SUTTER SUBBASIN

Water Year 2022 Annual Report to the GROUNDWATER SUSTAINABILITY PLAN

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March 2023

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Sutter Subbasin WY 2022 Annual Report

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Acronyms

AF	acre-feet
AFY	acre-feet per year
AZ	Aquifer Zone
C2VSimFG-Sutter	California Central Valley Groundwater-Surface Water Simulation Model, Fine Grid, Sutter Subbasin
CASGEM	California Statewide Groundwater Elevation Monitoring
CVP	Central Valley Project
DMS	data management system
DWR	California Department of Water Resources
ft bgs	feet below ground surface
GMP	Groundwater Management Plan
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GSW	groundwater substitution transfer
HCM	Hydrogeologic Conceptual Model
MAF	million acre-feet
MCL	maximum contaminant level
MSL	mean sea level
SEWD	Sutter Extension Water District
SGMA	Sustainable Groundwater Management Act
SMC	sustainable management criteria
SMCL	secondary maximum contaminant level
SSGMCC	Sutter Subbasin Groundwater Management Coordination Committee
SWP	State Water Project
TDS	total dissolved solids
USBR	United States Bureau of Reclamation
WY	Water Year

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EXECUTIVE SUMMARY

ES-1. INTRODUCTION

The Sutter Groundwater Subbasin (Sutter Subbasin or Subbasin) has been identified by the California Department of Water Resources (DWR) as a medium priority groundwater basin. The nine Sutter Subbasin Groundwater Sustainability Agencies (GSAs) developed and submitted a Groundwater Sustainability Plan (GSP) to DWR prior to the January 31, 2022 deadline. The GSP was developed to address the Sustainable Groundwater Management Act (SGMA) regulatory requirements while reflecting local needs and preserving local control over water resources, providing a path to achieve and maintain sustainable groundwater management within 20 years following Plan adoption.

This Annual Report provides information on conditions in the Sutter Subbasin and progress towards GSP implementation for Water Year (WY) 2022 (October 1, 2021 to September 30, 2022). The report has been prepared in accordance with Article 7 *Annual Reports and Periodic Evaluations by the Agency,* §356.2 *Annual Reports* of the GSP Emergency Regulations as contained within the California Code of Regulations.

ES-2. GROUNDWATER MANAGEMENT AND MILESTONES

While the enactment of SGMA in 2015 prohibited the development or renewal of any Groundwater Management Plans (GMPs) within medium and high priority basins (such as the Sutter Subbasin), Sutter County continued to implement the 2012 GMP throughout the GSP development process. WY 2022 included finalizing and adopting the Sutter Subbasin GSP and submittal of the GSP to DWR by the January 31, 2022 deadline, thus initiating the first year of GSP implementation. This Annual Report uses information contained within the GSP, as well as data collected during the first year of implementation, to evaluate continued sustainable conditions throughout the planning and implementation horizon.

The GSP sets sustainable management criteria (SMC) for applicable sustainability indicators and identifies projects and management actions to aid in maintaining sustainable conditions throughout the Sutter Subbasin. Under SGMA, SMC can be defined as the following:

- **Minimum Threshold** – Quantitative guidance levels established at each representative monitoring site set just above conditions that could generate an undesirable result for an applicable sustainability indicator.
- **Measurable Objective** – Quantitative targets that represent the desired conditions at each representative monitoring site for an applicable sustainability indicator. The measurable objective must be reached within 20 years of GSP implementation for all applicable sustainability indicators for the basin or subbasin to be considered sustainable.

- **Interim Milestones** – Targets set in increments of five years over the 20-year implementation period of the GSP to reach the Subbasin's sustainability goal by 2042. These 'check-in' points are used to put the subbasin on a path towards achieving or maintaining sustainability.
- **Margin of Operational Flexibility or Operating Range** – The range of active management between the measurable objective and minimum threshold.

During WY 2022, available monitoring data relative to all sustainability indicators indicated the Sutter Subbasin was continuing to operate under sustainable conditions as defined by the SMC set forth in the GSP. As projects and management actions are implemented, though not required for sustainability, the Sutter Subbasin GSAs will continue to assess conditions relative to established SMC, definitions of undesirable results, and the Subbasin's sustainability goal.

ES-3. GROUNDWATER MONITORING AND CONDITIONS ASSESSMENT

The subsections below summarize groundwater elevation, groundwater storage, groundwater quality, land subsidence, and groundwater-surface water interaction trends in the Sutter Subbasin, as well as total water use during WY 2022. Seawater intrusion is not an applicable sustainability indicator for the Sutter Subbasin as it is located inland from the Pacific Ocean and is not adjacent to the Sacramento-San Joaquin Delta. WY 2022 was a critical (C) water year under the Sacramento Valley Water Year Hydrologic Index preceded by critical and dry water years in WY 2021 and WY 2020, respectively.

Groundwater Levels

Hydrographs for representative wells in the Sutter Subbasin generally show groundwater level declines during the irrigation season and seasonal recovery to pre-irrigation levels once irrigation has ceased. During WY 2022, similar patterns were observed with many wells operating within their respective operating range or above the measurable objective. Minimum thresholds exceedances were observed at 13 wells during WY 2022, where most exceedances were recorded between June and September. Most wells recovered to above the minimum thresholds by the end of WY 2022, or shortly following, by December 2022, except where no recent measurements are available to assess potential well recovery. It should be noted that several minimum threshold exceedances occurred during nearby pumping operations and recovered likely after irrigation pumping ceased in September and October 2022.

General groundwater flow patterns in the Sutter Subbasin are from north to south. During the WY 2022 seasonal high period (March and April 2022), groundwater elevations ranged from 7 to 67 feet above mean sea level (MSL) across all aquifer zones. During the WY 2022 seasonal low period (September and October 2022), groundwater elevations ranged from -9 to 65 feet MSL across all aquifer zones.

Groundwater Storage

Groundwater level SMC are used as proxy for the groundwater storage sustainability indicator, using the same representative monitoring network. Minimum thresholds for groundwater levels are designed to be protective of significant and unreasonable impacts to changes in groundwater storage. For WY 2022, groundwater storage was estimated using C2VSimFG-Sutter integrated flow model. Change in groundwater storage from October 1, 2021 to September 30, 2022 was estimated to decrease by approximately 45,000 AF.

Groundwater Quality

Groundwater quality monitoring at representative wells was scheduled to take place in September 2022 for total dissolved solids (TDS) and nitrate as nitrogen (N) and evaluated against numeric SMC. No wells in the representative monitoring network were sampled for TDS or nitrate as N due to inabilities to access wells and confusion regarding groundwater quality sampling responsibilities during this first year of monitoring. During WY 2023, all Sutter Subbasin GSAs will reevaluate their respective groundwater quality monitoring responsibilities and modify the representative monitoring network as needed to ensure groundwater quality samples for TDS and nitrate as N are collected in September 2023 and reported in the WY 2023 Annual Report.

Land Subsidence

The land subsidence sustainability indicator is monitored using 22 monuments in DWR's Sacramento Valley Subsidence Network. The Sacramento Valley Subsidence Network is monitored at 5-year intervals, with the last survey taking place in 2017. Since the development of the GSP, DWR has discontinued its Sacramento Valley Subsidence Monitoring Network. The 2027 GSP update will evaluate alternative methods using Interferometric Synthetic Aperture Imagery (InSAR) data and/or establishing a new representative monitoring network with benchmarks to evaluate conditions relative to established numeric SMC.

InSAR data will be evaluated on an annual basis as available through DWR's SGMA Data Viewer or other publicly available database. Between October 2021 and October 2022, between -0.1 and +0.1 feet of vertical displacement was observed within majority of the Sutter Subbasin (within the realm of measurement error). Sutter Subbasin GSAs will continue to monitor available land subsidence data and confirm no negative impacts of land subsidence are reported on critical infrastructure as a result of groundwater pumping.

Groundwater-Surface Water Interaction

The depletions of interconnected surface water sustainability indicator in the Sutter Subbasin uses groundwater levels as proxy for sustainable management criteria. The minimum thresholds for this sustainability indicator are established to be protective of significant and unreasonable impacts to identified interconnected surface waters, which include the Sacramento and Feather Rivers and Sutter Bypass.

The minimum thresholds for interconnected surface waters are established to be protective of significant and unreasonable impacts. Minimum threshold exceedances were observed at eight wells during WY 2022, primarily recorded between July and September, with recovery to above the minimum threshold by December 2022 at all wells.

Total Water Use

The primary water use sector in the Sutter Subbasin is agricultural, where other uses include urban, managed wetlands, and groundwater substitution transfers. During WY 2022, groundwater extraction was estimated to be approximately 179,700 AF for the Sutter Subbasin. Surface water supply during WY 2022 was estimated to be approximately 293,700 AF in the Sutter Subbasin. Total water use is the sum of the groundwater and surface water use. Total water use during WY 2022 was estimated to be approximately 496,100 AF in the Sutter Subbasin. Water use for the Subbasin as a whole was estimated as not all sources are presently metered.

Groundwater Substitution Transfers

Information contained in the Sutter Subbasin GSP regarding groundwater substitution transfers in the Subbasin has been updated as part of this annual report. During WY 2023, the Sutter Subbasin GSAs will work on developing a Subbasin-wide methodology for evaluating and approving groundwater substitution transfers and updates will be provided in subsequent annual reports.

ES-4. ANNUAL REPORT ELEMENTS

The following table presents the sections and figure/table numbers where requirements for the Annual Report elements are included, subject to Article 7, §356.2 of the GSP Emergency Regulations.

California Code of Regulations - GSP Regulation Sections	Annual Report Elements	Section(s) and figure/table numbers(s) where requirements for Annual Report elements are included
Article 7	**Annual Reports and Periodic Evaluations by Agency**	
§ 356.2	**Annual Reports**	
	Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:	
	(a) General information, including an executive summary and a location map depicting the basin covered by the report.	Executive Summary, Section 1, Figure 1-1
	(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:	--
	(1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:	--
	(A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.	Section 3.1, Figure 3-5 through Figure 3-12
	(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.	Section 3.1, Appendix 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.	Section 3.6.1, Figure 3-26, Table 3-1
	(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.	Section 3.6.2, Table 3-2

California Code of Regulations - GSP Regulation Sections	Annual Report Elements	Section(s) and figure/table numbers(s) where requirements for Annual Report elements are included
	(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.	Section 3.6.3, Table 3-3
	(5) Change in groundwater in storage shall include the following:	--
	(A) Change in groundwater in storage maps for each principal aquifer in the basin.	Section 3.2, Figure 3-14
	(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.	Section 3.2, Figure 3-13
	(c) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.	Section 2.3, Appendix A

1. INTRODUCTION

The Sutter Groundwater Subbasin (Sutter Subbasin or Subbasin) has been identified by the California Department of Water Resources (DWR) as a medium-priority groundwater basin (**Figure 1-1**). The Sutter Subbasin Groundwater Sustainability Plan (GSP or Plan) was developed and submitted to meet Sustainable Groundwater Management Act (SGMA) regulatory requirements by the January 31, 2022 deadline for medium priority basins. The Sutter Subbasin GSP was developed by the Sutter Subbasin Groundwater Sustainability Agencies (GSAs) and addresses SGMA regulatory requirements while reflecting local needs and preserving local control over water resources. The Sutter Subbasin GSP provides a path to achieve and document sustainable groundwater management within 20 years following Plan adoption and promotes the long-term sustainability of locally managed groundwater resources. The GSP was developed by the nine Sutter Subbasin GSAs, including:

- Butte Water District – Sutter
- City of Live Oak
- City of Yuba City
- County of Sutter
- Reclamation District No. 70
- Reclamation District No. 1500
- Reclamation District No. 1660
- Sutter Extension Water District
- Sutter Community Service District

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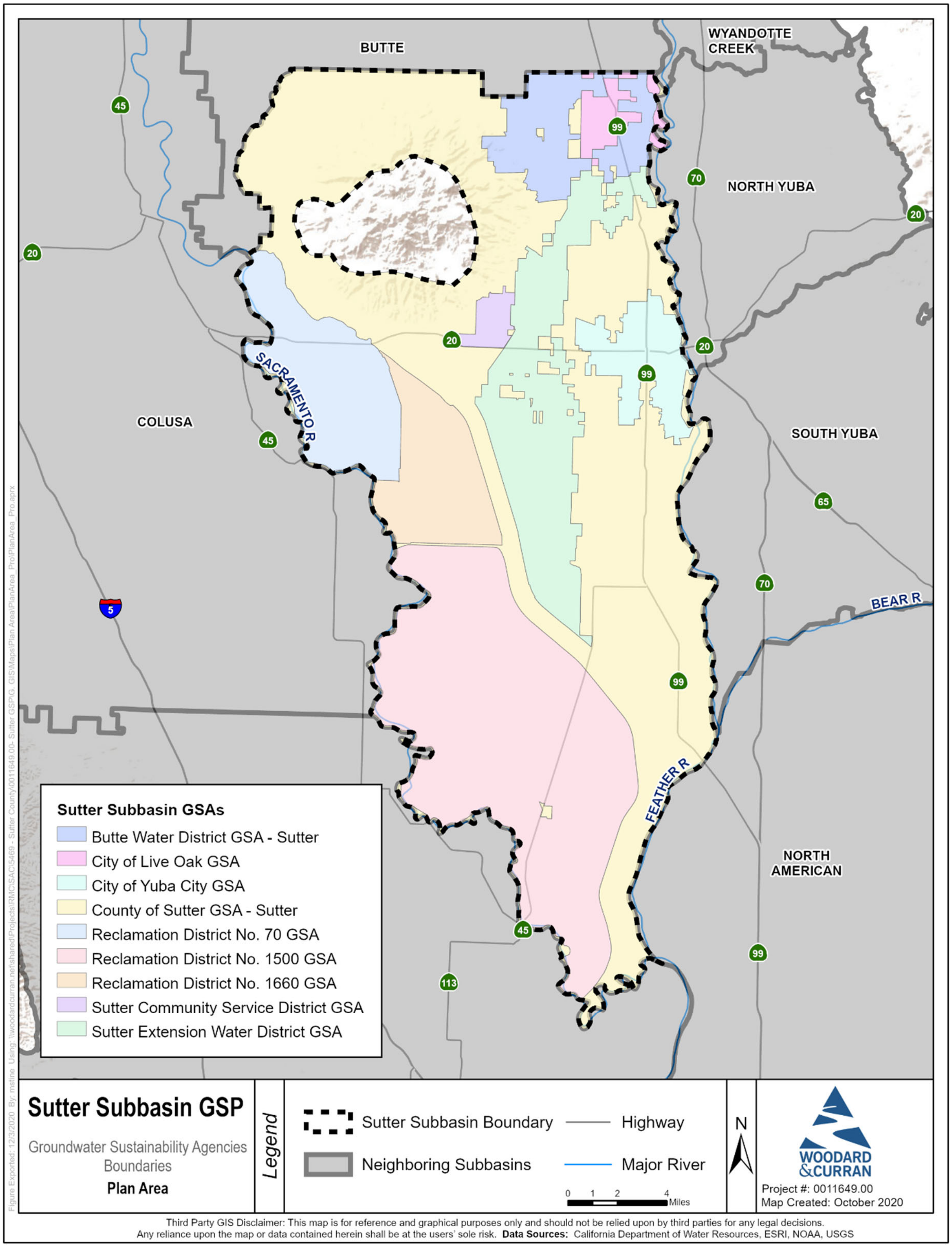

Figure 1-1: Sutter Subbasin Groundwater Sustainability Agencies

2. GROUNDWATER MANAGEMENT ACTIVITIES AND MILESTONES

This section summarizes the contents of the Sutter Subbasin GSP and documents GSP implementation progress during WY 2022 (the first year of GSP implementation), noting that the GSP was not fully adopted by all Sutter Subbasin GSAs until January 2022.

Implementation of the Sutter Subbasin GSP is underway, which includes this Annual Report as well as monitoring activities, assessment of sustainable management criteria (SMC), and implementation of projects and management actions as needed (not required to maintain sustainability).

2.1 Groundwater Sustainability Plan Development

The Sutter Subbasin GSP was developed by the nine Subbasin GSAs. Each GSA has its own individual organization and management structure as well as legal authority under which it operates. The Sutter Subbasin Groundwater Management Coordination Committee (SSGMCC) contains one representative from each GSA, and was created to cooperatively carry out the purposes of SGMA by coordinating the development, adoption, and implementation of the GSP. Activities of the SSGMCC include providing technical direction for GSP development and implementation, identifying projects and management actions, reporting to the respective GSA boards, and coordinating approval and adoption of the GSP by the respective GSA boards.

Public workshops were held approximately once per quarter during GSP development (five in total) to update interested residents and stakeholders about the GSP preparation process and included presentations on data, information, and analyses, as well as activities to solicit input and feedback from participants. Beyond these meetings, information regarding Plan development, noticing, and public comments periods was distributed via the project website (http://suttersubbasin.org/), e-mail notices, social media postings, press releases, mailings, and utility bill notifications. Supporting materials (online and hard copy) were prepared in English, Spanish, and Punjabi.

Outreach efforts will continue throughout the implementation of the GSP and plan to include SSGMCC meetings, regular updates at GSA board or city council meetings, maintenance of the project website, and local outreach at public events.

On May 29, 2020, the GSAs filed a notice of intent to prepare a GSP with DWR. A public draft of the GSP was posted for public comment on the project website on October 1, 2021, and a notice of intent to adopt a GSP was sent by Sutter County to all cities within the Subbasin and Sutter County on October 5, 2021. The final Sutter Subbasin GSP, submitted to DWR on January 28, 2022, was adopted by the GSAs between November 2021 and January 2022. As of the writing of this Annual Report, the Sutter Subbasin GSP is still currently under review by DWR.

2.2 Groundwater Sustainability Plan Contents Summary

The GSP was prepared in compliance with SGMA Regulations and GSP Emergency Regulations, Article 5 *Plan Contents*. The subsections below summarize the contents of the GSP relevant to assessing conditions in the Sutter Subbasin for the purposes of evaluating GSP implementation progress in this Annual Report.

2.2.1 Plan Area

The Sutter Groundwater Subbasin (DWR Basin 5-021.62) covers approximately 445 square miles of the Sacramento Valley floor and surrounding the foothills of the Sutter Buttes (**Figure 1-1**). The Subbasin is part of the larger Sacramento Valley Groundwater Basin, located within the Sacramento River Hydrologic Region. Major features within the Sutter Subbasin include portions of the Sutter Buttes, the Feather and Sacramento Rivers, Sutter Bypass, the cities of Live Oak and Yuba City, and Sutter National Wildlife Refuge.

The Plan area includes Sutter County and the cities of Live Oak and Yuba City. Land use within the Sutter Subbasin is predominantly agricultural, with rice as the primary crop grown along with walnuts, stone fruits, tomatoes, and sunflowers. Approximately 60 percent of agricultural users utilize only surface water for irrigation purposes, while 20 percent utilize only groundwater and 20 percent irrigate with a mix of surface water and groundwater (Wood Rodgers, 2012). The predominant source of water for permanent crops is groundwater. Managed wetlands use a mix of surface water and groundwater. Smaller communities and individual domestic well owners rely exclusively on groundwater, while the City of Yuba City provides mostly surface water and a smaller proportion of groundwater.

2.2.2 Hydrogeologic Conceptual Model

Lying within the Sacramento Valley Groundwater Basin, the regional geology of the Sutter Subbasin consists of freshwater sediments that are underlain by marine sediments and igneous or metamorphic rocks. Freshwater sediments consist of the volcanoclastic rocks of the Sutter Buttes and sediments weathered from the Sierra Nevada to the east. The Willows Fault is the primary active fault structure within Sutter County and lies to the southwest and west of the Sutter Buttes. The Sutter Buttes, which form an elliptical lateral boundary, is the only prominent topographic feature. Located in the northern part of the Subbasin, the Sutter Buttes abruptly rise 2,000 feet above the surrounding valley floor. The topography of the Sutter Subbasin, aside from the Sutter Buttes, is primarily comprised of gentle flatlands with elevations ranging from 80 feet above mean sea level (MSL) in the northeast to 20 feet above MSL in the south. Soils consist mainly of poorly drained clay and clay loam soils, but near the rivers, well drained loam to sandy loam may be present.

The Sutter Subbasin groundwater system is composed of a single principal aquifer comprised of various formations that create zones with varying hydrogeologic properties at different locations across the Subbasin. As such, the GSP recognizes one principal aquifer comprised of three Aquifer Zones (AZ): AZ-1 (surface to 150 feet below ground surface [ft bgs]), AZ-2 (150 to 400 ft bgs), and AZ-3 (greater than 400 ft bgs). AZ-1 has been further subdivided to include the Shallow AZ (surface to 50 ft bgs) to assess and monitor for impacts related to interconnected surface water and groundwater dependent ecosystems (GDEs), with AZ-1 then including depths from 50 to 150 ft bgs.

2.2.3 Existing Groundwater Conditions

Groundwater level trends in the Sutter Subbasin are largely flat over time, indicating sustainable conditions, as aquifer rebound from seasonal pumping is observed during all water year types. Shallow groundwater levels are relatively stable over time and indicate that most groundwater production is occurring from deeper aquifer zones. More groundwater appears to be produced primarily from AZ-2 and AZ-3, as indicated by large fluctuations in groundwater elevations where responses to groundwater pumping are observed with rebound following the irrigation season as the aquifer recharges and returns to pre-pumping levels on a seasonal basis.

As with groundwater levels, groundwater storage volumes in the Sutter Subbasin have been generally stable over at least the past 30 years (the length of available record). The volume of groundwater in storage increases as groundwater levels rise and decreases as groundwater levels fall; thus, stable groundwater level conditions also result in stable groundwater storage conditions. Total groundwater storage in the Sutter Subbasin was estimated to be around 49 million acre-feet (AF) based on the C2VSimFG-Sutter integrated flow model.

Due to its location inland from the Pacific Ocean and set back from the Sacramento-San Joaquin Delta, seawater intrusion and related groundwater conditions are not applicable to the Sutter Subbasin.

Groundwater quality in the Sutter Subbasin varies by location. Several constituents have been detected at levels that exceed the maximum contaminant level (MCL) for drinking water, including arsenic, boron, total dissolved solids (TDS), and nitrate. Median arsenic concentrations have decreased since 1952 and most recently are below the Primary MCL of 0.01 mg/L. Median boron concentrations peaked between 2009 and 2012 but remained below the agricultural water quality objective of 0.7 mg/L, and maximum concentrations of boron have decreased over time. Maximum TDS concentrations have substantially decreased since 1952, peaking in 2006, with the most recently observed maximum concentration occurring below the Upper Secondary MCL of 1,500 mg/L. Median nitrate concentrations have increased since 1952 and have been detected above the Primary MCL of 10 mg/L for nitrate as N as of 2012. The most recently observed maximum concentration exceeds the Primary MCL for nitrate by over

10 times. All of the referenced constituents are naturally occurring in the Subbasin, except nitrate.

Land subsidence within the Sutter Subbasin has been negligible to non-existent in recent years, and there have been no reported negative impacts of land subsidence on critical infrastructure. While elastic land subsidence is observed as a result of seasonal fluctuations in groundwater levels and associated aquifer pressure, evidence of inelastic land subsidence has not been recorded within the Subbasin.

Interconnected surface waters (surface waters that are hydraulically connected by a saturated zone to the groundwater system) are categorized as “losing” when the groundwater elevations adjacent to a river or stream decline, causing the river or stream to “lose” water to the underlying aquifer, or “gaining” when hydraulic gradients flow from the groundwater aquifer to the river or stream. The Sutter Bypass, Feather River, and Sacramento River were all found to have fluctuating gaining and losing conditions throughout the Subbasin.

2.2.4 Water Budgets

Water budgets are developed to provide a quantitative account of water (including surface water and groundwater) entering and leaving the Sutter Subbasin under historical, current, projected, and projected with climate change conditions. The water budgets were estimated using C2VSimFG-Sutter, a numerical groundwater and surface water model developed specifically for the Sutter Subbasin. The primary components of the groundwater budget include:

- Inflows:
  - Deep percolation from rainfall, irrigation-applied water, and applied water for refuge use
  - Stream seepage
  - Land subsidence inflow
  - Conveyance seepage
  - Subsurface inflow from adjacent subbasins
- Outflows:
  - Groundwater outflow to streams
  - Groundwater pumping
  - Subsurface outflow to adjacent subbasins
- Change in groundwater storage

The average annual change in groundwater storage is stable under all water budget scenarios, with a net 0 AF change in storage under projected conditions (both with and without climate change).

The sustainable yield for the Sutter Subbasin has been estimated to be 182,000 acre-feet per year (AFY). The estimated sustainable yield is higher than simulated average annual groundwater pumping in all four water budget scenarios – historical, current conditions, projected conditions, and projected conditions with climate change. Therefore, it can be reasonably stated that the Subbasin is currently operating under sustainable conditions and is expected to continue to be sustainable if changes estimated in the projected conditions scenario hold true into the future. Additionally, sustainable yield is a long-term value and groundwater pumping may exceed the estimated sustainable yield value during certain years (e.g., during extended drought conditions), balanced by other years with reduced pumping during wetter periods so that the long-term average remains at or below the sustainable yield.

2.2.5 Sustainable Management Criteria

The sustainability goal for the Sutter Subbasin is as follows:

> *The Sutter Subbasin will maintain locally-managed groundwater resources for existing and future beneficial uses and users that are economically viable and sustainable by managing groundwater use within the sustainable yield, resulting in the avoidance of undesirable results. This goal will be achieved through implementation of proposed projects and management actions and monitoring activities aiding in reaching or maintaining established interim milestones and measurable objectives culminating in the absence of undesirable results by 2042. Water managers in the Sutter Subbasin will work together and collaboratively with stakeholders and neighboring subbasins through GSP implementation and beyond to achieve this goal.*

The method prescribed by SGMA to measure undesirable results and achieve the sustainability goal involves setting minimum thresholds and measurable objectives for a series of representative monitoring sites. The sustainable management criteria are summarized in **Table 2-1**.

2.2.6 Monitoring Networks

The Sutter Subbasin GSP includes monitoring networks for the five applicable sustainability indicators. As previously noted, seawater intrusion is not applicable to the Sutter Subbasin. The objective of these monitoring networks is to monitor conditions across the Subbasin and detect trends toward undesirable results such that adaptive management actions and projects can be implemented to prevent the onset of undesirable results. Specifically, the monitoring networks were developed to:

- Monitoring changes in groundwater conditions relative to measurable objectives and minimum thresholds
- Monitor impacts to the beneficial uses and users of groundwater resulting from groundwater use

- Demonstrate progress toward achieving measurable objectives described in the GSP

The following monitoring networks were developed for the Sutter Subbasin GSP: groundwater levels by aquifer zone (also used as proxy for reduction in groundwater storage sustainability indicator), groundwater quality by aquifer zone, land subsidence, and interconnected surface water. All monitoring networks described in the GSP are representative monitoring networks and are used to determine compliance with the quantitative minimum thresholds and measurable objectives established at each representative monitoring site.

The monitoring networks were designed by evaluating existing monitoring programs, such as the California Statewide Groundwater Elevation Monitoring Program (CASGEM), monitoring conducted by DWR, or local agency monitoring programs. The monitoring networks largely consist of monitoring sites that have historical monitoring data and no significant barriers to future monitoring events. Data gaps identified in the Sutter Subbasin monitoring networks include unknown construction details for several groundwater quality monitoring wells and limited shallow monitoring wells currently available along identified interconnected surface waters. Progress will be made to fill these identified data gaps prior to the first five-year evaluation and assessment, where updated monitoring networks will be included in future GSP updates.

Monitoring frequencies vary by sustainability indicator. For groundwater levels and interconnected surface water, measurements will be taken during seasonal high (March through April) and seasonal low (September through October) conditions. Additional groundwater level measurements may be taken in areas where rice growing activities substantially alter the timing of seasonal highs and lows in shallow aquifer zones or in areas where wildlife refuges are managed. Groundwater quality for identified constituents of concern (TDS and nitrate as N) will be analyzed annually, with samples collected in September. Measurements for interconnected surface waters will be collected concurrently with those for groundwater levels. Land subsidence will be monitored by DWR using the Sacramento Valley Global Positioning System (GPS) Subsidence Monitoring Network every five years. Since development of the GSP, DWR has discontinued its Sacramento Valley Subsidence Monitoring Network, where alternative methods using InSAR data to evaluate conditions relative to established SMC will be included in the 2027 GSP update. Publicly available Interferometric Synthetic Aperture Radar (InSAR) and stream gage data will be collected and evaluated on an annual basis.

2.2.7 Projects and Management Actions

As the Sutter Subbasin is currently sustainable and projected to remain sustainable, there are no projects or management actions required to achieve sustainability. However, projects and management actions can enhance understanding of the groundwater system and improve the ability to adaptively manage the Subbasin so that undesirable results can be prevented. Most projects and management actions contained in the GSP will be implemented as-needed and as funding is available.

Projects and management actions listed in the Sutter Subbasin GSP include select on-going and planned projects and management actions, such as:

- System modernization by water purveyors
- Boundary flow and primary spill measurement and drainage recovery
- Multi-benefit recharge
- Grower education
- Installation of shallow monitoring wells

As-needed projects and management actions will be implemented, as deemed necessary, to support sustainability, allow for adaptation to changing conditions, and achieve other water management objectives, such as:

- Direct and in-lieu groundwater recharge
- Wetland habitat improvement, such as through securing firm water supplies or fish screen projects
- Surface water supply augmentation through backwash recovery
- Updated electrical Supervisory Control and Data Acquisition (SCADA) and telemetry
- Water quality enhancement through replacement of sewer mains
- Projects to address data gaps, such as:
    - Investigations of interactions between rivers and changes in groundwater levels
    - Investigation of source of elevated salinity in the shallow aquifer zone
    - Study of aquifer properties
    - Data collection to improve the hydrogeologic conceptual model (HCM)
    - Comprehensive groundwater quality investigation
    - Investigation and characterization of the Sutter Buttes, including salinity monitoring, airborne electromagnetic (AEM) survey, and an inter-basin working group focused on water quality
    - Groundwater dependent ecosystem mapping confirmation
    - Well census
    - Land subsidence monitoring evaluation

A living list of projects and management actions will be maintained and updated in the Subbasin data management system (DMS), reflecting the current status of each and continually adjusting as needed to meet changing basin conditions. The list of projects and management actions in the DMS is considered to be ‘live’ and constitutes the required list for the Sutter Subbasin GSP per the GSP Emergency Regulations Subarticle 5. *Projects and Management Actions*.

2.2.8 Implementation

Implementing the Sutter Subbasin GSP will require numerous management activities by the Sutter Subbasin GSAs, including:

- GSA administration and activities associated with the SSGMCC
- Conducting outreach and stakeholder engagement
- GSP-related monitoring activities at specified timing and frequency and analysis of monitoring data relative to established SMC
- Updating the Subbasin DMS
- C2VSimFG-Sutter model refinements
- Implementing adaptive management strategies as needed
- Implementing projects and management actions, as needed and as funding is available
- Annual Report development and submittal to DWR by April 1st each year
- Evaluating and updating the GSP at least every five years

Implementation of the Sutter Subbasin GSP will require funding from the GSAs as well as external sources. Outside grants will be sought to assist with reducing the cost of implementation to participating agencies, residents, and landowners in the Subbasin. Costs associated with the implementation of identified projects and management actions will vary depending on the project type and stage of the project (e.g., planning or construction). The Sutter Subbasin GSAs will individually fund implementation of projects in their respective areas unless otherwise agreed upon by the GSAs' governing bodies.

Table 2-1: Summary of Sustainable Management Criteria

Sustainability Indicator	Undesirable Results	Identification of Undesirable Results	Minimum Threshold	Measurable Objective
Chronic lowering of groundwater levels	Groundwater levels dropping to a level at which domestic or irrigation wells go dry or lose functional pumping capacity, resulting in significantly higher pumping costs and/or the significant and unreasonable effort to maintain or deepen production wells.	25% of representative monitoring locations across all aquifer zones drop below the minimum threshold criteria concurrently over two consecutive seasonal high water level measurements.	The deepest of: 1. The historic low from available record at each representative monitoring site; or 2. 90% of the average groundwater elevation from the projected water budget (baseline condition over 60-year period using C2VSimFG-Sutter) at each representative monitoring site with a 50% artificial increase in evapotranspiration; or 3. The average operating range using the above criteria for the following aquifer zones: - Shallow AZ and AZ-1 = 8.0 feet - AZ-2 and AZ-3 = 16.5 feet.	Average of the available historical record at each representative monitoring site.
Reduction of groundwater storage	Same as chronic lowering of groundwater levels. Groundwater levels are used as proxy.	Same as chronic lowering of groundwater levels. Groundwater levels are used as proxy.	Same as chronic lowering of groundwater levels. Groundwater levels are used as proxy.	Same as chronic lowering of groundwater levels. Groundwater levels are used as proxy.
Seawater intrusion	Undesirable results related to seawater intrusion are not applicable to the Sutter Subbasin.	Undesirable results related to seawater intrusion are not applicable to the Sutter Subbasin.	Minimum thresholds are not developed because undesirable results related to seawater intrusion are not applicable to the Sutter Subbasin.	Measurable objectives are not developed because undesirable results related to seawater intrusion are not applicable to the Sutter Subbasin.

Sustainability Indicator	Undesirable Results	Identification of Undesirable Results	Minimum Threshold	Measurable Objective
Degraded water quality	A result stemming from a causal nexus between groundwater-related activities, such as groundwater extraction or recharge, and a degradation in groundwater quality that causes a significant and unreasonable reduction in long-term viability of domestic, agricultural, municipal, or environmental uses over the planning and implementation horizon of this GSP.	50% of representative monitoring wells across all aquifer zones exceed the minimum threshold for two consecutive measurements at each location during non-drought years and where these minimum threshold exceedances can be tied to a causal nexus between SGMA-related activities and water quality.	The higher of: 1. The Upper Secondary Maximum Contaminant Level (SMCL) for TDS of 1,000 mg/L and Primary MCL for nitrate as N of 10 mg/L; or 2. Current water quality conditions for TDS and nitrate as N based on available data from 2000 to the time of GSP development at each representative monitoring well or nearby well in the same aquifer zone.	The higher of: 1. Current water quality conditions for TDS and nitrate as N based on available data from 2000 to the time of GSP development at each representative monitoring well or nearby well in the same aquifer zone. 2. The Recommended SMCL for TDS of 500 mg/L and 70% of the Primary MCL for nitrate as N of 7 mg/L.
Land subsidence	A result due to groundwater extraction that causes a significant reduction in the viability of the use of infrastructure for water distribution and flood control.	At least 25% of representative subsidence monitoring sites exceed the minimum threshold for subsidence over the 5-year monitoring period.	0.5 feet of subsidence over a 5-year period, representing the point at which water conveyance and levee infrastructure become sensitive to land subsidence ant twice the operational error of land survey measurements.	0.25 feet of subsidence over a 5-year period, representing the range of error for land survey measurements.
Depletions of interconnected surface water	A result that causes significant and unreasonable adverse effects on beneficial uses and users of interconnected surface water within the Sutter Subbasin over the GSP planning and implementation horizon.	25% of representative monitoring locations across all aquifer zones drop below the minimum threshold concurrently over two consecutive seasonal high water level measurements.	Same as chronic lowering of groundwater levels. Groundwater levels used as proxy.	Same as chronic lowering of groundwater levels. Groundwater levels used as proxy.

2.3 GSP Implementation Progress

The Sutter Subbasin GSP was adopted by the Subbasin GSAs between November 2021 and January 2022 and submitted to DWR on January 28, 2022. Therefore, implementation of the GSP did not begin until part way through WY 2022, as the GSP was still in development.

Measurable objectives, interim milestones, and minimum thresholds for applicable sustainability indicators were identified to aid in maintaining sustainable conditions throughout the Sutter Subbasin. Given that the Sutter Subbasin is currently considered sustainable, projects and management actions are not considered necessary to achieve the measurable objectives. However, projects and management actions were included and designed to allow for adaptive management of the groundwater basin, to maintain sustainable conditions, and to improve overall groundwater conditions. Section 3 *Groundwater Monitoring and Conditions Assessment,* of this annual report includes comparison of conditions monitored for all applicable sustainability indicators against SMC summarized in **Table 2-1**. Projects and management actions status updates for WY 2022 are included in **Appendix A**.

In December 2022, the Sutter Subbasin applied for approximately $8.5 million in grant funding under DWR's Sustainable Groundwater Management (SGM) Grant Program SGMA Implementation – Round 2 for development of annual reports and model updates, filling of data gaps through installation of pressure transducers on representative groundwater level and interconnected surface water wells and geophysical surveys of the Sutter Buttes, preparation of a financing plan to develop a long-term funding stream for GSP implementation, and a dual source irrigation system pilot program and lateral heading and turnout measurement modernization project within the Sutter Subbasin portion of Butte Water District. Draft awards are anticipated to be announced by DWR in June 2023.

Inter-basin coordination meetings were held during WY 2022 with the Yolo Subbasin on October 13, 2021; North Yuba and South Yuba Subbasins on November 1, 2021; and Butte Subbasin on January 10, 2022 as part of GSP development to discuss boundary flow conditions, monitoring along shared boundaries, interconnected surface water designations, sustainable management criteria, projected land use, and sustainable yield estimates. Additionally, all subbasins in the Sacramento Valley Groundwater Basin met quarterly in WY 2022 to coordinate data sharing and implementation. These meetings are facilitated by the Northern California Water Association (NCWA). The Sutter Subbasin will actively seek opportunities to coordinate with its neighboring subbasins throughout GSP implementation to ensure sustainable conditions are achieved and maintained throughout the region. Northern Sacramento Valley Integrated Regional Water Management Board meetings and Technical Advisory Committee meetings during WY 2022 also included SGMA-related agenda items such as groundwater conditions, SGMA implementation updates from Northern Sacramento

Valley representatives, and funding opportunities. All GSAs in the Sutter Subbasin continued during WY 2022 to provide SGMA-related updates during monthly Board and city council meetings and to provide access to information related to SGMA and the GSP on their respective websites (also linking to the Subbasin website at www.suttersubbasin.org), and answering questions from interested stakeholders/growers.

Governor Gavin Newsom's Executive Order (EO) N-7-22 issued on March 28, 2022 (as revised in EO N-3-23 issued on February 13, 2023) requires approval of permits for new groundwater wells or alterations of existing wells in a high- or medium-priority groundwater basin to include written verification from the overlying GSA that the well and its use would not be inconsistent with the adopted GSP and decrease the likelihood of achieving the sustainability goal of the adopted GSP. To date, several of the Subbasin GSAs developed their own approval processes; however, in WY 2023, the GSAs will work together on developing a Subbasin-wide approval process pertaining to Executive Orders N-7-22 and N-3-23. Similarly, the Sutter Subbasin GSAs are also working on developing a Subbasin-wide methodology for evaluating and approving groundwater substitution transfers in WY 2023. Refer to Section 4 *Groundwater Substitution Transfers* of this report for more information.

3. GROUNDWATER MONITORING AND CONDITIONS ASSESSMENT

This section discusses groundwater elevation, groundwater storage, groundwater quality, land subsidence, and groundwater-surface water interaction trends in the Sutter Subbasin, as well as total water use during WY 2022. Seawater intrusion is not an applicable sustainability indicator for the Sutter Subbasin as it is located inland from the Pacific Ocean and is not adjacent to the Sacramento-San Joaquin Delta.

3.1 Groundwater Levels

Figure 3-1 through **Figure 3-4** show the location of representative monitoring wells in the Sutter Subbasin GSP by aquifer zone for the chronic lowering of groundwater levels sustainability indicator. As previously described in **Section 2.2.2**, AZ-1 was further divided to create the Shallow AZ (ground surface to 50 feet bgs) in order to better monitor for interconnected surface water conditions and impacts to GDEs. Hydrographs for representative monitoring wells showing available historical groundwater level elevations through WY 2022 are included in **Appendix B**. Hydrographs showing established minimum thresholds and measurable objectives are also presented in Section 7.2 *Monitoring* of the GSP.

Hydrographs for representative wells in the Sutter Subbasin generally show annual groundwater level declines during the irrigation season and seasonal recovery to pre-irrigation levels once irrigation has ceased, with little to no variation by water year type (**Appendix B**). During WY 2022, similar patterns are observed with many wells operating within their respective operating range or above the measurable objective. Minimum threshold exceedances were observed at 13 wells during WY 2022: Local IDs BWD MW-1A, Feather River MW-1B, MFWC Prop 50, SEWD MW-1A, SEWD MW-2A, SEWD MW-2B, SEWD MW-2C, Sutter County MW-1C, Sutter County MW-3B, Sutter County MW-3C, Sutter County MW-3D, Sutter County MW-3E, and Sutter County MW-6A. Most minimum threshold exceedances were recorded between June and September, coinciding with the irrigation season, with recovery to above the minimum threshold by the end of WY 2022 for all wells except Local ID MFWC Prop 50 where no recent measurements are available to assess potential well recovery. Five wells (Local IDs SEWD MW-2B, SEWD MW-2C, Sutter County MW-3D, Sutter County MW-3E, and Sutter County MW-6A) recorded groundwater elevations below their respective minimum thresholds late in WY 2022 but recovered to above their respective minimum thresholds by December 2022. It should be noted that minimum threshold exceedances at Local IDs BWD MW-1A, SEWD MW-1A, SEWD MW-2A, SEWD MW-2B, and SEWD MW-2C occurred during nearby pumping operations and recovered likely after irrigation pumping ceased in September and October 2022. Recent downward trends are observed in the following wells and will be monitored to ensure minimum threshold exceedances are not observed: Local IDs (or State Well Numbers) Sutter County MW-6A, SEWD MW-3A, Feather River MW-1A, Sutter County MW-3A, 16N03E04E001M, BWD MW-1C, Sutter County MW-6B, Sutter County MW-6C, SEWD MW-3B, SEWD MW-2A, Sutter County MW-3B, Sutter County MW-3C, Sutter County MW-2D, Sutter County MW-4C, Sutter County MW-4D, SEWD MW-3C, Feather River MW-1C, Feather River MW-1D, Sutter County MW-3D, and Sutter County MW-3E.

Undesirable results for the chronic lowering of groundwater levels sustainability indicator occur when 25% of representative monitoring locations across all aquifer zones drop below the minimum threshold criteria concurrently over two consecutive seasonal high water level measurements. No minimum threshold exceedances were observed during the seasonal high monitoring period (March through April) in either WY 2021 or WY 2022. Therefore, an undesirable result for the chronic lowering of groundwater levels sustainability indicator was not observed in WY 2022.

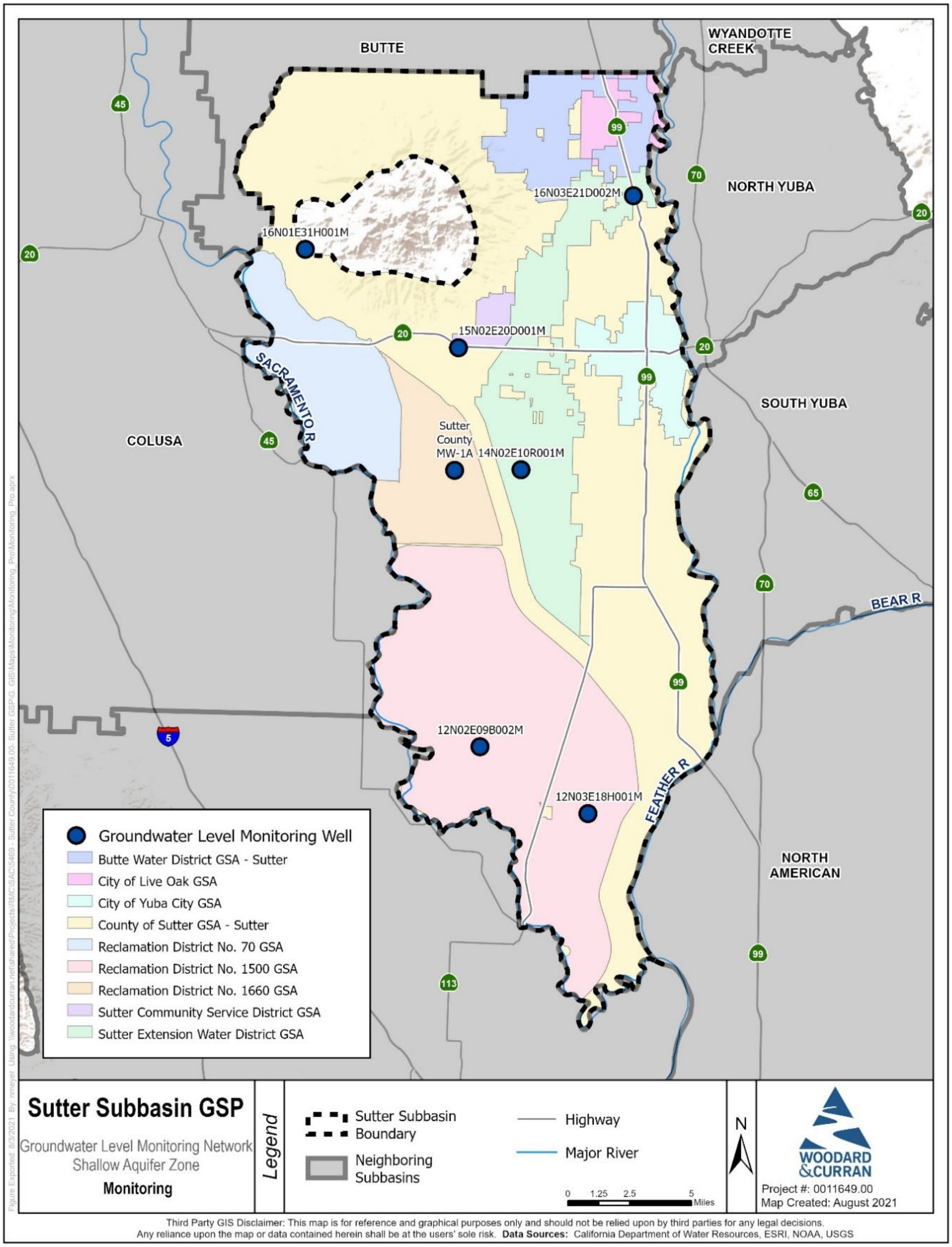

Figure 3-1: Groundwater Level Monitoring Network Wells, Shallow AZ

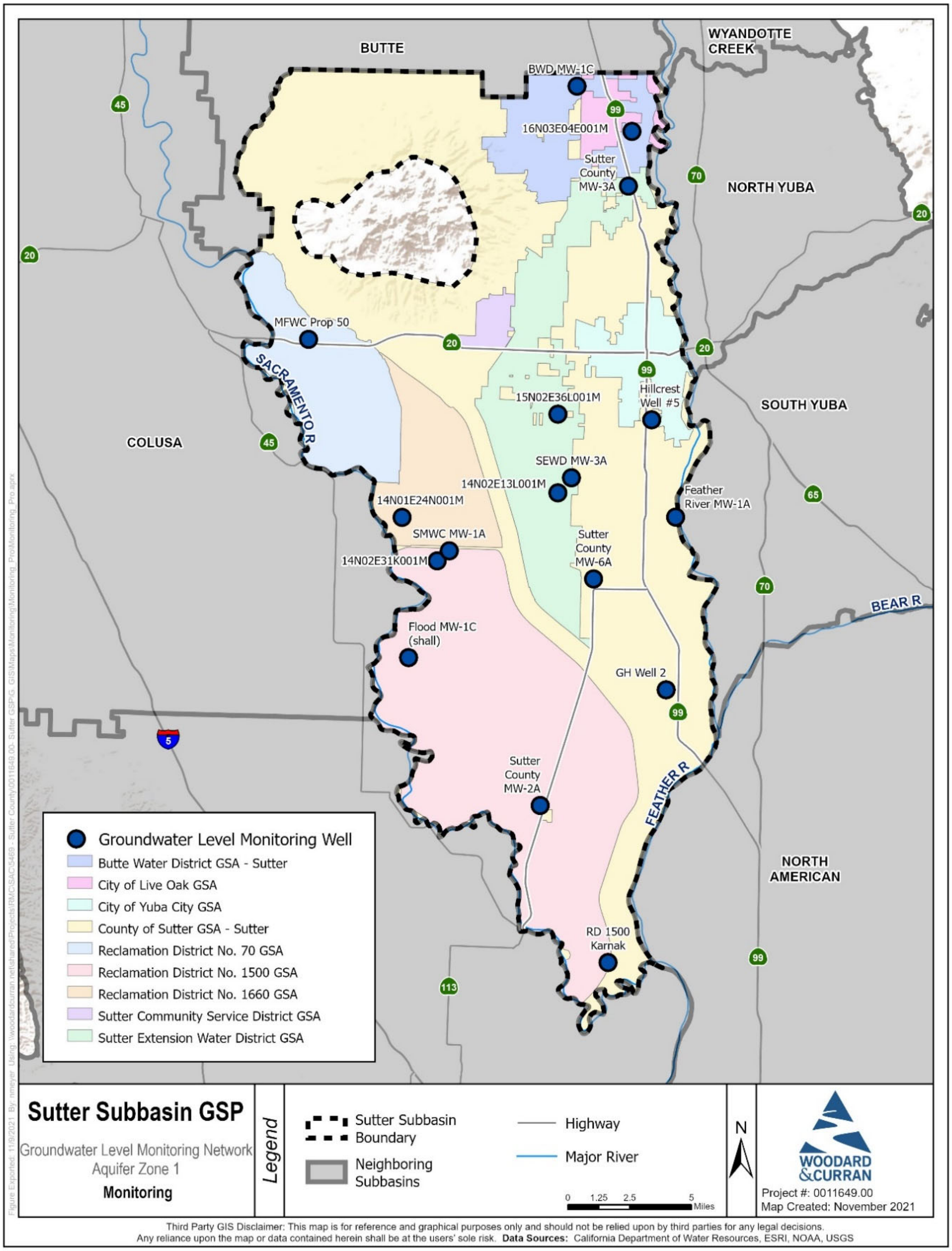

Figure 3-2: Groundwater Level Monitoring Network Wells, AZ-1

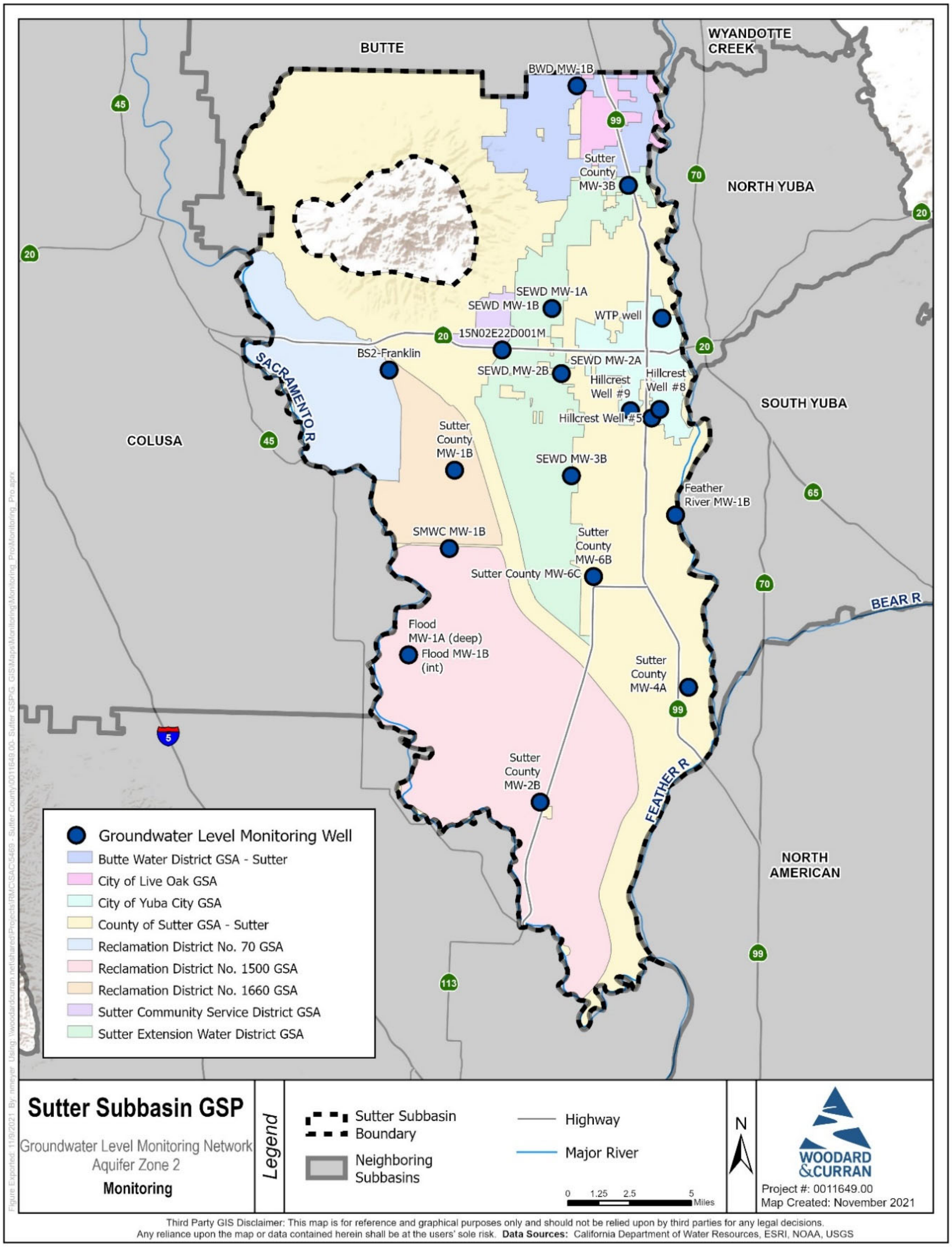

Figure 3-3: Groundwater Level Monitoring Network Wells, AZ-2

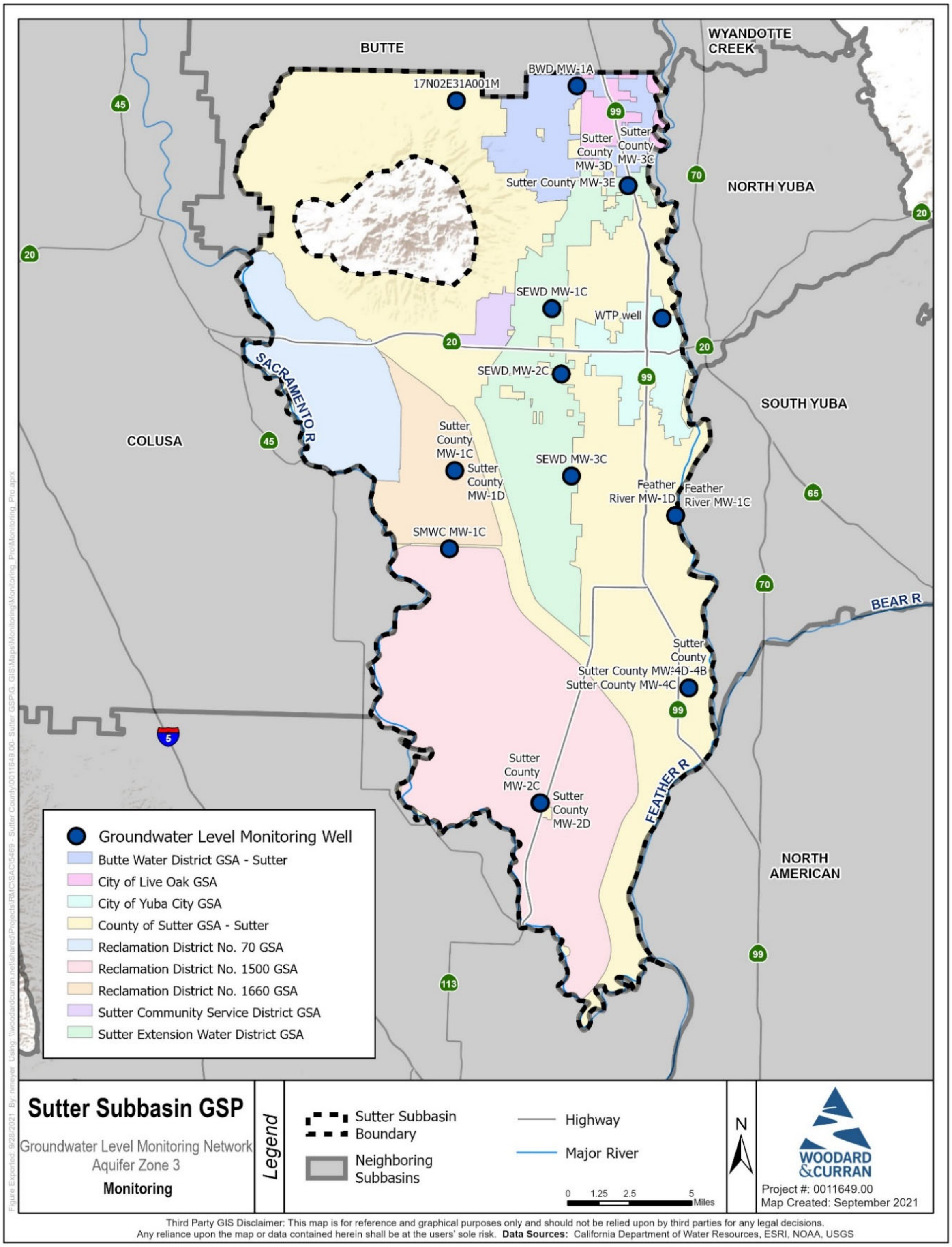

Figure 3-4: Groundwater Level Monitoring Network Wells, AZ-3

Figure 3-5 through **Figure 3-8** present contour maps of groundwater levels for seasonal high conditions (March and April 2022) for each aquifer zone during WY 2022. Data from representative monitoring wells were supplemented with publicly available data sources to develop the contour maps. Insufficient data are available for the Shallow AZ for March and April 2022, therefore **Figure 3-5** only shows wells with available groundwater elevation measurements during this period. Only five Shallow AZ wells with March and April 2022 data are available, primarily in the southern portion of the Subbasin, with elevations ranging from approximately 18 to 30 feet above mean sea level (MSL). Based on available data from March and April 2022, groundwater elevations ranged from approximately 8 to 67 feet above MSL in AZ-1 (**Figure 3-6**), from approximately 2 to 64 feet above MSL in AZ-2 (**Figure 3-7**), and from approximately 7 to 60 feet above MSL in AZ-3 (**Figure 3-8**). Groundwater flow is in the general north to south direction in AZ-1, AZ-2, and AZ-3.

Figure 3-9 through **Figure 3-12** present contour maps of groundwater levels for seasonal low conditions (September and October 2022) for each aquifer zone during WY 2022. Data from representative monitoring wells were supplemented with publicly available data sources to develop the contour maps. Insufficient data are available for the Shallow AZ for September and October 2022, therefore **Figure 3-9** shows only wells with available groundwater elevation measurements during this period. Only three Shallow AZ wells with September and October 2022 data are available near the Feather River along the Sutter Bypass, with groundwater elevations ranging from 20 to 26 feet above MSL. Based on available data from September and October 2022, groundwater elevations ranged from approximately -2 to 65 feet above MSL in AZ-1 (**Figure 3-10**), from approximately -9 to 65 feet above MSL in AZ-2 (**Figure 3-11**), and from approximately 9 to 62 feet above MSL in AZ-3 (**Figure 3-12**). Groundwater flow is in the general north to south direction in AZ-1, AZ-2, and AZ-3.

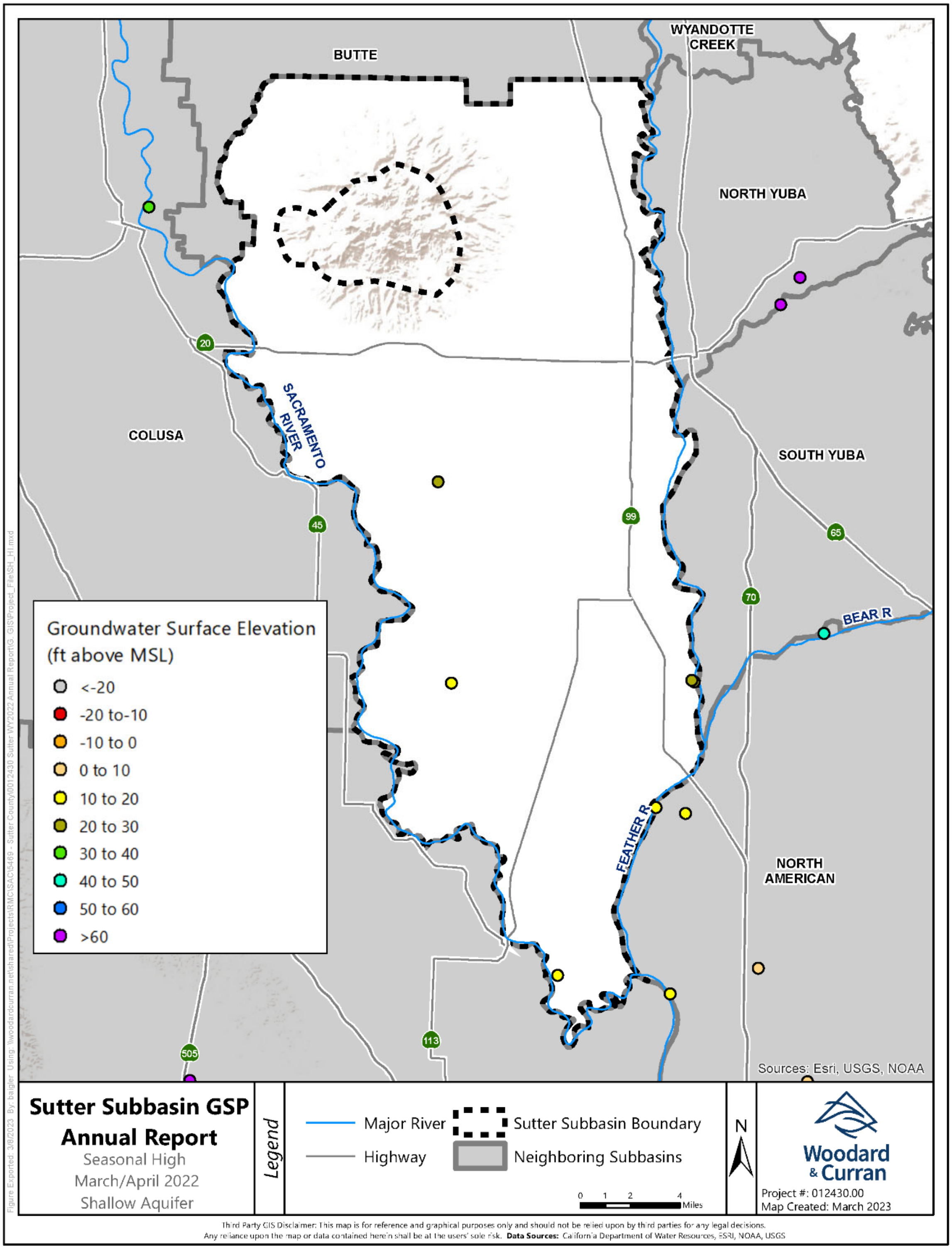

Figure 3-5: Seasonal High Groundwater Levels in Shallow AZ, March and April 2022

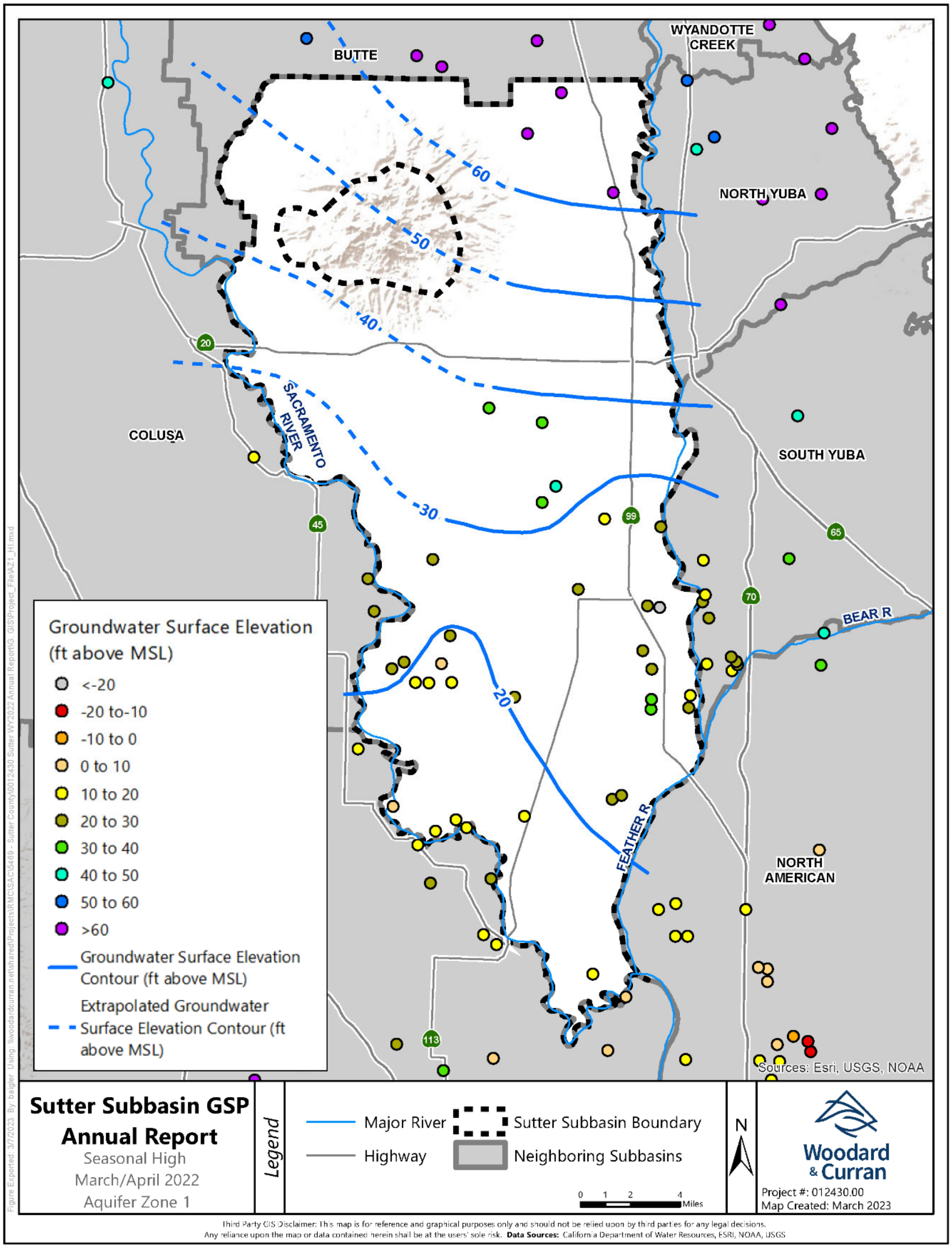

Figure 3-6: Seasonal High Groundwater Levels in AZ-1, March and April 2022

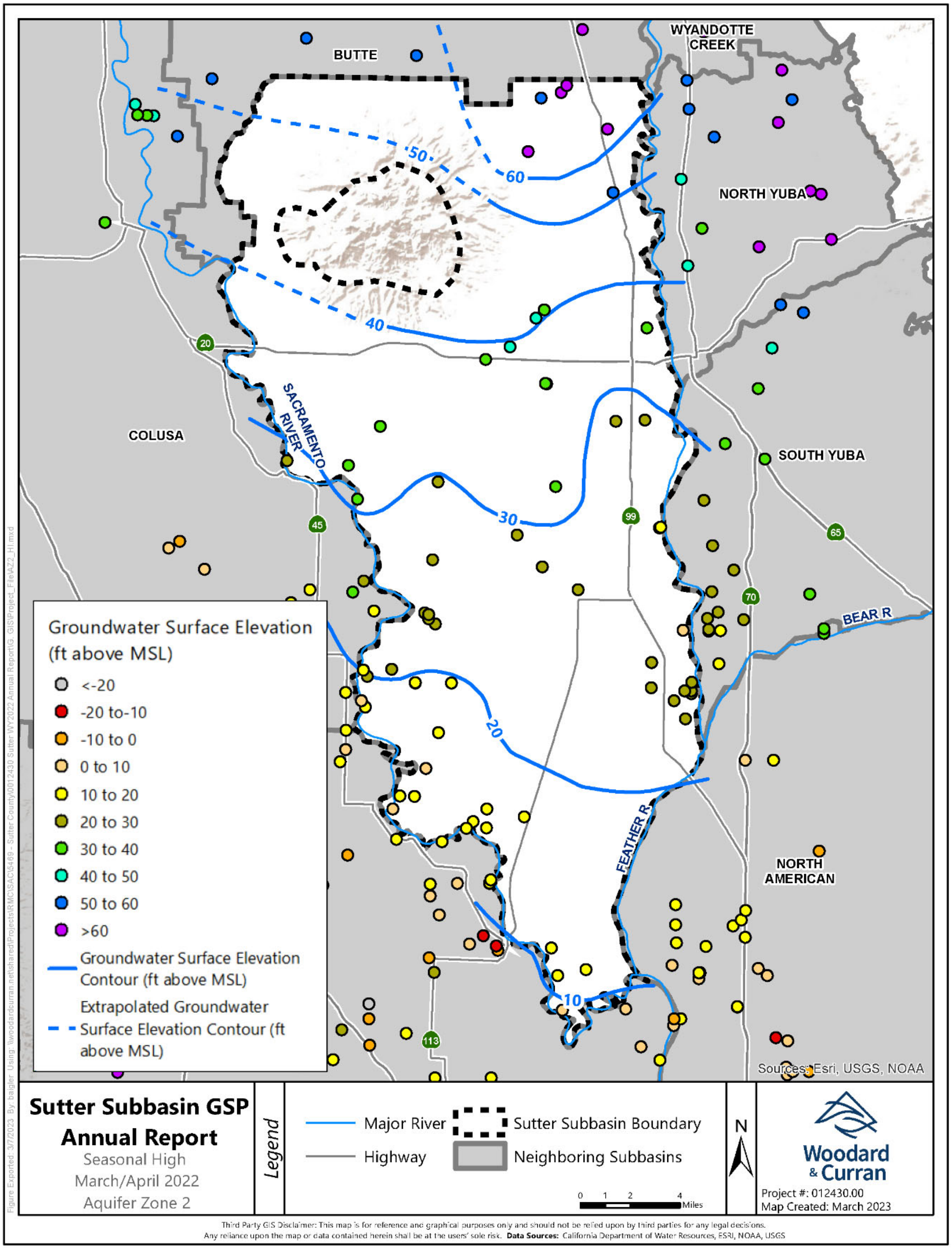

Figure 3-7: Seasonal High Groundwater Levels in AZ-2, March and April 2022

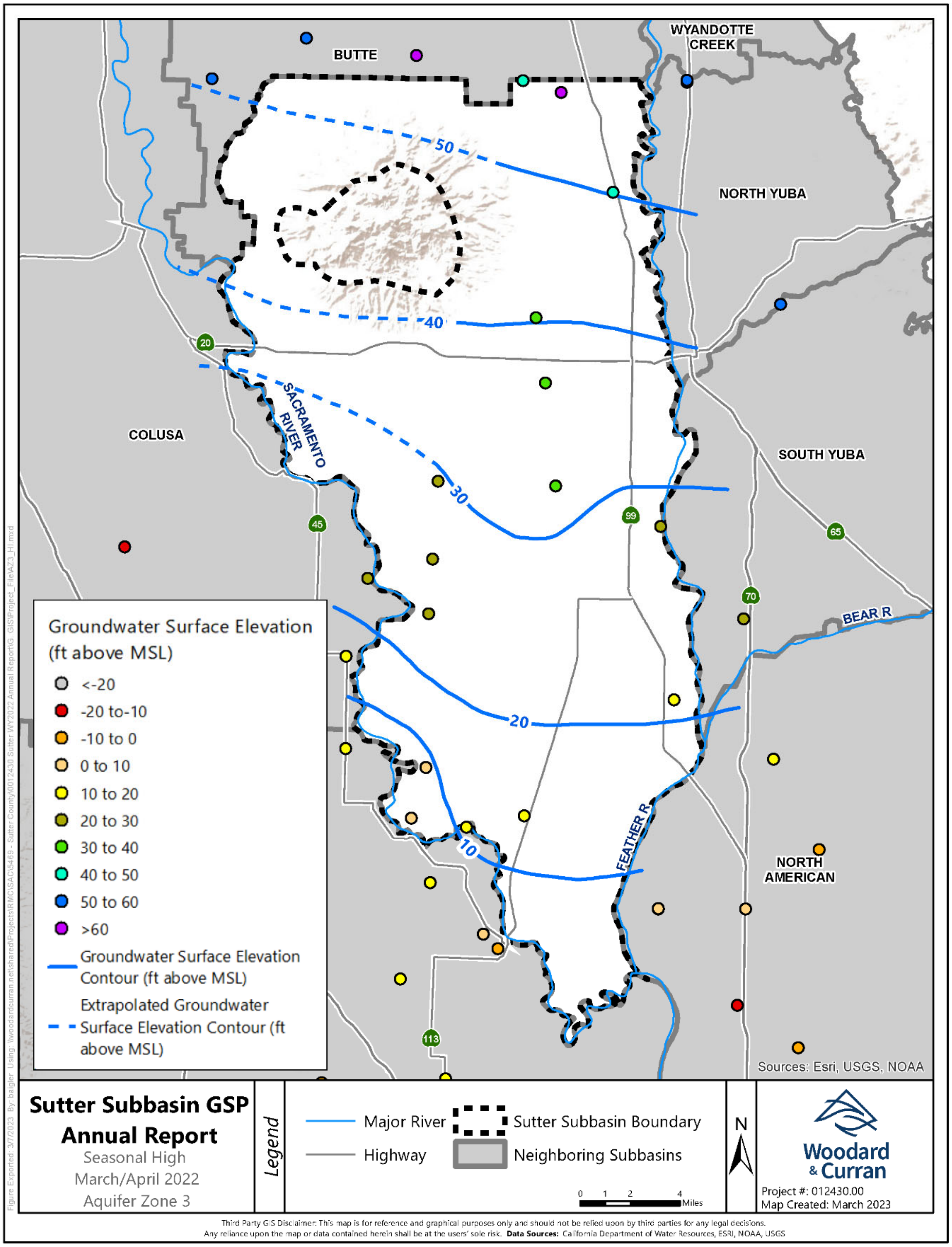

Figure 3-8: Seasonal High Groundwater Levels in AZ-3, March and April 2022

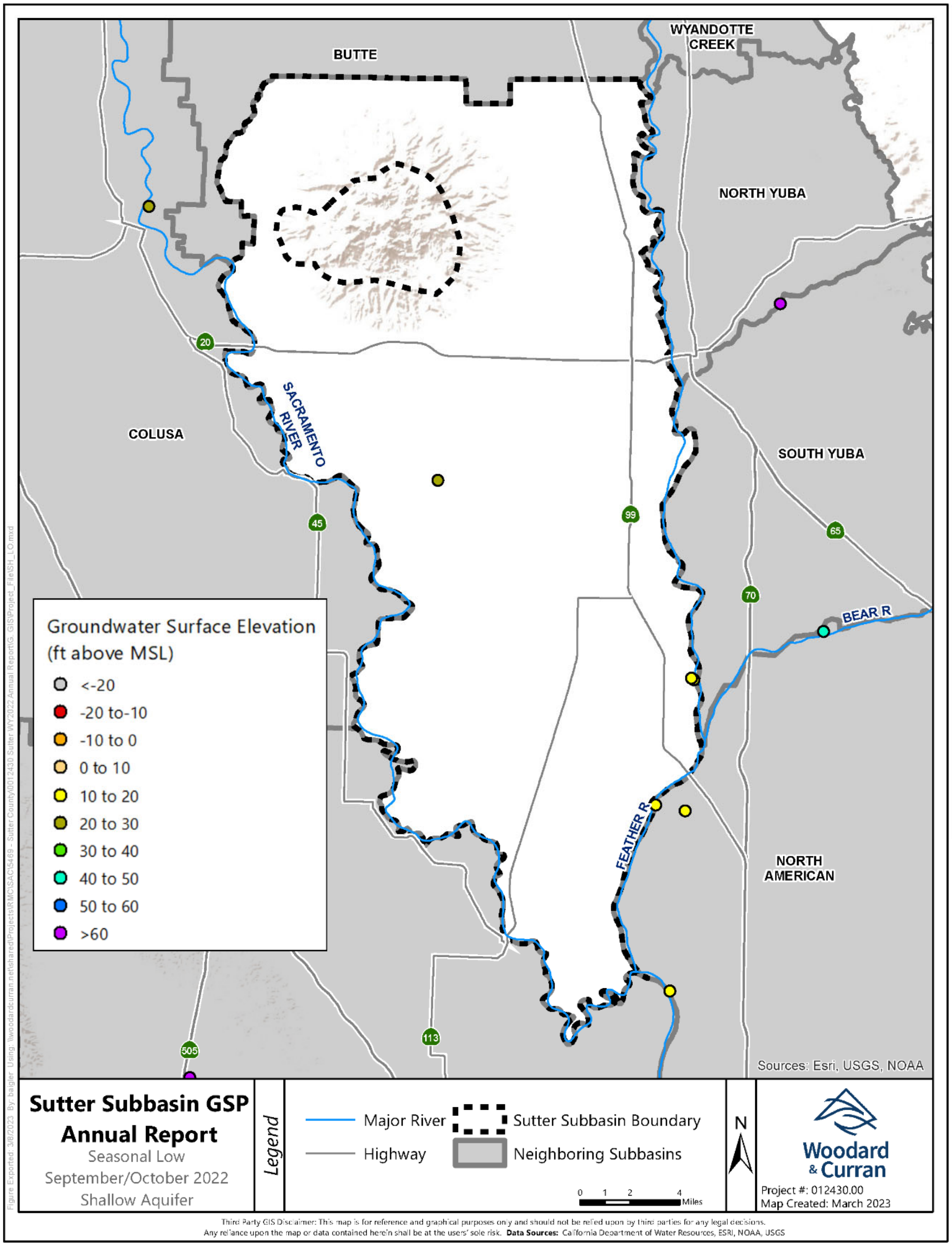

Figure 3-9: Seasonal Low Groundwater Levels in Shallow AZ, September and October 2022

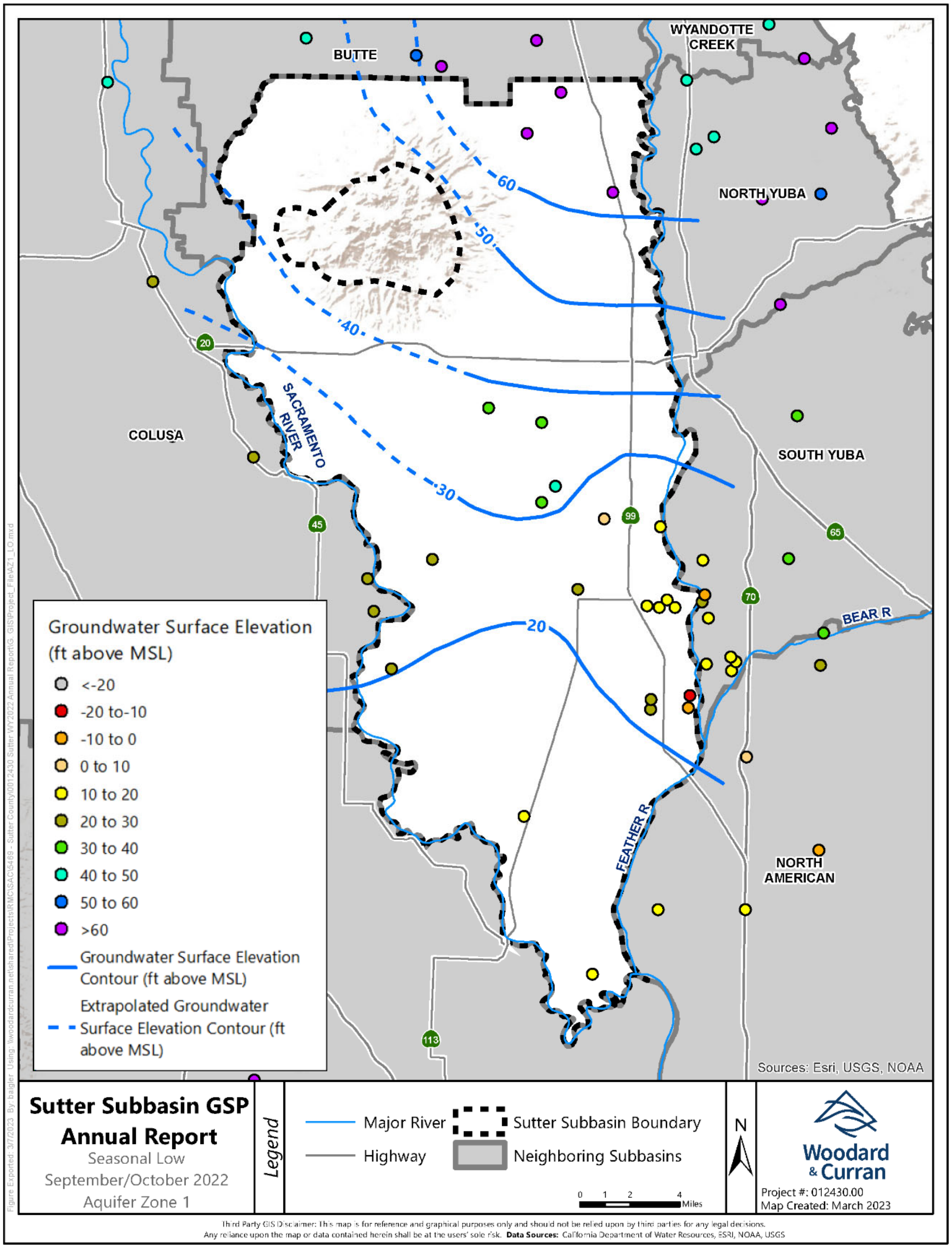

Figure 3-10: Seasonal Low Groundwater Levels in AZ-1, September and October 2022

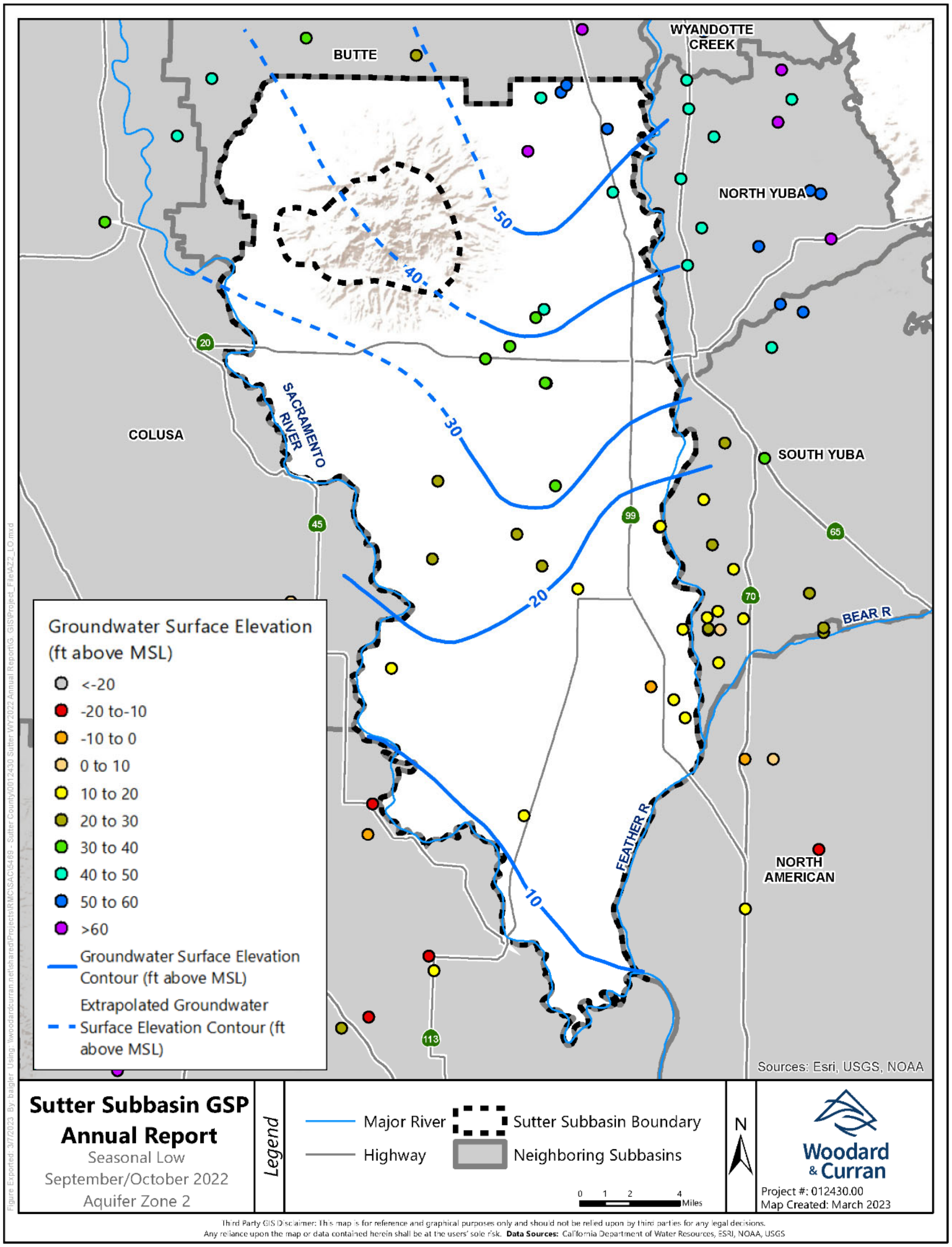

Figure 3-11: Seasonal Low Groundwater Levels in AZ-2, September and October 2022

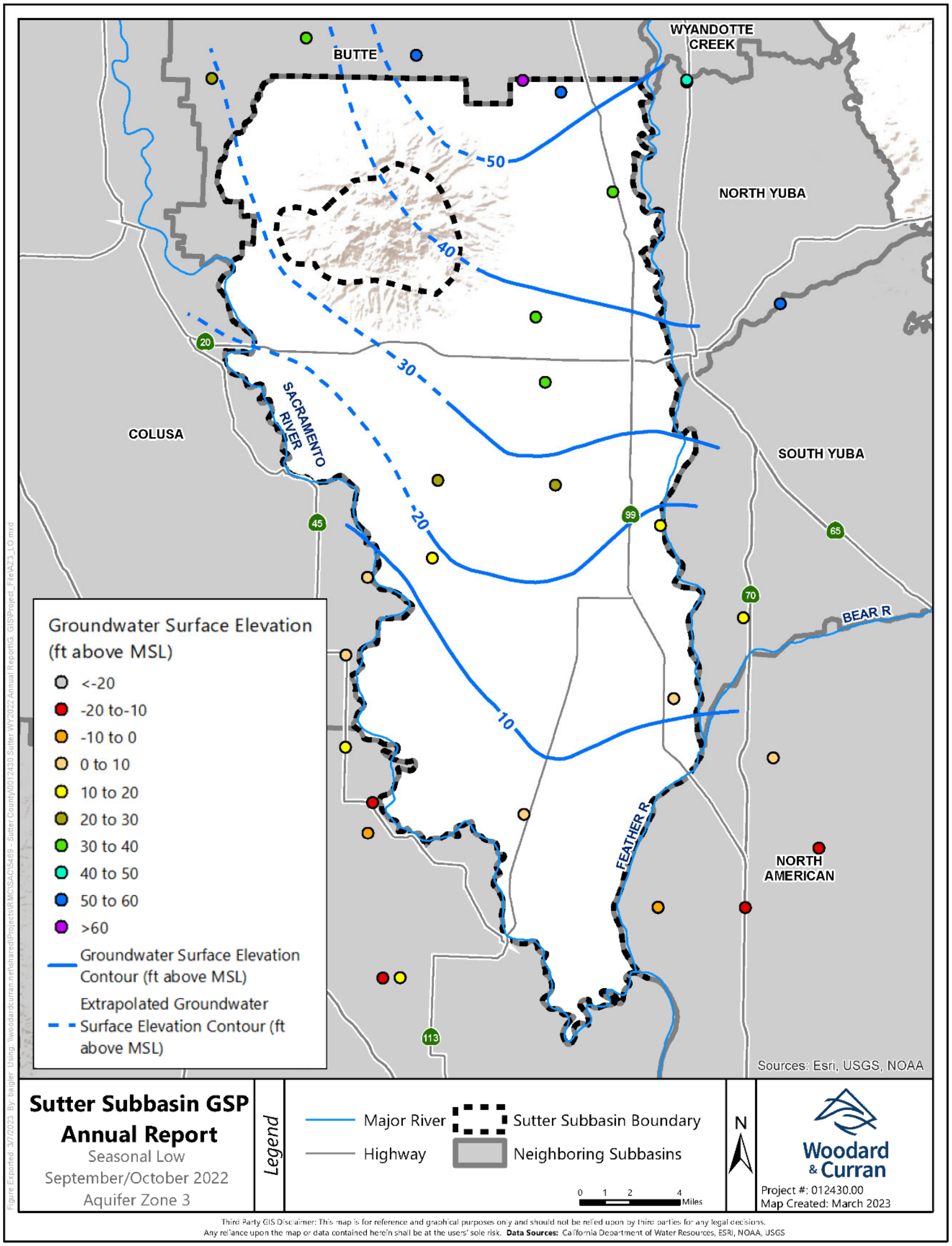

Figure 3-12: Seasonal Low Groundwater Levels in AZ-3, September and October 2022

3.2 Groundwater Storage

The groundwater storage sustainability indicator is monitored using groundwater levels as proxy by the representative monitoring network identified in **Section 3.1**. C2VSimFG-Sutter, used to develop the water budgets in the Sutter Subbasin GSP, is used as a tool jointly with groundwater level monitoring (hydrographs) to estimate changes in groundwater storage in the Subbasin.

Figure 3-13 shows the annual and cumulative change in storage along with annual groundwater pumping from WY 1996 to WY 2022 for the Sutter Subbasin. In WY 2022, Sutter Subbasin saw a decrease in storage of approximately 45,000 AF since WY 2021, reflecting the drier conditions of the critical water year. This change in storage represents approximately 0.1% of the total estimated 49 million acre-feet (MAF) of groundwater in storage.

Figure 3-14 shows the change in groundwater storage in the Sutter Subbasin between October 1, 2021 to September 30, 2022, estimated using C2VSimFG-Sutter. On a C2VSimFG-Sutter element basis, groundwater storage is estimated to decrease by up to 0.8 feet (or AF/acre) in the northeastern corner of the Subbasin, where decreases between 0.2 and 0.4 feet are estimated to have primarily occurred along the eastern boundary and along the southwestern boundary shared with the Yolo Subbasin. Change in groundwater storage is estimated to have increased by up to 0.2 feet in the northwestern corner of the Subbasin, along the central portion of the Subbasin, and down through the southern portion of the Subbasin. Though change in storage varied on an element basis, there was an overall net decrease in groundwater storage in the Sutter Subbasin during WY 2022.

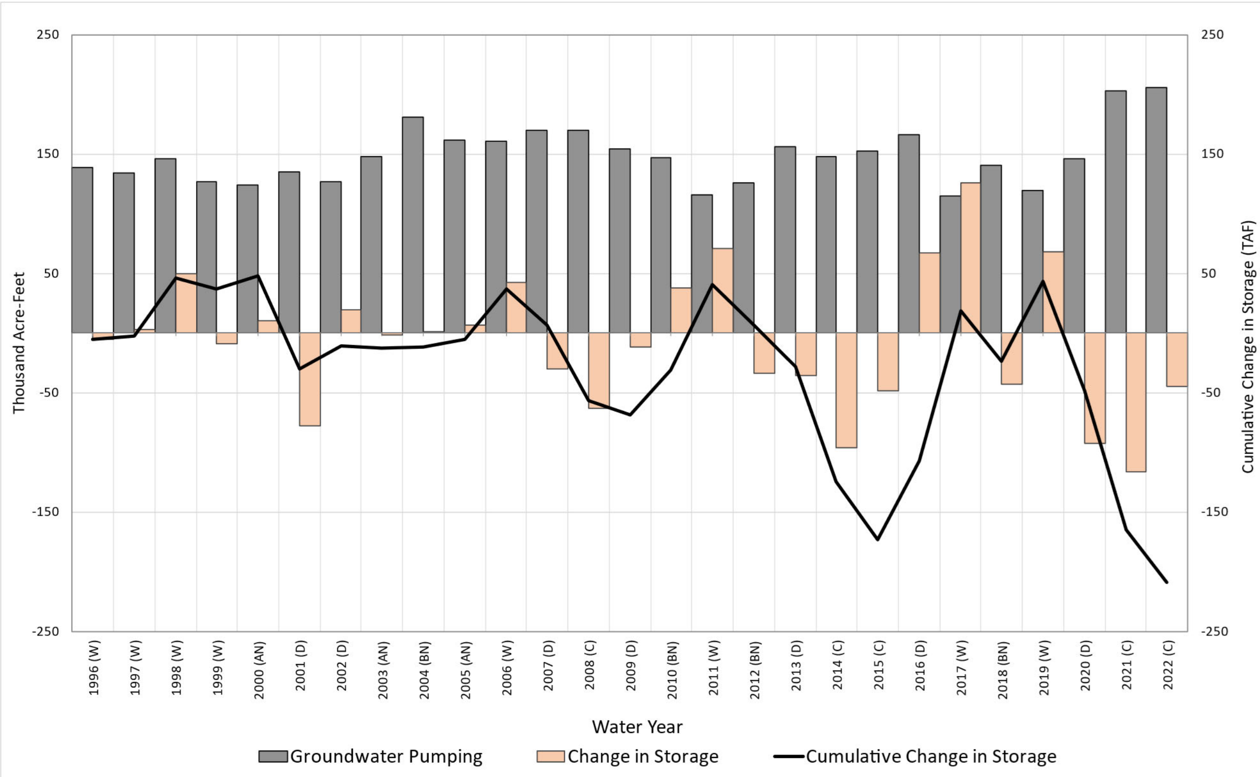

Figure 3-13: Historical Modeled Change in Annual Storage with Groundwater Pumping and Year Type

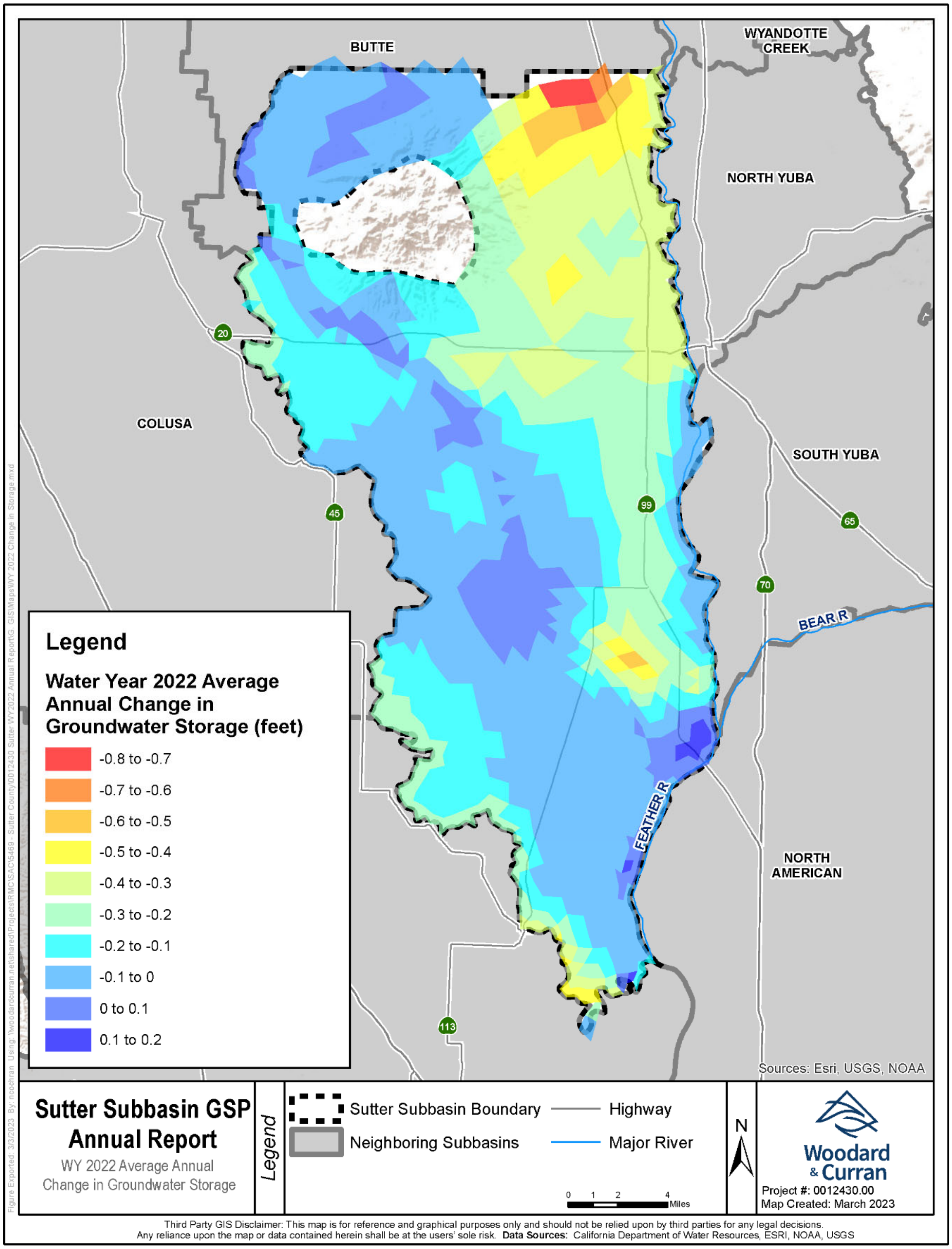

Figure 3-14: WY 2022 Change in Groundwater Storage

3.3 Groundwater Quality

Figure 3-15 through **Figure 3-18** show the location of representative monitoring wells identified in the Sutter Subbasin GSP for the degraded water quality sustainability indicator by aquifer zone. **Figure 3-19** shows the location of groundwater quality monitoring wells with unknown construction details, which is identified in the Sutter Subbasin GSP as a data gap to be filled. Groundwater quality monitoring at representative monitoring wells was scheduled to take place in September 2022 for TDS and nitrate as N. No wells in the representative monitoring network were sampled for TDS or nitrate as N in WY 2022 due to inability to access wells and confusion regarding groundwater quality sampling responsibilities. During WY 2023, all Sutter Subbasin GSAs will reevaluate their respective groundwater quality monitoring responsibilities and modify the representative monitoring network as needed to ensure groundwater quality samples for TDS and nitrate as N are collected in September 2023.

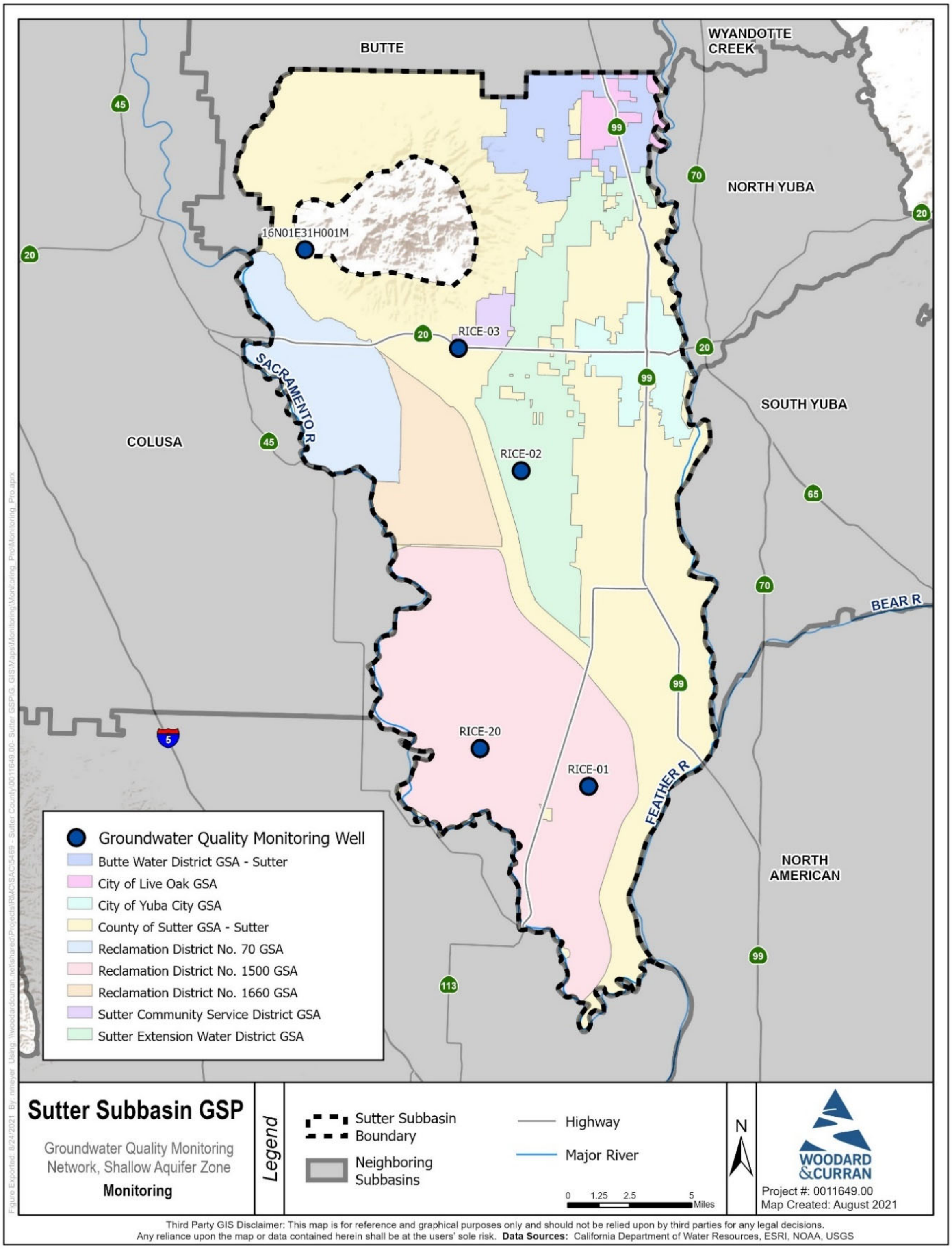

Figure 3-15: Groundwater Quality Monitoring Network Wells, Shallow AZ

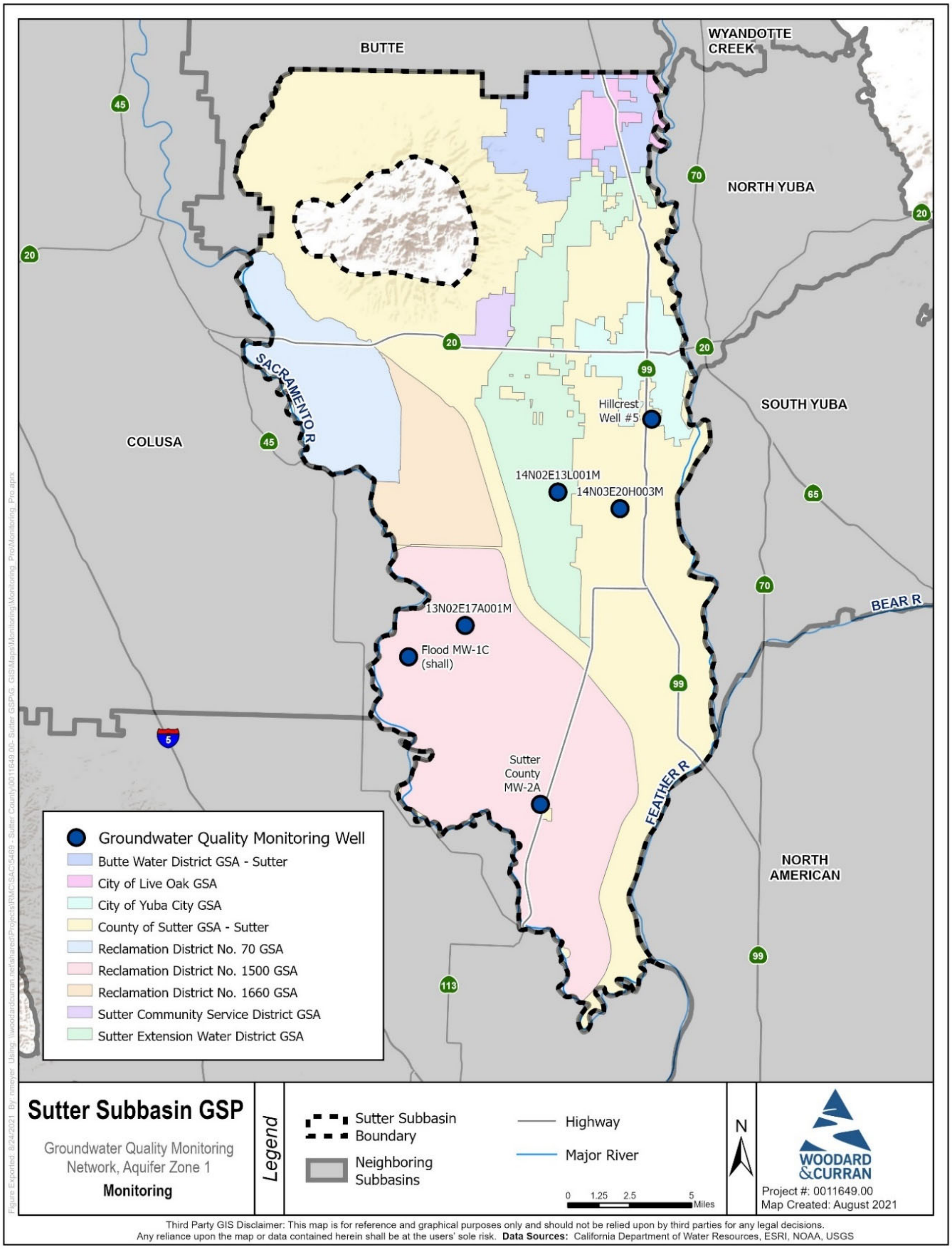

Figure 3-16: Groundwater Quality Monitoring Network Wells, AZ-1

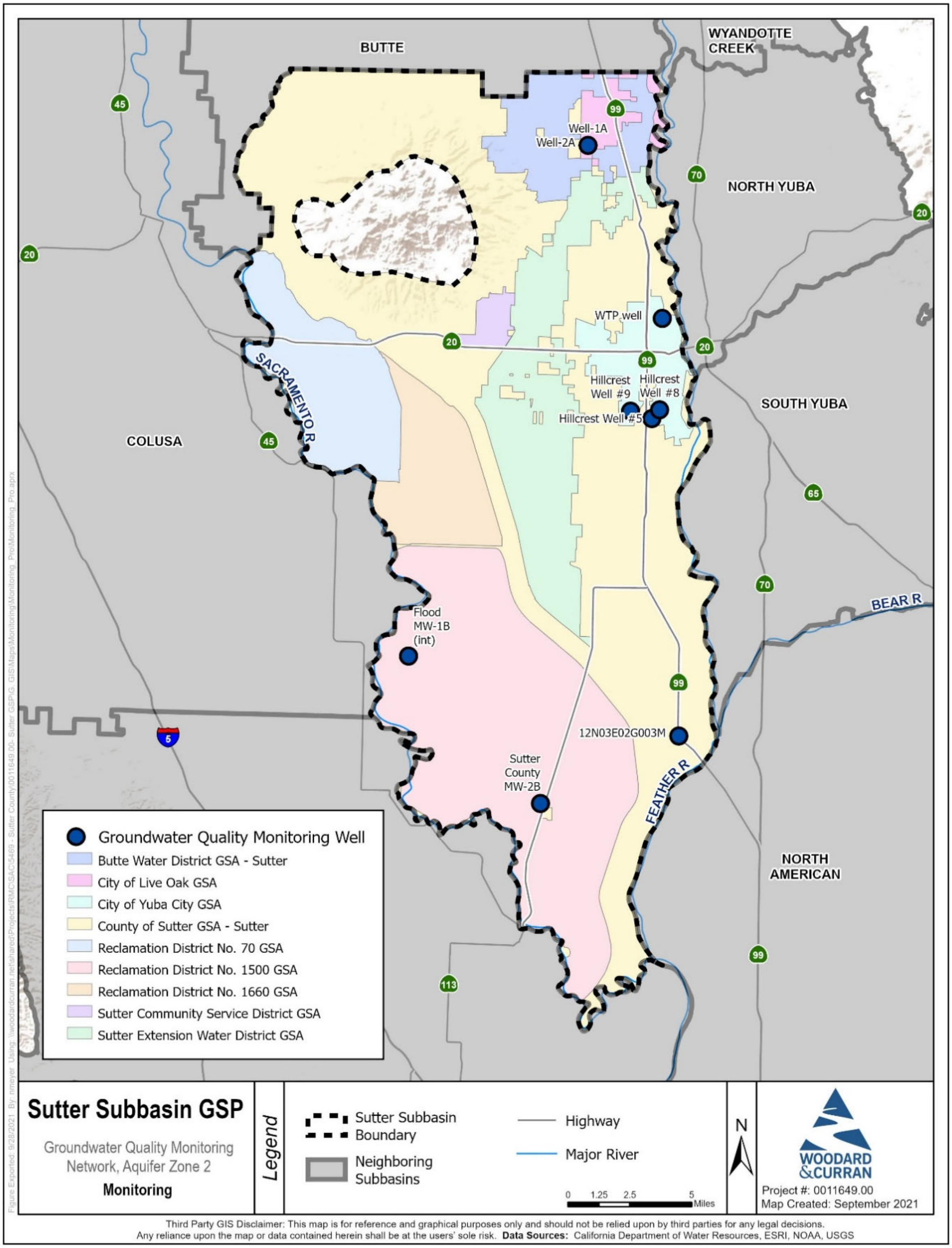

Figure 3-17: Groundwater Quality Monitoring Network Wells, AZ-2

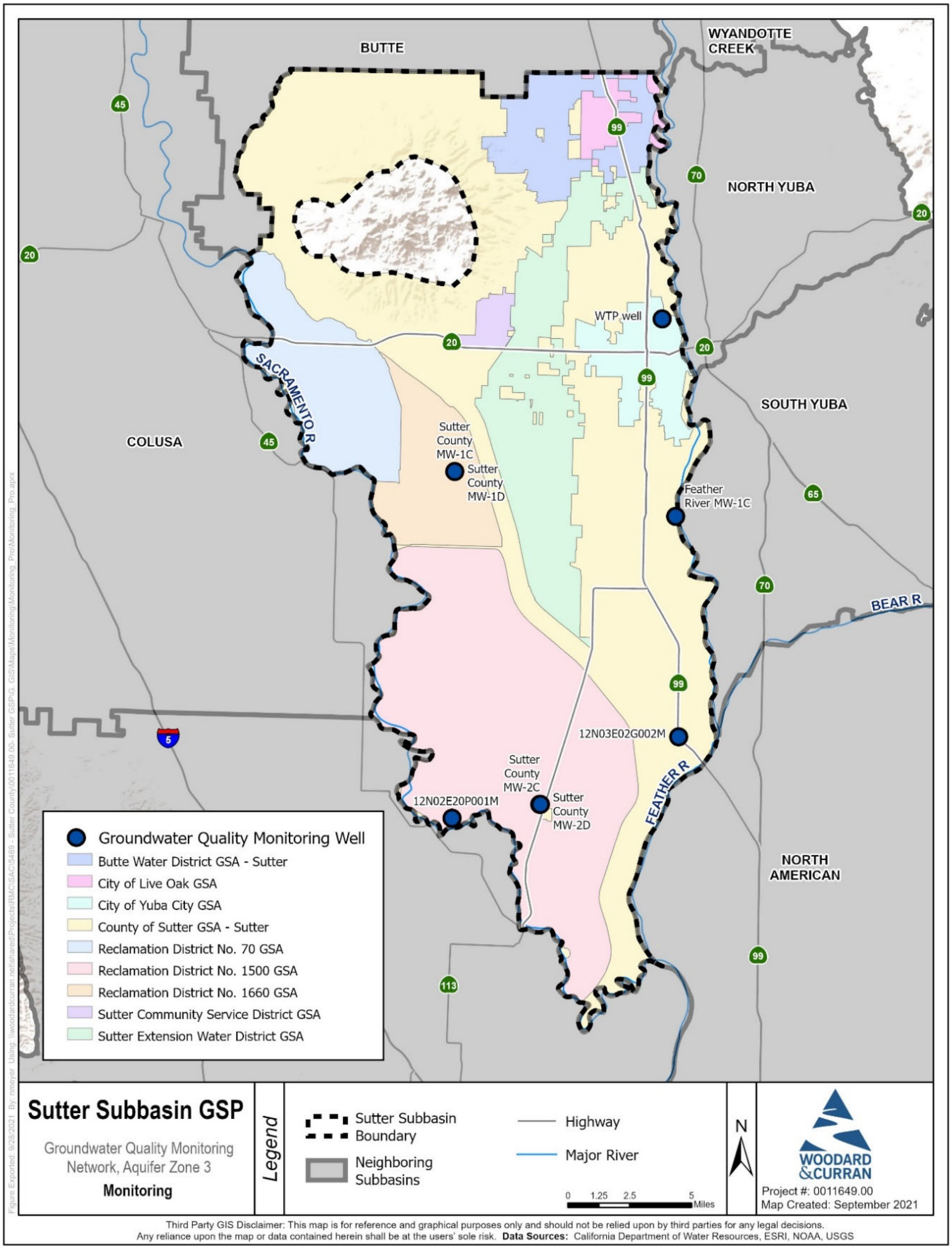

Figure 3-18: Groundwater Quality Monitoring Network Wells, AZ-3

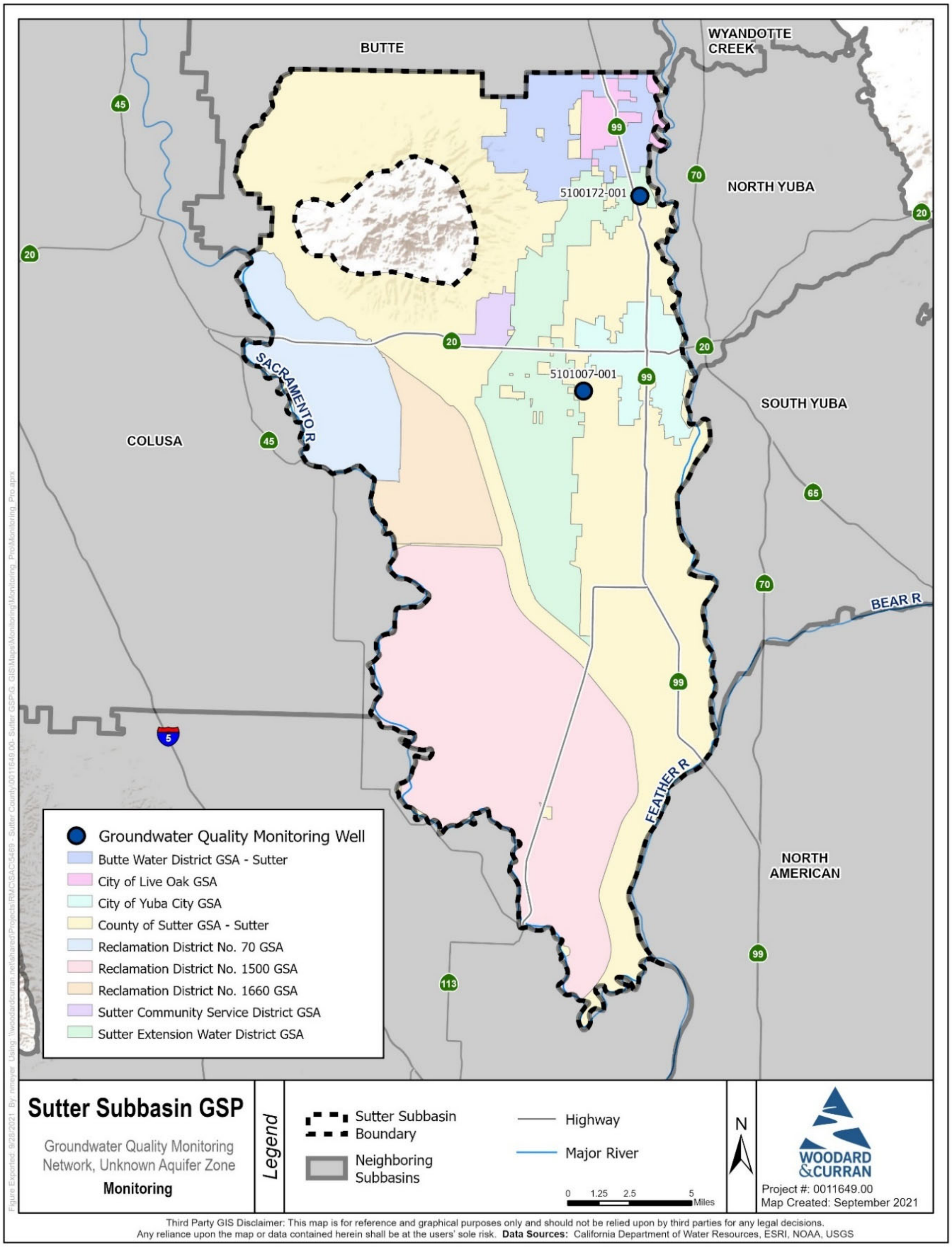

Figure 3-19: Groundwater Quality Monitoring Network Wells, Unknown AZ

3.4 Land Subsidence

Figure 3-20 shows the location of representative monitoring sites for the land subsidence sustainability indicator as identified in the Sutter Subbasin GSP. This monitoring network relies on the Sacramento Valley Subsidence Network and is supplemented annually by publicly available data. Developed in 2008 by DWR, the U.S. Bureau of Reclamation (USBR), and other State and local entities, the Sacramento Valley Subsidence Network consists of 339 monuments, 22 of which are located in the Sutter Subbasin and included in the Subbasin's land subsidence monitoring network. The Sacramento Valley Subsidence Network was monitored at 5-year intervals, with the last survey taking place in 2017. Since development of the GSP, DWR has discontinued its Sacramento Valley Subsidence Network and no 2022 survey was performed. The GSAs will evaluate alternative methods for monitoring for subsidence and re-establish a new representative monitoring network; however, in the interim, the Subbasin will use publicly accessible Interferometric Synthetic Aperture Imagery (InSAR), along with any other publicly available land surface measurements, to evaluate conditions relative to established numeric SMC.

Between October 2021 and October 2022, vertical displacement ranging from -0.1 to +0.1 feet was observed within most of the Sutter Subbasin with a small area of vertical displacement of up to 0.2 feet observed along the western boundaries shared with the Colusa and Yolo Subbasins, as shown in **Figure 3-21**. Sutter Subbasin GSAs will continue to monitor available land subsidence data and confirm no negative impacts of land subsidence are reported on critical infrastructure as a result of groundwater pumping.

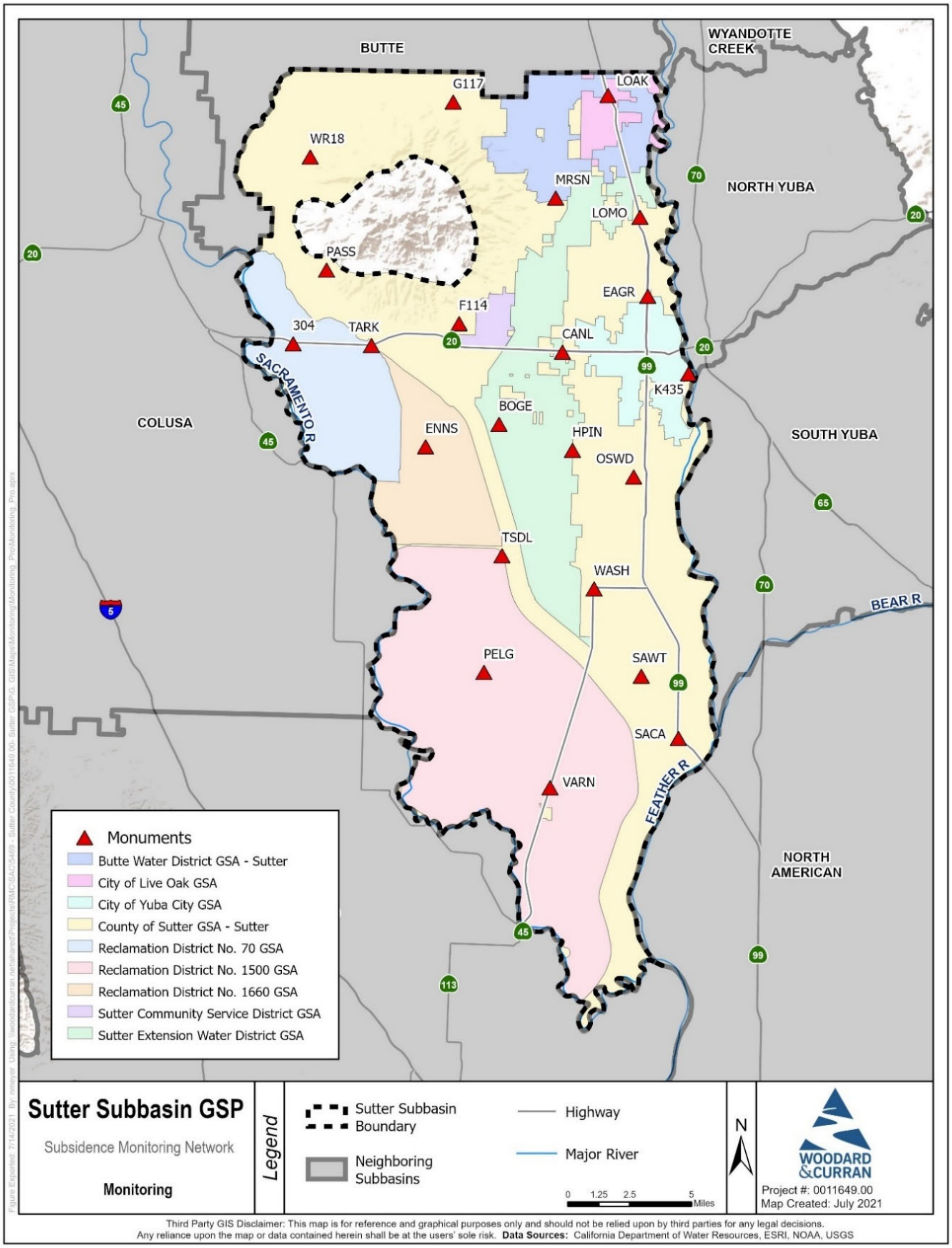

Figure 3-20: Subsidence Monitoring Network

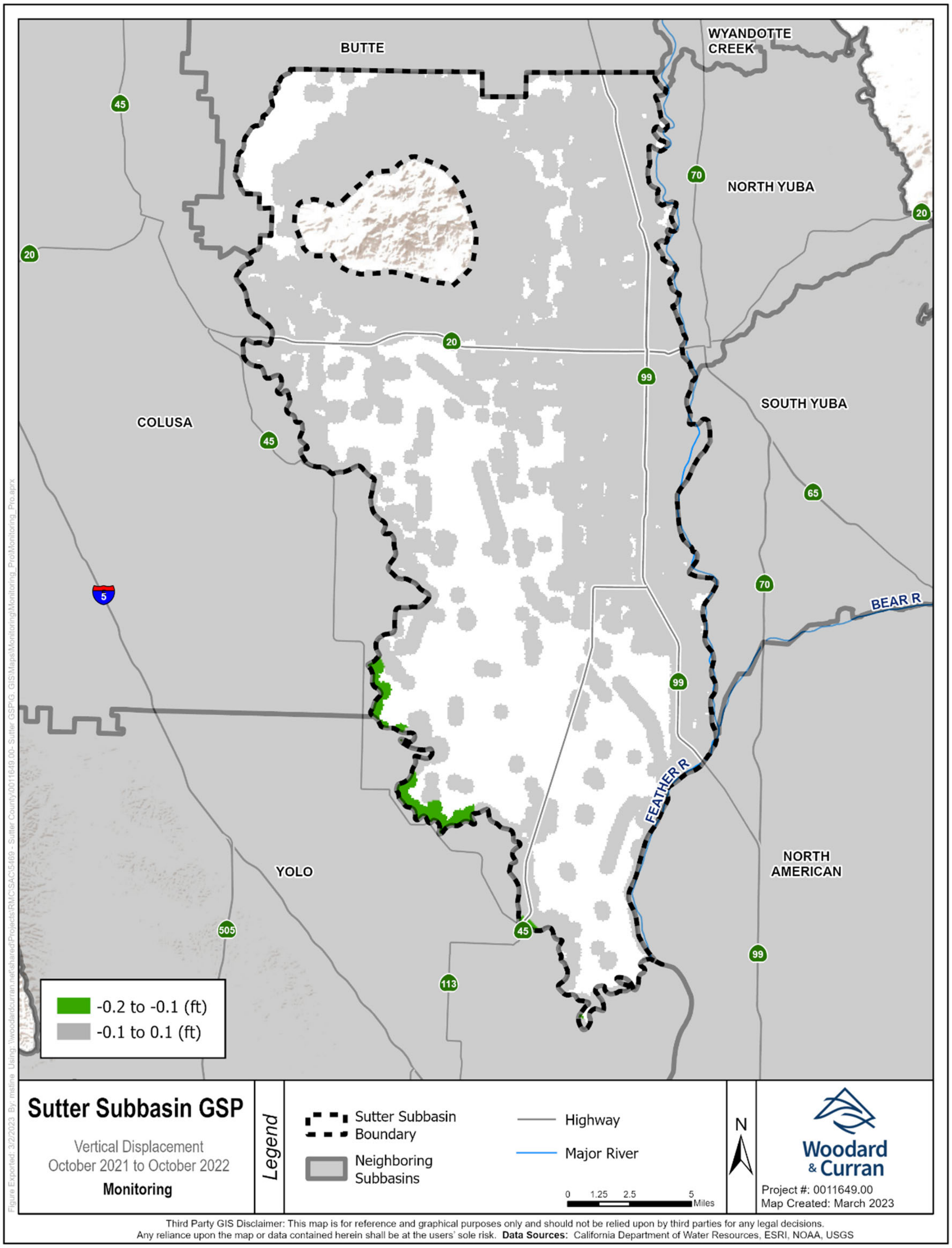

Figure 3-21: Vertical Displacement in the Sutter Subbasin, October 2021 to October 2022

3.5 Groundwater-Surface Water Interaction

Figure 3-22 through **Figure 3-25** show the location of representative monitoring wells identified in the Sutter Subbasin GSP for the depletions of interconnected surface water sustainability indicator by aquifer zone. Groundwater levels will be used as proxy and monitored at these wells during seasonal high (March through April) and seasonal low (September through October) conditions.

The minimum thresholds at representative monitoring locations were established to be protective of significant and unreasonable impacts to identified interconnected surface waters, which include the Sacramento and Feather Rivers and Sutter Bypass. Hydrographs for the representative wells in the interconnected surface water monitoring network are included in **Appendix B**. Minimum threshold exceedances were observed at eight wells during WY 2022: Local IDs 13N01E11A001M, Feather River MW-1B, GH Well 18, SR-1A, Sutter County MW-3B, Sutter County MW-3C, Sutter County MW-3D, and Sutter County MW-3E.

Minimum threshold exceedances were recorded primarily between July and September (coinciding with irrigation season), with recovery to above the minimum threshold by the end of WY 2022 at all wells except Local IDs GH Well 18, Sutter County MW-3D, and Sutter County MW-3E which all recovered above their respective minimum thresholds by November 2022. Local ID SR-1A observed minimum threshold exceedances early in WY 2022 in October and December 2021 as well as January 2022 with recovery above the minimum threshold by mid-January 2022. Recent downward trends are observed in the following wells and will be monitored to ensure minimum threshold exceedances are not observed: Local IDs (or State Well Numbers) 16N01E31H001M, Feather River MW-1A, Sutter County MW-3A, Sutter County MW-3B, Feather River MW-1C, Feather River MW-1D, Sutter County MW-3C, Sutter County MW-3D, and Sutter County MW-3E.

Undesirable results for the depletions of interconnected surface water sustainability indicator occur when 25% of representative monitoring locations across all aquifer zones drop below the minimum threshold criteria concurrently over two consecutive seasonal high water level measurements. No minimum threshold exceedances were observed during the seasonal high monitoring period (March through April) in either WY 2021 or WY 2022. Therefore, an undesirable result for the depletions of interconnected surface water sustainability indicator was not observed in WY 2022.

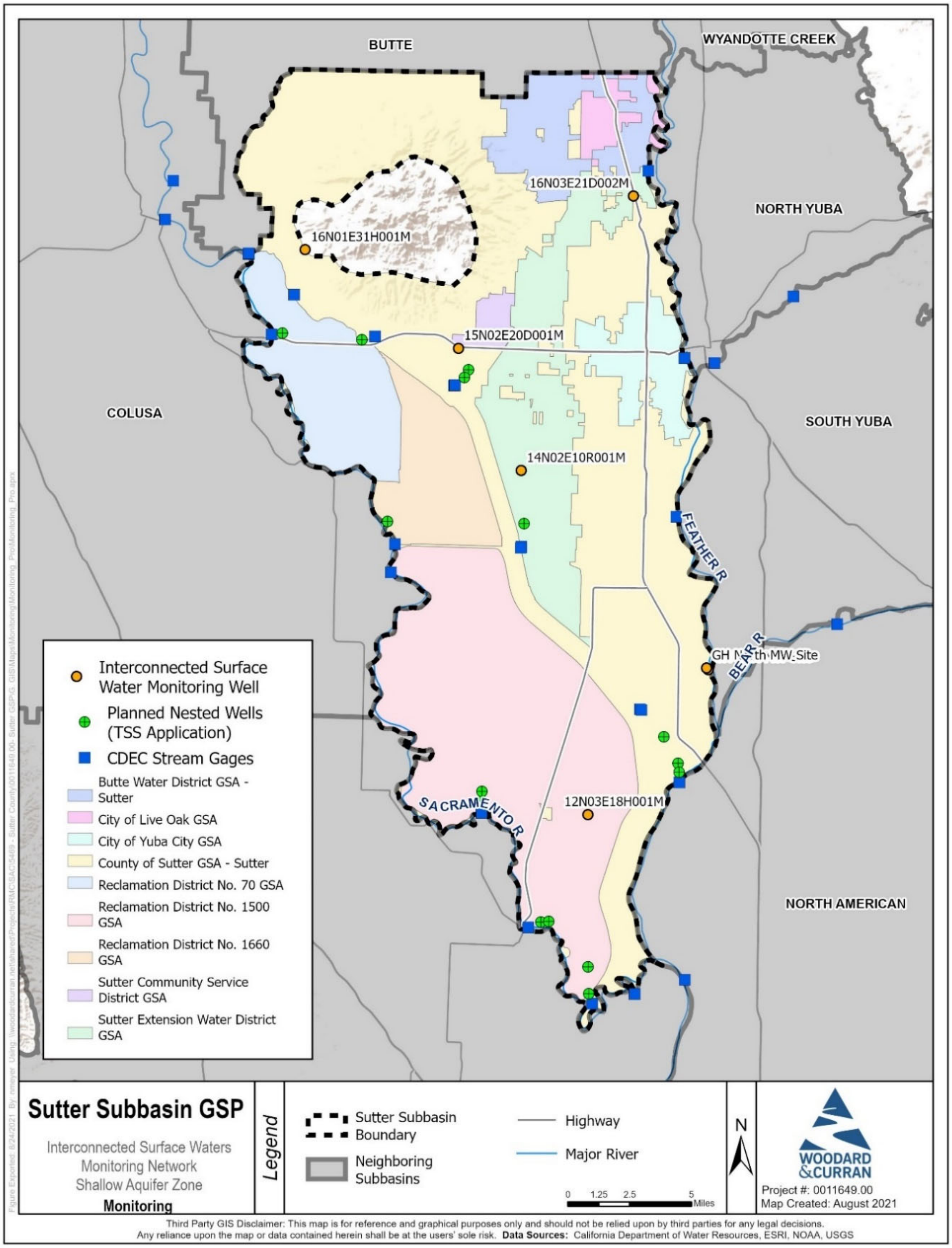

Figure 3-22: Interconnected Surface Water Monitoring Network Sites, Shallow AZ

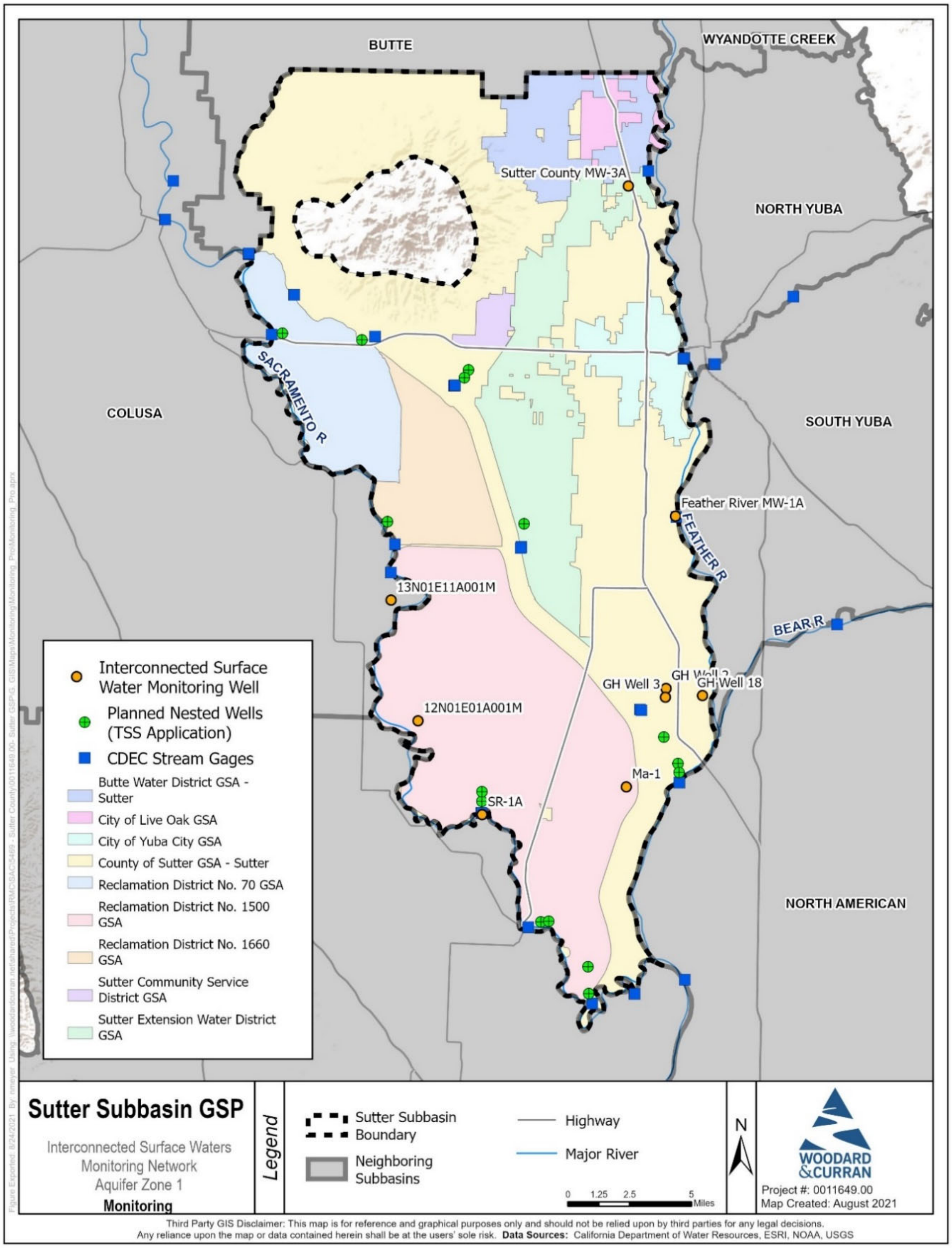

Figure 3-23: Interconnected Surface Water Monitoring Network Sites, AZ-1

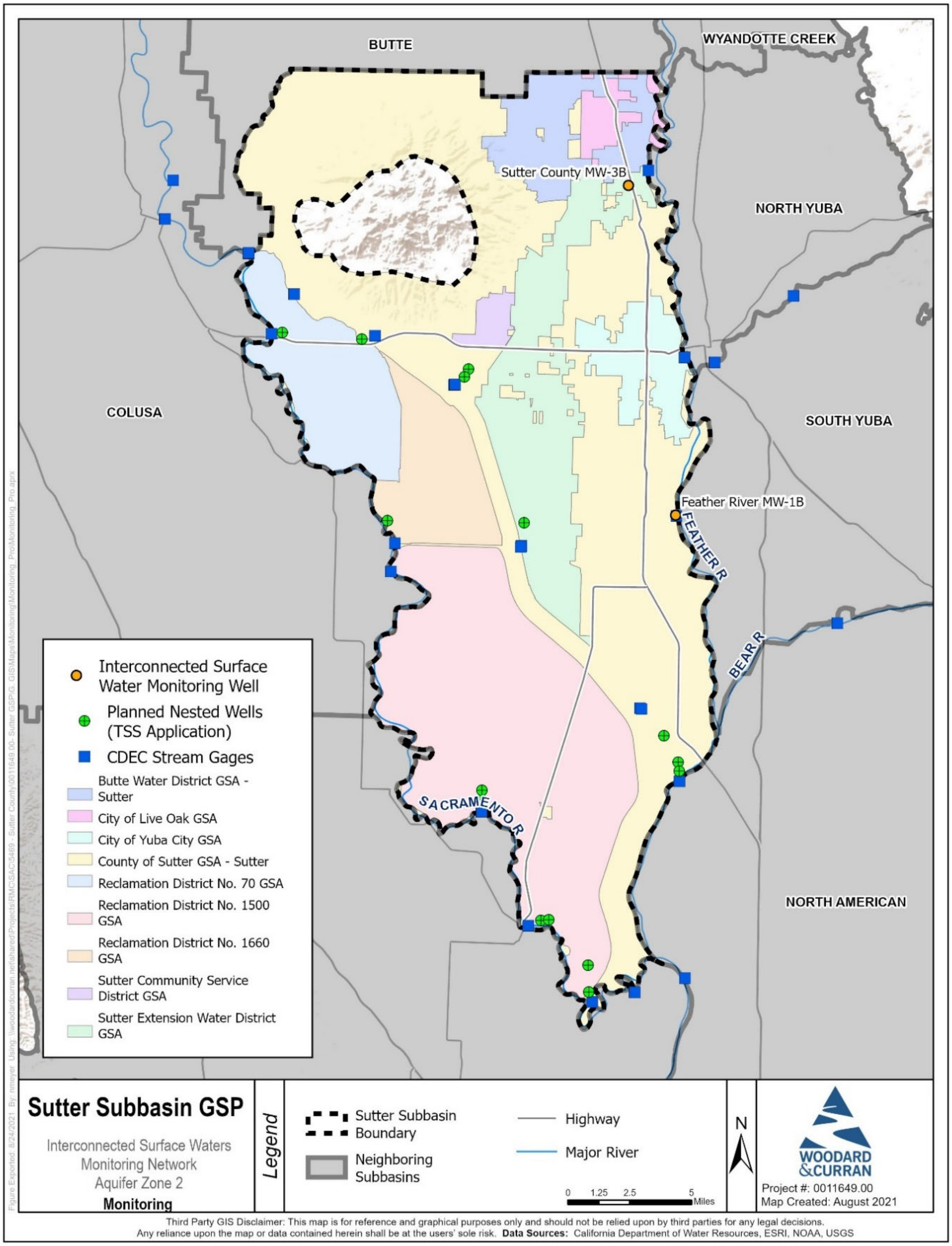

Figure 3-24: Interconnected Surface Water Monitoring Network Sites, AZ-2

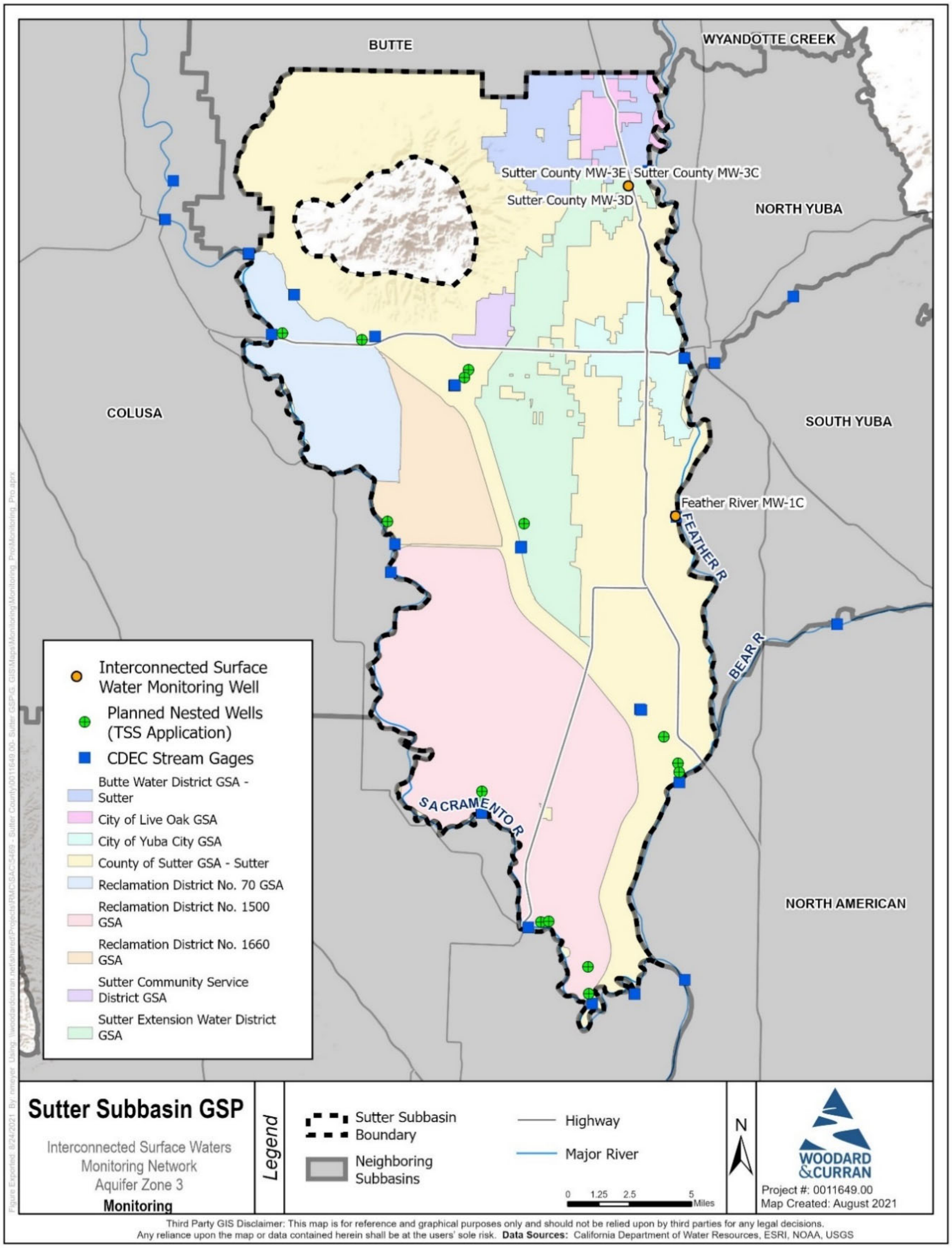

Figure 3-25: Interconnected Surface Water Monitoring Network Sites, AZ-3

3.6 Total Water Use

3.6.1 Groundwater Use

Groundwater extraction data are available only for a limited number of metered wells in the Sutter Subbasin, with the remainder of extraction information estimated using C2VSimFG-Sutter. Metered data are available from City of Live Oak GSA, Sutter Community Services District GSA, and City of Yuba City GSA, and metered groundwater substitution transfer wells from Butte Water District GSA, Garden Highway Mutual Water Company, and Sutter Extension Water District GSA. Agricultural, private domestic, and other groundwater extractions in the Subbasin are largely unmetered and are estimated by the overlying GSA and using C2VSimFG-Sutter, which bases water use on crop type, hydrologic data (precipitation and evapotranspiration), irrigation efficiency, and population information.

Figure 3-26 shows the general location and volume of groundwater pumping within the Subbasin by C2VSimFG-Sutter element for WY 2022. The majority of the Subbasin experienced very little groundwater pumping (less than 1 AF/acre or foot). Groundwater pumping greater than 1 foot (up to 8 AF/acre or feet) occurred along the eastern boundary of the Subbasin and generally around the Sutter Buttes.

The following WY 2022 groundwater extraction data, shown in **Table 3-1**, are a combination of direct measurements and estimates from each of the nine GSAs within the Sutter Subbasin. Measurement accuracies and estimates vary by GSA and on a site-by-site basis. Measurement methods also vary across the nine GSAs and largely consists of self-reported groundwater extraction volumes and estimates from C2VSimFG-Sutter.

In WY 2022, total groundwater use in the Sutter Subbasin was estimated at 179,700 AF across all water use sectors, as shown in **Table 3-1**. Of the total 179,700 AF, 10,200 AF were pumped for groundwater substitution (GWS) transfers by Butte Water District, Sutter Extension Water District, and Garden Highway Mutual Water Company, where GWS transfers are a short-term transfer of a portion of an agency’s surface water supplies to agencies south of the Sacramento-San Joaquin Delta and groundwater is pumped in-lieu of surface water for supply. The sustainable yield estimate for the Sutter Subbasin is 182,000 AF. Groundwater pumping in WY 2022 was approximately 2,300 AF less than the sustainable yield. Sustainable yield is a long-term value due to conjunctive water management in the Sutter Subbasin, where years where sustainable yield is exceeded are balanced by years with reduced pumping and increased recharge (during wetter periods) so the long-term average remains at or below the sustainable yield.

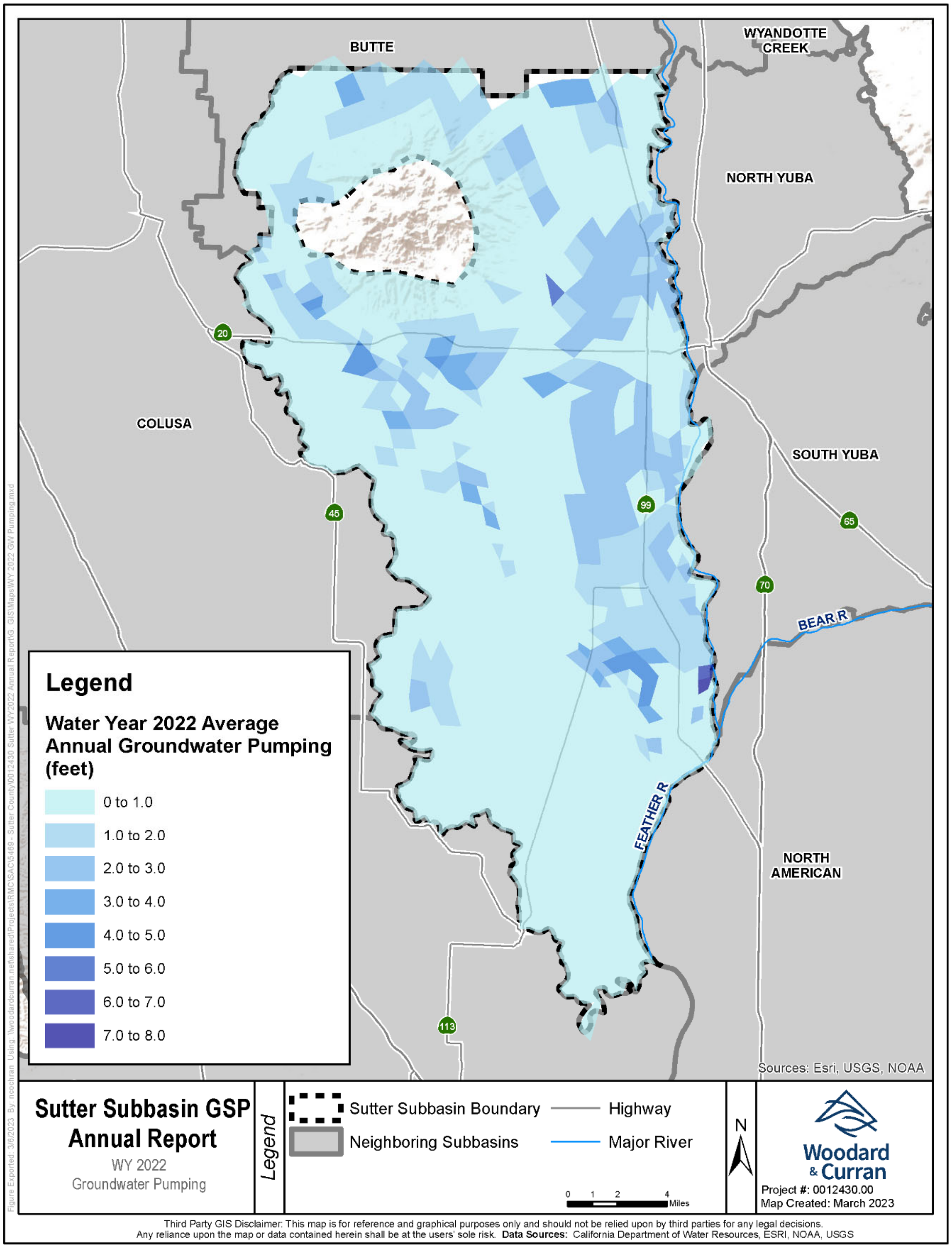

Figure 3-26: WY 2022 Groundwater Pumping

Table 3-1: WY 2022 Groundwater Water Extraction

Groundwater Extraction (Acre-Feet)			
Water Use Sector	**WY 2022 Total**	**Measurement Method (Direct or Estimate)**	**Measurement Accuracy (%)**
Urban/Domestic/Municipal	9,800	Estimate	N/A
Industrial	200	Direct	90-100%
Agricultural	157,000	Estimate	N/A
Managed Wetlands	2,500	Estimate	N/A
Managed Recharge	0	Estimate	N/A
Native Vegetation	0	Estimate	N/A
Other: Groundwater Substitution Transfers	10,200	Direct	Unknown
Total	**179,700**	**Estimate**	**N/A**

3.6.2 Surface Water Use

Surface water supply data are available from purveyors in the Subbasin (Butte Water District GSA, City of Yuba City GSA, Reclamation District 70 GSA, Reclamation District 1500 GSA, Reclamation District 1660 GSA, and Sutter Extension Water District GSA) and include predominantly agricultural uses with surface water also supplied by the City of Yuba City for urban use and managed wetlands within Sutter Extension Water District. The remaining surface water supply is estimated by C2VSimFG-Sutter for Sutter County GSA. The City of Live Oak GSA and Sutter Community Services District did not receive surface water supplies in WY 2022.

The following WY 2022 surface water supply data, shown in **Table 3-2**, are a combination of direct measurements and estimates from each of the nine GSAs within the Sutter Subbasin. Total surface water use during WY 2022 is estimated as 293,700 AF.

Table 3-2: WY 2022 Surface Water Supply

Surface Water Supply (Acre-Feet)	
Surface Water Source	**WY 2022 Total**
Central Valley Project (CVP)	41,000
State Water Project (SWP)	1,200
Colorado River Project	0
Local Supplies [1,2]	123,600
Local Imported Supplies [3]	115,900
Recycled Water	0
Desalination	0
Other: Surface Water Purchase and Diversion [4]	12,000
Groundwater Recharge	0
In-lieu Use	0
Total	**293,700**

[1] 89,581 AF reported by Sutter Extension Water District (SEWD) and 31,547 AF reported by Butte Water District (BWD) is conveyed through SWP facilities but is not considered SWP water. SEWD and BWD hold diversion agreements with DWR to transport water from the Feather River using SWP facilities for both diversion and storage.
[2] Includes creeks and other surface water bodies, such as the Sacramento and Feather Rivers and Sutter Bypass.
[3] Waters imported from a nearby watershed outside of the Sutter Subbasin, not waters diverted originally from the CVP or SWP.
[4] Surface water purchased by City of Yuba City from North Yuba Water District and diverted by City of Yuba City under two appropriative water rights issued by State Water Resources Control Board (Licenses 13855 and 18558).

3.6.3 Total Water Use

Total water use is the sum of groundwater use and surface water use. Total water use during WY 2022 is estimated as 496,100 AF for the Sutter Subbasin (**Table 3-3**). Measurement methods vary across the nine GSAs and largely consists of self-reported volumes. **Table 3-3** is a summation of data from each GSA for the entire Sutter Subbasin and presents a variety of methods for data calculation and estimation. These data are also a combination of direct measurements and estimates from each GSA. Groundwater pumping accounts for approximately 40% of total water use in the Subbasin, while surface water supplies account for approximately 60%.

Table 3-3: WY 2022 Total Water Use

Summary of Total Water Use (Acre-Feet)			
Total Water Use	**WY 2022 Total**	**Measurement Method (Direct or Estimate)**	**Measurement Accuracy (%)**
Urban/Domestic/Municipal			
Groundwater	9,800	Estimate	N/A
Surface Water	14,000	Estimate	N/A
Recycled Water	0	N/A	N/A
Reused Water	0	N/A	N/A
Other	0	N/A	N/A
Total	*23,800*	*Estimate*	*N/A*
Industrial			
Groundwater	200	Direct	90-100%
Surface Water	0	N/A	N/A
Recycled Water	0	N/A	N/A
Reused Water	0	N/A	N/A
Other	0	N/A	N/A
Total	*200*	*Direct*	*90-100%*
Agricultural			
Groundwater	157,000	Estimate	N/A
Surface Water	248,000	Estimate	N/A
Recycled Water	0	Estimate	N/A
Reused Water	22,700	Direct	Unknown
Other	0	Estimate	N/A
Total	*427,700*	*Estimate*	*N/A*
Managed Wetlands			
Groundwater	2,500	Estimate	N/A
Surface Water	31,700	Estimate	N/A
Recycled Water	0	N/A	N/A
Reused Water	0	N/A	N/A
Other	0	N/A	N/A
Total	*34,200*	*Estimate*	*N/A*
Managed Recharge			
Groundwater	0	N/A	N/A
Surface Water	0	N/A	N/A
Recycled Water	0	N/A	N/A
Reused Water	0	N/A	N/A
Other	0	N/A	N/A
Total	*0*	*N/A*	*N/A*
Native Vegetation			

Summary of Total Water Use (Acre-Feet)			
Total Water Use	**WY 2022 Total**	**Measurement Method (Direct or Estimate)**	**Measurement Accuracy (%)**
Groundwater	0	N/A	N/A
Surface Water	0	N/A	N/A
Recycled Water	0	N/A	N/A
Reused Water	0	N/A	N/A
Other	0	N/A	N/A
Total	*0*	*N/A*	*N/A*
Other: Groundwater Substitution Transfers			
Groundwater	10,200	Direct	Unknown
Surface Water	0	N/A	N/A
Recycled Water	0	N/A	N/A
Reused Water	0	N/A	N/A
Other	0	N/A	N/A
Total	*10,200*	*Direct*	*Unknown*
Total	**496,100**	**Estimate**	**N/A**

3.6.4 C2VSim-Sutter Model Update

C2VSimFG-Sutter integrated flow model was originally developed and calibrated to simulate historical groundwater conditions from WYs 1996 to 2015. The model was updated with publicly available data for this annual report to reflect more recent data and hydrologic conditions. The update for WY 2016-2021 was covered in the previous annual report; the following only discusses the update of data for WY 2022.

Data Sources

Data retrieved from the following publicly available sources:

- DWR 2019 Statewide Crop Mapping
- Precipitation-Elevation Regressions on Independent Slopes Model (PRISM) Climate Group, Oregon State University
- United States Geological Survey stream flows
- California Irrigation Management Information System (CIMIS) evapotranspiration, DWR

Updated Components

The above data sources provided the necessary data to allow the historical model to be updated to reflect recent conditions. The following components of the model were updated within the Sutter Subbasin based on recent data:

Evapotranspiration: Evapotranspiration was updated within Sutter Subbasin for WY 2022 based on potential evapotranspiration (ETo) data collected at the three (3) CIMIS stations closest to the Subbasin. Actual evapotranspiration estimates during the extended period were projected in proportion to observed changes in potential evapotranspiration.

Groundwater Pumping: Transfer pumping within Butte Water District, Garden Highway Mutual Water Company, and Sutter Extension Water District were incorporated for WY 2022. These annual totals were based on data provided as part of the development of this annual report.

Land Use: For WY 2022, the model uses data from DWR's 2019 Statewide Crop Mapping which provides data on urban and irrigated land throughout the model domain on a parcel scale (DWR, 2019). This survey was completed using remote sensing methods to collect and process the data. The spatial land use dataset was mapped to Sutter model elements and assumed to represent land use for WY 2022. In order to remain consistent with previous annual reporting, land use was not updated for prior water years at this time.

Population: Population in Sutter Subbasin is assumed to grow at the same rate as it did during the last 12 years of the historical simulation for WY 2022.

Per Capita Water Use: Per capita water use is assumed to remain constant at 2015 estimations for WY 2022.

Precipitation: Rainfall data for the model area are derived from the PRISM (Precipitation-Elevation Regressions on Independent Slopes Model) database used in the DWR's CALSIMETAW (California Simulation of Evapotranspiration of Applied Water) model. The database contains daily precipitation data from October 1, 1921, on a four-kilometer grid throughout the model area. C2VSimFG-Sutter has monthly rainfall data defined for every model element in order to preserve the spatial distribution of the monthly rainfall. Each of the model elements was mapped to the nearest available PRISM reference nodes, uniformly distributed across the model domain. The PRISM dataset is available online from Oregon State University through a partnership with the NRCS National Water and Climate Center (Oregon State University, 2023).

Streamflow: Monthly inflow to the Sutter Subbasin were updated for Sacramento River, Feather River, Honcut Creek, Yuba River, and Bear River. Sources of data included USGS (USGS, 2023) and CDEC (CDEC, 2023).

Results

Evaluation of WY 2022 shows that the Sutter Subbasin experienced, on an average and net basis, 259,000 AF of inflows and 304,000 AF of outflows, leading to an annual decrease of groundwater in storage of 45,000 AF. This change in storage represents approximately 0.1% of the total 49 MAF of groundwater estimated to be in storage in the

Sutter Subbasin. Deep percolation from the root zone, primarily from surface water provided by the agricultural water agencies, is the largest contributor of groundwater inflow (155,000 AFY), followed by recharge from unlined canals or reservoirs and ungauged watersheds (33,000 AFY), boundary flows from surrounding groundwater subbasins and the Sutter Buttes (66,000 AFY), and subsidence (5,000 AFY)[1]. Groundwater production (206,000 AFY)[2] and loss to streams (98,000 AFY) account for the outflows from the Sutter Subbasin.

[1] Subsidence is considered an inflow to the groundwater system as a result of land compaction freeing up previously inaccessible water held by clays and releasing this water for beneficial use. 5,000 AFY in subsidence inflow to the groundwater system is equal to approximately 0.24 inches (or 0.02 feet) of subsidence on average across the Sutter Subbasin in WY 2022, which is consistent with InSAR data presented in **Figure 3-21** showing subsidence between -0.1 and 0.1 feet across much of the Subbasin.
[2] Note: Groundwater production estimated from C2VSimFG-Sutter for WY 2021 differs from Table 3-1, as C2VSimFG-Sutter calculates groundwater demand using land use methods and Table 3-1 includes both direct and estimated groundwater pumped as reported by the Sutter Subbasin GSAs.

4. GROUNDWATER SUBSTITUTION TRANSFERS

Table 4-1 includes updates to Table 2-4 in the Sutter Subbasin GSP (January 2022) to include final groundwater substitution transfer volumes for WYs 2021 and 2022 as well as revised groundwater substitution transfer volumes back to WY 2009 for Sutter Extension Water District, Butte Water District, and Garden Highway Mutual Water Company. Additionally, WY 2009 through 2022 groundwater substitution transfer volumes are reported in **Table 4-1** for the following entities that were not reported in the Sutter Subbasin GSP (January 2022): Tule Basin Farms; Tudor Mutual Water Company; Sutter Mutual Water Company; Pelger Mutual Water Company; Pelger Road 1700; Henle Family, LP; and Windswept Land & Livestock. During WY 2023, the Sutter Subbasin GSAs will work on developing a Subbasin-wide methodology for evaluating and approving groundwater substitution transfers and updates will be provided in subsequent annual reports.

The Long-Term Water Transfers Environmental Impact Statement/Environmental Impact Report (EIS/EIR) prepared by USBR and San Luis & Delta-Mendota Water Authority (September 2019) evaluates water transfers conducted by Central Valley Project (CVP) contractors located south of the Sacrament-San Joaquin Delta or in the San Francisco Bay Area that would be conveyed through the Delta using CVP or State Water Project (SWP) pumps or facilities owned by other agencies in the San Francisco Bay Area. USBR facilitates transfers proposed by buyers and sellers. San Luis & Delta-Mendota Water Authority, consisting of federal and exchange water service contractors in western San Joaquin Valley, San Benito, and Santa Clara counties, helps to negotiate transfers in years when its member agencies could experience shortages. The EIS/EIR addresses the transfer of water to CVP contractors from CVP and non-CVP sources of supply that must be conveyed through the Delta using CVP, SWP, and local facilities, and identifies the following entities within the Sutter Subbasin as potential groundwater substitution transfer participants:

- Burrough Farms (Windswept Land & Livestock)
- Cranmore Farms (Pelger Road 1700)
- Giusti Farms
- Henle Family Ltd. Partnership
- Pelger Mutual Water Company
- Sutter Mutual Water Company
- Butte Water District
- Garden Highway Mutual Water Company
- Gilsizer Slough Ranch

- Goose Club Farms and Teichert Aggregates
- Tule Basin Farms

The EIS/EIR (September 2019) also analyzes the total upper limit of groundwater substitution transfers (in AF) proposed by the entities listed above at 74,170 AF between April and September each year, far exceeding the total historical transfers in any given year reported in **Table 4-1** (maximum of 33,447 in calendar year 2021).

Groundwater substitution transfer participants within the Sutter Subbasin must receive written concurrence from the overlying GSA identifying that the proposed transfer is consistent with the Subbasin's GSP. The GSA will make this determination based on items relevant to a proposed groundwater substitution transfer such as the available details for the proposed transfer, current groundwater conditions, quantities contained in **Table 4-1**, analyses and requirements identified in the Long-term Water Transfers EIS/EIR (September 2019), and any other relevant information, as applicable.

Table 4-1: Groundwater Substitution Transfers in Sutter Subbasin in Acre-Feet per Year, 2009 through 2022 (Revised Table 2-4 from GSP)

Water Year	Sutter Extension Water District	Butte Water District	Garden Highway Mutual Water Company	Tule Basin Farms	Tudor Mutual Water Company	Sutter Mutual Water Company	Pelger Mutual Water Company	Pelger Road 1700	Henle Family, LP	Windswept Land and Livestock	Total Water Transfers
2009	3,103	4,102	2,730	3,417	-	-	1,640	-	-	-	**14,992**
2010	2,870	3,847	4,082	3,520	-	-	-	-	-	-	**14,319**
2011	-	-	-	-	-	-	-	-	-	-	**-**
2012	-	-	-	-	-	-	-	-	-	-	**-**
2013	2,863	3,839	3,855	2,802	-	-	1,730	-	-	-	**15,089**
2014	4,106	5,350	3,791	-	-	-	3,975	-	-	-	**17,222**
2015	1,738		-	-	-	-	3,992	1,803	-	-	**7,533**
2016	-	-	-	-	-	-	-	-	-	-	**-**
2017	-	-	-	-	-	-	-	-	-	-	**-**
2018	3,611	4,324	4,807	3,050	-	-	-	-	-	-	**15,792**
2019	-	-	-	-	-	-	-	-	-	-	**-**
2020	2,653	2,655	5,546	2,830	-	5,322	1,599	1,977	220	655	**23,457**
2021	3,491	3,825	1,817	-	-	16,239	3,750	2,391	501	1,433	**33,447**
2022	3,279	4,113	2,756	-	250	-	-	-	-	-	**10,398**
Total	**27,714**	**32,055**	**29,384**	**15,619**	**250**	**21,561**	**16,686**	**6,171**	**721**	**2,088**	**152,249**

Note: Values based on final transfer quantities (post-baseline and pre-depletions). Transfer volumes reported in **Table 3-1** and **Table 3-3** reflect total groundwater pumped for transfer

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5. REFERENCES

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APPENDIX A

GSP Implementation Progress






SUTTER SUBBASIN

Water Year 2022 Annual Report to the

GROUNDWATER SUSTAINABILITY PLAN

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Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
Ongoing and Planned Projects and Management Actions: Projects and Management Actions in this category are planned to be completed prior to 2042. The expected yield of these projects and management actions are expected to support GSAs in achieving the GSP sustainability goal and responding to changing conditions in the Subbasin.				
System Modernization	Improved Water Management	Butte Water District	Upgrade and modernize system infrastructure to improve system operability and efficiency, reduce operational spillage, and enhancing the timing of farm deliveries. Modernization improvements to District infrastructure will include: 1. Improvements at canal headings to improve water level control, flow control, flow measurement, Supervisory Control and Data Acquisition (SCADA), and automation/measurement 2. Improvements at customer delivery turnouts to improve delivery flexibility and steadiness	Project included in SGM Grant Program SGMA Implementation – Round 2 grant application submitted to DWR in December 2022 (draft awards anticipated June 2023)
System Modernization	Improved Water Management	Sutter Extension Water District	Upgrade and modernize system infrastructure to improve system operability and efficiency, reduce operational spillage, and enhance the timing of farm deliveries. Modernization improvements to District infrastructure will include:	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
			1. Improvements at canal headings 2. Improvements to upstream water level control 3. Improvements to spill structures 4. Real-time monitoring through the establishment of a SCADA system.	
Boundary Flow and Primary Spill Measurement and Drainage Recovery Projects	Improved Water Management	Butte Water District	Install measurement and monitoring equipment at boundary outflow and spillage sites to allow real-time monitoring and adjustment to upstream operations. Real-time monitoring will be implemented through the establishment of a District SCADA system.	Project included in Butte Subbasin's SGM Grant Program SGMA Implementation – Round 2 grant application submitted to DWR in December 2022 (draft awards anticipated June 2023); Anticipated project will also benefit the Sutter Subbasin portion of Butte Water District service area
Boundary Flow and Primary Spill Measurement and Drainage Recovery Projects	Improved Water Management	Sutter Extension Water District	Install measurement and monitoring equipment at boundary outflow and spillage sites to allow real-time monitoring and adjustment to upstream operations. Real-time monitoring will be implemented through the establishment of a District SCADA system.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Dual Source Irrigation Systems	In-Lieu Recharge	Butte Water District	Incentivize the use of irrigation systems capable of using both	Project included in SGM Grant Program SGMA Implementation –

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
			surface water and groundwater. These systems will increase use of surface water and on-farm recharge of surface water, and offset groundwater pumping.	Round 2 grant application submitted to DWR in December 2022 (draft awards anticipated June 2023)
Multi-Benefit Recharge	Direct Recharge	Multi-Agency/GSA	A multi-benefit recharge program will provide groundwater recharge through normal farming operations while also providing critical wetland habitat for waterbirds migrating along the Pacific Flyway. Fields with soil and cropping conditions conducive to groundwater recharge will be flooded and maintained with shallow depths. Water will be sourced from existing water rights contracts, depending on availability. GSAs may also consider financial compensation for participation to offset field preparation, irrigation, and water costs.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Grower Education	Improved Water Management	Multi-Agency/GSA	A grower education and outreach program is proposed as a management action for the Sutter Subbasin. The program will provide growers with educational	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
			resources that help them to plan and implement on-farm practices that simultaneously support groundwater sustainability and maintain or improve agricultural productivity.	
Installation of Additional Shallow Groundwater Monitoring Wells	Additional Data Monitoring	Multi-Agency/GSA	Install 15 shallow monitoring wells in key areas of the Subbasin to support monitoring of interconnected surface water, particularly near the Sutter Bypass.	A Technical Support Services (TSS) application has been submitted and approved by DWR. Sutter County will be working with DWR on the identification of well locations and will begin outreach to landowners for permission to install wells.
Sutter Subbasin Well Permit Application Approval Process	Improved Water Management	Subbasin GSAs	A Subbasin-wide process is being developed for reviewing and verifying permit applications for new wells and modifications to existing wells to ensure their use does not impact the Subbasin's ability to reach its sustainability goal.	Process development is currently under way.
Sutter Subbasin Groundwater Transfer Approval Process	Improved Water Management	Subbasin GSAs	A Subbasin-wide process is being developed for reviewing and approving proposed groundwater substitution transfers to ensure that it does not impact the	Process development is currently under way.

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
			Subbasin's ability to reach its sustainability goal.	
Projects and Management Actions to be Implemented As Needed: Projects and Management Actions in this category are proposed as potential projects that GSAs may wish to implement, as needed, to support ongoing sustainability, to adapt to changing conditions in the Subbasin, and to achieve other water management objectives.				
Removal of Bottlenecks on the Sutter-Butte Main Canal	In-Lieu Recharge	Butte Water District	Increased ability to meet irrigation and environmental water needs using available surface water.	Initial in-house planning and study started in WY 2022
Improved Delivery Service to Pressurized Irrigation Systems	In-Lieu Recharge	Butte Water District	Increased ability to meet irrigation water needs using available surface water.	Project included in Butte Subbasin's SGM Grant Program SGMA Implementation – Round 2 grant application submitted to DWR in December 2022 (draft awards anticipated June 2023); Anticipated project will also benefit the Sutter Subbasin portion of Butte Water District service area
Wetlands Water Management	Wildlife Habitat Improvement	Central Valley Joint Venture	Securing firm water supplies to wetlands refuges within the Subbasin.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Advanced Treatment and Water Recycling	Direct and In-Lieu Recharge	City of Yuba City	Conduct a feasibility study for constructing a Recycled Water Facility and analyze the possibility of implementing advanced treatment and water recycling at	Applying for 2023 United States Bureau of Reclamation Water SMART: Water Recycling and Desalination Planning grant

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
			the City's Wastewater Treatment Facility (WWTF) for direct and in-lieu recharge.	To help fund development of a feasibility study for upgrading wastewater treatment facility processes to meet tertiary effluent standards and for installing conveyance system for recycled water
Aquifer Storage & Recovery and Second Well	Direct Recharge	City of Yuba City	This project involves investigating the feasibility of and implementing an aquifer storage recovery (ASR) well to store water during wet periods and provide additional groundwater in dry periods.	In March 2022, DWR authorized $6.3 million in grant funding toward the development of an aquifer storage and recovery (ASR) system for the City of Yuba City; City is developing a Request for Proposal (RFP) to find a qualified consultant for environmental services, permitting, and design for the project
Backwash Recovery	Surface Water Supply Augmentation	City of Yuba City	Reduce the amount of water being diverted from the Feather River for supply by 0.42 million gallons per day (MGD) (or 475 acre-feet per year) through treatment and distribution of backwash.	Project still in planning phase
Electrical SCADA and Telemetry	Additional Data Monitoring	City of Yuba City	Update the existing 20-year-old SCADA and telemetry for water treatment plant and distribution system to help the City monitor,	City staff are developing an Electrical and Instrumentation pre-design RFP to find a qualified consultant to identify the electrical

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
			manage data and control processes more effectively, and improve management of local water supplies.	and instrumentation needs for the water treatment plant
Groundwater Well Rehabilitation	Water Quality Enhancement	City of Yuba City	Rehabilitate three Hillcrest Water Company groundwater wells and install treatment facilities to provide emergency groundwater sources to supplement surface water supplies in low-water years.	Two of the three groundwater wells have been videoed and staff are awaiting further feedback about the potential rehabilitation each well might need
New Outfall Diffuser Installation	Water Quality Enhancement	City of Yuba City	Construct a new outfall diffuser from the treatment plant into the Feather River to be able to discharge to the river under all river flows, resulting in 6,600 acre-feet (AF) of treated effluent being placed back into the Feather River for beneficial uses.	An application for Clean Water State Revolving Fund financing was submitted to the State Water Resources Finance Division on December 30, 2022; City has completed design for pipeline and diffuser project construction project
Replacement of Sewer Mains	Water Quality Enhancement	City of Yuba City	Replace old and deteriorated sewer lines throughout the City and reduce groundwater quality impacts resulting from leaking sewer lines.	City conducted several small sewer main replacements in 2022; Total main lines replaced add up to less than one mile; City anticipates additional main replacements in 2023
Replacement of Water Distribution Mains	Reduce Groundwater Demand	City of Yuba City	Replace portions of the water distribution close to reaching their end of service life, enabling the	City conducted several small water main replacements in 2022; Total water lines replaced add up to less

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
			City to more effectively control water supply losses due to system leakage and reduce groundwater pumping due to system losses.	than one mile; City anticipates an increase in water line replacement projects in 2023
Feather River Pump Station Fish Screen Feasibility Study	Wildlife Habitat Improvement	Garden Highway Mutual Water Company	Contribute to wildlife habitat improvement by perform a Feasibility Study which analyzes three fish screen and two non-screen alternatives for Feather River surface water diversion pump station.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Installation of Fish Screens at Sutter Bypass Pumping Plants	Wildlife Habitat Improvement	Multi-Agency/GSA	Install fish screens to prevent entrainment of endangered juvenile salmonids and other fish species.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Rice Field Infiltration Study to Promote FloodMAR Projects	Direct Recharge	Multi-Agency/GSA	Conduct an infiltration study to promote Flood Managed Aquifer Recharge (FloodMAR) projects and determine the feasibility and amount of infiltration a FloodMAR project in rice could provide.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Improved Service to Pressurized Irrigation Systems	In-Lieu Recharge	Sutter Extension Water District	Increased ability to meet irrigation water needs using available surface water.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
Removal of Main Canal Bottlenecks	In-Lieu Recharge	Sutter Extension Water District	Increased ability to meet irrigation and environmental water needs using available surface water.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Sunset Project for Integrated Restoration and Efficiency (SPIRE)	Surface Water Supply Augmentation	Sutter Extension Water District	Provide up to 200 cubic feet per second (cfs) increased conveyance capacity from the Thermalito Afterbay to the District, eliminating the need for the Sunset Pumps Dam as well as the Sunset Pumps to augment surface water supply and improve wildlife habitat.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Projects and Management Actions to be Implemented As Needed to Address Data Gaps: Projects and Management Actions in this category are proposed as potential projects that GSAs may wish to implement, as needed, to support ongoing sustainability, to adapt to changing conditions in the Subbasin, and to achieve other water management objectives that will specifically address data gaps identified in this GSP.				
Investigation of Interactions Between Rivers and Changes in Groundwater Levels	Addressing Additional Data Gaps	Multi-Agency/GSA	Collect additional data to assist in developing appropriate sustainable management criteria for interconnected surface waters and analyzing changes in stream-aquifer interactions.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Investigation of Source of Elevated Salinity within Shallow Aquifer Zone	Addressing Additional Data Gaps	Multi-Agency/GSA	Collect additional data needed to evaluate the source of elevated salinity levels within the shallow aquifer zone.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
Study of Aquifer Properties	Addressing Additional Data Gaps	Multi-Agency/GSA	Conduct additional aquifer pumping tests to assess aquifer properties in the Sutter Subbasin.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Additional Assessments of Groundwater Recharge Dynamics and Effects	Addressing Additional Data Gaps	Multi-Agency/GSA	Conduct additional aquifer studies to assess the dynamics and effects of groundwater recharge in the Subbasin, particularly those effects of GSP projects.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Analysis of Recharge Rates	Addressing Additional Data Gaps	Multi-Agency/GSA	Conduct additional analyses of recharge rates to assess historical groundwater recharge rates and assess hydraulic connection between different zones in the aquifer system.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Data Collection to Improve the Hydrogeologic Conceptual Model	Addressing Additional Data Gaps	Multi-Agency/GSA	Collect additional data to understand the hydrogeology of the Sutter Subbasin and bolster the hydrogeologic conceptual model.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
AEM Survey of Sutter Buttes	Addressing Additional Data Gaps	Multi-Agency/GSA	Conduct airborne electromagnetic (AEM) survey to improve understanding of the unique geology and hydrogeology of the Sutter Buttes.	Project included in SGM Grant Program SGMA Implementation – Round 2 grant application submitted to DWR in December 2022 (draft awards anticipated June 2023)

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
Development of Uniform Criteria for Defining Stratigraphic Zones	Addressing Additional Data Gaps	Multi-Agency/GSA	Develop and recommended a uniform set of criteria for defining stratigraphic zones and for logging cuttings from soil boring drilled in the Subbasin.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Comprehensive Sutter Subbasin Groundwater Quality Evaluation	Addressing Additional Data Gaps	Multi-Agency/GSA	Conduct a comprehensive groundwater quality evaluation for the Sutter Subbasin.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Video Survey RMS Wells with Unknown Construction	Addressing Additional Data Gaps	Multi-Agency/GSA	Conduct video surveys of representative monitoring site (RMS) wells with unknown construction information in order to collect missing information.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Monitoring Well Refinements	Addressing Additional Data Gaps	Multi-Agency/GSA	Refine and improve the Subbasin monitoring network by identifying and adding additional, dedicated monitoring wells of known construction, and by collecting and confirming well construction information.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Sutter Buttes Salinity Monitoring	Addressing Additional Data Gaps	Multi-Agency/GSA	Monitor groundwater salinity (based on electrical conductivity [EC] measurements) at selected locations near the Sutter Buttes on a temporary or permanent basis.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
Sutter Buttes Water Quality Inter-Basin Working Group	Addressing Additional Data Gaps	Multi-Agency/GSA	Participate in an inter-basin working group focused on collaborative discussions, consensus-building and planning to address groundwater quality matters associated with the unique geology of the Sutter Buttes area.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Groundwater Dependent Ecosystem Mapping Confirmation	Addressing Additional Data Gaps	Multi-Agency/GSA	Conduct an on-ground survey to confirm mapping of groundwater dependent ecosystems (GDEs) to support ongoing investigation and monitoring of the relationship between the health of GDEs, groundwater levels, and access to water supplies.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Well Census	Addressing Additional Data Gaps	Multi-Agency/GSA	Conduct a survey of wells in the Subbasin to identify the location of previously unknown wells, determine their status (e.g., destroyed, active), and/or collect construction information to better inform groundwater use in the Subbasin.	Project status presented in the GSP is up to date; Updates regarding activity progress will be included in future Annual Reports
Land Subsidence Monitoring Evaluation	Addressing Additional Data Gaps	Multi-Agency/GSA	Conduct an assessment of land subsidence data to determine the optimal frequency for ongoing	Project status presented in the GSP is up to date; Updates

Project/Management Action Name	Project/ Management Action Type	Proponent	Brief Description	Project Status
			collection and analysis of data relating to inelastic land subsidence.	regarding activity progress will be included in future Annual Reports

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APPENDIX B

Representative Well Monitoring Network Hydrographs

SUTTER SUBBASIN

Water Year 2022 Annual Report to the

GROUNDWATER SUSTAINABILITY PLAN

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Table B-1: Representative Groundwater Levels Monitoring Network Wells

Site Code	State Well Number	Local ID / Other ID	Aquifer Zone	Overlying GSA	Status	Well Use	Depth (ft bgs)	Screen Interval (ft bgs)	Minimum Threshold (feet above MSL, NAVD88)	Measurable Objective / Interim Milestone (feet above MSL, NAVD88)
- *	12N02E09B002M	USGS-385431121451401	Shallow	Reclamation District No. 1500 GSA	Active	Unknown	29	-	12.3	20.3
- *	12N03E18H001M	USGS-385314121401701	Shallow	Reclamation District No. 1500 GSA	Active	Unknown	50	-	13.32	21.32
- *	14N02E10R001M	USGS-390416121433601	Shallow	Sutter Extension WD GSA	Active	Unknown	44	-	25.09	36.63
390696N1217778W001	14N02E17C001M	Sutter County MW-1A	Shallow	Reclamation District No. 1660 GSA	Active	Observation	60	30 - 50	21.5	29.5
- *	15N02E20D001M	USGS-390832121463601	Shallow	Sutter County GSA	Active	Unknown	35	-	29.5	37.5
391975N1218937W001 *	16N01E31H001M	-	Shallow	Sutter County GSA	Active	Unknown	36	-	29.9	41.46
392328N1216469W001 *	16N03E21D002M	-	Shallow	Sutter County GSA	Active	Residential	30	-	44.44	61.53
387859N1216565W001	11N03E20H003M	RD 1500 Karnak	AZ-1	Reclamation District No. 1500 GSA	Active	Industrial	165	135 - 156	10.51	18.51
388761N1217094W001	12N02E23H001M	Sutter County MW-2A	AZ-1	Sutter County GSA	Active	Observation	150	120 - 140	7.58	15.58
389605N1218102W003	13N01E24G004M	Flood MW-1C (shall) [1]	AZ-1	Reclamation District No. 1500 GSA	Active	Observation	100	70 - 90	13	23.33
390087N1216722W001	13N03E06A001M	Sutter County MW-6A	AZ-1	Sutter County GSA	Active	Observation	65	45 - 55	21.13	29.13
390426N1218166W001 *	14N01E24N001M	-	AZ-1	Reclamation District No. 1660 GSA	Active	Irrigation	145	-	23.58	31.58
390682N1216901W001	14N02E13A003M	SEWD MW-3A	AZ-1	Sutter Extension WD GSA	Active	Observation	115	90 - 110	37.37 [2]	45.37 [2]
390588N1217004W001	14N02E13L001M	-	AZ-1	Sutter Extension WD GSA	Active	Irrigation	82	68 - 82	15.93	35.8
390176N1217902W001 *	14N02E31K001M	-	AZ-1	Reclamation District No. 1500 GSA	Active	Unknown	131	-	19.08	27.08
390244N1217813W001	14N02E32D001M	SMWC MW-1A	AZ-1	Reclamation District No. 1500 GSA	Active	Observation	64	34 - 54	18.34	26.34
390458N1216114W001	14N03E23D003M	Feather River MW-1A	AZ-1	Sutter County GSA	Active	Observation	65	40 - 60	15.78	25.14
391051N1217012W001	15N02E36L001M	-	AZ-1	Sutter Extension WD GSA	Active	Irrigation	150	100 - 150	22.54	41.09
392712N1216493W001 *	16N03E04E001M	-	AZ-1	Butte WD GSA	Active	Irrigation	70	-	43.18	51.18
392394N1216509W001	16N03E17J001M	Sutter County MW-3A	AZ-1	Sutter Extension WD GSA	Active	Observation	85	65 - 85	45.8	67.82
392970N1216907W003	17N02E25J003M	BWD MW-1C	AZ-1	Butte WD GSA	Active	Observation	127	70 - 90	60.03	68.03
389453N1216159W001	-	GH Well 2	AZ-1	Sutter County GSA	Active	Irrigation	70	50 - 70	22.09	30.09
391456N1218904W001	-	MFWC Prop 50	AZ-1	Reclamation District No. 70 GSA	Active	Irrigation	320	125 - 155	27.72	35.72
391026N1216302W001	-	Hillcrest Well #5	AZ-1 and AZ-2	City of Yuba City GSA	Inactive	Public Supply	320	94 - 118; 166 - 180; 264 - 288	15.47	31.97
389605N1218102W001	13N01E24G002M	Flood MW-1A (deep) [1]	AZ-2	Reclamation District No. 1500 GSA	Active	Observation	310	240 - 300	7.2	24.5
389605N1218102W002	13N01E24G003M	Flood MW-1B (int) [1]	AZ-2	Reclamation District No. 1500 GSA	Active	Observation	160	130 - 160	-7.9	21.89
391078N1216244W002	-	Hillcrest Well #8	AZ-2	City of Yuba City GSA	Inactive	Public Supply	254	-	17.34	33.84
391068N1216464W002	-	Hillcrest Well #9	AZ-2	City of Yuba City GSA	Inactive	Public Supply	190	-	14.35	30.85

Site Code	State Well Number	Local ID / Other ID	Aquifer Zone	Overlying GSA	Status	Well Use	Depth (ft bgs)	Screen Interval (ft bgs)	Minimum Threshold (feet above MSL, NAVD88)	Measurable Objective / Interim Milestone (feet above MSL, NAVD88)
390087N1216722W002	13N03E06A002M	Sutter County MW-6B	AZ-2	Sutter County GSA	Active	Observation	175	155 - 165	10.21	26.71
390087N1216722W003	13N03E06A003M	Sutter County MW-6C	AZ-2	Sutter County GSA	Active	Observation	265	245 - 255	9.91	26.41
389452N1215992W001	13N03E26J002M	Sutter County MW-4A	AZ-2	Sutter County GSA	Active	Observation	175	145 - 165	5.09	21.59
390682N1216901W002	14N02E13A004M	SEWD MW-3B	AZ-2	Sutter Extension WD GSA	Active	Observation	245	210 - 240	21.16 [2]	37.66 [2]
390696N1217778W002	14N02E17C002M	Sutter County MW-1B	AZ-2	Reclamation District No. 1660 GSA	Active	Observation	245	205 - 215	12.33	28.83
388761N1217094W002	12N02E23H002M	Sutter County MW-2B	AZ-2	Sutter County GSA	Active	Observation	300	210 - 220	-0.08	16.42
390244N1217813W002	14N02E32D002M	SMWC MW-1B	AZ-2	Reclamation District No. 1500 GSA	Active	Observation	210	170 - 200	10.01	26.51
390458N1216114W002	14N03E23D004M	Feather River MW-1B	AZ-2	Sutter County GSA	Active	Observation	260	235 - 255	-30.19	13
391658N1217070W001	15N02E12E001M	SEWD MW-1A	AZ-2	Sutter Extension WD GSA	Active	Observation	173	148 - 168	15.66	46.28
391658N1217070W002	15N02E12E002M	SEWD MW-1B [1]	AZ-2	Sutter Extension WD GSA	Active	Observation	266	240 - 260	23.14	39.64
391414N1217442W001	15N02E22D001M	-	AZ-2	Sutter County GSA	Active	Residential	302	-	24	40.5
391279N1216989W001	15N02E24P001M	SEWD MW-2A	AZ-2	Sutter Extension WD GSA	Active	Monitoring	254	204 - 244	24.51	41.01
391279N1216989W002	15N02E24P002M	SEWD MW-2B [1]	AZ-2	Sutter Extension WD GSA	Active	Monitoring	379	354 - 374	-16.3	29.31
392394N1216509W002	16N03E17J002M	Sutter County MW-3B	AZ-2	Sutter Extension WD GSA	Active	Observation	315	285 - 305	36.89	53.39
392970N1216907W002	17N02E25J002M	BWD MW-1B [1]	AZ-2	Butte WD GSA	Active	Observation	370	320 - 360	3.9	43.89
391283N1218286W001	-	BS2-Franklin	AZ-2	Reclamation District No. 70 GSA	Active	Irrigation	300	-	16.77	33.27
391613N1216236W001	-	WTP well	AZ-2 and AZ-3	City of Yuba City GSA	Active	Public Supply	-	370 - 390; 453 - 473	21.51	38.01
388761N1217094W003	12N02E23H003M	Sutter County MW-2C	AZ-3	Sutter County GSA	Active	Observation	600	570 - 590	-0.12	16.38
388761N1217094W004	12N02E23H004M	Sutter County MW-2D	AZ-3	Sutter County GSA	Active	Observation	705	655 - 665	-0.41	16.09
389452N1215992W002	13N03E26J003M	Sutter County MW-4B	AZ-3	Sutter County GSA	Active	Observation	445	425 - 435	4.12	20.62
389452N1215992W003	13N03E26J004M	Sutter County MW-4C	AZ-3	Sutter County GSA	Active	Observation	610	590 - 600	2.82	19.32
389452N1215992W004	13N03E26J005M	Sutter County MW-4D	AZ-3	Sutter County GSA	Active	Observation	1005	985 - 995	0.34	16.84
390682N1216901W003	14N02E13A005M	SEWD MW-3C	AZ-3	Sutter Extension WD GSA	Active	Observation	585	550 - 580	18.52 [2]	35.02 [2]
390696N1217778W003	14N02E17C003M	Sutter County MW-1C	AZ-3	Reclamation District No. 1660 GSA	Active	Observation	425	395 - 415	5.77	25.72
390696N1217778W004	14N02E17C004M	Sutter County MW-1D	AZ-3	Reclamation District No. 1660 GSA	Active	Observation	755	725 - 745	11.91	28.41
390244N1217813W003	14N02E32D003M	SMWC MW-1C	AZ-3	Reclamation District No. 1500 GSA	Active	Observation	500	460 - 490	8.85	25.35
390458N1216114W003	14N03E23D005M	Feather River MW-1C	AZ-3	Sutter County GSA	Active	Observation	689	664 - 684	11.05	27.55
390458N1216114W004	14N03E23D006M	Feather River MW-1D	AZ-3	Sutter County GSA	Active	Observation	1021	996 - 1016	9.49	25.99
391658N1217070W003	15N02E12E003M	SEWD MW-1C [1]	AZ-3	Sutter Extension WD GSA	Active	Observation	559	524 - 554	22.91	39.41
391279N1216989W003	15N02E24P003M	SEWD MW-2C [1]	AZ-3	Sutter Extension WD GSA	Active	Monitoring	488	438 - 478	-13.8	29.8
392394N1216509W003	16N03E17J003M	Sutter County MW-3C	AZ-3	Sutter Extension WD GSA	Active	Observation	430	400 - 420	34.68	51.18

Site Code	State Well Number	Local ID / Other ID	Aquifer Zone	Overlying GSA	Status	Well Use	Depth (ft bgs)	Screen Interval (ft bgs)	Minimum Threshold (feet above MSL, NAVD88)	Measurable Objective / Interim Milestone (feet above MSL, NAVD88)
392394N1216509W004	16N03E17J004M	Sutter County MW-3D	AZ-3	Sutter Extension WD GSA	Active	Observation	615	595 - 605	31.78	48.28
392394N1216509W005	16N03E17J005M	Sutter County MW-3E	AZ-3	Sutter Extension WD GSA	Active	Observation	785	765 - 785	31.21	47.71
392970N1216907W001	17N02E25J001M	BWD MW-1A [1]	AZ-3	Butte WD GSA	Active	Observation	591	486 - 586	10.1	35.01
392867N1217825W001 *	17N02E31A001M	-	AZ-3	Sutter County GSA	Active	Irrigation	540	-	21.35	50.35

* No WY 2022 seasonal high or seasonal low measurements available.

[1] Hydrograph appears to be indicative of data points collected while active nearby pumping. See below hydrograph for context.

[2] Sustainable management criteria numeric value revised since GSP adoption to address discrepancy in the well record due to fluctuating reference point elevation.

Table B-2: Representative Depletions of Interconnected Surface Water Monitoring Network Wells

Site Code	State Well Number	Local ID / Other ID	Aquifer Zone	Overlying GSA	Status	Well Use	Depth (ft bgs)	Screen Interval (ft bgs)	Minimum Threshold (feet above MSL, NAVD88)	Measurable Objective / Interim Milestone (feet above MSL, NAVD88)
- *	12N03E18H001M	USGS-385314121401701	Shallow	Reclamation District No. 1500 GSA	Active	Unknown	50	-	13.32	21.32
- *	14N02E10R001M	USGS-390416121433601	Shallow	Sutter Extension WD GSA	Active	Unknown	44	-	25.09	36.63
- *	15N02E20D001M	USGS-390832121463601	Shallow	Sutter County GSA	Active	Unknown	35	-	29.5	37.5
391975N1218937W001 *	16N01E31H001M	-	Shallow	Sutter County GSA	Active	Unknown	36	-	29.9	41.46
392328N1216469W001 *	16N03E21D002M	-	Shallow	Sutter County GSA	Active	Residential	30	-	44.44	61.53
389563N1215843W001	-	GH East MW Site	Shallow	Sutter County GSA	Active	Monitoring	40	30 - 40	13.03	21.03
389571N1215858W001	-	GH North MW Site	Shallow	Sutter County GSA	Active	Monitoring	40	30 - 40	14.39	22.39
389233N1218022W001 *	12N01E01A001M	-	AZ-1	Reclamation District No. 1500 GSA	Active	Unknown	75	-	15.11	23.11
388813N1217525W001 **	12N02E21Q001M	SR-1A	AZ-1	None - Yolo Subbasin	Active	Monitoring	68	54 - 64	14.74	22.74
389937N1218240W001	13N01E11A001M	-	AZ-1	None - Colusa Subbasin	Active	Domestic	145	-	18.69	27.5
390458N1216114W001	14N03E23D003M	Feather River MW-1A	AZ-1	Sutter County GSA	Active	Observation	65	40 - 60	15.78	25.14
392394N1216509W001	16N03E17J001M	Sutter County MW-3A	AZ-1	Sutter Extension WD GSA	Active	Observation	85	65 - 85	45.8	67.82
389453N1216159W001	-	GH Well 2	AZ-1	Sutter County GSA	Active	Irrigation	70	50 - 70	22.09	30.09
389398N1216162W001	-	GH Well 3	AZ-1	Sutter County GSA	Active	Irrigation	100	52 - 100	17.04	25.04
389410N1215884W001	-	GH Well 18	AZ-1	Sutter County GSA	Active	Irrigation	150	90 - 100	5.65	19.08
388869N1216445W002 **	-	Ma-1	AZ-1	Reclamation District No. 1500 GSA	Active	Irrigation	140	103 - 133	14.36	22.36
390458N1216114W002	14N03E23D004M	Feather River MW-1B	AZ-2	Sutter County GSA	Active	Observation	260	235 - 255	-30.19	13
392394N1216509W002	16N03E17J002M	Sutter County MW-3B	AZ-2	Sutter Extension WD GSA	Active	Observation	315	285 - 305	36.89	53.39
390458N1216114W003	14N03E23D005M	Feather River MW-1C	AZ-3	Sutter County GSA	Active	Observation	689	664 - 684	11.05	27.55
390458N1216114W004	14N03E23D006M	Feather River MW-1D	AZ-3	Sutter County GSA	Active	Observation	1021	996 - 1016	9.49	25.99
392394N1216509W003	16N03E17J003M	Sutter County MW-3C	AZ-3	Sutter Extension WD GSA	Active	Observation	430	400 - 420	34.68	51.18
392394N1216509W004	16N03E17J004M	Sutter County MW-3D	AZ-3	Sutter Extension WD GSA	Active	Observation	615	595 - 605	31.78	48.28
392394N1216509W005	16N03E17J005M	Sutter County MW-3E	AZ-3	Sutter Extension WD GSA	Active	Observation	785	765 - 785	31.21	47.71

* No WY 2022 seasonal high or seasonal low measurements available.

** WY 2022 seasonal high measurement available. No WY 2022 seasonal low measurement available.

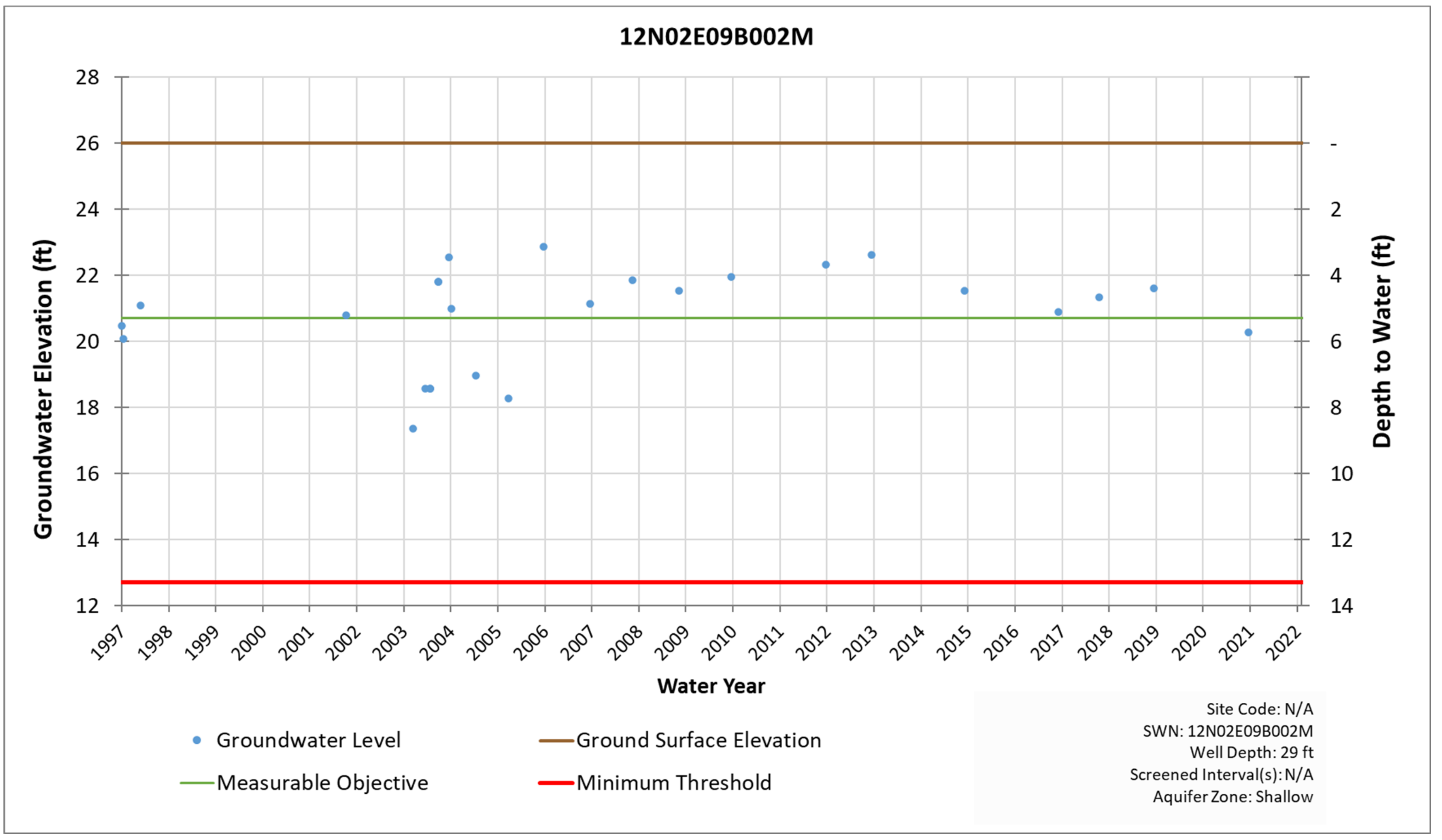
Table B-3: Sacramento Valley Water Year Hydrologic Classification Index

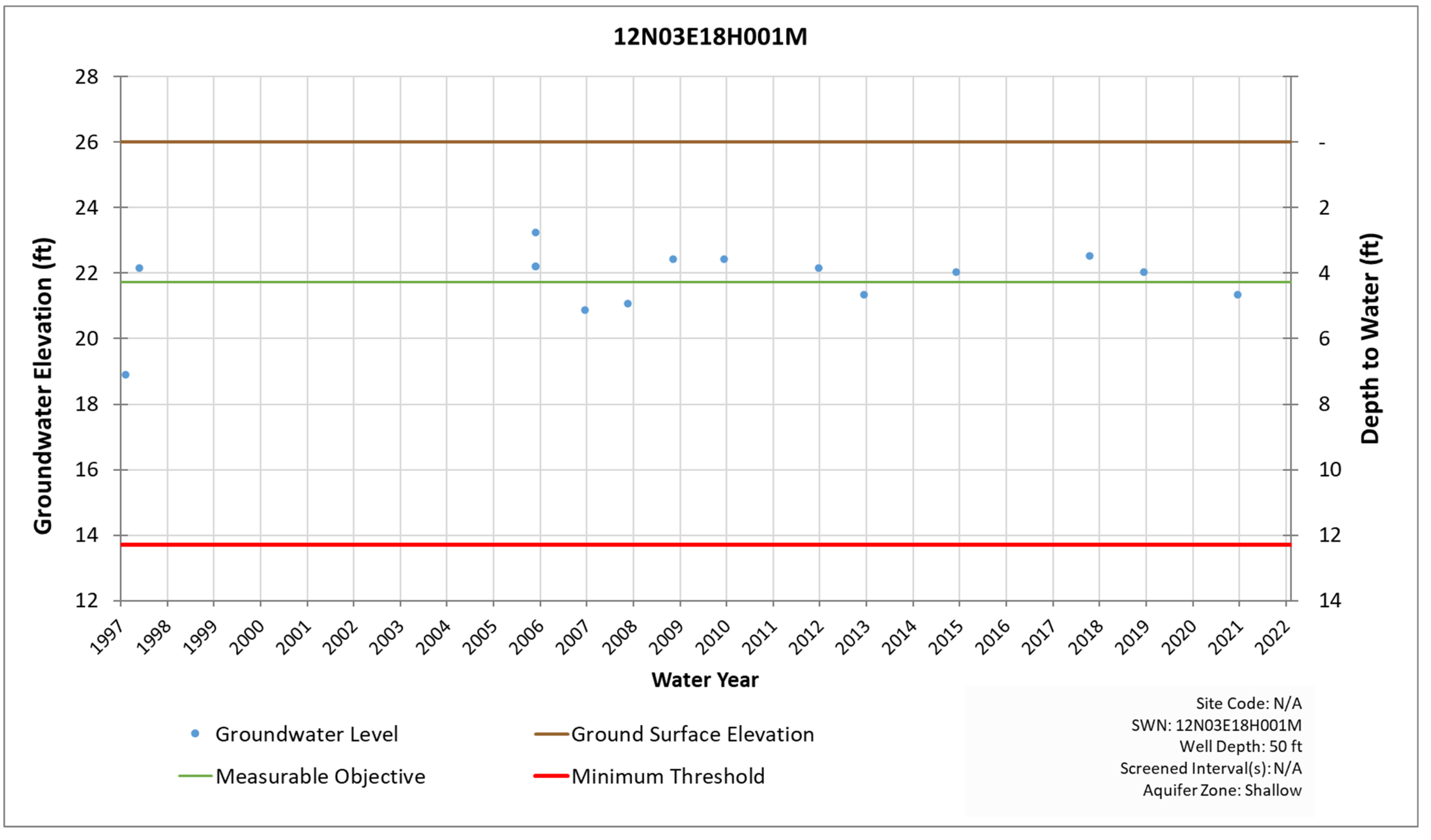
Water Year	Classification
1933	Critically Dry
1934	Critically Dry
1935	Below Normal
1936	Below Normal
1937	Below Normal
1938	Wet
1939	Dry
1940	Above Normal
1941	Wet
1942	Wet
1943	Wet
1944	Dry
1945	Below Normal
1946	Below Normal
1947	Dry
1948	Below Normal
1949	Dry
1950	Below Normal
1951	Above Normal
1952	Wet
1953	Wet
1954	Above Normal
1955	Dry
1956	Wet
1957	Above Normal
1958	Wet
1959	Below Normal
1960	Dry
1961	Dry
1962	Below Normal
1963	Wet
1964	Dry
1965	Wet
1966	Below Normal
1967	Wet
1968	Below Normal
1969	Wet
1970	Wet
1971	Wet
1972	Below Normal
1973	Above Normal
1974	Wet
1975	Wet
1976	Critically Dry
1977	Critically Dry
1978	Above Normal
1979	Below Normal
1980	Above Normal
1981	Dry
1982	Wet
1983	Wet
1984	Wet
1985	Dry
1986	Wet
1987	Dry
1988	Critically Dry
1989	Dry
1990	Critically Dry
1991	Critically Dry
1992	Critically Dry
1993	Above Normal
1994	Critically Dry
1995	Wet
1996	Wet

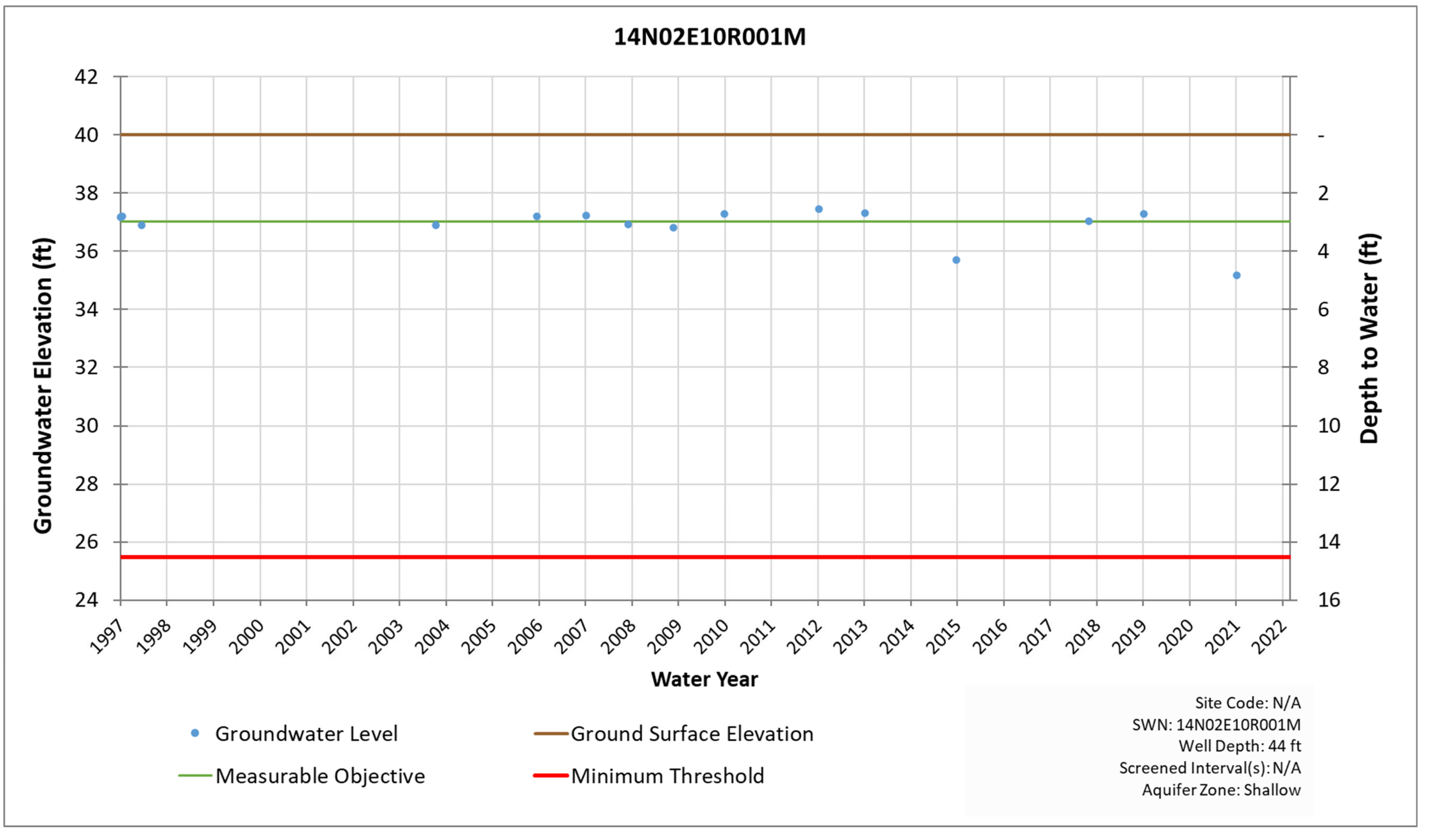
Water Year	Classification
1997	Wet
1998	Wet
1999	Wet
2000	Above Normal
2001	Dry
2002	Dry
2003	Above Normal
2004	Below Normal
2005	Above Normal
2006	Wet
2007	Dry
2008	Critically Dry
2009	Dry
2010	Below Normal
2011	Wet
2012	Below Normal
2013	Dry
2014	Critically Dry
2015	Critically Dry
2016	Below Normal
2017	Wet
2018	Below Normal
2019	Wet
2020	Dry
2021	Critically Dry
2022	Critically Dry

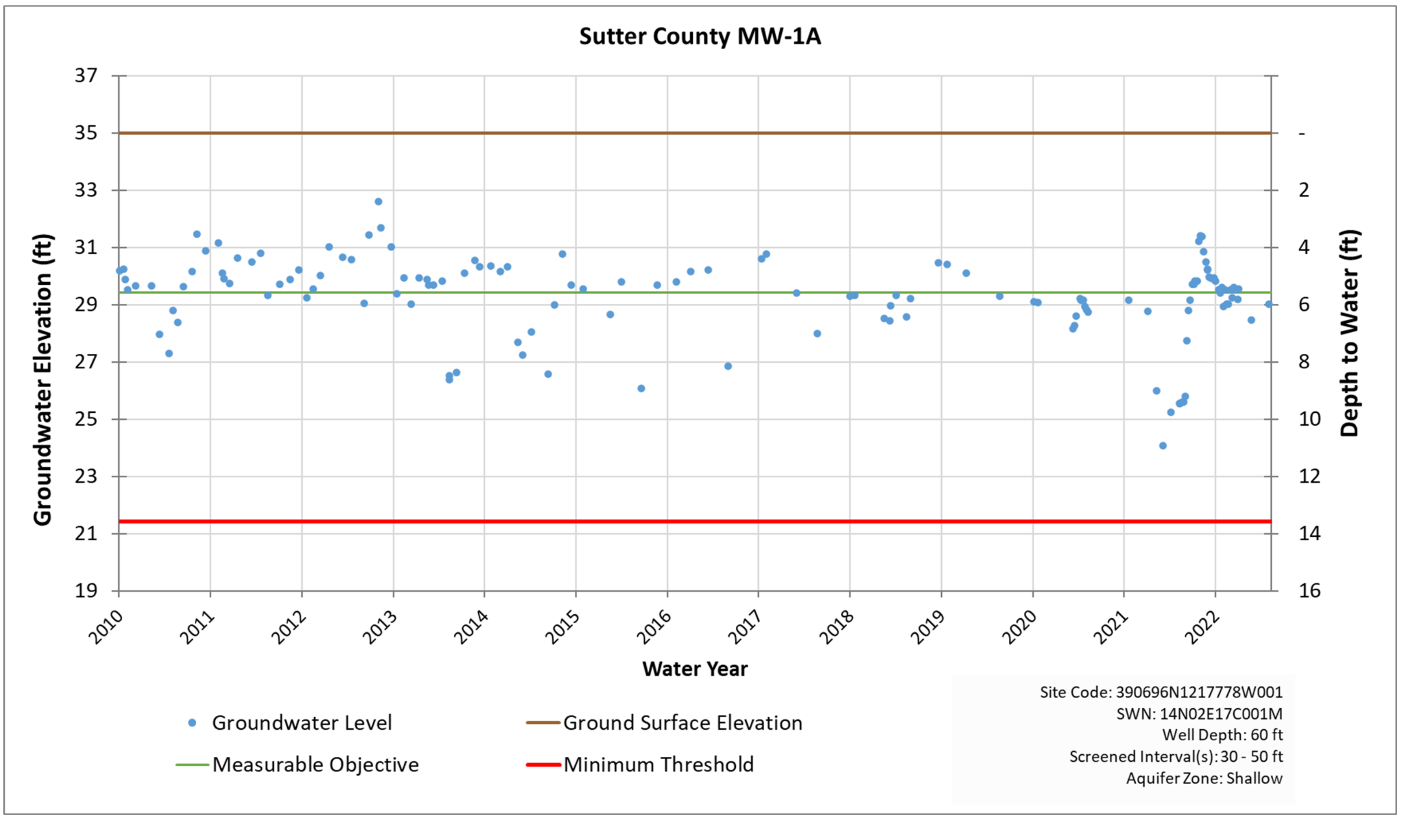
Source: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

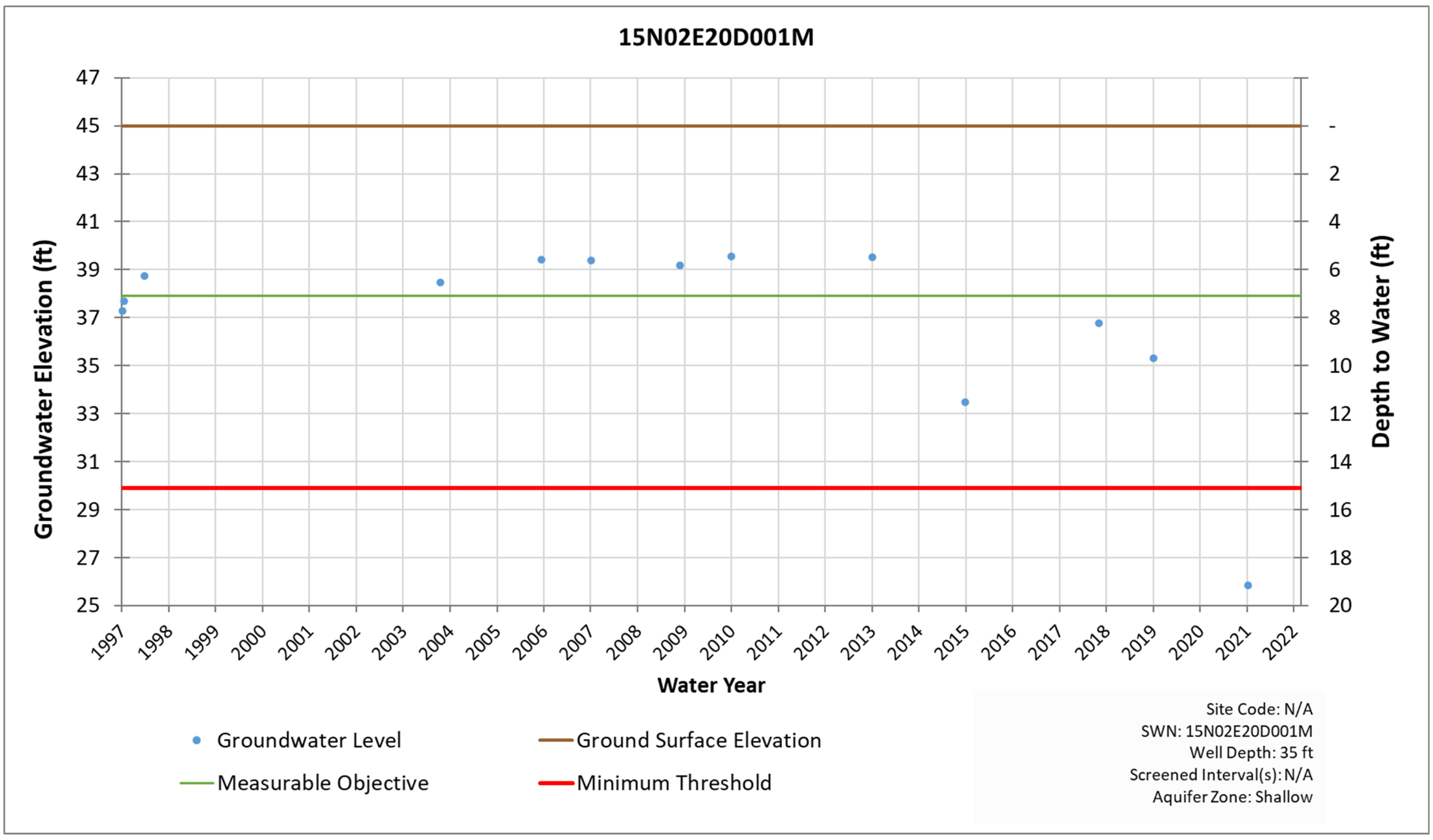
Representative Groundwater Levels Monitoring Network

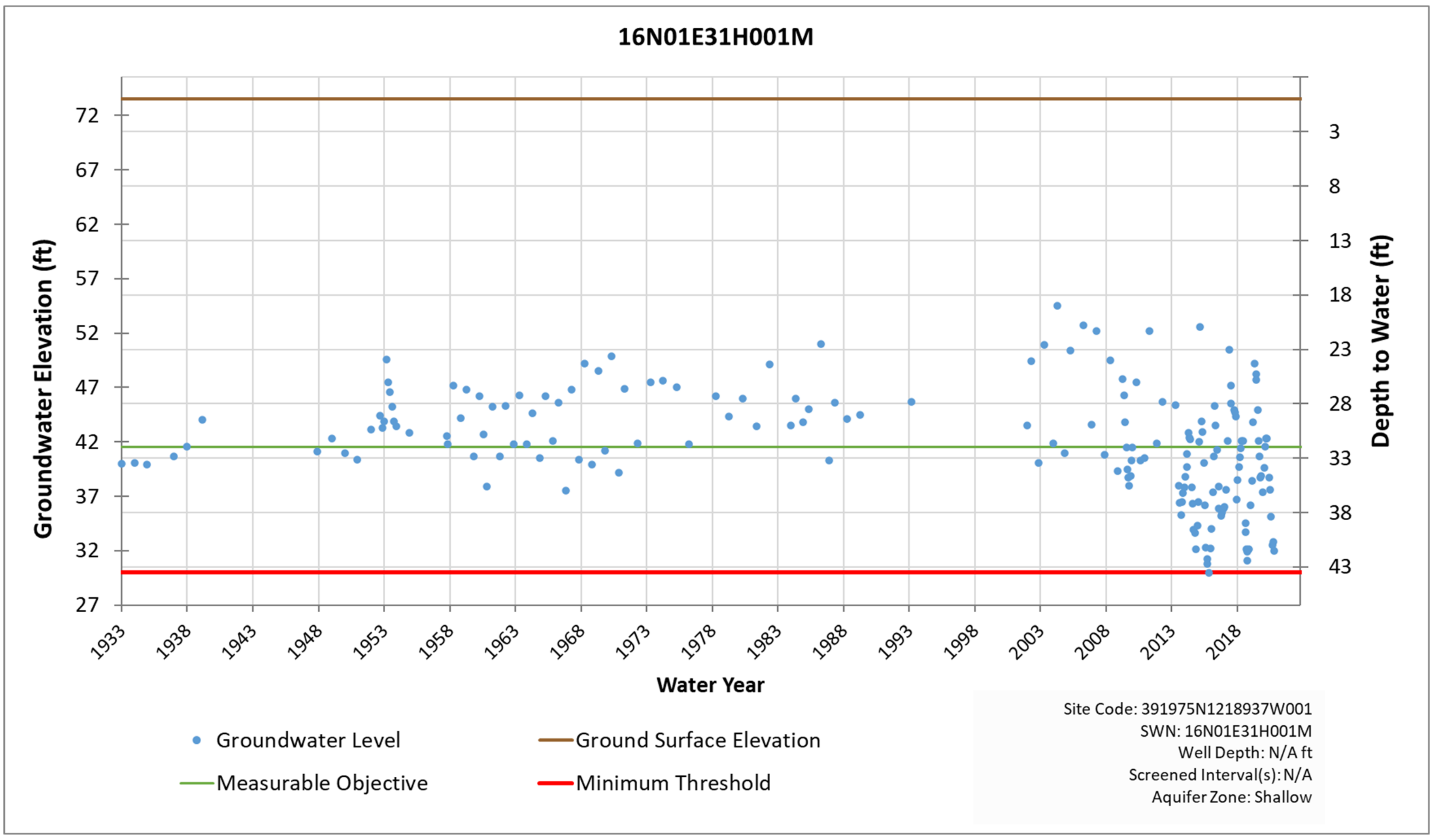


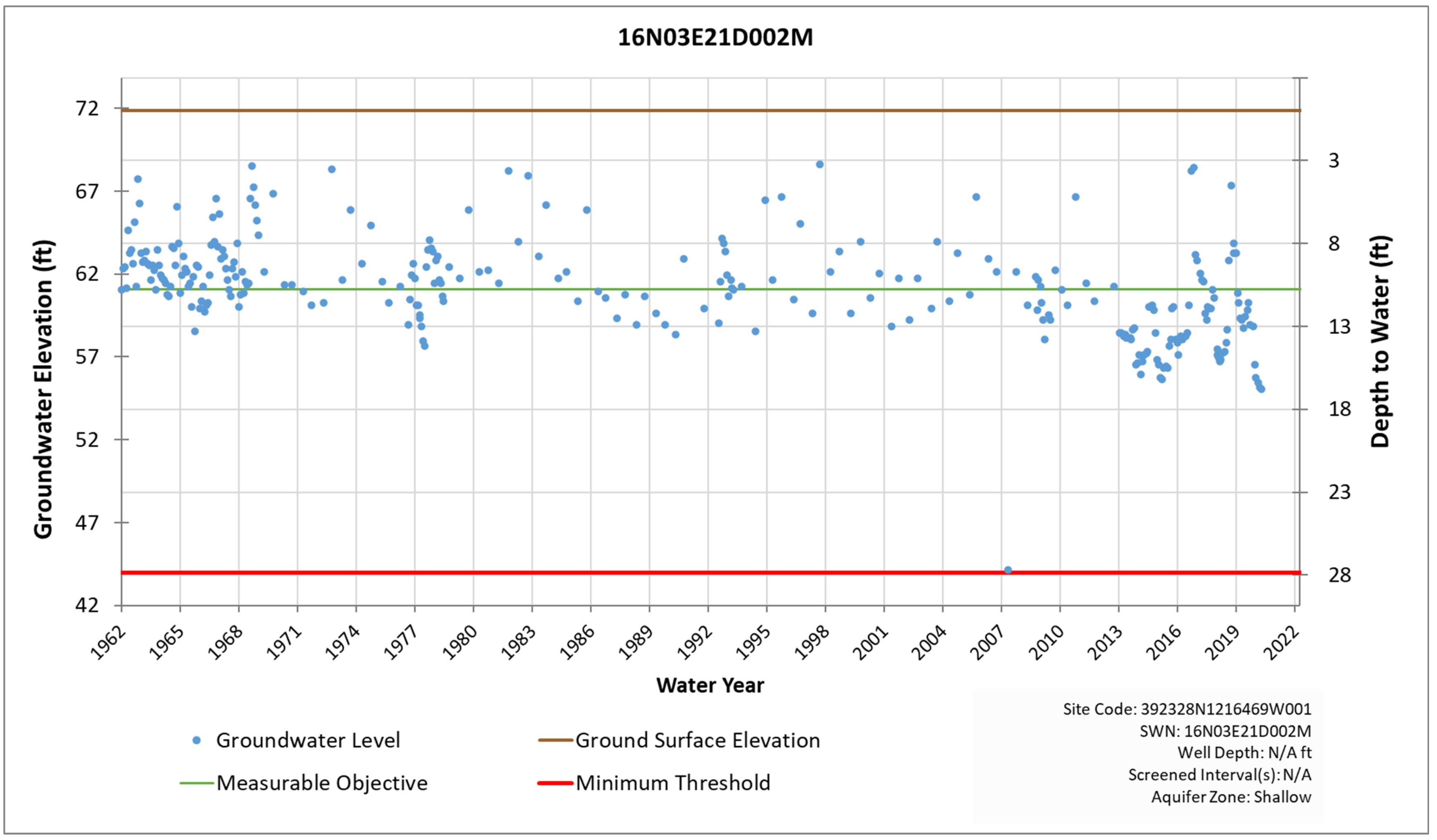


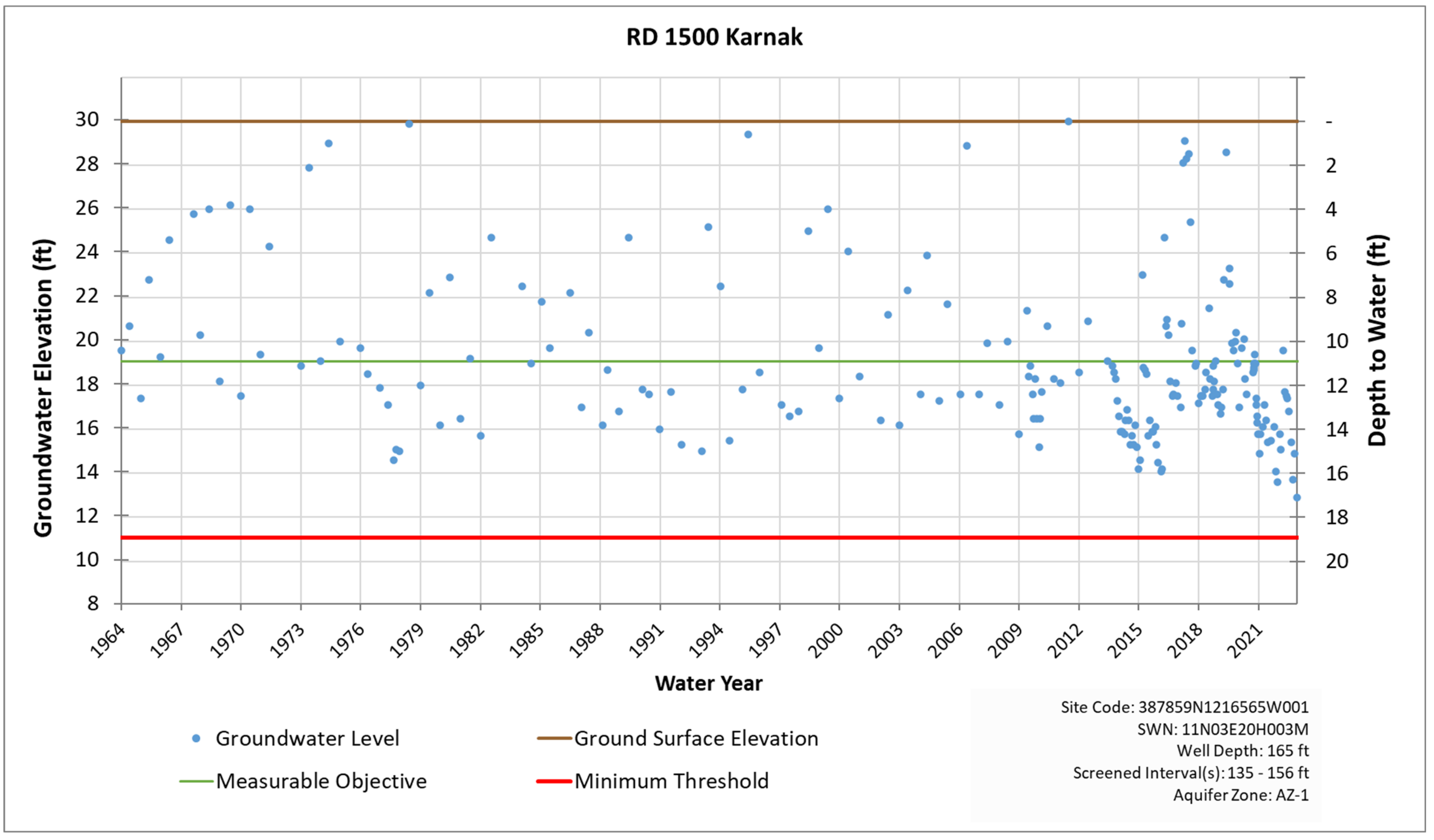

14N02E10R001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: N/A
SWN: 14N02E10R001M
Well Depth: 44 ft
Screened Interval(s): N/A
Aquifer Zone: Shallow

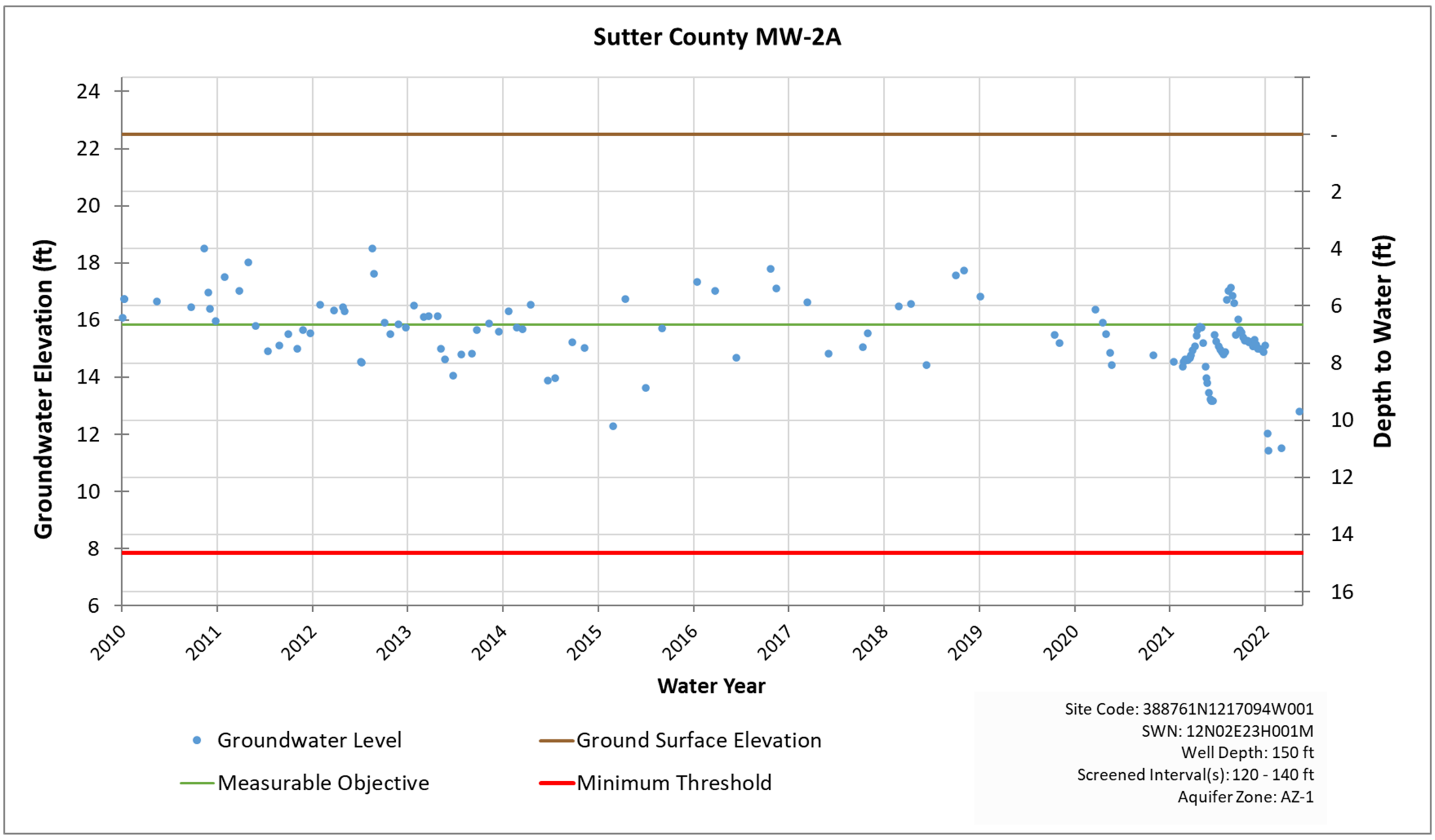

Sutter County MW-1A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390696N1217778W001
SWN: 14N02E17C001M
Well Depth: 60 ft
Screened Interval(s): 30 - 50 ft
Aquifer Zone: Shallow

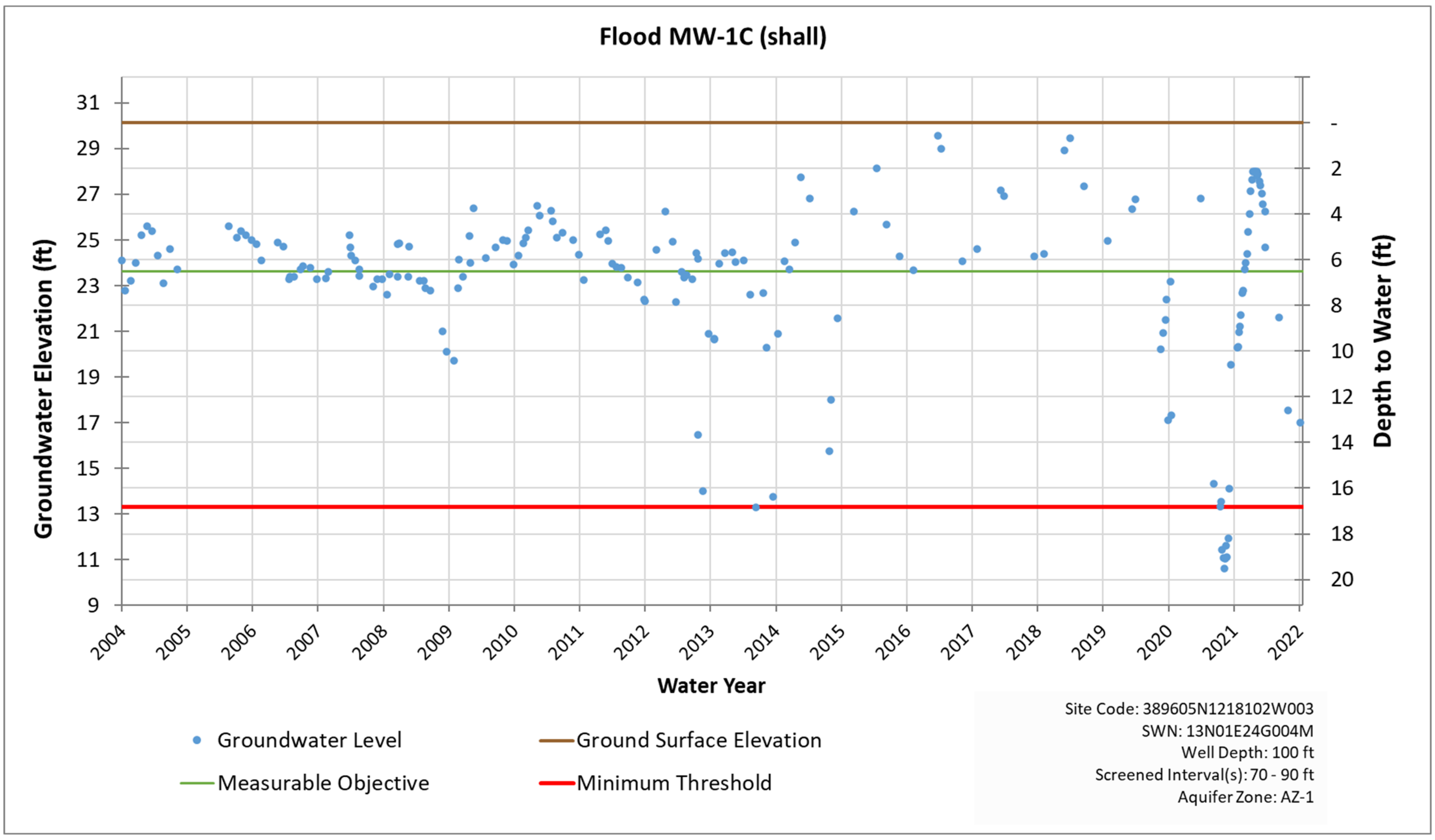

15N02E20D001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: N/A
SWN: 15N02E20D001M
Well Depth: 35 ft
Screened Interval(s): N/A
Aquifer Zone: Shallow

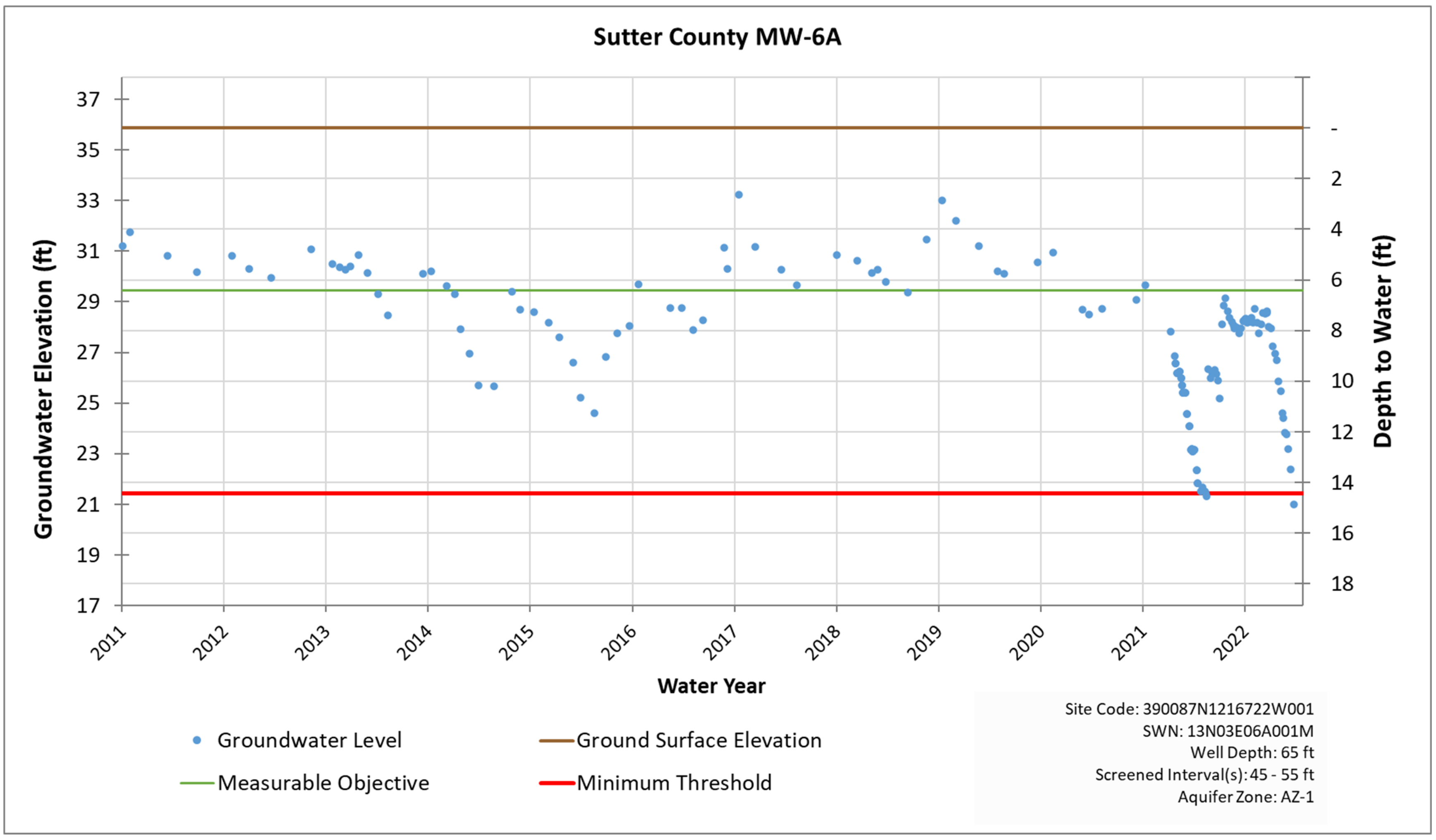

16N01E31H001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391975N1218937W001
SWN: 16N01E31H001M
Well Depth: N/A ft
Screened Interval(s): N/A
Aquifer Zone: Shallow

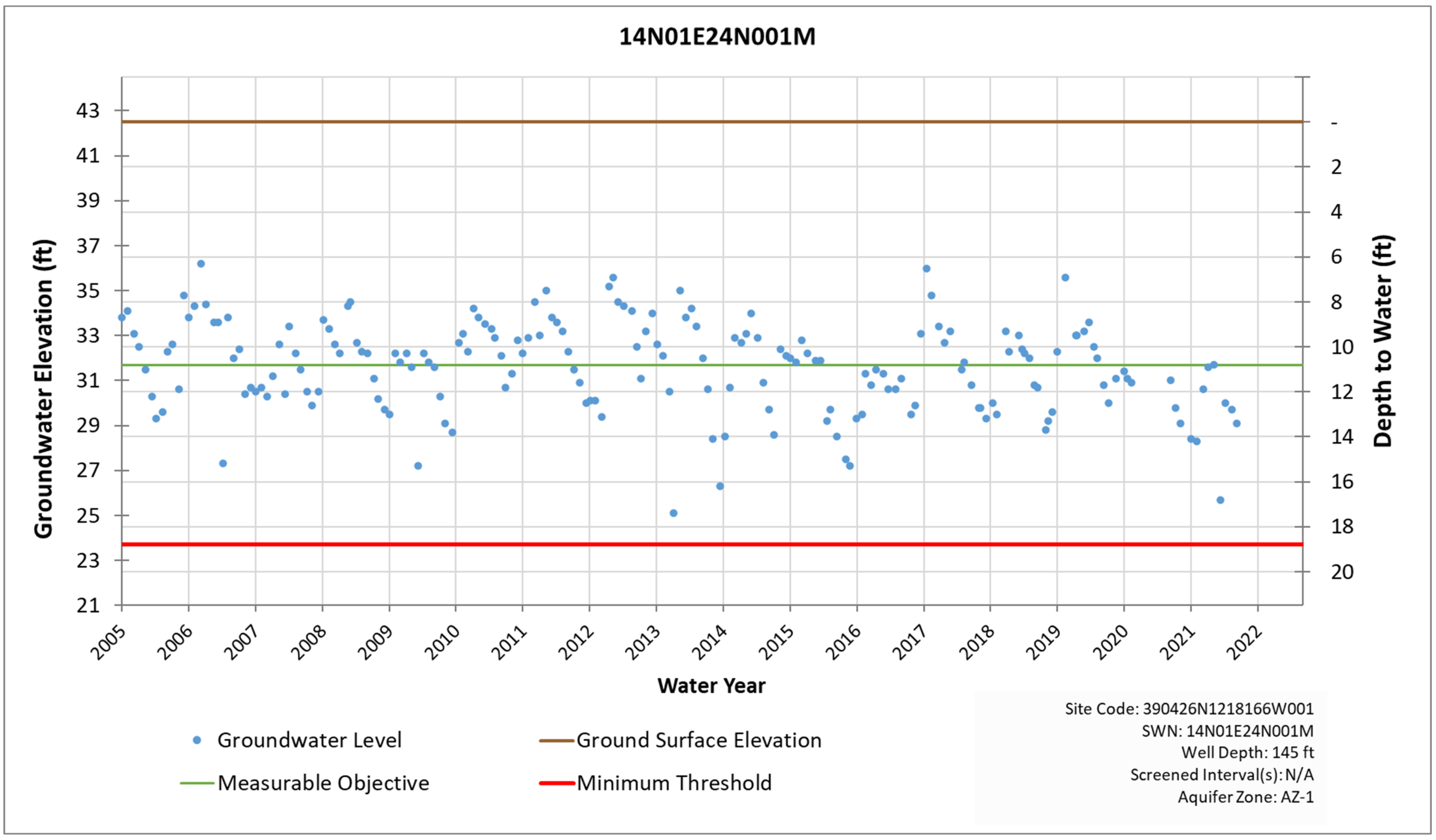

16N03E21D002M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392328N1216469W001
SWN: 16N03E21D002M
Well Depth: N/A ft
Screened Interval(s): N/A
Aquifer Zone: Shallow

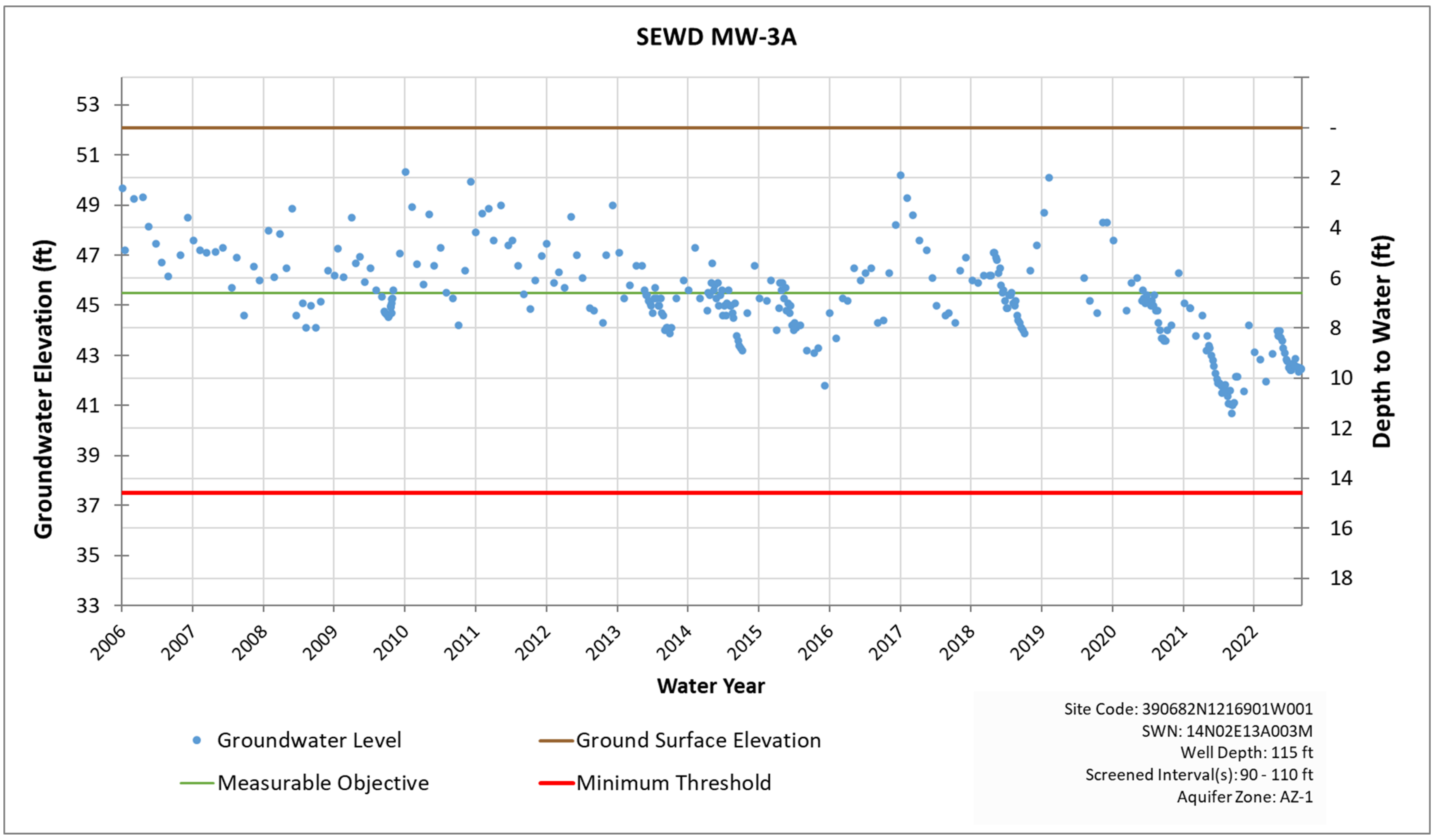

RD 1500 Karnak
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 387859N1216565W001
SWN: 11N03E20H003M
Well Depth: 165 ft
Screened Interval(s): 135 - 156 ft
Aquifer Zone: AZ-1

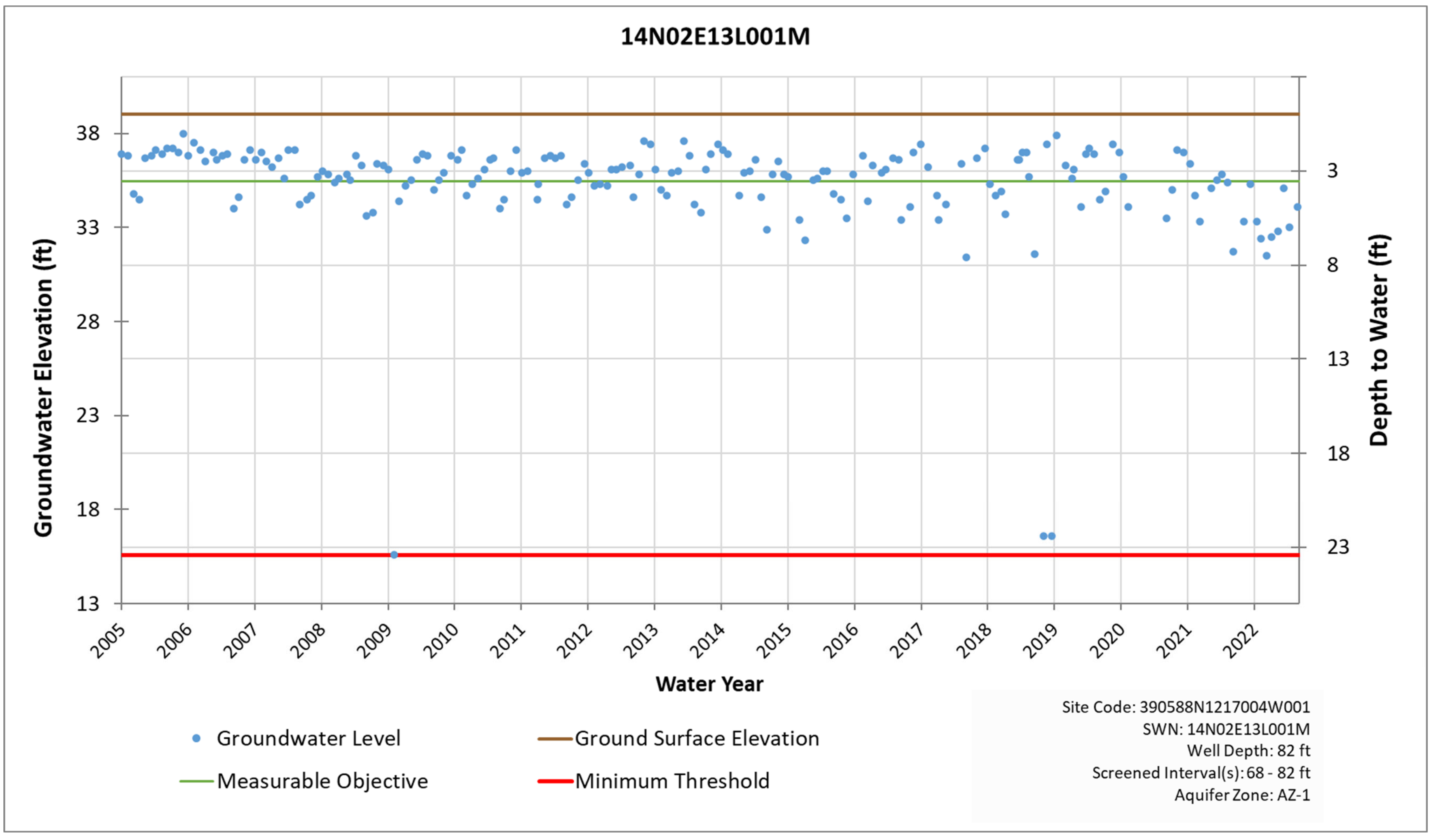

Sutter County MW-2A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 388761N1217094W001
SWN: 12N02E23H001M
Well Depth: 150 ft
Screened Interval(s): 120 - 140 ft
Aquifer Zone: AZ-1

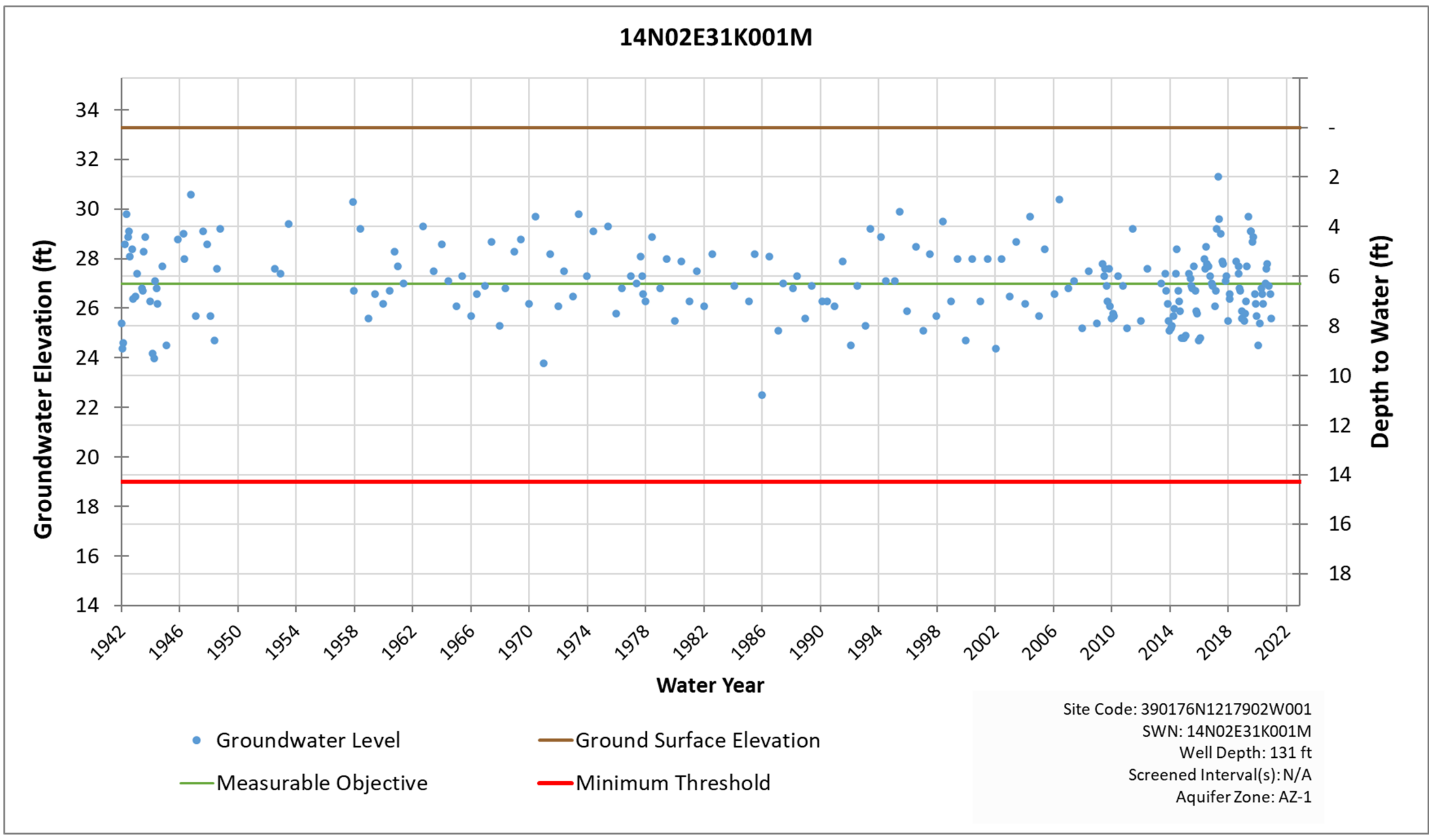

Flood MW-1C (shall)
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389605N1218102W003
SWN: 13N01E24G004M
Well Depth: 100 ft
Screened Interval(s): 70 - 90 ft
Aquifer Zone: AZ-1

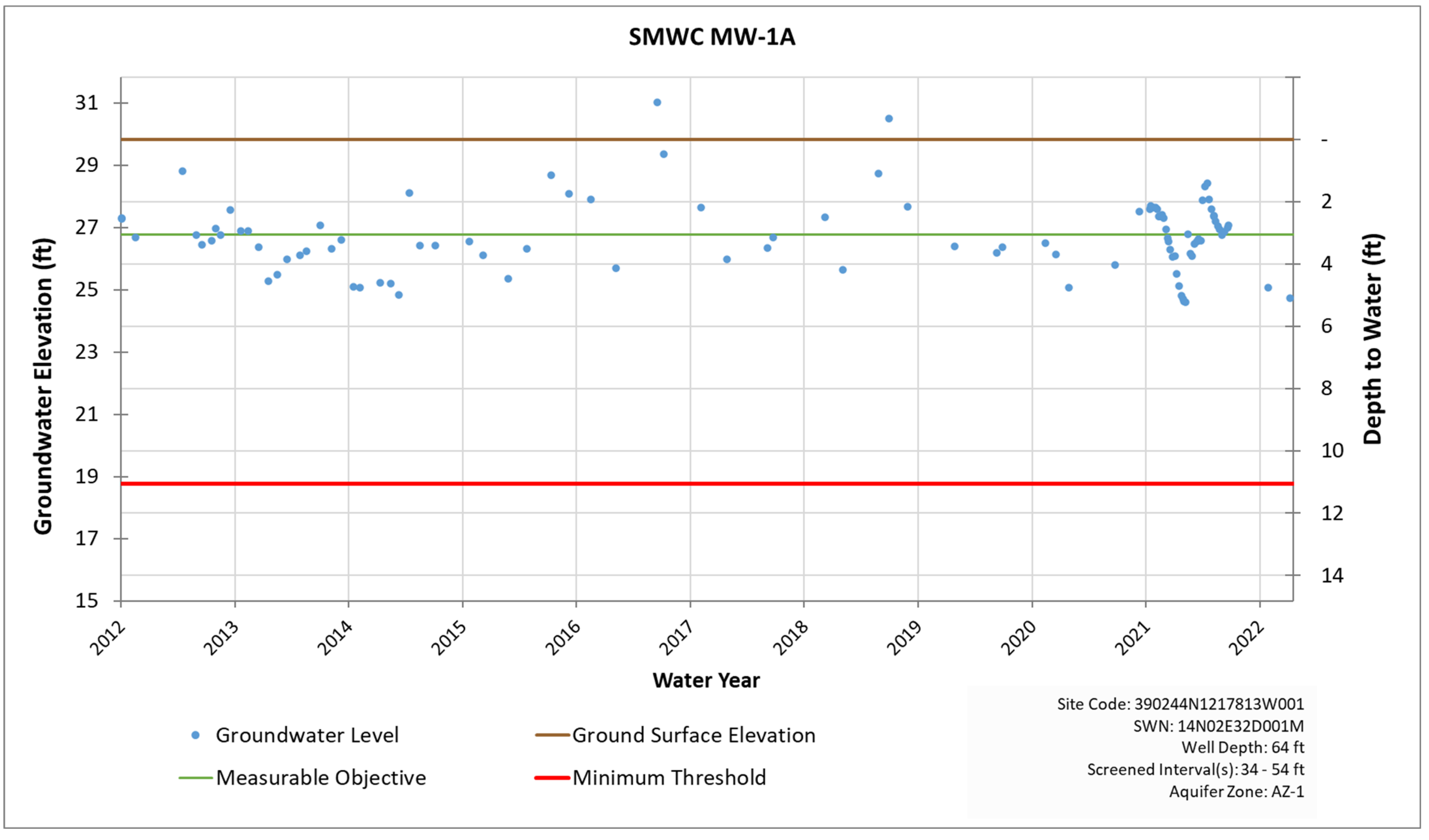

Sutter County MW-6A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390087N1216722W001
SWN: 13N03E06A001M
Well Depth: 65 ft
Screened Interval(s): 45 - 55 ft
Aquifer Zone: AZ-1

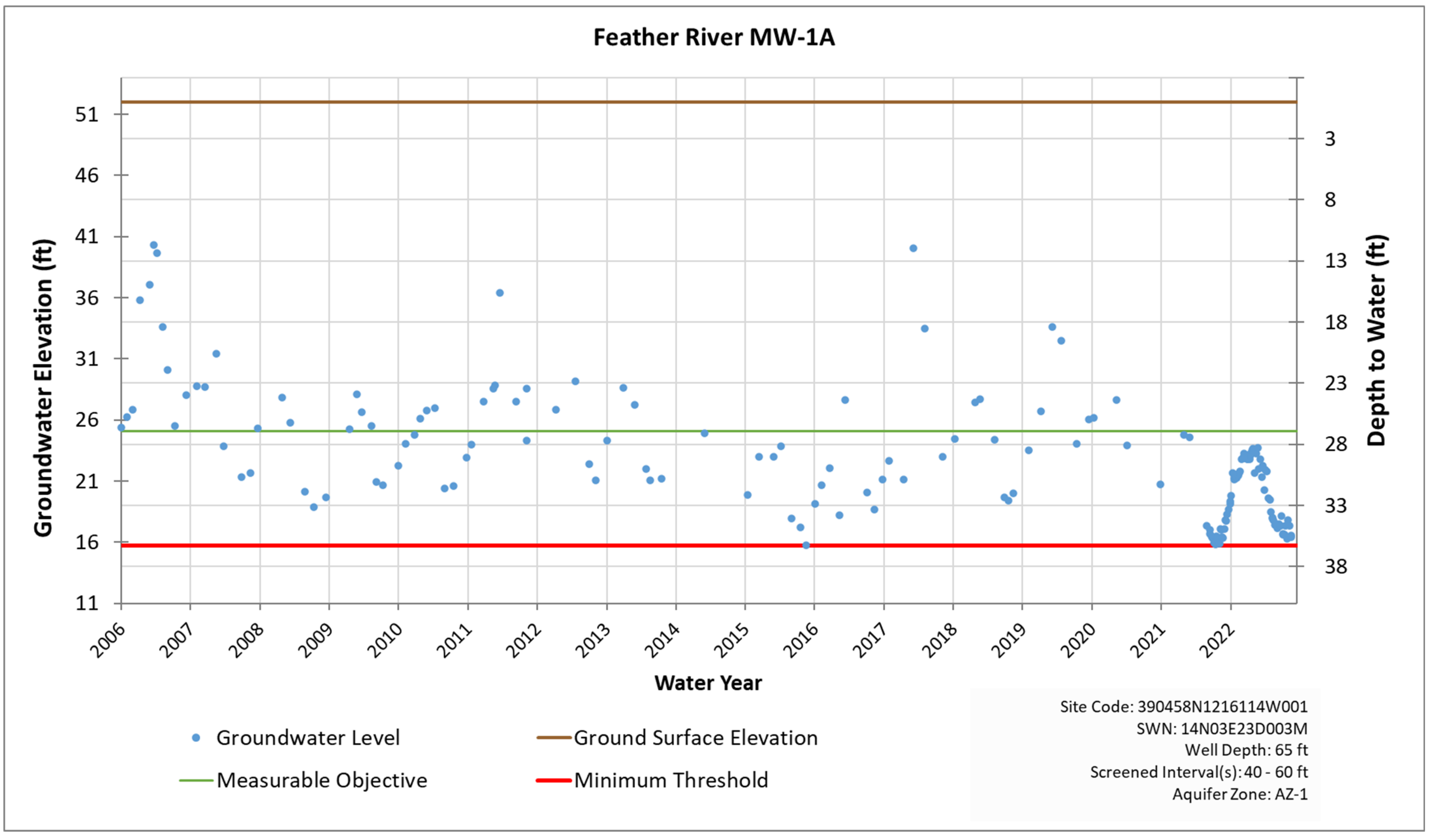

14N01E24N001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390426N1218166W001
SWN: 14N01E24N001M
Well Depth: 145 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-1

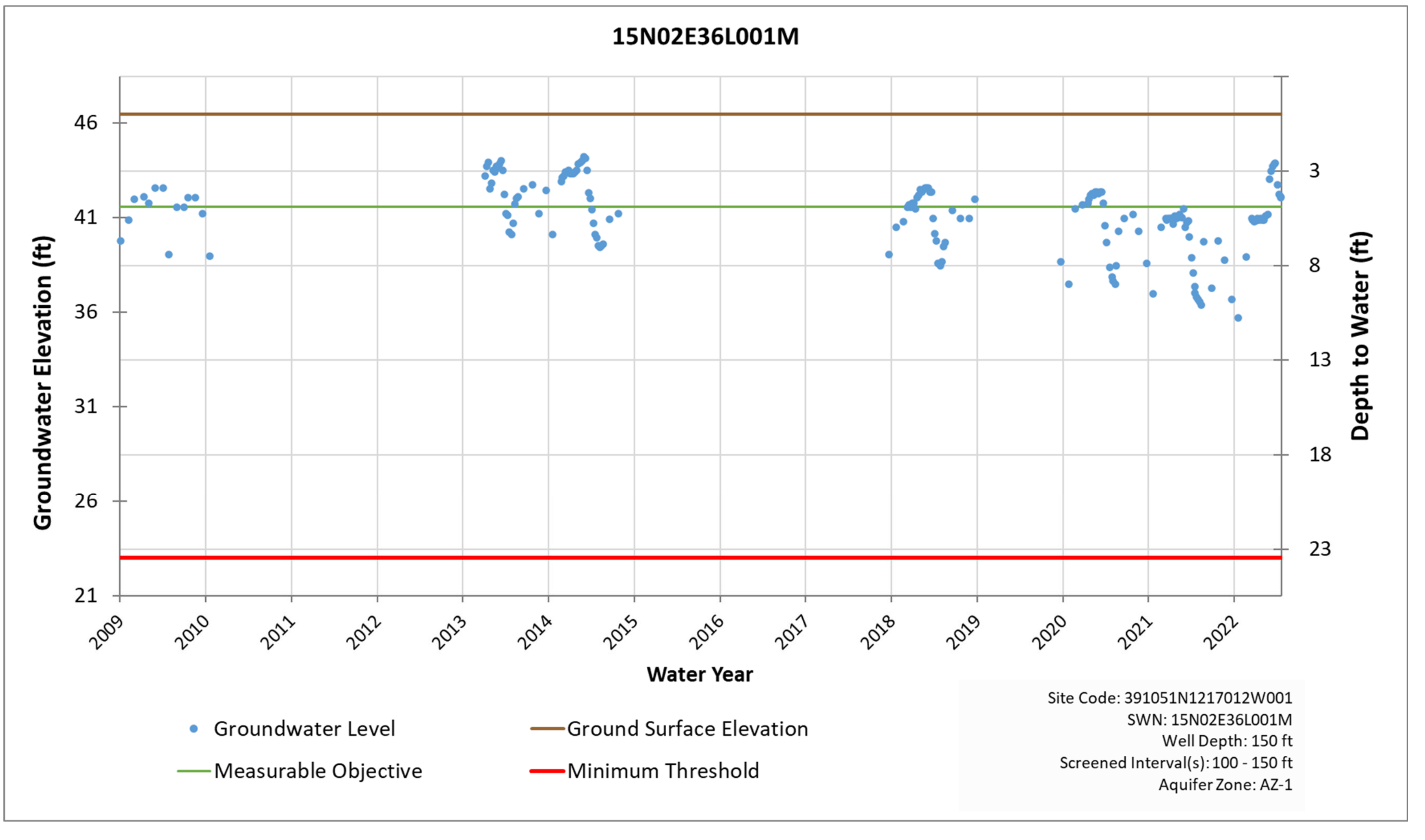

SEWD MW-3A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390682N1216901W001
SWN: 14N02E13A003M
Well Depth: 115 ft
Screened Interval(s): 90 - 110 ft
Aquifer Zone: AZ-1

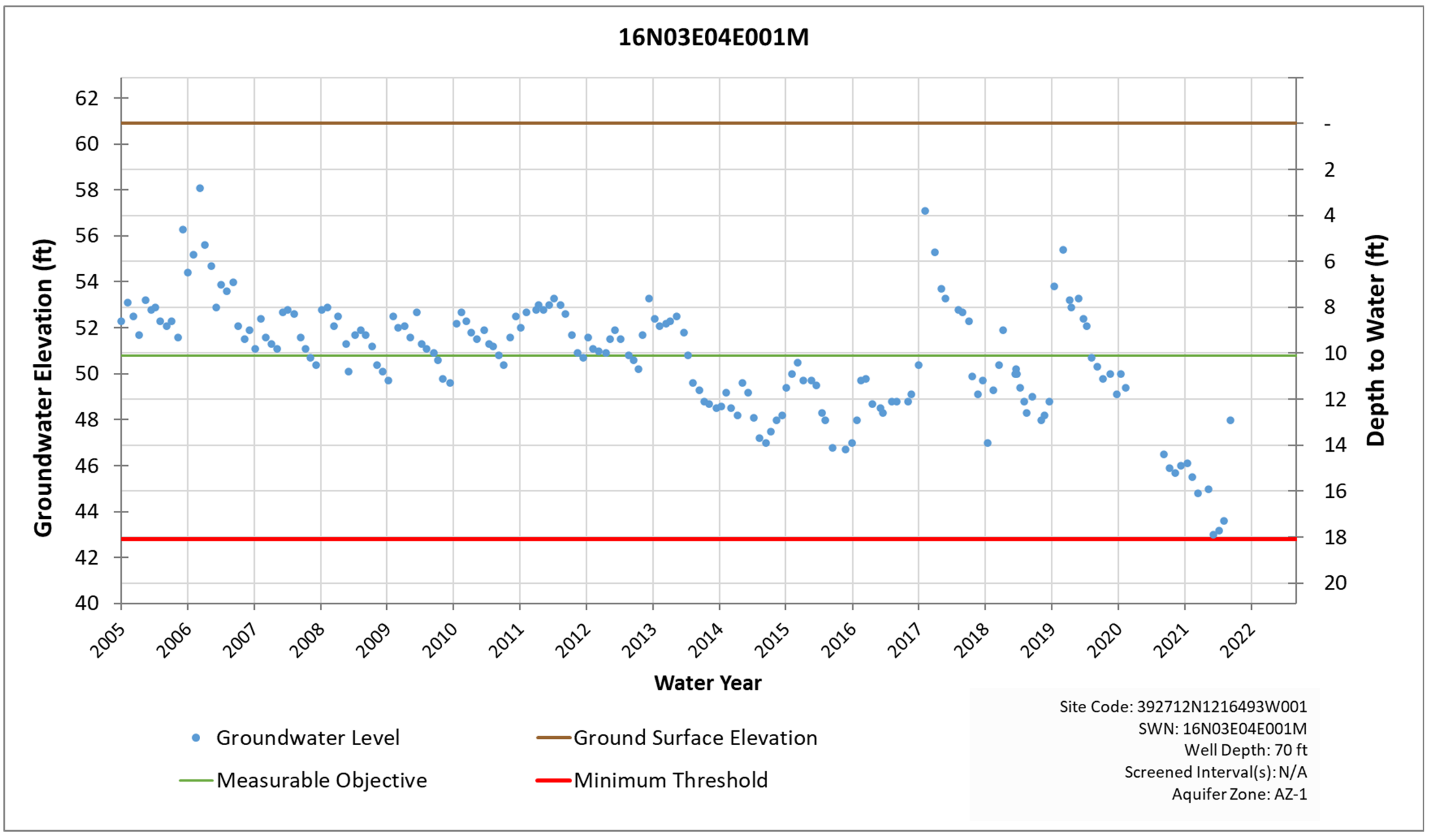

14N02E13L001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390588N1217004W001
SWN: 14N02E13L001M
Well Depth: 82 ft
Screened Interval(s): 68 - 82 ft
Aquifer Zone: AZ-1

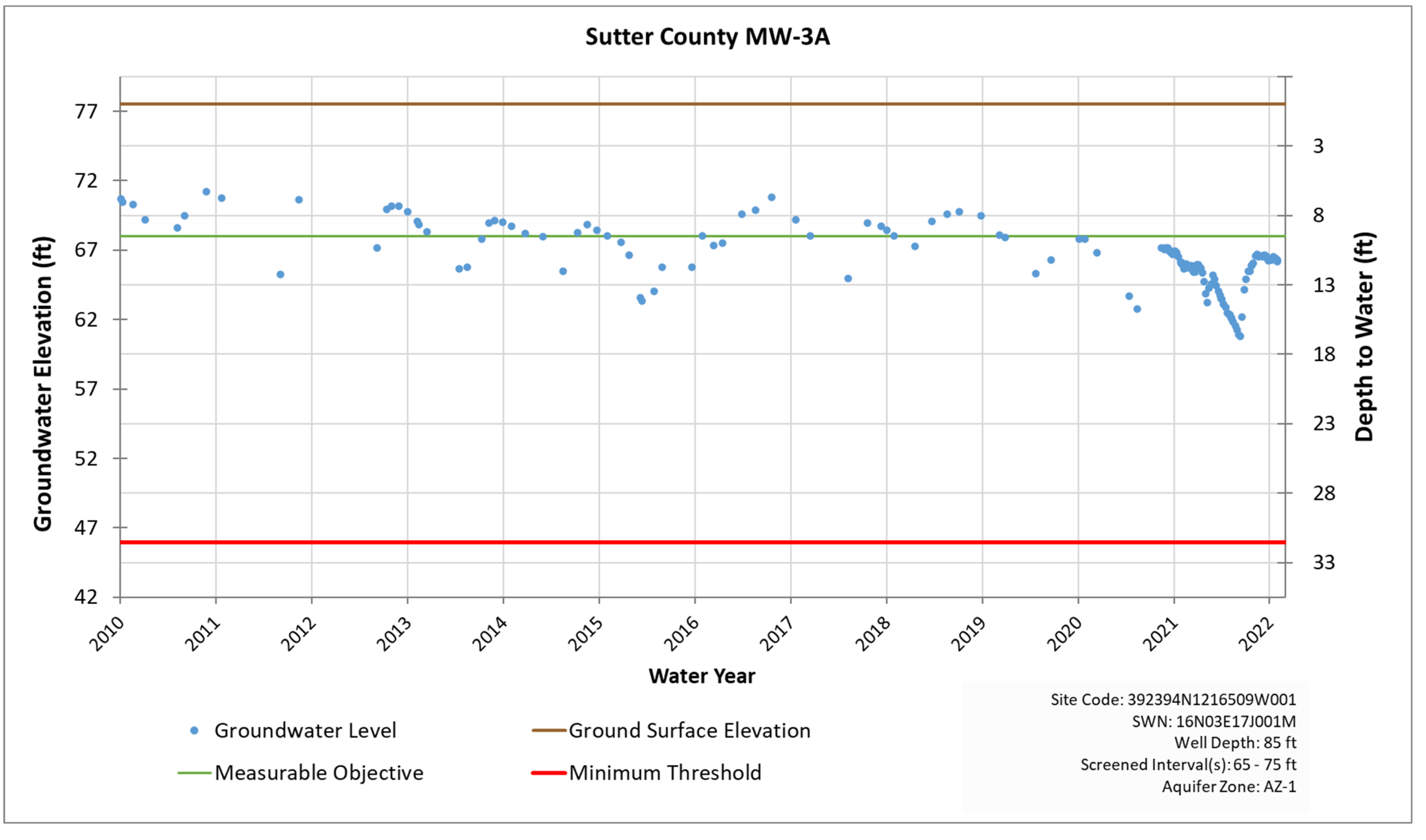

14N02E31K001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390176N1217902W001
SWN: 14N02E31K001M
Well Depth: 131 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-1

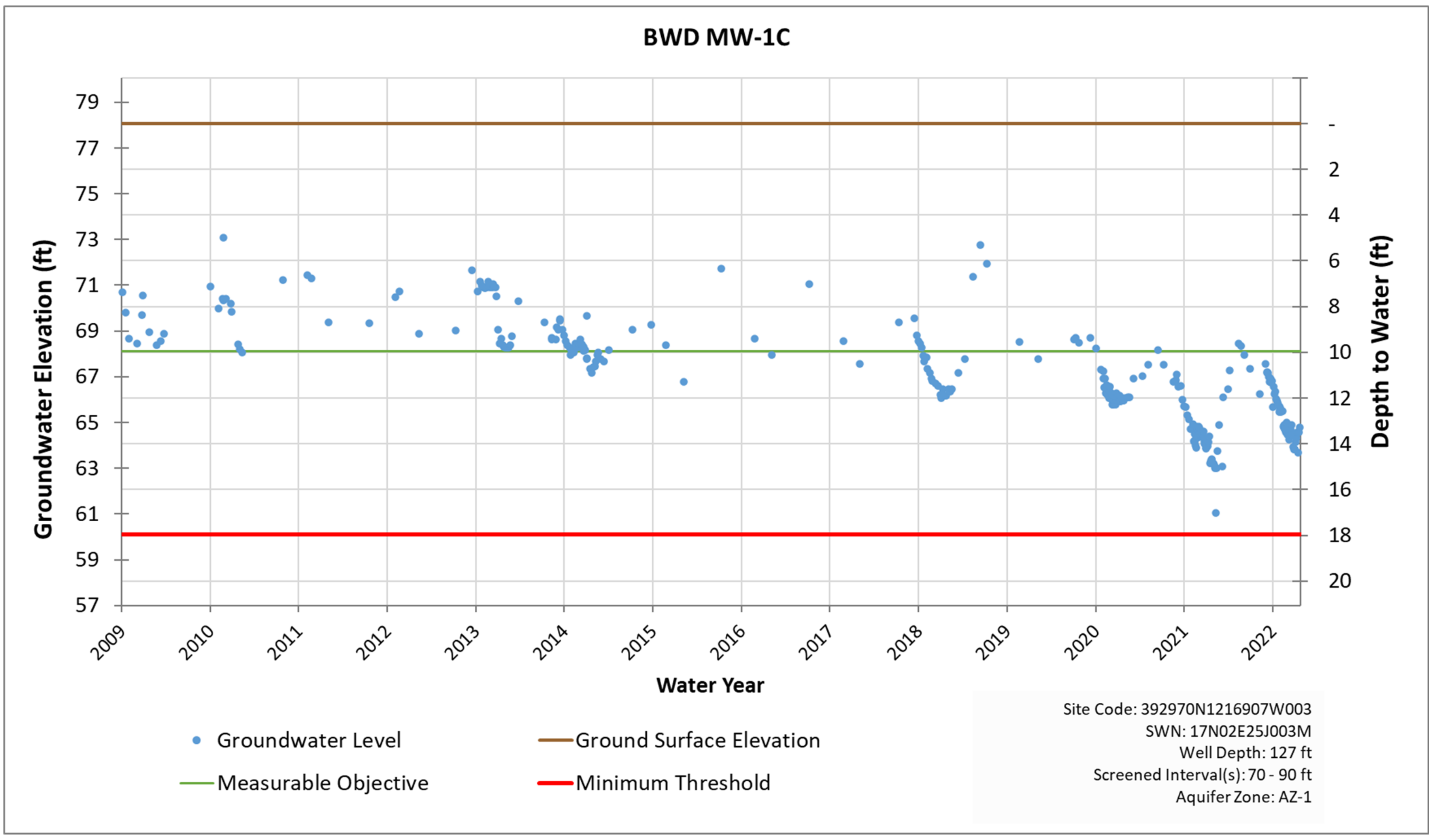

SMWC MW-1A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390244N1217813W001
SWN: 14N02E32D001M
Well Depth: 64 ft
Screened Interval(s): 34 - 54 ft
Aquifer Zone: AZ-1

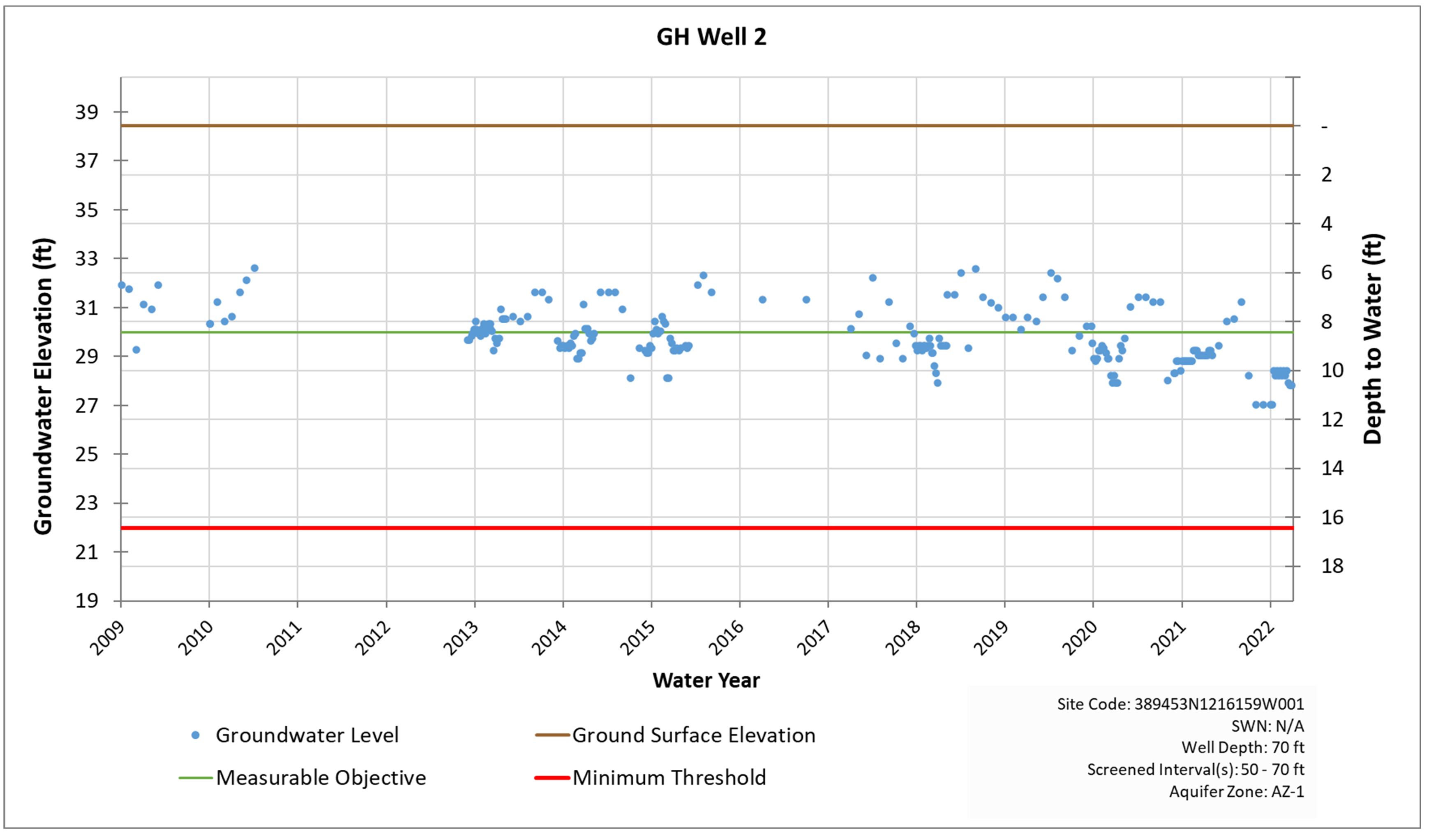

Feather River MW-1A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390458N1216114W001
SWN: 14N03E23D003M
Well Depth: 65 ft
Screened Interval(s): 40 - 60 ft
Aquifer Zone: AZ-1

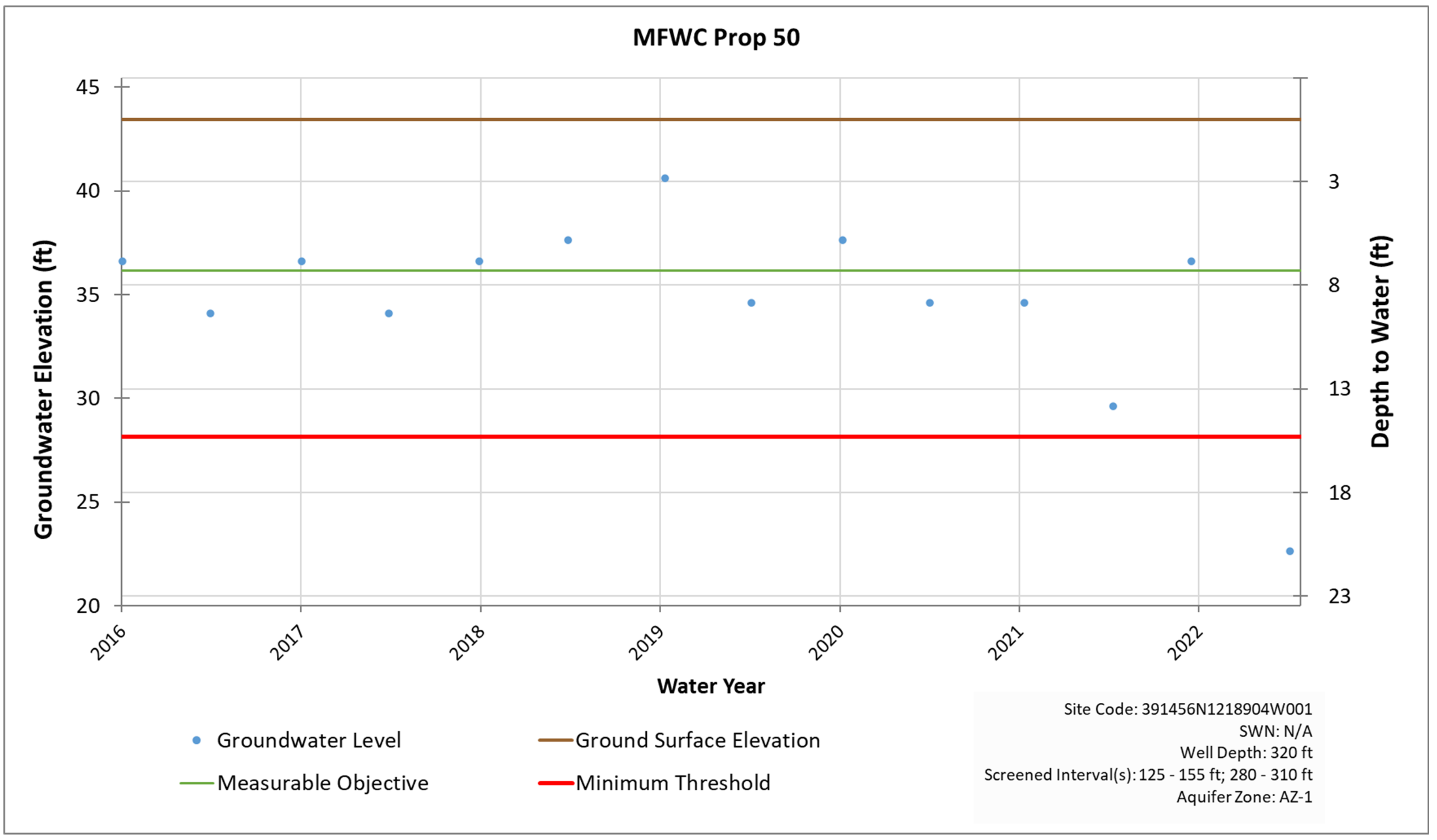

15N02E36L001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391051N1217012W001
SWN: 15N02E36L001M
Well Depth: 150 ft
Screened Interval(s): 100 - 150 ft
Aquifer Zone: AZ-1

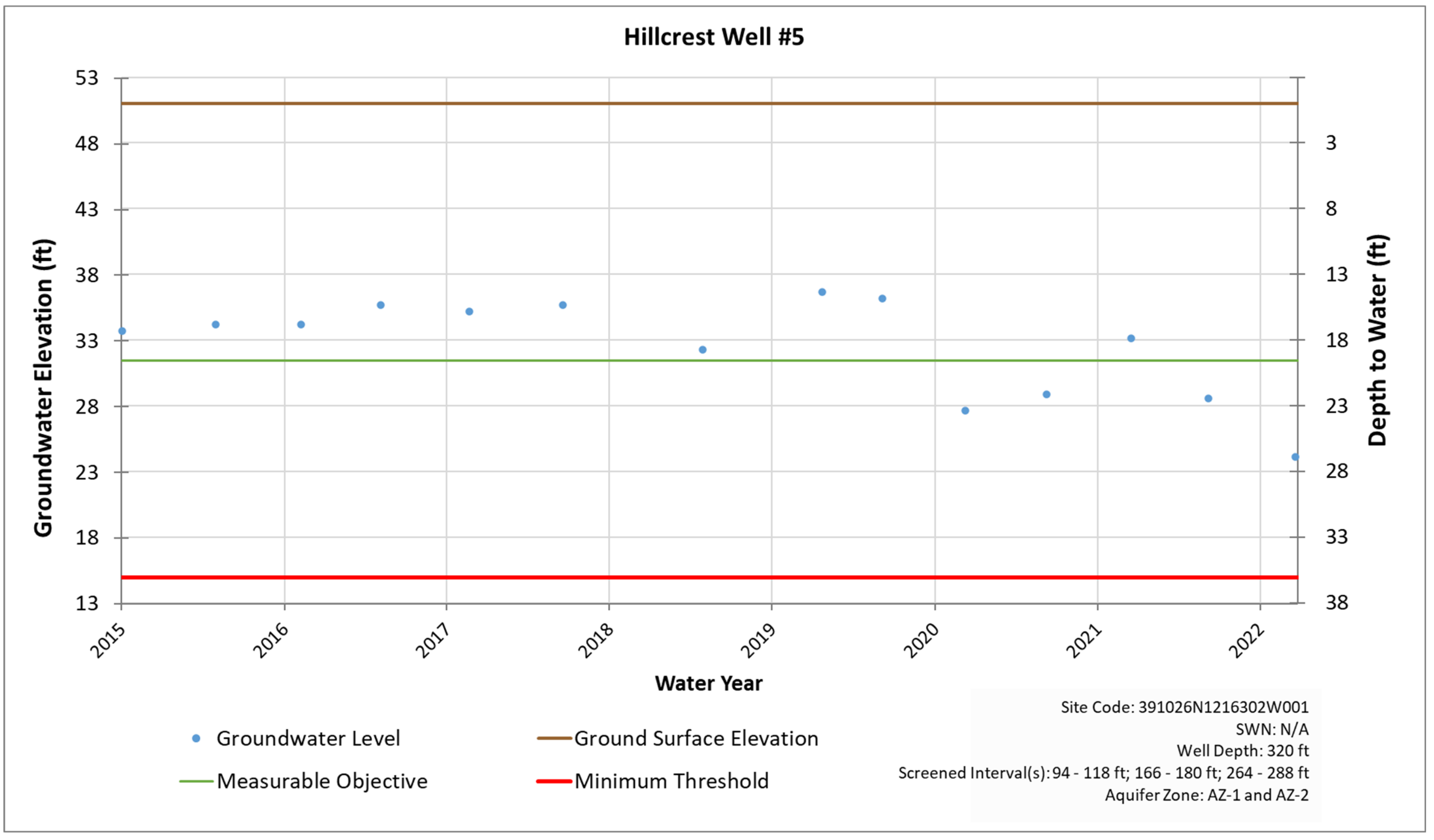

16N03E04E001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392712N1216493W001
SWN: 16N03E04E001M
Well Depth: 70 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-1

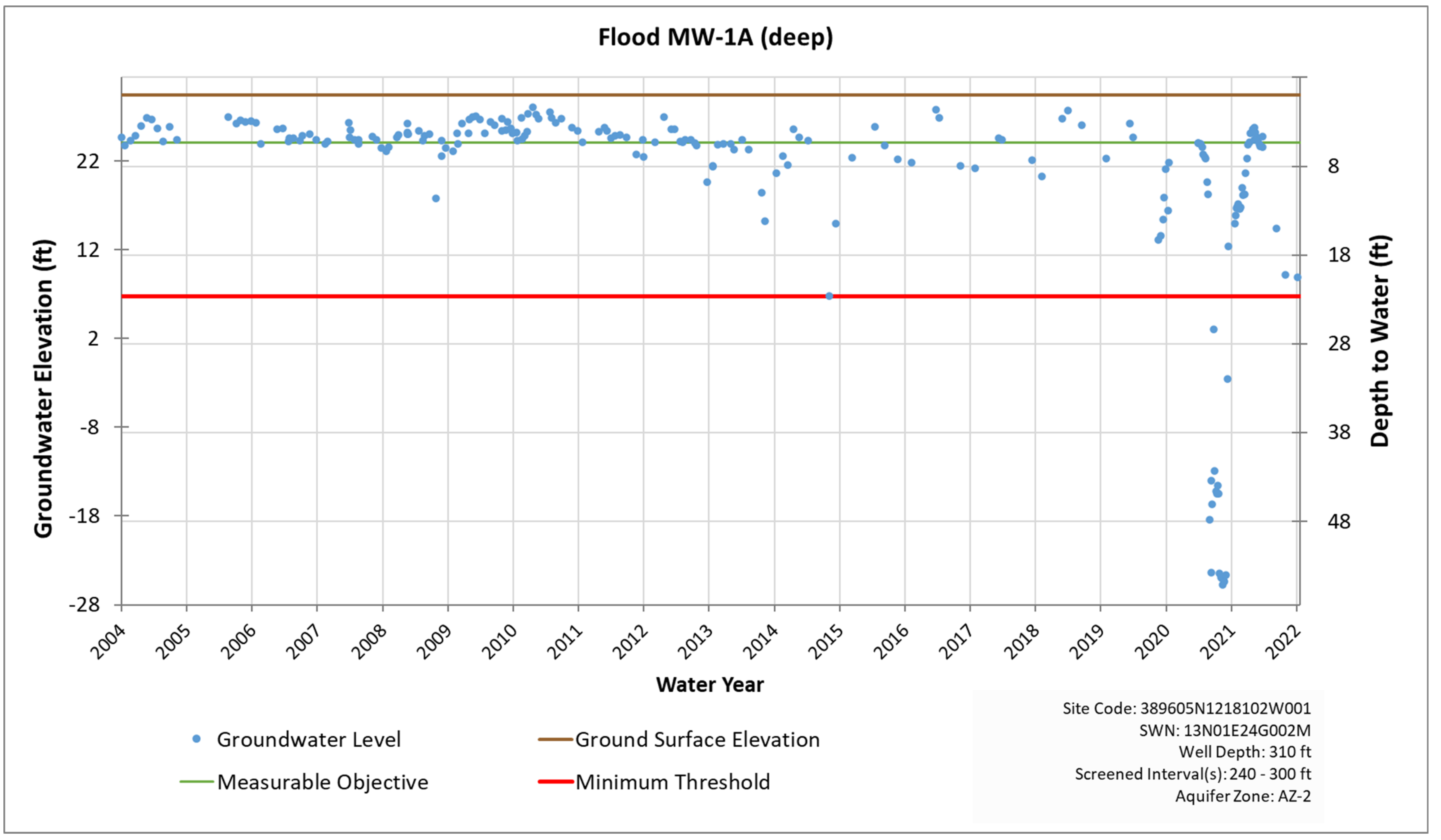

Sutter County MW-3A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W001
SWN: 16N03E17J001M
Well Depth: 85 ft
Screened Interval(s): 65 - 75 ft
Aquifer Zone: AZ-1

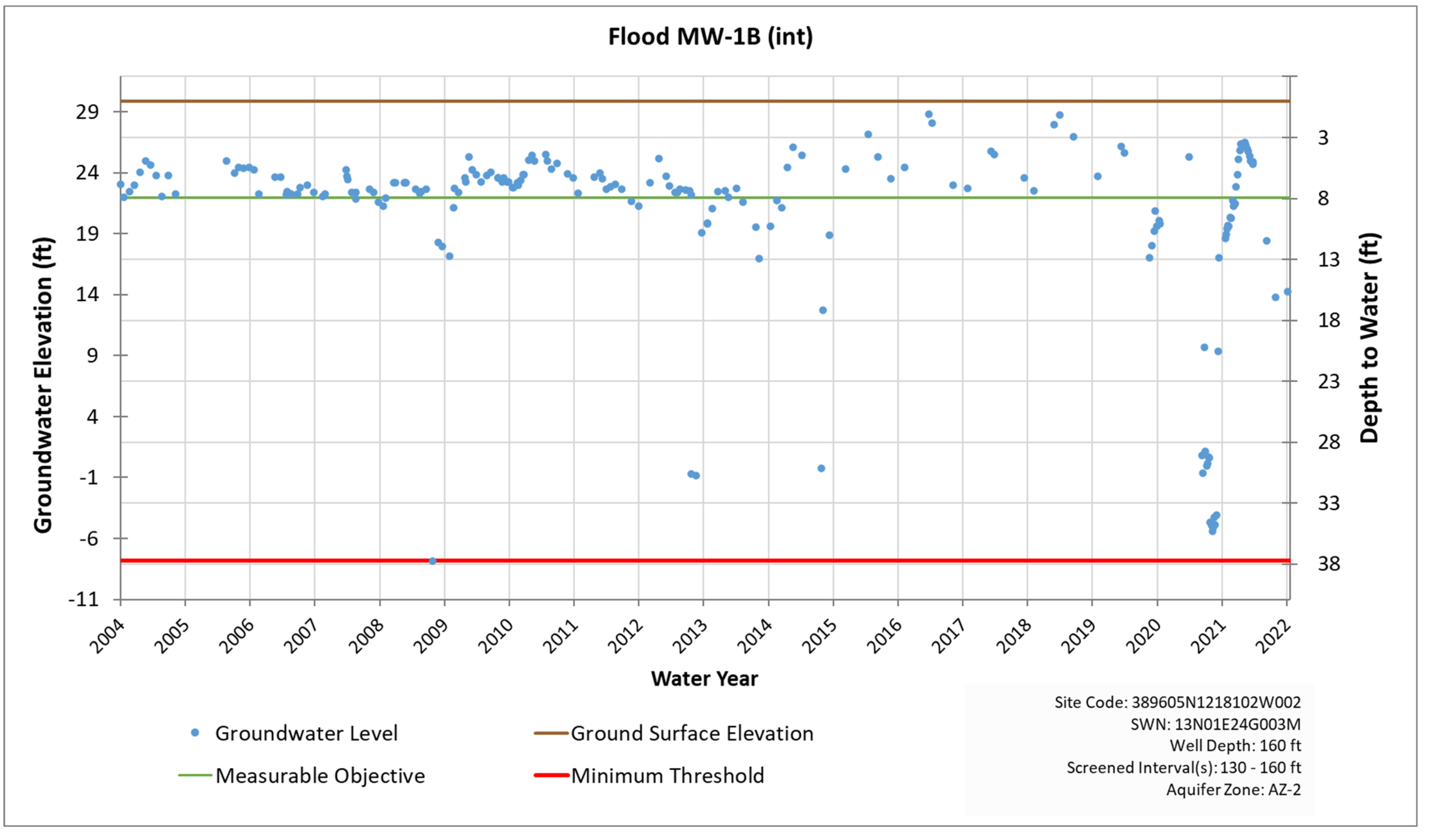

BWD MW-1C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392970N1216907W003
SWN: 17N02E25J003M
Well Depth: 127 ft
Screened Interval(s): 70 - 90 ft
Aquifer Zone: AZ-1

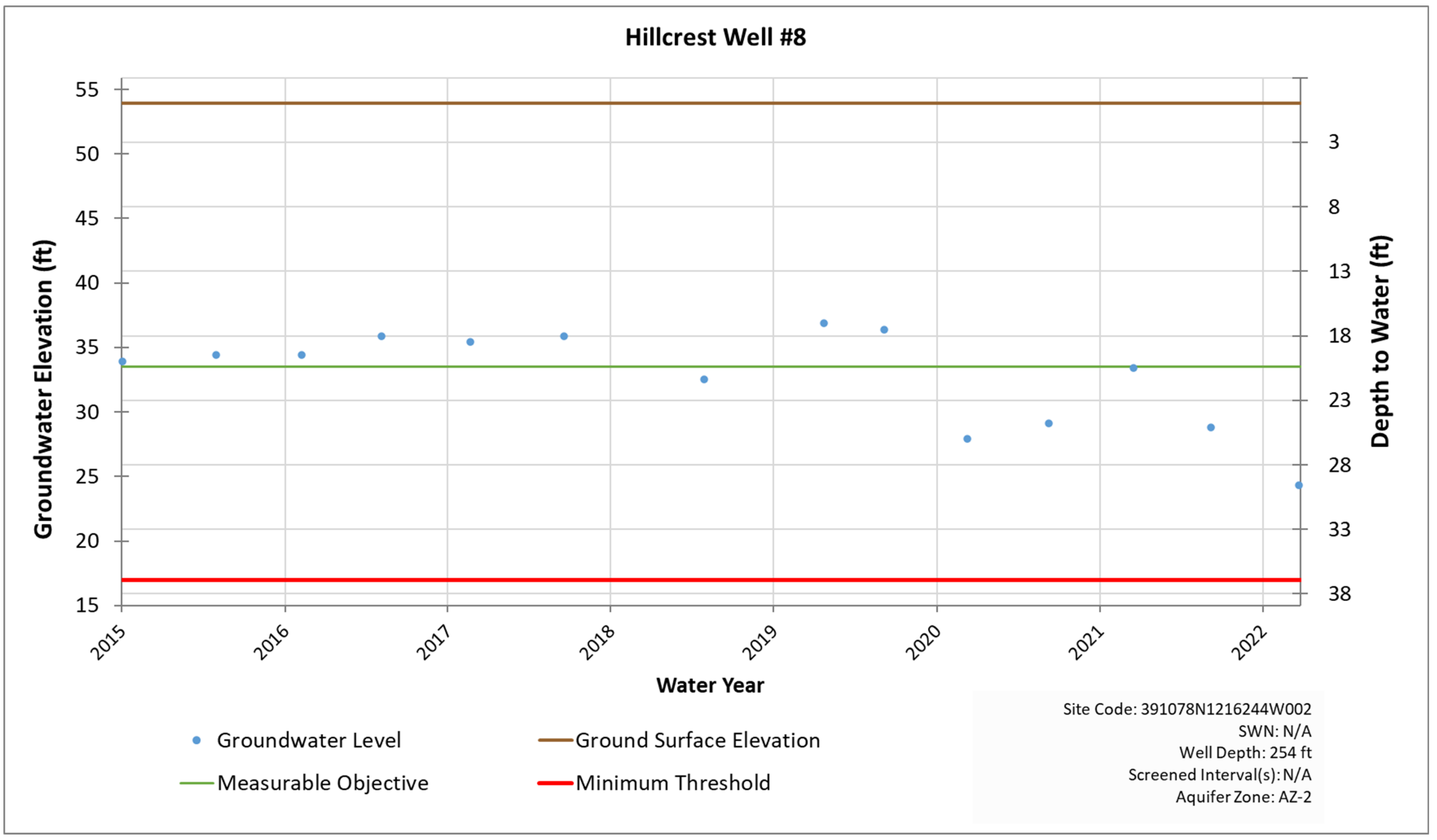

GH Well 2
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389453N1216159W001
SWN: N/A
Well Depth: 70 ft
Screened Interval(s): 50 - 70 ft
Aquifer Zone: AZ-1

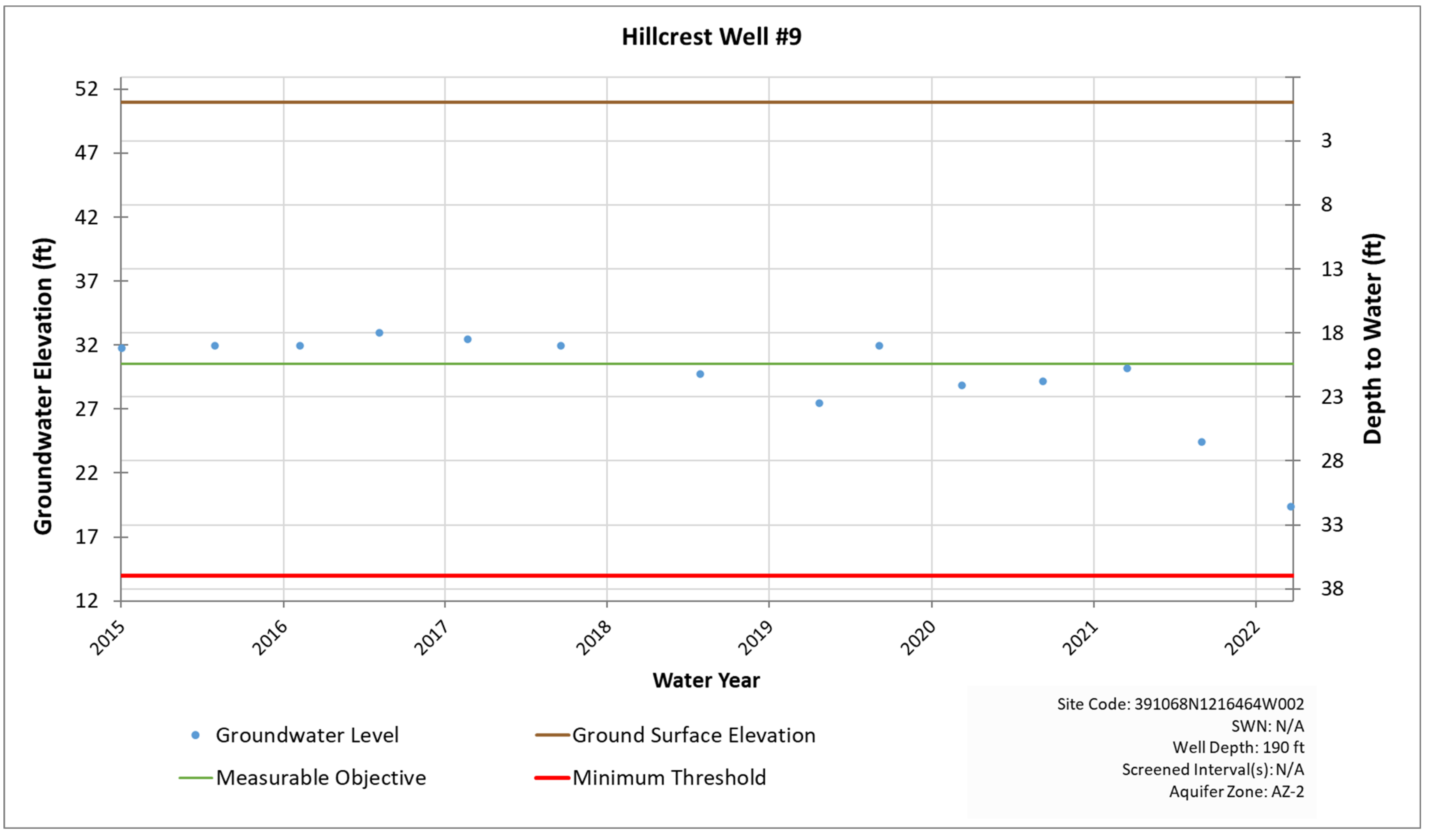

MFWC Prop 50
Groundwater Elevation (ft)
Depth to Water (ft)
45
40
35
30
25
20
3
8
13
18
23
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391456N1218904W001
SWN: N/A
Well Depth: 320 ft
Screened Interval(s): 125 - 155 ft; 280 - 310 ft
Aquifer Zone: AZ-1

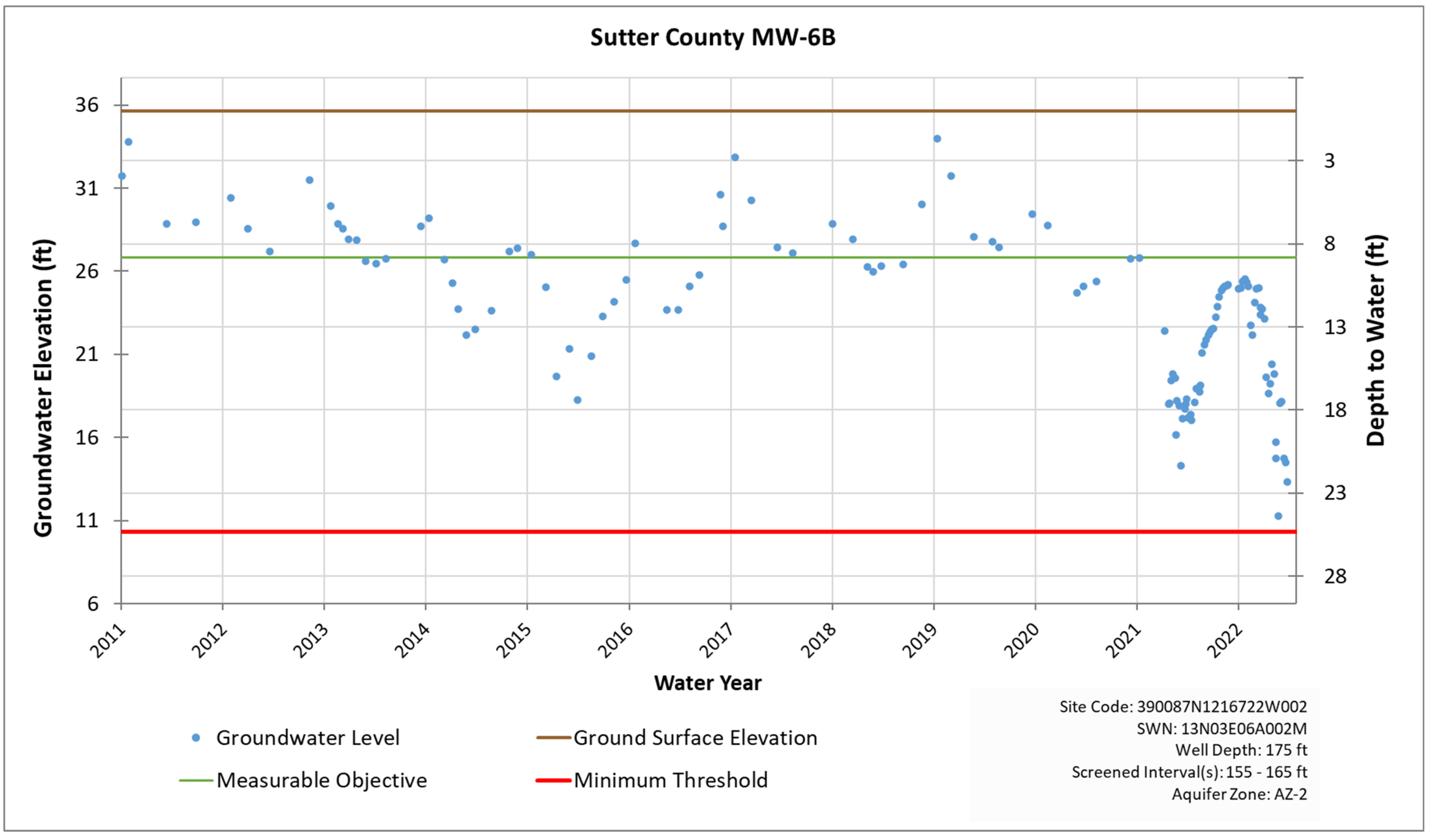

Hillcrest Well #5
Groundwater Elevation (ft)
Depth to Water (ft)
53
48
43
38
33
28
23
18
13
3
8
13
18
23
28
33
38
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391026N1216302W001
SWN: N/A
Well Depth: 320 ft
Screened Interval(s): 94 - 118 ft; 166 - 180 ft; 264 - 288 ft
Aquifer Zone: AZ-1 and AZ-2

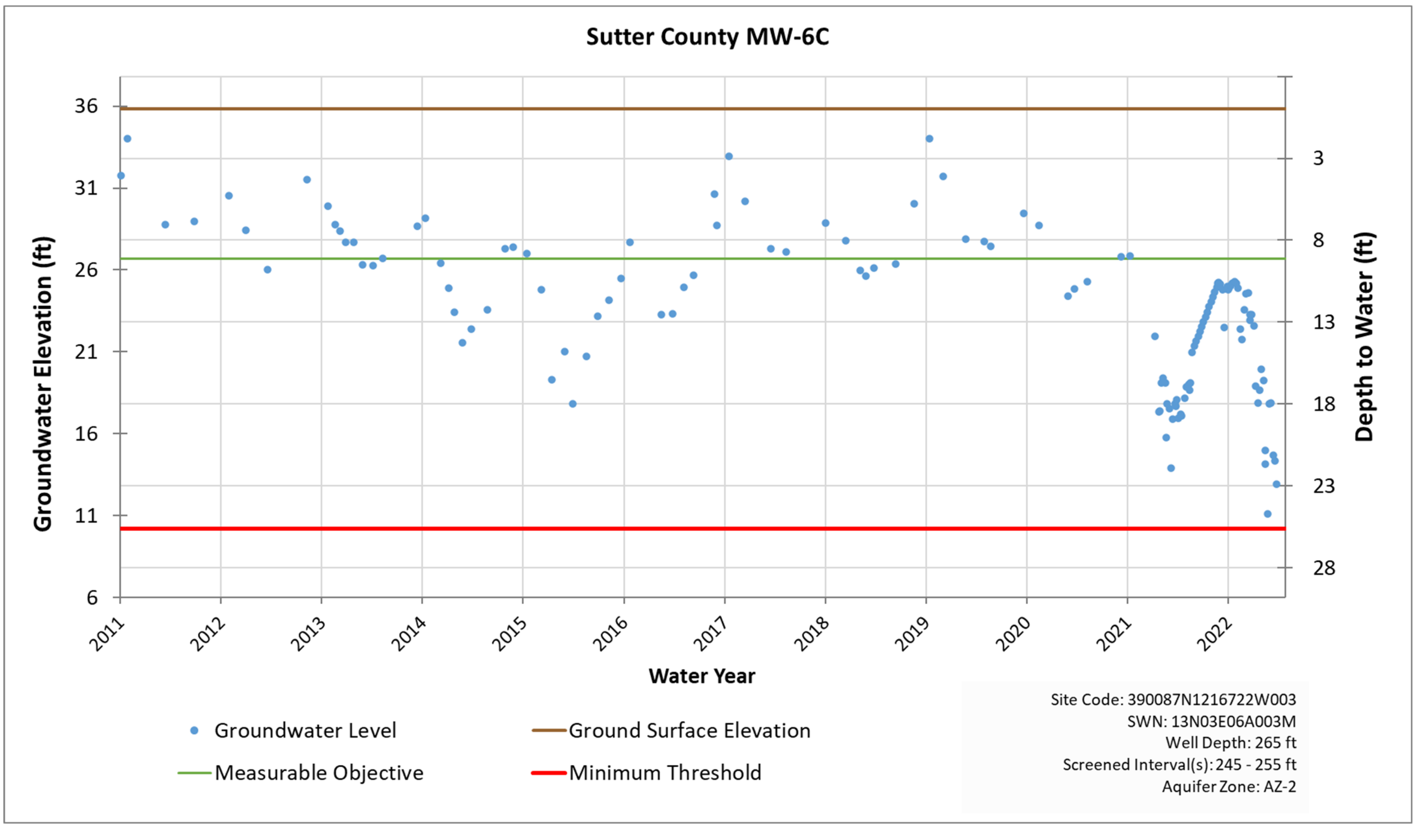

Flood MW-1A (deep)
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389605N1218102W001
SWN: 13N01E24G002M
Well Depth: 310 ft
Screened Interval(s): 240 - 300 ft
Aquifer Zone: AZ-2

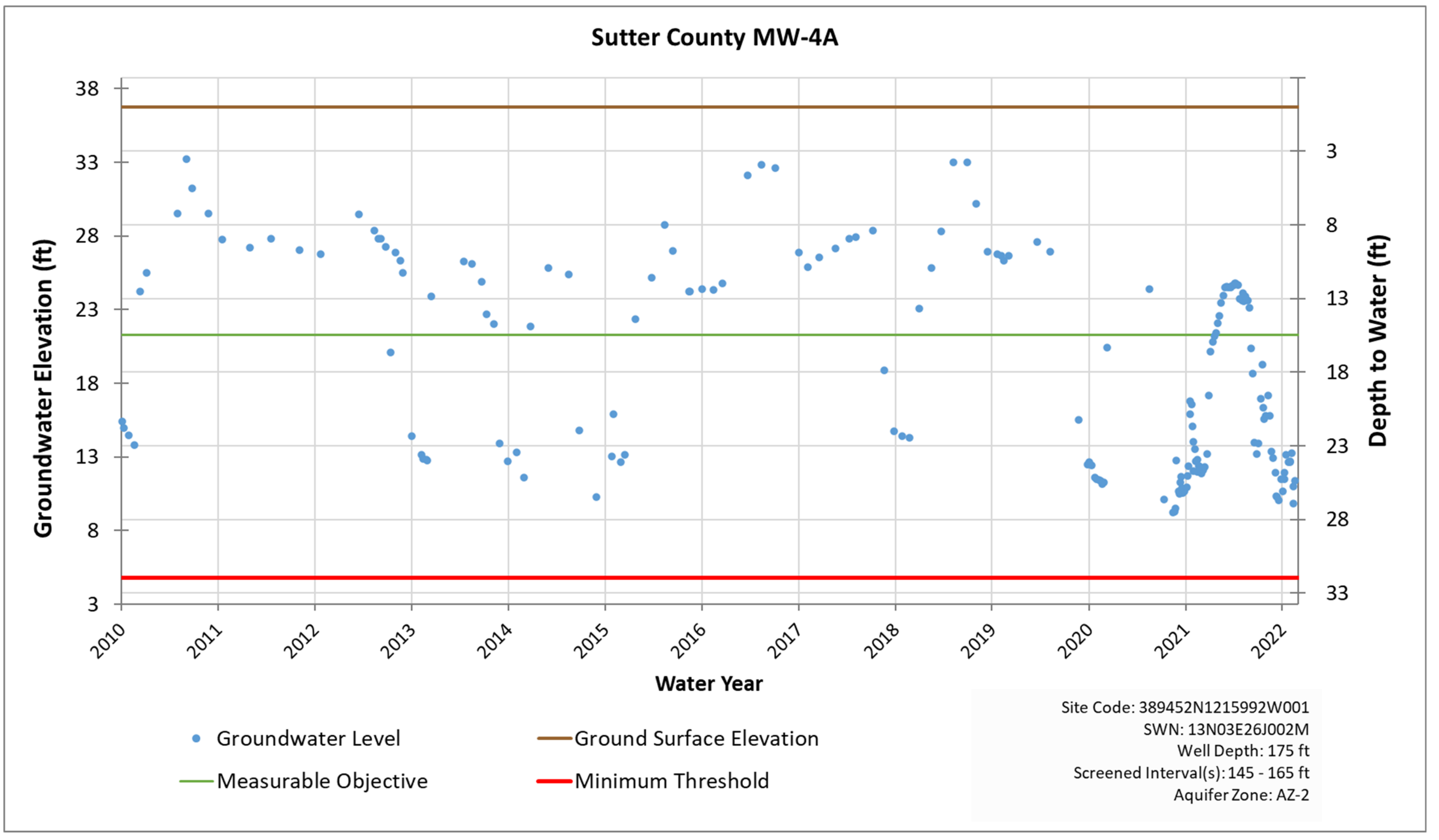

Flood MW-1B (int)
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389605N1218102W002
SWN: 13N01E24G003M
Well Depth: 160 ft
Screened Interval(s): 130 - 160 ft
Aquifer Zone: AZ-2

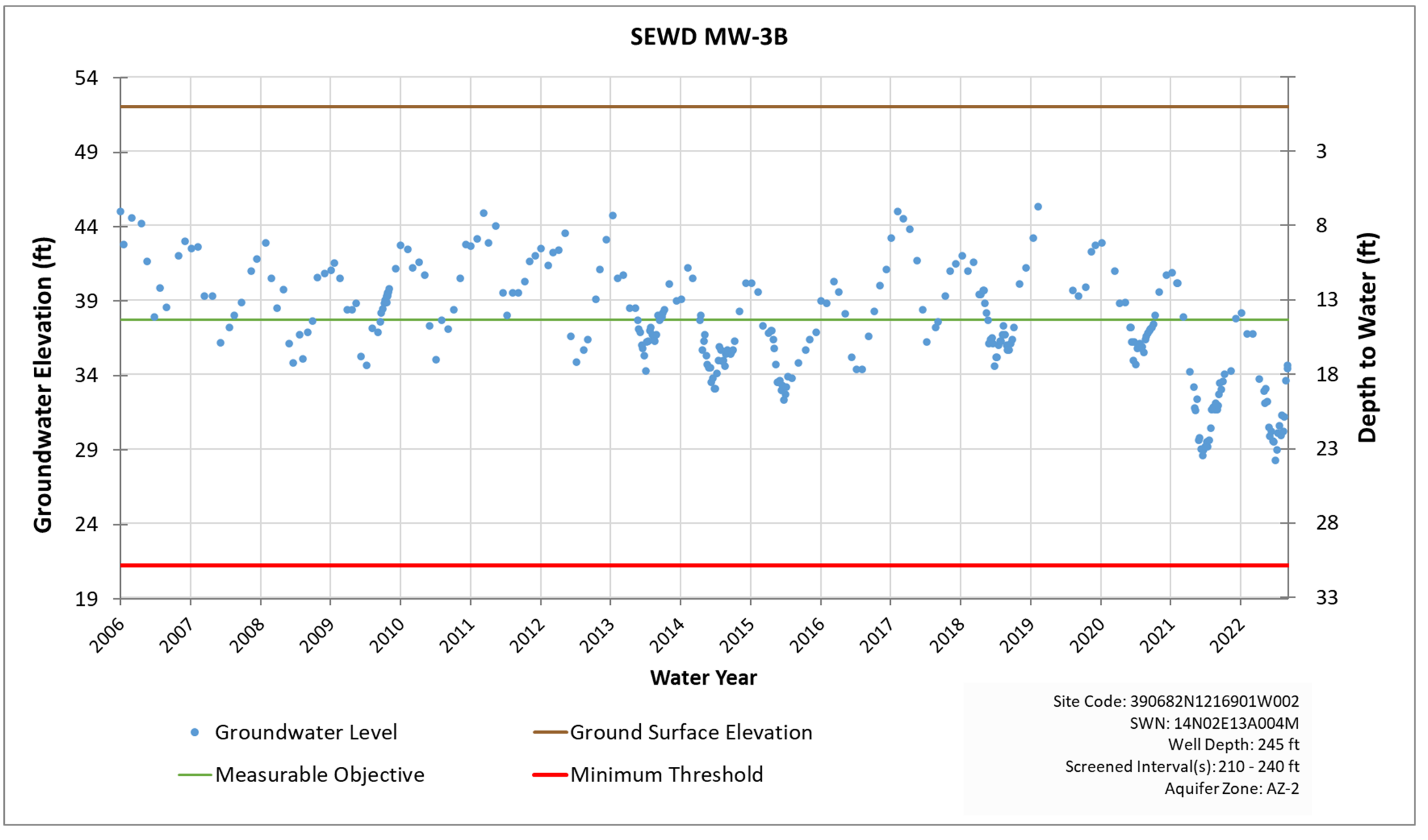

Hillcrest Well #8
Groundwater Elevation (ft)
Depth to Water (ft)
55
50
45
40
35
30
25
20
15
3
8
13
18
23
28
33
38
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391078N1216244W002
SWN: N/A
Well Depth: 254 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-2

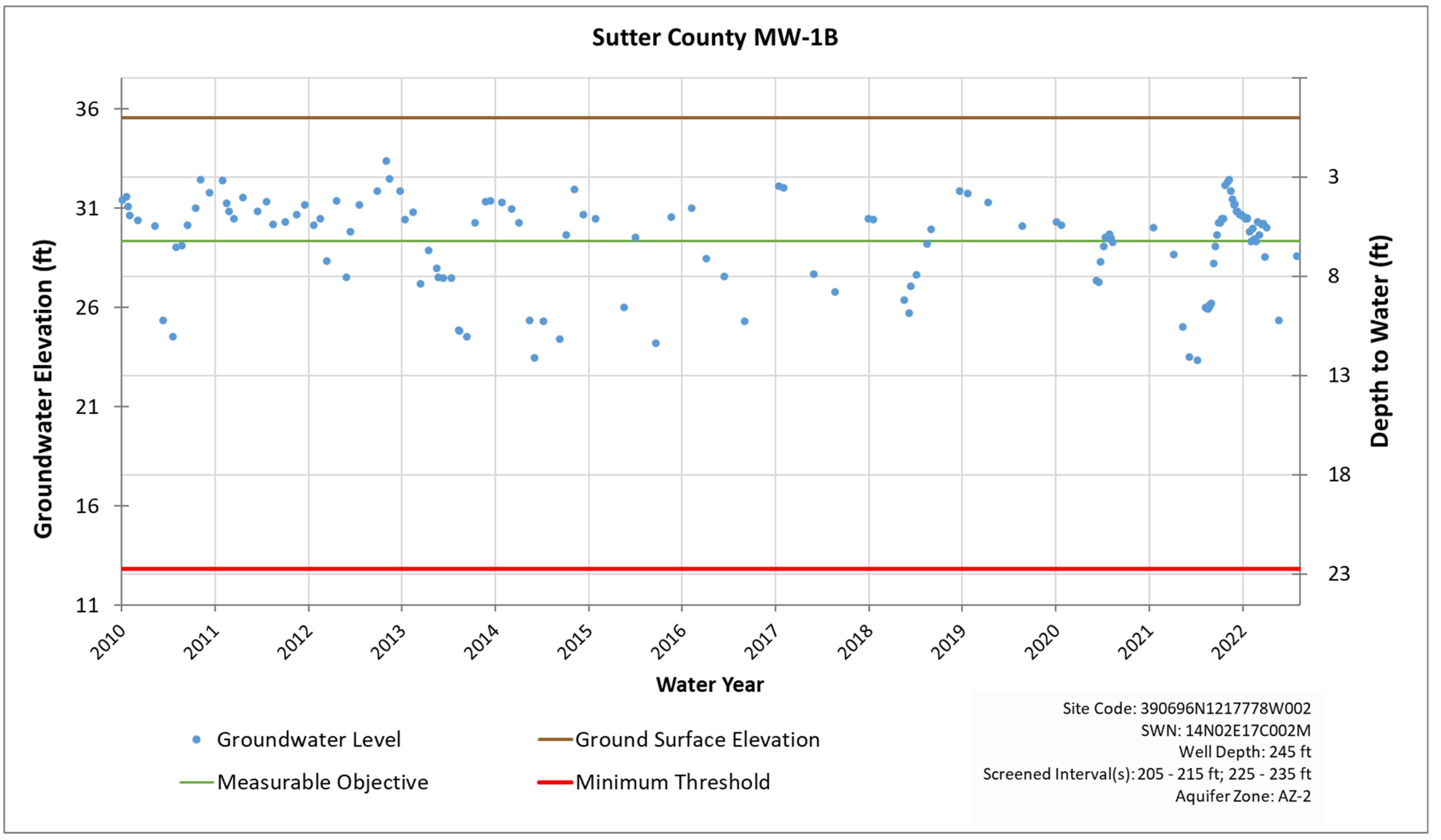

Hillcrest Well #9
Groundwater Elevation (ft)
Depth to Water (ft)
52
47
42
37
32
27
22
17
12
3
8
13
18
23
28
33
38
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391068N1216464W002
SWN: N/A
Well Depth: 190 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-2

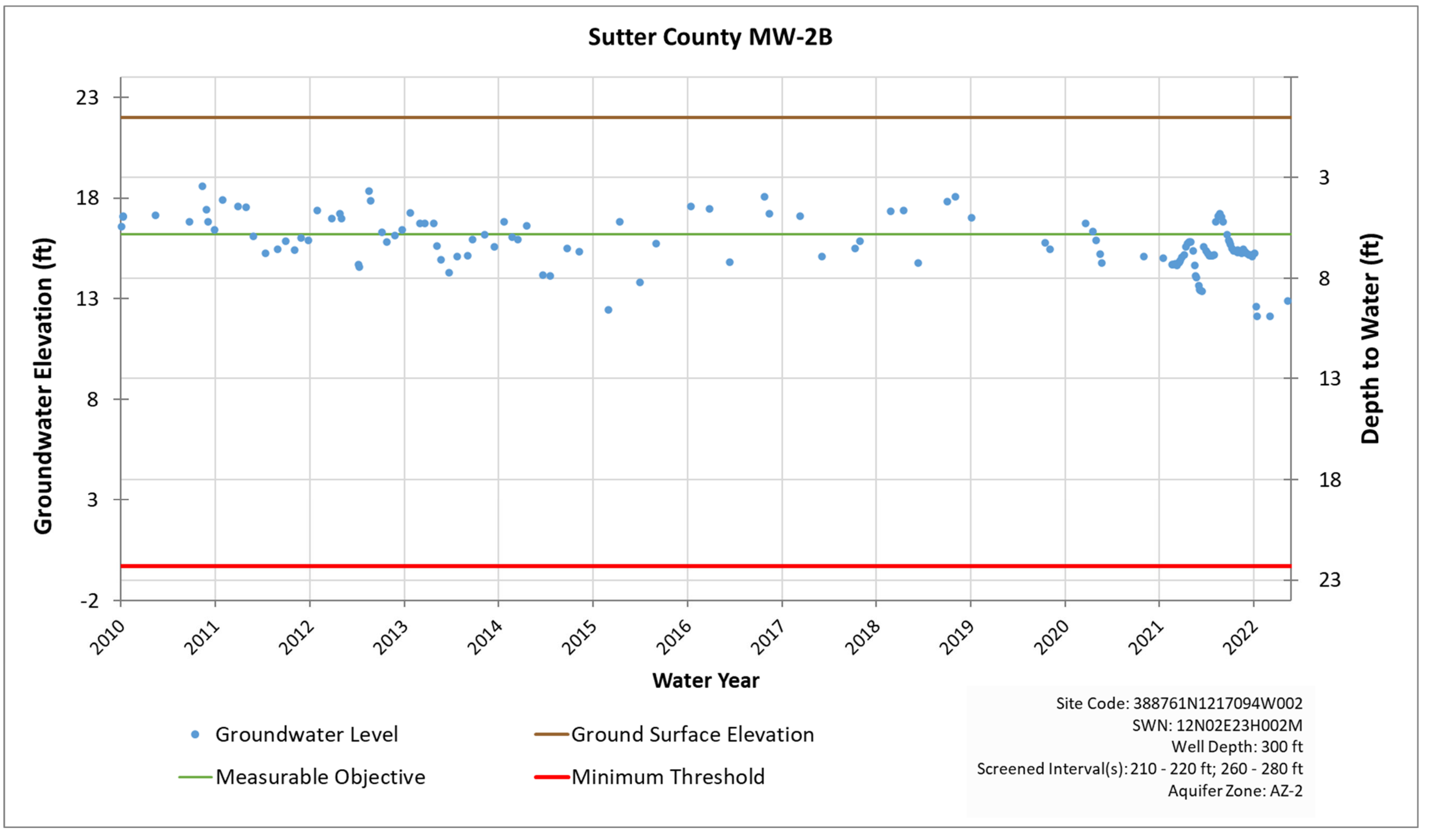

Sutter County MW-6B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390087N1216722W002
SWN: 13N03E06A002M
Well Depth: 175 ft
Screened Interval(s): 155 - 165 ft
Aquifer Zone: AZ-2

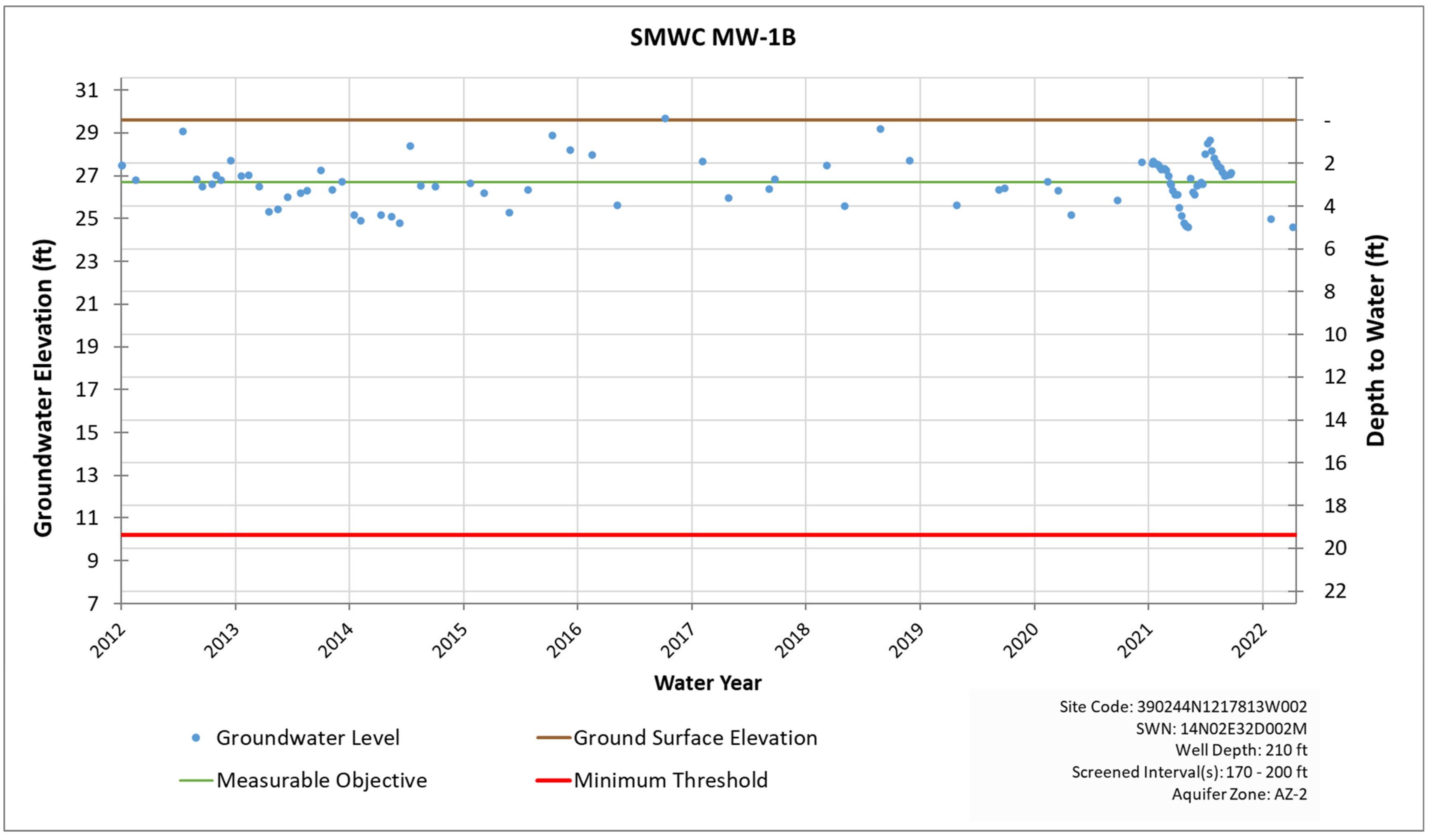

Sutter County MW-6C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390087N1216722W003
SWN: 13N03E06A003M
Well Depth: 265 ft
Screened Interval(s): 245 - 255 ft
Aquifer Zone: AZ-2

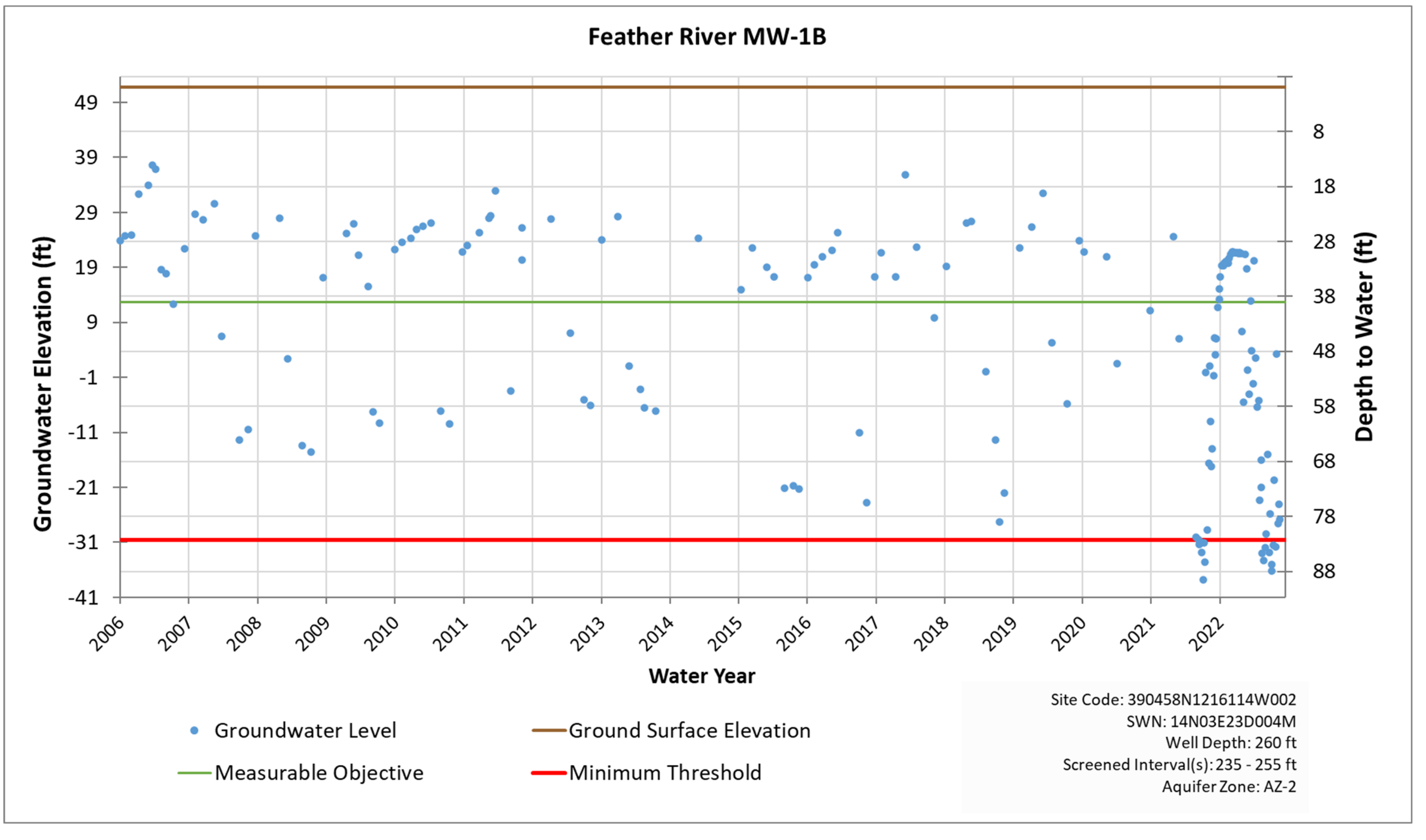

Sutter County MW-4A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389452N1215992W001
SWN: 13N03E26J002M
Well Depth: 175 ft
Screened Interval(s): 145 - 165 ft
Aquifer Zone: AZ-2

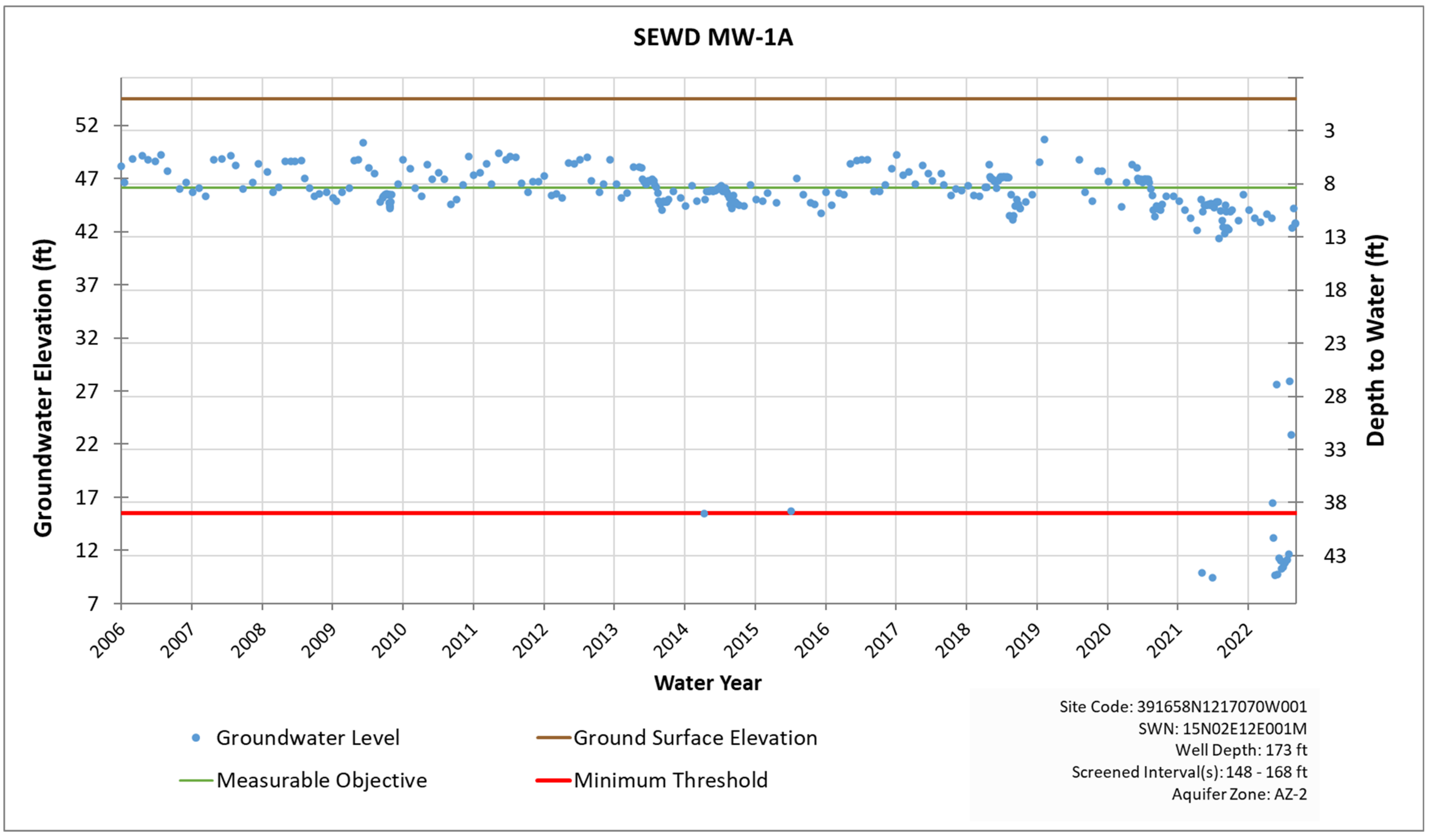

SEWD MW-3B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390682N1216901W002
SWN: 14N02E13A004M
Well Depth: 245 ft
Screened Interval(s): 210 - 240 ft
Aquifer Zone: AZ-2

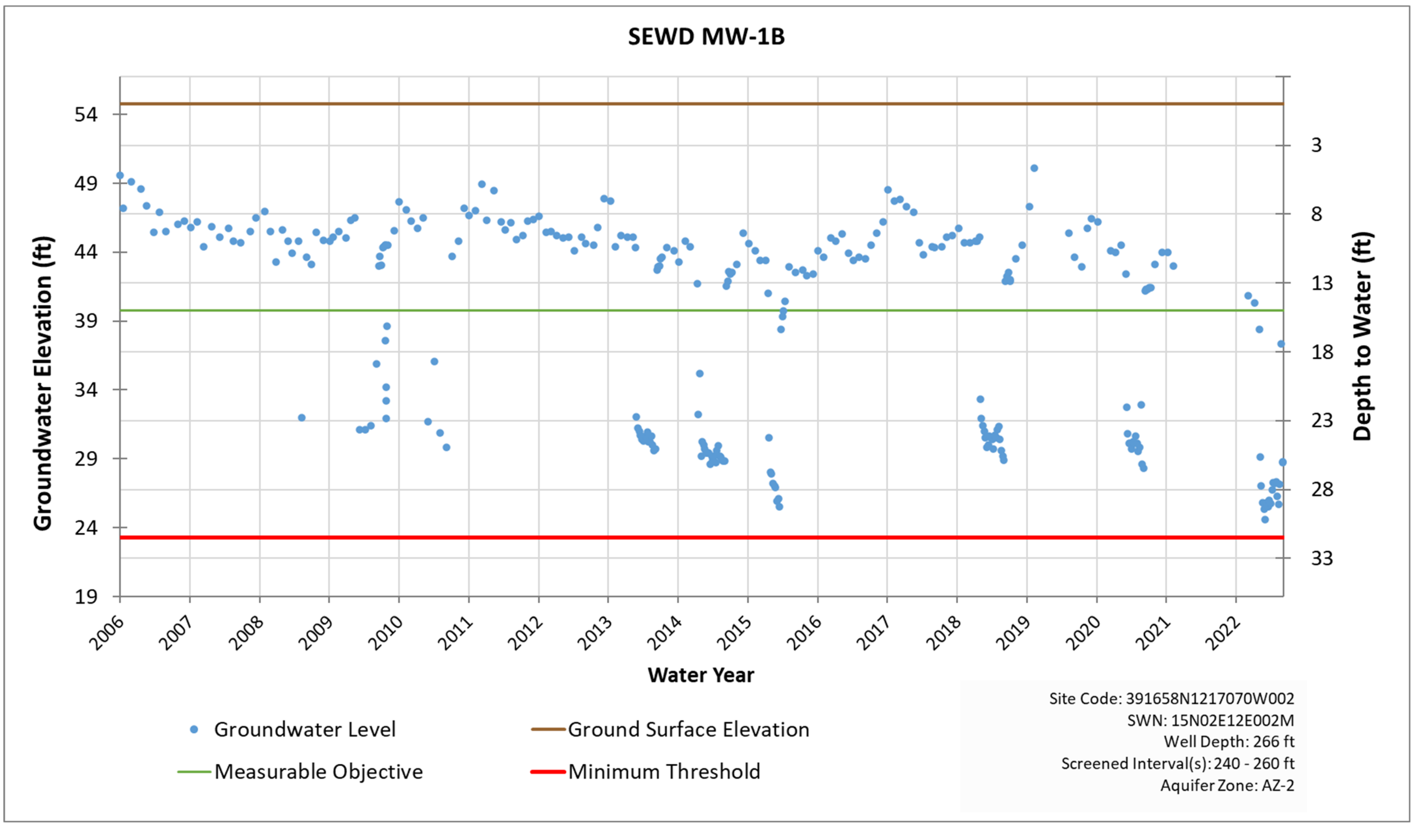

Sutter County MW-1B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390696N1217778W002
SWN: 14N02E17C002M
Well Depth: 245 ft
Screened Interval(s): 205 - 215 ft; 225 - 235 ft
Aquifer Zone: AZ-2

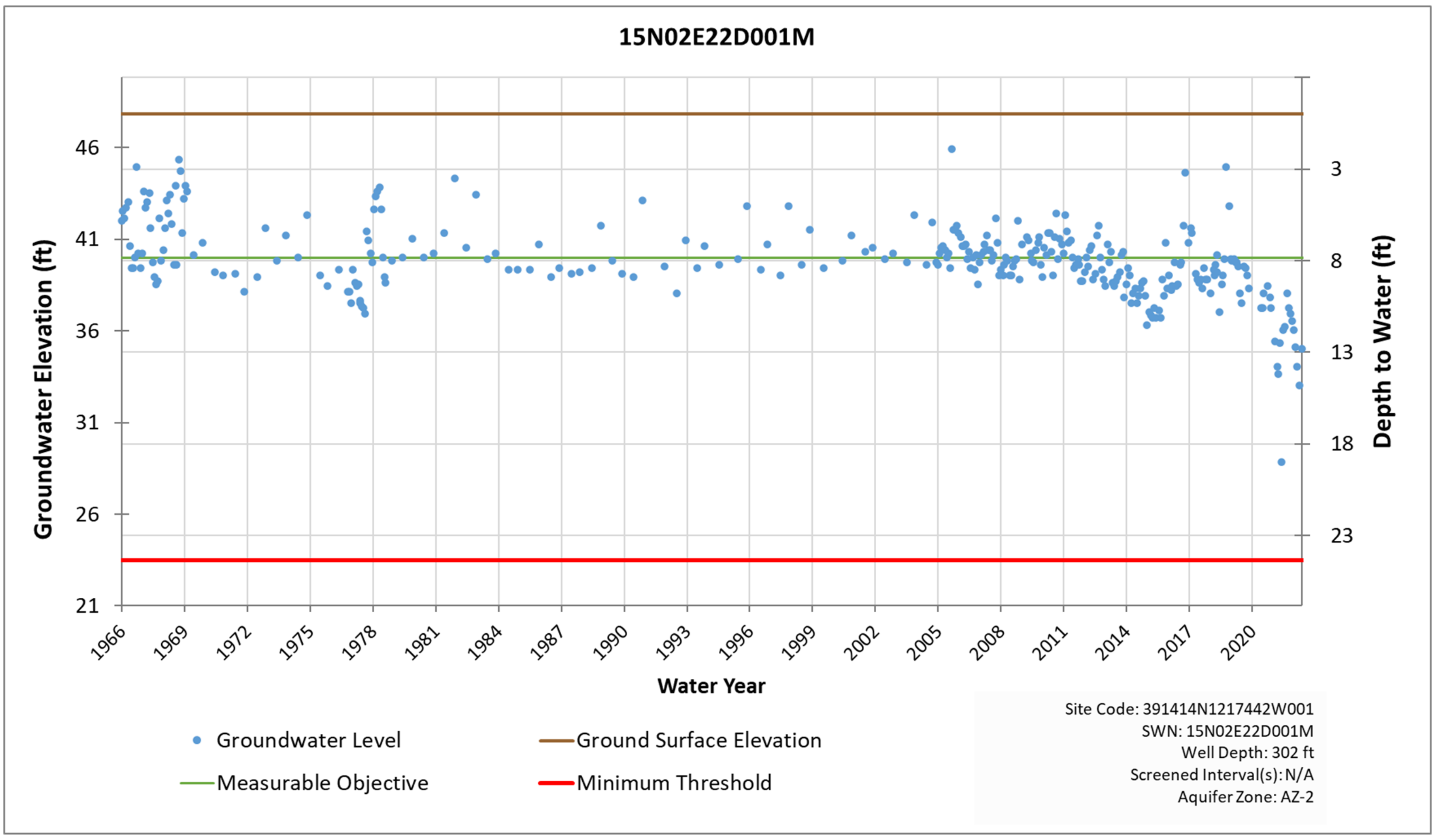

Sutter County MW-2B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 388761N1217094W002
SWN: 12N02E23H002M
Well Depth: 300 ft
Screened Interval(s): 210 - 220 ft; 260 - 280 ft
Aquifer Zone: AZ-2

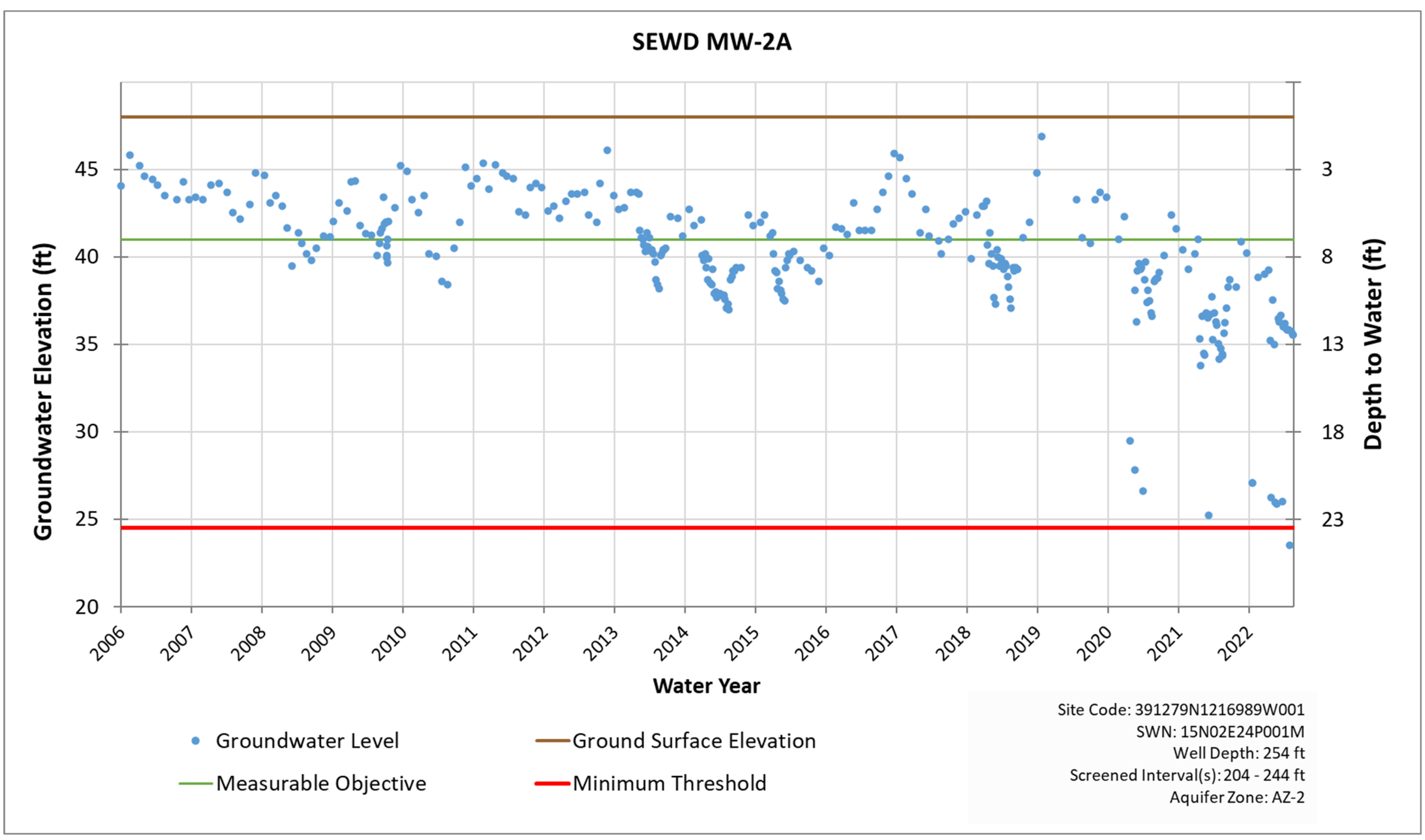

SMWC MW-1B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390244N1217813W002
SWN: 14N02E32D002M
Well Depth: 210 ft
Screened Interval(s): 170 - 200 ft
Aquifer Zone: AZ-2

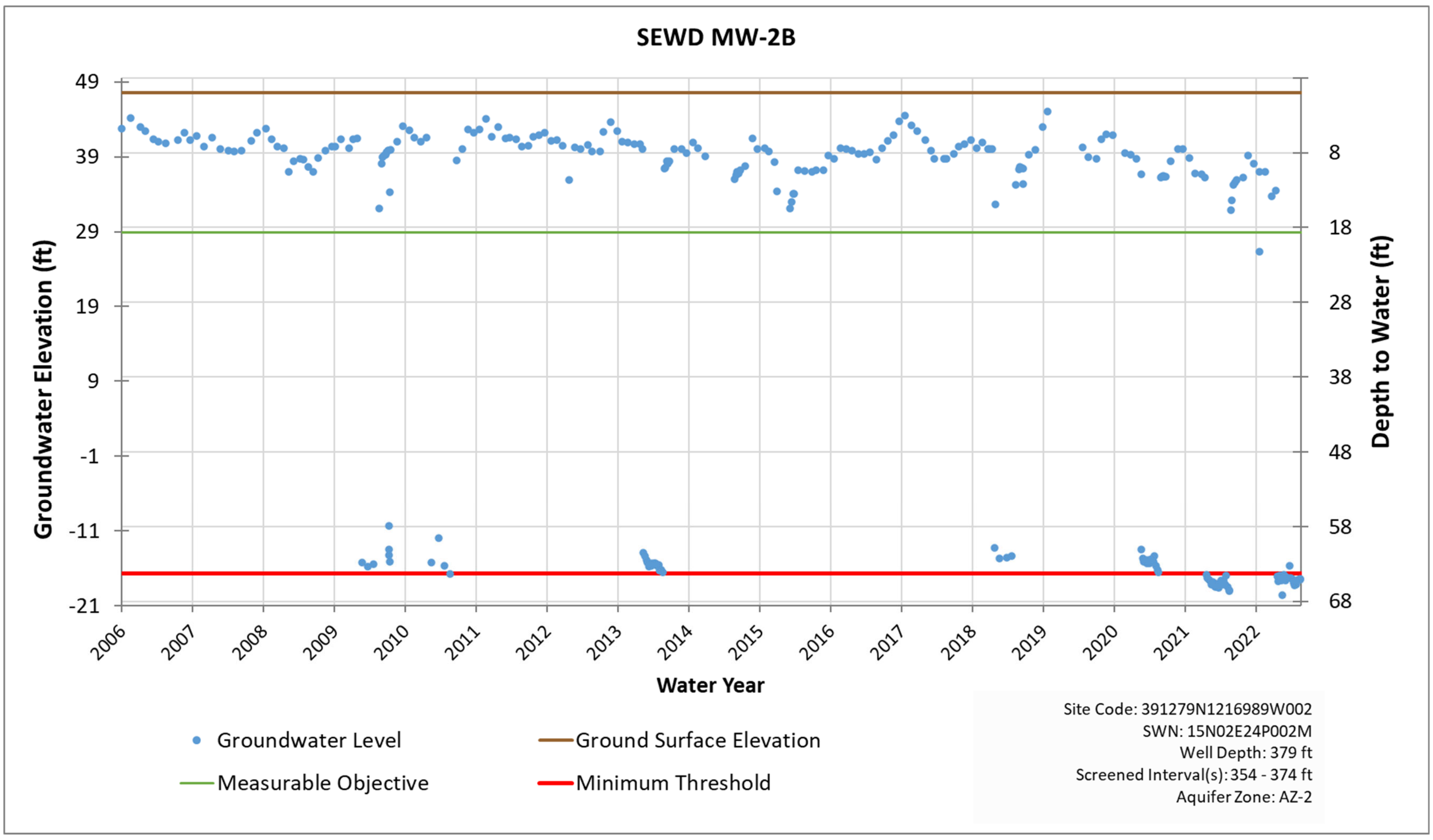

Feather River MW-1B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390458N1216114W002
SWN: 14N03E23D004M
Well Depth: 260 ft
Screened Interval(s): 235 - 255 ft
Aquifer Zone: AZ-2

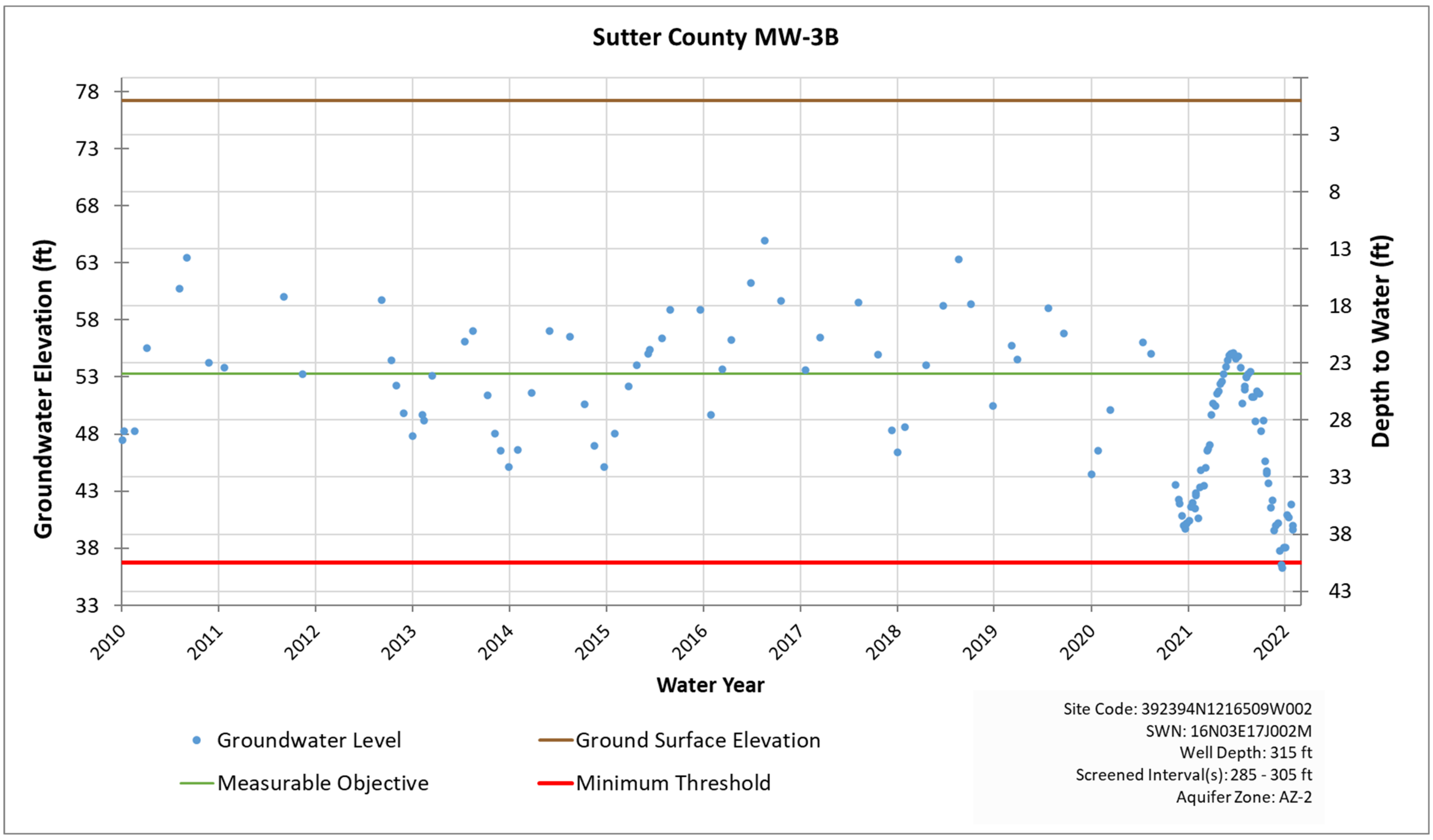

SEWD MW-1A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391658N1217070W001
SWN: 15N02E12E001M
Well Depth: 173 ft
Screened Interval(s): 148 - 168 ft
Aquifer Zone: AZ-2

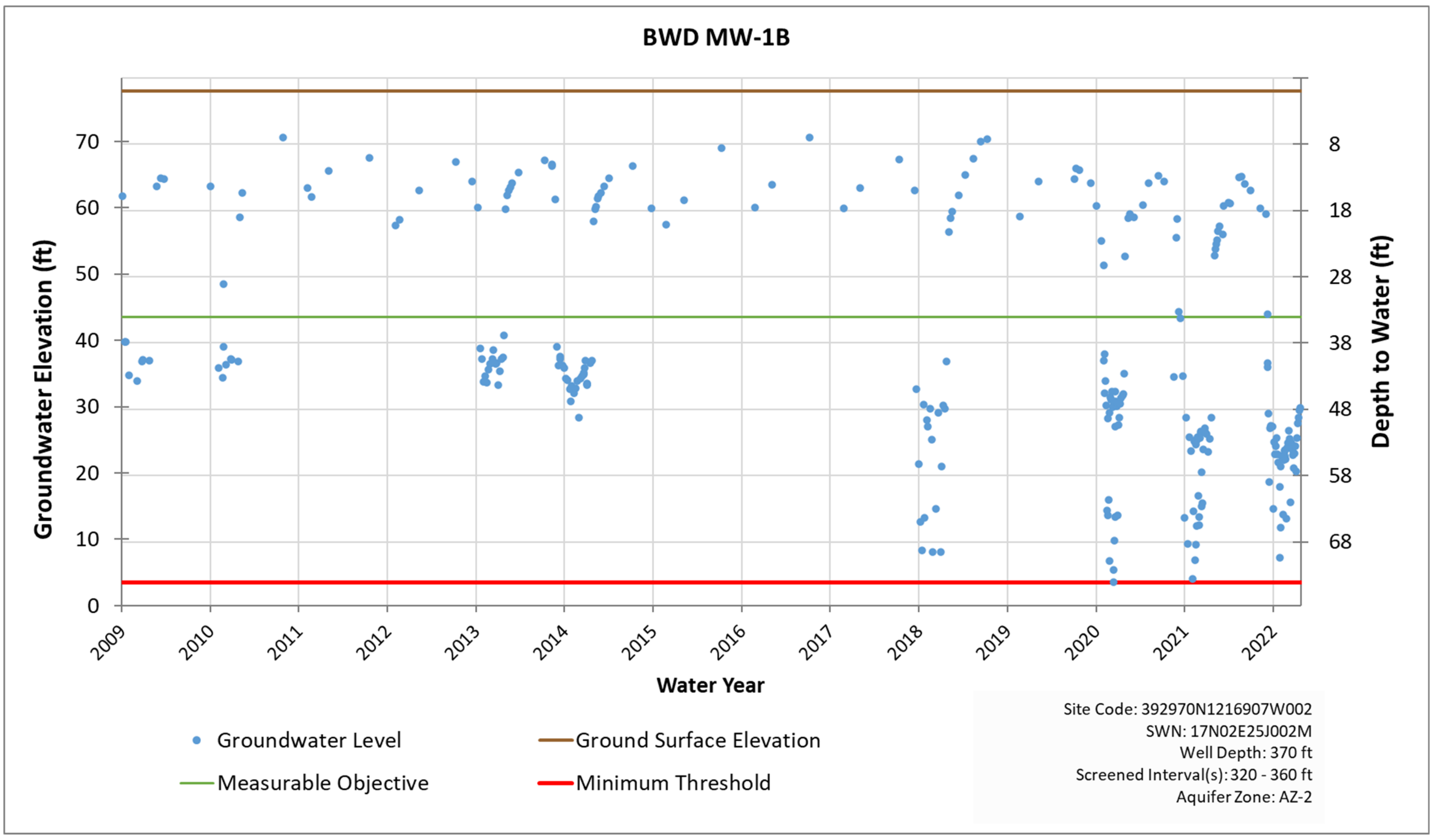

SEWD MW-1B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391658N1217070W002
SWN: 15N02E12E002M
Well Depth: 266 ft
Screened Interval(s): 240 - 260 ft
Aquifer Zone: AZ-2

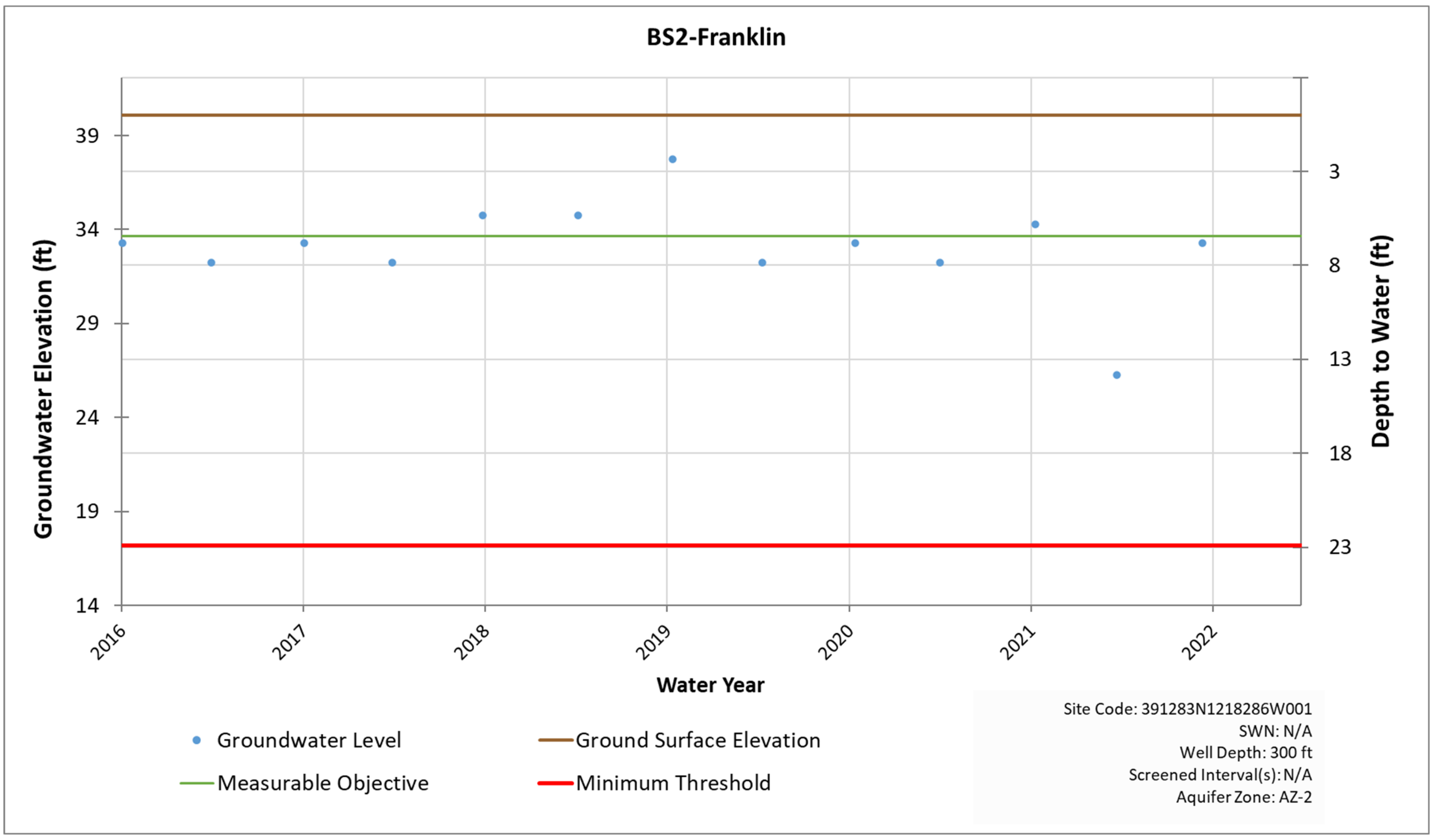

15N02E22D001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391414N1217442W001
SWN: 15N02E22D001M
Well Depth: 302 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-2

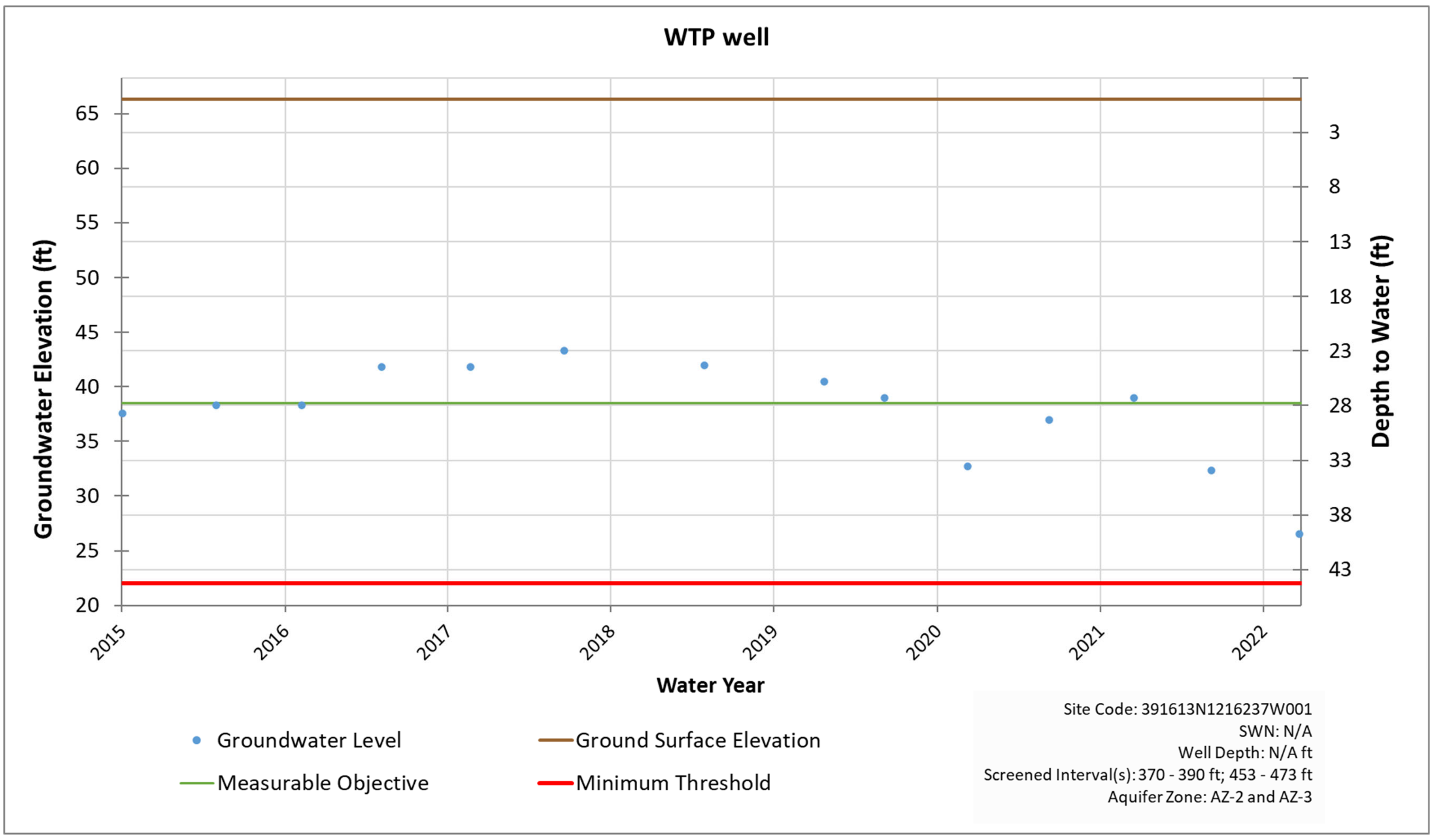

SEWD MW-2A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391279N1216989W001
SWN: 15N02E24P001M
Well Depth: 254 ft
Screened Interval(s): 204 - 244 ft
Aquifer Zone: AZ-2

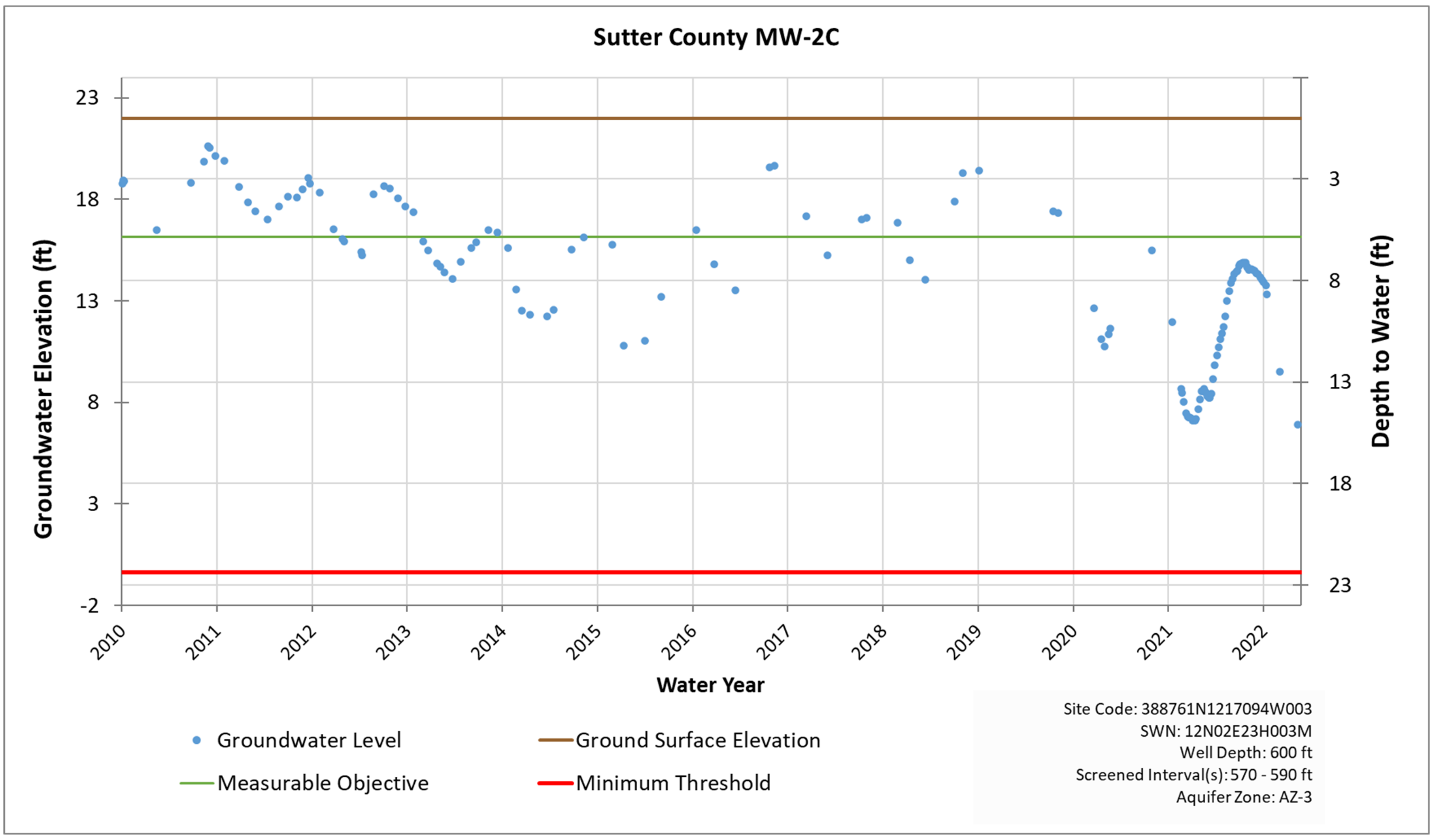

SEWD MW-2B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391279N1216989W002
SWN: 15N02E24P002M
Well Depth: 379 ft
Screened Interval(s): 354 - 374 ft
Aquifer Zone: AZ-2

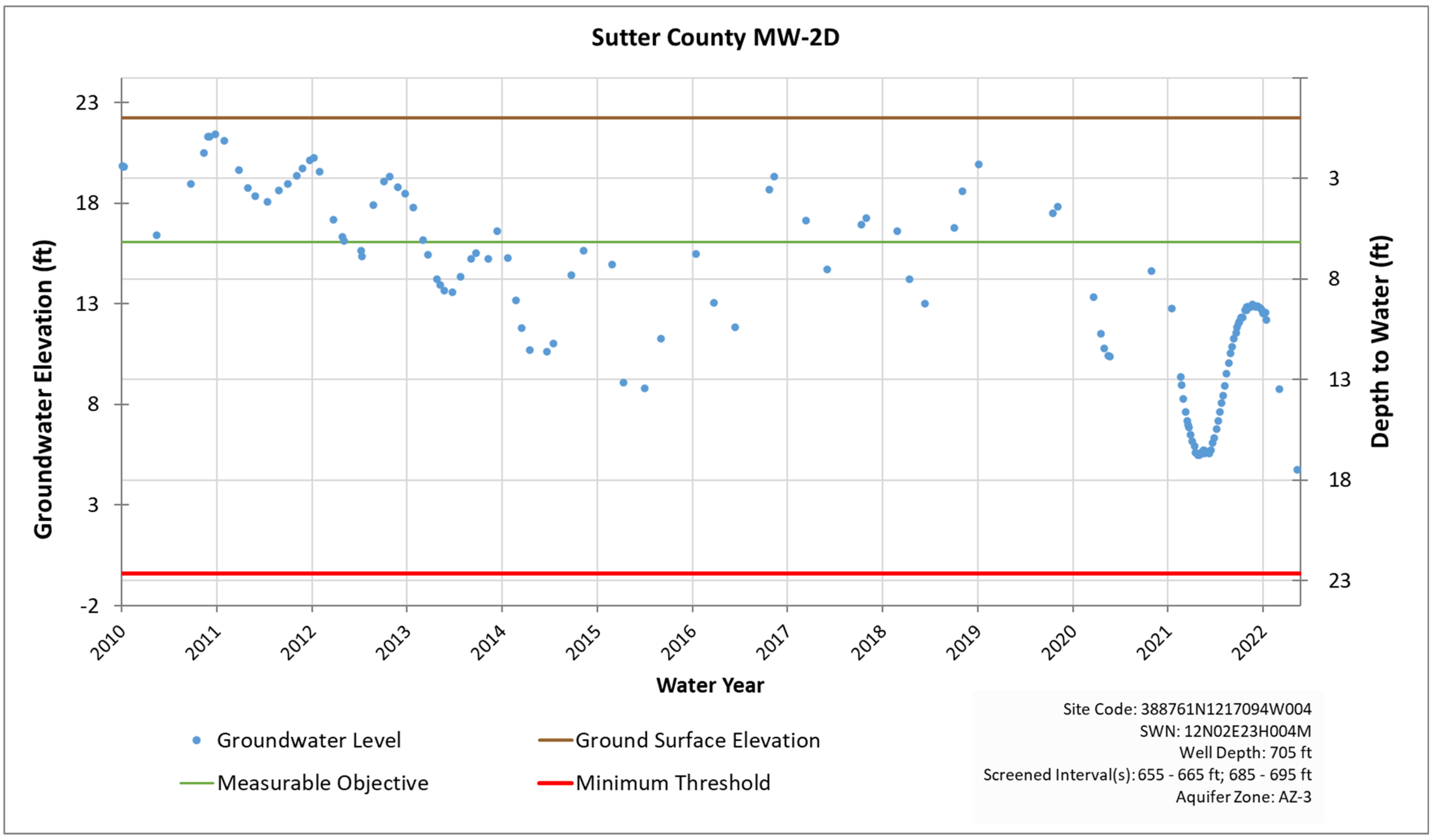

Sutter County MW-3B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W002
SWN: 16N03E17J002M
Well Depth: 315 ft
Screened Interval(s): 285 - 305 ft
Aquifer Zone: AZ-2

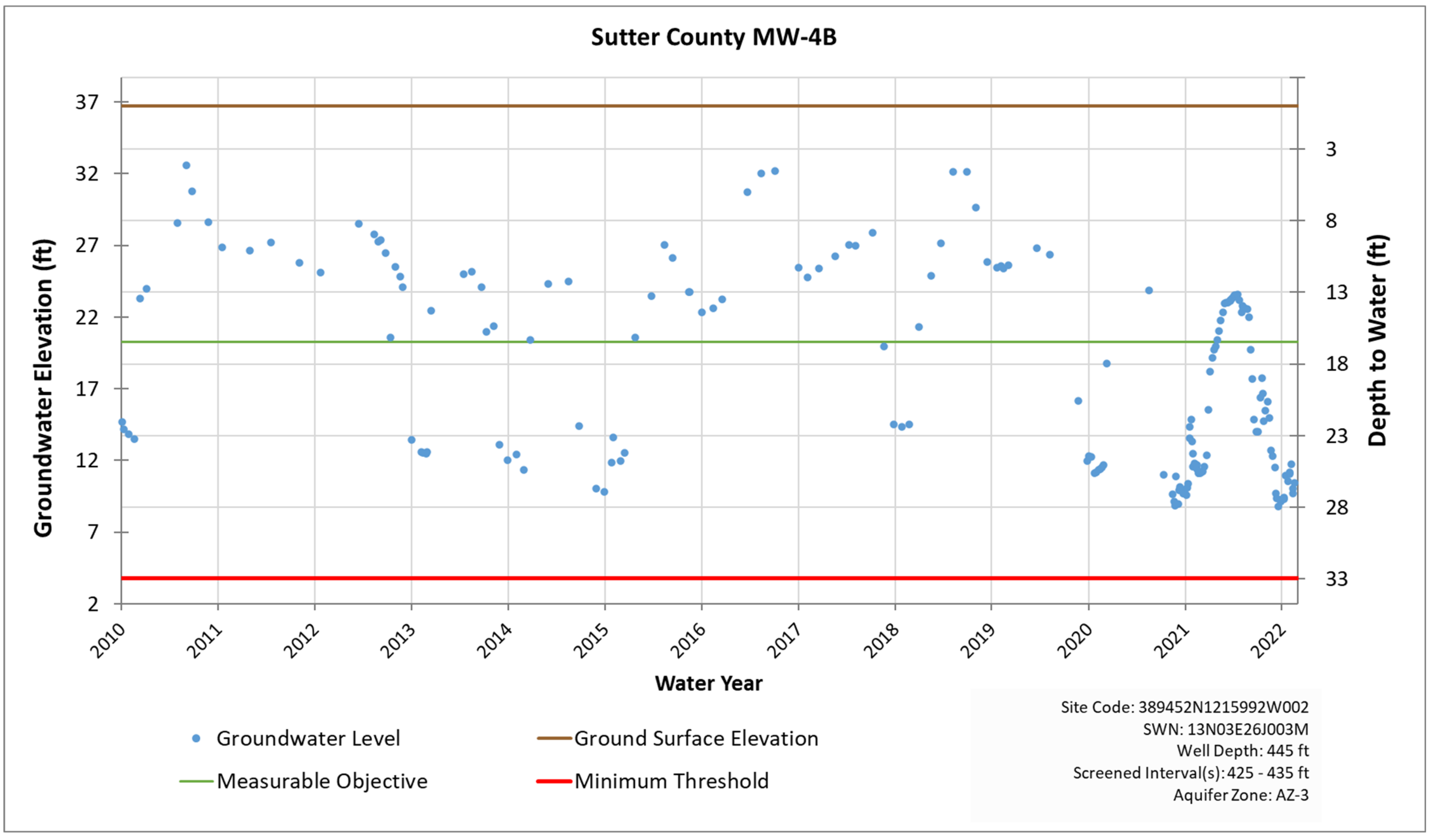

BWD MW-1B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392970N1216907W002
SWN: 17N02E25J002M
Well Depth: 370 ft
Screened Interval(s): 320 - 360 ft
Aquifer Zone: AZ-2

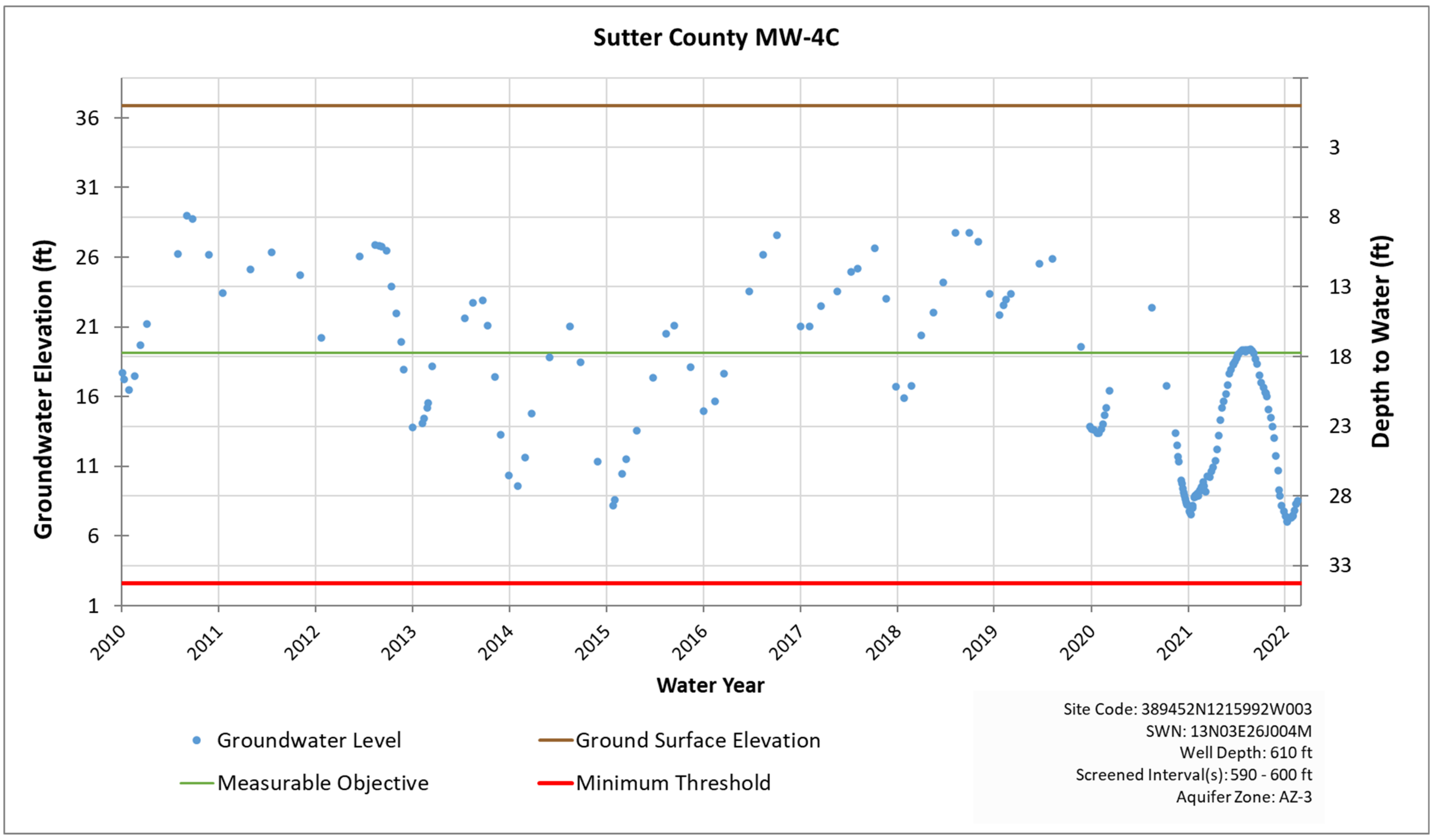

BS2-Franklin
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391283N1218286W001
SWN: N/A
Well Depth: 300 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-2

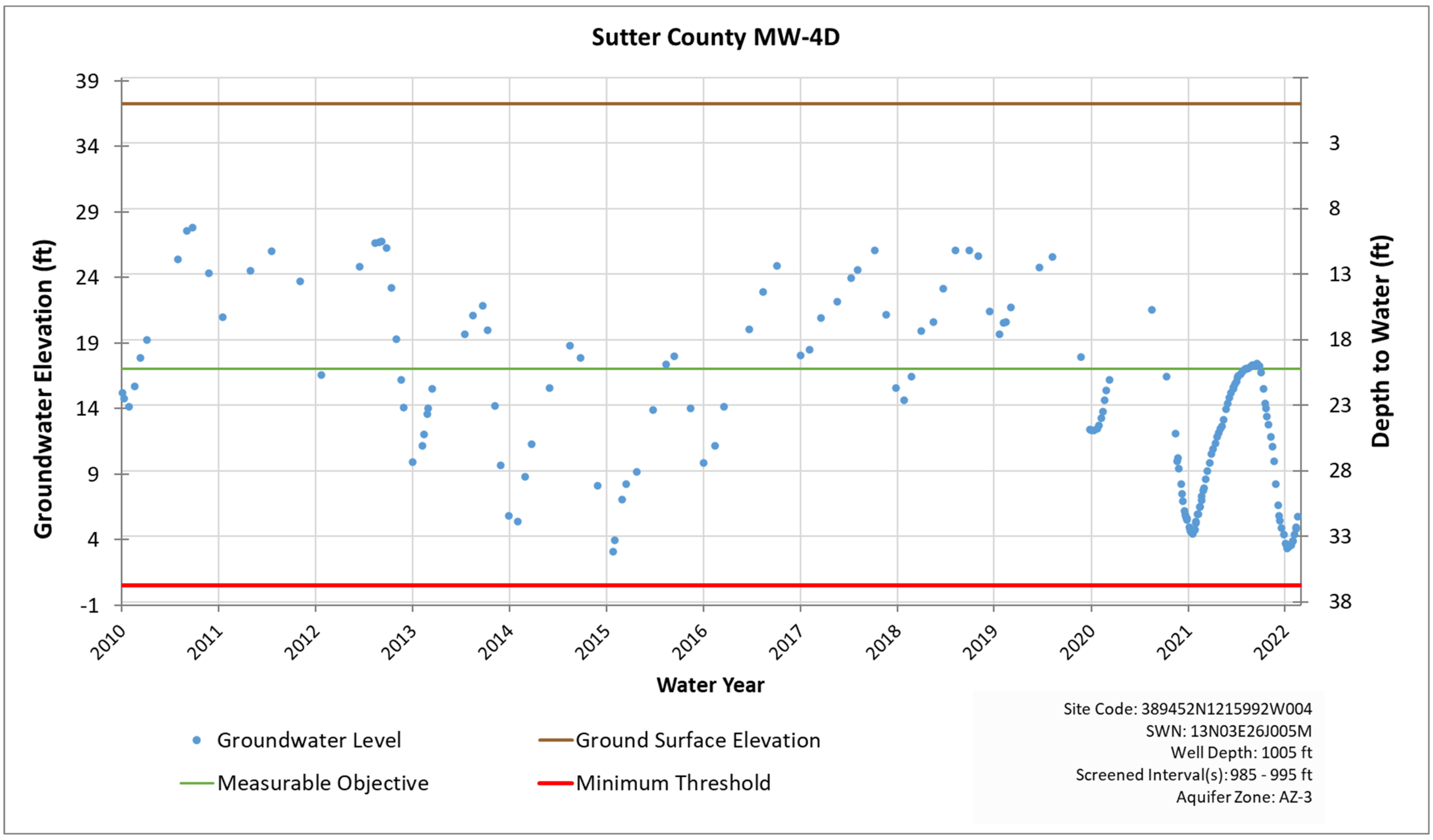

WTP well
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391613N1216237W001
SWN: N/A
Well Depth: N/A ft
Screened Interval(s): 370 - 390 ft; 453 - 473 ft
Aquifer Zone: AZ-2 and AZ-3

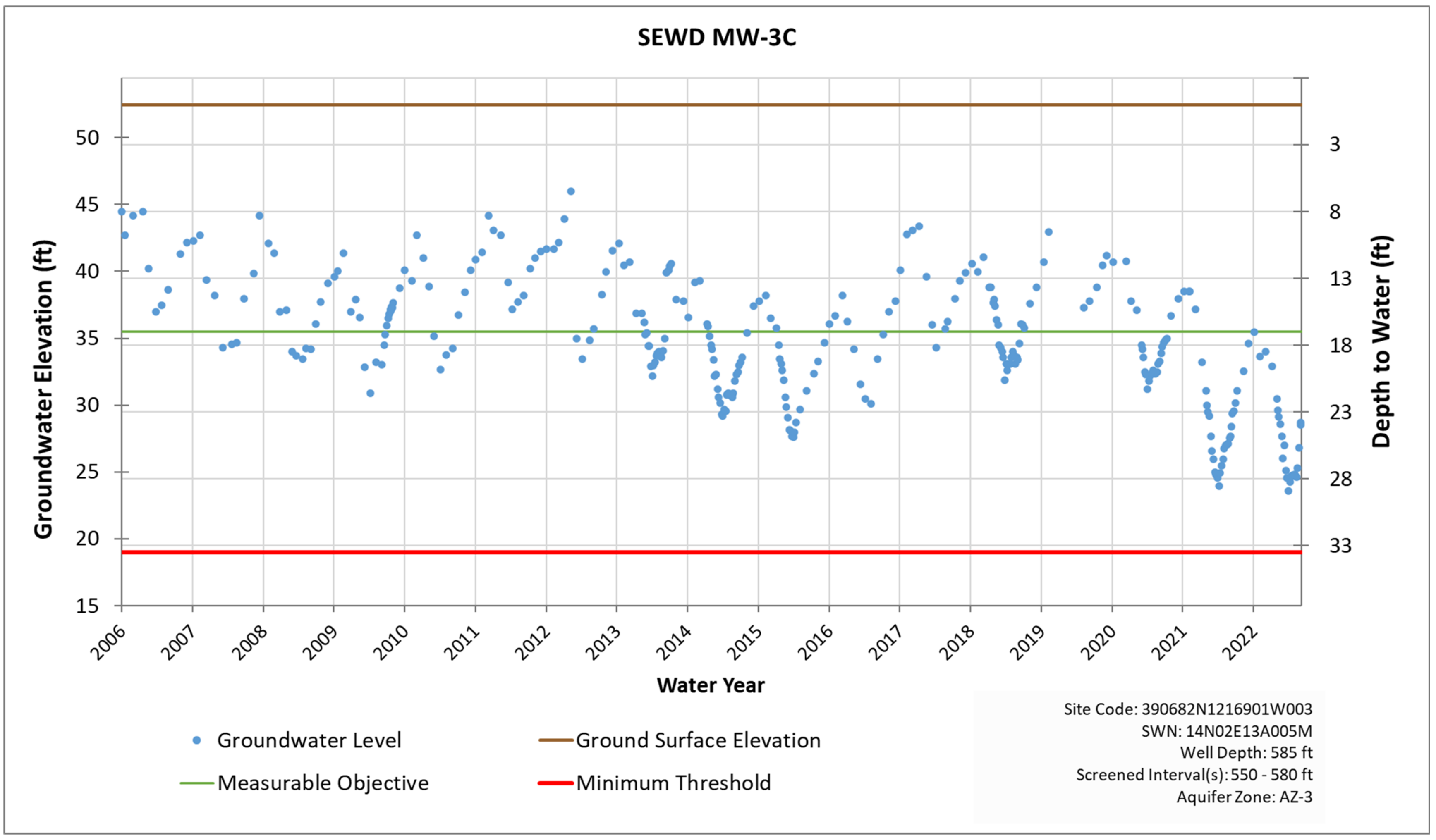

Sutter County MW-2C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 388761N1217094W003
SWN: 12N02E23H003M
Well Depth: 600 ft
Screened Interval(s): 570 - 590 ft
Aquifer Zone: AZ-3

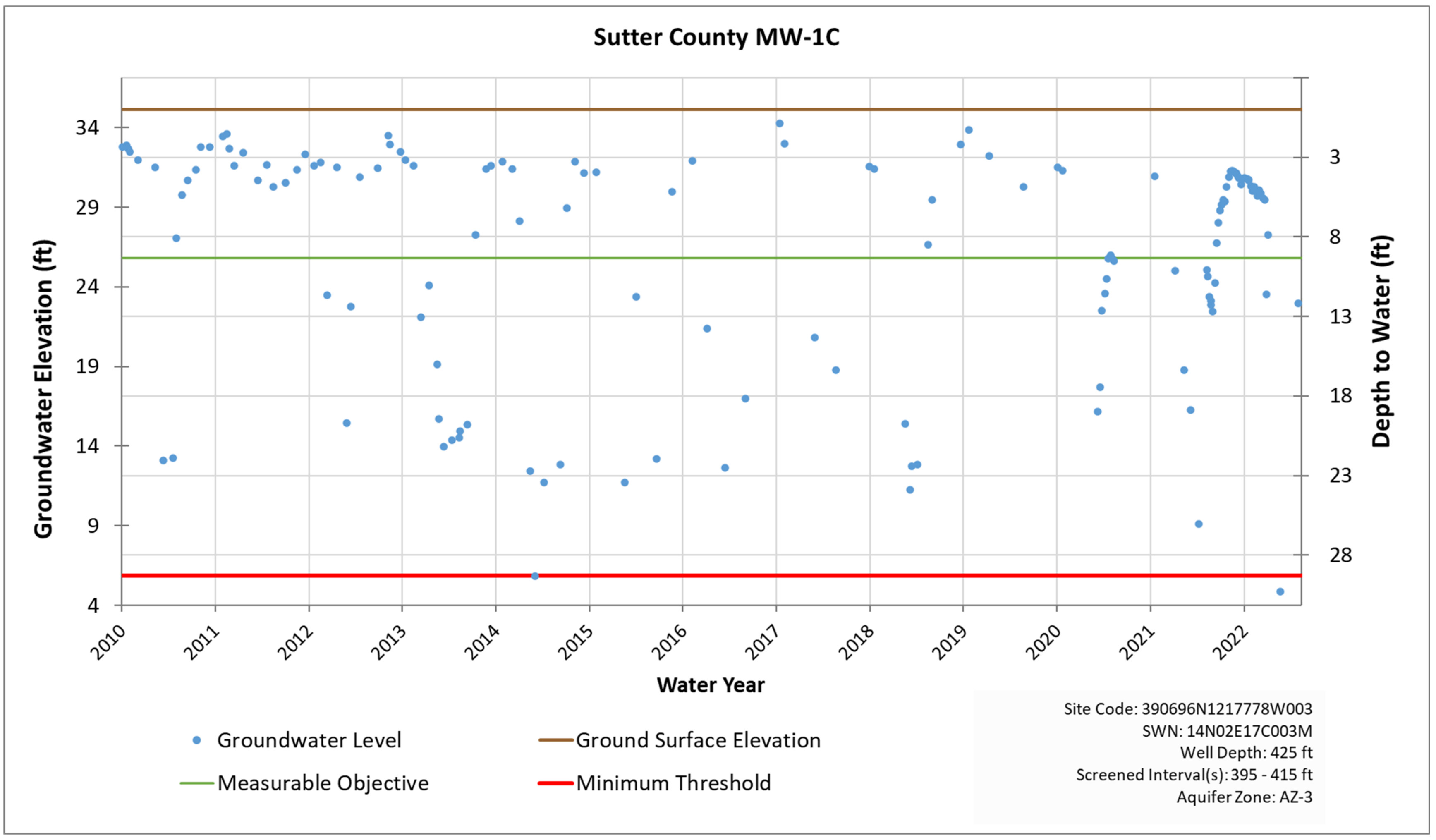

Sutter County MW-2D
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
23
18
13
8
3
-2
3
8
13
18
23
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 388761N1217094W004
SWN: 12N02E23H004M
Well Depth: 705 ft
Screened Interval(s): 655 - 665 ft; 685 - 695 ft
Aquifer Zone: AZ-3

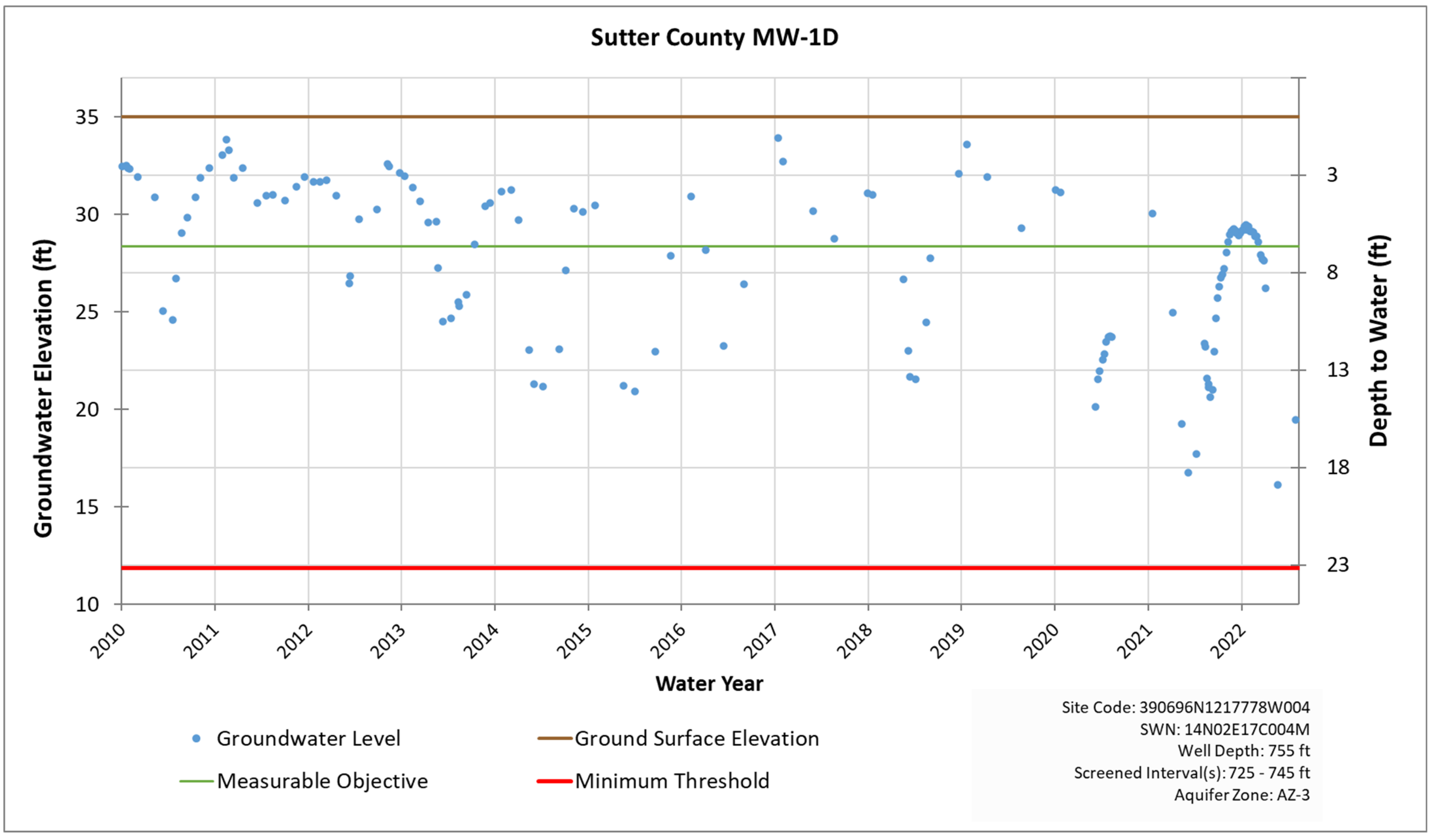

Sutter County MW-4B
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
37
32
27
22
17
12
7
2
3
8
13
18
23
28
33
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389452N1215992W002
SWN: 13N03E26J003M
Well Depth: 445 ft
Screened Interval(s): 425 - 435 ft
Aquifer Zone: AZ-3

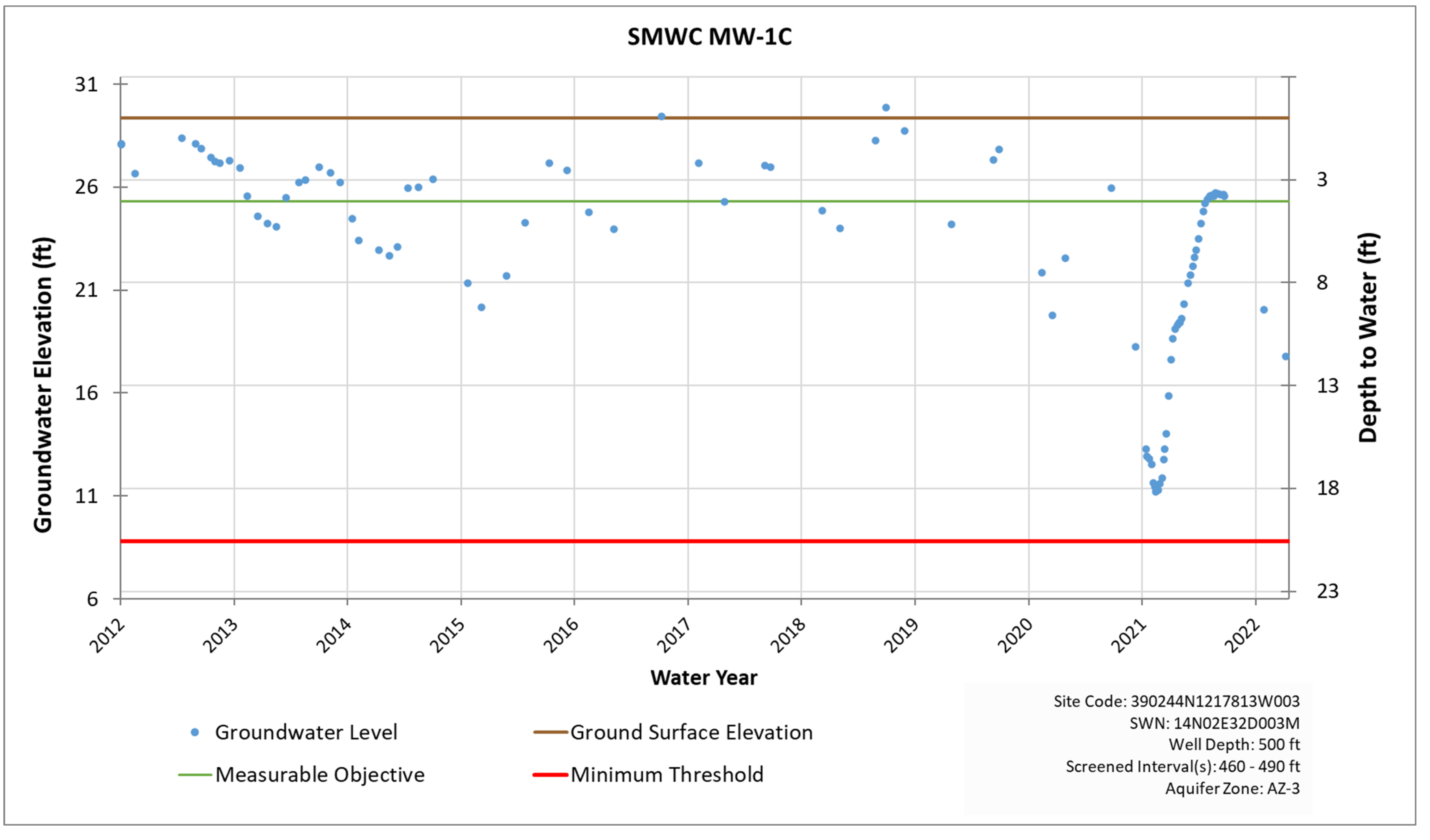

Sutter County MW-4C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389452N1215992W003
SWN: 13N03E26J004M
Well Depth: 610 ft
Screened Interval(s): 590 - 600 ft
Aquifer Zone: AZ-3

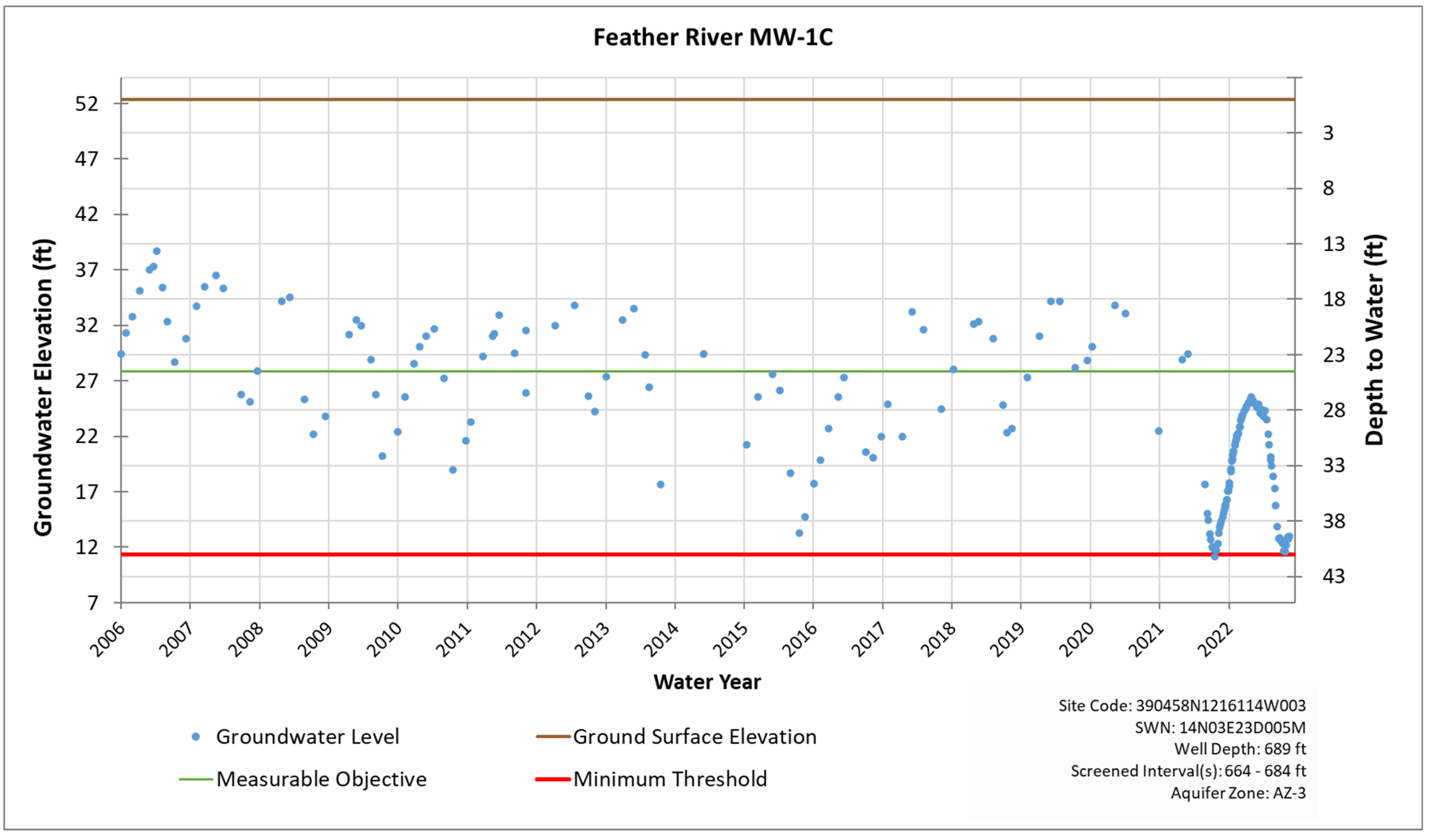

Sutter County MW-4D
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389452N1215992W004
SWN: 13N03E26J005M
Well Depth: 1005 ft
Screened Interval(s): 985 - 995 ft
Aquifer Zone: AZ-3

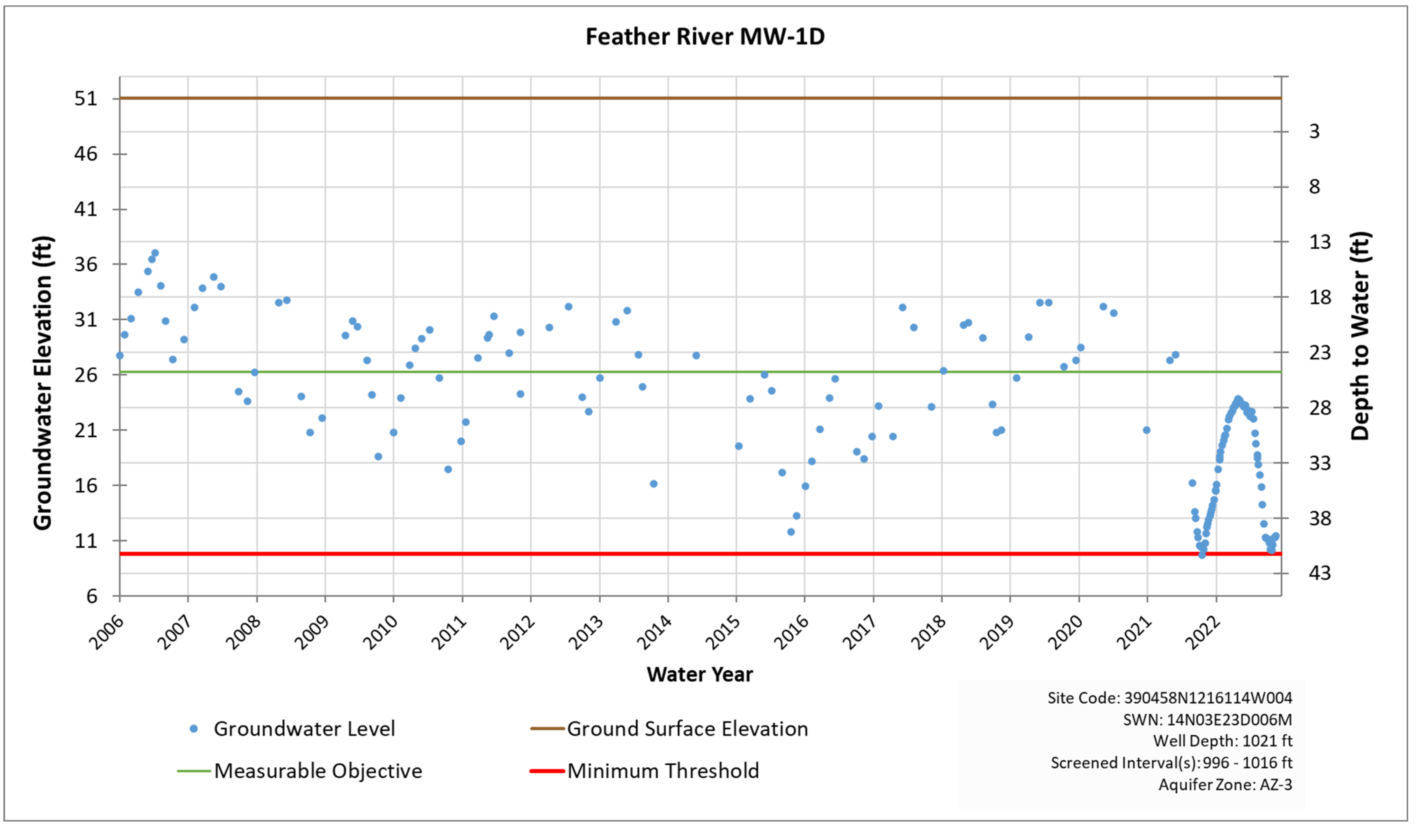

SEWD MW-3C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390682N1216901W003
SWN: 14N02E13A005M
Well Depth: 585 ft
Screened Interval(s): 550 - 580 ft
Aquifer Zone: AZ-3

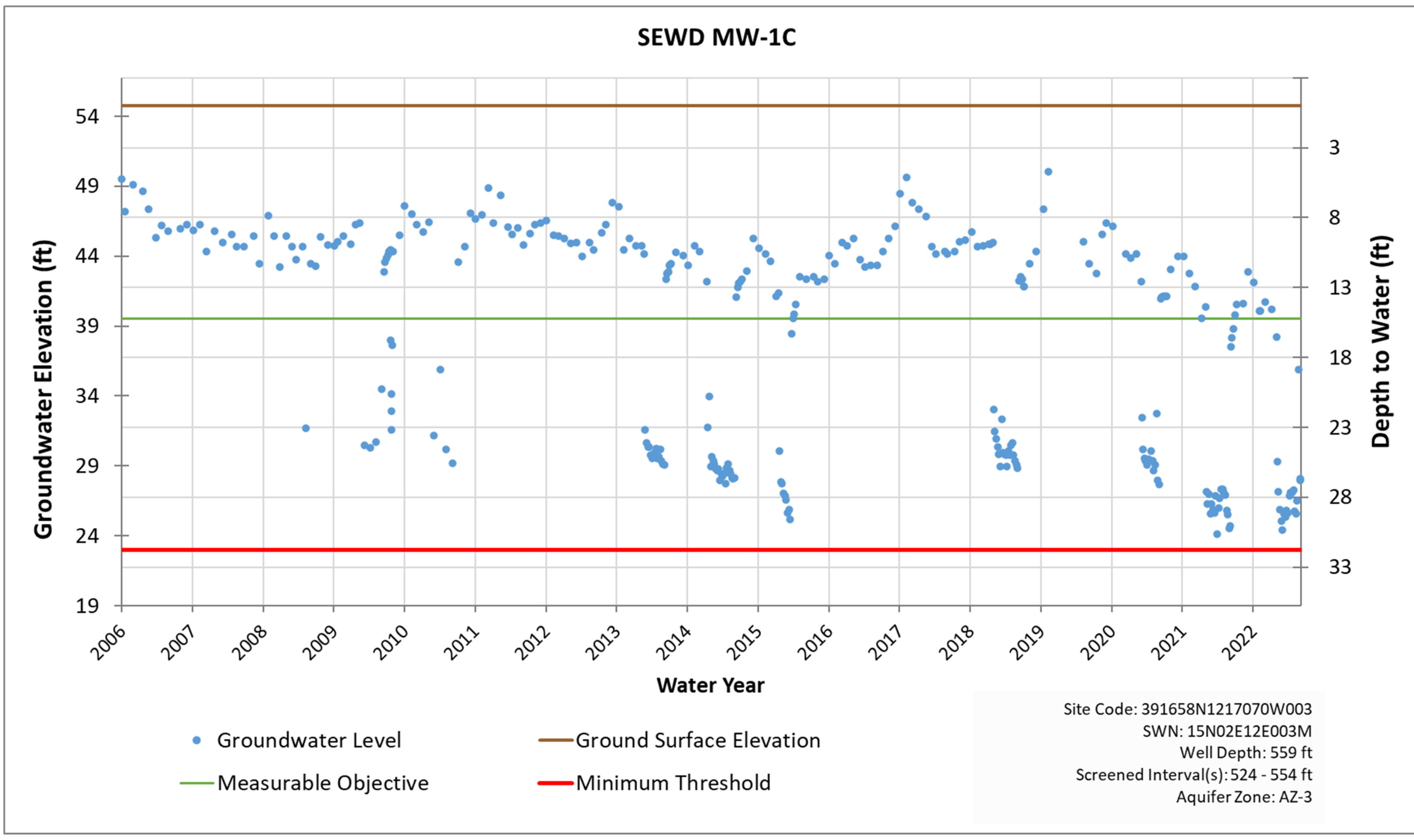

Sutter County MW-1C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390696N1217778W003
SWN: 14N02E17C003M
Well Depth: 425 ft
Screened Interval(s): 395 - 415 ft
Aquifer Zone: AZ-3

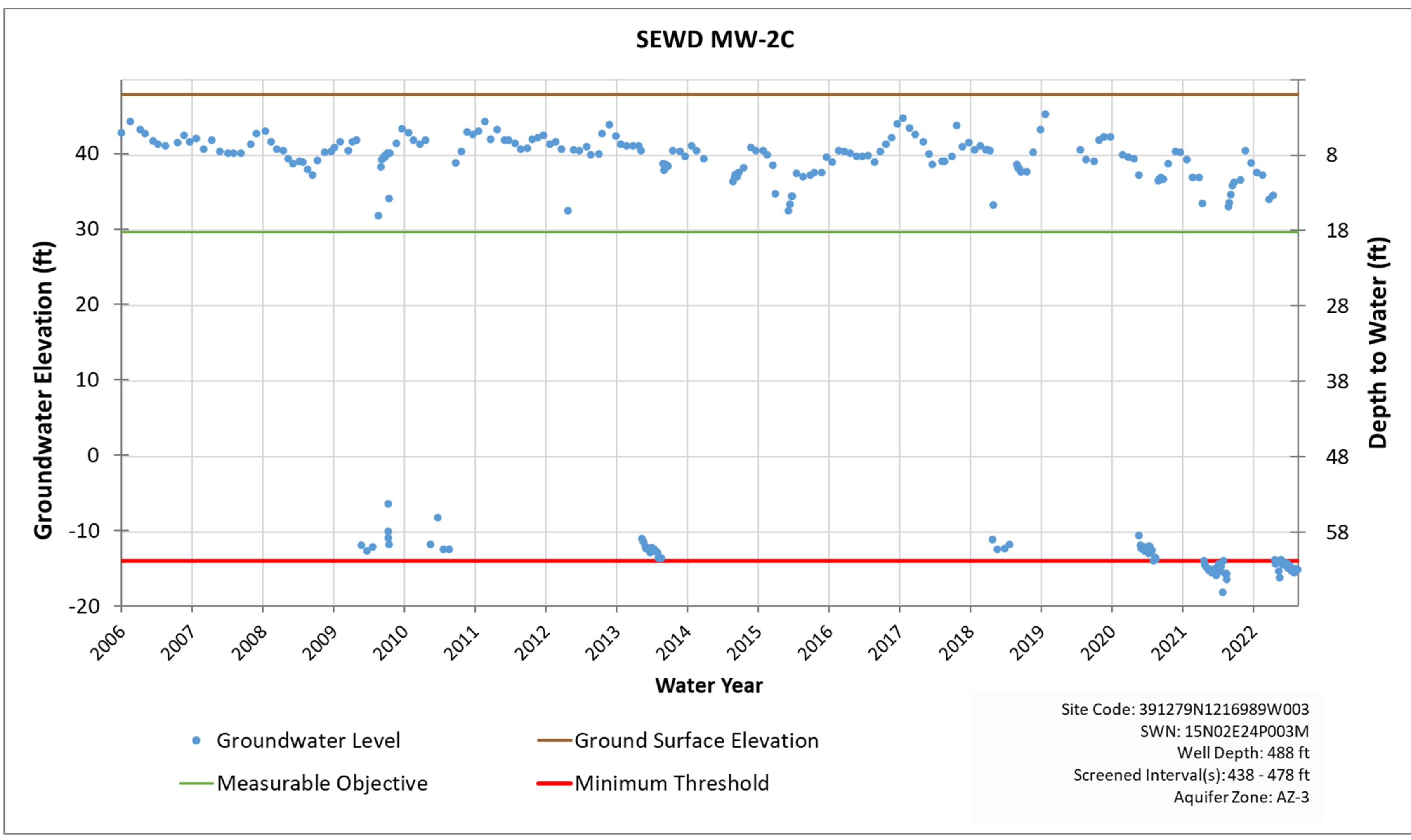

Sutter County MW-1D
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390696N1217778W004
SWN: 14N02E17C004M
Well Depth: 755 ft
Screened Interval(s): 725 - 745 ft
Aquifer Zone: AZ-3

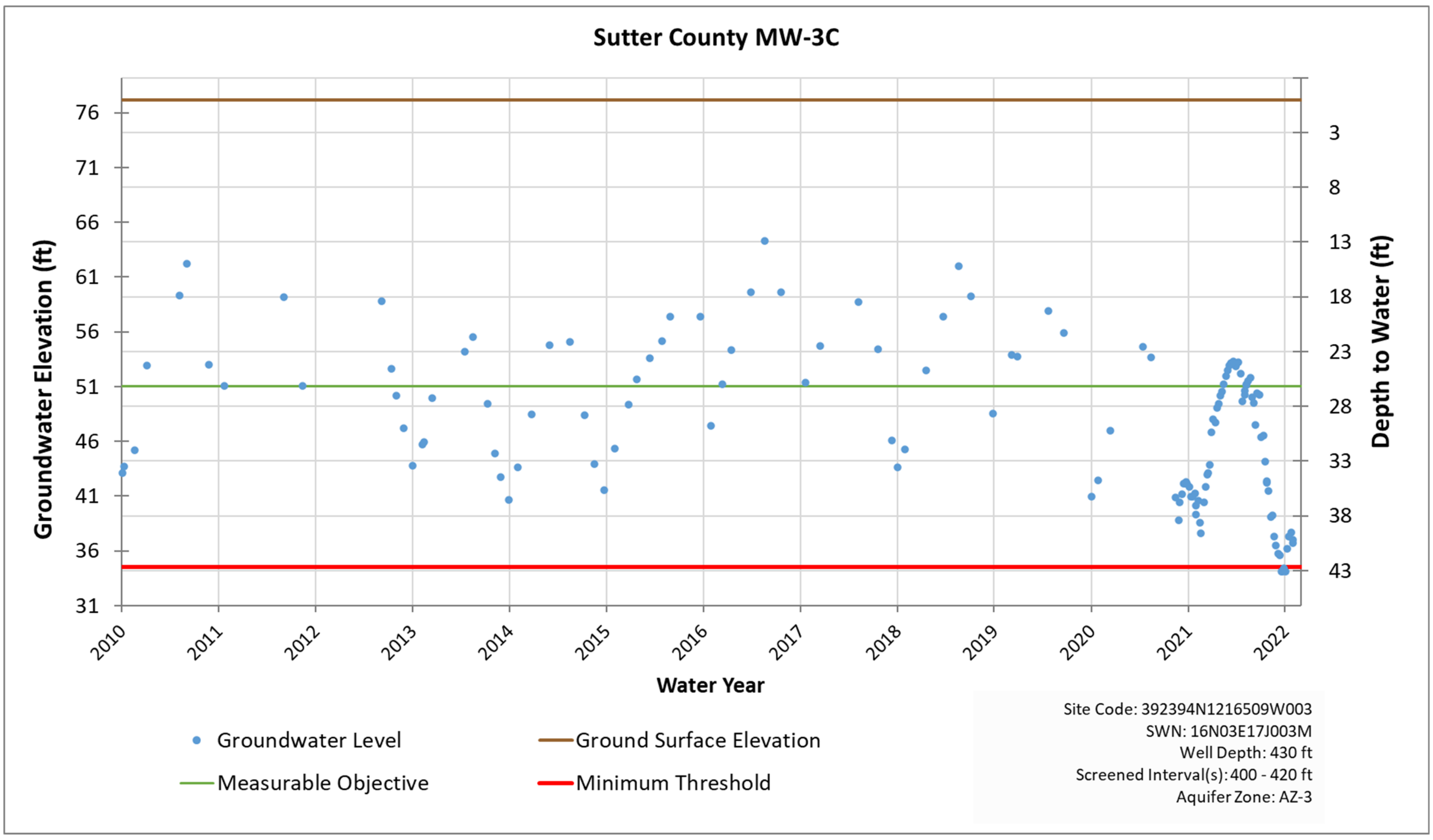

SMWC MW-1C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390244N1217813W003
SWN: 14N02E32D003M
Well Depth: 500 ft
Screened Interval(s): 460 - 490 ft
Aquifer Zone: AZ-3

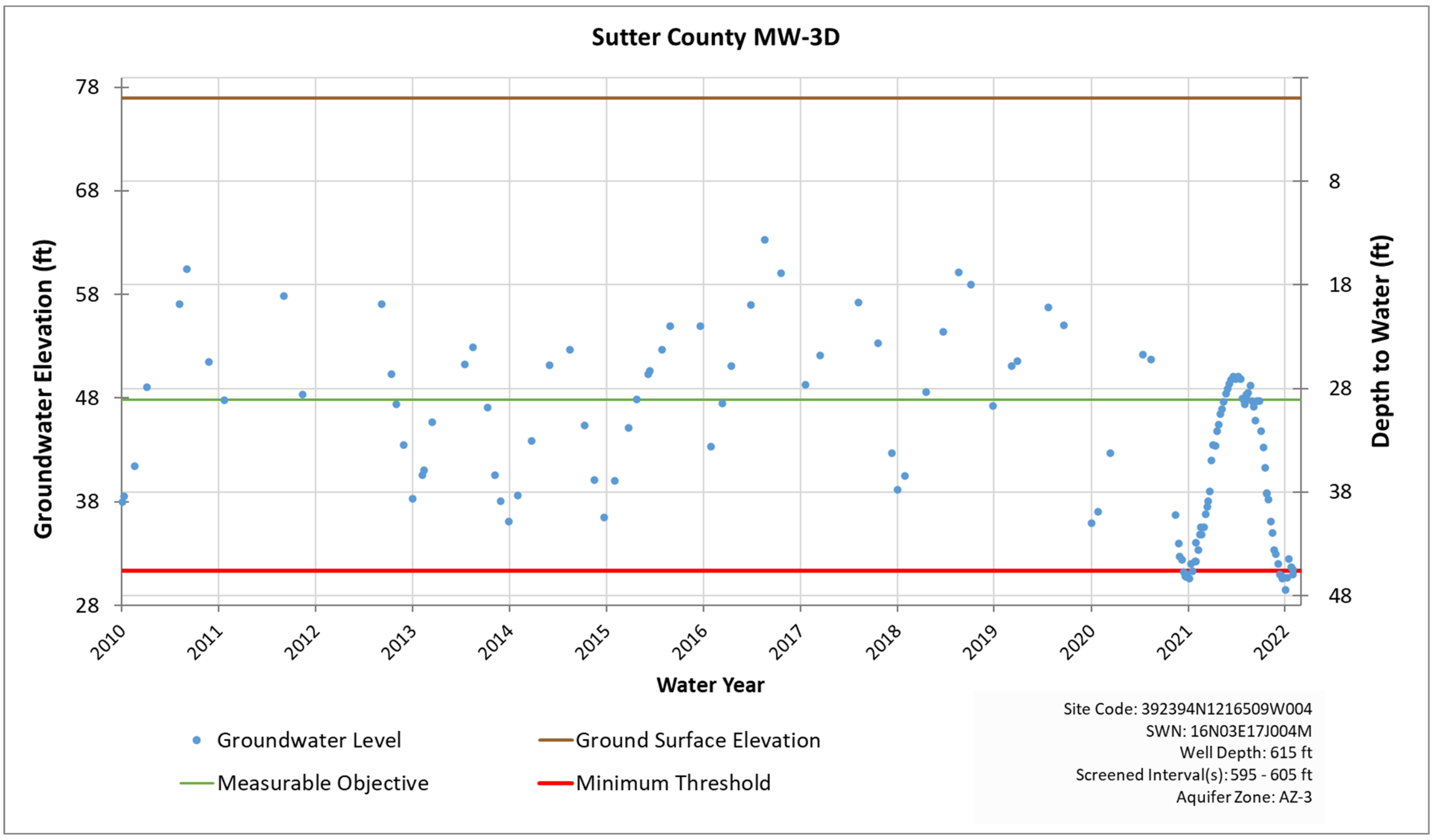

Feather River MW-1C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390458N1216114W003
SWN: 14N03E23D005M
Well Depth: 689 ft
Screened Interval(s): 664 - 684 ft
Aquifer Zone: AZ-3

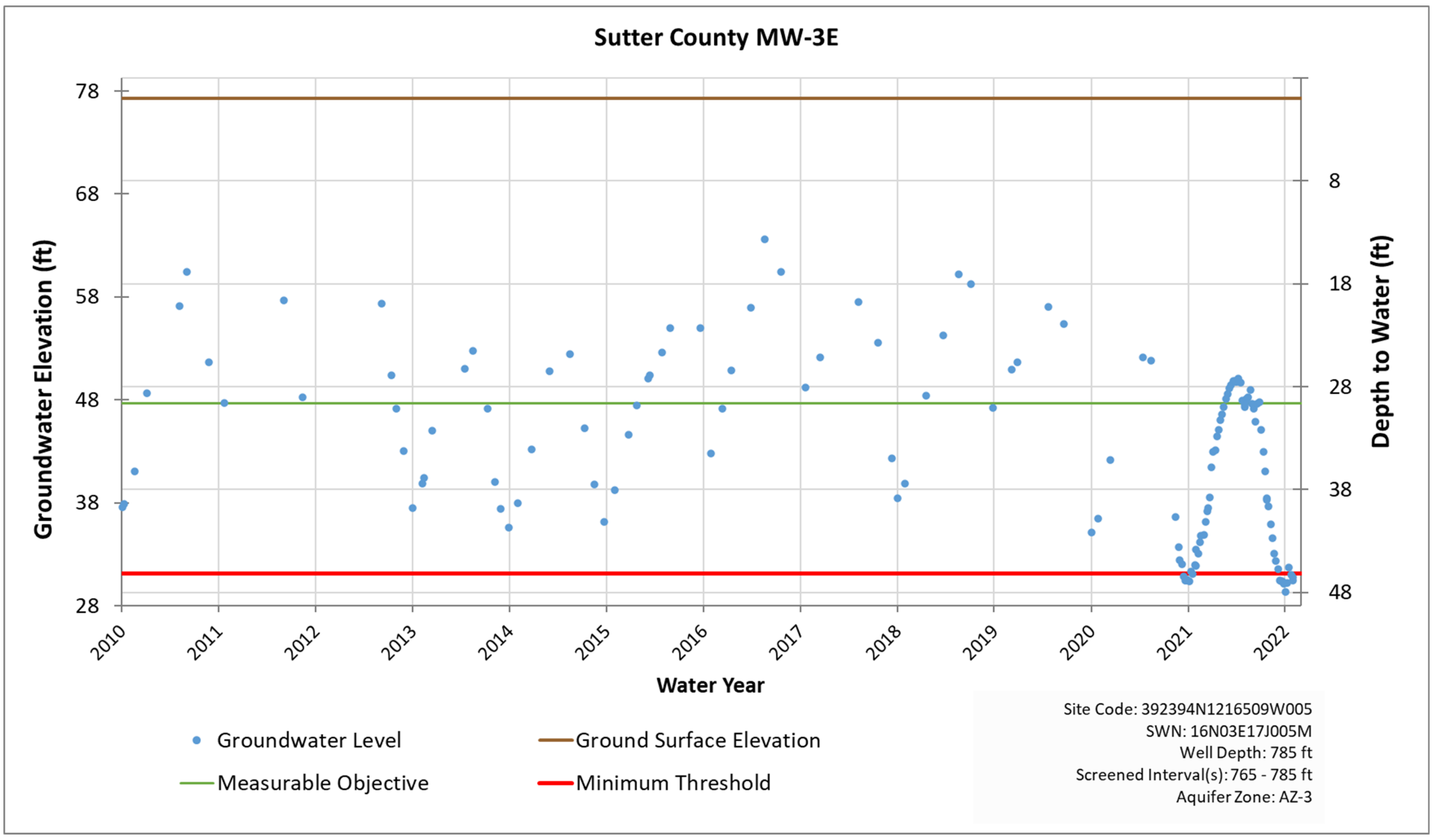

Feather River MW-1D
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390458N1216114W004
SWN: 14N03E23D006M
Well Depth: 1021 ft
Screened Interval(s): 996 - 1016 ft
Aquifer Zone: AZ-3

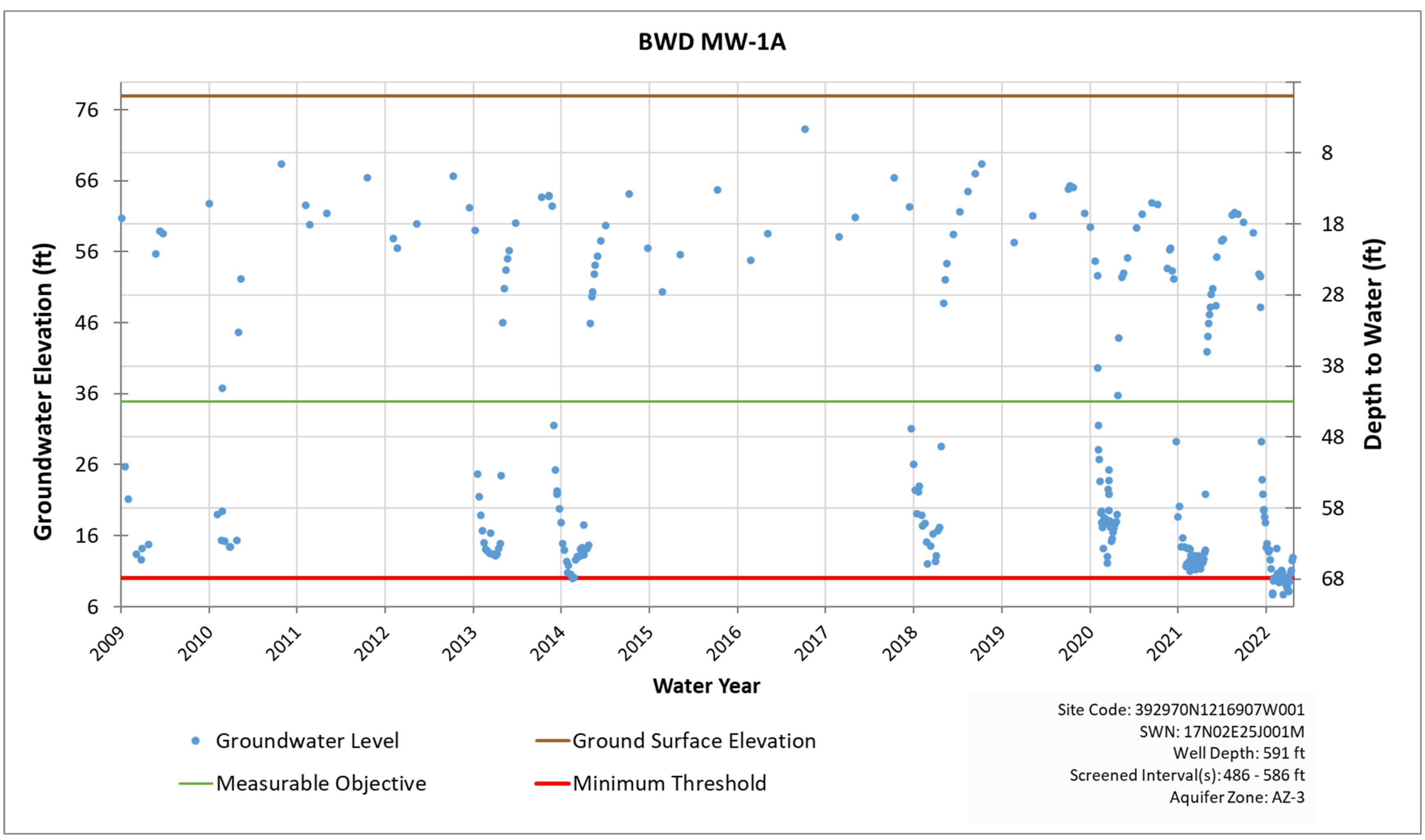

SEWD MW-1C
Groundwater Elevation (ft)
Depth to Water (ft)
54
49
44
39
34
29
24
19
3
8
13
18
23
28
33
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391658N1217070W003
SWN: 15N02E12E003M
Well Depth: 559 ft
Screened Interval(s): 524 - 554 ft
Aquifer Zone: AZ-3

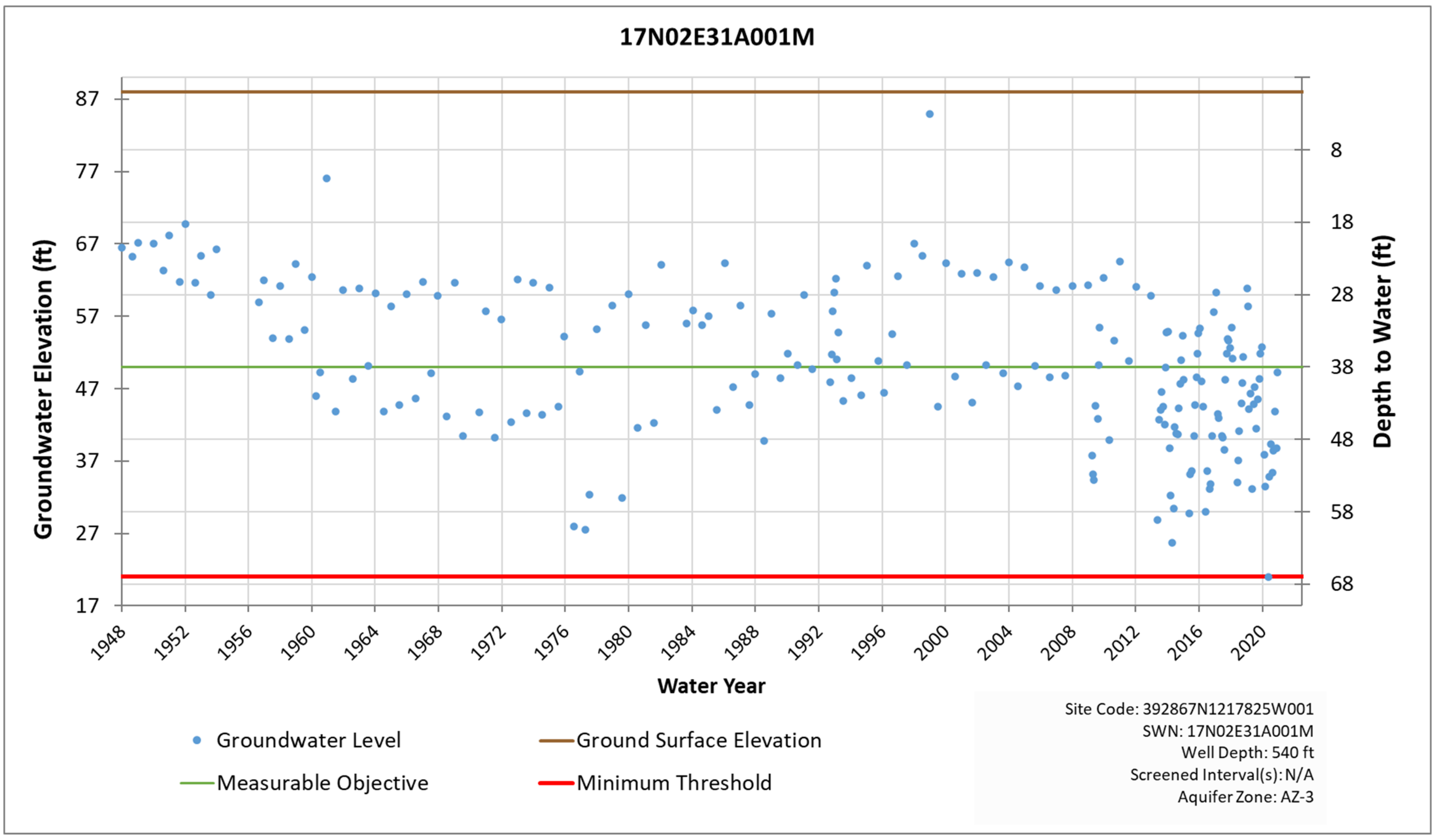

SEWD MW-2C
Groundwater Elevation (ft)
Depth to Water (ft)
40
30
20
10
0
-10
-20
8
18
28
38
48
58
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391279N1216989W003
SWN: 15N02E24P003M
Well Depth: 488 ft
Screened Interval(s): 438 - 478 ft
Aquifer Zone: AZ-3


Sutter County MW-3C
Groundwater Elevation (ft)
Depth to Water (ft)
76
71
66
61
56
51
46
41
36
31
3
8
13
18
23
28
33
38
43
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W003
SWN: 16N03E17J003M
Well Depth: 430 ft
Screened Interval(s): 400 - 420 ft
Aquifer Zone: AZ-3

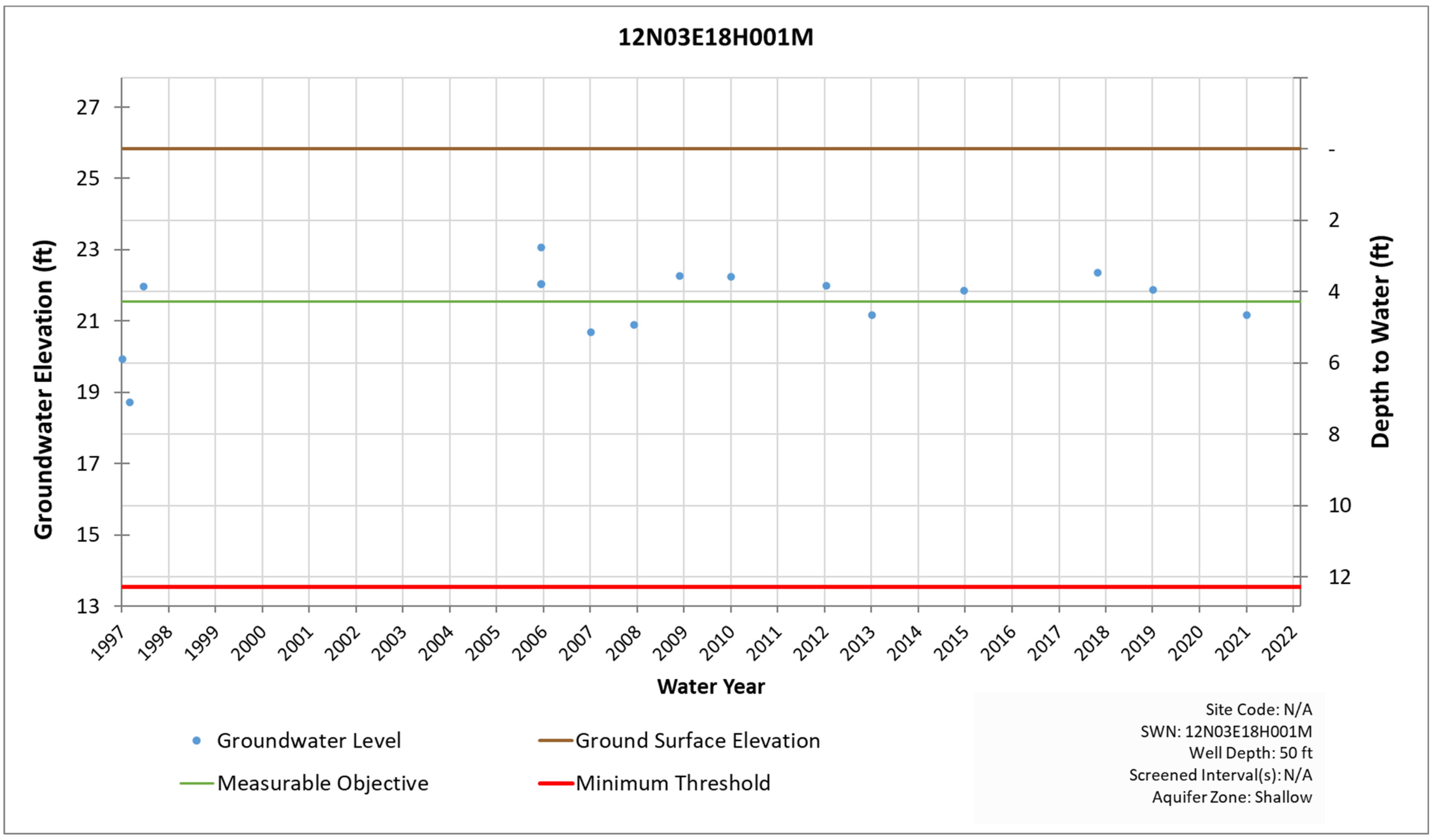

Sutter County MW-3D
Groundwater Elevation (ft)
Depth to Water (ft)
78
68
58
48
38
28
8
18
28
38
48
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W004
SWN: 16N03E17J004M
Well Depth: 615 ft
Screened Interval(s): 595 - 605 ft
Aquifer Zone: AZ-3

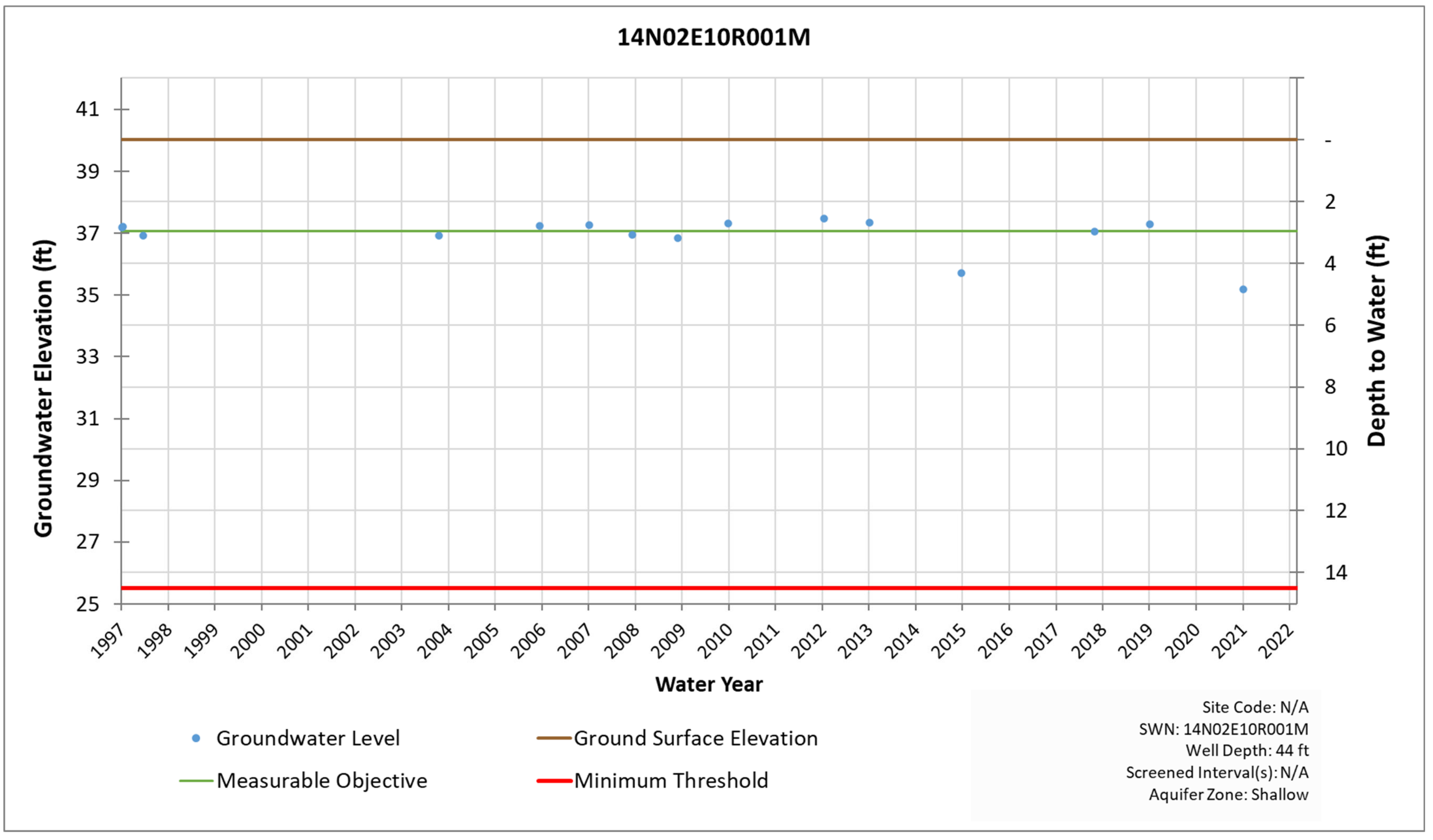

Sutter County MW-3E
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W005
SWN: 16N03E17J005M
Well Depth: 785 ft
Screened Interval(s): 765 - 785 ft
Aquifer Zone: AZ-3

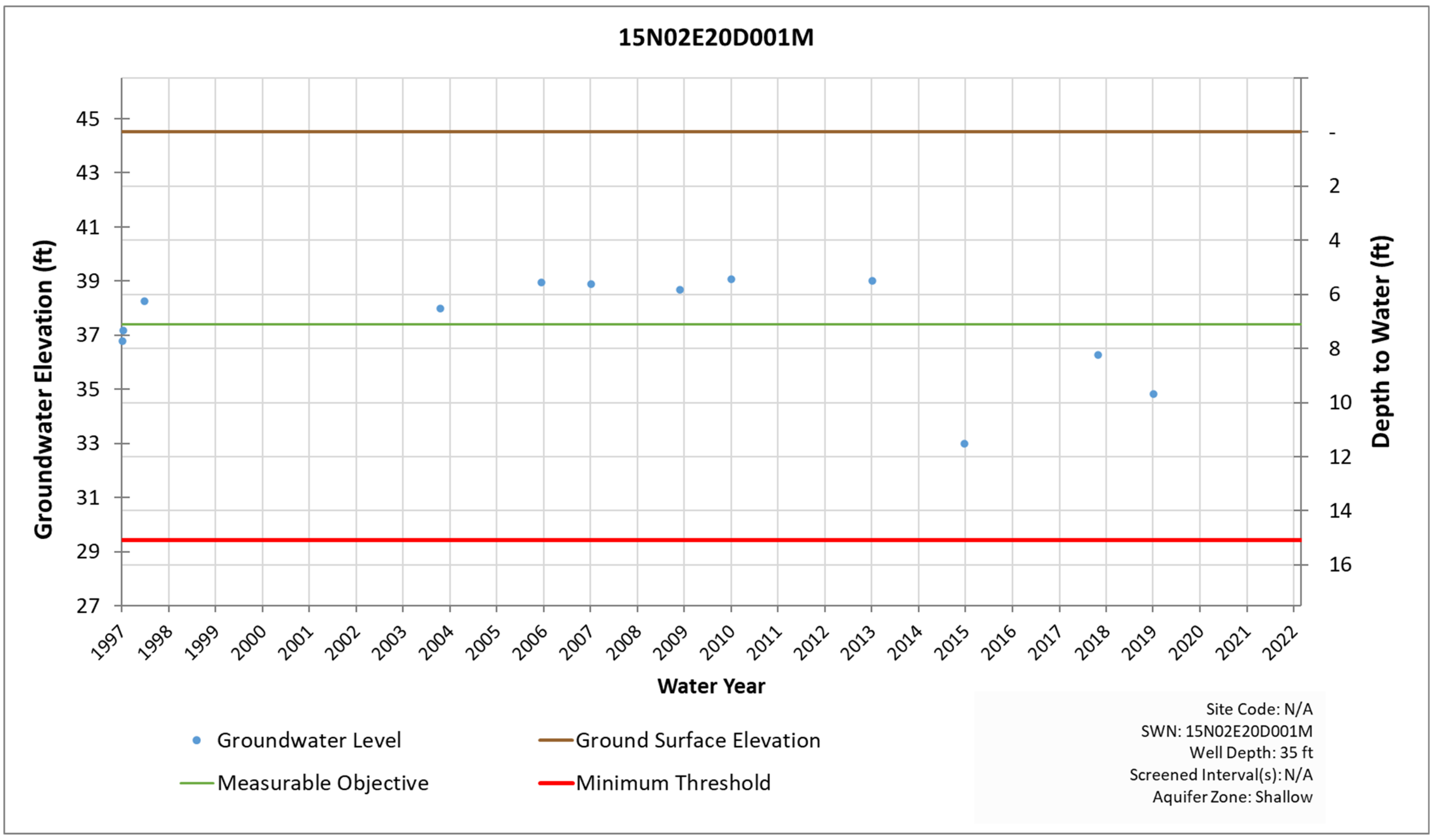

BWD MW-1A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392970N1216907W001
SWN: 17N02E25J001M
Well Depth: 591 ft
Screened Interval(s): 486 - 586 ft
Aquifer Zone: AZ-3

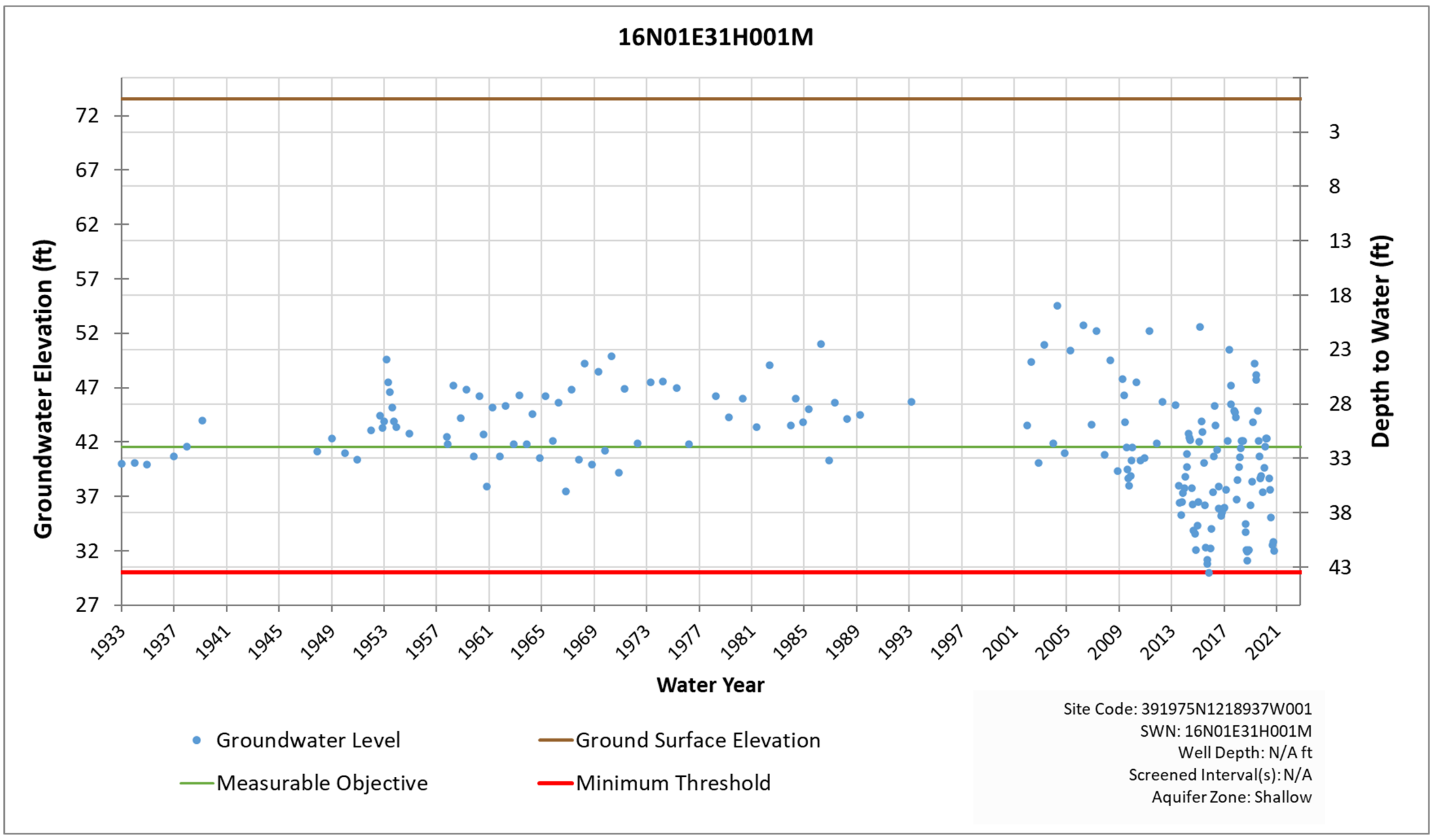

17N02E31A001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392867N1217825W001
SWN: 17N02E31A001M
Well Depth: 540 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-3

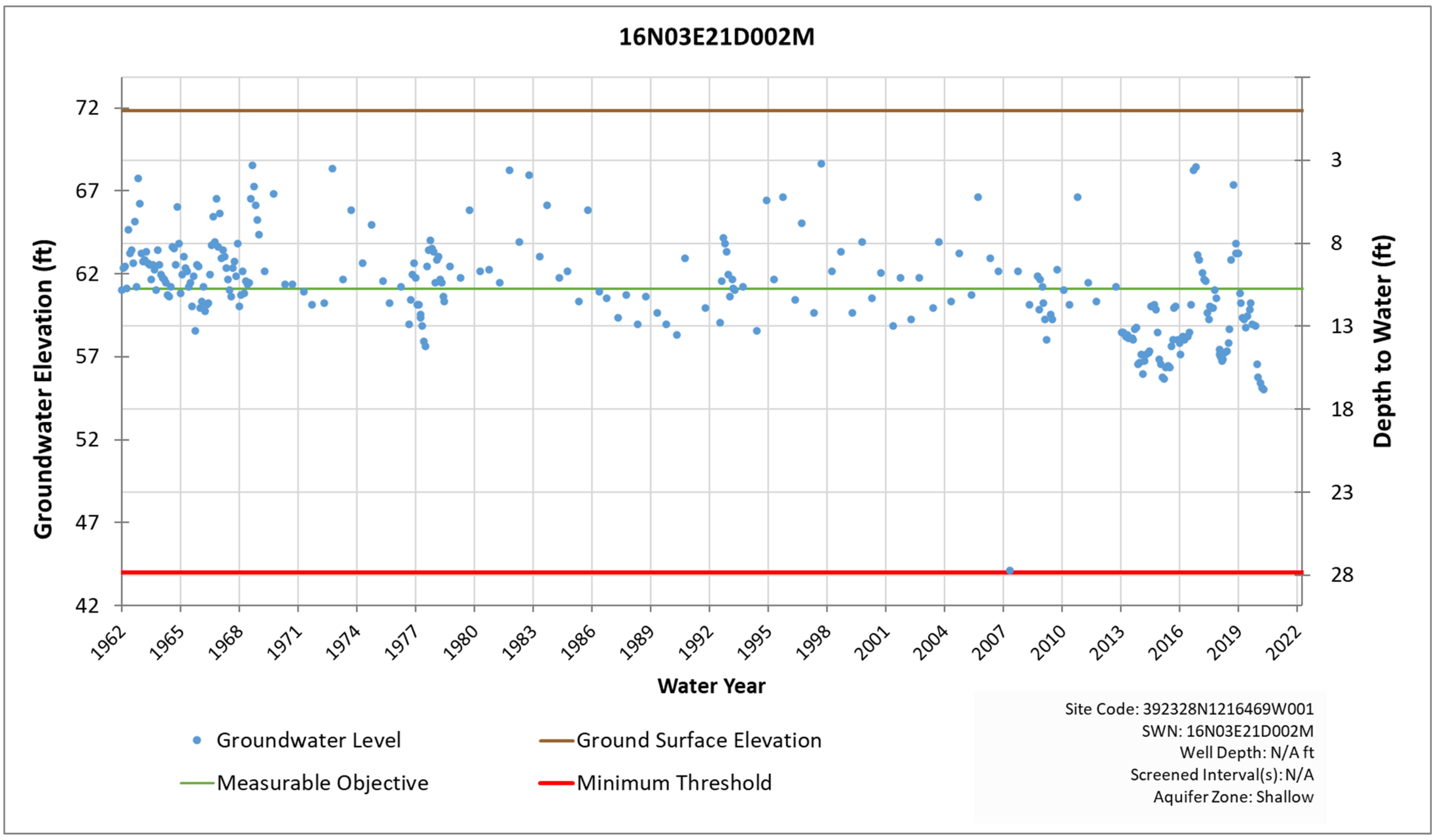
Depletions of Interconnected Surface Water Monitoring Network

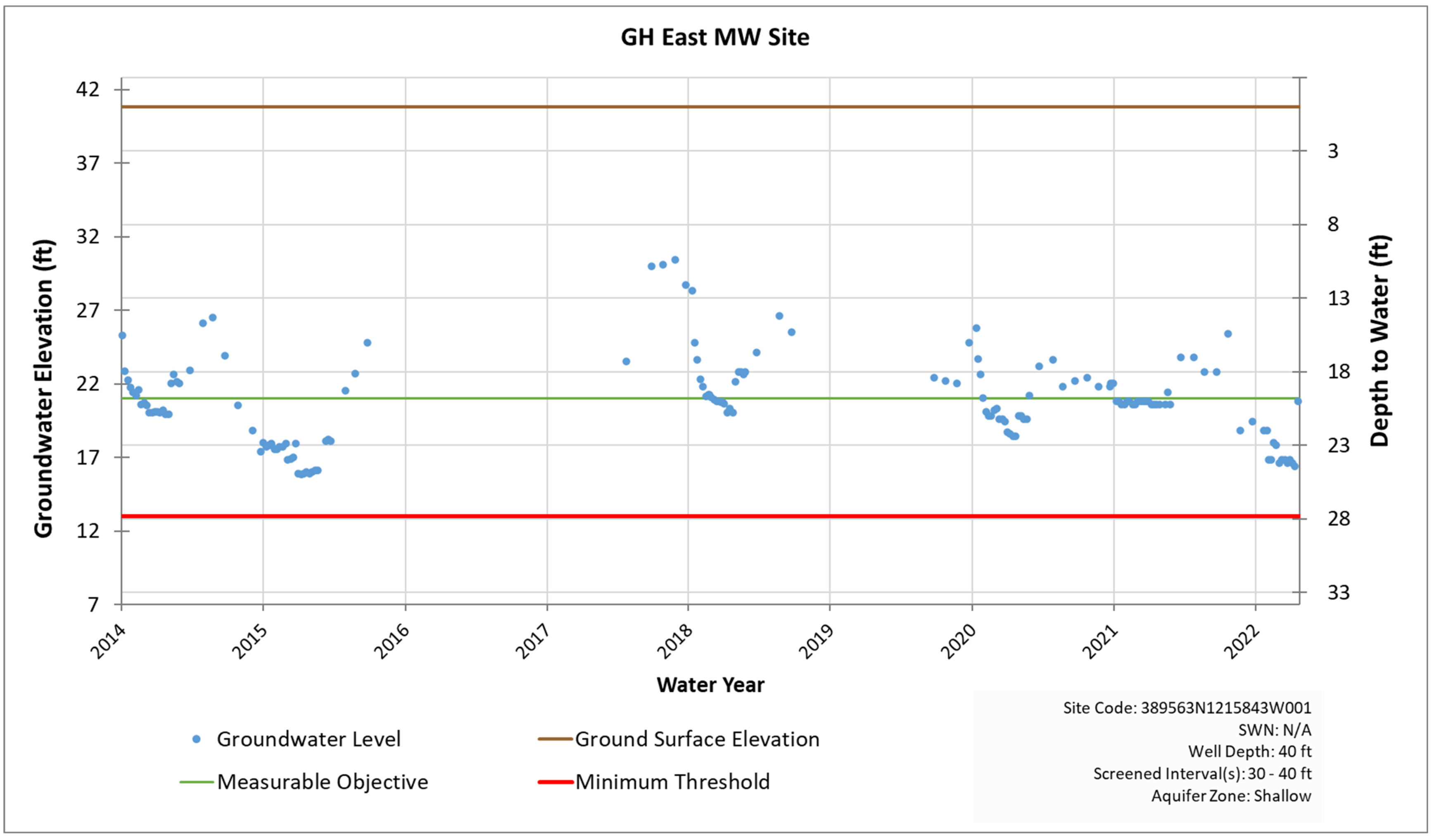


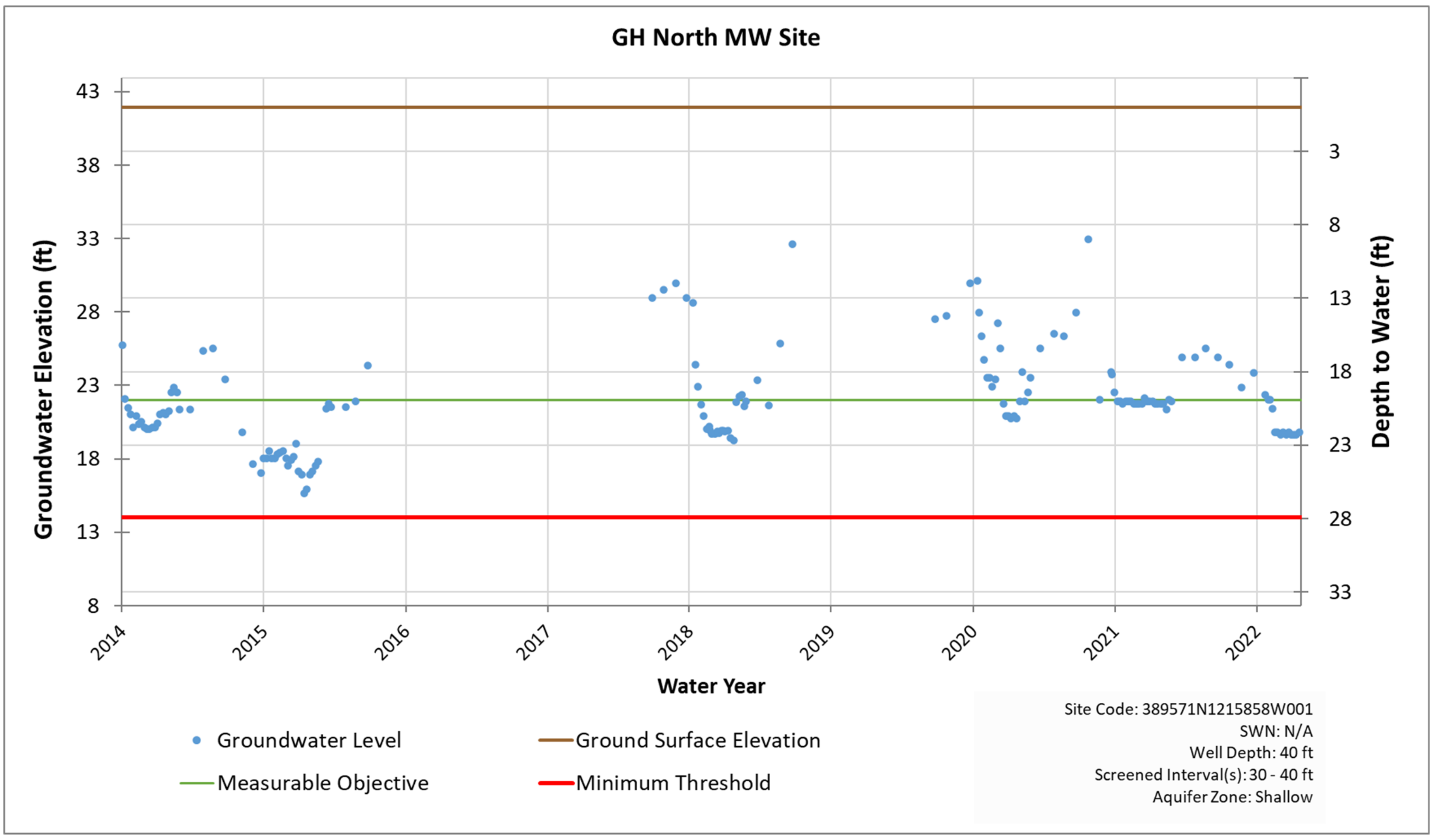


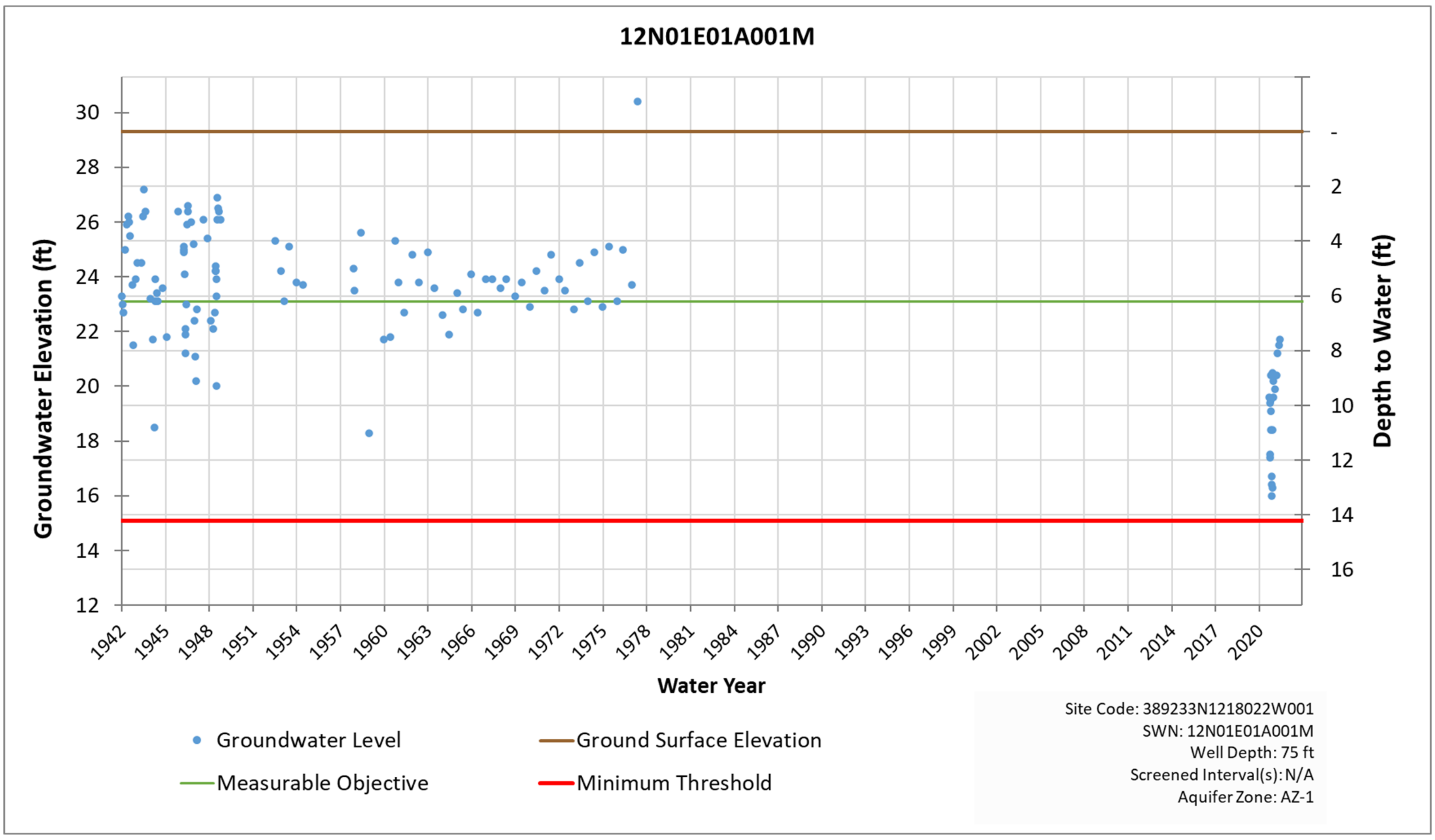

15N02E20D001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: N/A
SWN: 15N02E20D001M
Well Depth: 35 ft
Screened Interval(s): N/A
Aquifer Zone: Shallow

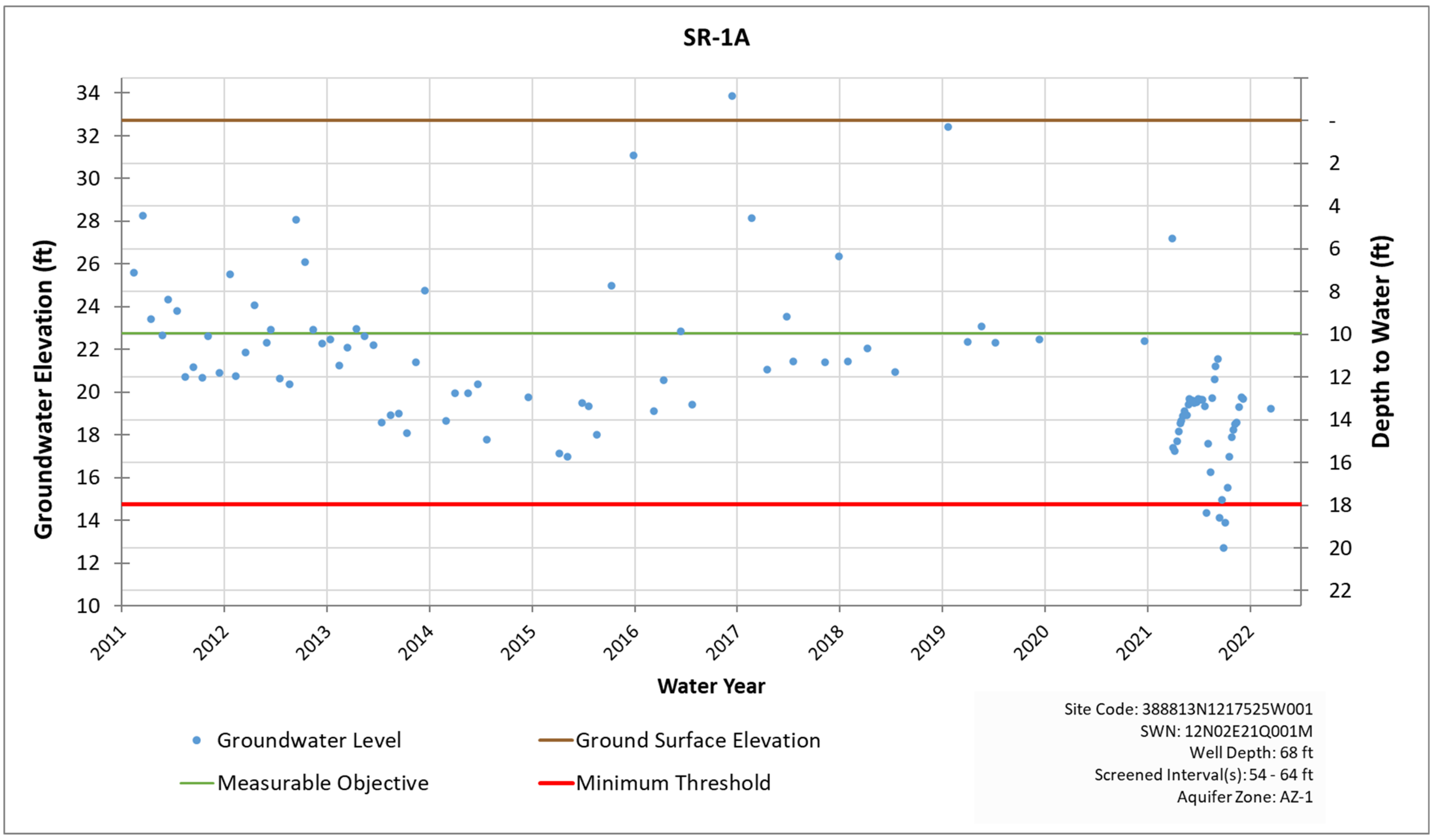

16N01E31H001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 391975N1218937W001
SWN: 16N01E31H001M
Well Depth: N/A ft
Screened Interval(s): N/A
Aquifer Zone: Shallow

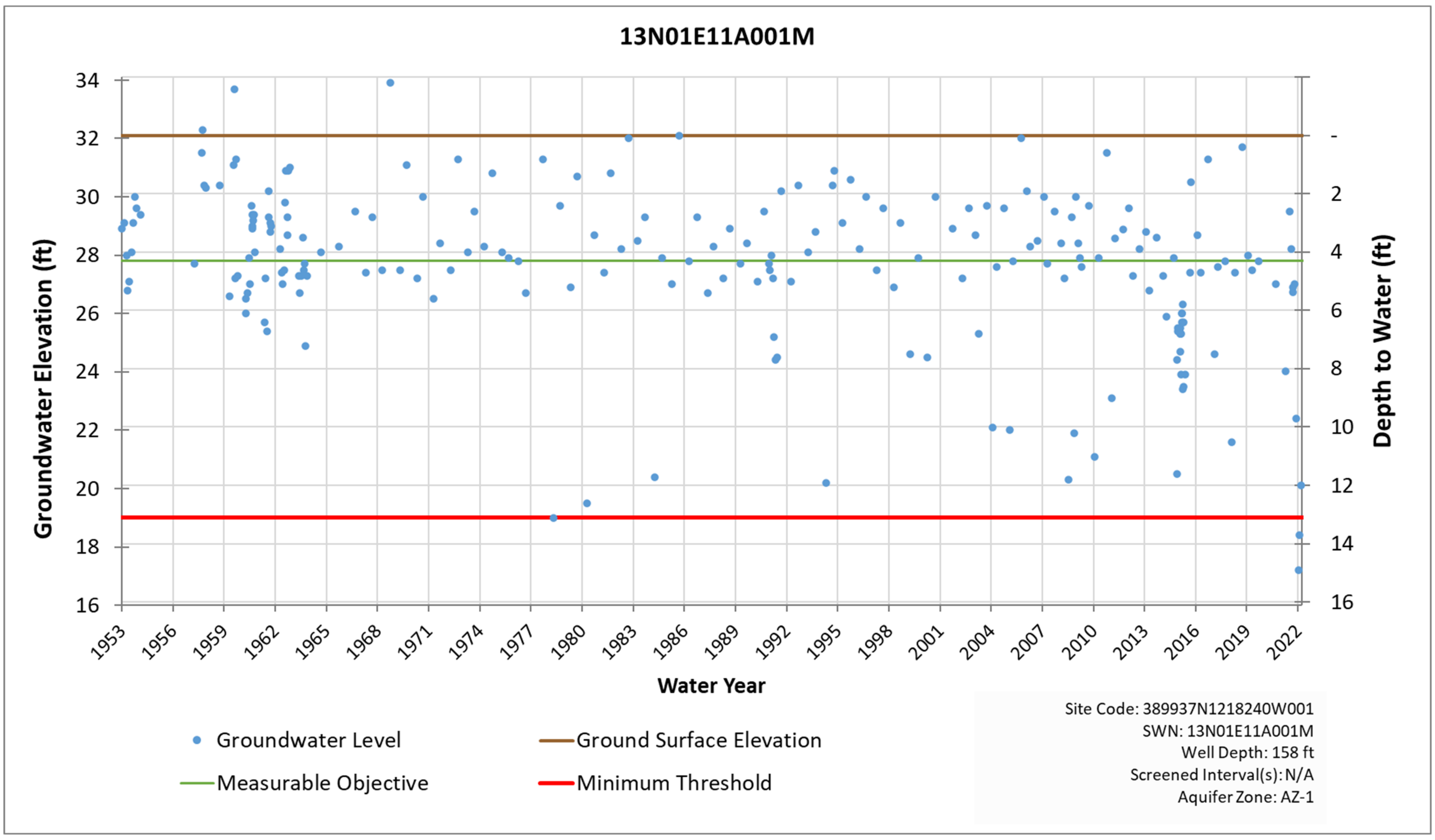

16N03E21D002M
Groundwater Elevation (ft)
Depth to Water (ft)
72
67
62
57
52
47
42
3
8
13
18
23
28
1962
1965
1968
1971
1974
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
2007
2010
2013
2016
2019
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392328N1216469W001
SWN: 16N03E21D002M
Well Depth: N/A ft
Screened Interval(s): N/A
Aquifer Zone: Shallow

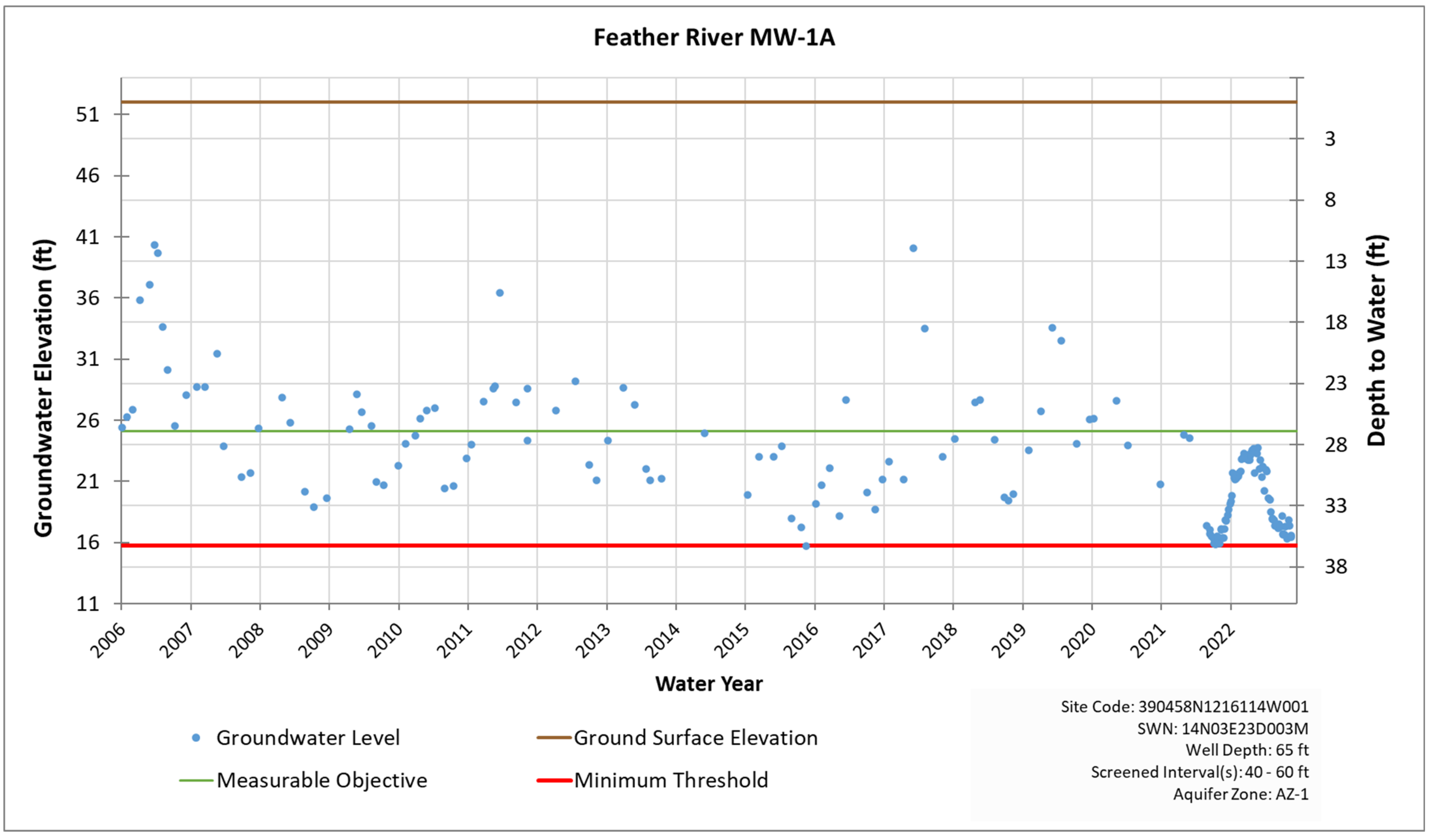

GH East MW Site
Groundwater Elevation (ft)
Depth to Water (ft)
42
37
32
27
22
17
12
7
3
8
13
18
23
28
33
2014
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389563N1215843W001
SWN: N/A
Well Depth: 40 ft
Screened Interval(s): 30 - 40 ft
Aquifer Zone: Shallow

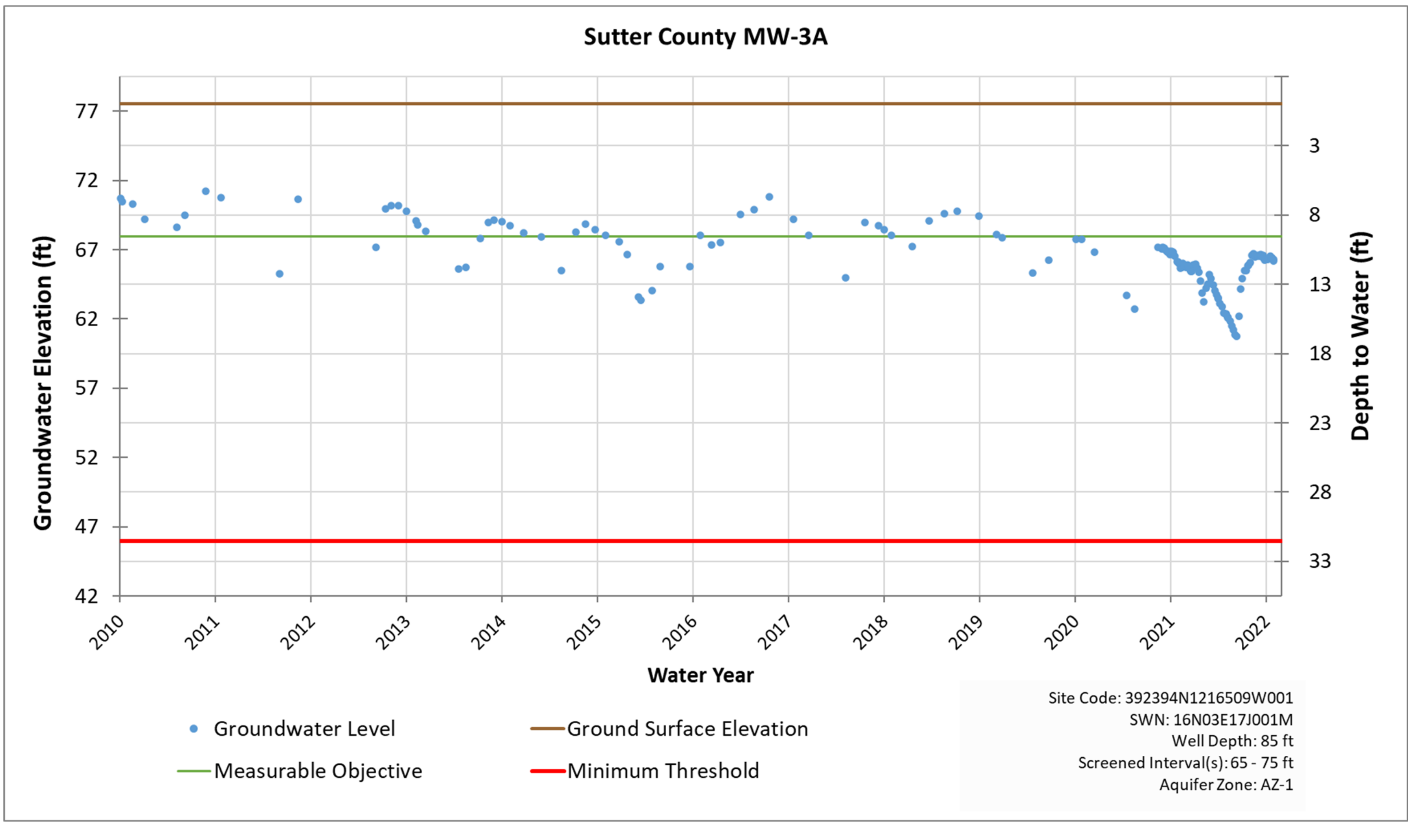

GH North MW Site
Groundwater Elevation (ft)
43
38
33
28
23
18
13
8
Depth to Water (ft)
3
8
13
18
23
28
33
2014
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389571N1215858W001
SWN: N/A
Well Depth: 40 ft
Screened Interval(s): 30 - 40 ft
Aquifer Zone: Shallow

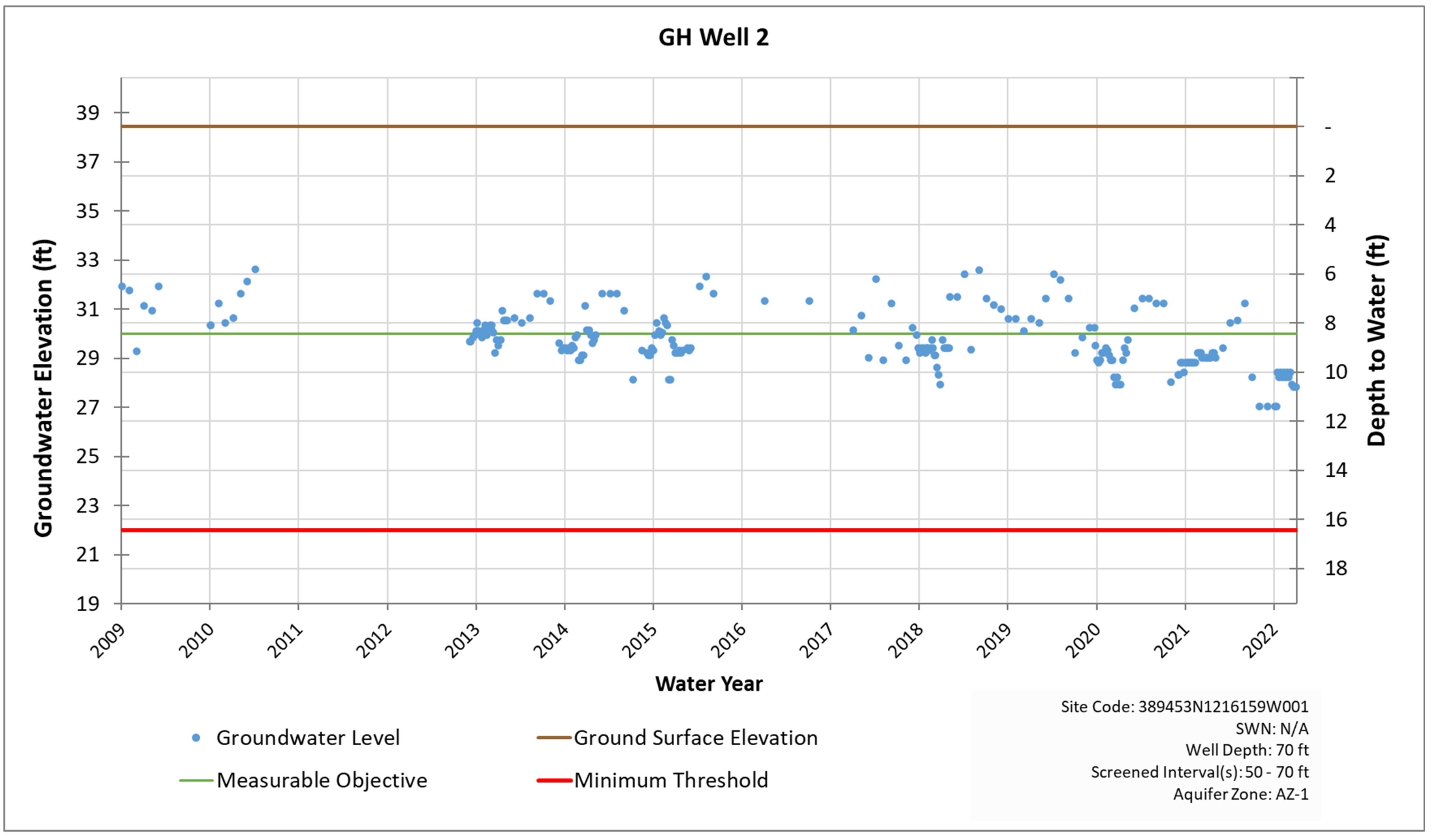

12N01E01A001M
Groundwater Elevation (ft)
30
28
26
24
22
20
18
16
14
12
Depth to Water (ft)
-
2
4
6
8
10
12
14
16
1942
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
2017
2020
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389233N1218022W001
SWN: 12N01E01A001M
Well Depth: 75 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-1

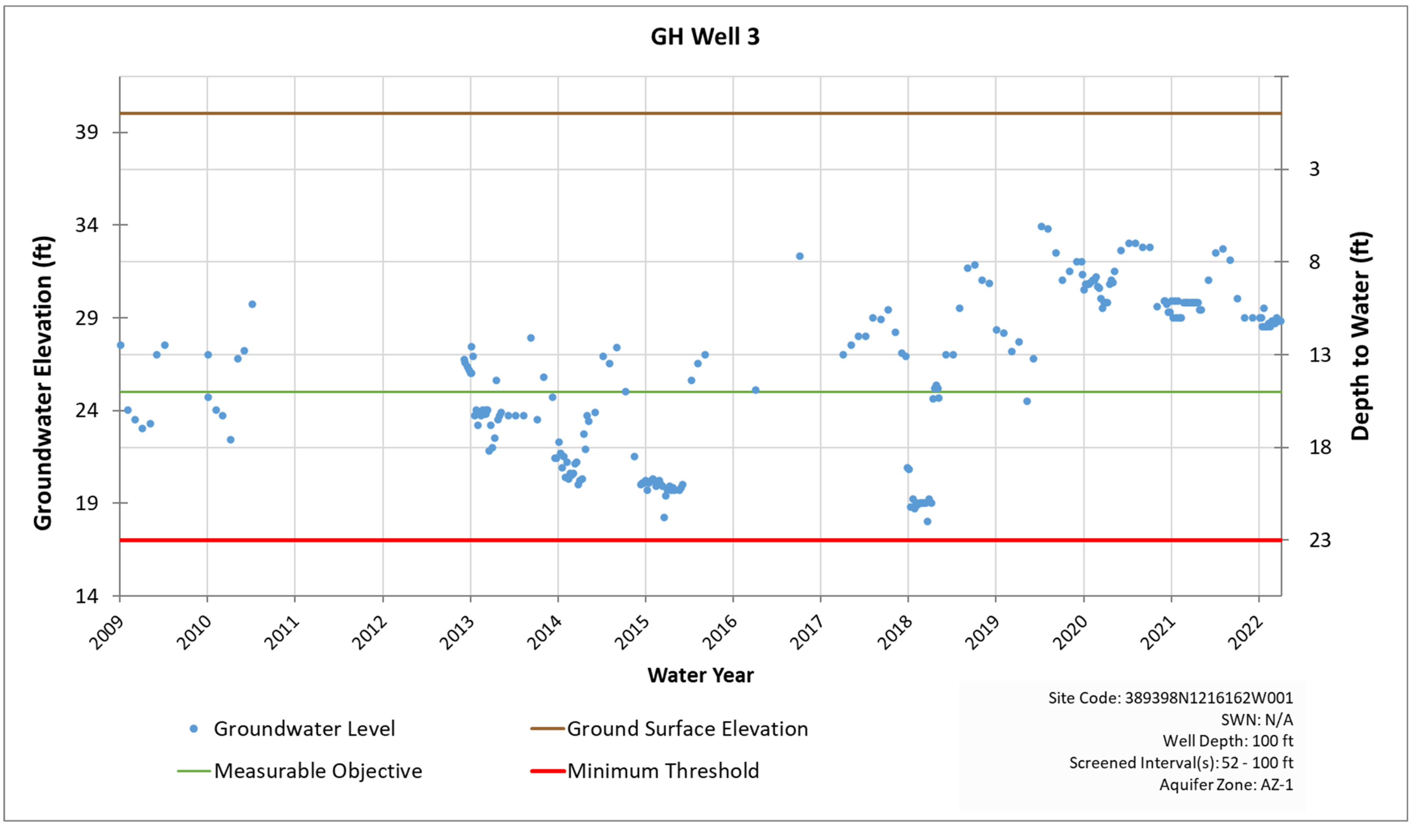

SR-1A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 388813N1217525W001
SWN: 12N02E21Q001M
Well Depth: 68 ft
Screened Interval(s): 54 - 64 ft
Aquifer Zone: AZ-1

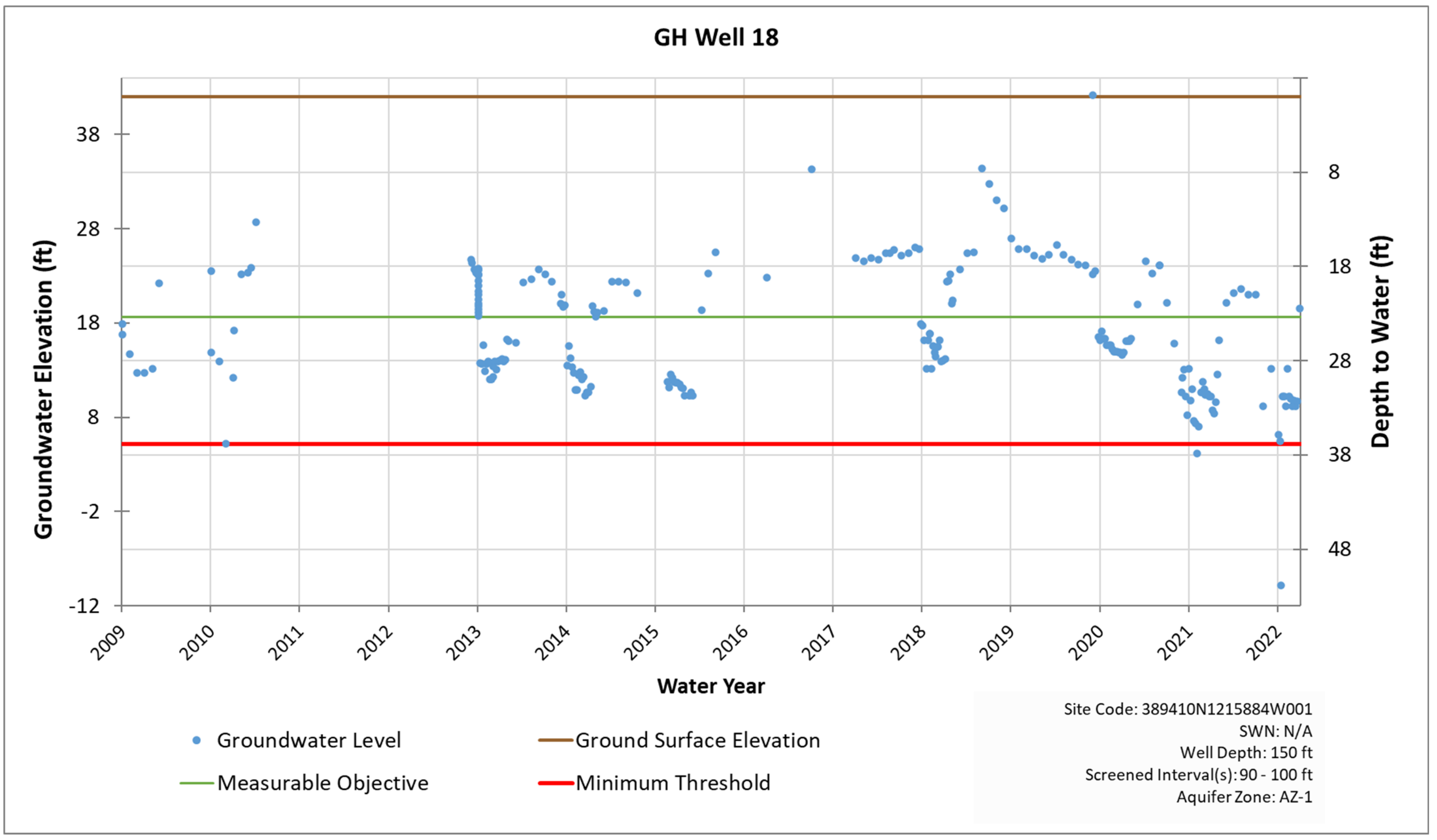

13N01E11A001M
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389937N1218240W001
SWN: 13N01E11A001M
Well Depth: 158 ft
Screened Interval(s): N/A
Aquifer Zone: AZ-1

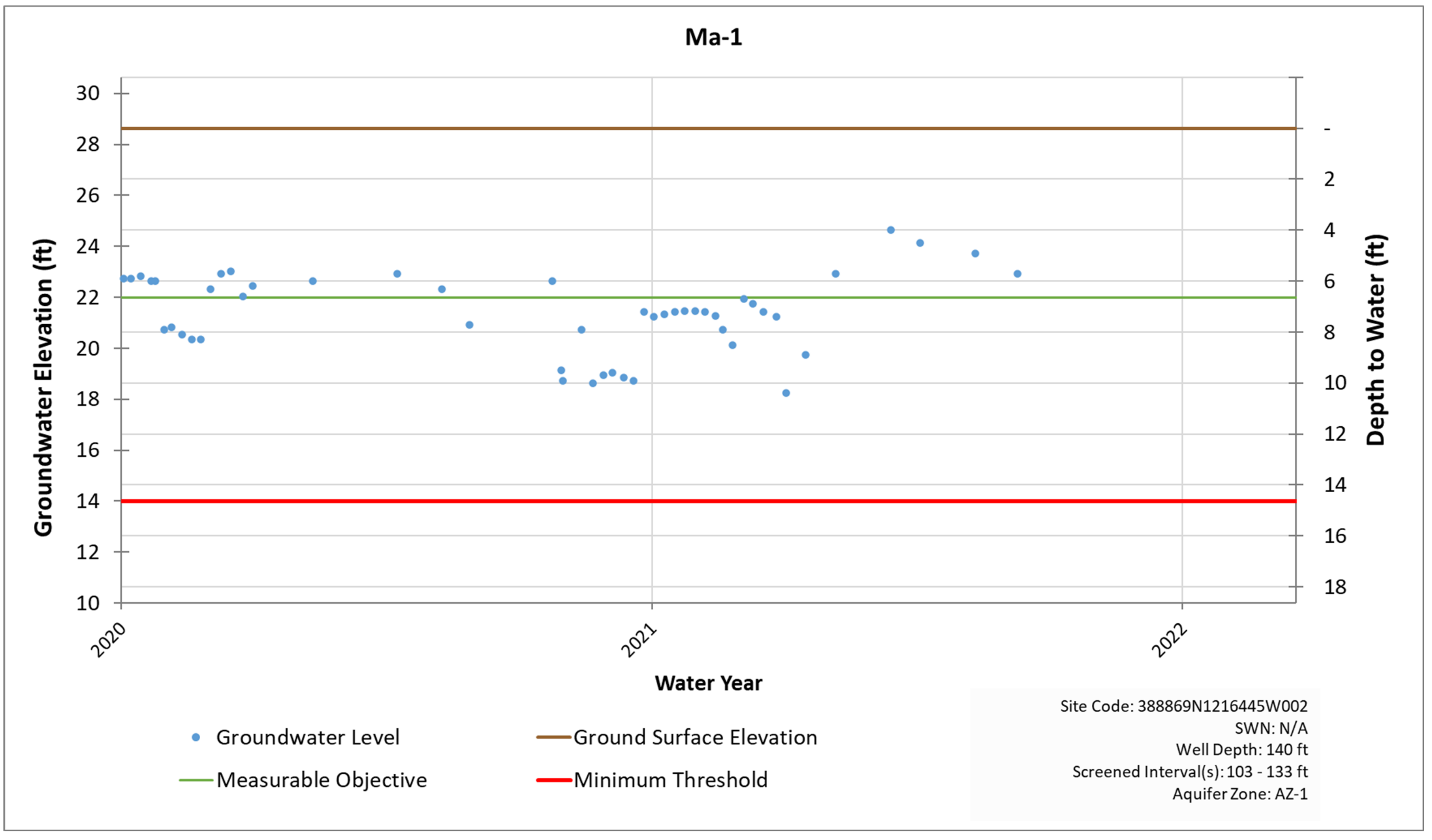

Feather River MW-1A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390458N1216114W001
SWN: 14N03E23D003M
Well Depth: 65 ft
Screened Interval(s): 40 - 60 ft
Aquifer Zone: AZ-1

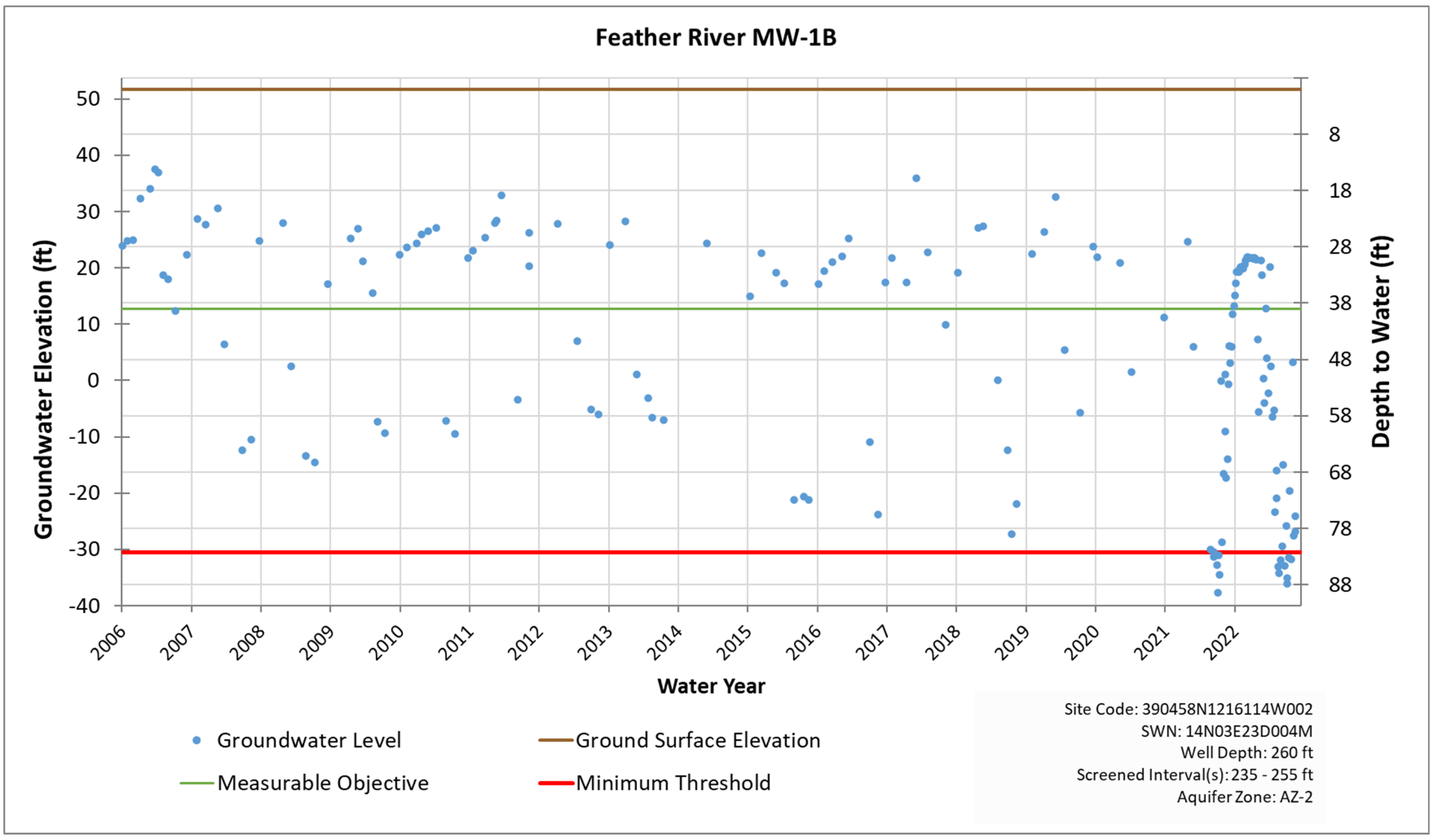

Sutter County MW-3A
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W001
SWN: 16N03E17J001M
Well Depth: 85 ft
Screened Interval(s): 65 - 75 ft
Aquifer Zone: AZ-1

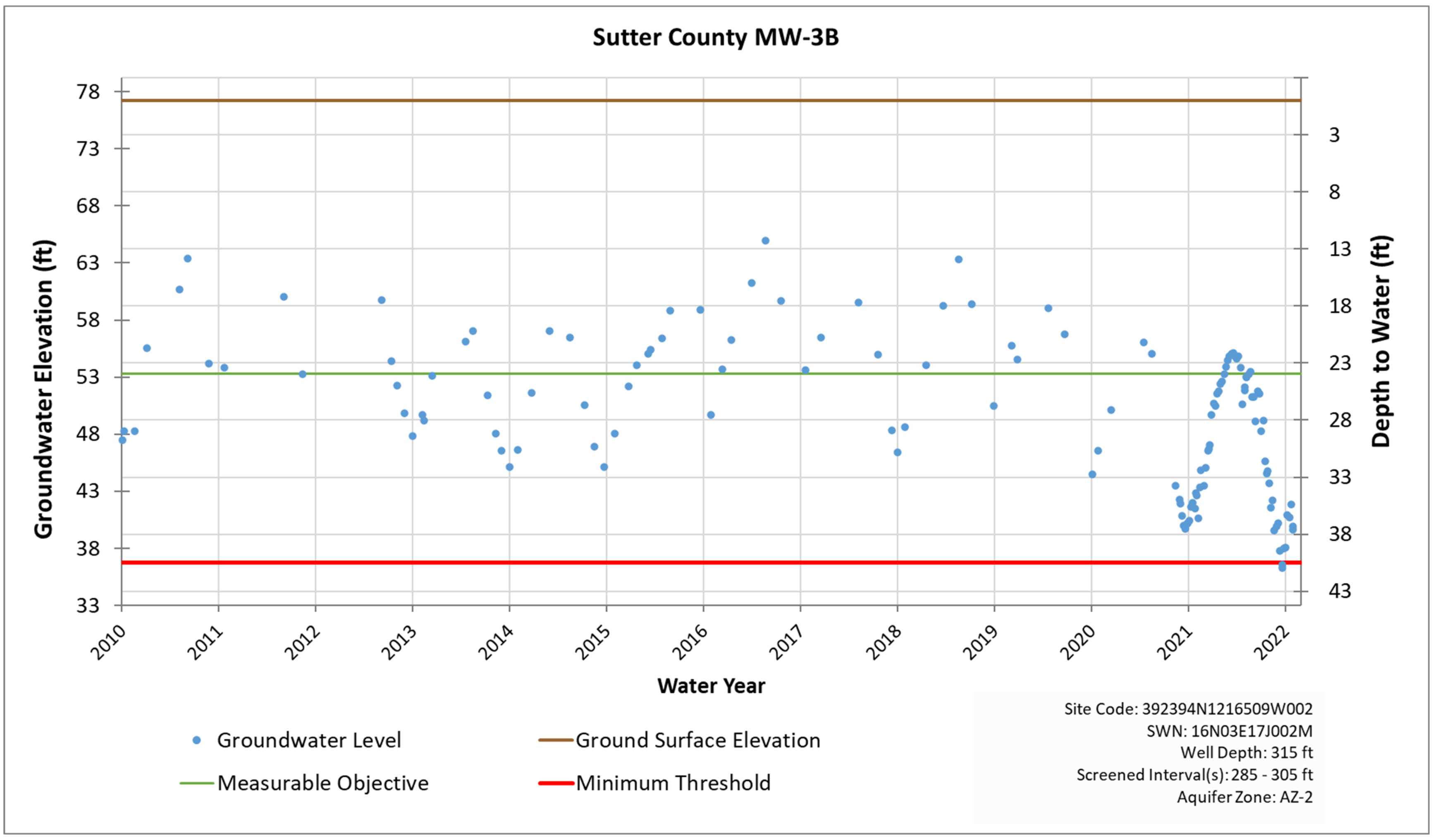

GH Well 2
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389453N1216159W001
SWN: N/A
Well Depth: 70 ft
Screened Interval(s): 50 - 70 ft
Aquifer Zone: AZ-1

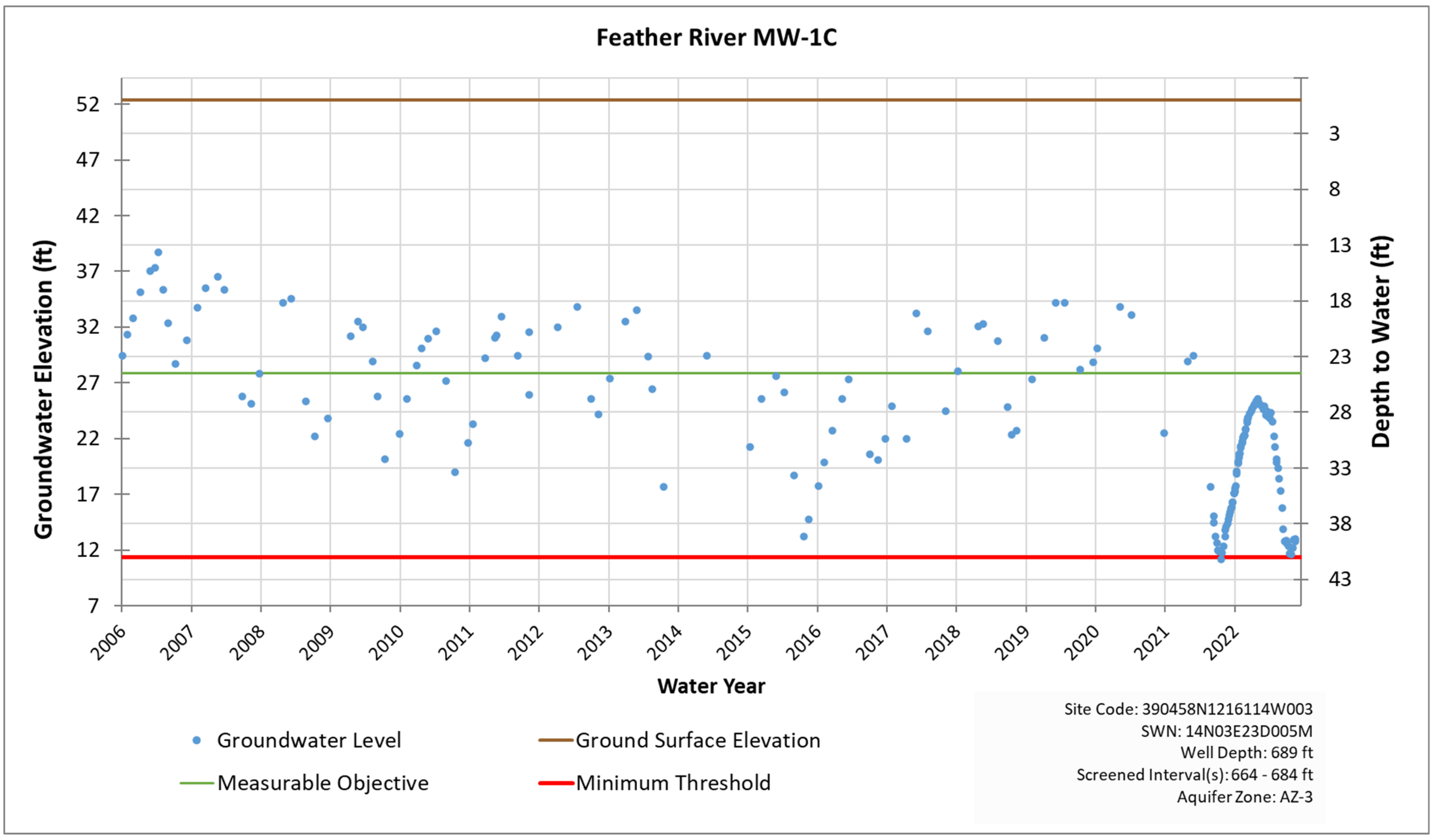

GH Well 3
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389398N1216162W001
SWN: N/A
Well Depth: 100 ft
Screened Interval(s): 52 - 100 ft
Aquifer Zone: AZ-1

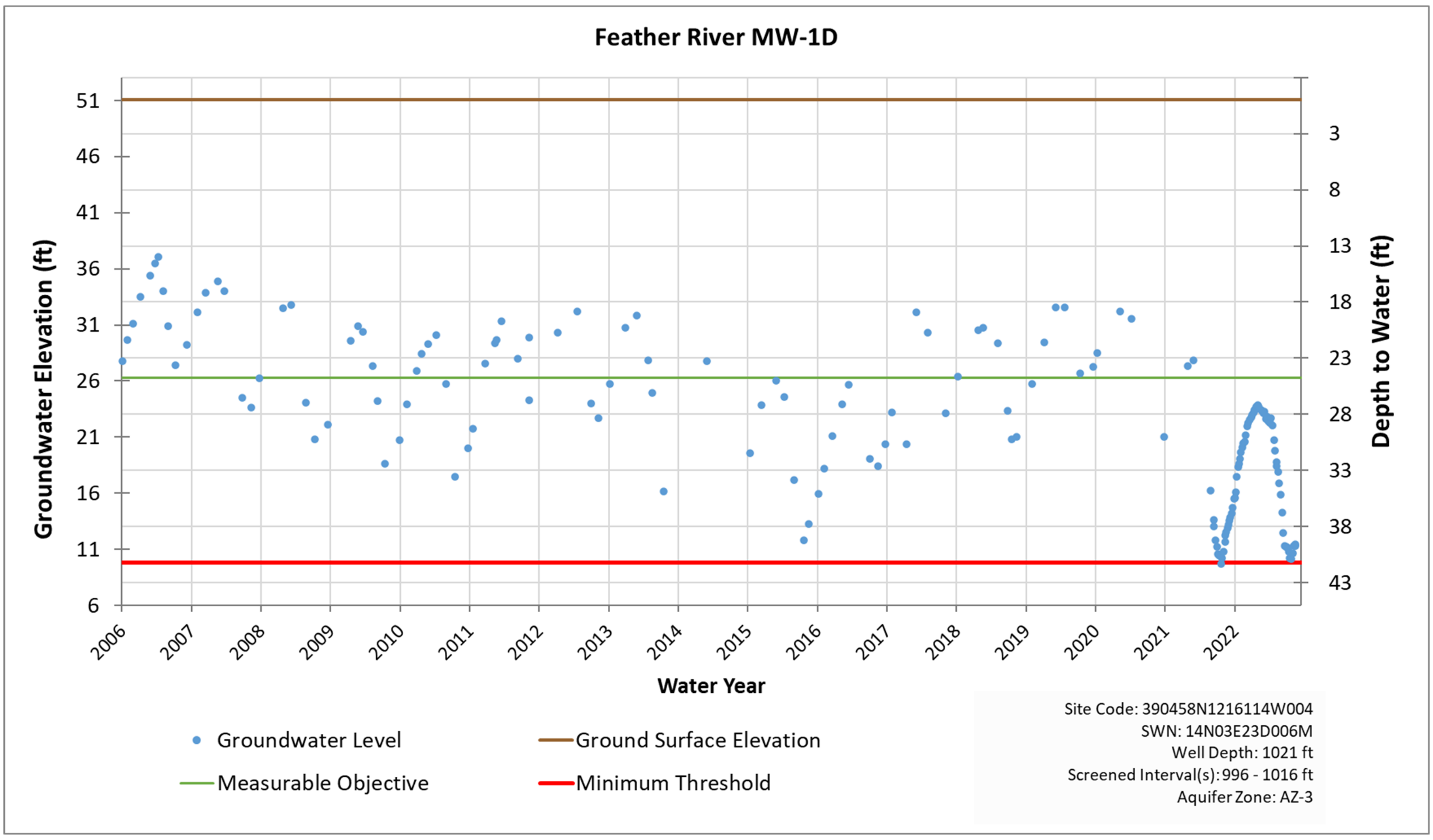

GH Well 18
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 389410N1215884W001
SWN: N/A
Well Depth: 150 ft
Screened Interval(s): 90 - 100 ft
Aquifer Zone: AZ-1

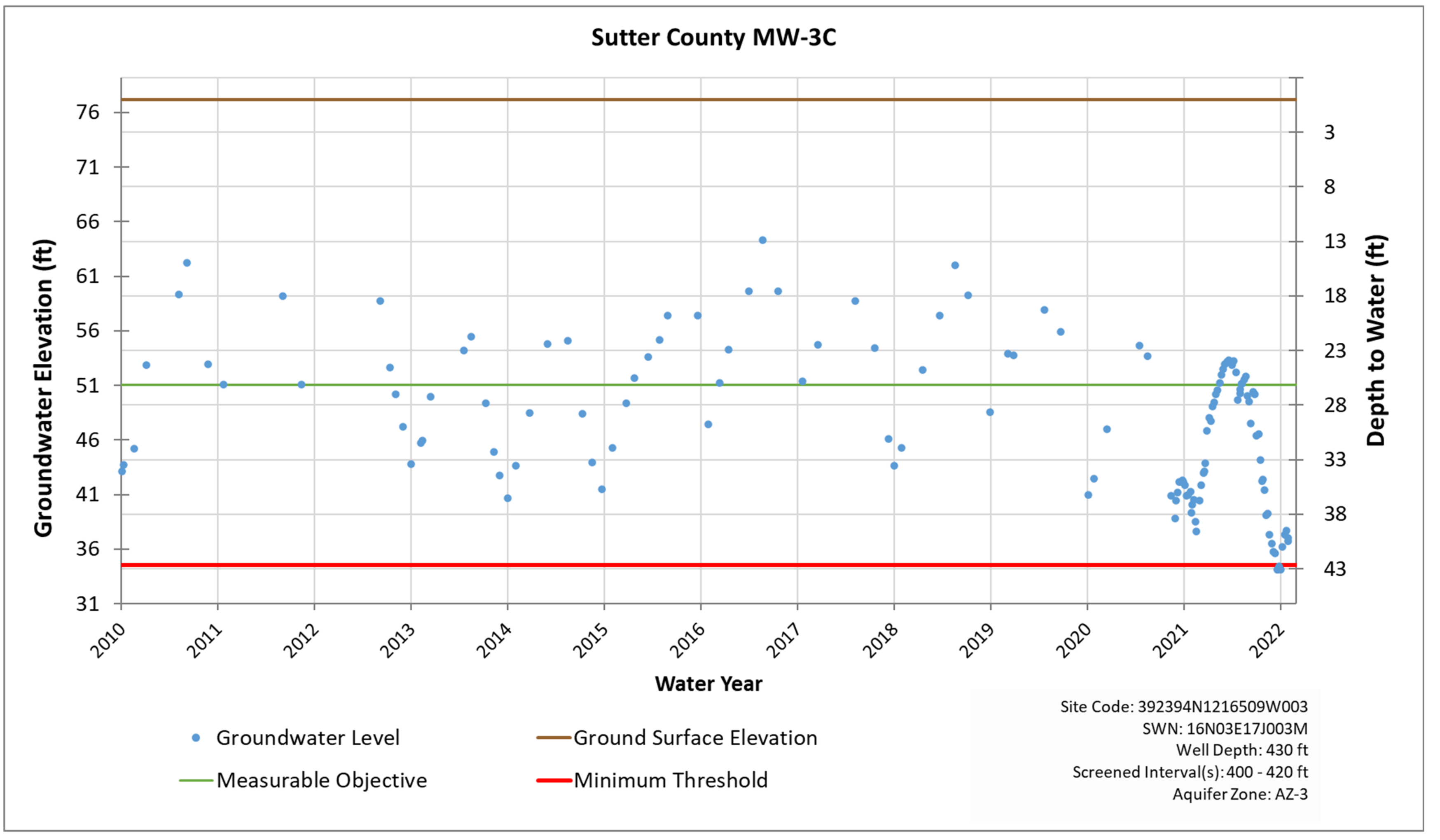

Ma-1
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 388869N1216445W002
SWN: N/A
Well Depth: 140 ft
Screened Interval(s): 103 - 133 ft
Aquifer Zone: AZ-1

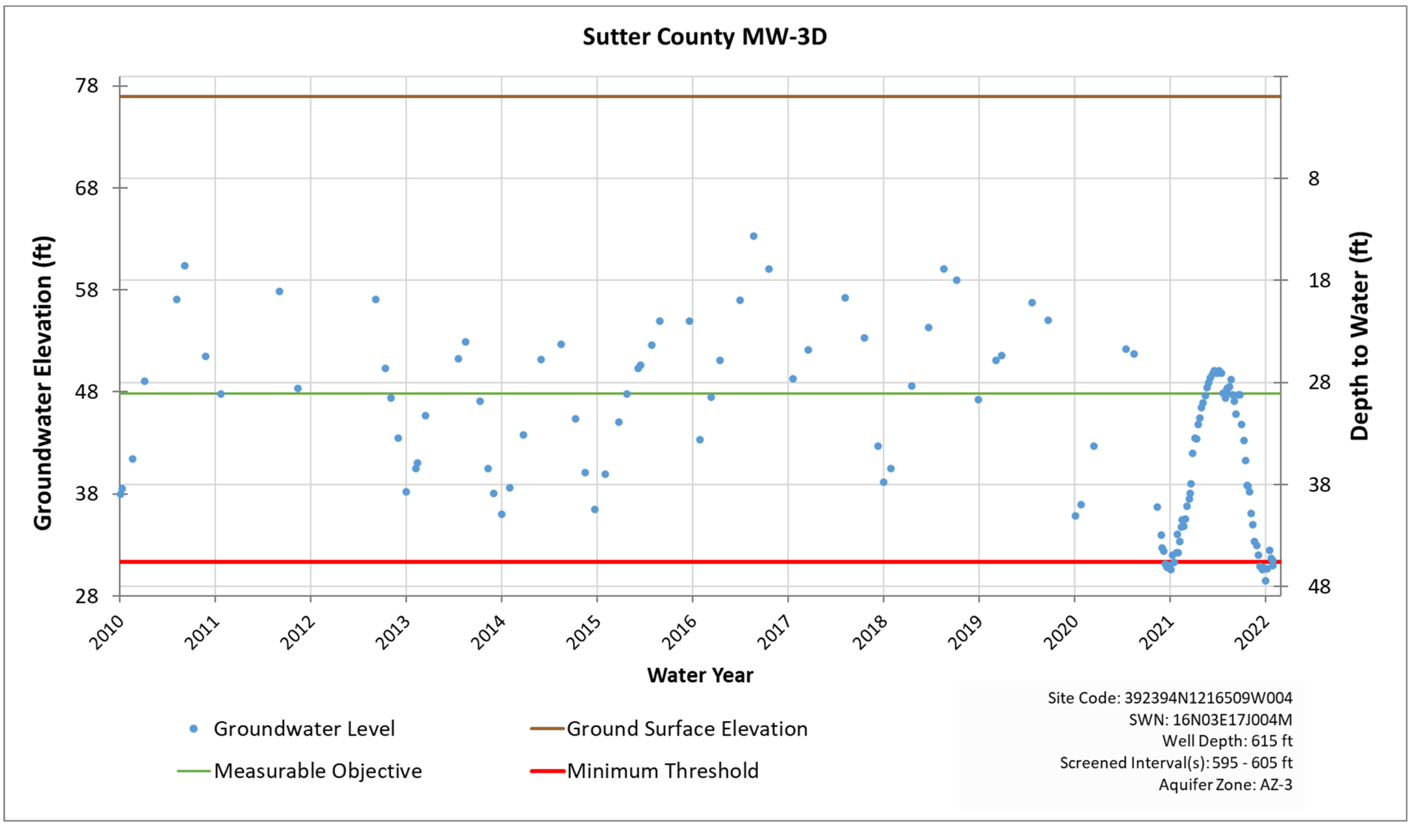

Feather River MW-1B
Groundwater Elevation (ft)
Depth to Water (ft)
50
40
30
20
10
0
-10
-20
-30
-40
8
18
28
38
48
58
68
78
88
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390458N1216114W002
SWN: 14N03E23D004M
Well Depth: 260 ft
Screened Interval(s): 235 - 255 ft
Aquifer Zone: AZ-2

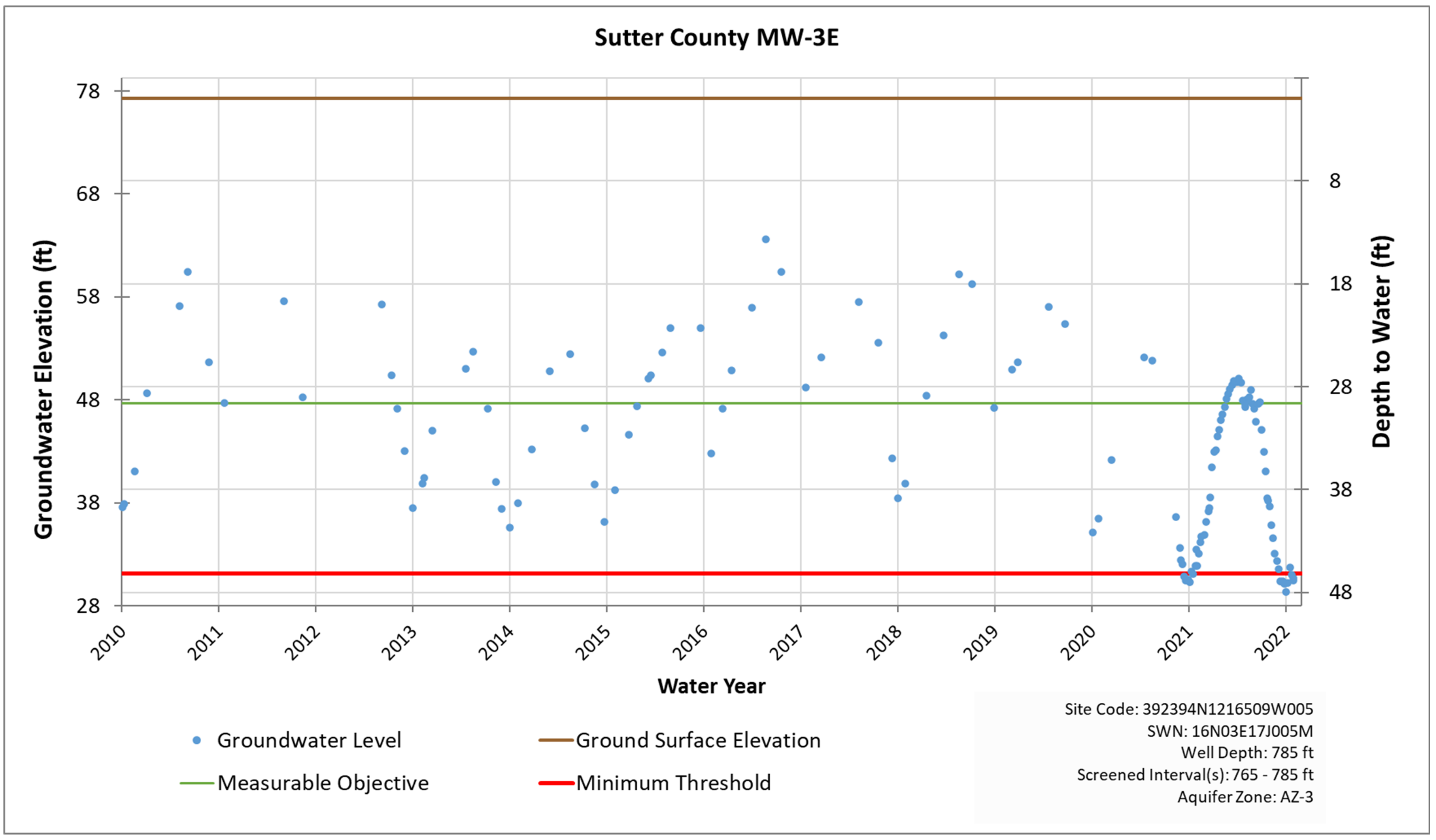

Sutter County MW-3B
Groundwater Elevation (ft)
Depth to Water (ft)
78
73
68
63
58
53
48
43
38
33
3
8
13
18
23
28
33
38
43
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W002
SWN: 16N03E17J002M
Well Depth: 315 ft
Screened Interval(s): 285 - 305 ft
Aquifer Zone: AZ-2


Feather River MW-1C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390458N1216114W003
SWN: 14N03E23D005M
Well Depth: 689 ft
Screened Interval(s): 664 - 684 ft
Aquifer Zone: AZ-3


Feather River MW-1D
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 390458N1216114W004
SWN: 14N03E23D006M
Well Depth: 1021 ft
Screened Interval(s): 996 - 1016 ft
Aquifer Zone: AZ-3


Sutter County MW-3C
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W003
SWN: 16N03E17J003M
Well Depth: 430 ft
Screened Interval(s): 400 - 420 ft
Aquifer Zone: AZ-3


Sutter County MW-3D
Groundwater Elevation (ft)
Depth to Water (ft)
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W004
SWN: 16N03E17J004M
Well Depth: 615 ft
Screened Interval(s): 595 - 605 ft
Aquifer Zone: AZ-3


Sutter County MW-3E
Groundwater Elevation (ft)
Depth to Water (ft)
78
68
58
48
38
28
8
18
28
38
48
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Water Year
Groundwater Level
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Site Code: 392394N1216509W005
SWN: 16N03E17J005M
Well Depth: 785 ft
Screened Interval(s): 765 - 785 ft
Aquifer Zone: AZ-3

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SUTTER SUBBASIN

Water Year 2022 Annual Report to the

GROUNDWATER SUSTAINABILITY PLAN