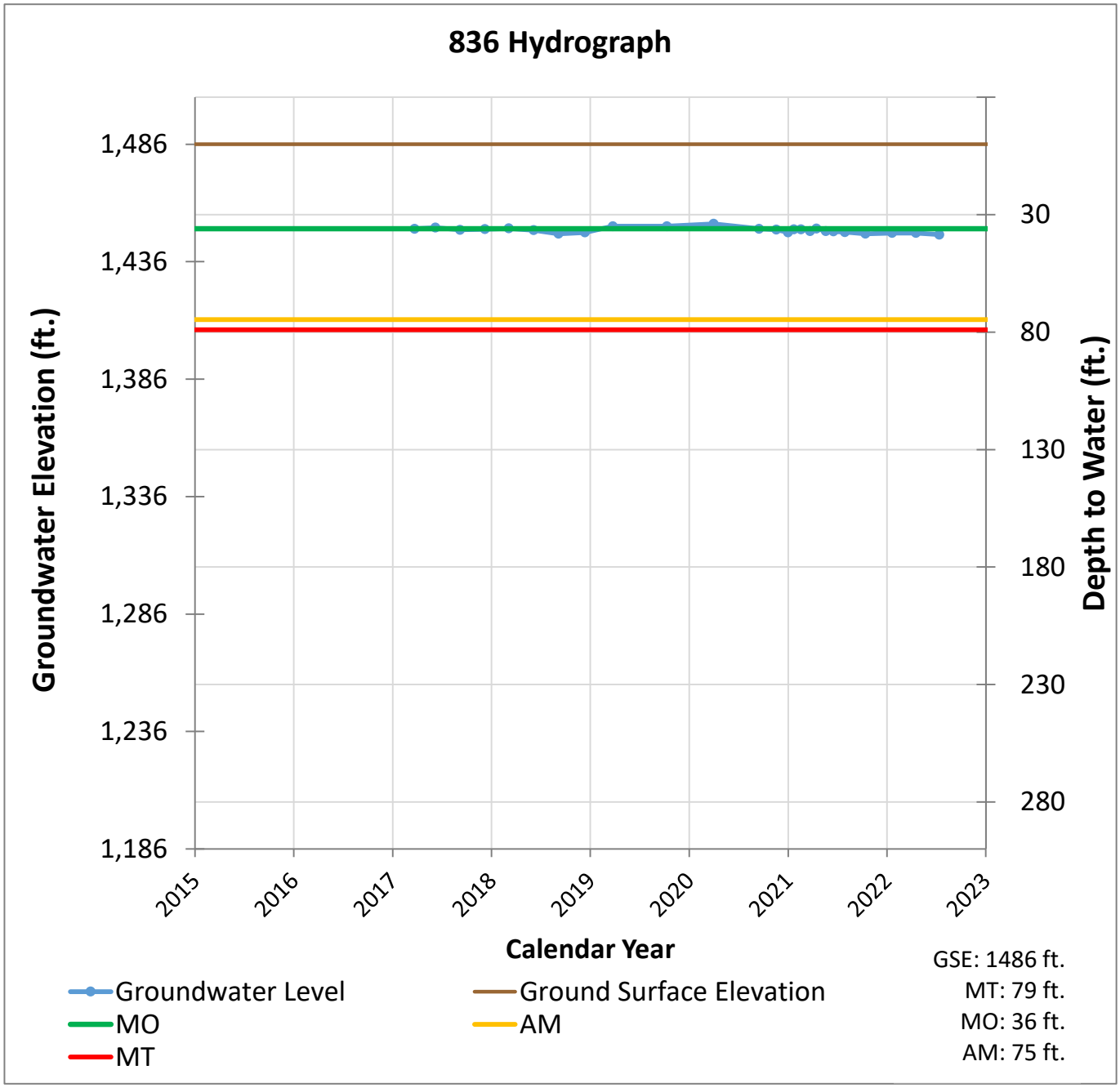

629 Hydrograph
Groundwater Elevation (ft.)
2,087
2,037
1,987
1,937
1,887
1,837
1,787
Depth to Water (ft.)
230
280
330
380
430
480
530
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2379 ft.
MT: 559 ft.
MO: 527 ft.
AM: 556 ft.

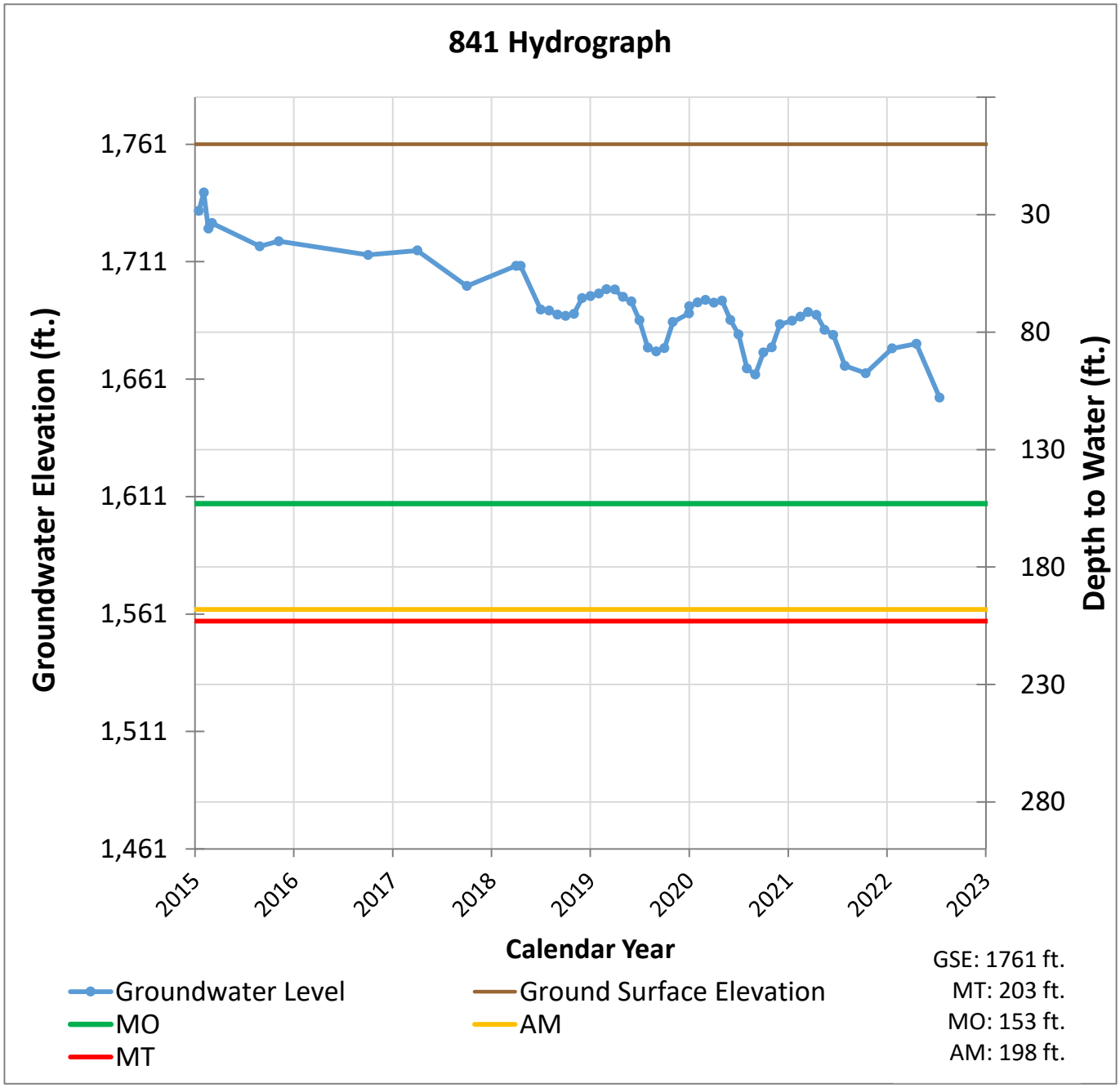

633 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
2,074
2,024
1,974
1,924
1,874
1,824
1,774
280
330
380
430
480
530
580
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 2364 ft.
MT: 547 ft.
MO: 493 ft.
AM: 542 ft.

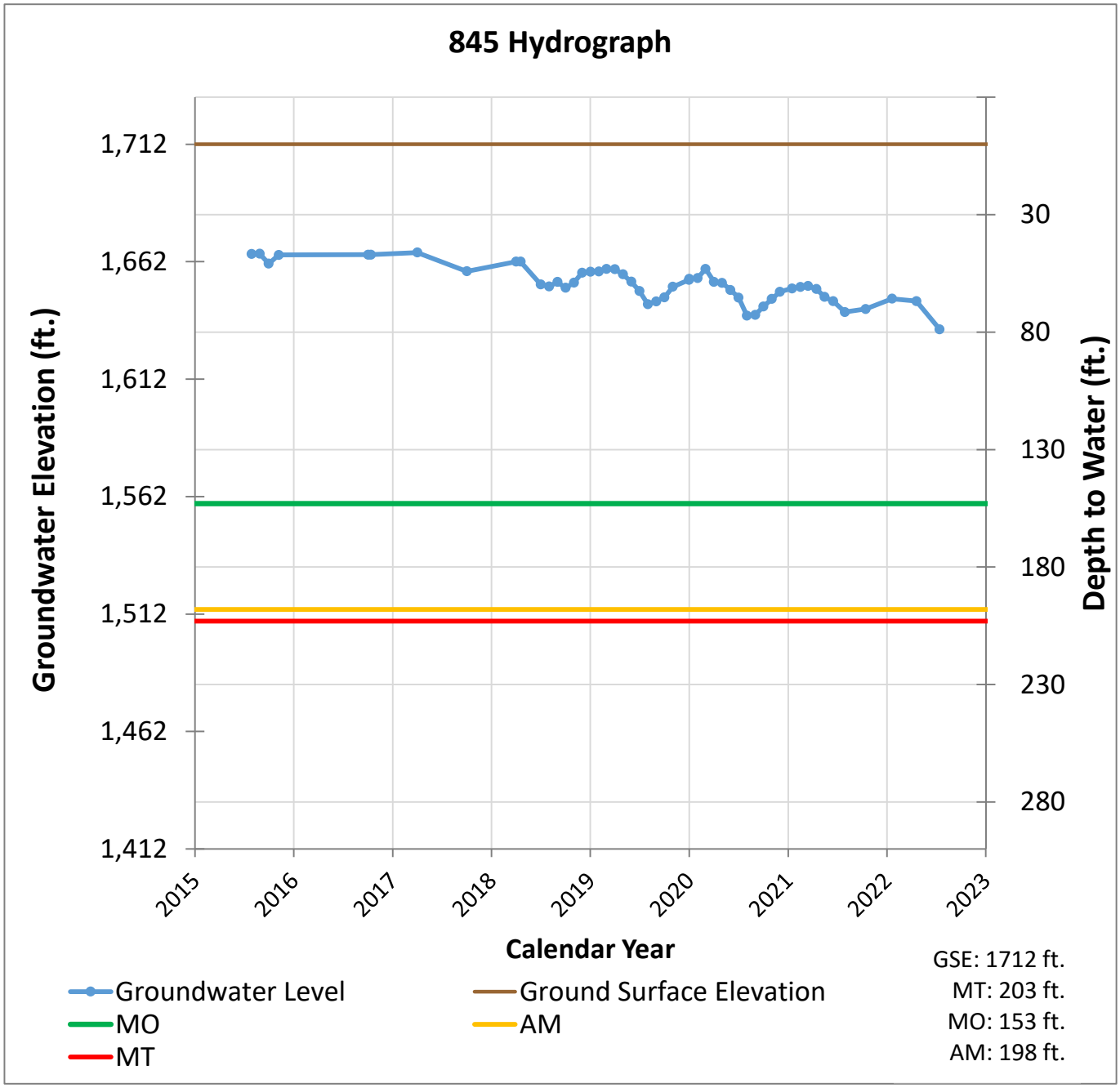

830 Hydrograph
Groundwater Elevation (ft.)
1,571
1,521
1,471
1,421
1,371
1,321
1,271
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 1571 ft.
MT: 59 ft.
MO: 56 ft.
AM: 59 ft.


832 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
1,630
1,580
1,530
1,480
1,430
1,380
1,330
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 1630 ft.
MT: 45 ft.
MO: 30 ft.
AM: 44 ft.


833 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
1,457
1,407
1,357
1,307
1,257
1,207
1,157
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 1457 ft.
MT: 96 ft.
MO: 24 ft.
AM: 89 ft.


836 Hydrograph
Groundwater Elevation (ft.)
1,486
1,436
1,386
1,336
1,286
1,236
1,186
Depth to Water (ft.)
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 1486 ft.
MT: 79 ft.
MO: 36 ft.
AM: 75 ft.


841 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
1,761
1,711
1,661
1,611
1,561
1,511
1,461
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 1761 ft.
MT: 203 ft.
MO: 153 ft.
AM: 198 ft.


845 Hydrograph
Groundwater Elevation (ft.)
Depth to Water (ft.)
1,712
1,662
1,612
1,562
1,512
1,462
1,412
30
80
130
180
230
280
2015
2016
2017
2018
2019
2020
2021
2022
2023
Calendar Year
Groundwater Level
Ground Surface Elevation
MO
AM
MT
GSE: 1712 ft.
MT: 203 ft.
MO: 153 ft.
AM: 198 ft.