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Santa Margarita Basin
2022 Groundwater Sustainability Plan
Periodic Evaluation

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Prepared for:

Santa Margarita Groundwater Agency

Prepared by:

Montgomery & Associates

1970 Broadway, Suite 700, Oakland, California

and

Regional Water Management Foundation

7807 Soquel Drive, Aptos, California

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ACRONYMS & ABBREVIATIONS

AB303.....Assembly Bill 303 Local Groundwater Assistance Grant Program
AEM.....Airborne Electromagnetic
AF .....acre-feet
AFY.....acre-feet per year
amsl.....above mean sea level
Annual Report GSP Annual Report
ASR.....aquifer storage and recovery
Basin .....Santa Margarita Groundwater Basin
Basin Model ...Basin Groundwater Flow Model
BMP .....Best Management Practices
CCR.....California Code of Regulations
CDFW .....California Department of Fish and Wildlife
COC .....constituent of concern
County.....County of Santa Cruz
DWR .....California Department of Water Resources
GDE .....groundwater dependent ecosystems
GPY.....gallons per year
GSA.....Groundwater Sustainability Agency
GSP .....Groundwater Sustainability Plan
HCP.....Habitat Conservation Plan
HCM .....Hydrogeologic Conceptual Model
IM.....interim milestone
InSAR .....Interferometric Synthetic Aperture Radar
IRWM .....Integrated Regional Water Management Plan
ISW .....interconnected surface water
JPA.....Joint Powers Agreement
LID.....low impact development
MCL.....maximum contaminant level
MGA .....Santa Cruz Mid-County Groundwater Agency
mg/L.....milligrams per liter
MHA .....Mount Hermon Association
MO .....measurable objective
MOA .....Memorandum of Agreement
MT.....minimum threshold
NDVI.....Normalized Difference Vegetation Index
NMFS.....National Marine Fisheries Service
PMA.....project and management action(s)

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RCA .....recommended corrective action(s)
RMP .....representative monitoring point(s)
RWMF .....Regional Water Management Foundation
SAFER .....Safe and Affordable Funding for Equity and Resilience
SCEH .....Santa Cruz County Environmental Health
SCWD .....City of Santa Cruz Water Department
SGMA .....Sustainable Groundwater Management Act
SLV .....San Lorenzo Valley
SLVWD .....San Lorenzo Valley Water District
SMC .....sustainable management criteria
SMGWA .....Santa Margarita Groundwater Agency
SVWD.....Scotts Valley Water District
SWS .....small water system
SWRCB.....State Water Resources Control Board
TDS .....total dissolved solids
TSS.....DWR Technical Support Services
UR .....undesirable result
UWMP .....Urban Water Management Plan
VOCs.....volatile organic compound(s)
WY .....Water Year

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EXECUTIVE SUMMARY

This Periodic Evaluation covers the period from January 3, 2022, through January 3, 2027 (Evaluation Period), the first 5 years of implementation of the Santa Margarita Groundwater Agency's (SMGWA's) Groundwater Sustainability Plan (GSP or Plan) for the Santa Margarita Basin (Basin). Based on this Periodic Evaluation, the Basin is currently being managed sustainably. SMGWA will continue to implement the GSP through monitoring, reporting, adaptive management, and implementation of projects and management actions (PMAs) to achieve the Basin's sustainability goal by 2042 and thereafter maintain sustainable groundwater management, without causing undesirable results, through the 50-year planning and implementation horizon ending in 2072.

Although the Basin is sustainable, a Plan amendment is necessary to incorporate new information since the 2022 GSP was adopted and to revise the sustainable management criteria (SMC) and monitoring networks in response to Recommended Corrective Actions (RCAs) issued by the California Department of Water Resources (DWR). A 2027 GSP Amendment (Amendment) is therefore being submitted concurrently with this Periodic Evaluation, together with a redline and a final amended GSP. SMGWA anticipates Board adoption of the Amendment and submission in January 2027 following a public review draft, a public comment period, and consideration at a publicly noticed Board meeting.

Significant new information was acquired during the Evaluation Period and used to prepare this Periodic Evaluation. SMGWA installed 7 new monitoring wells in 2023 and added several existing wells to the GSP monitoring networks, which expanded coverage in areas used for private supply and near interconnected streams. SMGWA also collected streamflow data, evaluated DWR's airborne electromagnetic (AEM) geophysical survey data, and updated Basin water use and the numerical groundwater flow model (Basin Model). The AEM analysis confirms that the geologic structure represented in the Basin Model is reasonable, and the new monitoring data confirm rather than change the hydrogeologic conceptual model (HCM). The updated water use analysis resets the baseline for extraction, reflects the current extraction well network, and supports revised projected model runs. Adoption of the City of Santa Cruz Anadromous Salmonid Habitat Conservation Plan (HCP) in September 2025 identifies minimum streamflows supportive of steelhead and coho salmon and enabled SMGWA to establish SMC for depletion of interconnected surface water (ISW).

DWR's determination letter on the 2022 GSP included 4 RCAs, each of which is addressed in Section 3. RCA #1 asked SMGWA to evaluate beneficial uses and users of the Monterey Formation and to fill monitoring data gaps; SMGWA installed 2 new monitoring wells, identified 1 existing private supply well for monitoring, and documented stable to increasing

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groundwater levels in a technical memorandum (Appendix 3A), so no Plan amendment is required. RCAs #2, #3, and #4 each led to SMC revisions in a GSP Amendment. RCA #2 asked SMGWA to remove the drought year exception from the definition of undesirable results (UR[s]) for the chronic lowering of groundwater levels, and RCA #3 recommended SMGWA revise the degraded groundwater quality SMC, including the UR definition and the list of constituents of concern (COCs). RCA #4 asked SMGWA to remove the drought year exemption for ISW, consider forthcoming DWR ISW guidance, continue filling data gaps, and coordinate with regulatory agencies and interested parties.

The revised Basin sustainability goal is to achieve and maintain groundwater conditions that support beneficial uses and users of groundwater and sustain the long-term health of the Basin's community, economy, and environment. The Amendment supports that goal through an integrated SMC framework. Groundwater levels continue to serve as the primary indicator of aquifer response to pumping and recharge, groundwater extraction and storage conditions provide a Basin-scale constraint on water use, and ISW depletion is evaluated as a function of broader groundwater conditions rather than localized measurements alone.

Amendments to the SMC and monitoring networks are summarized in Section 11. The groundwater level monitoring network adds 11 and removes 2 representative monitoring points (RMPs) and is grouped into shallow/unconfined and deeper/confined networks. Minimum thresholds (MTs) are set at measured fall 2013 groundwater levels and measurable objectives (MOs) at fall 2006 levels, with interim milestones (IMs) for 2032 and 2037 providing a managed trajectory to the MO by 2042. The reduction of groundwater in storage SMC consolidates 4 aquifers into 2 aquifer groups, with an MO of 2,600 acre-feet per year (AFY) matching the model-estimated sustainable yield and an MT of 3,000 AFY to accommodate conjunctive use during dry years, both evaluated on a 5-year rolling average basis. The degraded groundwater quality network is amended to 13 RMPs. Chloride, iron, manganese, and volatile organic compounds are removed as COCs; MTs and MOs are reset for total dissolved solids, nitrate, and arsenic to indicate degradation from baseline conditions. The ISW monitoring network is amended to use all groundwater level RMPs together with tracking of extraction by aquifer groups. UR definitions for each indicator are revised to require exceedances at multiple locations over 2 consecutive years, which removes the drought year exceptions in the 2022 GSP and aligns with groundwater management at the Basin-scale rather than localized conditions.

Groundwater sustainability management activities are progressing as described in Section 5. Of the 20 PMAs identified in the 2022 GSP, the four Group 1 baseline commitments remain ongoing, including water use efficiency programs, low impact development, San Lorenzo Valley Water District (SLVWD) conjunctive use, and Scotts Valley Water District (SVWD) recycled water program. Among the Group 2 projects, the SVWD intertie with the City of Santa Cruz was completed in Water Year (WY)2025 with a bi-directional capacity of up to 1 million gallons per

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day, and its pump station and an associated new production well are scheduled for completion in 2026. SLVWD continued planning for expanded conjunctive use, advancing an environmental impact report in support of its water rights petition. The Group 3 projects remain conceptual and would be evaluated only if Group 1 and Group 2 projects do not achieve sustainability. With the information gained over the previous 5 years and during this Periodic Evaluation, SMGWA is able to streamline the PMAs down to 2 Primary and 2 Supplemental PMAs.

SMGWA has maintained active outreach and engagement throughout GSP implementation, as described in Section 9. All 15 Board meetings held since GSP adoption in November 2021 through July 2026 were recorded and posted online, and SMGWA provided opportunity for public comment on the Periodic Evaluation at 6 publicly noticed Board meetings, beginning on August 28, 2025. A Board draft of the Periodic Evaluation was released 30 days before the October 22, 2026, Board meeting to allow time for public review. Other outreach included 21 website announcements, at least 7 press releases, 21 electronic newsletters to a distribution list of 824 interested parties, direct mailings to 62 nearby homeowners for the monitoring well construction project, and participation in community events including the Environmental Town Hall and the State of the San Lorenzo River Symposium.

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1 INTRODUCTION

This Periodic Evaluation reviews the first 5 years of implementation of the Santa Margarita Groundwater Agency's (SMGWA's) Groundwater Sustainability Plan (GSP or Plan) for the Santa Margarita Basin (Basin). The 2022 GSP (SMGWA, 2022) is a detailed sustainability plan that aligns groundwater management in the Basin with the Sustainable Groundwater Management Act (SGMA) code and the California Department of Water Resources (DWR) GSP Regulations (California Water Code §10720 *et seq.*; 23 California Code of Regulations [CCR] §351 *et seq.*). The Periodic Evaluation covers the period from January 3, 2022, through January 3, 2027 (i.e., the "evaluation period").

1.1 Purpose of the Periodic Evaluation and 2027 GSP Amendment

The purpose of the Periodic Evaluation is to evaluate whether GSP implementation is on track to achieve sustainability in the 20-year GSP implementation period from 2022 through 2042. The evaluation identifies changes to the Basin management approach that are addressed through a 2027 GSP Amendment (Amendment) being submitted concurrently. The Amendment revises representative monitoring point networks (RMPs) and Sustainable Management Criteria (SMC) to address DWR's Recommended Corrective Actions (RCAs) on the 2022 GSP, updates water use and water budgets to reflect current Basin conditions, and modifies Project and Management Actions (PMAs) to incorporate implementation progress since adoption of the 2022 GSP.

1.2 Plan Area and Groundwater Sustainability Agency Overview

The Basin, identified by DWR as #3-027, is a 34.8 square mile (22,249 acres) medium-priority groundwater basin in central Santa Cruz County. The Basin is home to an estimated 29,000 residents and includes the City of Scotts Valley and the communities of Boulder Creek, Brookdale, Ben Lomond, Lompico, Zayante, Felton, and Mount Hermon.

SMGWA, the sole Groundwater Sustainability Agency (GSA) for the Basin, was formed through a Joint Powers Agreement (JPA) between Scotts Valley Water District (SVWD), San Lorenzo Valley Water District (SLVWD), and the County of Santa Cruz (County). Figure 1-1 shows the jurisdictional extent of member agencies that comprise the SMGWA in relation to the Basin boundary. SGMA and the JPA grant SMGWA the legal authority to prepare, adopt, and implement the GSP in the Basin.

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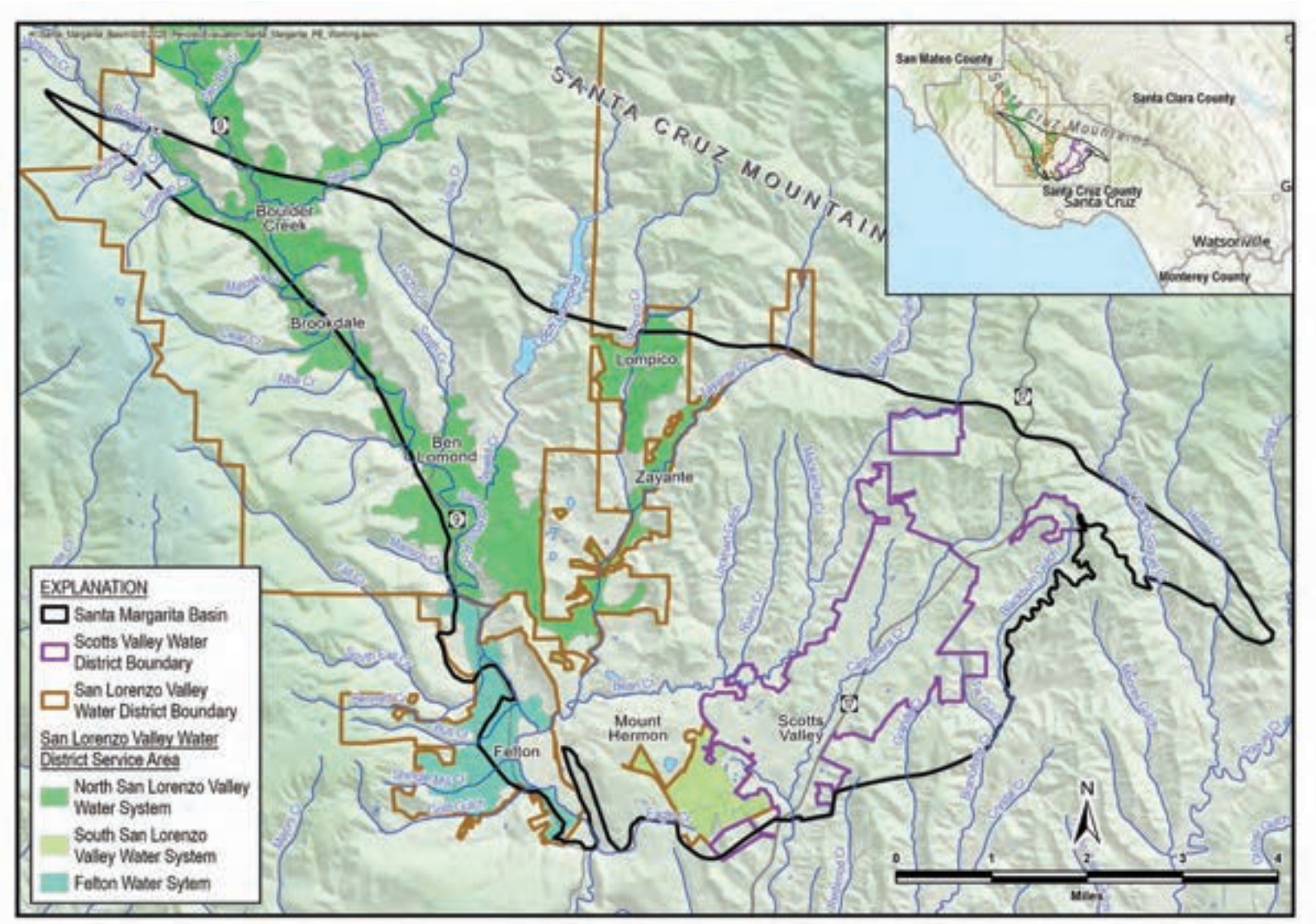


Figure 1-1. Basin and Member Agency Jurisdictional Boundaries

1.3 Water Use and Beneficial Users of Groundwater

Water supply in the Basin is sourced from groundwater, surface water, springs, and recycled water. SLVWD and SVWD are the 2 largest volume water users in the Basin. SLVWD uses groundwater and surface water diverted just outside of the Basin on tributaries of the San Lorenzo River. SVWD uses groundwater exclusively for potable supply and supplements with recycled water for non-potable supply. Groundwater is used to meet the remaining Basin water demands including water supply for Mount Hermon Association (MHA) public water supply system, various small water systems, private domestic wells, quarry dust control and operations, landscaping, and pond filling.

Groundwater and surface water are interconnected in the Basin. There is net groundwater discharge to streams in the Basin, so groundwater also supports streamflow that is used for water supply, habitat, and recreation. Groundwater dependent ecosystems (GDEs) rely on groundwater availability within the root zone to sustain ecological function, especially in areas near interconnected streams.

The City of Santa Cruz Water Department (SCWD) does not pump any groundwater in the Basin. However, it is an indirect user of groundwater in the Basin because the surface water it diverts from the San Lorenzo River is partially supported by groundwater discharge to creeks in the Basin. The SCWD owns and operates Loch Lomond Reservoir on Newell Creek, which intersects the Basin's northern boundary and has 2 diversion points on the San Lorenzo River near the Basin boundary in Felton and 5 miles downstream.

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1.4 Basin Hydrogeologic Setting

The Basin is a geologically complex area that was formed by the same tectonic forces along the San Andreas fault zone that created uplift of the Santa Cruz Mountains and the rest of the California Coast Range. The Basin is bounded on the north by the Zayante trace of the active, strike-slip Zayante-Vergeles fault zone; on the east by a buried granitic high that separates the Basin from Santa Cruz Mid-County Basin; and on the west by the Ben Lomond fault (except where areas of alluvium lie west of the fault in an area previously designated as the Felton Basin). The southern boundary of the Basin with the West Santa Cruz Terrace Basin is located where sedimentary formations thin over a granitic high. A geologic map of the Basin is shown on Figure 1-2.

The Basin is filled with Tertiary-age sedimentary rocks. From oldest and deepest to youngest and shallowest, the main units are the Butano Sandstone, Lompico Sandstone, Monterey Formation, and Santa Margarita Sandstone. The 3 sandstone formations are the Basin's principal aquifers for

water supply, as defined in the GSP. Although used for private domestic wells, the Monterey Formation is not a principal aquifer because it only supports small groundwater extraction volumes. Two younger formations cap the hilltops east of Zayante Creek: the impermeable Santa Cruz Mudstone and the overlying Purisima Formation, which is a major aquifer in the adjacent Santa Cruz Mid-County Basin, but is of such limited extent in the Santa Margarita Basin that it is used only for private domestic wells.

An example cross-section on Figure 1-3 illustrates the subsurface geology along line D-D' on the geologic map shown on Figure 1-2. The cross-section highlights several unique characteristics of the Basin's aquifers, including the following:

- The Santa Margarita Sandstone is an unconfined aquifer throughout the Basin.
- The Lompico Sandstone and the Butano Sandstone are partially confined aquifers due to the presence of the overlying Monterey Formation.
- The Monterey Formation aquitard is absent between the Santa Margarita Sandstone and the underlying Lompico Sandstone in Mount Hermon and southern Scotts Valley, in the area shown on Figure 1-2.

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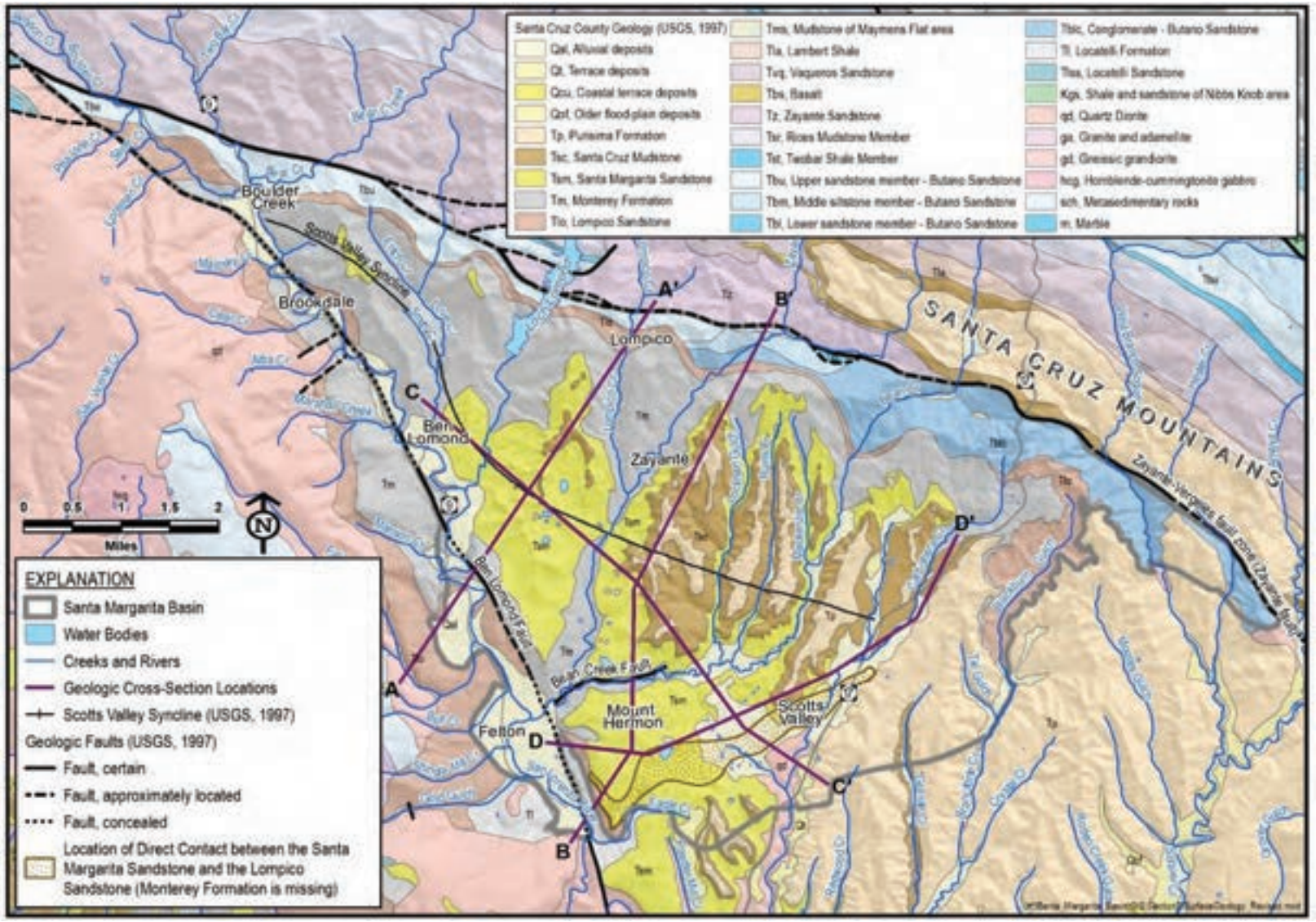
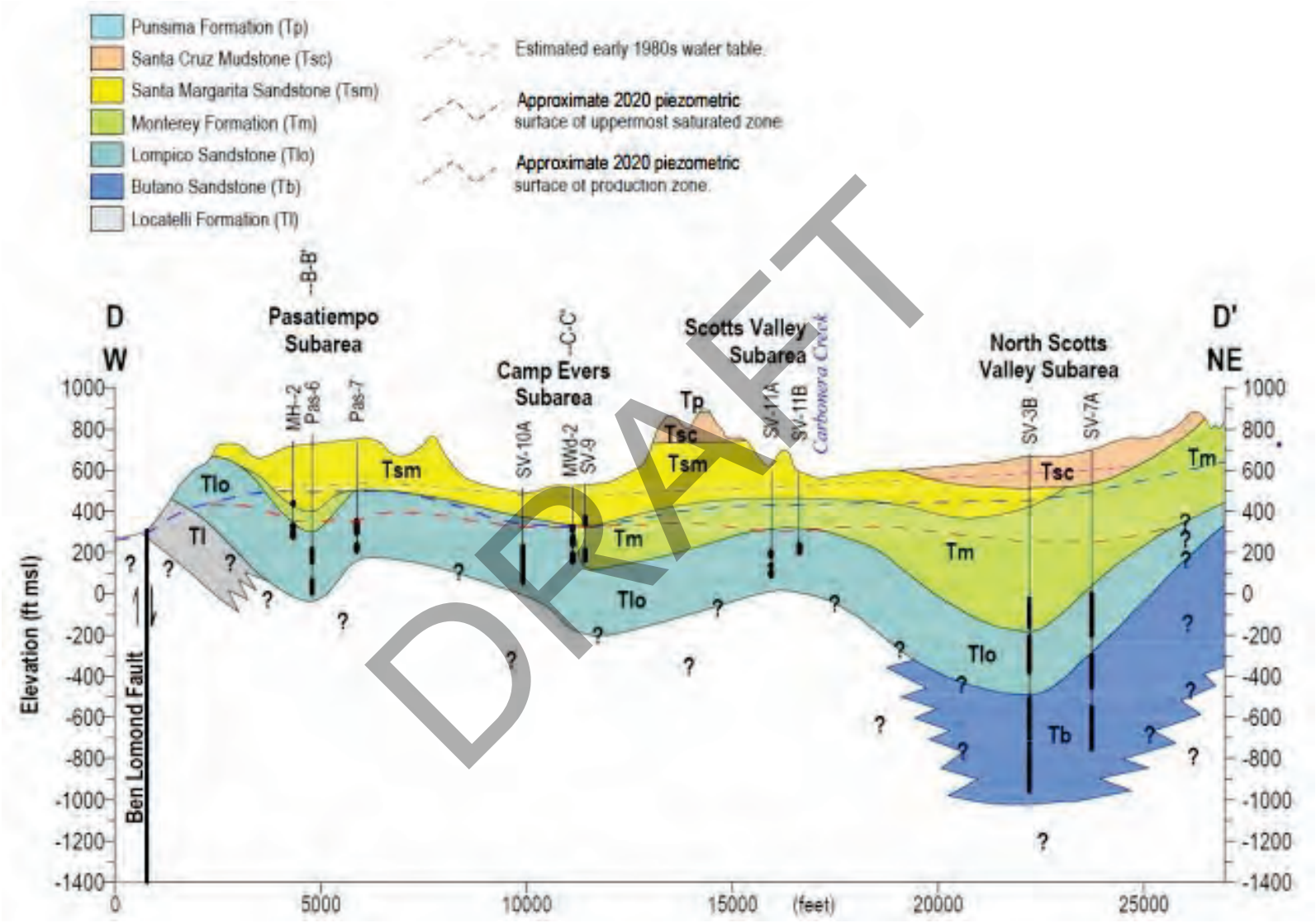


Figure 1-2. Surface Geology and Geologic Cross-Section Locations



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Figure 1-3. D-D' Geologic Cross-Section

1.4.1 Principal Aquifers and Other Formations Used for Water Supply

The Basin's aquifers have unique characteristics related to recharge and water use. The following describes the notable characteristics of the principal aquifers and Monterey Formation as they relate to the GSP:

- The Santa Margarita aquifer is the shallowest principal aquifer, with widespread surface exposures in the southern and central portions of the Basin. It is a high-yielding aquifer that is a critical source of baseflow to creeks and domestic water supply. The aquifer can respond rapidly to climate in some areas of the Basin – groundwater levels can rise rapidly in wet years and fall in dry years. The Santa Margarita is generally unconfined in the Basin due to its shallow occurrence.
- The Monterey Formation, a low-yielding shale formation, is only used for domestic water supply in areas where higher yielding aquifers are not present. The formation was used briefly in the 1990s for municipal supply. Permeable lenses within the Monterey Formation are likely interconnected with surface water where the formation outcrops in creek beds. The low vertical conductivity and permeability of the formation forms springs fed by the overlying Santa Margarita and limits surficial recharge of the underlying Lompico aquifer. The Monterey Formation behaves as a confined aquifer and acts as a primary confining layer for the underlying Lompico and Butano aquifers.
- The Lompico aquifer is used for municipal supply in the Mount Hermon, Pasatiempo, and Scotts Valley areas where the formation is thickest. This mostly confined aquifer has significantly less direct recharge from precipitation than the Santa Margarita aquifer because of its much smaller surface exposure in the Basin. The Lompico is generally a confined aquifer in the Basin.
- The Butano aquifer is the deepest of the productive aquifers in the Basin and is only used for water supply in northern Scotts Valley. It is recharged by surface water and precipitation where it is exposed along the Basin's northern boundary. SVWD is the only municipal user of the Butano aquifer, although private well owners use it in areas where it's found at or close to the ground surface along the ridgeline that makes up the northeast end of the Basin. The Butano is generally a confined aquifer in the Basin.

1.4.2 Principal Aquifer Subareas

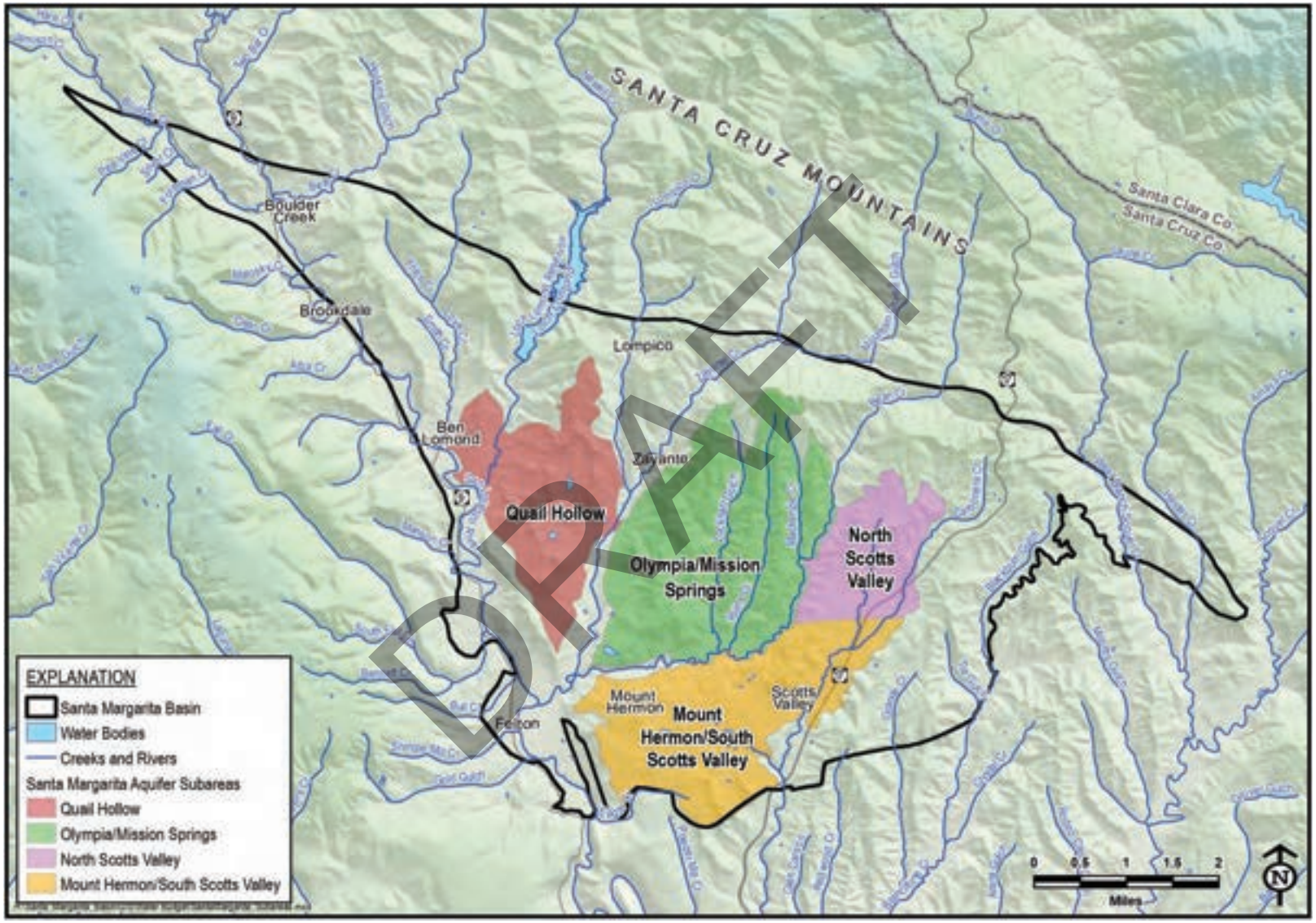
The Santa Margarita aquifer is generally unconfined and has 4 distinct subareas identified in the GSP and shown on Figure 1-4. These subareas have unique groundwater level responses to climate and water use:

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- The Quail Hollow subarea is isolated due to erosion of the aquifer by Zayante Creek and thus does not have the same trends as the other subareas.
- The Quail Hollow and Olympia/Mission Springs subareas are used for water supply by SLVWD and have more groundwater level fluctuation than the other subareas south of Bean Creek.
- The Mount Hermon / South Scotts Valley and North Scotts Valley subareas south of Bean Creek are pumped by lower demand small water systems, industrial, and private users. Groundwater levels are more consistent over time than the subareas north of Bean Creek. The Mount Hermon / South Scotts Valley Santa Margarita aquifer remains dewatered in some places due to historical groundwater level declines in the underlying Lompico aquifer where the low permeability Monterey Formation is absent between these sandstone aquifers.

The Monterey Formation and Lompico/Butano confined aquifer subareas shown on Figure 1-5 also have distinct groundwater level characteristics related to water supply and recharge. Nearly all of the confined aquifer extraction is from the subareas south of Bean Creek, where SLVWD, SVWD, and MHA supply wells are located. The largest extractors in the Basin—SLVWD, MHA, and SVWD—all use Lompico aquifer supply wells in the Mount Hermon/South Scotts Valley Subarea. The Butano aquifer is only pumped extensively for water supply in the North Scotts Valley Subarea, where SVWD has 3 supply wells screened through both the Lompico and Butano aquifers.

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Figure 1-4. Santa Margarita Aquifer Subareas

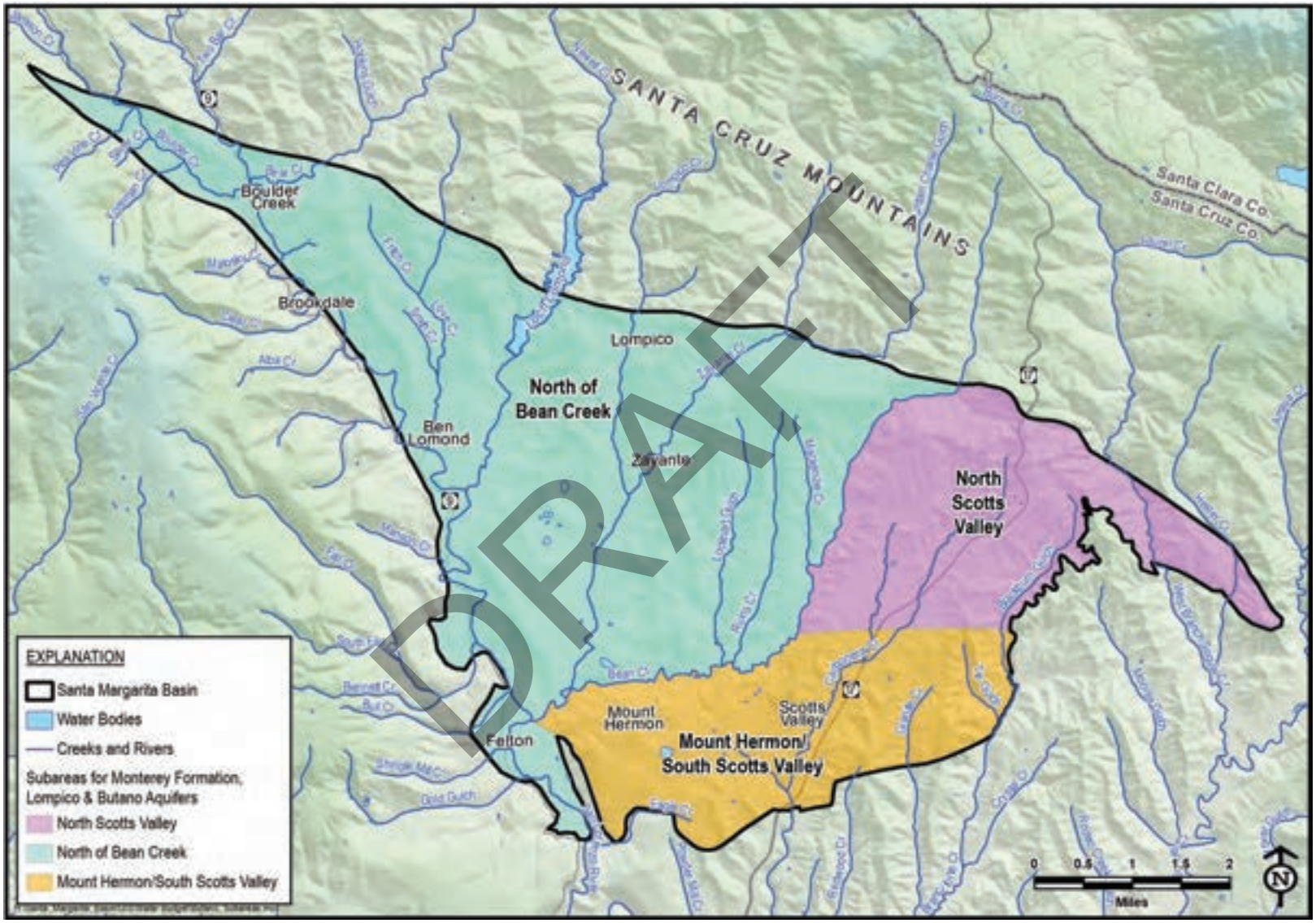


Figure 1-5. Monterey Formation, Lompico Aquifer, and Butano Aquifer Subareas

2 NEW INFORMATION COLLECTED

New information and data were acquired by the SMGWA and member agencies during the evaluation cycle that improves understanding of Basin groundwater conditions and confirms hydrogeological conceptual model (HCM) assumptions. This information supplements but does not change how the Basin is managed as described in the 2022 GSP. New information collected is summarized in Table 2-1 with reference to sections where the information is used for this evaluation.

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Table 2-1. Summary of New Information Since 2022 Groundwater Sustainability Plan

Significant New Information Collected	General Description of New Information	Use of New Information in the Periodic Evaluation	Reference to Section in Periodic Evaluation Where Information Is Discussed
Monitoring Improvements	Installation of 7 new monitoring wells, addition of several existing monitoring wells to GSP monitoring networks, and other stream monitoring to better understand the surface water/groundwater relationship and expand networks in areas used for private supply	New monitoring wells improve the monitoring coverage in the Basin. The improved monitoring networks are discussed throughout the Periodic Evaluation	Section 4 and 7
Airborne Electromagnetic (AEM) Geophysical Survey	Evaluate DWR's AEM data to improve subsurface characterization and HCM	Confirm geologic structure is representative in the groundwater model	Section 6.1
Groundwater Use and Modeling Updates	Updated water use and groundwater model to reset baseline water use, adjust pumping conditions to reflect updated extraction well network, revise projected model runs, and help evaluate the need for projects to achieve sustainability	Documented updated water use in the periodic evaluation; model results are provided in 2027 GSP Amendment	Section 6.3
Anadromous Salmonid Habitat Conservation Plan (HCP)	Plan completed in 2025 that intends to restore habitats and populations of steelhead and coho salmon in the San Lorenzo River	Identifies minimum flows to support beneficial uses and users that enable Basin to establish SMC for depletion of interconnected surface water	Section 3.4 and 4.6.3

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3 RESPONSE TO DWR RECOMMENDED CORRECTIVE ACTIONS

The 4 RCAs from DWR's Determination Letter and how they are addressed in this Periodic Evaluation are summarized below.

3.1 RCA #1

DWR Comment

The GSA should evaluate beneficial uses and users of the Monterey Formation and consider how changes in groundwater levels in the Monterey Formation may affect domestic well users and GDEs. The GSA should evaluate monitoring in the Monterey Formation and fill any data gaps in areas where beneficial uses are present and monitoring is not present.

SMGWA Response

DWR recommended SMGWA provide additional information about the potential impacts to beneficial users extracting from the Monterey Formation due to GSP implementation. A technical memorandum (Appendix 3A) provides a detailed review of the subject. The key information from Appendix 3A is summarized below.

The Monterey Formation is currently used for the following beneficial uses and users of groundwater:

- Domestic and small water system (SWS) supply wells screened in the Monterey Formation are found where the more productive Santa Margarita aquifer is not present, especially at the Basin margins.
- Wetlands and riparian corridors associated with most of the creeks in the Basin could potentially rely on groundwater partially sourced from hydraulically conductive lenses within the Monterey Formation.
- Springs and GDEs occur where the low permeability Monterey Formation surface causes basal flow of water in the overlying, highly permeable Santa Margarita aquifer.

SMGWA has improved groundwater monitoring of the Monterey Formation during the evaluation cycle, especially in areas with no historical monitoring. The SMGWA installed 2 new monitoring wells and identified 1 existing private supply well to monitor in 3 areas with the highest concentration of domestic wells in the Monterey Formation. Available groundwater level data from the new wells, an inactive municipal supply well already in the GSP monitoring network, and the Basin numerical groundwater flow model (Basin Model) suggest that groundwater levels throughout the formation are currently stable to increasing due to reduced water use in the Basin as a whole.

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There are additional measures in place should future extreme droughts impact water availability in this lower permeability aquifer. The County has developed drought preparedness plans as a backstop to support domestic or SWS well owners. Also, GDE health in the Basin will continue to be assessed periodically to confirm that GDEs potentially supported by the Monterey Formation, and other principal aquifers, are not impacted by implementation of the GSP.

Along with increasing or stable groundwater levels in the Monterey Formation, groundwater users dependent on the water source are protected by GSP implementation objectives to maintain groundwater levels above pre-SGMA historical low levels. No GSP amendment is required as a result of this explanatory response as it does not affect how groundwater is managed.

3.2 RCA #2

DWR Comment

The GSA should revise the definition of undesirable results to remove the drought year condition or discuss how extractions and recharge will be managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods within the sustainable management criteria for the chronic lowering of groundwater levels.

SMGWA Response

The definition of an undesirable result (UR) for the chronic lowering of groundwater levels sustainability indicator is being amended to remove the drought year condition exception in the GSP to address RCA #2. The UR definition now includes a combination of minimum threshold (MT) exceedances as discussed in Section 4.3.3.

3.3 RCA #3

DWR Comment

The GSA should revise sustainable management criteria for degraded water quality.

a) Revise the definition of undesirable results for degraded groundwater quality so that exceedances of minimum thresholds caused by groundwater extraction, whether the GSA has implemented pumping regulations or not, are considered in the assessment of undesirable results in the Basin.

b) Revise the sustainable management criteria for degraded water quality to include undesirable results for constituents of concern in the basin identified in the GSP.

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SMGWA Response

The UR definition for the degraded groundwater quality sustainability indicator is being amended in the GSP to address RCA #3 by removing the condition of whether or not SMGWA has implemented pumping regulations. SMGWA is also amending the GSP to remove SMC for some of the constituents identified in the 2022 GSP. The amended constituents of concern (COC) list and UR definition are discussed in Section 4.5.3.

3.4 RCA #4

DWR Comment

Department staff understand that estimating the location, quantity, and timing of stream depletion due to ongoing, basin-wide pumping is a complex task and that developing suitable tools may take additional time; however, it is critical for the Department's ongoing and future evaluations of whether GSP implementation is on track to achieve sustainable groundwater management. The Department plans to provide guidance on methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water and support for establishing specific sustainable management criteria in the near future. This guidance is intended to assist GSAs to sustainably manage depletions of interconnected surface water.

In addition, the GSA should work to address the following items by the first periodic update:

a) Revise sustainable management criteria with the removal of the exemption for undesirable results in drought years.

b) Consider using the interconnected surface water guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.

c) Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of interconnected surface water and define segments of interconnectivity and timing.

d) Prioritize collaborating and coordinating with local, state, and federal regulatory agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion within the GSA's jurisdictional area.

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SMGWA Response

SMGWA has the following responses to RCA #4:

a) The drought year exemption for SMC for interconnected surface water (ISW) has been removed. The amended UR definition is further discussed in Section 4.6.3.

b) SMGWA cannot fully consider the DWR ISW guidance because it has not been released. However, SMGWA did consult with the 3 DWR ISW Technical Papers released in 2024 and watched the December 2025 presentation titled "Depletion of Interconnected Surface Water under SGMA: Regulatory Requirements and Upcoming DWR Guidance" by Mr. Craig Altare. SMGWA also met with DWR in January 2026 to describe its proposed approach to manage ISW depletions by comprehensively managing groundwater gradients throughout the Basin and reducing extraction as compared to pre-SGMA conditions. SMGWA understands that other factors in addition to groundwater extraction, including climate variability and changing riparian demands, may affect surface water flows. However, SMGWA believes that managing groundwater gradients and extractions is a conservative way to ensure that the reduced surface water flows are not due to groundwater depletion. This approach is discussed in Section 4.6.3.

c) SMGWA believes it has filled its most critical data gaps for assessing ISW. The 2027 GSP Amendment addresses RCA #4 by expanding the monitoring network and refining SMC for evaluating ISW depletion. The 2022 GSP ISW monitoring network only included 2 shallow wells that measured groundwater levels as a proxy monitoring interconnected stream depletion. An additional 7 relatively shallow monitoring wells were installed in 2023, some of which were placed specifically to fill data gaps near streams, as documented in the Monitoring Well Installation Report (M&A, 2023). The amended ISW monitoring network uses a comprehensive Basin-wide approach to manage to groundwater levels that support continued discharge to local streams and maintain reduced groundwater extraction in the Basin to provide for conditions that support beneficial uses and users of interconnected surface water. The amended approach uses the same monitoring networks and SMC for chronic lowering of groundwater levels and reduction in storage sustainability indicators. More information is included in Sections 7.4.4 and 7.4.4.

d) SMGWA has developed the amended ISW approach based on consideration of the City of Santa Cruz Anadromous Salmonid Habitat Conservation Plan (HCP), which was adopted by the Santa Cruz City Council in September 2025. The HCP (City of Santa Cruz, 2025) had been in development since 2001 and intends to restore habitats and populations of steelhead and coho salmon, which are priority species in the Basin identified in the 2022 GSP, while minimizing the impacts of the City's water diversion to

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meet its long-term water supply needs. The City worked with the California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS) in developing the HCP. SMGWA met with City of Santa Cruz staff responsible for development of the HCP in July 2026 and modified some of the ISW SMC based on feedback from staff. SMGWA briefed CDFW staff and NMFS staff in August 2026 to discuss the draft ISW approach. SMGWA also met with DWR staff in January 2026 to describe the modified approach of managing both groundwater elevations basin-wide and groundwater extraction to ensure that Basin groundwater use was not causing significant and unreasonable depletions of interconnected surface water.

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4 GROUNDWATER CONDITIONS RELATIVE TO SUSTAINABLE MANAGEMENT CRITERIA

Groundwater conditions during the evaluation period demonstrate that the Basin continues to operate within its established SMC and is not experiencing significant and unreasonable impacts to beneficial uses and users of groundwater. Temporary exceedances of some SMC occurred during emergency operational conditions associated with the CZU Lightning Complex wildfire. These exceedances were short-term, operationally constrained, and do not reflect underlying unsustainable groundwater management conditions. Based on the 2022 GSP SMC and evaluation of groundwater levels, groundwater storage, groundwater quality, and depletion of interconnected surface water, there were some intermittent undesirable results that were related to routine operations in the Basin. These undesirable results did not reflect unsustainable groundwater conditions or management, which points to the need to revise the definitions of undesirable results in the GSP. The 2027 GSP Amendment refines the SMC framework to improve consistency across sustainability indicators, address DWR's recommendations from their 2022 GSP review, and implement an integrated basin management approach in which groundwater levels, extraction, and ISW depletion are evaluated collectively to achieve common sustainability objectives.

4.1 Sustainability Goal

The SMC were defined during the GSP development process to achieve the sustainability goal. The 2022 GSP sustainability goal is the following:

- Implement the SGMA, which requires the management and use of groundwater in the Basin in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.
- Provide a safe and reliable groundwater supply that meets the current and future needs of beneficial users.
- Support groundwater sustainability measures and projects that enhance a sustainable and reliable groundwater supply in the Basin, utilizing integrated water management principles by:
    - Safeguarding water supply availability for public health and welfare
    - Maintaining and enhancing groundwater availability for municipal, private, and industrial users and uses
    - Maintaining and enhancing groundwater contributions to streamflow, where beneficial users are dependent upon such contributions (fish, frogs, salamanders, dragonflies, etc.)

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  - Maintaining and enhancing groundwater levels that support GDEs
  - Maintaining and enhancing groundwater quality for existing and future beneficial uses
- Provide for operational flexibility within the Basin by supporting a drought supply reserve that takes into account future climate change.
- Plan and implement projects and activities to achieve sustainability that are cost effective and do not place undue financial hardship on the SMGWA, its cooperating agencies, or basin stakeholders. A cost-benefit analysis, taking into consideration financial, social, environmental, and adverse consequences, may be conducted to evaluate whether a project or activity results in undue financial hardship.

Measures that the SMGWA member agencies will take to achieve Basin sustainability are focused on increasing Lompico aquifer groundwater levels in the Mount Hermon/South Scotts Valley area. The most immediate action will be to expand conjunctive use of surface water and groundwater using existing infrastructure. It is likely that this measure will be followed by development of infrastructure to gain access to SLVWD entitlement of 313 acre-feet per year (AFY) of Loch Lomond water for further conjunctive use opportunities. Combining the 2 projects would potentially provide for a long-term average of 540 AFY of in-lieu recharge by SLVWD and SVWD resting their extraction wells during the wet seasons when surface water is available for conjunctive use. Groundwater modeling has demonstrated the combined projects will raise Mount Hermon/South Scotts Valley area Lompico aquifer groundwater levels by 20 to 50 feet and Monterey Formation levels by 20 feet. Additionally, resting SVWD wells extracting from the Butano aquifer may raise Butano aquifer groundwater levels by 20 to 50 feet in the central to northern Scotts Valley areas. Anticipated increases in groundwater levels from 540 AFY of conjunctive use enables the SMGWA to meet its long-term measurable objectives for chronic lowering of groundwater levels, depletion of interconnected surface water, and reduction of groundwater in storage, while having no impact on groundwater quality.

Larger, more costly projects using either treated surface water or purified wastewater imported from outside the Basin, will be evaluated during the first 5 years of GSP implementation. The larger projects will provide cooperating agencies additional water supply resiliency and drought protection, beyond the level likely needed for sustainable management of groundwater in the Basin.

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4.2 Sustainable Management Criteria Framework

To evaluate progress toward sustainability, SMC were established for each sustainability indicator in accordance with SGMA requirements. The SMC consist of representative monitoring points (RMPs), minimum thresholds (MTs), measurable objectives (MOs), interim milestones (IMs), and undesirable results (URs):

- MT: Condition at which significant and unreasonable impacts may occur
- MO: Desired condition that provides operational flexibility above the MT
- IM: Incremental targets to achieve the MO by the sustainability horizon
- UR: Significant and unreasonable adverse impacts, defined qualitatively and quantified through exceedance of MTs

The SMC adopted in the 2022 GSP are useful metrics for tracking basin conditions and are summarized in Table 4-1. However, the metrics did not fully align with revisions needed to address RCAs for the Plan identified by DWR and in some cases did not provide enough operational flexibility to adaptively manage groundwater conditions.

SMC refinements included in the 2027 GSP Amendment address data gaps, improve representative monitoring, and align indicators within an integrated SMC framework. With the 2027 GSP Amendment, groundwater levels continue to serve as a primary indicator of aquifer response to pumping and recharge, groundwater extraction and storage conditions provide a basin-scale constraint on water use, and ISW depletion is evaluated as a function of broader groundwater conditions rather than localized measurements alone. This integrated framework reflects the conceptual understanding that changes in groundwater levels and storage ultimately control the magnitude and timing of groundwater contributions to surface water systems.

The sections below describe the current conditions, evaluate progress toward achieving SMC, and describe the amendments being made to the GSP for each sustainability indicator. Additional information about the monitoring networks is provided in Section 7.

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Table 4-1. 2022 GSP Sustainable Management Criteria Summary

Indicator	Measurement	Minimum Threshold	Measurable Objective	Interim Milestones	Undesirable Result
Chronic lowering of groundwater levels	Groundwater elevation measured in RMP wells	Average groundwater elevation of the 5 lowest historical measured values in each RMP	*Santa Margarita aquifer:* seasonal low groundwater levels in each RMP well in WY2004 *Monterey Formation, Lompico and Butano aquifer:* average annual minimum groundwater elevation from 2016 to 2020 in each RMP well plus the projected increase in seasonal low groundwater elevations from the 540 AFY conjunctive use project	*Santa Margarita aquifer:* seasonal low groundwater levels in each RMP well in WY2004 *Monterey Formation, Lompico and Butano aquifer:* simulated groundwater elevations projected from implementation of a 540 AFY conjunctive use project	Groundwater elevation in any RMP falls below the minimum threshold in 2 or more consecutive non-drought years and is not caused by emergency operational issues or extended droughts
Reduction in groundwater storage	Metered and estimated municipal, small water system, non-de minimis, and de minimis groundwater extraction	*Santa Margarita aquifer*: Average projected groundwater extraction from 2030 to 2049 *Monterey Formation, Lompico and Butano aquifer:* Average projected groundwater extraction from 2022-2072, plus 5%	Average groundwater pumping projected in a model simulation incorporating a 540 AFY conjunctive use project in the Mount Hermon / South Scotts Valley area	Equivalent to minimum thresholds prior to 2027 and equivalent to measurable objectives from 2027 onward	Groundwater extraction volumes exceed minimum thresholds in 1 or multiple principal aquifers
Degraded groundwater quality	Concentrations of chemical constituent of concern in RMP wells	State drinking water standards, except for nitrate, which is half the State drinking water standard	Average concentration for each constituent of concern at each RMP between January 2010 and December 2019	Identical to measurable objectives	Minimum thresholds are exceeded at RMPs when: • Minimum thresholds have not been exceeded prior to SMGWA approved project(s) or management action(s) • An immediate resampling confirms the exceedance • The exceedance is caused by SMGWA approved project(s) or management action(s)
Depletion of interconnected surface water	Groundwater elevations measured in RMP wells as a proxy	Average groundwater elevation of the 5 lowest measured values in each RMP	Seasonal low groundwater levels in each RMP from the fall of WY2004	Identical to measurable objectives	The groundwater elevation in any RMP falls below the minimum threshold in 2 or more consecutive non-drought years and is not caused by emergency operational issues or extended droughts

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4.3 Chronic Lowering of Groundwater Levels

Chronic lowering of groundwater levels is monitored and evaluated using RMP wells in the principal aquifers and Monterey Formation.

4.3.1 Current Groundwater Level Conditions

The Basin's current groundwater level conditions are sustainable since they are not believed to be causing significant and unreasonable impacts to beneficial users or uses of groundwater. The evaluation period includes a significant drought, coupled with increased municipal pumping due to damage of SLVWD's surface water infrastructure from the August 2020 CZU Lightning Complex wildfire. Despite these operational challenges, groundwater levels are above historical low levels and recovering in the areas with the largest historical declines, and stable in other areas without as much annual fluctuation.

The following hydrographs support the groundwater level analysis in this evaluation:

- Appendix 4A – Groundwater Level Sustainability Indicator RMPs in the 2022 GSP
- Appendix 4B – ISW Sustainability Indicator RMPs in the 2022 GSP
- Appendix 4C – Non-RMP Groundwater Level Monitoring Wells in the 2022 GSP
- Appendix 4D – Groundwater Levels and ISW Sustainability Indicator RMPs in the 2027 GSP Amendment

4.3.1.1 Santa Margarita Aquifer

Groundwater levels fluctuate with climate in the highly permeable Santa Margarita aquifer. Currently, groundwater levels in Santa Margarita RMPs are stable and above their historical low levels observed in 1990-1994 and 2014-2016 at the ends of droughts. Since land use plans and topography limit rural development, future groundwater level trends are not expected to vary much from historical conditions.

4.3.1.2 Lompico Aquifer

Groundwater levels in the Lompico aquifer are stable or increasing as the aquifer continues to recover from historical low levels. The most concentrated usage of the Lompico aquifer is in the southern Scotts Valley and Pasatiempo areas of the Basin. Current groundwater levels are about 50 feet higher than historical low levels and rising most years.

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4.3.1.3 Butano Aquifer

Groundwater level monitoring in the Butano Aquifer is somewhat limited with only 2 dedicated monitoring wells in Northern Scotts Valley Subarea. These monitoring wells have relatively stable groundwater levels since monitoring began in early 2012.

4.3.1.4 Monterey Formation

There is also little historical monitoring of the Monterey Formation since it is not used as a primary water supply, though a long-term record in southern Scotts Valley at former SVWD extraction well #9, shows a recovering groundwater level trend similar to other Lompico aquifer wells in the area. More recent dedicated monitoring wells added to the network throughout the Basin have stable groundwater levels over the last few years in areas with concentrated domestic wells.

4.3.2 Chronic Lowering of Groundwater Levels SMC Evaluation

The objective of SMGWA and its member agencies is to maintain groundwater levels above the MTs to avoid significant and unreasonable impacts and near MOs to allow for operational flexibility to manage droughts or other unplanned changes to water use. Most of the RMPs are achieving their MOs and are above the MTs indicating that the Basin is being managed sustainably.

There are 12 RMPs defined in the 2022 GSP that are used to evaluate chronic lowering of groundwater levels relative to SMC. Table 4-2 shows the annual minimum groundwater elevation since WY2021 at each RMP compared to the SMC. Of the 12 RMPs, 8 currently meet their MO and 1 meets its 2027 IM. With only limited exceptions described below, Table 4-2 shows that groundwater levels have generally increased since WY2021 and the number of wells meeting their MOs has increased from 4 to 8 during the evaluation period.

There are 2 RMPs that have not yet met their 2027 IM, and 1 RMP that experienced an MT exceedance in WY2025. These wells are discussed in more detail below:

- SLVWD Quail MW-B: This unconfined Santa Margarita aquifer well has a relatively stable long-term groundwater level trend since the early 2000s. Groundwater levels increase in wet years and decrease in dry years within a 15-foot range. Groundwater levels remain well above the MT. The Santa Margarita aquifer in the Quail Hollow wellfield is used conjunctively with surface water sources to provide municipal water supply. Progress toward the MO has been hampered in recent years by limited surface water delivery capacity to offset groundwater demand in the Quail Hollow wellfield due to the loss of the Peavine Pipeline in the CZU Lightning Complex wildfire. The pipeline

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is currently being reconstructed, so a more robust conjunctive use program is expected in the near future.

- SVWD #15 Monitoring Well: This confined Lompico/Butano aquifer well is influenced by nearby active municipal pumping, making it difficult to obtain representative static groundwater level measurements. The WY2025 level was at the MT, but is not thought to be representative of static conditions due to pumping of the nearby Orchard well in WY2025. In addition, SVWD Sucinto, which is a new groundwater supply well, has been constructed on the same property as SVWD #15 making it more unsuitable as an RMP. This well is being removed as an RMP in the 2027 GSP Amendment because its data are not reliable for Basin management. SVWD has other Lompico and Butano monitoring wells that are better monitoring locations and SMGWA plans to install an additional Butano monitoring well, potentially with DWR's Technical Support Services (TSS) support, to improve monitoring of the Butano aquifer (Section 7.1.3).
- SVWD Canham Well: This confined Butano aquifer well fluctuates very little, though it does have a slight decreasing groundwater level trend of about a total of 1 foot over the evaluation period. This trend is potentially influenced by increased extraction from the Butano aquifer over the past decade which may have marginally lowered the aquifer's static level. However, the groundwater level remains over 13 feet higher than its MT based on historical low measurements shortly after the well was installed in 2012. The groundwater level MO is based on implementation of a conjunctive use project that may not benefit this area of the aquifer to the degree predicted in the Basin Model. The MO is being revised in the 2027 GSP Amendment to align with management objectives in this area of the Basin.

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Table 4-2. Groundwater Elevations Compared to Chronic Lowering of Groundwater Levels Sustainable Management Criteria, WY2021-2025

Aquifer	Well Name		Annual Minimum Groundwater Elevation (feet amsl)						
		MT	2027 IM	MO	WY2021*	WY2022	WY2023	WY2024	WY2025
Water Year Type					Critically Dry	Normal	Wet	Normal	Normal
Santa Margarita	SLVWD Quail MW-B	449	472	472	455.8	451.8	451.0	458.4	458.6
	SLVWD Olympia #3	302	307	307	335.9	330.1	327.3	354.5	359.7
	SLVWD Pasatiempo MW-2	498	514	514	512.7	516.3	516.2	528.1	523.6
	SVWD TW-18	462	471	471	471.8	470.9	470.4	470.1	471.2
Monterey	SVWD #9	301	340	358	351.0	354.0	356.0	360.6	365.1
Lompico	SLVWD Pasatiempo MW-1	334	339	372	340.4	335.4	337.0	343.9	361.5
	SVWD #10	286	302	322	330.3	338.1	338.7	337.2	342.0
	SVWD #11A	288	299	317	308.0	312.6	320.2	324.7	333.7
	SVWD TW-19	314	357	376	370.4	370.0	378.4	378.1	389.3
Lompico/Butano	SVWD #15 Monitoring Well	291	310	333	307.1	307.9	306.5	307.2	290.6
Butano	SVWD Stonewood Well	836	844	844	845.0	845.8	847.6	847.7	847.4
	SVWD Canham Well	427	447	467	441.7	441.2	440.7	441.0	440.4

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* Damage to SLVWD surface water intakes caused by the August 2020 CZU Lightning Complex wildfire caused groundwater extraction to increase and groundwater levels to decline in some SLVWD wells.
amsl = above mean sea level

Minimum threshold not met
Minimum threshold met but 2027 interim milestone and measurable objective not met
Minimum threshold and 2027 interim milestone met, but measurable objective not met
Measurable objective met

4.3.3 Chronic Lowering of Groundwater Levels SMC Amendment

Refinements to the groundwater level SMC in the 2027 GSP Amendment focus on increasing the number of RMPs throughout the Basin and aligning SMC targets with representative historical conditions. MTs are being standardized based on groundwater levels from fall 2013 to develop a pre-SGMA baseline that is above historic lows in wells, while MOs are being redefined based on higher groundwater levels observed at the conclusion of a wetter period in 2006. The UR definition is also being revised to reflect basin-scale conditions, such that URs are associated with sustained exceedances across multiple monitoring locations rather than isolated or short-term exceedances. This refinement better aligns the SMC framework with the Basin's hydrogeologic variability and operational flexibility needs, and addresses DWR's RCA #2 to remove the drought conditions exclusion.

The groundwater level SMC are being amended, as summarized in Table 4-3, to address the following:

1. Adding 11 and removing 2 RMPs from the monitoring network, discussed further in Section 7.1.4.
2. Classifying RMP wells within the Unconfined and Confined aquifer groups to better reflect the rapid response to hydrology in the unconfined system and the longer timeframe over which recharge occurs in the confined system.
3. Revising the UR definition to address RCA #2 and provide an approach better suited to adaptive management of the Basin. Qualitatively, the Basin will be experiencing URs if groundwater elevations fall below MTs in multiple locations for 2 consecutive years. Temporary groundwater levels dropping below the MT, or single locations with MT exceedances, can generally be managed by shifting operations to reduce pumping in affected areas. Quantitatively, URs will occur if either of the following conditions are observed:
    - Unconfined aquifer group: Fall groundwater elevations in 3 or more RMPs are below the MT in 2 consecutive years.
    - Confined aquifer group: Fall groundwater elevations in 3 or more RMPs are below the MT in 2 consecutive years.
4. The MTs, MOs, and IMs are being amended as described below:
    - The 2022 GSP calculated the MT using the average groundwater elevation of the 5 lowest historical measured values in each RMP. The amended MT is the measured fall 2013 groundwater level. While this represents a relatively low groundwater level in many areas of the Basin, these groundwater levels are notably higher than the MTs used in the 2022 GSP; this results in increasing the MT elevations in several wells as

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shown in Table 4-1. If a measured value is not available for an RMP in fall 2013, then the level is selected based on a similar nearby well, discussed below, or from the historical Basin Model simulation. Establishing MTs at the fall 2013 levels across the Basin provides a consistent management target to prevent significant and unreasonable impacts from occurring since the passage of SGMA. Using the fall 2013 groundwater elevations as an MT also allows for addressing depletions of Interconnected Surface Water as discussed in Section 4.5.3 below.

- The 2022 GSP MO is established using different methods for the unconfined Santa Margarita aquifer and confined Monterey Formation, Lompico and Butano aquifer RMPs. The Santa Margarita MOs were generally associated with the seasonal low groundwater levels in each RMP well in WY2004. The confined Monterey Formation, Lompico and Butano aquifer MOs used the average annual minimum groundwater elevation from 2016 to 2020 in each RMP well, plus the projected increase in seasonal low groundwater elevations from the 540 AFY conjunctive use project model simulations. The amended MO is using the groundwater level from the fall 2006 timeframe, which was the conclusion of 2 wet years following a 3-year period of relatively average climate, resulting in relatively high groundwater levels. This approach establishes MOs at observed historical levels that would not have resulted in significant and unreasonable undesirable results, rather than rely on modeled projections based on uncertain climate and project scenarios as was done for the 2022 GSP. Using the fall 2006 groundwater elevations as an MO also aligns with ISW depletion SMC amendments, discussed in Section 4.5.3 below.
- IMs for 2032 and 2037 are being amended to provide a managed trajectory toward sustainability from current conditions to achieve the MO by 2042. For wells with groundwater levels below the MO, the 2032 IM is one-third of the difference and 2037 IM is two-thirds of the difference between the current conditions and MO.

5. Some amended MT/MO values are selected using other criteria if the measured values or GSP Model did not provide reasonable targets:
   - SLVWD Pasatiempo #3 MT was not monitored in fall 2013 so the MT is set using groundwater level trend matching with nearby well SVWD #10, as shown on Figure 4-1. The groundwater elevation at SLVWD Pasatiempo #3 is typically about 40 feet higher than SVWD #10, so its MT is being set accordingly.
   - SMGWA-6 Quail Hollow MT was established at 325 feet amsl to ensure that it is above the nearby interconnected streambed elevation of the San Lorenzo River, which is below 300 feet amsl. This level is also above the historical low of 308 feet amsl measured in the late 1980s in SLVWD Quail #8, an inactive extraction well installed on the same property shown on Figure 4-2.

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- SMGWA-8 Randall Morgan Sandhills Preserve MT/MO was established based on nearby SVWD #9 trends as shown on Figure 4-3. Both wells are completed in the Monterey Formation.

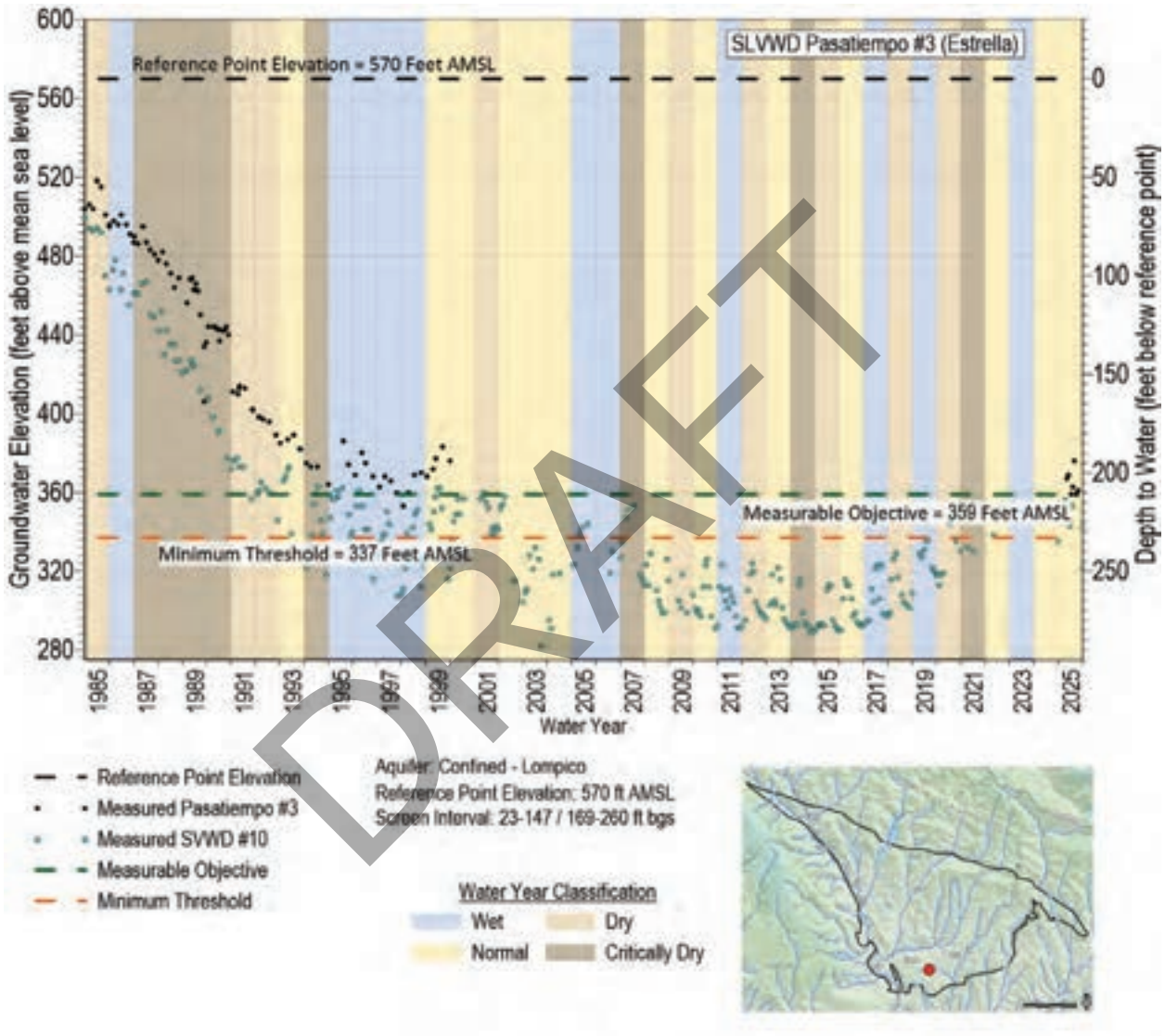
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Table 4-3. Summary of Revised SMC in Amended RMP Networks

Aquifer Group	Aquifer	Well Name	RMP Status	2022 GSP MT (ft amsl)	2022 GSP MO (ft amsl)	Amended MT (ft amsl)	Amended MO (ft amsl)	MT Difference (feet)	MO Difference (feet)
Unconfined	Santa Margarita	SLVWD Olympia #1	New RMP	NA	NA	349	359	NA	NA
	Santa Margarita	SLVWD Olympia #3	RMP Removed	302	307	NA	NA	NA	NA
	Santa Margarita	SLVWD Pasatiempo MW-2	Existing RMP	498	514	516	528	18	14
	Santa Margarita	SLVWD Quail MW-A	Existing RMP (ISW)	413	416	413	417	0	1
	Santa Margarita	SLVWD Quail MW-B	Existing RMP	449	472	457	470	8	-2
	Santa Margarita	SMGWA-2 Bean Creek	New RMP	NA	NA	392	396	NA	NA
	Santa Margarita	SMGWA-3 Ruins Creek	New RMP	NA	NA	387	393	NA	NA
	Santa Margarita	SMGWA-4 Nelson Road	New RMP	NA	NA	345	349	NA	NA
	Santa Margarita	SMGWA-5 Bahr Drive	New RMP	NA	NA	515	528	NA	NA
	Santa Margarita	SMGWA-6 Quail Hollow	New RMP	NA	NA	325	360	NA	NA
	Santa Margarita	SVWD AB303 MW-1	New RMP	NA	NA	478	488	NA	NA
	Santa Margarita	SVWD SV4-MW	Existing RMP (ISW)	381	387	399	408	14	21
	Santa Margarita	SVWD TW-18	Existing RMP	462	471	469	474	7	3
Confined	Monterey	SMGWA-8 Randall Morgan Sandhills Preserve	New RMP	NA	NA	320	325	NA	NA
	Monterey	SVWD #9	Existing RMP	301	358	340	346	39	-12
	Lompico	SLVWD Pasatiempo #3	New RMP	NA	NA	337	359	NA	NA
	Lompico	SLVWD Pasatiempo MW-1	Existing RMP	334	372	337	372	3	0
	Lompico	SVWD #10	Existing RMP	286	322	286	335	0	13
	Lompico	SVWD #11A	Existing RMP	288	317	294	317	6	0
	Lompico	SVWD AB303 MW-2	New RMP	NA	NA	387	400	NA	NA
	Lompico	SVWD AB303 MW-3A	New RMP	NA	NA	354	361	NA	NA
	Lompico	SVWD TW-19	Existing RMP	314	376	337	348	23	-28
	Lompico/Butano	SVWD #15 Monitoring Well	RMP Removed	291	333	NA	NA	NA	NA
	Butano	SVWD Canham Well	Existing RMP	427	467	433	451	6	-16
	Butano	SVWD Stonewood Well	Existing RMP	836	844	841	845	5	1

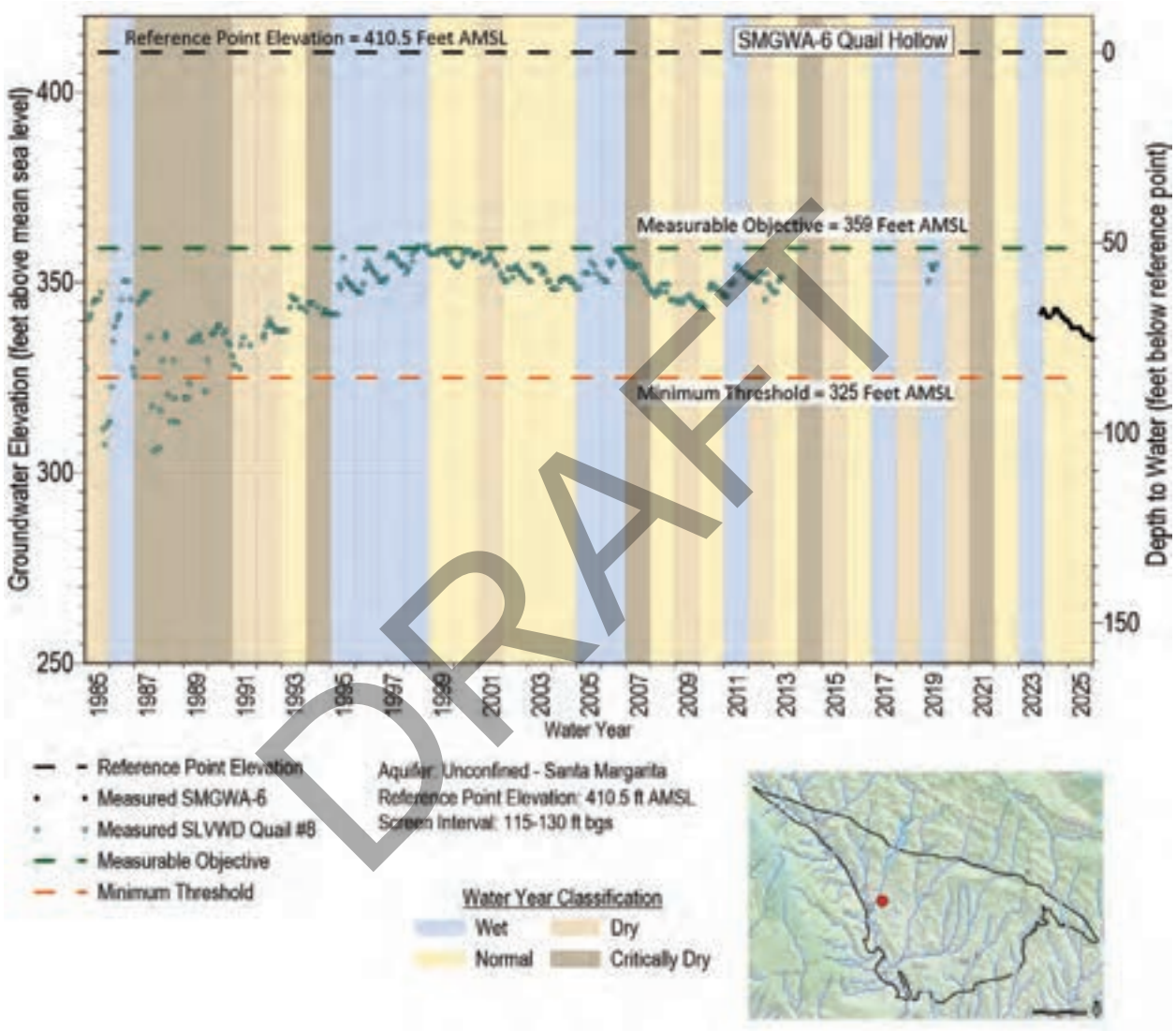
NA – not applicable since the well is either being added or removed from the network

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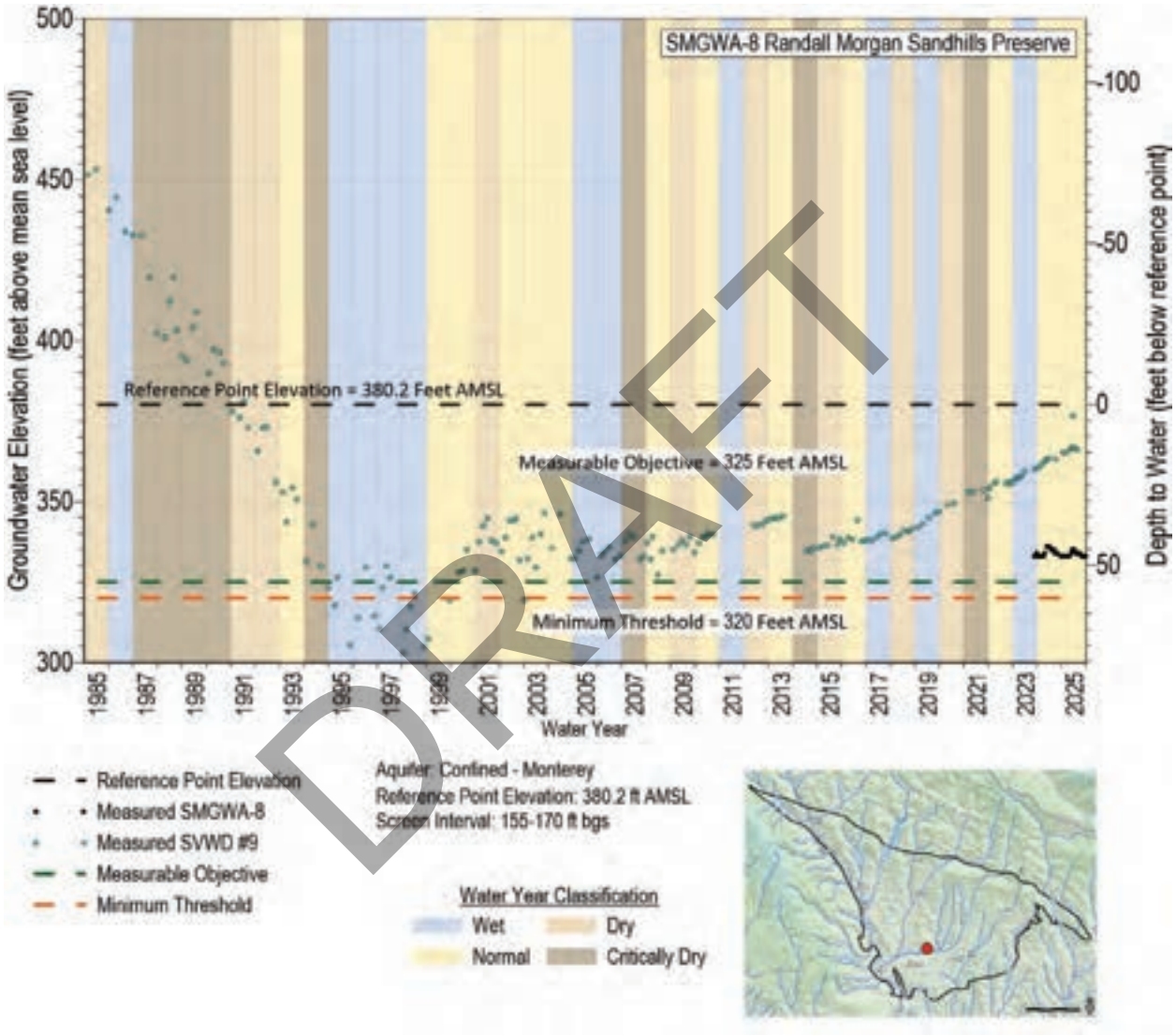
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Figure 4-1. Hydrograph of SLVWD Pasatiempo #3 and SVWD #10 for SMC Development



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Figure 4-2. Hydrograph of SMGWA-6 and SLVWD Quail #8 for SMC Development



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Figure 4-3. Hydrograph of SMGWA-8 and SVWD #9 for SMC Development

4.4 Reduction of Groundwater in Storage

Between the 1970s and early 2000s, groundwater storage steadily declined, primarily due to over-pumping of the Lompico aquifer in the Mount Hermon / South Scotts Valley Subarea. Groundwater extraction over the past 3 years has been the lowest recorded since reliable measurements began in the 1980s. As a result of reduced extraction, long-term reduction of groundwater in storage is no longer occurring. A timeseries chart of historical groundwater extraction (green bars) and Basin Model change in storage (gray bars) is shown on Figure 4-4.

The reduction of groundwater in storage SMC are annual groundwater extraction volumes for the principal aquifers and Monterey Formation. Groundwater sustainable yield estimates are developed using the Basin Model baseline projection that includes climate change. The MTs represent groundwater extraction volumes predicted without implementation of additional projects or management actions, and the MOs represent groundwater extraction volumes calculated assuming implementation of a hypothetical 540 AFY conjunctive use project. The 2027 IM is equal to the MT through 2027 and thereafter are equal to the MO through 2042.

The volume of groundwater stored in the unconfined and highly conductive Santa Margarita aquifer is strongly correlated with precipitation and streamflow. Groundwater levels and groundwater storage in this aquifer decrease during dry years but rise quickly during wet years. The low permeability of the Monterey Formation mutes groundwater level responses due to climate, despite significant surface exposure. The Lompico and Butano aquifers are generally confined and thus annual changes in storage are less pronounced and are more associated with groundwater extraction than precipitation. Direct recharge from precipitation and streamflow occurs in all aquifers where they are exposed at the ground surface.

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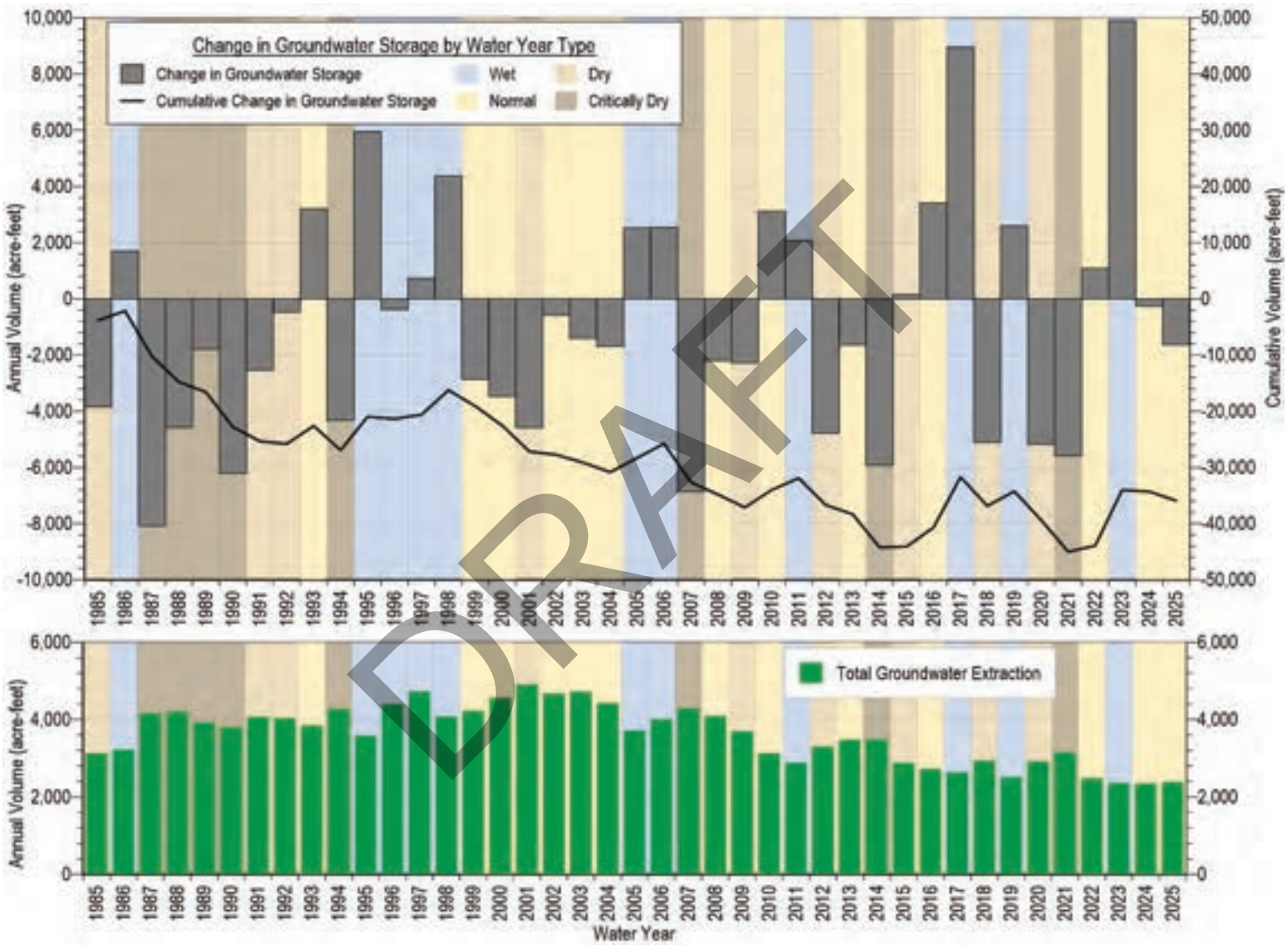


Figure 4-4. Change in Groundwater Storage and Extraction, WY1985-2025

4.4.1 Current Groundwater in Storage Conditions

Following abnormally high groundwater extraction in WY2021 due to emergency conditions associated with the 2020 CZU Lightning Complex wildfire, groundwater extraction has decreased dramatically. The total groundwater extraction volume from the principal aquifers and Monterey Formation varies between 2,316 and 2,455 AFY over the past 4 years (Table 4-4). Groundwater extraction has been consistent since WY2023, with all 3 years ranking among the lowest groundwater volume extracted since WY1985 when reliable record keeping began (Figure 4-4). Table 4-4 summarizes the annual extraction volumes and the SMC for each aquifer.

Table 4-4. Groundwater Extractions Compared to Reduction in Groundwater in Storage Sustainable Management Criteria, WY2021-2025

Aquifer	Groundwater Extraction (AFY)						
	MT*	MO	WY2021	WY2022	WY2023	WY2024	WY2025
Santa Margarita	850	615	1,250	683	612	611	578
Monterey	140	130	92	91	92	92	91
Lompico**	1,290	1,000	1,510	1,258	1,269	1,269	1,336
Butano**	540	380	268	423	356	345	347
TOTAL	2,820	2,125	3,120	2,455	2,330	2,316	2,352

*The first interim milestone in 2027 is equal to the minimum threshold.
**For the SVWD extraction well screened in both Lompico and Butano aquifers, it is estimated that 40% of the water is from the Lompico aquifer and 60% is from the Butano aquifer.

Minimum threshold not met
Minimum threshold and 2027 interim milestone met, but measurable objective not met
Measurable objective met

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4.4.2 Groundwater in Storage SMC Evaluation

Groundwater extraction has been decreasing steadily, but there have been some exceedances of the aquifer-specific MTs during the evaluation period due to emergency situations and operational challenges. As defined in the GSP, any exceedance of the MT indicates an UR. However, as explained below, the conditions were caused by short-term operations, are not expected to continue, and are addressed with adaptive management. Groundwater extracted by individual wells is summarized below and tabulated in Section 6.3.

4.4.2.1 Santa Margarita Groundwater Extraction

Santa Margarita extraction temporarily increased in WY2021 to 1,250 acre-feet (AF) due to emergency conditions and has decreased in subsequent years. Over the past 3 years, extraction has met the MO of 615 AFY, ranging between 578 AFY and 612 AFY. About 72% of Santa Margarita extraction is by SLVWD for municipal supply and the other Santa Margarita aquifer users extract similar volumes year-to-year, so successfully meeting the SMC is attributed to SLVWD's conjunctive management of groundwater and surface water.

The CZU Lightning Complex wildfire in August 2020 caused extensive damage to SLVWD's water supply infrastructure, including the destruction of multiple surface water intake structures and approximately 7.5 miles of raw water pipelines that convey supplies to the treatment system. As a result, significant portions of the District's surface water diversion capacity—particularly in the North System—were rendered inoperable, necessitating a shift in operations toward increased reliance on groundwater sources.

In WY2021, groundwater extraction from the Santa Margarita and Lompico aquifers exceeded MTs due to emergency pumping required to replace surface water supplies that were unavailable due to wildfire-related damage. The increased reliance on groundwater was a temporary operational response to maintain water service during post-fire recovery.

Since the wildfire, SLVWD has worked to restore critical surface water infrastructure, including the planning and reconstruction of key pipelines and intake facilities needed to reestablish reliable diversions. The District has also utilized emergency interties to transfer treated surface water between its systems, reducing dependence on groundwater. These recovery efforts highlight the effectiveness of SLVWD's conjunctive use strategy, which integrates surface water and groundwater supplies to maintain reliability under both emergency and long-term conditions.

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4.4.2.2 Monterey Formation Extraction

Monterey Formation pumping is consistent year-to-year at around 92 AFY, which meets the MO of 130 AF and MT of 140 AF. Approximately 95% of recent Monterey Formation extraction is for domestic supply. There are currently only 2 metered small water systems in the Monterey Formation—Love Creek Heights and Moon Meadows—which collectively pump about 5 AFY.

4.4.2.3 Lompico and Butano Aquifer Extraction

The Lompico and Butano aquifers are primarily pumped by the Basin's 3 largest public water systems—SVWD, SLVWD, and, to a lesser extent by MHA—which collectively account for 90% of groundwater extraction from these aquifers. Since the 1990s, SVWD has operated wells screened across both aquifers in the North of Scotts Valley subarea and plans to increase

extraction from these multi-aquifer wells through the addition of the recently constructed Grace Way and Sucinto supply wells, the latter of which replaced SVWD well #3B.

With exception of emergency operations in WY2021, total pumping in the Lompico and Butano aquifers has been relatively consistent over time totaling between 1,614 and 1,683 AFY, which is less than the combined MTs for these aquifers of 1,830 AF, and more than the combined MO of 1,380 AF. Achieving the SMC for groundwater extraction in the Lompico and Butano aquifers largely depends on operations by the 3 largest public water systems.

The Lompico aquifer has little margin for operational flexibility between average annual extraction and the SMC. Excluding 1,510 AF influenced by emergency use of the Lompico aquifer during the CZU Lightning Complex wildfire in WY2021, the Lompico aquifer has relatively consistent annual extraction of 1,258 to 1,336 AFY since WY2022. Average annual extraction is close to the MT of 1,290 AF every year. The MT was exceeded by 46 AF in WY2025 due to shifting operations for required well maintenance, discussed further below. The MO of 1,000 AFY has not been achieved in the Lompico aquifer.

There is more margin for operational flexibility in extraction from the Butano aquifer, which ranged from 268 to 423 AFY over the evaluation period. These volumes are consistently below the MT of 540 AF. Butano aquifer extraction is also routinely below the MO of 380 AF, except for in WY2022 when 423 AF was extracted due to SVWD Orchard screened in both the Lompico and Butano aquifers being pumped more than usual.

The distribution of Lompico and Butano aquifer extraction is uncertain in the SVWD supply wells screened in both aquifers like SVWD's Orchard well, which is the highest producing supply well in the Basin. SVWD Orchard accounts for about 38% of the extraction from the Lompico/Butano aquifers. For Annual Reporting, the volume from SVWD Orchard is estimated as 40% from the Lompico aquifer and 60% from the Butano aquifer.

Groundwater extraction in WY2025 illustrates the influence of Lompico/Butano aquifer pumping on the SMC evaluation. During WY2025, SVWD increased pumping from Lompico aquifer well #11B while the Orchard well was taken offline for well maintenance. As a result, estimated groundwater extraction from the Lompico aquifer exceeded the MT by 46 AF. As SVWD brings its wells into service that extract from both the Lompico and Butano aquifers, this condition is not expected to persist.

4.4.3 Groundwater in Storage SMC Amendment

The 2027 GSP Amendment refines the groundwater in storage SMC to reflect updated extraction volumes, changes in water supply infrastructure, and improved understanding of aquifer

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interactions. The evaluation approach is also being aligned with groundwater level and ISW indicators to provide a more integrated assessment of basin response to extraction.

Changes are being made to the reduction of groundwater in storage SMC in the 2027 GSP Amendment:

1. SMC will no longer be represented by 4 aquifers but will be consolidated into 2 aquifer groups. The unconfined aquifer group consists of the Santa Margarita Formation. The confined aquifer group consists of the Monterey, Lompico, and Butano formations.
2. The MO is being amended to coincide with the model-estimated sustainable yield of 700 AFY in the unconfined aquifer group and 1,900 AFY in the confined aquifer group, totaling 2,600 AF. Due to known historical multi-year dry periods, the MO will be evaluated using a 5-year rolling average calculation.
3. The MT is being amended to allow for greater groundwater usage during dry years. The MT is set at 750 AFY in the unconfined aquifer group and 2,250 AFY in the confined aquifer group (3,000 AFY Basin total). To account for multi-year dry periods, the MT will be evaluated using a 5-year rolling forward average calculation. While the estimated sustainable yield of the Basin is 2,600 AFY, SMGWA recognizes that conjunctive use operations will necessitate greater groundwater usage in dry years and more surface water usage in wet years. Conjunctive use programs will be defined as part of GSP implementation, so the maximum amount of groundwater usage in dry years is yet to be determined. As an estimate for high groundwater usage under future conjunctive use operations, SMGWA reviewed groundwater usage in the 5 years leading up to the passage of SGMA (WY2010 through 2014). This period represents a greater than 28% decrease from the Basin's peak groundwater extraction in the 5-year period from WY2001 through 2005 (3,210 AFY compared to 4,492 AFY at peak extraction). The proposed MT values are lower than the extraction values observed in WY2010 through 2014, so they represent improved conditions since the passage of SGMA. In conjunction with SMC for groundwater elevations and interconnected surface water, these values would generally result in stream baseflows that are supportive of the target baseflows in the City of Santa Cruz HCP (described in Section 4.6.3 below); thus, SMGWA believes that these MTs are protective of beneficial uses and users. As project proponents develop future conjunctive use programs, they will be expected to demonstrate (e.g., showing that sufficient surface water will be made available in wet years to offset increased groundwater extraction in dry years) that operations will result in meeting the Basin MO.

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4.5 Degraded Groundwater Quality

Groundwater in the Basin is generally of good quality and meets primary drinking water standards. However, the 2022 GSP identified both naturally occurring and anthropogenic groundwater quality COCs that are present in some areas. Iron and manganese are the only naturally occurring groundwater quality constituents that routinely exceed drinking water standards. Naturally occurring arsenic and total dissolved solids (TDS) occasionally approach or slightly exceed drinking water standards in a few wells. Anthropogenic groundwater quality constituents that are occasionally detected, though at concentrations less than drinking water standards, are nitrate from septic system leaching and organic point-source contaminants originating from several former industrial sites.

4.5.1 Current Degraded Groundwater Quality Conditions

The MTs and WY2025 maximum concentrations for degraded water quality RMPs are summarized in Table 4-5. Chemographs showing groundwater quality data over time for wells with constituents that have increasing trends or are close to MTs are shown in Appendix 4E. Groundwater quality has not changed much year-to-year and is best presented in the annual summary format (Table 4-5); other results not shown in this evaluation are documented in similar format in the WY2021 through WY2024 Annual Reports (SMGWA, 2022 through 2025).

Consistent with past years, the only COCs found in WY2025 at concentrations higher than the MTs are iron and manganese. Iron and manganese are naturally elevated in the Lompico aquifer and in parts of the Santa Margarita aquifer, such as the Olympia wellfield (Table 4-5). Iron and manganese concentrations greater than the MTs do not constitute undesirable results because they are naturally occurring, are not being degraded by groundwater use, and are not impacting beneficial use of groundwater. SLVWD and SVWD routinely treat or blend raw groundwater to meet state drinking water standards for iron and manganese.

Table 4-6 lists the WY2025 maximum concentrations relative to MOs for iron and manganese in wells that exceed MTs. In WY2025, iron concentrations met MOs in 4 of 5 wells, with the exception being SLVWD Pasatiempo #7. Two wells meet the MO for manganese and 3 wells—SLVWD Pasatiempo #7, SVWD #10A, and SVWD #11A—do not.

TDS, chloride, nitrate, and chlorobenzene do not meet MOs in some wells in WY2025 (Table 4-5). Given that the MOs are based on long-term average concentrations for each well, and for chlorobenzene, the laboratory reporting limit, it is expected that some wells will not meet their MOs by a small amount in a typical year based on their 2022 GSP SMC definitions.

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Arsenic in groundwater is naturally occurring at or near the Maximum Contaminant Level (MCL) and MT in some areas of the Basin. SVWD and SLVWD blend the water extracted from wells with higher arsenic concentrations with water from sources with lower arsenic concentrations to ensure drinking water quality standards are met. SVWD #11B is the only RMP that regularly approaches the arsenic MCL and MT of 0.01 milligrams per Liter (mg/L) and in WY2025 nearly exceeded the MT/MCL with a reported concentration of 0.0098 mg/L. The arsenic concentration in this well has increased for 3 consecutive years since WY2023, perhaps related to its increased extraction discussed in Section 4.4.2.3 and tabulated in Section 6.3. Arsenic was detected in 3 other RMPs in WY2024 (SLVWD Quail Hollow #5A and SVWD #11A), but concentrations were much closer to or below the MOs. There is arsenic near the MCL in SLVWD Pasatiempo #8, which was installed in December 2018 and was not made an RMP during development of the GSP because there was insufficient water quality data to make informed decisions on SMC. Samples collected from SLVWD Pasatiempo #8 in recent years are routinely around the MCL for arsenic and reached 0.0098 mg/L in WY2025 (Appendix 4E).

TDS and chloride concentrations are well below their respective MTs. TDS concentrations range from 110 to 740 mg/L in WY2025, which remains below the MT of 1,000 mg/L and chloride ranges from 7.3 to 64 mg/L, well below the MT of 250 mg/L (Table 4-5). TDS did not meet the MO in 5 of 7 sampled wells in WY2025. This reflects long-term trends in several wells in which TDS concentrations are slowly rising, such that MOs for more than half the RMPs are not met. Wells with increasing TDS trends include SLVWD Olympia #3 in the Santa Margarita aquifer, SLVWD Pasatiempo #7 and SVWD #10A in the Lompico aquifer, and SVWD Orchard well in the Lompico/Butano aquifer, as shown on the chemographs in Appendix 4E. Chloride concentrations also exceed the MO in 4 of 7 wells but are at no risk of degrading to concentrations that would impact beneficial use of groundwater.

Nitrate was only detected in WY2025 at SLVWD Quail Hollow #5A. Quail Hollow #5A is typically the only RMP with elevated nitrate between 1 and 3.5 mg/L, which is below the MT of 5 mg/L. The chemograph for this well is provided in Appendix 4E.

Occasionally chlorobenzene is detected at trace concentrations near the reporting limit at SVWD #11A located in a commercial area of Scotts Valley, including in WY2025. The MO for chlorobenzene is the laboratory reporting limit, so any detection indicates that the MO is not being met.

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Table 4-5. Groundwater Quality Compared to Sustainable Management Criteria, WY2025

Aquifer	Well Name	Concentration milligrams per Liter (mg/L)										
		TDS	Chloride	Iron	Manganese	Arsenic	Nitrate (as Nitrogen)	Methyl-tert-butyl-ether	Chlorobenzene	Trichloroethylene	Tetrachloroethylene	1,2-Dichloroethylene
Minimum Threshold		*1,000*	*250*	*0.3*	*0.05*	*0.01*	*5*	*0.013*	*0.07*	*0.005*	*0.005*	*0.07*
Santa Margarita	SLVWD Quail Hollow #5A	110	8.5	ND	ND	0.0015	2.3	ND	ND	ND	ND	ND
	SLVWD Olympia #3	740	8.9	0.30	0.150	ND	ND	ND	ND	ND	ND	ND
Monterey	SVWD Well #9	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lompico	SLVWD Pasatiempo #7	150	7.3	0.76	0.110	ND	ND	ND	ND	ND	ND	ND
	SVWD #10A	300	33	1.6	0.120	ND	ND	ND	NS	ND	ND	ND
	SVWD #11A	540	27	0.32	0.120	0.002	ND	ND	0.0009	ND	ND	ND
	SVWD #11B	360	21	0.59	0.065	0.0098	ND	ND	NS	ND	ND	ND
Lompico / Butano	SVWD Orchard Well	530	64	ND	0.0029	ND	ND	ND	NS	ND	ND	ND

ND – non-detect
NS – not sampled because well was not actively pumped for water supply or analyte was not reported

Minimum threshold not met
Minimum threshold met, but measurable objective not met (see 2022 GSP for MO)
Minimum threshold and measurable objective met, or analyte not detected (ND)

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Table 4-6. Groundwater Quality Compared to Iron and Manganese Measurable Objectives, WY2025

Aquifer	Well Name	Iron Concentration (mg/L)		Manganese Concentration (mg/L)	
		Measurable Objective	WY2025 Maximum	Measurable Objective	WY2024 Maximum
Santa Margarita	SLVWD Olympia #3	0.502	0.30	0.157	0.15
Lompico	SLVWD Pasatiempo #7	0.539	0.76	0.099	0.11
	SVWD #10A	1.51	1.6	0.099	0.12
	SVWD #11A	0.459	0.32	0.112	0.12
	SVWD #11B	0.826	0.59	0.077	0.065

Measurable objective not met
Measurable objective met

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4.5.2 Degraded Groundwater Quality SMC Evaluation

Exceedances of MTs are limited to naturally occurring constituents and are not attributable to groundwater management practices. Other constituents remain below MTs, and exceedances of MOs reflect natural variability rather than degradation. Accordingly, groundwater quality conditions do not represent significant and unreasonable impacts, and no undesirable results have occurred based on the 2022 GSP SMC definitions.

4.5.3 Degraded Groundwater Quality SMC Amendment

Revisions to groundwater quality SMC focus on tracking key indicators that are basin-wide priorities such as nitrate, TDS, and arsenic. The amendments also address DWR RCA #3 by revising the definition for URs, which now includes experiencing MT exceedances at multiple locations to ensure that the issue is at the Basin scale as opposed to being localized to a single well.

Changes to the degraded groundwater quality SMC being made in the 2027 GSP Amendment include the following:

1. Adding 6 new routinely monitored public supply wells and removing 2 inactive or destroyed supply wells from the RMPs (see Section 7.3.4).
2. Removing chloride as there is no evidence that it is a COC in the Basin. There are no observed increases in chloride concentrations and concentrations are well below the health-based primary MCL.

3. Removing iron and manganese as COCs:
    - The elevated concentrations for iron and manganese are naturally occurring and are relative to an aesthetics-based secondary MCL.
    - The SMGWA does not have the ability to manage concentrations due to naturally occurring conditions. Iron and manganese concentrations are being managed by water suppliers prior to delivering to consumers to ensure drinking water standards are met.
4. Removing Volatile Organic Compounds (VOCs) from the list of COCs with established SMC:
    - VOCs are rarely detected and when they are found, are at low concentrations well below the MCLs. The VOCs being removed from the analyte list include methyl tert-butyl ether, chlorobenzene, trichloroethene, tetrachloroethene, and 1,2-dichloroethene. It is up to urban water providers to test their water and treat these constituents if they are detected above drinking water standards.
    - Historically, some wells have low concentration detections of some VOCs related to nearby environmental cleanup sites. Rather than identify and monitor for the fixed list of COCs in the 2022 GSP, SMGWA is adopting a new management action to facilitate annual review of any constituents found at point sources in the Basin. The SMGWA will coordinate annually with Santa Cruz County Environmental Health (SCEH), Site Mitigation Program staff to share public water system water quality results and discuss the status of site investigation and cleanup operations. This approach will help ensure that point source contaminants are being captured and/or remediated at their source and not degrading groundwater used for other beneficial uses by the municipal water systems and other dispersed smaller volume groundwater users. This coordination is being added as a new management action in the 2027 GSP Amendment.
5. Revising the MTs and MOs for the remaining COCs to provide better indications of degradation rather than comparison to drinking water standards (i.e., 2022 GSP MT) and average concentrations (i.e., 2022 GSP MO). The amended MT and MO based on degradation from baseline conditions since 2011 are summarized in Table 4-7 for TDS, Table 4-8 for nitrate, and Table 4-9 for arsenic. The general approach is to manage concentrations at better than drinking water quality standards where possible, allowing for a slight degradation of background concentrations as the MO and some additional degradation as the MT. In the case of arsenic, there are a couple of locations that already exceed a primary MCL, so some degradation above that background level is acceptable considering that public water supply delivered to customers meets all primary drinking water standards. SMC will be established for any new public supply, including SVWD Grace Way and Sucinto when there are a minimum of 3 years of data available.

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6. Revising the UR definition to address RCA #3 and provide an approach better suited to adaptive management of the Basin. Qualitatively, the Basin will be experiencing URs if concentrations of TDS, arsenic, or nitrate exceed the MT in multiple locations for multiple years. Widespread exceedances of groundwater quality MTs would be significant and unreasonable. However, groundwater quality exceeding the MT in a single location or year, should be manageable by shifting operations to reduce pumping or modify PMAs being implemented by SMGWA or member agencies. Quantitatively, URs will occur if 3 or more RMPs experience an MT exceedance for the same constituent for 2 consecutive years.

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Table 4-7. Amended Monitoring Network and SMC for Total Dissolved Solids

Aquifer Group	Aquifer	Representative Monitoring Point	RMP Status	TDS Concentrations, mg/L						
				Highest TDS Concentrations Since 2011			2022 GSP MO	2022 GSP MT	Amended MO	Amended MT
				Maximum TDS	2nd Highest	3rd Highest				
Unconfined	Santa Margarita	SLVWD Quail #4A	New RMP	150	130	130	NA	NA	250	500
	Santa Margarita	SLVWD Quail #5A	Existing RMP	130	130	120	123	1,000	250	500
	Santa Margarita	SLVWD Olympia #2	New RMP	480	460	430	NA	NA	600	800
	Santa Margarita	SLVWD Olympia #3	Existing RMP	740	730	690	573	1,000	900	1,000
Confined	Lompico	SLVWD Pasatiempo #5A	New RMP	180	180	160	NA	NA	250	500
	Lompico	SLVWD Pasatiempo #7	Existing RMP	190	180	150	143	1,000	250	500
	Lompico	SLVWD Pasatiempo #8	New RMP	170	160	140	NA	NA	250	500
	Lompico	SVWD #10A	Existing RMP	340	330	320	290	1,000	400	600
	Lompico	SVWD #11A	Existing RMP	580	580	570	525	1,000	700	800
	Lompico	SVWD #11B	Existing RMP	410	400	390	367	1,000	500	700
	Lompico/Butano	SVWD Orchard Well	Existing RMP	660	520	510	450	1,000	800	1,000
	Lompico/Butano	SVWD Sucinto Well	New RMP	534	500	NA	NA	NA	NA	NA
	Lompico/Butano	SVWD Grace Way Well	New RMP	324	NA	NA	NA	NA	NA	NA

NA – not applicable as there is not enough historical data, or the location was not an RMP in 2022 GSP

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Table 4-8. Amended Monitoring Network and SMC for Nitrate

Aquifer Group	Aquifer	Representative Monitoring Point	RMP Status	Nitrate (as N) Concentrations, mg/L						
				Highest Nitrate Concentrations Since 2011			2022 GSP MO	2022 GSP MT	Amended MO	Amended MT
				Maximum Nitrate	2nd Highest	3rd Highest				
Unconfined	Santa Margarita	SLVWD Quail #4A	New RMP	0.77	0.69	0.68	NA	NA	2	5
	Santa Margarita	SLVWD Quail #5A	Existing RMP	3.4	2.7	2.6	2.1	5	4	5
	Santa Margarita	SLVWD Olympia #2	New RMP	ND	ND	ND	NA	NA	2	5
	Santa Margarita	SLVWD Olympia #3	Existing RMP	ND	ND	ND	0.4	5	2	5
Confined	Lompico	SLVWD Pasatiempo #5A	New RMP	0.15	0.07	ND	NA	NA	2	5
	Lompico	SLVWD Pasatiempo #7	Existing RMP	0.7	0.6	0.57	0.4	5	2	5
	Lompico	SLVWD Pasatiempo #8	New RMP	ND	ND	ND	NA	NA	2	5
	Lompico	SVWD #10A	Existing RMP	ND	ND	ND	0.4	5	2	5
	Lompico	SVWD #11A	Existing RMP	ND	ND	ND	0.4	5	2	5
	Lompico	SVWD #11B	Existing RMP	ND	ND	ND	0.4	5	2	5
	Lompico/Butano	SVWD Orchard Well	Existing RMP	ND	ND	ND	0.4	5	2	5
	Lompico/Butano	SVWD Sucinto Well	New RMP	ND	ND	NA	NA	NA	NA	NA
	Lompico/Butano	SVWD Grace Way Well	New RMP	ND	NA	NA	NA	NA	NA	NA

ND – not detected at the laboratory reporting limit
NA – not applicable as there is not enough historical data, or the location was not an RMP in 2022 GSP

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Table 4-9. Amended Monitoring Network and SMC for Arsenic

Aquifer Group	Aquifer	Representative Monitoring Point	RMP Status	Arsenic Concentrations, mg/L						
				Highest Arsenic Concentrations Since 2011			2022 GSP MO	2022 GSP MT	Amended MO	Amended MT
				Maximum Arsenic	2nd Highest	3rd Highest				
Unconfined	Santa Margarita	SLVWD Quail #4A	New RMP	0.0032	0.0029	0.0028	NA	NA	0.005	0.008
	Santa Margarita	SLVWD Quail #5A	Existing RMP	0.0027	0.0022	0.0015	0.002	0.01	0.005	0.008
	Santa Margarita	SLVWD Olympia #2	New RMP	ND	ND	ND	NA	NA	0.002	0.005
	Santa Margarita	SLVWD Olympia #3	Existing RMP	ND	ND	ND	0.002	0.01	0.002	0.005
Confined	Lompico	SLVWD Pasatiempo #5A	New RMP	0.0035	0.0035	0.0034	NA	NA	0.005	0.008
	Lompico	SLVWD Pasatiempo #7	Existing RMP	0.0028	0.0025	0.002	0.002	0.01	0.005	0.008
	Lompico	SLVWD Pasatiempo #8	New RMP	0.011	0.011	0.011	NA	NA	0.013	0.015
	Lompico	SVWD #10A	Existing RMP	ND	ND	ND	0.002	0.01	0.002	0.005
	Lompico	SVWD #11A	Existing RMP	0.0052	0.0046	0.0046	0.003	0.01	0.006	0.008
	Lompico	SVWD #11B	Existing RMP	0.012	0.012	0.011	0.009	0.01	0.014	0.016
	Lompico/Butano	SVWD Orchard Well	Existing RMP	ND	ND	ND	0.002	0.01	0.002	0.005
	Lompico/Butano	SVWD Sucinto Well	New RMP	0.0013	ND	NA	NA	NA	NA	NA
	Lompico/Butano	SVWD Grace Way Well	New RMP	.0026	NA	NA	NA	NA	NA	NA

ND – not detected at the laboratory reporting limit
NA – not applicable as there is not enough historical data, or the location was not an RMP in 2022 GSP

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4.6 Depletion of Interconnected Surface Water

Surface water is hydraulically connected to groundwater throughout much of the Basin, resulting in predominantly gaining stream conditions and a net outflow of surface water from the Basin. Groundwater discharge to streams supports baseflow and associated beneficial uses; however, groundwater extraction may reduce baseflow to streams and thus cause ISW depletion.

The GSP included 2 RMPs for evaluating ISW depletion using groundwater elevations as a proxy and identified additional data gaps to be addressed during GSP implementation. The RMPs were selected based on their proximity to interconnected stream reaches and their ability to represent shallow groundwater conditions that influence baseflow contributions. The RMPs—SVWD SV4-MW on Bean Creek and SLVWD Quail MW-A on Zayante Creek—provide groundwater elevation data used to evaluate conditions necessary to maintain hydraulic gradients that support streamflow.

The initial monitoring network lacked co-located shallow groundwater and streamflow or stage data, limiting the ability to directly evaluate pumping-related depletion. Four shallow monitoring wells were installed in 2023 adjacent to interconnected stream reaches in areas with surface water stage and discharge measurements. Data from these wells, together with dry-season streamflow monitoring (Section 7.5), support improved characterization of groundwater–surface water interactions, evaluation of ISW depletion, and refinement of SMC.

In 2024, DWR released a series of technical papers describing approaches for identifying interconnected surface water, estimating the location, timing, and magnitude of depletion, and supporting development of SMC. Consistent with these recommendations, the Basin's management approach is being revised to better integrate groundwater levels, changes in storage, and ISW depletion, so that these indicators are evaluated collectively to meet common sustainability objectives. The initial RMP-based approach, which provided a localized proxy for evaluating baseflow conditions, is being expanded to evaluate ISW depletion on a basin-wide scale.

4.6.1 Current Interconnected Surface Water Conditions

Groundwater elevations at both ISW RMPs remained stable during the evaluation period and above their respective MTs and well above the streambed elevation, indicating that hydraulic gradients continue to support groundwater discharge to streams. Table 4-10 compares annual minimum groundwater elevations to MTs and MOs, and hydrographs are provided in Appendix 4B.

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Table 4-10. Groundwater Elevations Compared to Depletion of Interconnected Surface Water Sustainable Management Criteria, WY2021-2025

Aquifer	Well Name	Minimum Groundwater Elevation (feet amsl)						
		MT	MO*	WY2021	WY2022	WY2023	WY2024	WY2025
Water Year Type				Critically Dry	Normal	Wet	Normal	Normal
Santa Margarita	SLVWD Quail MW-A	413	416	413.3	413.1	413.3	414.5	413.9
	SVWD SV4-MW	381	387	404.1	405.7	408.7	404.2	401.1

*2027 interim milestones are equal to the measurable objective

Minimum threshold not met

Minimum threshold met, but measurable objective not met

Measurable objective met

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4.6.2 Interconnected Surface Water SMC Evaluation

Groundwater elevations at both RMPs remained above MTs during the evaluation period; therefore, undesirable results for ISW did not occur. Observed groundwater levels indicate that baseflow to interconnected streams continued throughout the evaluation period. Hydrographs in Appendix 4B show variability in near-stream groundwater levels that are likely related to climatic conditions rather than groundwater extraction.

4.6.3 Interconnected Surface Water SMC Amendment

The monitoring and evaluation approach for ISW is being revised in the 2027 GSP Amendment. MTs for groundwater levels and reduction of groundwater in storage (measured as extraction) are being used going forward for managing ISW depletion. Given that the Basin is a well-defined structural syncline with generally no-flow boundaries, managing groundwater levels to maintain or improve gradients throughout the Basin, combined with a reduction of average annual groundwater extraction, compared to the pre-SGMA conditions is the most effective approach SMGWA can employ to manage depletions of ISW. This approach is consistent with DWR's ISW Management Papers (DWR, 2024a, b, and c) in that it recognizes that depletion is a cumulative response to groundwater extraction and may not be fully captured at individual monitoring locations. Cross-sections on Figure 4-5 and Figure 4-6 demonstrate the amended MTs and MOs for shallow monitoring wells are at a higher elevation than nearby interconnected stream reaches on the San Lorenzo River, Newell Creek, Zayante Creek, and Bean Creek and thus continue to support baseflow of groundwater to streams.

The following changes to ISW depletion monitoring and SMC are being made:

- The ISW monitoring network is being amended to use all groundwater level RMPs and to integrate the approach for achieving and demonstrating sustainability with the groundwater level and reduction in storage monitoring networks and SMC. As described in more detail in the 2027 GSP amendment, this approach manages groundwater gradients on a basin-wide basis. As described in Section 4.3.3 above, groundwater level SMC are based on fall 2013 conditions as the MT (pre-SGMA) and 2006 conditions (relatively wet period) as the MO. These periods were selected to be supportive of the City of Santa Cruz' 2025 HCP that intends to restore habitats and populations of steelhead and coho salmon while minimizing the impacts of the City's water diversion to meet its long-term water supply needs.
- The UR definition is being revised to align with the amended ISW monitoring network and approaches for groundwater level and change in storage sustainability indicators being used as a proxy for ISW monitoring:

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- Groundwater elevations in 3 or more RMPs fall below the minimum threshold in 2 consecutive years in the shallow/unconfined aquifer system
- Groundwater elevations in 3 or more RMPs fall below the minimum threshold in 2 consecutive years in the deeper/confined aquifer system
- Groundwater extraction from 1 or more aquifers exceeds its change in groundwater storage MT for 2 consecutive years

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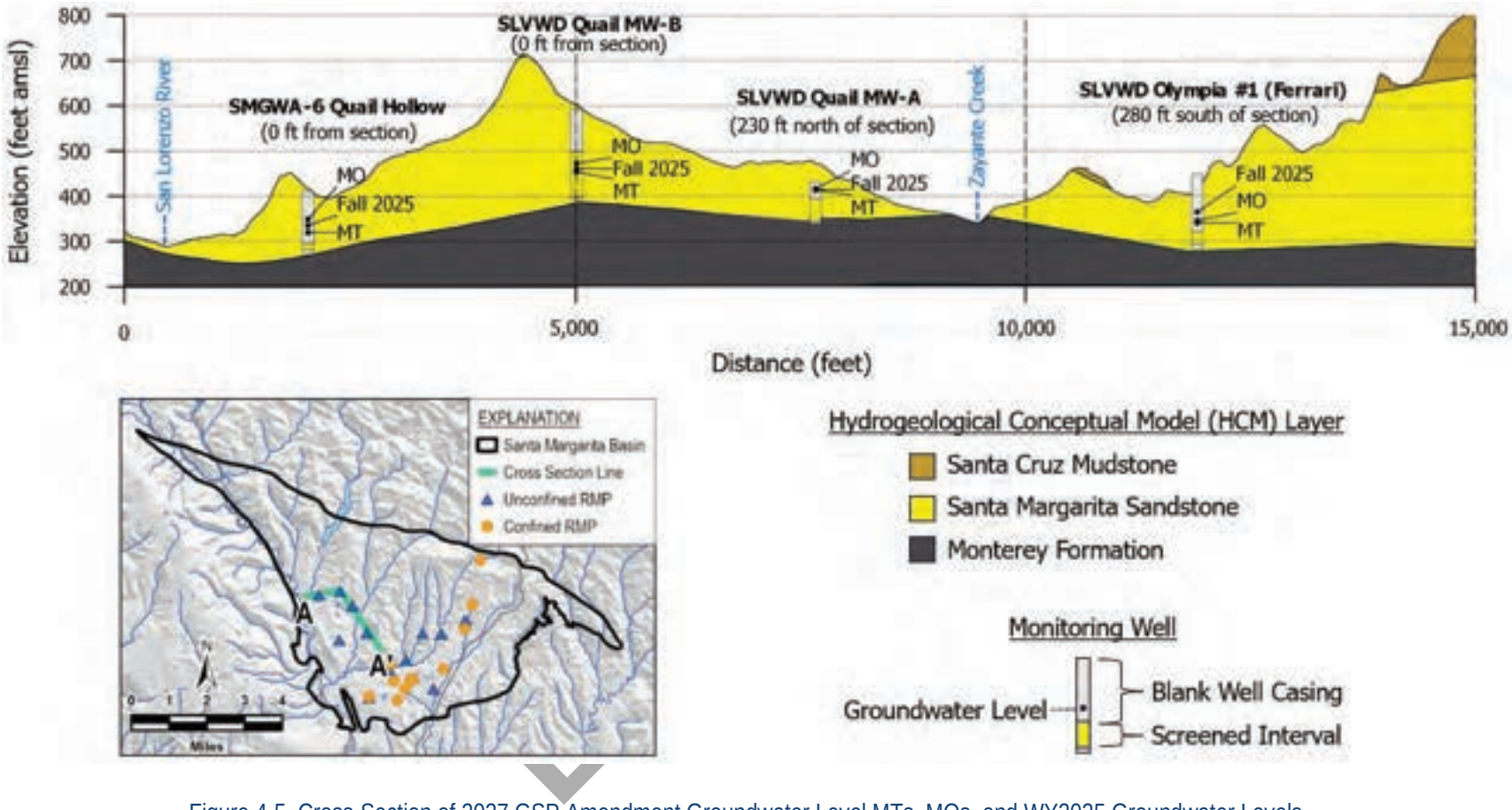


Figure 4-5. Cross-Section of 2027 GSP Amendment Groundwater Level MTs, MOs, and WY2025 Groundwater Levels Relative to Interconnected Streams in the Quail Hollow and Olympia / Mission Springs Subareas

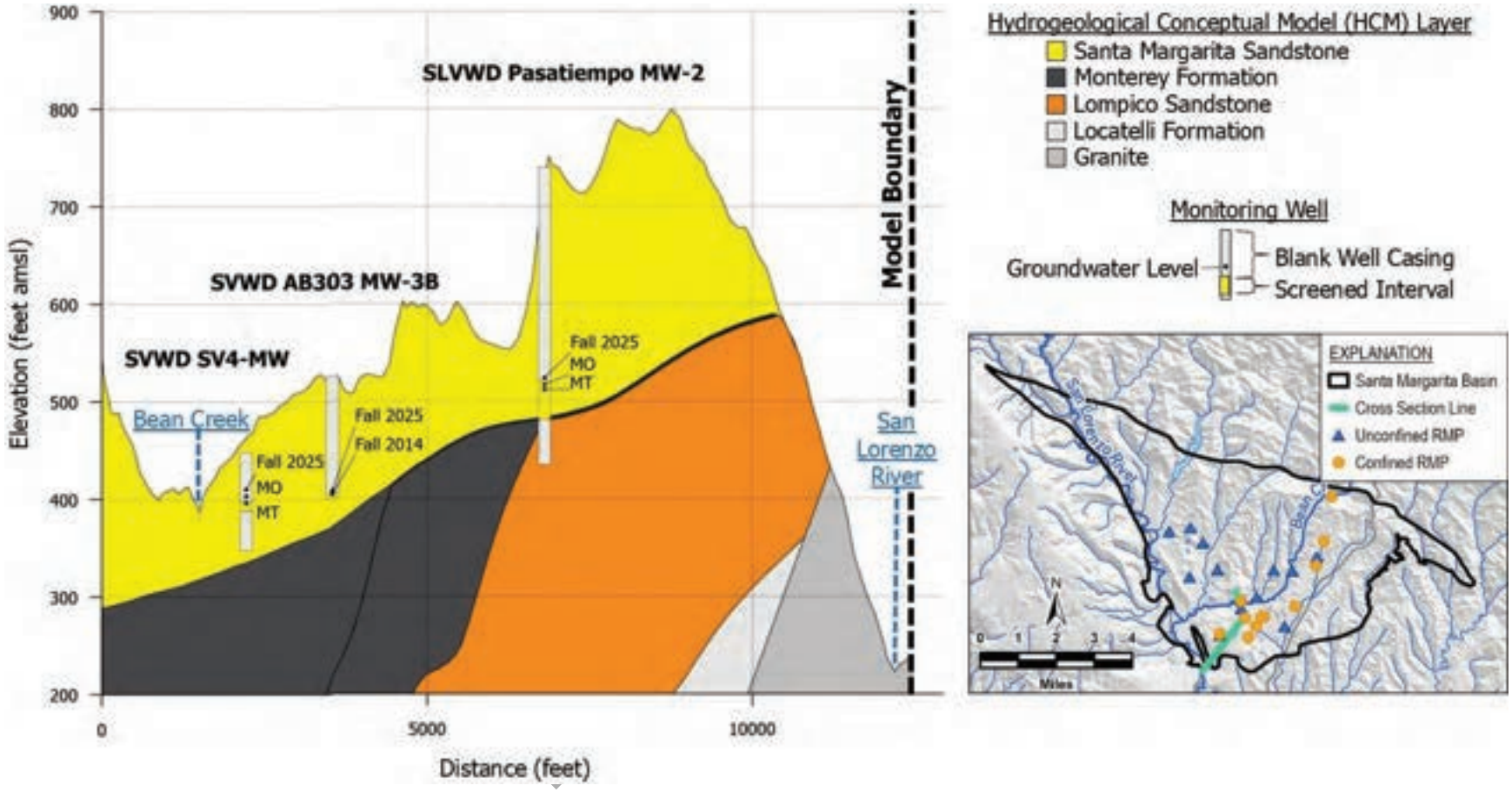


Figure 4-6. Cross-Section of 2027 GSP Amendment Groundwater Level MTs, MOs, and WY2025 Groundwater Levels Relative to Interconnected Streams in the Olympia/Mission Springs and Mount Hermon/South Scotts Valley Subareas

4.7 Land Subsidence

As indicated in the 2022 Basin GSP, subsidence is not an applicable sustainability indicator. Subsidence due to groundwater extraction is not likely to occur in this Basin because the consolidated bedrock aquifers are not susceptible to further compaction with changes in groundwater levels. Even if the geologic setting was prone to subsidence, groundwater levels are recovering in all principal aquifers and the Monterey Formation from historical lows prior to SGMA, which prevents onset of future subsidence from groundwater overdraft.

4.7.1 Current Land Subsidence Conditions

As indicated in the 2022 GSP, SMGWA reviewed DWR's Interferometric Synthetic Aperture Radar (InSAR) subsidence monitoring data as part of this 5-year periodic evaluation to confirm that subsidence is not occurring. The InSAR dataset reviewed on DWR's SGMA Data Viewer for this evaluation continues to show that the Basin has experienced between -0.25 feet and +0.25 of vertical land displacement since 2015 (DWR InSAR Data; DWR SGMA Data Viewer). The GSP interpretation continues to be validated by InSAR data; the Basin's consolidated bedrock aquifers are not prone to subsidence, and even if they were, groundwater levels are stable or increasing so subsidence is not likely to occur.

4.7.2 Land Subsidence SMC Evaluation

There are no SMC established for subsidence in the 2022 GSP since it is not expected to occur due to the geologic setting. Since the GSP was submitted, DWR released the Best Management Practices of the Sustainable Management of Groundwater – Land Subsidence (Subsidence Best Management Practices [BMP]; DWR, 2026), to help GSAs establish effective subsidence management practices. This BMP does not change the Basin's subsidence management approach and no amendments to subsidence SMC are needed.

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5 STATUS OF PROJECTS AND MANAGEMENT ACTIONS

Ongoing and planned projects and management actions (PMAs) are being implemented to achieve sustainability in the Basin. This section describes the status since the GSP and modifications to the 2027 GSP Amendment.

5.1 Status of 2022 GSP Projects and Management Actions

Table 5-1 summarizes the 20 PMAs from the 2022 GSP as updated in the DWR PMA module upload for WY2025. PMAs 1 though 4, characterized as Group 1 and shaded tan in the summary table, are baseline commitments already completed before the GSP was adopted. PMAs 5 through 12 shaded green in the summary table are in Group 2, meaning they were in some state of planning and among the best options for achieving Basin sustainability. PMAs 13 through 20 shaded blue, are in Group 3, which were projects requiring further evaluation if Group 2 projects did not achieve sustainability.

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Table 5-1. Project and Management Action Summary Based on Submission to DWR PMA Module for WY2025

PMA ID	PMA Name	Status	Describe the project or management action's progress toward implementing the plan since the previous annual report
3-027_PMA_1	Existing Water Use Efficiency	Ongoing	In WY2025, SVWD continued its WaterSmart platform for customers. The number of enrolled customers increased to 3,141 from the prior year of 3,011. San Lorenzo Valley (SLV) continued its Eye on Water platform. The number of enrolled customers increased to 1,115 from the prior year of 845.
3-027_PMA_2	SVWD Low Impact Development	Ongoing	Expansion of the Transit Center low impact development (LID) project was completed in June 2025, which is expected to increase stormwater recharge capacity by up to 7 AFY. Recharge of the 3 existing facilities was 23.82 AF in WY2025.
3-027_PMA_3	SLVWD Conjunctive Use	Ongoing	In WY2025, SLVWD once again implemented its ongoing conjunctive use program in the North System, and emergency conjunctive use of the Felton System instituted after the 2020 CZU Lightning Complex wildfire. For the period, SLVWD used 58% surface water and 42% groundwater in the North System. This represents a conservative estimated benefit of North System conjunctive use in WY2025 of 29 AF of in-lieu groundwater recharge in the North System. In WY2025, 329 AF of surface water was transferred from the Felton system to the San Lorenzo Valley system. This surface water displaced an equivalent volume of water that would otherwise be extracted from wells in the SLVWD system.
3-027_PMA_4	SVWD Recycled Water Program	Ongoing	Scotts Valley Water District continued to deliver recycled water to non-potable water customers. During WY2025, 168.6 AF was delivered.
3-027_PMA_5	SLVWD, SVWD, and Santa Cruz County Additional Water Use Efficiency	Ongoing	In WY2025, SLVWD issued 9 clothes washer rebates, 16 toilet rebates, and 2 irrigation controllers, resulting in an estimated savings of 0.64 AFY (or 208,545 gallons per year (GPY)). SVWD issued 8 rebates for turf replacement resulting in an estimated 0.42 AF/yr (137,054 GPY) savings, and additional 9 rebates for toilet and smart irrigation controller replacements saving an additional 0.02 AFY (7,118 GPY) for a total of 0.44 AF/yr (144,172 GPY).

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PMA ID	PMA Name	Status	Describe the project or management action's progress toward implementing the plan since the previous annual report
3-027_PMA_6	SLVWD Existing Infrastructure Expanded Conjunctive Use (Phase 1)	Planning	In WY2025, SLVWD continued work on an Environmental Impact Report in support of its water rights petition to change the place of use of surface water in the Felton system so that it may be used system-wide on a routine basis.
3-027_PMA_7	SLVWD and SVWD Inter-District Conjunctive Use with Loch Lomond (Phase 2)	Planning	In parallel with its Phase 1 conjunctive use expansion, SLVWD has continued working toward finalizing a permanent conjunctive use permit, which will incorporate SLVWD's water rights in Loch Lomond and include ongoing coordination and negotiations with surrounding water agencies.
3-027_PMA_8	Transfer for Inter-District Conjunctive Use	Construction	The current project under construction is an intertie between SVWD and the City of Santa Cruz with a bi-directional capacity of up to 1 million gallons per day. The project also includes the construction of a new production well by SVWD. In WY2025, the intertie was completed and the associated pump station for the interties and the well will be completed in WY26.
3-027_PMA_9	Aquifer Storage & Recovery Project in Scotts Valley Area of the Basin	Conceptual	There were no additional studies related to aquifer storage and recovery (ASR) in WY2025.
3-027_PMA_10	Purified Wastewater Recharge in Scotts Valley Area of the Basin (710 – 1,500 AFY Treated at Existing Facility Outside of the Basin)	Conceptual	There are currently no additional sources of purified wastewater available to the basin, so there were no studies related to this project in WY2025.
3-027_PMA_11	Purified Wastewater Recharge in Scotts Valley Area of the Basin (3,500 AFY Treated at New Facility inside the Basin)	Conceptual	There are currently no additional sources of purified wastewater available to the basin, so there were no studies related to this project in WY2025.
3-027_PMA_12	Purified Wastewater Augmentation at Loch Lomond	Conceptual	There are currently no additional sources of purified wastewater available to the basin, so there were no studies related to this project in WY2025.

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PMA ID	PMA Name	Status	Describe the project or management action's progress toward implementing the plan since the previous annual report
3-027_PMA_13	SLVWD Olympia Groundwater Replenishment	Conceptual	This is a Group 3 project that may be evaluated in the future if Group 1 or Group 2 projects are not feasible or do not achieve sustainability, so there were no additional studies in WY2025.
3-027_PMA_14	Public/Private Stormwater Recharge and Low Impact Development	Conceptual	This is a Group 3 project that may be evaluated in the future if Group 1 or Group 2 projects are not feasible or do not achieve sustainability, so there were no additional studies in WY2025.
3-027_PMA_15	Enhanced Santa Margarita Aquifer Conjunctive Use	Conceptual	This is a Group 3 project that may be evaluated in the future if Group 1 or Group 2 projects are not feasible or do not achieve sustainability, so there were no additional studies in WY2025.
3-027_PMA_16	SLVWD Quail Hollow Pumping Redistribution	Conceptual	This is a Group 3 project that may be evaluated in the future if Group 1 or Group 2 projects are not feasible or do not achieve sustainability, so there were no additional studies in WY2025.
3-027_PMA_17	Santa Margarita Aquifer Private Pumpers Connect to Public Water System	Conceptual	This is a Group 3 project that may be evaluated in the future if Group 1 or Group 2 projects are not feasible or do not achieve sustainability, so there were no additional studies in WY2025.
3-027_PMA_18	Direct Potable Reuse	Conceptual	This is a Group 3 project that may be evaluated in the future if Group 1 or Group 2 projects are not feasible or do not achieve sustainability, so there were no additional studies in WY2025.
3-027_PMA_19	Groundwater Use Restrictions	Conceptual	This is a Group 3 project that may be evaluated in the future if Group 1 or Group 2 projects are not feasible or do not achieve sustainability, so there were no additional studies in WY2025.
3-027_PMA_20	Scotts Valley Non-Potable Reuse	Conceptual	This is a Group 3 project that may be evaluated in the future if Group 1 or Group 2 projects are not feasible or do not achieve sustainability, so there were no additional studies in WY2025.

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5.2 Proposed Modifications to Projects and Management Actions

Based on the status of the SMC over 5 WYs (2021 through 2025) described in Section 4, the updated current and projected groundwater budgets in Section 6.3, SMGWA believes that the Basin will be sustainable with a much smaller suite of PMAs than initially planned.

PMAs 1 through 4 were already in place prior to GSP adoption and were foundational to the Basin achieving its current positive status. These are permanent PMAs that are expected to continue indefinitely as part of ongoing Basin operations and management. SMGWA will remove these projects in the 2027 GSP Amendment and PMA module. Relevant information (e.g., recycled water deliveries) will still be collected each year as part of water use reporting under SGMA.

PMA 5 for additional water use efficiency will be removed from the 2027 GSP Amendment and PMA module. While the agencies continue water use efficiency programs, the amount of additional water saved each year is less than 2 AF due to the very efficient use already achieved in the region. It is not cost effective for SMGWA to continue tracking this information.

PMAs 6 through 9 will be modified to reflect that Basin conditions have improved. These projects could expand conjunctive use in the Basin using in-basin and out-of-basin surface water sources. During 2022 GSP development, the 540 acre-feet per year of conjunctive use surface water associated with PMAs 6 and 7 was determined to benefit the Basin under future climate change scenarios. Currently, SLVWD is only advancing PMA 6 (increasing in-lieu conjunctive use through expansion of the place of use of its existing water rights). This PMA will be retained in the 2027 GSP as a “Primary” PMA. Given that modeling results indicate that PMA 6 will allow the Basin to be sustainable under future demands, PMA 7 is being eliminated at the request of the project proponent as it is not cost effective.

PMAs 8 and 9 are not currently needed to reach sustainability, so they will be retained as combined single “Supplemental” PMA in the 2027 GSP. Of the remaining Group 2 PMAs (PMA 10 through 12), purified wastewater is not currently available or being planned because it would not be cost effective to justify given the sustainable state of the Basin. Therefore, PMAs 10 through 12 are being removed in the 2027 GSP Amendment and PMA module.

Of the Group 3 PMAs, only PMA 14 will be retained in the 2027 GSP Amendment. This PMA focuses on recharge opportunities primarily in the Scotts Valley area where the Santa Margarita aquifer is largely dewatered and there is continued interest by potential project partners. PMA 14 will be characterized as a “Supplemental” PMA. The remaining PMAs will be removed at the request of project proponents because they are largely unnecessary to achieve and maintain Basin sustainability.

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SMGWA will add a management action to complement meeting the degraded groundwater quality SMC. This is described in Section 4.5.3 and will be further described in the 2027 GSP Amendment.

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6 BASIN SETTING BASED ON NEW INFORMATION OR CHANGES IN WATER USE

This section describes significant changes in the understanding of the basin setting based on information collected during the evaluation cycle.

6.1 Hydrogeologic Conceptual Model

The Basin's HCM is enhanced, but not changed, by new information collected during the evaluation cycle. As summarized in Table 2-1 new information collected during the evaluation cycle includes monitoring improvements and DWR's AEM surveys. The monitoring improvements help collect data to fill HCM data gaps identified in the GSP, evaluate Basin conditions, and implement the Plan. The AEM data supplements interpretation of structural and lithologic data that was used to develop aquifer thickness and extent in the Basin Model. The new information verifies and refines but does not substantially change the HCM described in the GSP.

6.1.1 Status of Data Gaps Identified in the GSP

The status of GSP-identified data gaps are summarized in Table 6-1. Most of these have been filled, except for a Butano aquifer dedicated monitoring well that SMGWA is seeking to install with TSS support. Filling these data gaps supports understanding of the HCM and is also used to monitor groundwater conditions, as discussed further in Section 7.

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Table 6-1. Status of Identified HCM and Monitoring Data Gaps in the 2022 GSP

2022 GSP Data Gap	Status
Shallow Santa Margarita Aquifer and Monterey Formation Monitoring Data Gaps	Data gap has been addressed by installing 7 new dedicated monitoring wells in 2023 using Proposition 68 grant funding. Also added a private well to the monitoring network in an area where access limitations prevented a planned well installation.
Butano aquifer data gap	SMGWA was not able to install this well as planned with Proposition 68 grant funding due to the unforeseen increase in construction costs between the grant request and construction planning. The agency has requested TSS support to install this well and is waiting for confirmation from DWR. SMGWA and SVWD will continue to evaluate other funding mechanisms if TSS funding is not available.
Groundwater extraction monitoring	The GSP identified 4 potential unmetered non-de minimis groundwater pumpers. SMGWA reached out to all of these users to discuss their estimated water use. Based on that information, SMGWA has determined that requiring meters on these wells will not substantively improve its management of the basin, so it will continue relying on estimated volumes going forward.
Groundwater quality monitoring frequency	SLVWD increased monitoring frequency to annual in WY2023 for some constituents that had more infrequent frequency requirements.
Carbonera Creek streamflow monitoring	Established a dry season streamflow monitoring station for Carbonera Creek in 2024 to analyze streamflow and groundwater interactions in this spring-fed stream. During periodic evaluation, determined this is not a data gap and monitoring is no longer necessary.

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6.1.2 Airborne Electromagnetic Survey Analysis

Geophysical survey cross-sections of the Basin were collected as part of DWR's AEM Survey Area 8 (Petersen *et al.*, 2023). AEM surveys were flown by helicopter, with geophysical equipment suspended below the aircraft collecting electromagnetic data along chosen flight paths. Residential and urban areas are avoided by the surveys due to interference caused by power lines, buildings, railroads, pipelines, and other infrastructure.

AEM surveys measure voltage, which is used to infer the resistivity of the subsurface over large areas. Lower resistivity materials include clays and silts. Higher resistivity materials include sands and gravels, and/or bedrock. Typical resistivity values of different subsurface materials are illustrated on Figure 6-1. Once processed, the data are displayed as fence diagrams of subsurface resistivity, revealing layers of higher resistivity (usually aquifers) and lower resistivity (usually aquitards).

DWR provides processed data with AEM survey measurements converted to resistivity values (California Natural Resources Agency, 2025). M&A further processed the data by assigning a color to each resistivity value consistent with the colors used in DWR's Survey Area 8 AEM data report (Petersen *et al.*, 2023; Figure 6-2). Data below the depth of investigation are less

reliable data than shallower data and are represented by faded colors. Because depth of investigation in the Basin is about 1,000 feet, in most places, the Lompico and Butano sandstones are too deep for proper comparison with AEM data.

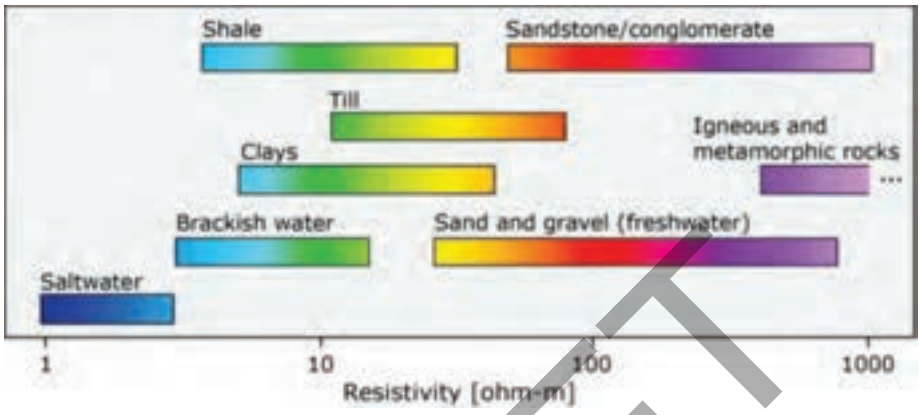


Figure 6-1. Typical Resistivity Values of Subsurface Materials (Petersen *at al.*, 2023)

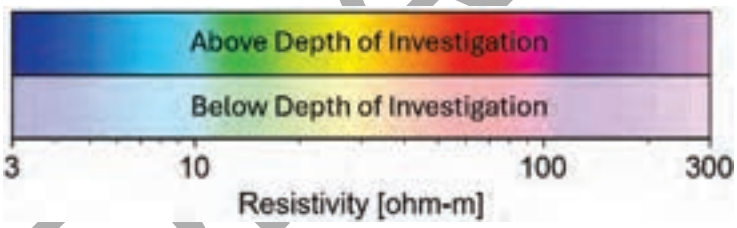


Figure 6-2. Resistivity Color Scale

The AEM data were compared to the HCM and Basin Model to evaluate whether this new information verifies or conflicts with the 2022 GSP. Figure 6-3, Figure 6-4, and Figure 6-5 show the contact between the Santa Margarita and Monterey Formation in several areas of the Basin where AEM surveys were collected. The AEM data shows the Santa Margarita sandstone aquifer as high-resistivity while the underlying Monterey Formation mudstone/shale has low-resistivity. The AEM data generally supports the depth of the contact between those 2 layers in the HCM used to construct the Basin Model, however, there is some room for improvement. AEM data on Figure 6-3 and Figure 6-4 suggest the contact between these geologic units may be more undulating and slightly deeper in places than depicted in the Basin Model.

Although AEM data indicate some refinement could be made to Basin Model layering, the model is currently well calibrated in most areas and therefore the layering was not updated to

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preserve its functionality. SMGWA will consider model layer adjustments in the future if the Basin Model needs to be recalibrated.

The AEM data was also used to confirm that underlying bedrock forms a hydrogeologic barrier between the Basin and the neighboring Santa Cruz Mid-County Basin. Figure 6-6 shows bedrock to the depth of investigation (~500 feet) at the Basin's southeastern boundary, which confirms the HCM. Fresh granite generally has higher resistivity than sandstone due to its low porosity, but the Basin's granite is near active faults and is likely fractured, which explains that the resistivity is similar to the Santa Margarita Sandstone signature on other cross-sections. Groundwater-filled fractures can reduce a granite's bulk resistivity to that of a sandstone (Telford *et al.*, 1976).

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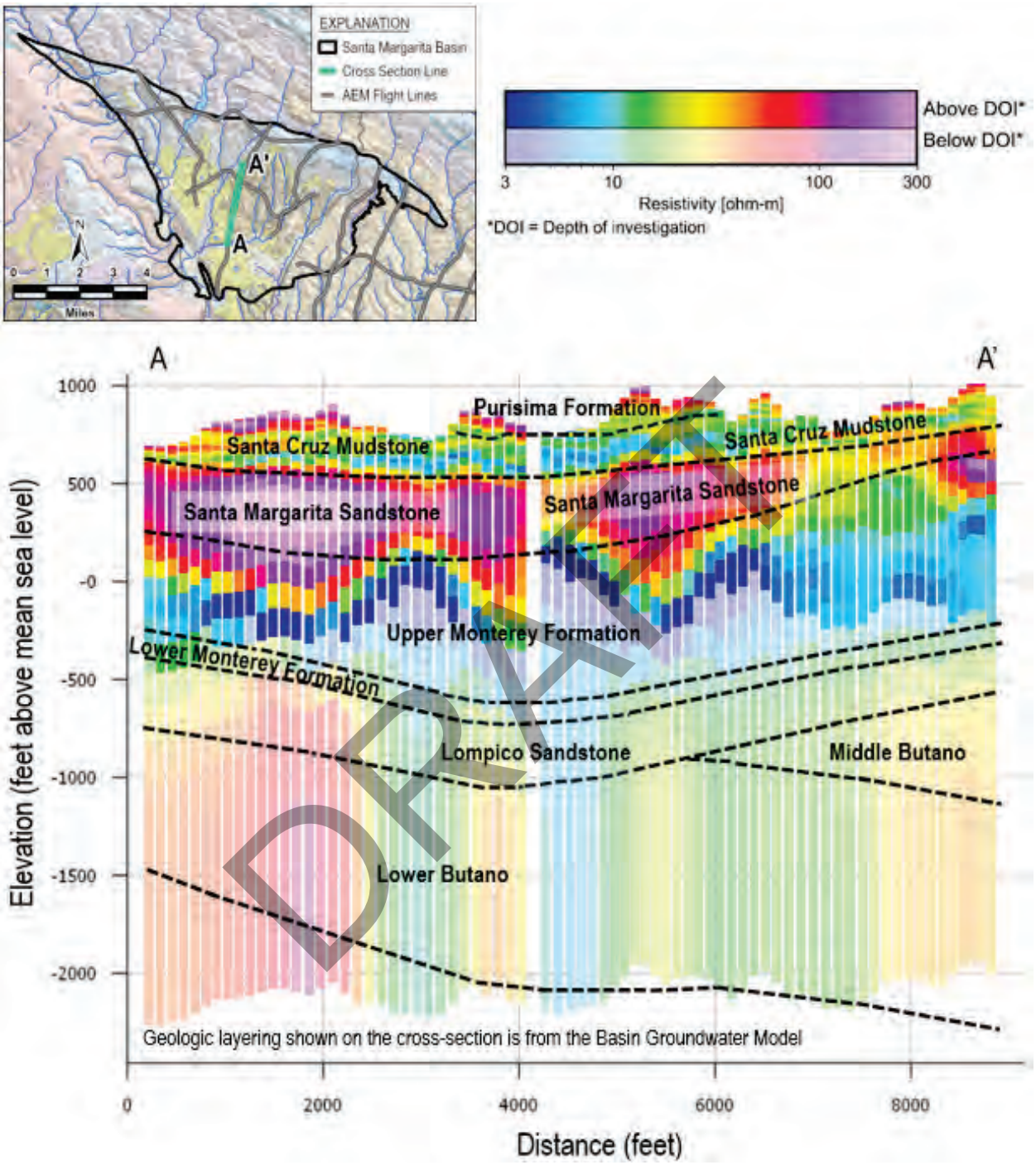


Figure 6-3. Cross-Section A-A' AEM Geophysical Survey Compared to Basin Model

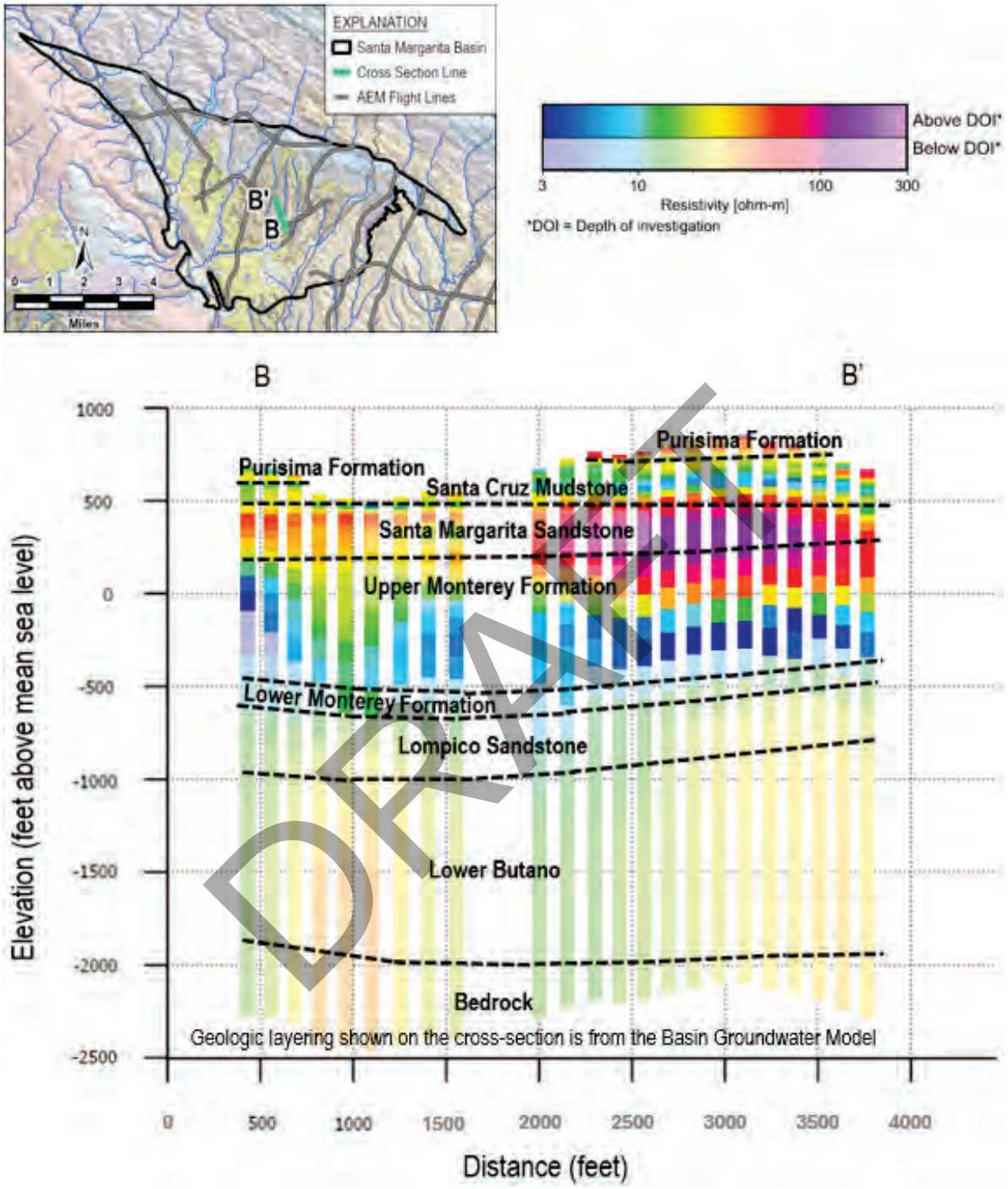


Figure 6-4. Cross-Section B-B' AEM Geophysical Survey Compared to Basin Model

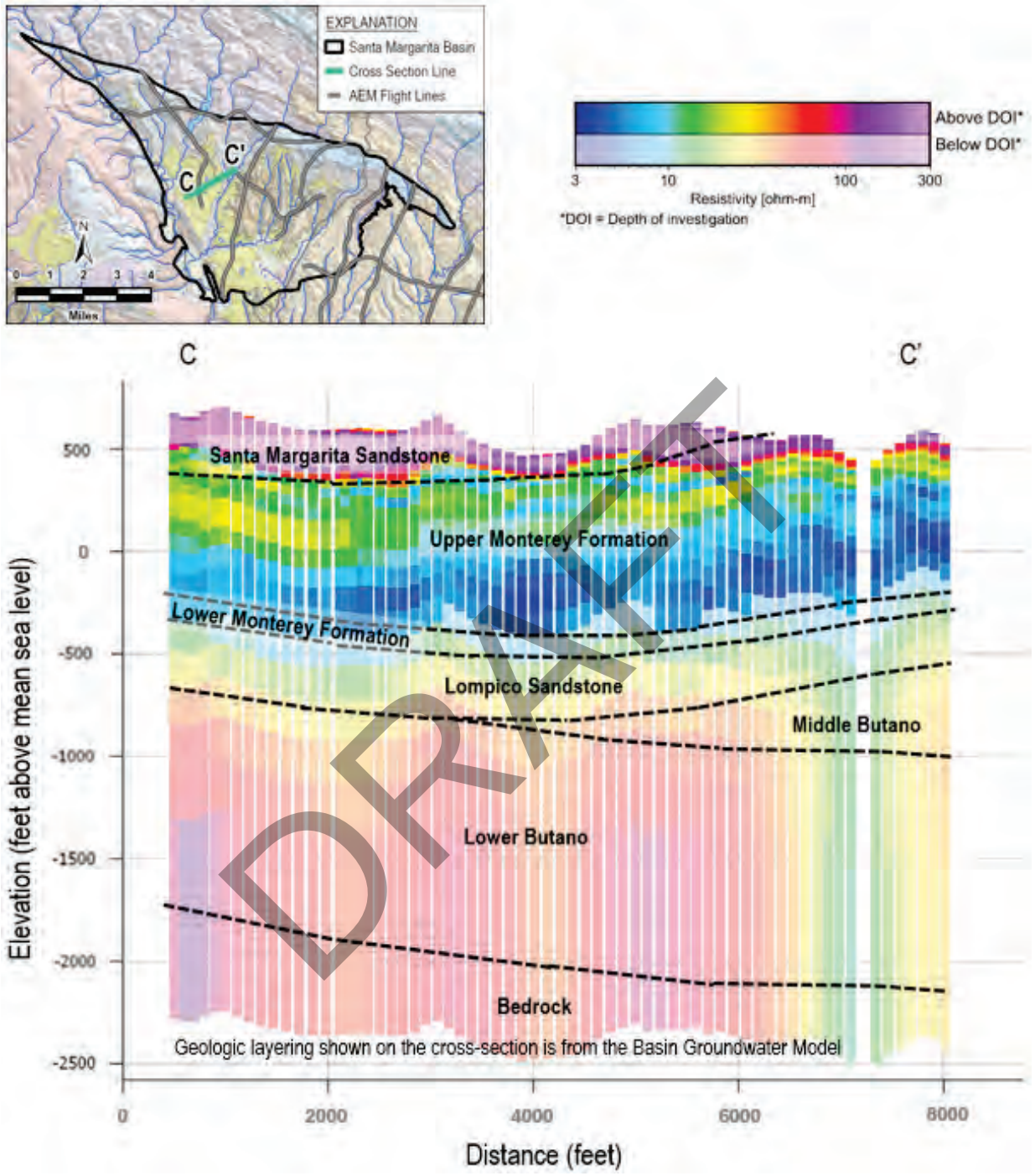
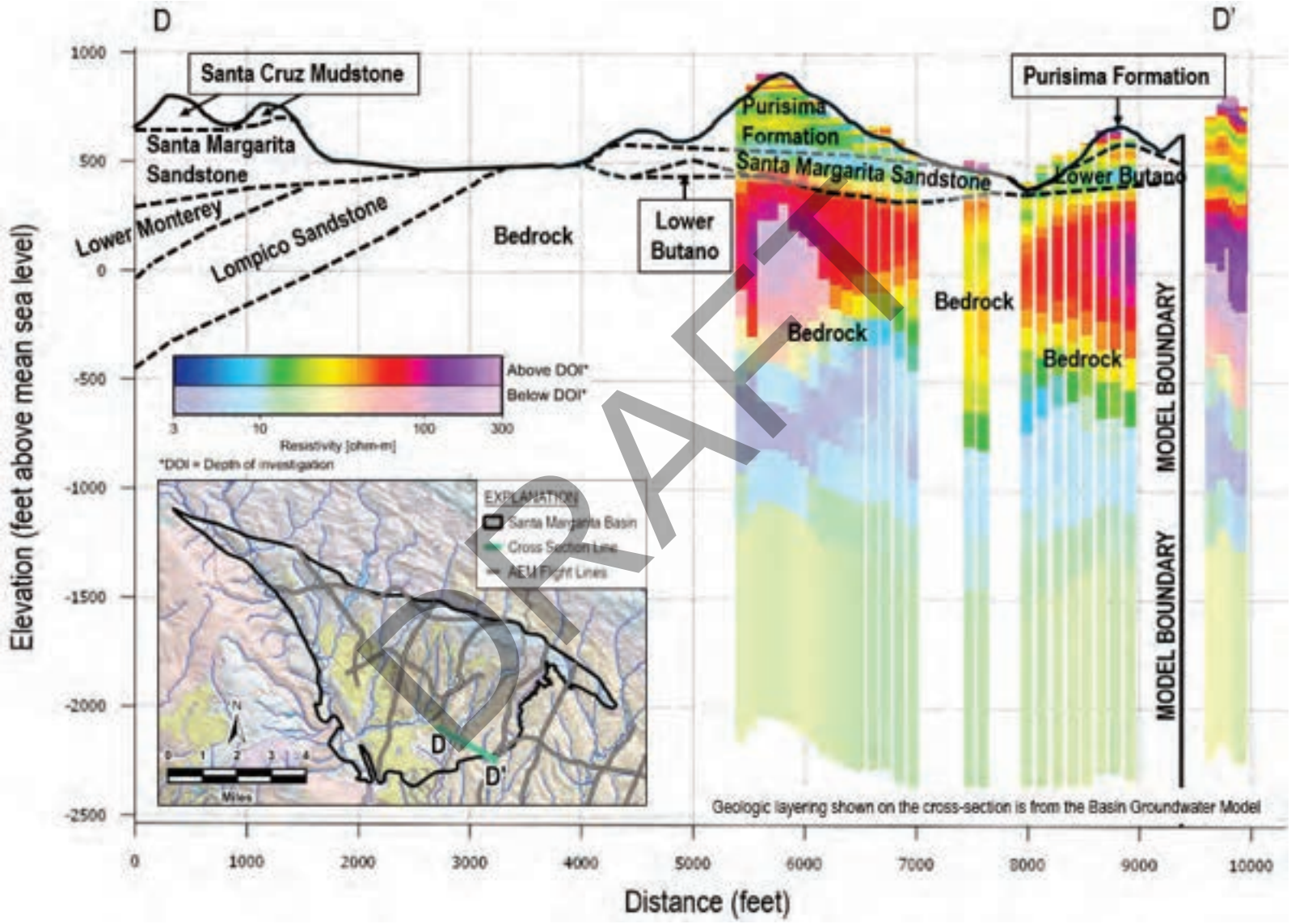


Figure 6-5. Cross-Section C-C' AEM Geophysical Survey Compared to Basin Model



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Figure 6-6. Cross-Section D-D' AEM Geophysical Survey Compared to Basin Model

6.2 Groundwater Conditions

The Basin's groundwater conditions were well characterized during GSP planning and development and the understanding has not significantly changed during the evaluation cycle. New data sources, applications, and tools made available to support sustainable management by DWR and other organizations have enhanced SMGWA's ability to monitor groundwater conditions and adaptively manage the Basin, but do not require amendments to the GSP.

6.3 Water Use Changes and Associated Water Budget

The Basin continues to rely less on groundwater as water demand declines through conservation and increased surface water use. Looking ahead, however, groundwater demand is projected to increase modestly in response to population growth and climate change if no additional PMAs are implemented.

As part of this periodic evaluation, groundwater use and Basin conditions were reevaluated and the GSP will be amended to incorporate updated information, including data collected from SVWD's recently drilled water supply wells. Historical, current, and projected water budgets timeframes are revised in the 2027 GSP Amendment to align the historical budget with the passage of SGMA, update the current budget to the most recent water year, use an updated baseline for projections, and revise estimates of future water use. An additional projected baseline scenario is also developed repeating the historical climate with projected future water demands to supplement the projected simulation with climate change.

The updated water budgets demonstrate that the Basin can continue to be managed sustainably through the GSP planning and implementation horizon under the baseline projected conditions, though it will become more challenging to achieve sustainability if long-term droughts occur that may become more common with climate change. For that reason, SMGWA and its member agencies will continue to improve conservation, implement conjunctive use, use recycled water, and adaptively manage the basin to achieve sustainability as discussed in Section 5.

6.3.1 Current Water Use

Groundwater extraction is at historically low levels for the past 3 years, consistent with the lowest volumes recorded since at least the early 1980s. Total Basin water use from WY1984-2025 is summarized on Figure 6-7, and WY2025 groundwater extraction by aquifer and volume is shown on Figure 6-8.

Pumping from WY2022-2025 is used to calculate recent average annual extraction by well and system. Basin-wide recent pumping totals average 2,392 AFY (Table 6-2) as extraction

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continues to decline from early-2000s highs (Figure 6-7). The current WY2015-2025 average is 2,590 AFY, and the baseline for projected model simulations starting in WY2026 is 2,539 AFY.

This WY2015-2025 average is used as the 2026 baseline volume for SLVWD and SVWD projections (Table 6-2). SLVWD has higher year-to-year groundwater use variability due to access to surface water and wildfire-related operational flexibility that have allowed for use of surface water outside of the permit-authorized place of use; therefore, its longer-term average (829 AFY) is used instead of the more recent 680 AFY. For SVWD, the current average (1,143 AFY) is as a conservative baseline relative to recent pumping (1,082 AFY). The projected baseline volume is allocated evenly across 2 existing (SVWD 10A and Orchard) and 2 new supply wells (SVWD Sucinto and Grace Way), though long-term extraction from new wells remains uncertain.

Other Basin groundwater uses—MHA public supply, small water systems, landscape, quarry, and private domestic pumping—are assumed to remain consistent with GSP values and recent data and therefore use WY2022-2025 average values for the projected baseline (Table 6-2). Unmetered quarry pumping is updated from 25 AFY to ~32 AFY, while unmetered landscape and pond-filling pumping at each of 3 locations in the Basin is revised downward from 38–46 AFY to ~20 AFY based on coordination with well owners or operators and review of recent water use information at each location.

In WY2025, Basin groundwater extraction was distributed as follows: Lompico aquifer 56%, Santa Margarita aquifer 24%, Butano aquifer 15%, and the remaining 5% from non-principal aquifers (Monterey Formation and Purisima Formation) primarily for rural domestic uses.

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Table 6-2. Groundwater Extraction Summary

System or Water User	Well Name	Aquifer	Evaluation Cycle Extraction (AFY)					Current Extraction (AFY)	Projected Baseline Extraction (AFY)
			WY2022	WY2023	WY2024	WY2025	Average WY2022-2025	Average WY2015-2025	WY2026
SLVWD	Olympia #2	Santa Margarita	131	78	67	81	89	189	189
SLVWD	Olympia #3	Santa Margarita	80	54	44	42	55	70	70
SLVWD	Pasatiempo #5A	Lompico	140	117	114	122	123	165	165
SLVWD	Pasatiempo #6	Lompico	0	0	0	0	0	20	0
SLVWD	Pasatiempo #7	Lompico	46	38	45	34	41	43	43
SLVWD	Pasatiempo #8	Lompico	42	109	88	63	75	48	68
SLVWD	Quail #4A	Santa Margarita	184	197	196	172	187	190	190
SLVWD	Quail #5A	Santa Margarita	110	106	124	99	109	103	103
SLVWD Total			*732*	*698*	*678*	*613*	*680*	*829*	*829*
SVWD	#10A	Lompico	233	237	325	299	273	299	286
SVWD	#11A	Lompico	0	1	4	7	3	19	0
SVWD	#11B	Lompico	213	260	182	287	236	256	0
SVWD	Orchard	Lompico/Butano	663	551	531	535	570	394	286
SVWD	Sucinto	Lompico/Butano	0	0	0	0	0	0	286
SVWD	Grace Way	Lompico/Butano	0	0	0	0	0	0	286
SVWD	#3B*	Lompico/Butano	0	0	0	0	0	92	0
SVWD	#7A*	Lompico/Butano	0	0	0	0	0	82	0
SVWD Total			*1,108*	*1,049*	*1,043*	*1,128*	*1,082*	*1,143*	*1,143*
MHA	MHA #2	Lompico	73	90	76	138	94	103	94
MHA	MHA #3	Lompico	81	58	77	28	61	42	61
MHA Total			*154*	*147*	*153*	*167*	*155*	*146*	*155*

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System or Water User	Well Name	Aquifer	Evaluation Cycle Extraction (AFY)					Current Extraction (AFY)	Projected Baseline Extraction (AFY)
			WY2022	WY2023	WY2024	WY2025	Average WY2022-2025	Average WY2015-2025	WY2026
SWS	Fern Grove 1 & 2	Santa Margarita	22	20	21	21	21	11	21
SWS	Hidden Meadow 1 & 2	Santa Margarita	5	5	6	6	5	4	5
SWS	Karls Dell	Santa Margarita	2	2	2	2	2	2	2
SWS	Love Creek Heights	Monterey	2	2	2	2	2	2	2
SWS	Mission Springs 1 & 2	Santa Margarita	10	7	9	10	9	24	9
SWS	Moon Meadows	Monterey	3	3	2	2	2	3	2
SWS	Roaring Camp	Lompico	47	34	30	31	36	38	36
SWS	Vista Robles Well 1	Santa Margarita	10	11	10	10	10	11	10
SWS Total			*100*	*85*	*82*	*83*	*87*	*96*	*87*
Landscape	Montevalle #3	Santa Margarita	38	38	38	38	38	28	20
Landscape	Spring Lakes #6	Lompico	46	46	46	46	46	46	20
Landscape	Vista Del Lago	Lompico	38	38	38	38	38	38	20
Landscape Total			*122*	*122*	*122*	*122*	*122*	*112*	*60*
Quarry	Quail Hollow Quarry	Santa Margarita	32	32	32	32	32	32	32
Quarry Total			*32*	*32*	*32*	*32*	*32*	*32*	*32*
Private	Santa Margarita	Santa Margarita	62	62	62	62	62	62	62
Private	Monterey	Monterey	87	87	87	87	87	87	87
Private	Lompico	Lompico	28	28	28	28	28	28	28
Private	Butano	Butano	26	26	26	26	26	26	26
Private	Purisima	Purisima	31	31	31	31	31	31	31
Private Total			*233*	*233*	*233*	*233*	*233*	*233*	*233*
Total Pumping			*2,475*	*2,366*	*2,342*	*2,377*	*2,392*	*2,590*	*2,539*

* SVWD #3B last pumped in WY2021 and replaced with SVWD Sucinto; SVWD #7A last pumped in WY2017 and replaced with SVWD Orchard

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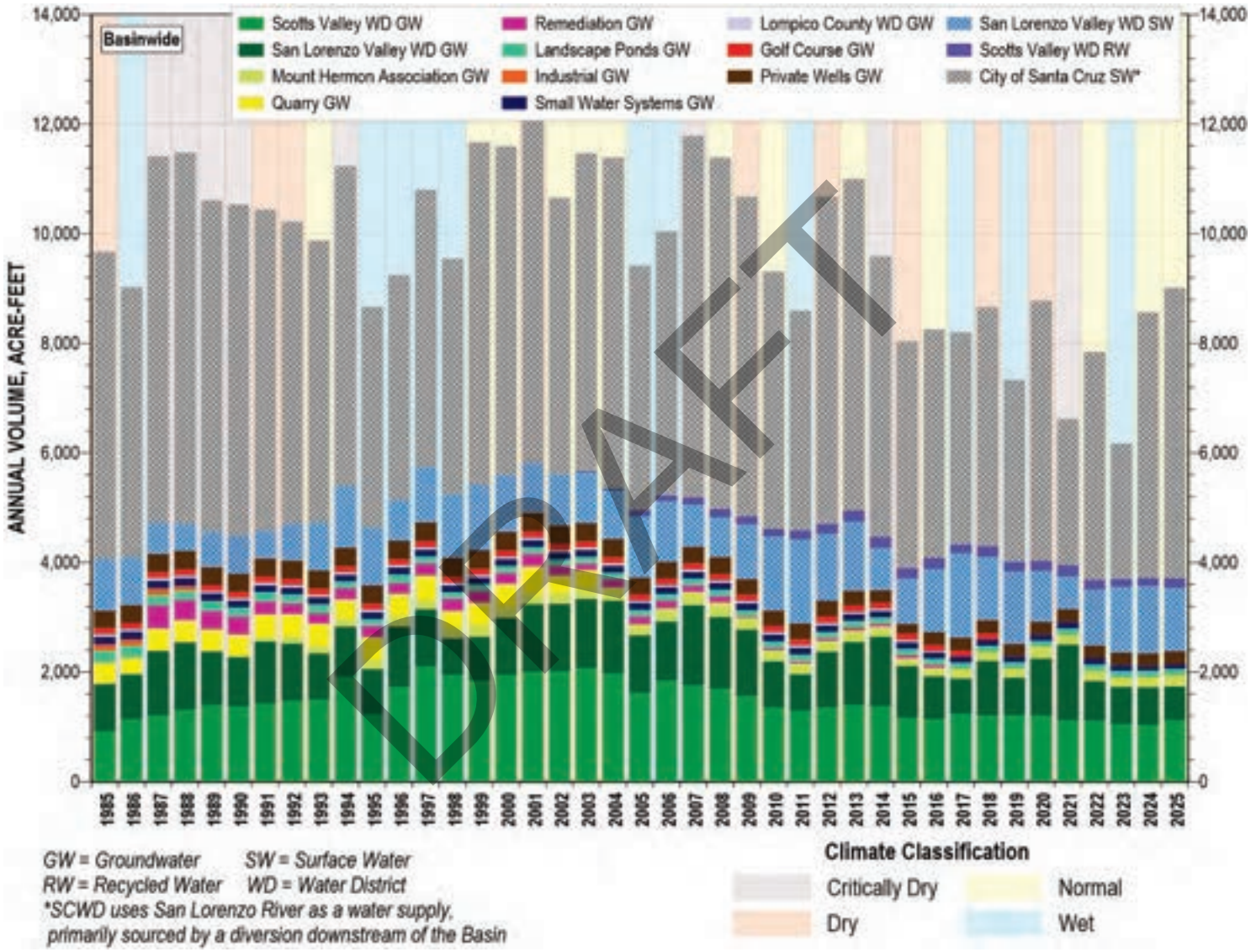


Figure 6-7. Total Basin Water Use, WY1985-2025

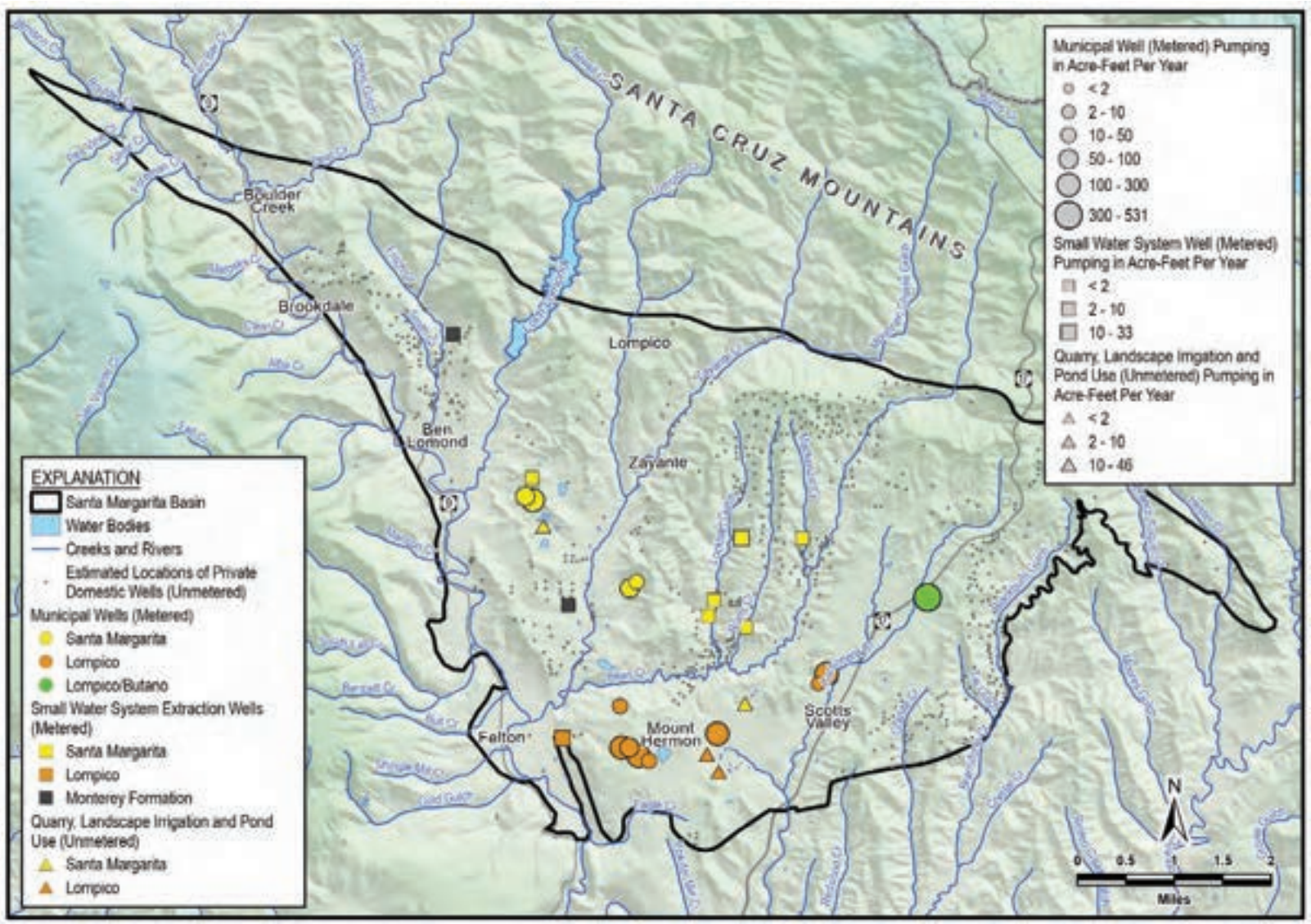


Figure 6-8. Groundwater Extraction Across the Santa Margarita Basin, WY2025

6.3.2 Projected Water Use

The 2027 GSP Amendment includes updated WY2026 to 2072 Projected Baseline Simulations, which are a projection of future conditions with future demand but no additional projects. The following updates were made to the Projected Baseline Simulations:

- Update starting groundwater levels and boundary flows in the Projected Baseline Simulation to match the end of the Current Basin Model (October 1, 2025). The 2022 GSP Projected Baseline Simulation started in WY2019.
- SVWD installed 2 new supply wells and plans to phase out 2 active supply wells, SVWD #11A and #11B. SVWD pumping locations and volumes are revised to incorporate new wells and align with planned operations.
- Projected simulations for the 2022 GSP assumed SVWD demands will increase 0.3% per year to keep up with growing population per the 2015 Urban Water Management Plan (UWMP) (SVWD, 2015). The revised Projected Baseline Simulation updates SVWD's annual extraction to reflect a lesser 0.14% increase per year to align with the 2025 UWMP (SVWD, 2026). SLVWD demand increase in the 2022 GSP Projected Baseline Simulation was 0.18% per year, which is still valid.
- Targeted outreach to other small water systems and industrial groundwater users updated the assumed volume extracted for some lower volume uses in the Basin. The revised Projected Baseline Simulation aligns water use with current understanding of Basin conditions.
- Private domestic pumping is assumed to remain the same in the GSP Projected Baseline Simulation, but the revised simulation assumes a modest 5% demand increase from 2026 to 2072 to account for uncertainty in future land use conversions and private water use.
- Modeled 2 projected conditions scenarios: 1) repeat of the historical climate from WY1985 to 2025 with updated future water demands and 2) projected conditions under a climate change scenario documented in the 2022 GSP.

6.3.3 Lompico/Butano Aquifer Extraction Distribution

Recent spinner surveys conducted following the construction and development of 2 new SVWD supply wells indicate that groundwater extraction from the Lompico and Butano aquifers is more evenly distributed than previously thought. Aquifer extraction estimates in the 2022 GSP assumed SVWD supply wells installed in the Lompico and Butano aquifer received approximately 40% of their water from the Lompico aquifer and 60% from the Butano aquifer. The dynamic spinner log data collected from the Sucinto and Grace Way wells indicates the

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distribution is more likely a 50/50 split between the aquifers during observed pumping conditions shown in Table 6-3 below and in Appendix 6A.

Table 6-3. Summary of Dynamic Spinner Log Analysis for Sucinto and Grace Way Wells

Well Name	Aquifer	Screen Interval (ft bgs)	Production (Gallons per Minute)	Flow Contribution (%)
Sucinto Well	Lompico	700 to 930	97	28
		930 to 1,050	77	22
	Subtotal Lompico	—		50
	Butano	1,070 to 1200	98	28
		1,200 to 1390	77	22
	Subtotal Butano	—		50
Grace Way Well	Lompico (Upper)	570 to 700	302	48
	Butano (Lower)	720 to 950	345	52

It should be noted that the 2027 GSP Amendment will not track the Lompico and Butano aquifers separately for evaluating the reduction in groundwater in storage SMC. This is largely because there is no distinct known separation between these aquifers (e.g., no confining unit). Rather, they are being combined with the Monterey Formation into a confined aquifer group, which is consistent with information evaluated for the Basin HCM. These estimates of volume extracted for wells is most relevant for the Basin groundwater model as these formations have been assigned to distinct model layers.

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7 MONITORING NETWORK ASSESSMENT

This section reviews the monitoring networks for the 5 sustainability indicators in the 2022 GSP: chronic lowering of groundwater levels, reduction of groundwater in storage, degraded groundwater quality, land subsidence, and depletion of interconnected surface water. Overall, the GSP-identified monitoring networks remain appropriate for assessing groundwater sustainability. Since GSP approval, several networks have been improved through targeted data gap filling. The subsections below assess each network to determine if it provides sufficient information to evaluate groundwater conditions.

The section is organized into consistent subsections to review the following information:

1. Existing network – describes the monitoring network in the GSP
2. Improvements – summarizes data gap filling efforts and other improvements to networks during the Evaluation Period
3. Data Gaps Remaining – identifies any remaining data gaps
4. Amendments – provides network updates and rationale for GSP Amendment

7.1 Groundwater Level Monitoring Assessment

Groundwater levels are collected to evaluate the chronic lowering of groundwater levels SMC and as a proxy for monitoring ISW depletion. This section only describes the chronic lowering of groundwater levels network, the monitoring network for ISW depletion is assessed in Section 7.4.

7.1.1 Existing Groundwater Level Monitoring Network

The SMGWA relies on an established groundwater level monitoring network that was developed and documented in the 2022 GSP to evaluate groundwater conditions and track progress toward sustainability. This section summarizes the existing monitoring network.

The 2022 GSP monitoring network comprises municipal supply wells, dedicated monitoring wells, and select private and small water system wells in each of the Basin's principal aquifers and the Monterey Formation. A subset of the groundwater level monitoring network was designated as RMPs for evaluation of SMCs related to chronic lowering of groundwater levels. The broader groundwater level monitoring network, which includes all wells including those that are not designated as RMPs, is used to provide spatial context for groundwater conditions, improve understanding of aquifer specific responses to pumping and recharge, and support interpretation of RMP groundwater level trends. Together, the monitoring networks provide the technical basis for evaluating groundwater sustainability in the Basin. Table 7-1 summarizes the

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wells that make up the GSP monitoring network, including RMPs and changes being made in the 2027 GSP Amendment, discussed further below. Note that in the 2027 GSP RMP column, there is no distinction of wells used for ISW RMPs. This is because all RMPs will be used to assess both groundwater levels and depletion of ISW sustainability indicators.

Table 7-1. Summary of 2022 GSP and 2027 GSP Amendment Groundwater Level Monitoring Network

Aquifer Type	Aquifer Unit	Well Name	Well Type (Status Change)	2022 GSP RMPs	2027 GSP RMPs
Unconfined	Santa Margarita	SLVWD Olympia #1	Monitoring (Addition)		X
		SLVWD Olympia #2	Extraction		
		SLVWD Olympia #3	Extraction	X	
		SLVWD Pasatiempo MW-2	Monitoring	X	X
		SLVWD Quail #4A	Extraction		
		SLVWD Quail #5A	Extraction		
		SLVWD Quail MW-A	Monitoring	X (ISW)	X
		SLVWD Quail MW-B	Monitoring	X	X
		SLVWD Quail MW-C	Monitoring		
		SMGWA-2 Bean Creek	Monitoring (New)		X
		SMGWA-3 Ruins Creek	Monitoring (New)		X
		SMGWA-4 Nelson Road	Monitoring (New)		X
		SMGWA-5 Bahr Drive	Monitoring (New)		X
		SMGWA-6 Quail Hollow	Monitoring (New)		X
		SVWD AB303 MW-1	Monitoring		X
		SVWD AB303 MW-3B	Monitoring		
		SVWD SV4-MW	Monitoring	X (ISW)	X
		SVWD TW-18	Monitoring	X	X
Confined	Monterey	SMGWA-8 Sandhills Preserve	Monitoring (New)		X
		SVWD #9	Monitoring (Was Inactive Extraction)	X	X
	Lompico	MHA #1	Extraction		
		MHA #2	Extraction		
		MHA #3	Extraction		
		MHA-MW1	Monitoring		
		SLVWD Pasatiempo #3	Monitoring (Addition)		X
		SLVWD Pasatiempo #5A	Extraction		
		SLVWD Pasatiempo #7	Extraction		
		SLVWD Pasatiempo #8	Extraction		
		SLVWD Pasatiempo MW-1	Monitoring	X	X
		SVWD #10	Monitoring	X	X
		SVWD #10A	Extraction		
		SVWD #11A	Extraction	X	X
		SVWD #11B	Extraction		

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Aquifer Type	Aquifer Unit	Well Name	Well Type (Status Change)	2022 GSP RMPs	2027 GSP RMPs
		SVWD AB303 MW-2	Monitoring		X
		SVWD AB303 MW-3A	Monitoring		X
		SVWD TW-19	Monitoring	X	X
	Lompico, Butano	SVWD #15 Monitoring Well	Monitoring	X	
		SVWD Orchard Well	Extraction		
		SVWD Grace Way	Extraction		
		SVWD Sucinto	Extraction		
	Monterey	SVWD Canham Well	Monitoring	X	X
		SVWD Stonewood Well	Monitoring	X	X

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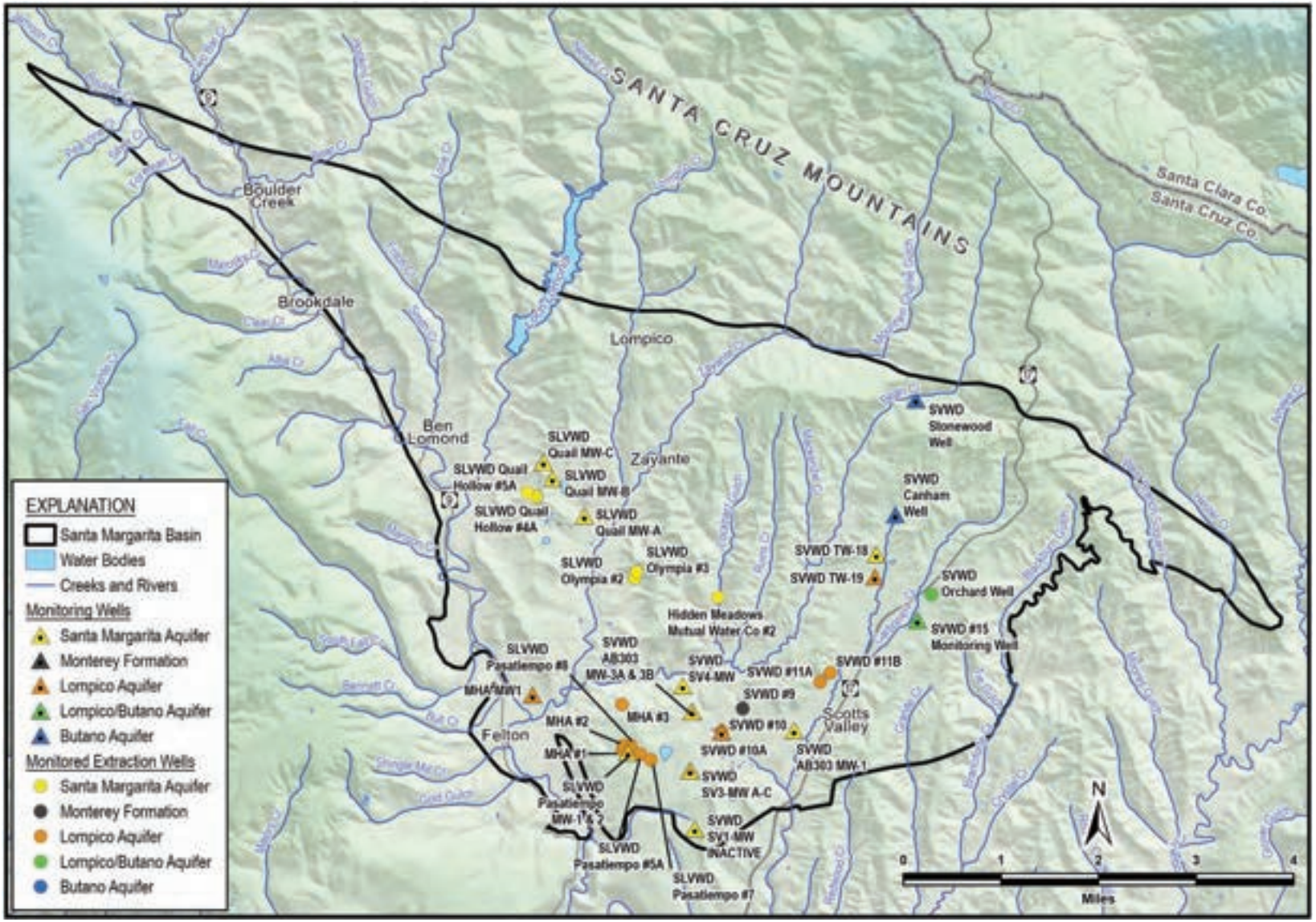


Figure 7-1. 2022 GSP Groundwater Monitoring Network

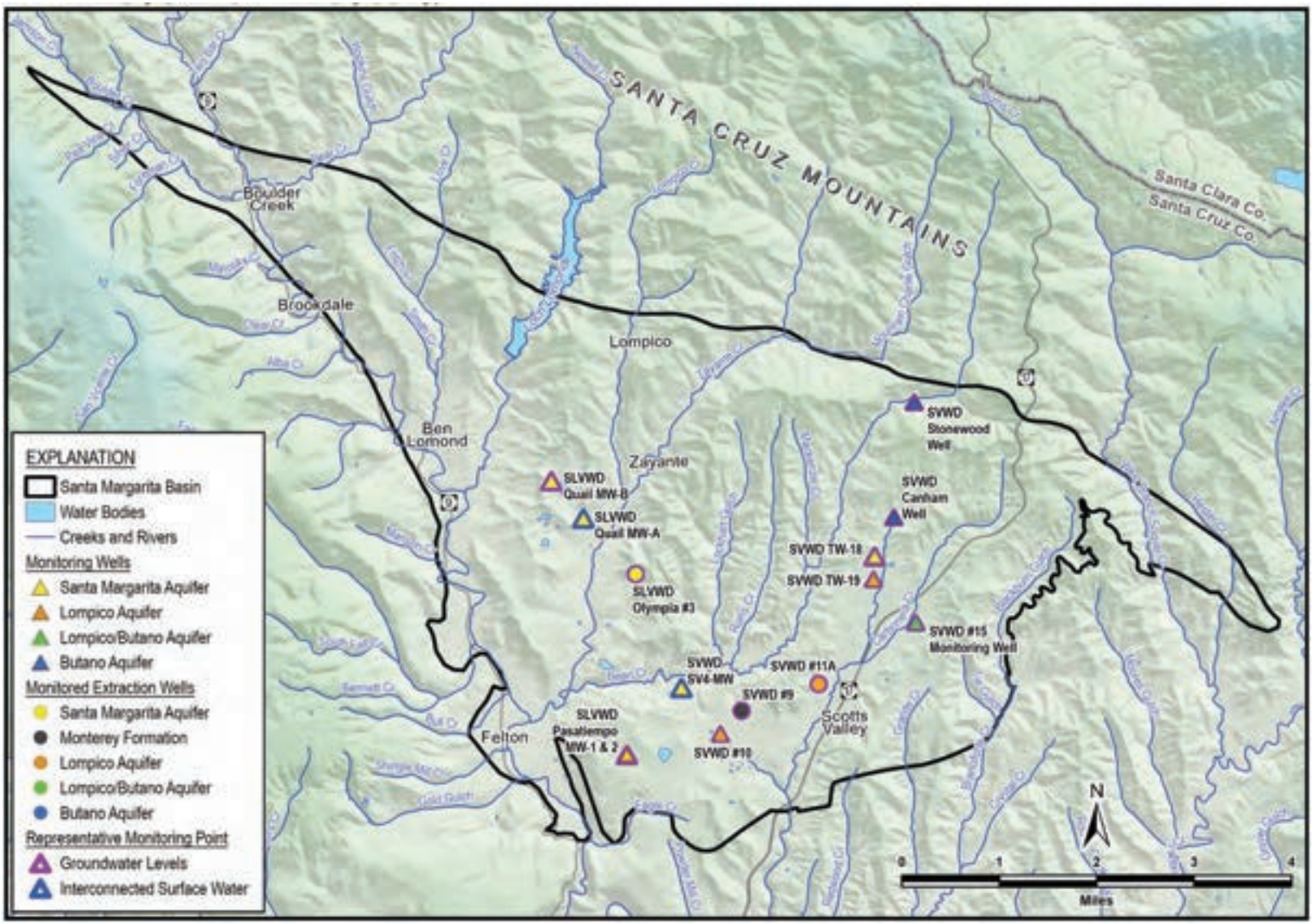


Figure 7-2. 2022 GSP Groundwater Monitoring RMP Network

7.1.2 Improvements to Groundwater Level Monitoring Network

The 2022 GSP identified groundwater level monitoring data gaps in 9 areas. Eight locations were identified in the Santa Margarita aquifer and Monterey Formation that either support private domestic wells or potential interconnected streams. The 2022 GSP noted that improved monitoring in these locations would help evaluate impacts to beneficial users in areas where little historical monitoring has been performed historically. There are also few dedicated Butano monitoring wells near SVWD extraction wells screened in the Lompico and Butano aquifers. The need for a deep Butano aquifer monitoring location needs to be balanced with the cost of installing a monitoring well in the deep confined aquifer.

SMGWA received Proposition 68 funding from DWR to address these data gaps. Sites for 9 new monitoring wells were selected in WY2021, shortly after the GSP was submitted. In WY2022, SMGWA acquired site access, developed well installation technical specifications, prepared public bid documents, and coordinated well permits for 8 of the sites. SMGWA was unable to find a suitable location for a new dedicated Monterey Formation monitoring well on Weston Road in the northern portion of the Basin where there is concentrated private well use.

In WY2023, SMGWA installed 7 monitoring wells in the Santa Margarita aquifer and Monterey Formation (SMGWA-2 through -8). The wells were equipped with dataloggers for frequent groundwater level measurement. The well installation report is available online at https://www.smgwa.org/media/DocumentsReports/santa-margarita_well-installation-report_final.pdf. In WY2024, the County of Santa Cruz identified a private domestic well owner in the Weston Road area that will allow County staff to collect semi-annual groundwater level measurements to fill that data gap. This well filled the data gap identified in the GSP.

Additional existing monitoring locations were also incorporated into the existing networks that were either not identified or were being underutilized in the 2022 GSP. Several groundwater level monitoring wells that have been used historically, including SLVWD Pasatiempo #3, SVWD AB303 MW-2 and SVWD AB303 MW-3A, were not identified as RMPs in the GSP. These wells are completed in principal aquifers and have long-term, reliable groundwater level records. These existing wells were added to the RMP network to improve groundwater level monitoring coverage without the need to install new wells.

The RMP network was also updated to reduce potential influences from extraction well operations on groundwater level measurements. SLVWD Olympia #3, which was identified as an RMP in the 2022 GSP, is an active municipal supply well. SLVWD Olympia #3 is replaced with SLVWD Olympia #1 as an RMP. Olympia #1 is an inactive supply well located near Olympia #3 and is screened in the same aquifer. The Lompico/Butano SVWD #15 monitoring well is located on the same property as the new SVWD Sucinto supply well and also responds to

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pumping at nearby SVWD Orchard. SVWD #15 is also screened from a depth of 700 to 1,100 feet below ground surface in both the Lompico and Butano aquifers, so it is not possible to discern which aquifer levels are represented. This well is no longer an RMP because it does not provide reliable data for monitoring static groundwater conditions as these wells are almost always in service.

SMGWA still desires to install a deeper Butano aquifer monitoring well to address a data gap identified in the 2022 GSP. On September 26, 2023, SMGWA requested direct assistance from the DWR's TSS program to install this well, but has yet to hear whether this request will be fulfilled.

7.1.3 Data Gaps Remaining in Groundwater Level Monitoring Network

The deeper Butano aquifer monitoring data gap has not been addressed yet. On September 26, 2023, SMGWA requested direct assistance from the DWR's TSS program to install this well.

7.1.4 Amendments to Groundwater Level Monitoring Network

The groundwater level monitoring network is being revised in the GSP Amendment. The monitoring network and SMC amendments provide a more robust and regionally representative framework for evaluating groundwater conditions and tracking progress toward sustainable groundwater management.

The amended monitoring network is grouped into 2 different hydrogeologic units for SMC evaluation – the Shallow / Unconfined Monitoring Network and Deeper / Confined Monitoring Network. The 2 consolidated network designations are used to evaluate groundwater level URs as described in Section 4.3.3. The Unconfined and Confined aquifer terminology is a generalization. The Santa Margarita is unconfined throughout the Basin and the deeper Monterey Formation and Lompico and Butano aquifers are generally confined in the areas where they are monitored and used for water supply. However, each of the "Confined" geologic units outcrop within the Basin at the margins and where the Santa Margarita aquifer is not present, and there is also direct contact between the Lompico and Santa Margarita aquifers in the South Scotts Valley area where the Monterey Formation is not present. Therefore, all the "Confined" hydrogeologic units can be unconfined or semi-confined in limited areas within the Basin.

The RMP and GSP monitoring network locations are also updated to improve spatial coverage, data reliability, and representation of groundwater conditions across the Basin. These updates include the addition of new monitoring wells to address data gaps, incorporation of a few existing wells with long-term records, and removal or replacement of monitoring wells influenced by active pumping or exhibiting non-representative conditions. The amended RMP and GSP monitoring networks are summarized in Table 7-1 and shown on Figure 7-3 and Figure 7-4, respectively.

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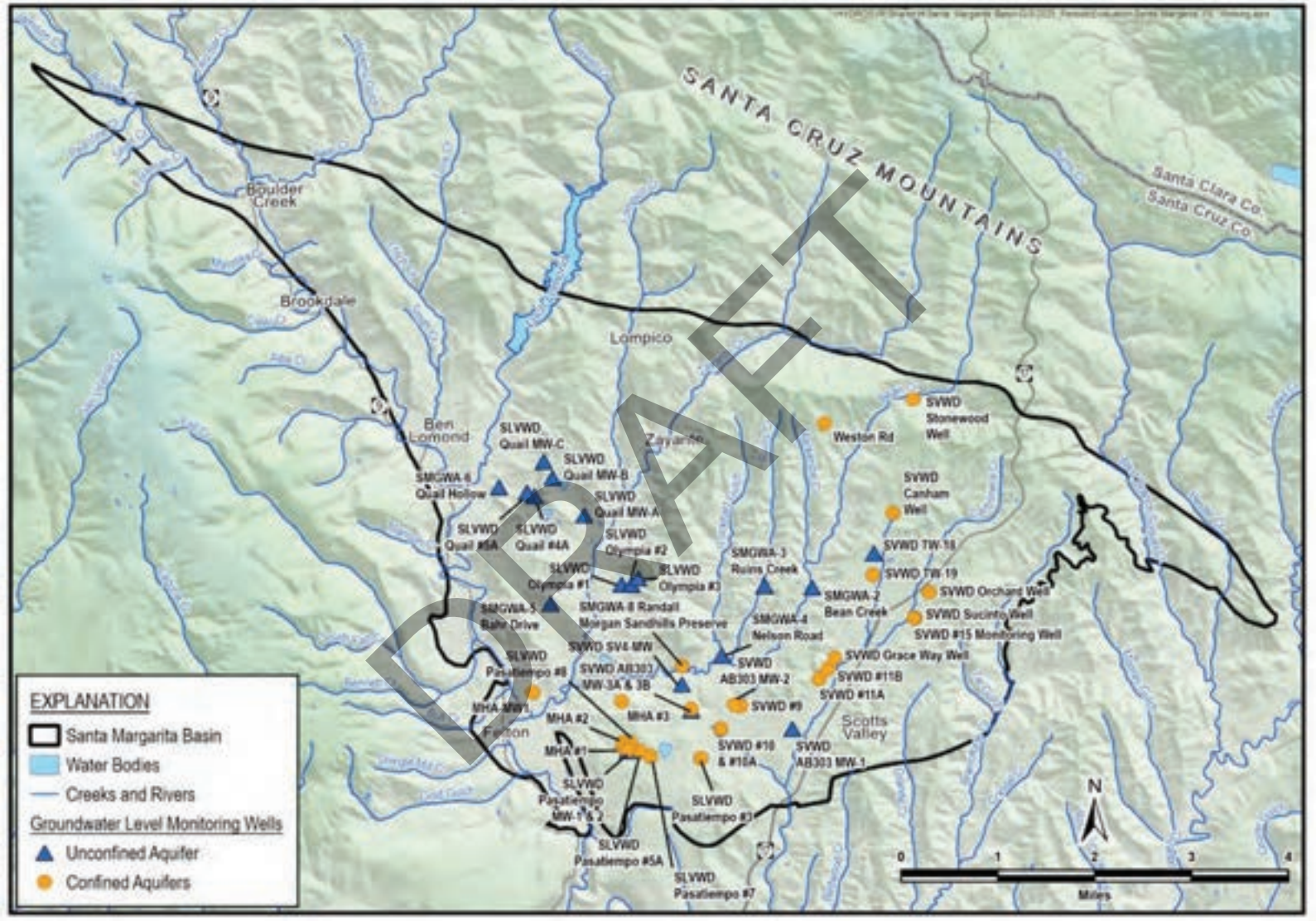


Figure 7-3. Amended Groundwater Level Monitoring Network (Unconfined and Confined)

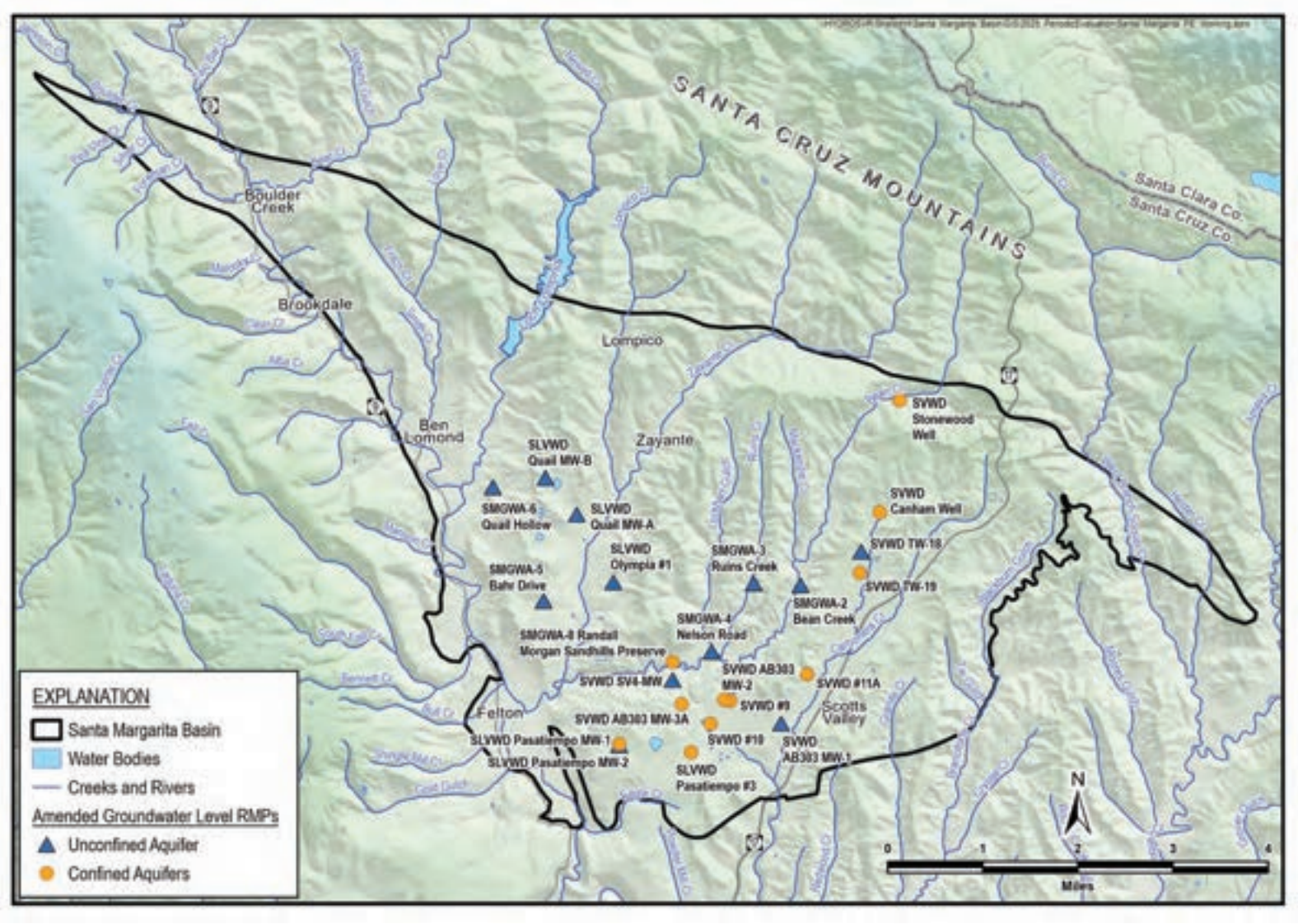


Figure 7-4. Amended Groundwater Level RMPs

7.2 Reduction of Groundwater in Storage Monitoring Assessment

Per GSP regulations, the quantitative metric for reduction of groundwater in storage is an annual volume of groundwater extracted. The volume of groundwater extracted is measured using flow meters where available and estimated where direct measurements are not available. Lower volume private and industrial extraction wells do not have flow meters, so assumptions are made about water demand to estimate groundwater extraction.

7.2.1 Existing Groundwater in Storage Monitoring Network

The SMC for groundwater extraction are annual extraction volumes from the principal aquifers. Therefore, the RMPs are all supply wells in the Basin's principal aquifers, including known public and non-*de minimis* extraction wells and estimated private well locations. The location of the groundwater extraction well monitoring network is shown on Figure 7-5.

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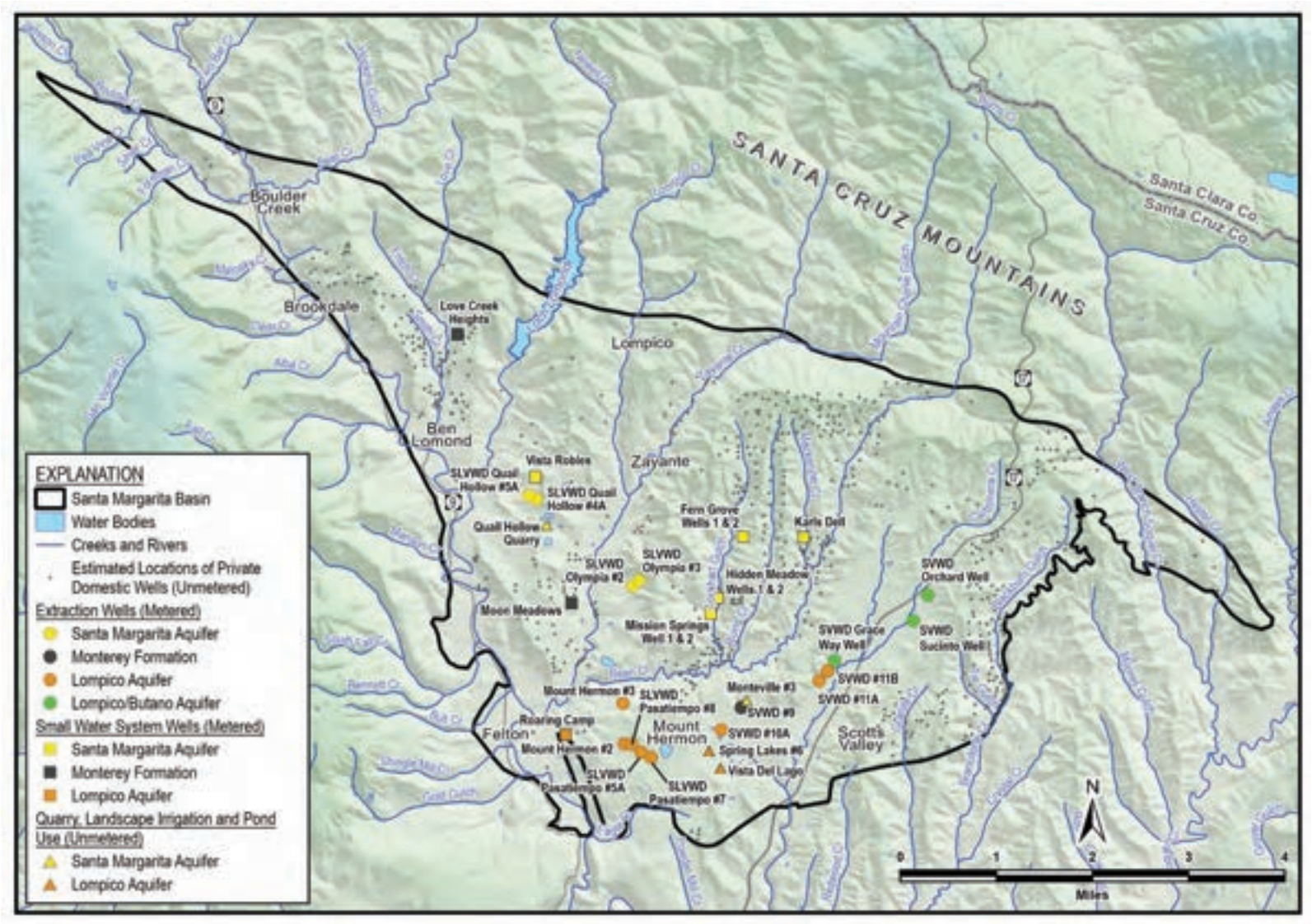


Figure 7-5. Groundwater Extraction Monitoring RMP Network

7.2.2 Improvements to Groundwater Extraction Monitoring Network

Groundwater extraction in the Basin is represented in the Basin Model by a combination of measured municipal pumping and estimated non-municipal pumping to support simulation of basin-wide water budgets, groundwater elevations, and storage change calculations. Municipal supply pumping is directly metered at each well and reported, while extraction from private domestic wells, small water systems, and other non-domestic users is represented using established estimates consistent with GSP assumptions. Private domestic use is treated as an aggregated category and represents a meaningful share of total extraction. Because the Purisima Formation is limited in extent within the Basin, groundwater pumped from it is not tracked separately and is instead included within the broader private domestic use category. This approach ensures that all non-*de minimis* groundwater extraction is accounted for at the basin scale, even where individual wells are not metered.

From WY2021 through WY2025, updates to groundwater extraction volumes for small water systems and industrial users have been limited, with methods and assumptions remaining largely consistent. Reported extraction volumes for small water systems have remained relatively stable, varying only slightly from year to year in response to minor demand fluctuations. These values are generally on the order of approximately 80 to 90 AFY and are based on metered data reported to the County. Because these data are available on a calendar-year basis, water year totals are developed by supplementing current-year reported data with data from the previous reporting period to represent the full water year. As a result of this reporting approach, and because overall demand is relatively consistent, annual updates are minor and do not affect basin-wide water budgets.

For non-domestic private groundwater users, including landscape irrigation, small commercial uses, and pond filling, extraction volumes have remained constant at approximately 122 AFY throughout WY2021–WY2025. These values are not directly metered and derived from GSP-established estimates based on WY2018 conditions. They remain unchanged because no new data have become available and land use patterns and water demand conditions have not changed in the Basin's rural areas.

For quarry operations, extraction estimates were updated in WY2024, increasing from earlier assumed values of 25 AF to 32 AF based on revised estimates. This updated value was retained in WY2025 without further modification and represents the only substantive revision to industrial user extractions during the WY2021-WY2025 period.

Extraction from small water systems and industrial users has remained both minor in volume and stable in methodology, consistently representing only a small share of total basin extraction—generally on the order of 10% or less. Recent updates are limited to small refinements, such as

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revising the quarry pumping estimate, rather than any change in the underlying estimation approach. Given the absence of metering and the relatively stable nature of these demands, continued reliance on the established estimates remains appropriate.

7.2.3 Data Gaps Remaining in Groundwater Extraction Monitoring Network

There are no identified data gaps in the groundwater extraction monitoring network.

7.2.4 Amendments to Groundwater Extraction Monitoring Network

Since adoption of the 2022 GSP, SVWD has updated their extraction well system to add 2 new wells and remove 2 existing wells:

- Extraction well SVWD #3B, which was inactive since WY2021, was destroyed and replaced by SVWD Sucinto, which is similarly screened in the Lompico and Butano aquifers, in WY2024.
- New extraction well SVWD Grace Way is screened in the Lompico and Butano aquifers.
- The pump was pulled from inactive Monterey extraction well SVWD #9, converting it to a dedicated monitoring well.

SVWD's extraction well network continues to be metered and extraction volumes are used for evaluating the reduction in storage sustainability indicator and incorporated into Basin Model historical and projected simulations. No other changes are made to the extraction well monitoring network identified in the GSP.

7.3 Groundwater Quality Monitoring Network Assessment

Groundwater quality sampling is conducted routinely in public drinking water supply wells. There are no spatial data gaps in the groundwater quality monitoring network as it solely relies on data collection from public supply wells for evaluating groundwater conditions.

7.3.1 Existing Groundwater Quality Monitoring Network

The GSP groundwater quality monitoring network includes 21 wells including municipal and small systems with historical monitoring and infrequent required sampling intervals. Nine SLVWD and SVWD extraction wells were defined as RMPs in the 2022 GSP, with some active extraction wells omitted because there was insufficient data (SLVWD Pasatiempo #8) or redundancy with other locations (SLVWD Quail Hollow #4A and Olympia #2). The RMPs are representative as they are distributed in the areas and extract from aquifers where most of the Basin's groundwater extraction occurs. The GSP monitoring network is shown on Figure 7-6 and the RMP network on Figure 7-7.

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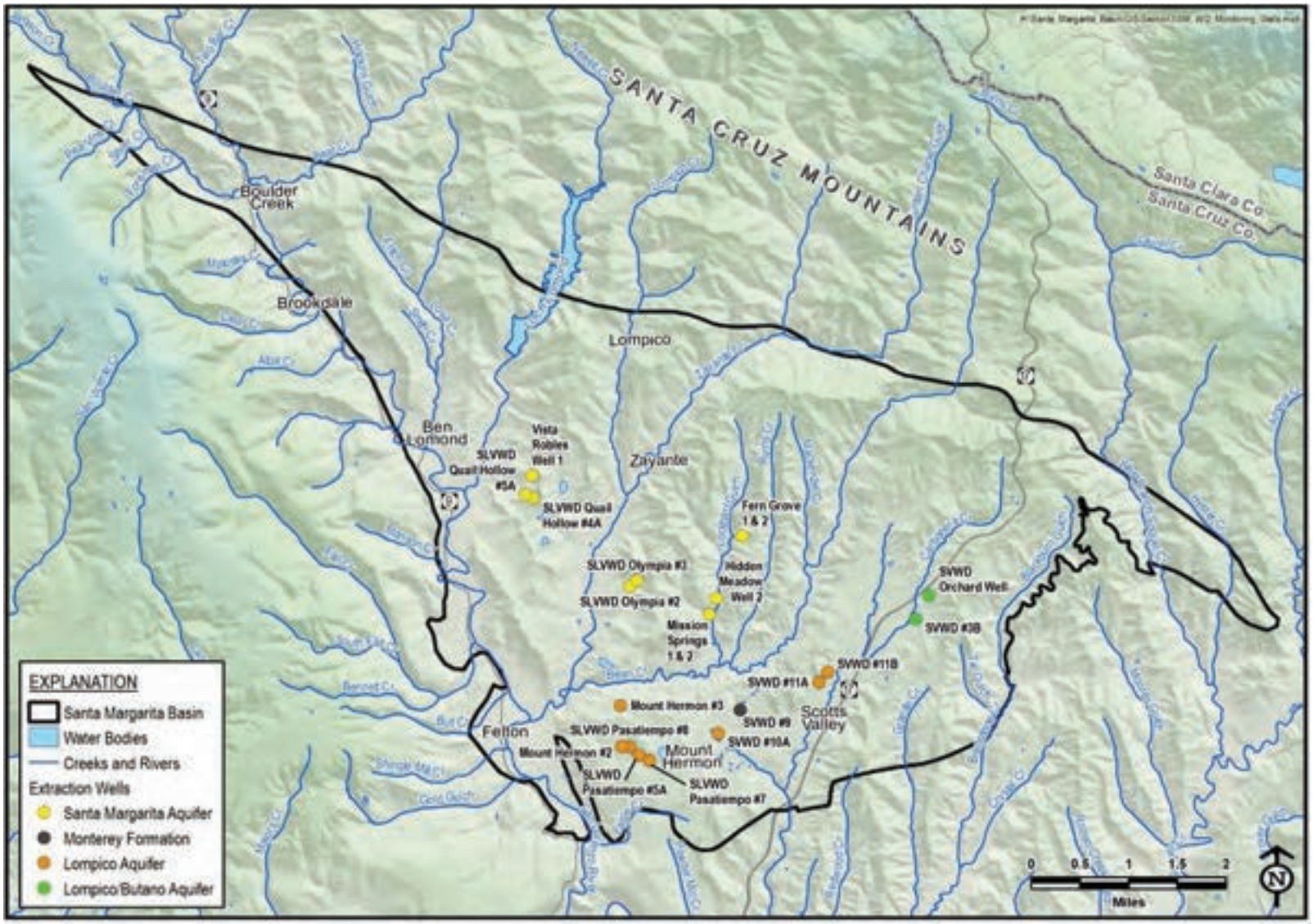


Figure 7-6. 2022 GSP Groundwater Quality Monitoring Network

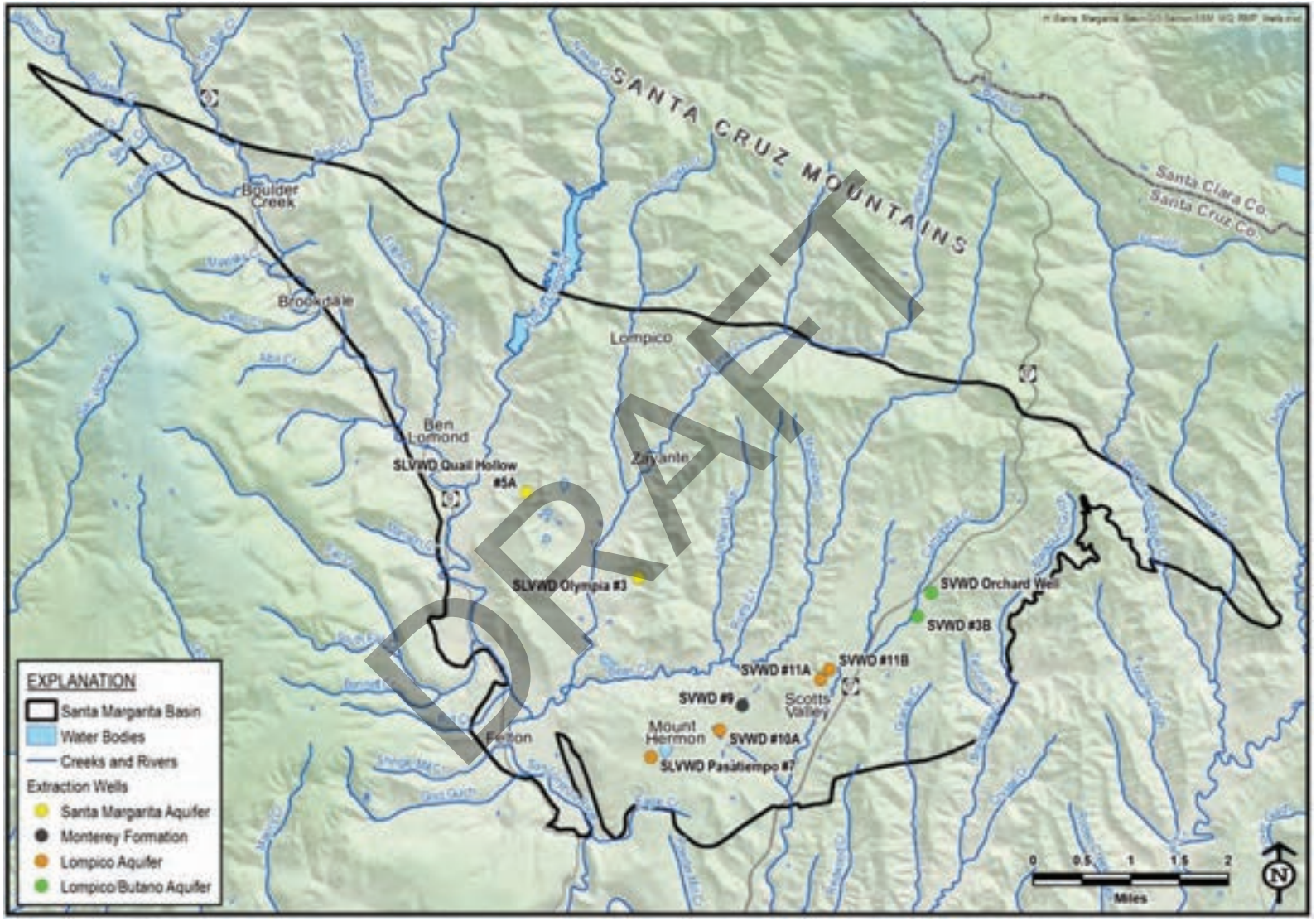


Figure 7-7. 2022 GSP Groundwater Quality Monitoring RMP Network

7.3.2 Improvements to Groundwater Quality Monitoring Network

Improvements to the GSP monitoring network are made to align the network with the active municipal extraction wells:

- Addition of SLVWD Pasatiempo #8 which did not have sufficient data to establish SMC during 2022 GSP development.
- SLVWD Quail Hollow #5A, Olympia #2, and Pasatiempo #7A are being added as RMPs to increase the number of wells monitored for groundwater quality.
- SVWD #3B was destroyed in WY2024 and replaced with SVWD Sucinto.
- SVWD Grace Way was installed in WY2025 but has yet to be incorporated into SVWD's system so will be added to the RMP network during the next evaluation period.

SVWD #9 is no longer being used for public supply or sampled routinely, so is being removed from the GSP groundwater quality monitoring network.

7.3.3 Data Gaps Remaining in Groundwater Quality Monitoring Network

The groundwater quality monitoring network consists of public supply wells that are routinely sampled, so there are no data gaps.

7.3.4 Amendments to Groundwater Quality Monitoring Network

The 2027 GSP Amendment includes 13 RMPs summarized in Table 4-7. The small water system wells identified in the GSP water quality monitoring network are being retained as non-RMP and will be evaluated when data is available.

7.4 Depletion of Interconnected Surface Water Monitoring Network Assessment

Depletion of ISW is assessed using groundwater elevations as a proxy. The 2022 GSP relied on 2 RMPs for this sustainability indicator and identified data gaps near likely interconnected stream reaches. Four dedicated monitoring wells installed in 2023, 2 of them paired with stream gages, addressed those gaps. The ISW monitoring network is being amended to rely on all groundwater level RMPs and extraction by principal aquifer, integrating the ISW approach with the groundwater level and reduction in storage monitoring networks described in Sections 7.1 and 7.2.

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7.4.1 Existing Interconnected Surface Water Monitoring Network

The 2022 GSP identifies the 2 RMPs using groundwater elevations as a proxy for monitoring depletion of interconnected surface water and several data gaps in the monitoring network that were addressed through monitoring well installation.

7.4.2 Improvements to Interconnected Surface Water Monitoring Network

Dedicated monitoring wells were installed in 2023 to address ISW data gaps identified in the GSP (Section 7.1.2). Four well locations shown on Figure 7-3 were selected to improve monitoring networks near likely interconnected stream reaches:

- SMGWA-2 – Bean Creek: Monitor Santa Margarita aquifer near Bean Creek in an area with concentrated private domestic pumping and adjacent to Bean Creek which is connected to surface water. The reach of Bean Creek near the new well periodically dries up in summer months. A stream gage installed in Bean Creek near the monitoring well in 2022 allows collection of coupled stream stage and groundwater level measurements.
- SMGWA-4 – Nelson Road: Monitor Santa Margarita aquifer groundwater levels near the confluence of Bean Creek and Lockhart Gulch in an area with concentrated private domestic pumping and the interconnected surface water of Bean Creek.
- SMGWA-5 – Bahr Drive: Monitor Santa Margarita aquifer groundwater levels near Zayante Creek in an area with concentrated private domestic pumping and likely interconnection with Zayante Creek. The well is near an area where groundwater seeps out of the valley side into Zayante Creek upstream of its confluence with Bean Creek.
- SMGWA-6 – Quail Hollow: Monitor Santa Margarita aquifer downgradient of SLVWD's Quail Hollow wellfield and likely interconnection with Newell Creek. A coupled stream gage in Newell Creek was upgraded in 2020 to allow stream stage data to be collected and compared to groundwater level measurements from the monitoring well.

7.4.3 Data Gaps Remaining in Interconnected Surface Water Monitoring Network

There are no remaining data gaps in the amended ISW monitoring network as it was presented in the 2022 GSP. With the amended comprehensive groundwater level monitoring approach described in Section 7.1.4, the only data gap in the groundwater level monitoring network being used as a proxy for the ISW indicator is a dedicated Butano aquifer monitoring well in the North Scotts Valley area. Extraction and groundwater levels in the deep confined aquifer in this area should have minimal short-term influence on ISW depletion, so filling the data gap does not prevent effective ISW management.

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7.4.4 Amendments to Interconnected Surface Water Monitoring Network

The ISW monitoring network is being amended to use all groundwater level RMPs and tracking of extraction by principal aquifer to integrate the approach for achieving and demonstrating sustainability with the groundwater level and reduction in storage monitoring networks and SMC as described in Sections 7.1.4 and 7.2.4. Using all groundwater level RMPs will help ensure that there are no unexpected gradients emerging that could cause significant and unreasonable surface water depletions. Monitoring groundwater extraction volumes to ensure they remain lower than pre-SGMA and are within the projected sustainable yield of the Basin, will help prevent significant and unreasonable surface water depletions.

7.5 Other Monitoring Assessment

Other monitoring performed in the Basin not linked to specific sustainability indicators includes streamflow and GDE monitoring.

7.5.1 Streamflow Monitoring Assessment

The 2022 GSP identified 4 streamflow gages (San Lorenzo River above Love Creek, Newell creek above San Lorenzo River, Zayante Creek at Woodwardia, and Bean Creek at Mount Hermon Camp) for monitoring during the dry season (May through October), and 1 location (Bean Creek below MacKenzie Creek) for year-round monitoring to support ISW evaluation.

Dry season monitoring was conducted for 6 years from 2020 through 2025. The year-round gage on Bean Creek was monitored from late 2022 through mid-2026. Annual reports for each year are available on-line at https://www.smgwa.org/basinmonitoring. The monitoring demonstrates that the tributaries contribute to groundwater baseflow under all water year conditions.

SMGWA stream monitoring locations provided valuable confirmation of groundwater baseflow contributions to local streams and were also used to understand the ISW relationship in shallow wells constructed by SMGWA in 2023, but the gages are no longer needed for ongoing Basin management. At its May 28, 2026 meeting, the SMGWA Board accepted the recommendation to discontinue active stream monitoring with the future provision that if fall groundwater level measurements approach an MT in monitoring wells near the main interconnected streams—Newell Creek, Zayante Creek, or lower Bean Creek—SMGWA will take the following actions:

- Increase groundwater level monitoring frequency to monthly at the well
- Prepare for monthly streamflow monitoring the following season near the specific well (if conditions do not improve over winter)
- Coordinate with City of Santa Cruz on monitoring related to the City HCP

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One potential streamflow monitoring data gap along Carbonera Creek identified in the 2022 GSP was addressed with the addition of a stream monitoring site in the 2024 and 2025 dry seasons. However, SMGWA has determined that the reasoning for identifying the data gap was erroneous. The original basis was the presence of springs near the Glenwood Preserve that if groundwater-fed could potentially be impacted by municipal supply pumping in the vicinity. A review of 2 well logs constructed near the springs near Carbonera Creek during this periodic evaluation, indicated that the springs are supported by groundwater discharge along the impermeable surface of the Monterey Formation (i.e., these are basal springs). A domestic well drilled to 400 feet deep near the site in 2018 had a standing water level of 35 feet below groundwater surface (bgs), whereas an exploratory municipal well drilled near the site in 2012 that was completed as a monitoring well at a depth of 1,390 feet had a standing water level of 368 feet bgs. It is clear that the source of the spring is perched groundwater with substantial separation from the water table from which public supply is drawn. Given that groundwater extraction would have no effect on the spring, streamflow in this area will no longer be monitored.

7.5.2 GDE Monitoring Assessment

The 2022 GSP identifies that groundwater is closely connected to streams throughout the Basin, particularly through the Santa Margarita aquifer, which supplies much of the summer and fall baseflow to creeks. Because of this connection, protecting groundwater elevations that support stream baseflow is the primary mechanism for protecting GDEs. Rather than creating a separate GDE monitoring network, the GSP leverages existing programs, including the County's Juvenile Steelhead and Stream Habitat Monitoring Program, which has collected fish and habitat data since 1994. The GSP notes that these datasets can be used to better understand relationships among groundwater conditions, streamflow, habitat conditions, and presence/absence of priority species.

The 2022 GSP identified that the health of GDEs would be monitored by direct semi-annual field observations at priority GDE locations and by using publicly available satellite derived normalized Difference Vegetation Index (NDVI) data. County staff made these field observations from 2022 through 2025. An assessment of GDE vegetation health was conducted over the 2020 to 2025 evaluation period using NDVI data. Results indicate that vegetation health remained consistently high throughout the evaluation period, including during drier conditions in WY2020 and WY2021. Across the Basin, approximately 99% of mapped GDE vegetation was classified as “Very Healthy” each year, with less than 1% of GDEs classified as “Moderately Healthy” or “Poor Health” each year. No persistent, or worsening trends were identified during dry or critically dry water years, and conditions remained stable through subsequent normal and wet years. Taken together, these results indicate that groundwater conditions during the

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evaluation period did not result in significant and unreasonable impacts to GDEs in the Basin. Additional details on this assessment are provided in Appendix 7A.

A key outcome of this periodic evaluation is that the NDVI assessment results were consistent with County staff observations. Because the NDVI assessment method is more cost-effective, at its May 28, 2026 meeting, the SMGWA Board accepted the recommendation to discontinue field data collection and continue to rely on assessment from NDVI data.

The County's Juvenile Steelhead and Stream Habitat Monitoring Program measures juvenile steelhead density annually across more than 40 sites throughout the San Lorenzo, Soquel, Aptos, and Pajaro watersheds, and assesses habitat conditions for steelhead and coho salmon to inform conservation priorities countywide. The lower portion of the San Lorenzo watershed occurs within the Basin. The San Lorenzo River juvenile steelhead summary below is sourced from the D.W. Alley & Associates 2022 and 2025 Summary Reports (D.W. Alley and Associates, 2023 and 2026).

Over the evaluation period, juvenile steelhead densities closely followed baseflow. This relationship is shown on Figure 7-8 which compares the production index for Size Class II/III juveniles across 17 San Lorenzo River reaches (6 mainstem and 11 tributary) against baseflow.

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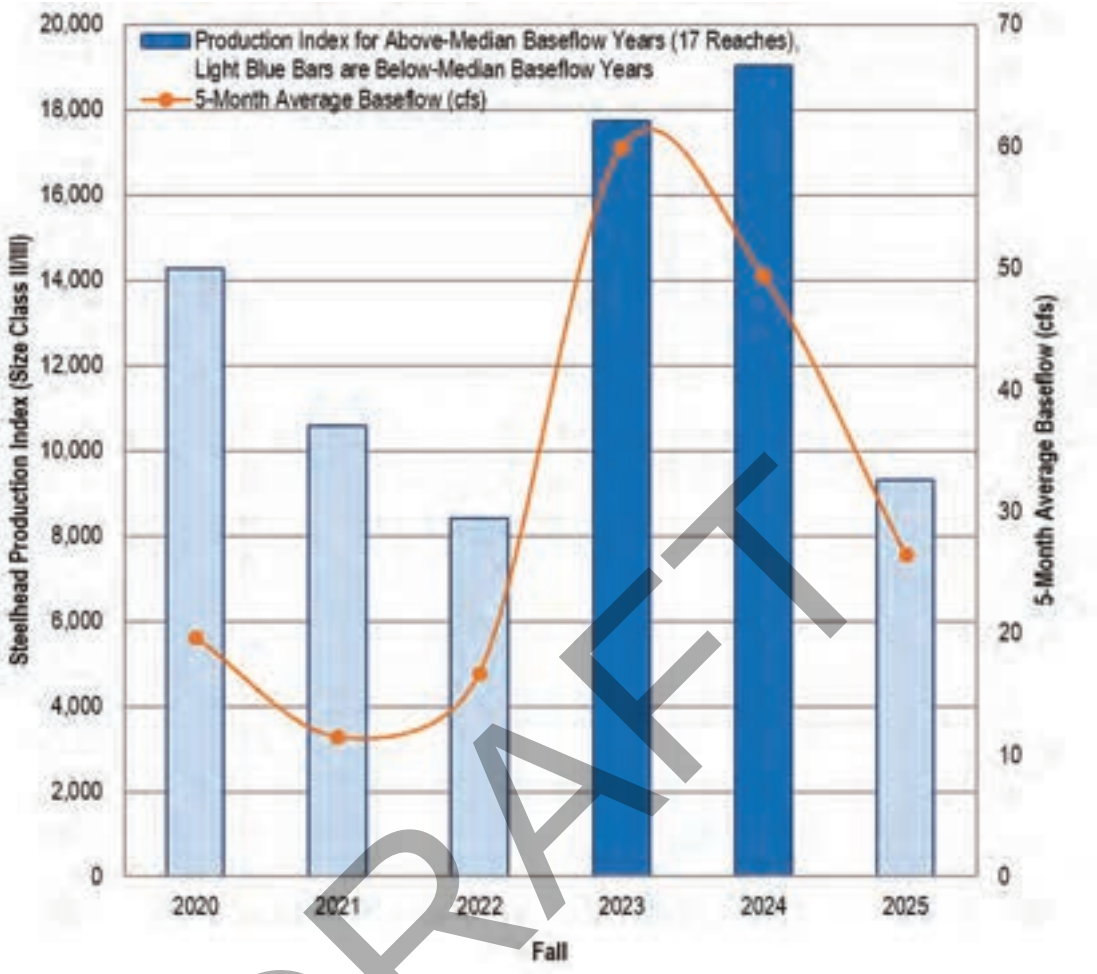


Figure 7-8. San Lorenzo River — Juvenile Steelhead Production, 2020–2025

Habitat conditions were impacted by the August 2020 CZU Lightning Complex wildfire which burned significant portions of the Boulder Creek and Fall Creek sub-drainages. Fire effects on hydrology were evident as early as 2022—when baseflow downstream of the Boulder Creek confluence measured higher than expected for a dry year—attributed to vegetation transpiration loss and possibly reduced surface diversions following the fire.

Boulder Creek has shown progressive recovery. By 2025, lower Boulder Creek had much-improved pool escape cover and reduced embeddedness in pool and run habitat, and the upper reach showed less percent fines in pools and runs. Fall Creek, however, had not recovered as of fall 2025. Considerable sediment continued moving through the system with no improvement in percent fines, embeddedness, or fastwater escape cover upstream of the fish ladder. The Fall Creek riparian corridor showed heavy foot traffic with bare forest floor along the stream margin, suggesting continued human disturbance impeding recovery.

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8 GSA AUTHORITIES AND ENFORCEMENT ACTIONS

SMGWA has not needed to use any of its authorities or enforcement mechanisms since adoption of the 2022 GSP. As part of this Periodic Evaluation, the 2 authorities identified in the 2022 GSP were reviewed.

8.1 Well Metering

The GSP identified a new well metering program requiring measurement and reporting of all non-*de minimis* groundwater extraction greater than 2 AFY. Current active non-municipal extractors using more than 2 AFY include the Quail Hollow Quarry, 3 mobile home parks that fill landscape ponds, and small water systems with more than 5 connections. Small water systems with more than 5 connections have been metered since 2015 and that data is reported to the County or state. During GSP implementation, SMGWA contacted the 4 other unmetered non-*de minimis* users. Based on estimates of these users, SMGWA has determined during this Periodic Evaluation that the additional information from a meter on these few users would provide very limited benefit to the knowledge of water use in the Basin and would not contribute significantly to our ability to effectively manage the Basin. Therefore, SMGWA will delete its requirement to establish a metering program in the GSP amendment.

It is worth noting that SMGWA participated on a Technical Advisory Committee (see Section 9.3.4 below) for the Santa Cruz County well ordinance update that became effective in July 2025. The ordinance resulted in a well meter installation requirement on non-*de minimis* users when permits are issued, so metering of non-*de minimis* users will increase through time. Additionally, SMGWA now receives all new well permits as they come into the County. While SMGWA does not have approval authority of these permits, it is allowed to comment on the permit.

8.2 Pumping Fees

The 2022 GSP identified prioritizing establishing fees on other private groundwater users not contributing financially to the SMGWA to help fund groundwater management efforts. Upon considering the potential impacts and benefits these users receive compared to their groundwater use, SMGWA has determined that it is not necessary to pursue fees from these users at this time. SMGWA will modify the language in its 2027 GSP Amendment to reflect this.

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9 OUTREACH, ENGAGEMENT, AND COORDINATION WITH OTHER AGENCIES

This section describes continued outreach, engagement, and communication with stakeholders and agencies in the Basin since the GSP was approved by the SMGWA Board of Directors (Board) in November 2021.

9.1 Outreach and Engagement

SMGWA has maintained active public outreach and engagement throughout GSP development and implementation as documented in the sections below.

9.1.1 Assessment of Public Comments Submitted to the SMGWA during Periodic Evaluation

While there are no specific requirements for public comment on the Periodic Evaluation, the SMGWA has taken public comment during the Periodic Evaluation agenda item at 4 publicly noticed Board meetings. In addition, the SMGWA released a Board draft of the Periodic Evaluation 30 days prior to the October 22, 2026, SMGWA Board meeting to provide ample time for the public to consider comments prior to that meeting.

9.1.2 Public Engagement

The SMGWA has continually and actively engaged the public since GSP adoption through public SMGWA Board meetings, maintenance of the SMGWA website[1] and maintenance of an extensive distribution list of interested parties. These are described further under the outreach methods below.

Specific to this Periodic Evaluation, commencement of the effort was initially announced through an SMGWA E-Newsletter on August 20, 2025, and the Periodic Evaluation Kickoff meeting was held at the SMGWA Board meeting on August 28, 2025. Additionally, a press release was issued on November 12, 2025, announcing the effort and inviting public participation. The release was published up by Lookout Santa Cruz on November 18, 2025. A total of 6 Board meetings were held in which the Periodic Evaluation was discussed.

[1] https://www.smgwa.org/

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9.1.3 Evaluation of Methods for Outreach and Engagement

The GSP Communication and Engagement Plan focused on activities up to adoption of the GSP. While there was no specific description of activities for post-adoption, many of the outreach methods were carried forward into GSP implementation. Table 9-1 lists outreach methods during GSP development and describes relevant activities that have continued post GSP-adoption.

Table 9-1. Outreach Methods

Outreach Method	Notes on Post GSP-Adoption
Website	The SMGWA website has been at the heart of the SMGWA's outreach since GSP adoption. The site is actively maintained with an announcements section for noteworthy items of interest (21 postings since GSP adoption through July 2026). An active Board meeting calendar with agenda packets (dating back to 2017) and past meeting recordings (dating back to 2021) are on the web site. Sign-up for the newsletter is available on the home page to actively recruit new interested parties.
Press Releases	Since GSP adoption, SMGWA has issued at least 7 press releases. These are also posted on the SMGWA website under the News section.
Public Meetings/Workshops	Regular meetings of the SMGWA Board have served as the primary forum for public meetings since GSP adoption. Beginning in August 2025, the SMGWA has been using its Board meetings for public engagement on its GSP Periodic Evaluation.
Community Events	Since GSP adoption, SMGWA has tabled at the 2023, 2024, and 2025 Environmental Town Hall hosted by the Valley Women's Club and the 2026 State of the San Lorenzo River Symposium.
Mailings	Direct mailings are sent to targeted interested parties for specific management actions or projects. Since adoption of the GSP, direct mailings associated with the SMGWA monitoring well construction project were sent to 62 letters sent to nearby homeowners in mid-2023.
E-Newsletter	Prior to each Board meeting, an E-blast is distributed to an extensive distribution list (824 as of August 2026). The E-blast serves to both announce the meeting and to provide updates on other GSP-related activities. There have been 21 E-blasts since GSP adoption through July 2026.
Recorded Meetings	To ensure engagement with interested parties not able to attend and to ensure transparency, all SMGWA meetings since GSP adoption in November 2021 (15 meetings through July 2026) have been recorded and posted online at the SMGWA website.

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9.2 Responsibilities of GSA Board

The SMGWA Board has continued to meet regularly since GSP adoption, including:

- 8 times in 2022
- 4 times in 2023
- 4 times in 2024
- 4 times in 2025
- 4 times in 2026

Board meetings are open to the public and all required meeting materials are posted on the SMGWA website a minimum of 72 hours prior to the meeting in compliance with the Brown Act. Notices of Board meetings are emailed to a distribution list of 824 (as of August 2026) interested parties. The list has been developed through sign-ups at public meetings, outreach events, and at the SMGWA website. All Board meetings are recorded and posted[2] to allow for continued public engagement. Board meetings begin at 6:00 pm to avoid most work-related conflicts for members of the public that wish to participate or otherwise observe the meeting. All meetings are held in person with live stream remote to afford maximum public participation.

9.3 Coordination with Other Agencies

The SMGWA and its member agencies have coordinated with adjacent basins, reached out to applicable agencies, developed inter-agency agreements, and participated in inter-agency planning efforts. These are discussed in the subsections below.

9.3.1 Coordination with GSAs in Hydrologically Connected Basins

The only adjacent groundwater basin to the Santa Margarita Basin is the Santa Cruz Mid-County Basin. There is very limited hydrologic connection between the basins due to the presence of shallow granitic bedrock along the common boundary, which was confirmed by the DWR AEM study described in Section 6.1.2. Despite the lack of connection, the County is a member of both GSAs and both basins share staffing resulting in a high level of coordination. Additionally, there is coordination on water use due to the shared San Lorenzo River interests for water supply and construction of an intertie between SVWD and the City of Santa Cruz.

[2] https://www.smgwa.org/meetingdashboard

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9.3.2 Coordination with Tribal, Federal, State, and Other Local Agencies

There are no tribal lands or federal water supply facilities in the Basin, so engagement with those entities has been limited. SMGWA does not directly implement projects, so it has had little interaction with State and Federal agencies. Rather, project proponents coordinate as needed. The most extensive coordination during the period was by the City of Santa Cruz with the State Water Resources Control Board (SWRCB) in completing a final water rights change petition and with National Marine Fisheries Services (NMFS) and California Department of Fish and Wildlife (CDFW) in completing an Anadromous Salmonid HCP covering the San Lorenzo River and other watersheds in 2025. These actions will help support conjunctive use projects in the Basin. SMGWA coordinated with City of Santa Cruz staff to confirm that the revised approach to defining ISW SMC was consistent with, and supportive of, the City's 2025 HCP in July 2026. SMGWA also briefed CDFW and NMFS staff on the ISW approach in August 2026.

9.3.3 New Inter-Agency Agreements

The SMGWA Board approved entering into a Memorandum of Agreement (MOA) with agencies throughout Santa Cruz County committing to participation in the Santa Cruz Integrated Regional Water Management (IRWM) Plan on February 29, 2024 (Santa Cruz IRWM, 2024). Initiated in 2005 in the Santa Cruz Region, participants in the IRWM Program include local agencies with authority and responsibility to carry out water resources management within the region including water supply, water quality, flood management, stormwater, wastewater, land use, and natural resources. The MOA creates opportunities for engagement with agencies representing the diverse communities and interested parties as projects are being developed and implemented, and it creates opportunities for seeking more integrated benefits from future projects that may be considered.

9.3.4 Inter-Agency Coordination

The most notable inter-agency coordination has been with Santa Cruz County Environmental Health. Environmental Health updated its well ordinance to include, among other items, metering requirements for new or replacement wells for non-*de minimis* users and updated construction and review standards for wells proposed near interconnected surface water. The effort was consistent with, and supportive of, the SMGWA. SMGWA was represented on the Technical Advisory Committee for the ordinance update, which resulted in passage of a new well permitting policy in 2025. The updated ordinance supports the sustainability goals in the GSP by protecting beneficial users of groundwater including ISW, GDEs, and domestic well users from installation of large capacity supply wells without proper environmental review.

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Table 9-2. Santa Cruz County Well Ordinance Update Technical Advisory Committee Composition

Technical Expertise	Representative
Small farmers	Alma Fernandez
Large working lands/Agriculture	Dennis Lebow
Large working lands/Agriculture alternate	Robert Wall
Well driller	Aaron Lingemann
Well driller	Dave Landino
County Water Advisory Commission	Bryan Largay
County Water Advisory Commission	Nate Gillespie
Santa Cruz Mid-County and Santa Margarita Groundwater Agencies	Rob Swartz
Pajaro Valley Water Management Agency	Brian Lockwood
Biotic resources - National Marine Fisheries Service	Rick Rogers
Biotic resources - California Department of Fish and Wildlife	Jessie Maxfield
Public utilities/Soquel Creek Water District	Brice Dahlmeier
Department of Water Resources	Benjamin Brezing

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10 OTHER INFORMATION

This section describes issues related to potential impacts to adjacent basins as well as GSP implementation challenges not previously discussed and whether there have been any legal issues related to SGMA.

10.1 Consideration of Adjacent Basins

The member agencies that make up the GSAs for SMGWA and Santa Cruz Mid-County Groundwater Agency (MGA) for the neighboring Mid-County Basin routinely coordinate, especially as the County is an overlapping member agency and both GSAs are managed by the Regional Water Management Foundation (RWMF) under a contract held by the County. This beneficial coordination has resulted in cost-sharing for the development and maintenance of a data management system as well as sharing contracted staffing expenses. The Mid-County Basin is not significantly interconnected with the adjacent Santa Margarita Basin, so there has been no need to align SMC, no concerns related to impacts due to Plan implementation, and no concern that Plan implementation will affect the basins' abilities to achieve their respective sustainability goals. There are, however, opportunities for inter-basin conjunctive use operations that are of mutual benefit in meeting supply reliability objectives and SMC. This is discussed in this Periodic Evaluation in Section 5.2 and in the 2027 GSP in Section 8.3.

10.2 Challenges Not Previously Discussed

The primary challenge that the SMGWA foresees is the cost of ongoing SGMA compliance. For GSAs managing basins with very large groundwater extraction, there is an economy of scale presented by spreading the cost of compliance over tens to hundreds of thousands of AFY. For example, basic SGMA compliance in the Salinas Valley Eastside Subbasin, which pumps more than 80,000 AFY, results in a compliance cost around $6 per AF. For the SMGWA, where less than 2,500 AFY is extracted, the recent compliance cost is around $190 per AF. That cost does not include any of the projects intended to improve groundwater conditions; it is simply administration, monitoring and reporting to comply with SGMA. Further, pumped groundwater is mostly for domestic use by either municipal water providers or rural domestic well owners; there is very little commercial or agricultural pumping. Sourcing the funding to maintain the agency is an ongoing concern for the SMGWA and many other small GSAs throughout the State, especially given that the Basin meets its criteria for sustainability.

10.3 Legal Challenges

SMGWA has not encountered any legal challenges in the implementation of its GSP.

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11 SUMMARY OF PROPOSED OR COMPLETED REVISIONS TO PLAN ELEMENTS

Based on this Periodic Evaluation, the Basin is currently being managed sustainably and is on track to remain sustainable through the GSP planning and implementation horizon. SMGWA will continue to adaptively manage the Basin to maintain groundwater levels and extraction volumes that prevent significant and unreasonable impacts to beneficial users of groundwater. Water demands in the Basin are projected to remain relatively similar to current conditions though future modest population growth and a more variable climate will need to be managed effectively. Should conditions change, SMGWA will work with its member agencies to adjust operations or implement planned PMAs to achieve sustainability.

Despite the Basin being sustainable, a GSP Amendment is necessary to revise the SMC and monitoring networks to address RCAs. The GSP Amendment aligns with more recent conditions in the Basin and establishes an integrated monitoring and evaluation approach for the groundwater level, change in storage, and interconnected surface water sustainability indicators. A redline and final amended GSP accompany the Periodic Evaluation, addressing the following revisions. A summary of the most substantive revisions to the 2022 GSP is included below.

11.1 Amendment to the Sustainability Goal

The revised sustainability goal for the Basin below better aligns with the SMC approach in the 2027 GSP Amendment:

The Basin sustainability goal is to achieve and maintain groundwater conditions that support beneficial uses and users and sustain the long-term health of the Basin's community, economy, and environment.

This goal will be achieved by:

- Monitoring and managing groundwater conditions to meet established sustainable management criteria and striving to achieve measurable objectives to enhance Basin conditions
- Maintaining groundwater levels sufficient to protect domestic, municipal, agricultural, and industrial supply wells
- Supporting continued groundwater contributions to streamflow and groundwater dependent ecosystems, where applicable
- Maintaining groundwater quality for current and future beneficial uses

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- Implementing cost-effective projects and adaptive management strategies, including expanding conjunctive use and drought response measures, to enhance drought resilience and long-term supply reliability

11.2 Amendments to the Chronic Lowering of Groundwater Levels SMC and Monitoring Networks

The following amendments are being made to the chronic lowering of groundwater levels SMC and monitoring network, as described in Sections 4.3.3 and 7.1.4:

- Grouping the monitoring network into 2 hydrogeologic units for SMC evaluation: the shallow/unconfined monitoring network, composed of the Santa Margarita aquifer, and the deeper/confined monitoring network, composed of the Monterey Formation and the Lompico and Butano aquifers
- Amending the MTs to the measured fall 2013 groundwater level at each RMP, which establishes a consistent pre-SGMA baseline that is above historical lows and higher than the 2022 GSP MTs in most RMPs
- Amending the MOs to the fall 2006 groundwater level at each RMP, which reflects observed conditions at the conclusion of a wet period rather than modeled projections of uncertain climate and project scenarios
- Amending the 2032 and 2037 IMs to provide a managed trajectory toward achieving the MO by 2042, set at one-third and two-thirds of the difference between current conditions and the MO
- Revising the UR definition to address DWR RCA #2 by removing the drought conditions exclusion, such that URs occur when fall groundwater elevations in 3 or more RMPs within either aquifer group are below the MT in 2 consecutive years
- Adding 11 RMPs and removing 2 RMPs from the groundwater level monitoring network to improve spatial coverage, data reliability, and representation of groundwater conditions across the Basin

11.3 Amendments to the Reduction in Groundwater in Storage SMC and Monitoring Networks

The following amendments are being made to the reduction of groundwater in storage SMC and monitoring network, as described in Sections 4.4.3 and 7.2.4:

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- Consolidating the SMC from 4 individual aquifers into 2 aquifer groups: the unconfined aquifer group, composed of the Santa Margarita Formation, and the confined aquifer group, composed of the Monterey, Lompico, and Butano formations
- Amending the MT to 750 AFY in the unconfined aquifer group and 2,250 AFY in the confined aquifer group, totaling 3,000 AFY for the Basin, evaluated using a 5-year rolling forward average to accommodate greater groundwater usage during multi-year dry periods under future conjunctive use operations
- Amending the MO to coincide with the model-estimated sustainable yield of 700 AFY in the unconfined aquifer group and 1,900 AFY in the confined aquifer group, totaling 2,600 AFY for the Basin, evaluated using a 5-year rolling average
- Requiring project proponents to demonstrate that future conjunctive use operations will result in meeting the Basin MO, such as by showing that sufficient surface water will be made available in wet years to offset increased groundwater extraction in dry years
- Updating the list of monitored and metered wells to include municipal supply wells constructed since adoption of the GSP, with extraction quantified from metered pumping data where available and estimated where meters are not used

11.4 Amendments to the Degraded Groundwater Quality SMC and Monitoring Networks

The following amendments are being made to the degraded groundwater quality SMC and monitoring network, as described in Sections 4.5.3 and 7.4.4:

- Removing chloride as a COC because concentrations show no observed increases and remain well below the health-based primary MCL
- Removing iron and manganese as COCs because elevated concentrations are naturally occurring, are measured against an aesthetics-based secondary MCL, and are managed by water suppliers before delivery to consumers
- Removing VOCs from the list of COCs with established SMC because detections are rare and at concentrations well below MCLs, and adding a new management action for annual coordination with Santa Cruz County Environmental Health, Site Mitigation Program staff to review constituents found at point sources in the Basin
- Revising the MTs and MOs for TDS, nitrate, and arsenic to indicate degradation from baseline conditions rather than comparison to drinking water standards and average concentrations, with SMC to be established for the SVWD Grace Way and Sucinto wells once a minimum of 3 years of data are available

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- Revising the UR definition to address DWR RCA #3, such that URs occur when 3 or more RMPs experience an MT exceedance for the same constituent in 2 consecutive years
- Adding 6 routinely monitored public supply wells and removing 2 inactive or destroyed supply wells, resulting in an amended network of 13 RMPs
- Retaining the small water system wells identified in the GSP water quality monitoring network as non-RMP locations, to be evaluated when data are available

11.5 Amendments to the Depletion of Interconnected Surface Water SMC and Monitoring Networks

The following amendments are being made to the ISW depletion SMC and monitoring network, as described in Sections 4.6.3 and 7.4.4:

- Using the groundwater level and groundwater extraction MTs as the proxy for managing ISW depletion, consistent with DWR's ISW management papers (DWR, 2024a, b, and c), which recognize that depletion is a cumulative response to groundwater extraction and may not be fully captured at individual monitoring locations
- Basing the groundwater level SMC on fall 2013 conditions as the MT and fall 2006 conditions as the MO, which are supportive of the target baseflows in the City of Santa Cruz 2025 HCP for steelhead and coho salmon
- Revising the UR definition to align with the amended monitoring network, such that URs occur when groundwater extraction from 1 or more aquifers exceeds its reduction in storage MT for 2 consecutive years, or when groundwater elevations in 3 or more RMPs fall below the MT for 2 consecutive years in either the shallow/unconfined or the deeper/confined aquifer system
- Amending the ISW monitoring network to use all groundwater level RMPs and tracking of groundwater extraction by principal aquifer, which integrates the ISW approach with the groundwater level and reduction in storage monitoring networks and SMC

11.6 Amendments to the Water Budget

Section 6.3 describes updates to the water budgets that are also reflected in the 2027 GSP Amendment. The updates are substantial because lower recent and projected groundwater extraction reduces the loss of groundwater in storage predicted in the 2022 GSP. Lower predicted groundwater demand allows for a reduction in the number of proposed PMAs. The following amendments are being made to the water budgets:

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- Revise the historical water budget timeframe to align with the passage of SGMA and update the current water budget through the most recent water year
- Update the Projected Baseline Simulation to begin at the end of the current Basin Model (October 1, 2025) rather than WY2019, using revised starting groundwater levels and boundary flows
- Revise SVWD pumping locations and volumes to incorporate the 2 new supply wells and the planned phase-out of SVWD #11A and #11B
- Reduce the assumed SVWD demand growth rate from 0.3% to 0.14% per year to align with the 2025 UWMP; the SLVWD rate of 0.18% per year remains valid
- Update assumed extraction volumes for small water systems and industrial users based on targeted outreach, including unmetered quarry pumping revised to about 32 AFY and unmetered landscape and pond-filling pumping revised to about 20 AFY at each of 3 locations
- Assume a 5% increase in private domestic pumping from 2026 to 2072, rather than holding it constant as in the 2022 GSP
- Add a projected baseline scenario repeating the historical climate from WY1985 to 2025 with revised future demands, supplementing the projected simulation with climate change
- Revise the assumed Lompico and Butano aquifers extraction distribution for SVWD supply wells from 40/60 to 50/50 based on dynamic spinner log data from the Sucinto and Grace Way wells

11.7 Amendments to Projects and Management Actions

The following amendments are being made to the PMAs, as described in Section 5.2:

- Remove PMAs 1 through 4, which were in place before GSP adoption and are expected to continue indefinitely as part of ongoing Basin operations and management; Relevant information will still be collected each year as part of water use reporting under SGMA
- Remove PMA 5 for additional water use efficiency, because additional annual savings are less than 2 AF and tracking this information is no longer cost effective
- Retain PMA 6 as a Primary PMA, reflecting SLVWD's expansion of the place of use of its existing water rights to increase in-lieu conjunctive use
- Remove PMA 7, which would have been an additional phase of SVLWD conjunctive use expansion; This project is not considered cost-effective given the updated groundwater modeling that projects sustainable conditions with implementation of PMA 6

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- Retain and combine PMAs 8 and 9 as a Supplemental PMA, because they are not currently needed to achieve sustainability
- Remove PMAs 10 through 12, because purified wastewater is neither available nor planned and would not be cost effective given the sustainable state of the Basin
- Retain PMA 14 as a Supplemental PMA for recharge opportunities, primarily in the Scotts Valley area, and remove the remaining Group 3 PMAs at the request of project proponents
- Add a management action to complement meeting the degraded groundwater quality SMC, as described in Section 4.5.3

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Appendix 3A

Potential Impacts to Domestic Wells in Monterey Formation Technical Memorandum

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RECOMMENDED CORRECTIVE ACTION 1 ANALYSIS

Introduction

The California Department of Water Resources (DWR)—in a letter dated April 27, 2023, detailing its review and approval of the Santa Margarita Groundwater Agency (SMGWA) 2022 Groundwater Sustainability Plan (GSP)—identified 4 recommended corrective actions (RCAs) to improve the GSP. RCA #1 recommended additional evaluation and data gap filling specific to protection of beneficial users of groundwater extracted from the Monterey Formation:

> *The GSA should evaluate beneficial uses and users of the Monterey Formation and consider how changes in groundwater levels in the Monterey Formation may affect domestic well users and GDEs. The GSA should evaluate monitoring in the Monterey Formation and fill any data gaps in areas where beneficial uses are present and monitoring is not present.*

This Technical Memorandum (TM) explains how SMGWA addressed RCA #1. It also identifies how Santa Cruz County (County) drought planning and domestic well mitigation efforts provide a backstop should extreme dry conditions, wildfire, or other factors beyond the control of the GSA cause domestic and small water system (SWS) supply wells to go dry or become unusable.

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Hydrogeologic Conceptual Model

The Monterey Formation is composed primarily of thick mudstone and siliceous shale that forms a hydraulic barrier between the Santa Margarita Sandstone and Lompico Sandstone, except where it is not present in the southern portion of the Basin. The Monterey Formation is generally an aquitard because the conductivity of the formation is low relative to the overlying Santa Margarita and underlying Lompico sandstone aquifers. However, there are productive sandstone interbeds used for water supply, especially closer to the base of the formation. These interbeds are especially prominent in southern Scotts Valley and are more hydrogeologically connected to the underlying Lompico Sandstone than to the overlying Santa Margarita Sandstone (Kennedy/Jenks Consultants, 2015).

Monterey Formation Beneficial Uses and Users

Groundwater from the Monterey Formation has some beneficial uses and users that are considered in the GSP. Historically, Scotts Valley Water District (SVWD) used extraction well #9 in the Monterey Formation for public supply, but the well was not reliable because of low aquifer transmissivity and is now inactive. The presence of permeable interbeds within the shale and widespread exposure at the ground surface still makes the Monterey Formation a locally

important aquifer for some beneficial users. The beneficial users of Monterey Formation groundwater, shown on Figure 1, include the following:

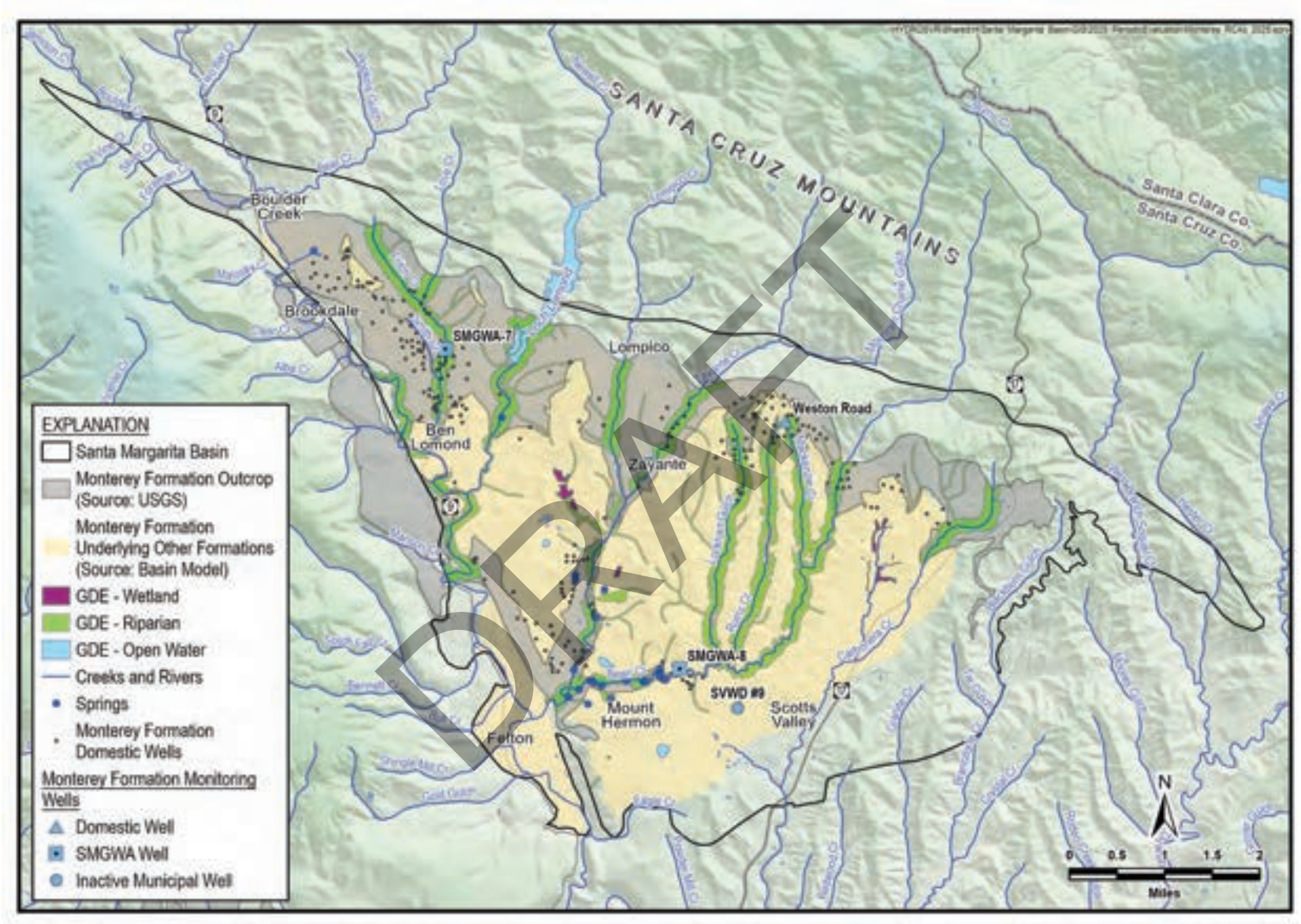
- Domestic and SWS supply wells supported by the Monterey Formation are found where the more productive Santa Margarita aquifer is not present, especially at the Basin margins. In total, these wells are estimated to extract about 100 acre-feet per year (AFY), which is about 4% of the total extraction in the Basin.
- Groundwater supported streams are found throughout the Basin. Wetlands and riparian corridors associated with most of the creeks could potentially rely on groundwater partially sourced by conductive lenses within the Monterey Formation. Surface water fed by groundwater baseflow is used downstream of the Basin by the City of Santa Cruz.
- Springs and GDEs associated with the Monterey Formation occur where the low permeability Monterey Formation surface causes basal flow of water from the overlying, highly permeable Santa Margarita Aquifer, especially near the confluence of Bean and Zayante Creeks. Therefore, these GDEs likely rely on groundwater from the Santa Margarita Aquifer, not the Monterey Formation, but they are included in this analysis to be comprehensive.

A water supply well inventory was compiled using DWR and County well records for the 2022 GSP Basin groundwater model (Basin Model) update. The Basin Model well inventory identified 270 domestic or SWS supply wells likely screened, at least partially, in the Monterey Formation (Figure 1). Since there is little new growth in the unincorporated areas of the Basin, the number and location of supply wells has not likely changed substantially since 2018 when the model was updated. The County is working on an updated well inventory that will be incorporated into future GSP implementation efforts and groundwater modeling if it significantly changes the understanding of well locations and extraction depths in the Basin.

The County has ongoing efforts supporting GSP implementation and protection of domestic and SWS well owners. The County well permitting office and DWR's Dry Well Reporting System[1] track reported dry wells in the Basin. Neither program has reports of dry wells in the Basin. Regardless, the County drought response plans provide assistance for domestic and SWS wells should impacts occur during droughts.

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[1] https://data.cnra.ca.gov/dataset/dry-well-reporting-system-data



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Figure 3A-1. Beneficial Groundwater Uses and Users of the Monterey Formation and Groundwater Level Monitoring Network

Groundwater Level Monitoring Network Improvements

The 2022 GSP identified data gaps in the Monterey Formation groundwater level monitoring network. In fall 2023, SMGWA installed and added 2 new monitoring wells to the Monterey Formation groundwater level monitoring network and identified an existing well for County groundwater level monitoring. The wells are located in areas with concentrated domestic use and no historical monitoring (Figure 1). New monitoring network wells include the following:

- Dedicated monitoring well SMGWA-7 on Love Creek northeast of Ben Lomond
- Dedicated monitoring well SMGWA-8 on Bean Creek between Mount Hermon and Scotts Valley
- Domestic supply well on Weston Road northeast of Scotts Valley

Installation of SMGWA-7 and SMGWA-8 and addition of the Weston Road well substantially address the spatial monitoring gaps identified in areas of concentrated domestic groundwater use. However, because monitoring began in WY 2024, these wells have not yet produced a record spanning the range of hydrologic conditions needed to fully characterize drought response. Continued monitoring is necessary to address the remaining temporal data limitation. The 2027 GSP Amendment includes SVWD #9 and SMGWA-8 as representative monitoring points (RMPs) for evaluating groundwater levels relative to sustainability metrics.

Historical and Projected Groundwater Conditions

Groundwater level monitoring in the Monterey Formation has historically been limited because the formation is primarily an aquitard and is used very little for municipal supply. The only groundwater level RMP identified in the 2022 GSP was SVWD #9 (Figure 1 and Figure 2). Hydrographs with observed data supplemented by Basin Model historical and projected groundwater levels are shown on Figure 3 through Figure 6. The minimum threshold and measurable objectives from the 2027 GSP Amendment are included for SVWD #9 and SMGWA-8, which are Monterey Formation RMPs. The projected groundwater levels with climate change shown are from the more conservative of the 2 projected model simulations documented in the 2027 GSP Amendment.

In 1981, groundwater levels at SVWD #9 were about 20 feet below ground surface (bgs), as shown in the hydrograph on Figure 2. Extraction from this well and from nearby Santa Margarita and Lompico aquifer supply wells caused groundwater levels to decline rapidly in all aquifers in the South Scotts Valley/Camp Evers/Pasatiempo area during the 1980s and 1990s. Monterey Formation groundwater levels fell to about 230 feet bgs in 1998 and SVWD #9 was taken out of production in early 2000s. Reduced pumping from the Monterey Formation and from nearby

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supply wells in the other aquifers allowed groundwater levels at SVWD #9 to recover about 75 feet from the historical low in WY1998. The Basin Model projects that groundwater levels may decline in this area again by about 80 feet in severe drought.

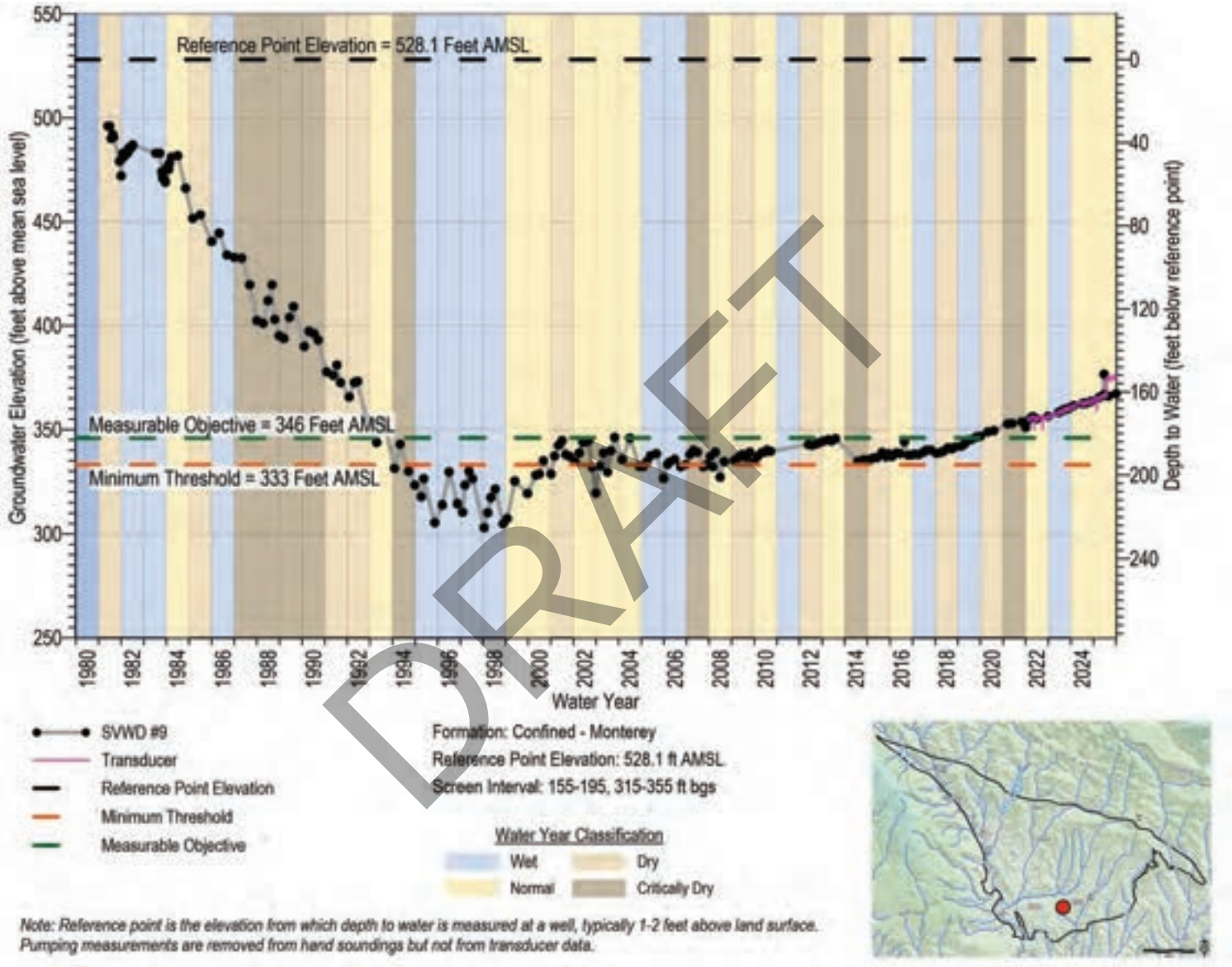
Groundwater level data collected from the 3 additional Monterey Formation monitoring wells added to the GSP monitoring network in WY2024 show relatively stable trends, fluctuating by less than 5 feet between minimum and maximum values collected since fall 2023, at depths that are likely shallow enough to support private water supply wells. However, the depth screened by private supply wells is not well documented in available historical records and the groundwater level data has not yet been collected yet in a record spanning the range of hydrologic conditions. Projected groundwater levels vary in the Basin Model in some areas but not all. Detailed observations from new monitoring wells include the following:

- SMGWA-8: Daily groundwater levels collected by a transducer are between 44 and 48 feet bgs between August 2023 and October 2025. Simulated historical and projected groundwater levels fluctuate by less than 10 feet over the modeled timeframe remaining stable over a wide range of future climate.

- Weston Road: Three groundwater level measurements collected by the County in spring and fall 2024 and spring 2025 are between 75 and 80 feet bgs. Simulated historical and projected groundwater levels fluctuate by 120 feet during the modeled timeframe, indicating that this area may be sensitive to pumping and climate. Ongoing monitoring will help ground-truth the model in this area over a range of climate conditions.

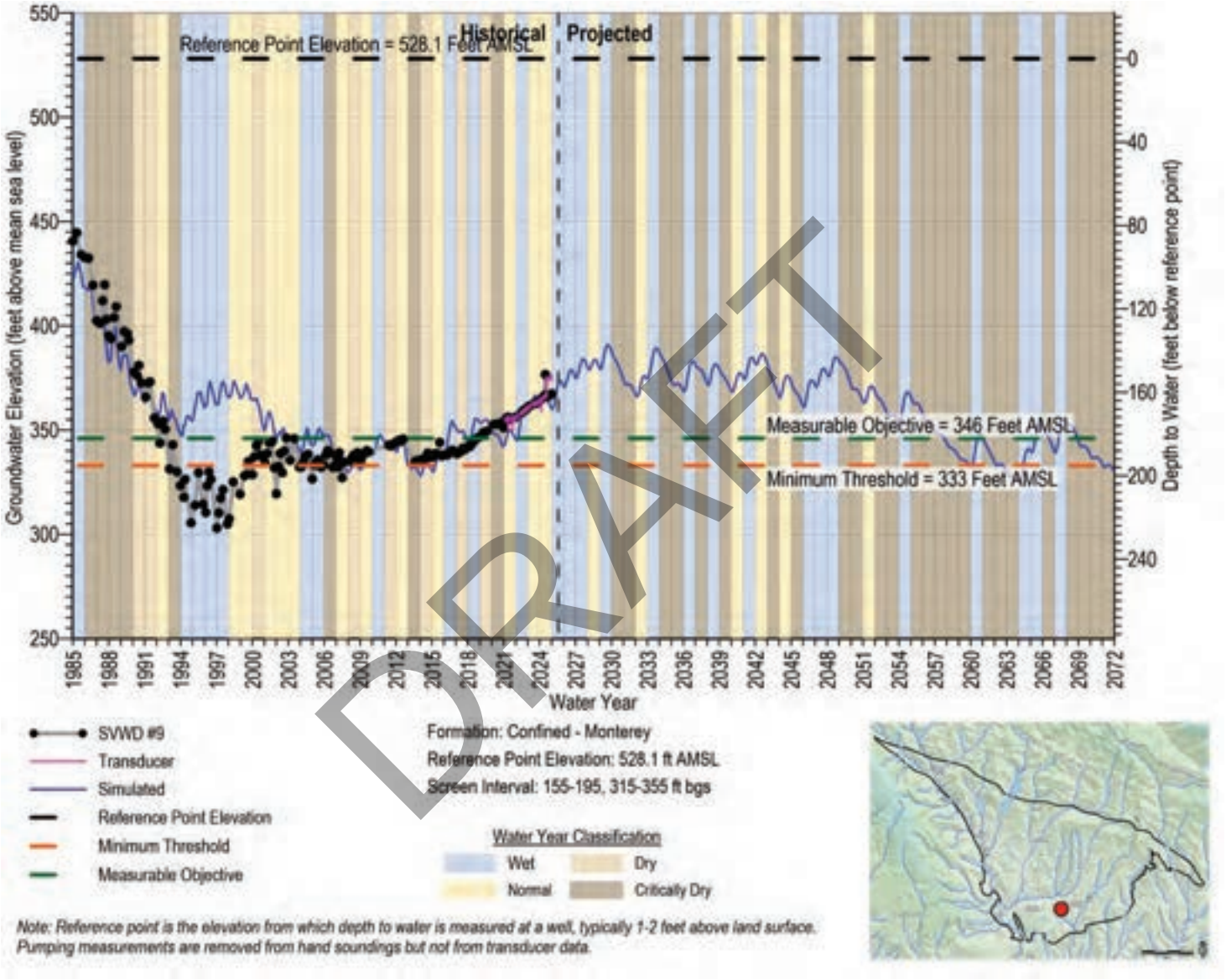
- SMGWA-7: This well has been artesian since it was installed in fall 2023 with groundwater levels above the ground surface. Groundwater level measurements are not collected routinely and it did not become an RMP, but the fact that groundwater levels in the confined Monterey Formation conductive lenses in this area are above the ground surface indicates that groundwater extraction by private wells in this area is not impacting access to groundwater. The simulated historical and projected groundwater levels fluctuate by less than 3 feet during the modeled timeframe remaining stable over a wide range of future climate.

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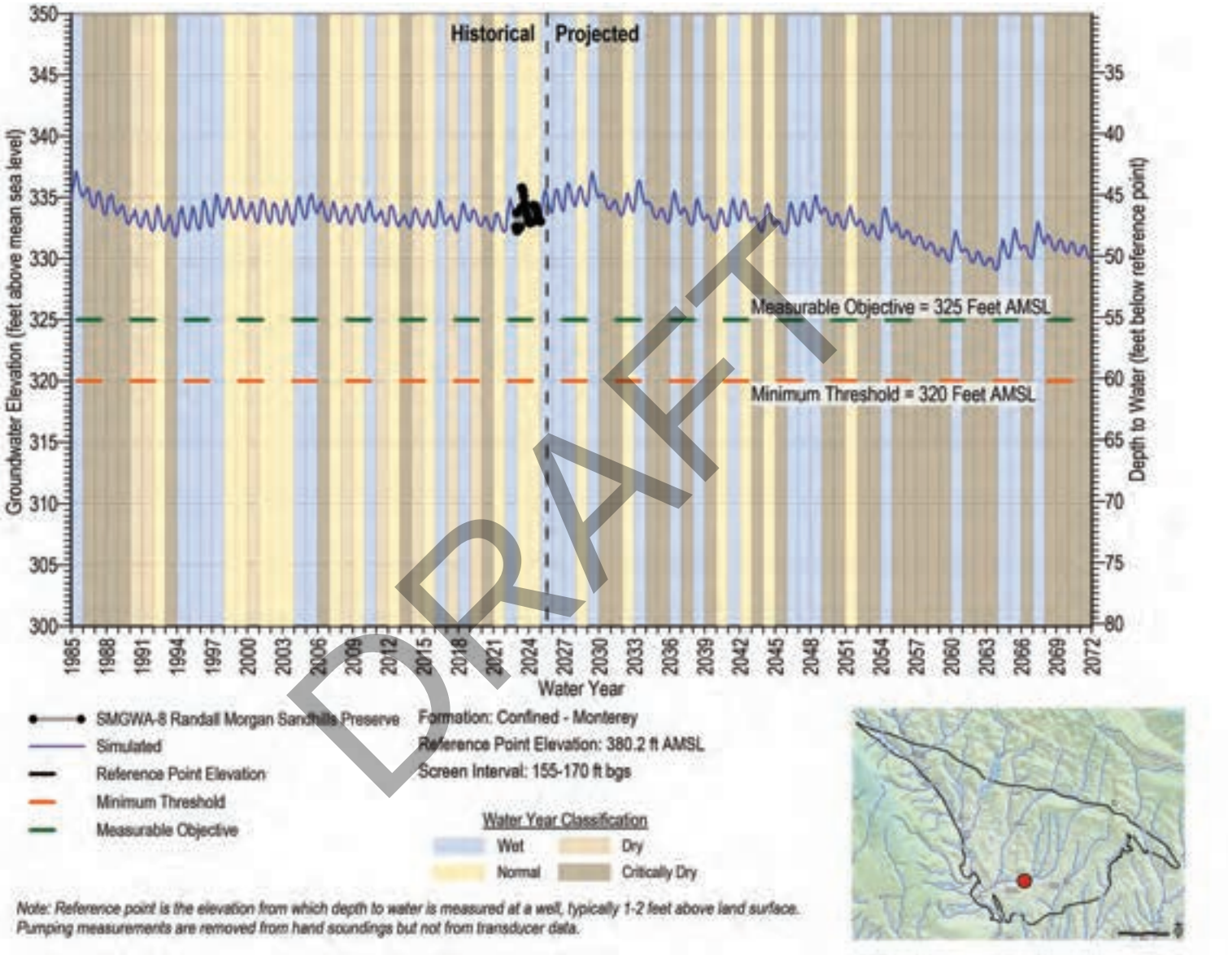
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Figure 3A-2. SVWD #9 Groundwater Level Observations and 2027 GSP Amendment SMC



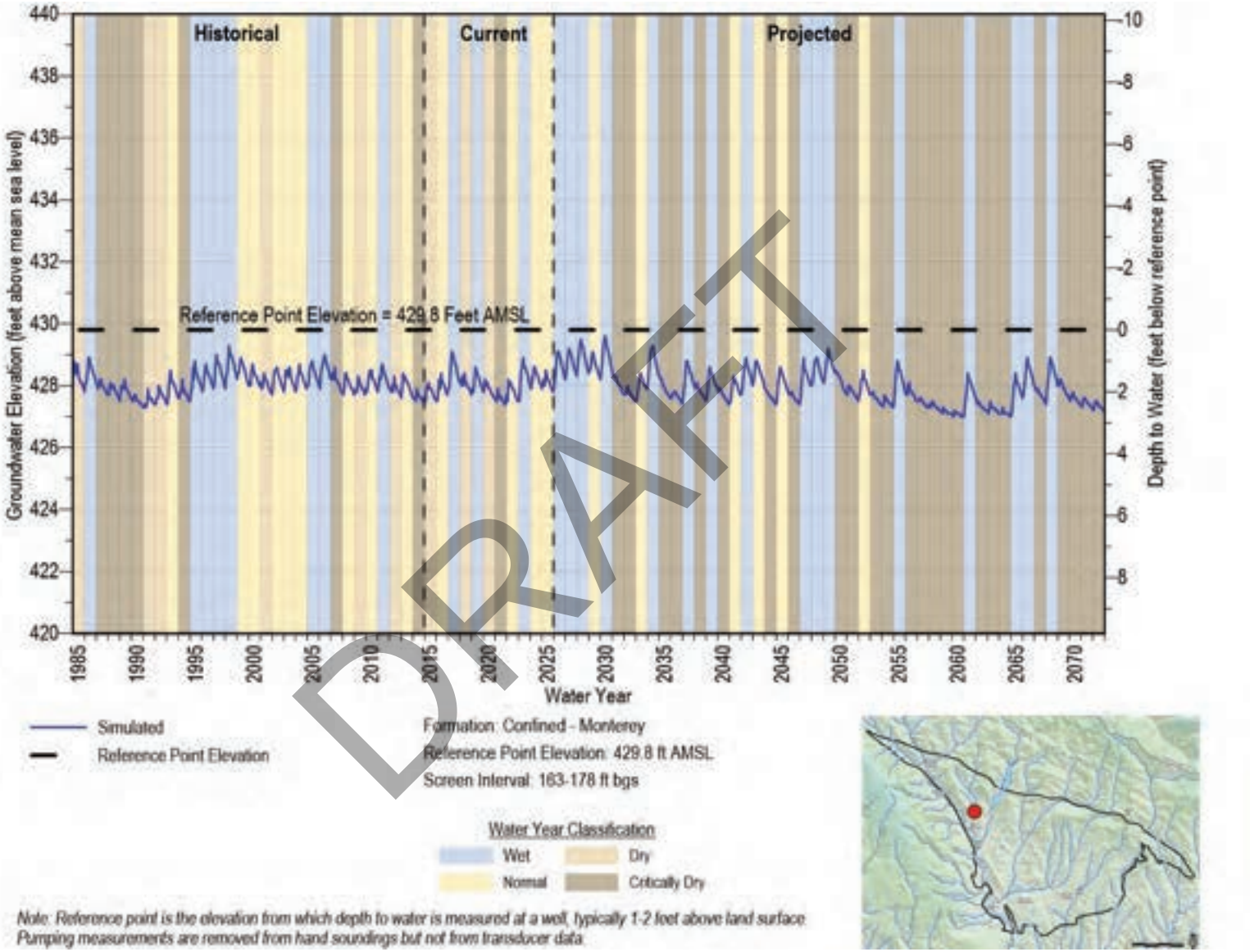
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Figure 3A-3. SVWD #9 Groundwater Level Observations, Basin Model Simulations, and 2027 GSP Amendment SMC



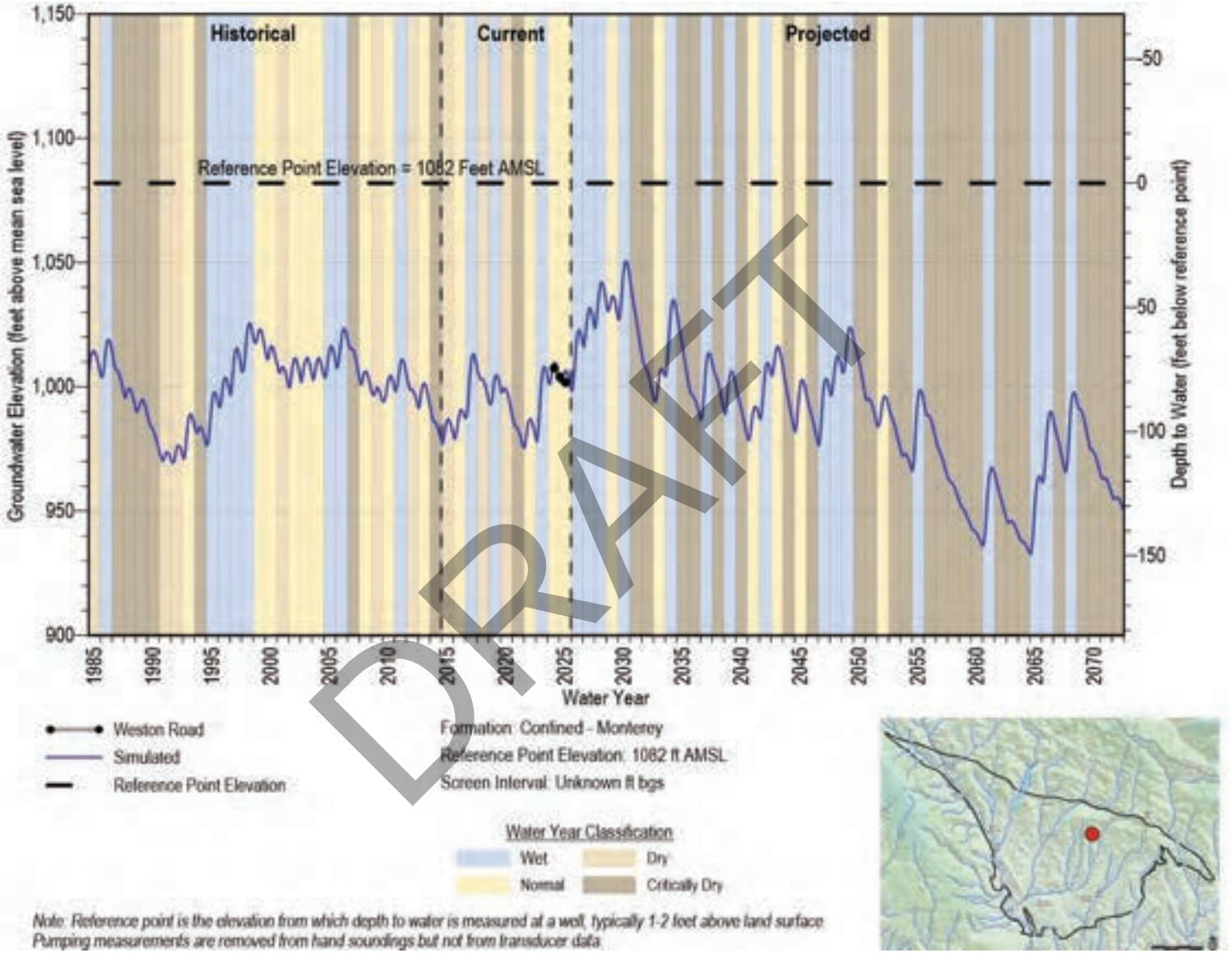
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Figure 3A-4. SMGWA-8 Groundwater Level Observations, Basin Model Simulations, and 2027 GSP Amendment SMC



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Figure 3A-5. SMGWA-7 Groundwater Level Observations and Basin Model Simulations



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Figure 3A-6. Weston Road Groundwater Level Observations and Basin Model Simulations

Potential Future Impacts to Beneficial Users

Based on the available data, groundwater levels have been increasing or stable over a range of climate conditions in the Monterey Formation since the early 2000s. Increasing or stable groundwater levels protect beneficial users from any additional harm since the passage of SGMA in 2015. However, it is possible that future drought or other unexpected conditions could lead to a reversal of these trends and lowered groundwater levels could impact domestic wells, springs, and GDEs by preventing access to water that supports these beneficial uses and users.

This analysis investigates the potential for impacts to Monterey Formation beneficial users by evaluating groundwater level fluctuation with historical water demands and climate. Consistent with SVWD #9 observations, the Basin Model groundwater levels increased up to 20 feet in the Monterey Formation between the historically dry year in 2014 and historically wet year in 2023 (Figure 7). SVWD #9 observed groundwater levels increased 28 feet during this period (Figure 2). More dynamic areas of the Monterey Formation in the Basin Model could be more at risk to impacts from future extended droughts or increased extraction lowering groundwater levels. Areas identified as dynamic areas, shown in yellow, orange, and red on Figure 7, include some of the areas with concentrated domestic supply wells that were targeted with data gap filling efforts since GSP development. The well network covers the most extensive dynamic areas of the Basin with groundwater extraction from the Monterey formation.

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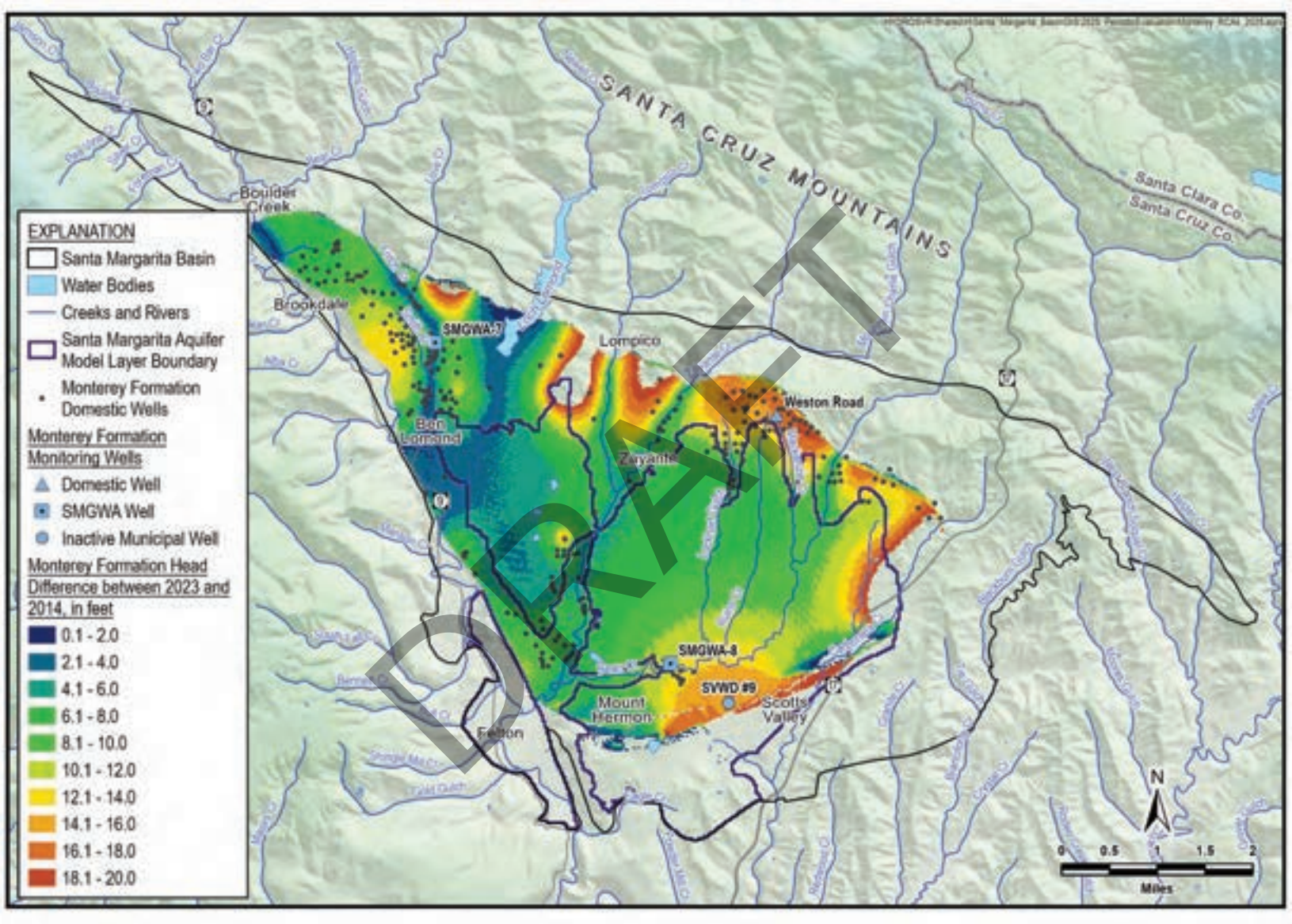


Figure 3A-7. Projected Groundwater Level Changes (2014-2023) and Wells Likely Screened in the Monterey Formation

Basin Model Projections

Basin Model projections with and without climate change show the Monterey Formation groundwater conditions should remain similar to current conditions because the formation is used minimally for groundwater supply. Monterey Formation groundwater extraction volumes are small and not expected to change significantly compared to current conditions or with climate change. Both projected scenarios in the 2027 GSP Amendment assume that groundwater extraction for small water systems and private wells is about 100 AFY, or about 4% of the total extraction in the Basin.

Monterey Formation extraction is also small compared to simulated groundwater discharge to creeks, so should have little to no impact on this important source of water for GDEs and downstream surface water use by the City of Santa Cruz. The Monterey Formation discharge to creeks is projected to be about 2,100 to 2,200 AFY, mainly occurring at the Basin margins and along Zayante and Newell Creek where the overlying Santa Margarita aquifer has been eroded. This volume is over 20 times greater than the extraction volume, so Monterey Formation extraction should have little bearing on groundwater discharge to creeks.

Additionally, in the areas where the Monterey Formation is used for water supply, the Basin Model projects groundwater levels to remain stable except for in the extreme drought after 2050 simulated in the projected climate change scenario where levels may fall up 60 feet at SVWD #9 and 120 feet at Weston Road, but remain consistent fluctuating less than 10 feet across all climate types at other well locations (Figure 3 through Figure 6). The 2027 GSP Amendment includes ongoing and planned projects and management actions that will help the SMGWA and member agencies maintain sustainability in the Basin should a future drought of this magnitude occur.

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Protecting Beneficial Users During GSP Implementation

Historically there have been no documented impacts to Monterey Formation groundwater users in the Basin, but backstops exist in case these conditions arise in the future. The GSP describes ongoing and planned projects and management actions that will help the SMGWA adaptively manage the Basin to protect beneficial users of groundwater. There are concurrent County drought planning efforts that supplement GSP implementation to ensure SWS and domestic well owners and other beneficial users are protected from future drought impacts.

The County Board of Supervisors adopted the Drought Response and Outreach Plan (DROP) on December 13, 2022, as part of the Climate Action and Adaptation Plan (Santa Cruz County, 2023). The DROP describes the County's plans to improve data collection and provide resources to domestic and SWS well owners. The DROP focuses on the County's role assisting well

owners during drought, however other emergencies such as wildfire are also relevant to water supply reliability in the Basin and are also included. Drought preparedness information for domestic[2] and SWS[3] well owners is available on the County's Environmental Health Department website.

A Domestic Well Drought Mitigation Plan (Mitigation Plan) included in the DROP intends to build resiliency and prepare for potential drought-related impacts to private domestic wells. Mitigation Plan development included assessment of the County population that relies on domestic wells, planning for outreach and education, a preliminary vulnerability assessment, and identification of well mitigation strategies that can be implemented to provide water in the short-term (interim strategies) and long-term (permanent strategies).

The County has secured temporary funding that can provide help for domestic well owners and State Small Water Systems impacted by drought. Through this funding, the County can provide impacted well owners up to 50 gallons of bottled water per person per month or 3,800 gallons of hauled water per household every 6 weeks at no cost, though income restrictions do apply. To receive this assistance, well owners need to report their dry well through the State's Dry Well Reporting System[4]. County staff will review the report to determine if the well is likely to have gone dry or if there is another issue causing the well to stop producing water. If the well is likely dry, County staff will coordinate with the well owner and the water hauler to fill on-site storage tanks for the duration of the grant period while a long-term solution is pursued. If a long-term solution is needed and if it's feasible, the County can assist the well owner to connect to an existing public water system.

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[2] https://www.scceh.org/NewHome/Programs/WaterResources/DroughtResponse/HouseholdWellAssistance.aspx
[3] https://www.scceh.org/NewHome/Programs/WaterResources/DroughtResponse/DroughtPreparednessSmallWaterSystems.aspx
[4] https://mydrywatersupply.water.ca.gov/report/

Conclusions

SMGWA has addressed RCA #1. Beneficial users of Monterey Formation groundwater, including domestic and SWS supply wells, groundwater supported streams, springs, and GDEs, are protected by implementation of the GSP and by concurrent Santa Cruz County drought programs. No GSP amendment is required, because the RCA response is explanatory and does not change groundwater management.

The monitoring data gap identified in the 2022 GSP has been filled. SMGWA added 3 monitoring wells in areas of concentrated domestic use that had no historical record, and SVWD #9 and SMGWA-8 are carried into the 2027 GSP Amendment as RMPs with sustainable management criteria. Continued monitoring across a wider range of hydrologic conditions remains necessary to characterize drought response at the new wells.

Groundwater conditions in the Monterey Formation do not indicate impacts to beneficial users. Extraction of about 100 AFY is about 4% of total Basin extraction and is more than 20 times smaller than simulated Monterey Formation discharge to creeks. Observed and simulated groundwater levels have been stable to increasing since the early 2000s, reflecting reduced pumping from the overlying Santa Margarita and underlying Lompico aquifers. Available data suggests that the small volume of Monterey Formation extraction is within its sustainable yield and is not causing undesirable results.

Residual risk is limited to Basin-wide drought conditions. The Basin Model projects lower groundwater levels by 60 feet only during the extreme drought simulated after WY2050 in the climate change scenario. Managing groundwater conditions to withstand severe drought will be addressed through adaptive management and implementation of supplemental projects and management actions identified in the 2027 GSP Amendment. County drought preparedness and domestic well mitigation programs provide a backstop for domestic and SWS well owners, and GDE health will continue to be assessed during periodic evaluations to determine if beneficial users are being impacted in the Basin.

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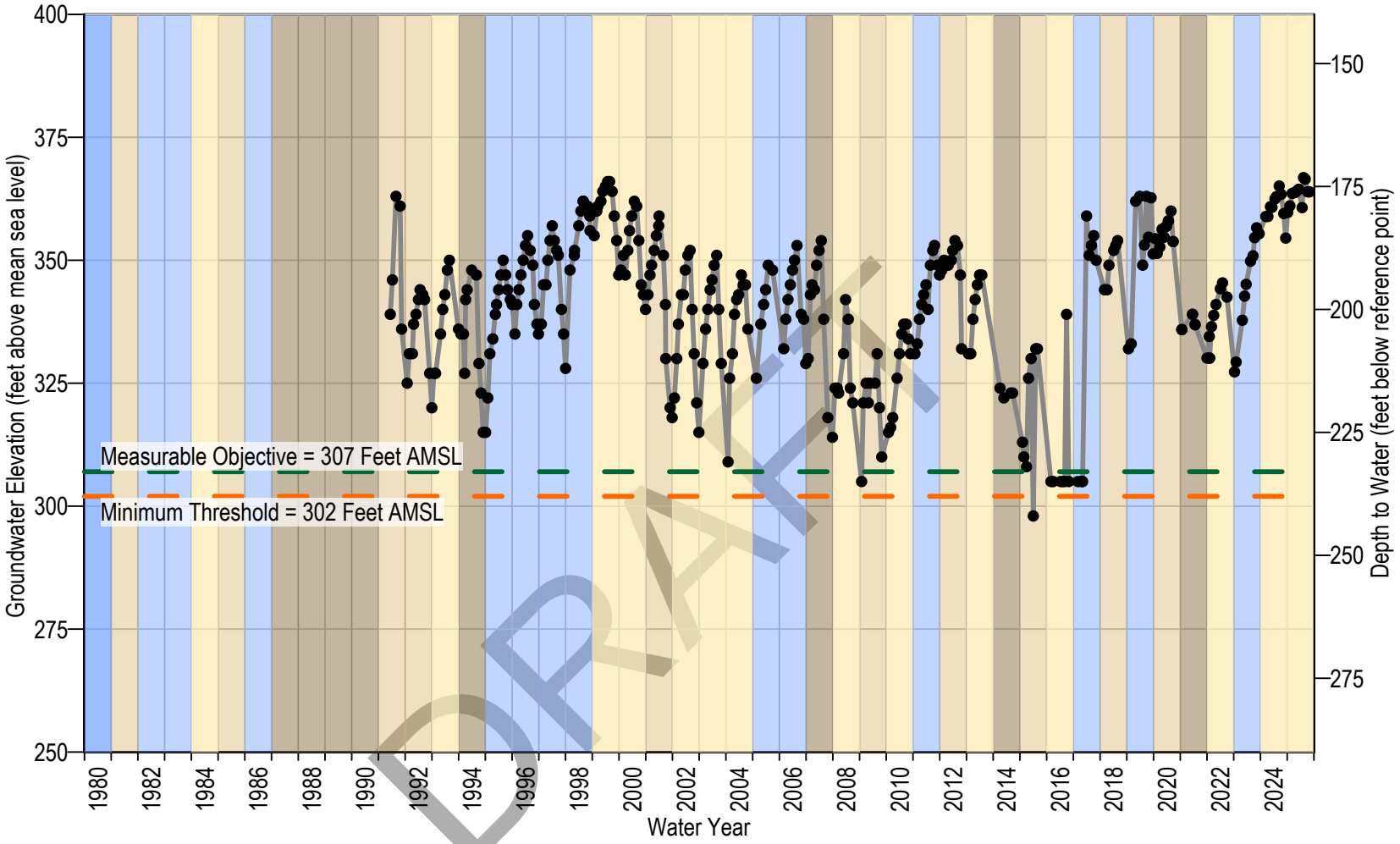
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Appendix 4A

Groundwater Level Sustainability Indicator RMP in the 2022 GSP

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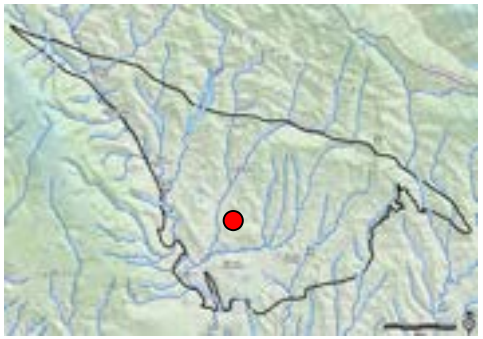
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SLVWD Olympia #3
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 540 ft AMSL
Screen Interval: 230-308 ft bgs

Water Year Classification

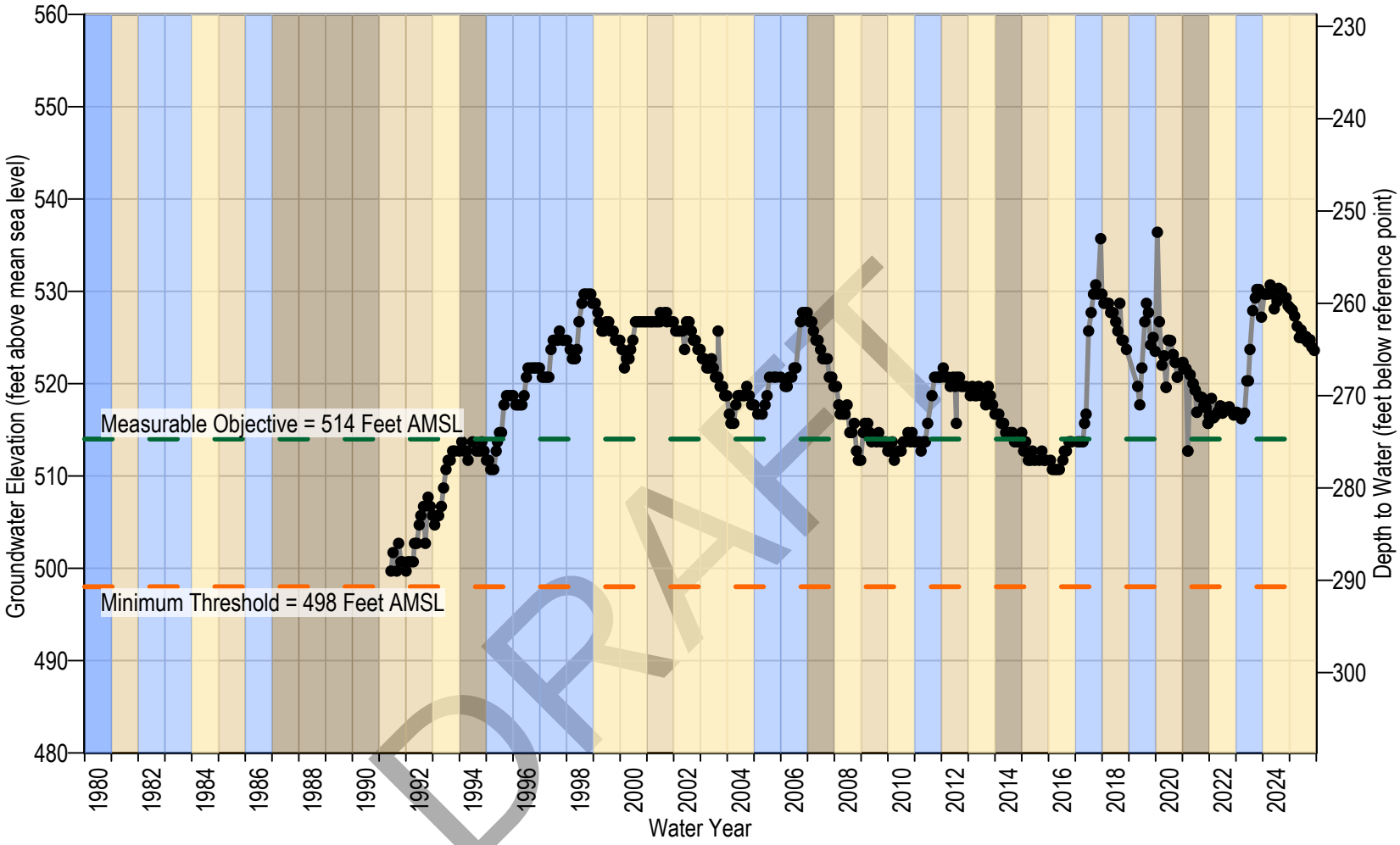
Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-1. Hydrograph of SLVWD Olympia #3

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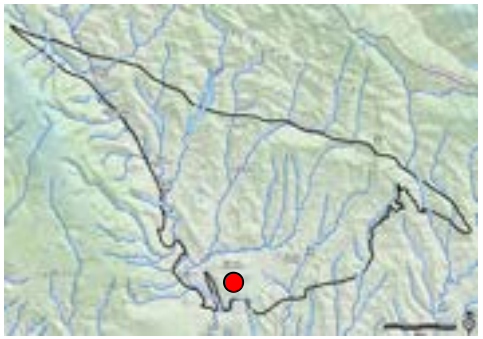


SLVWD Pasatiempo MW-2
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 788.7 ft AMSL
Screen Interval: 254-294 ft bgs

Water Year Classification

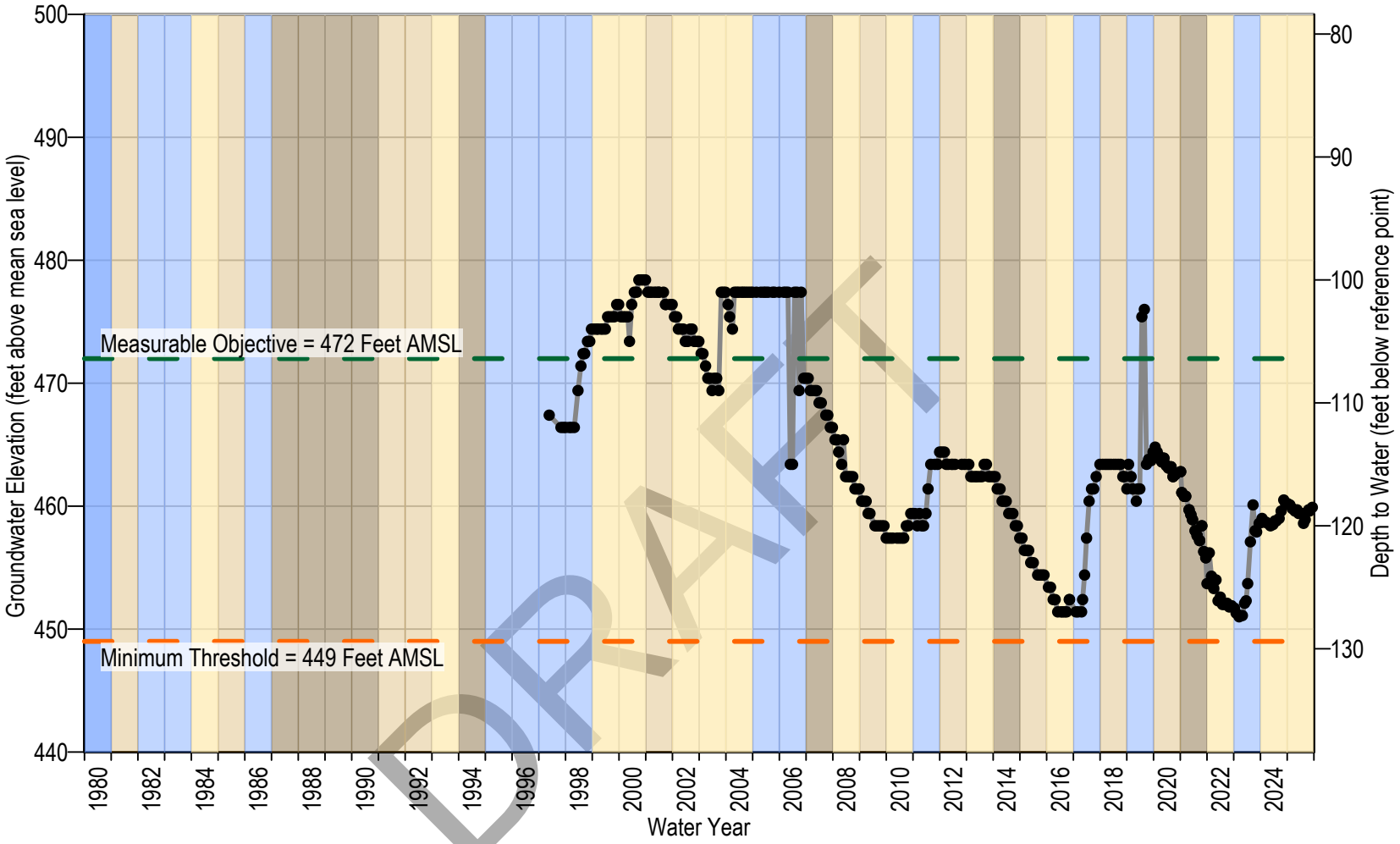
Wet	Dry
Normal	Critically Dry



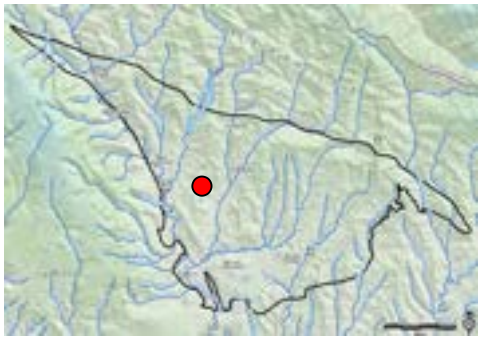
Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-2. Hydrograph of SLVWD Pasatiempo MW-2

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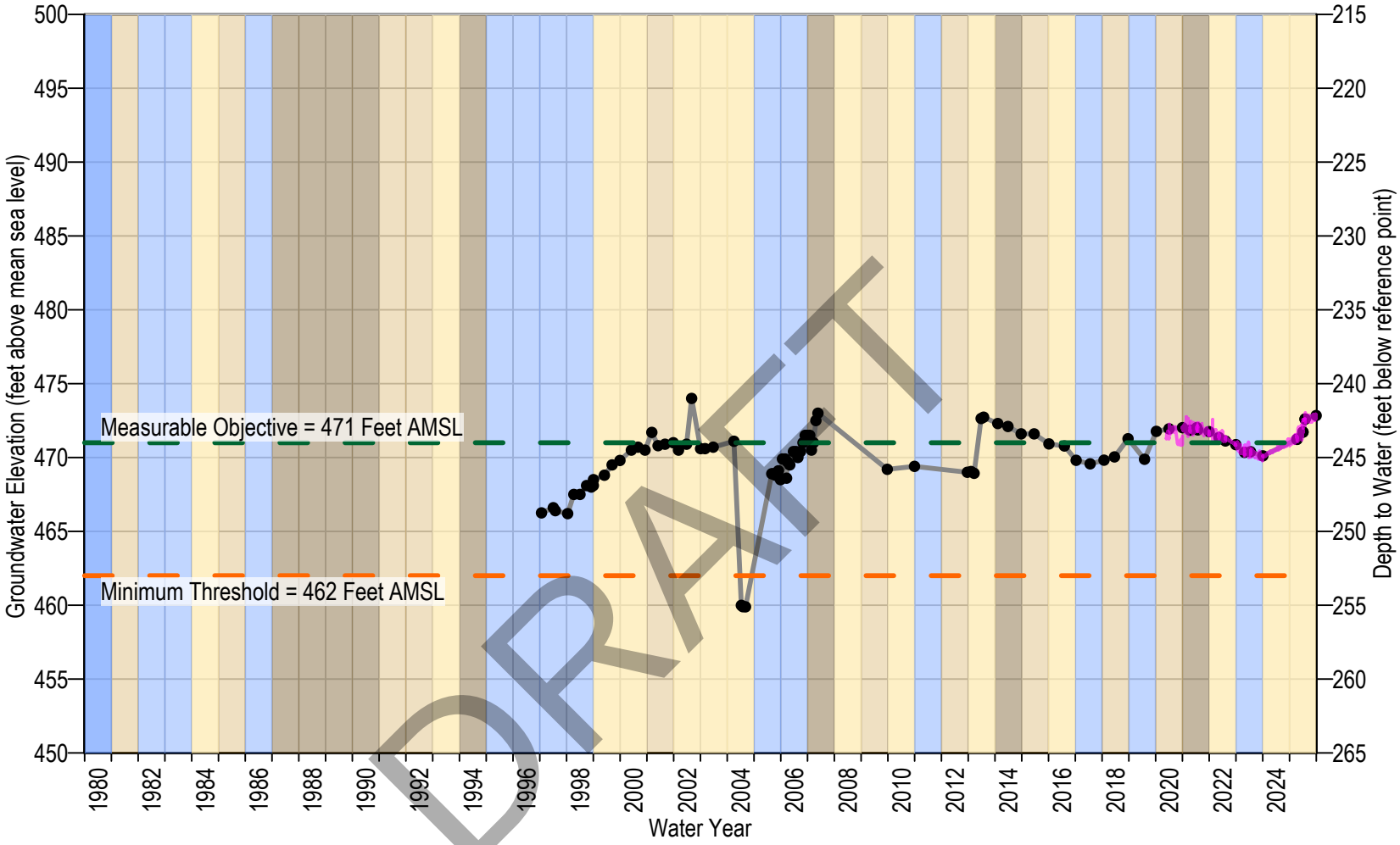


DRAFT



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-3. Hydrograph of SLVWD Quail MW-B

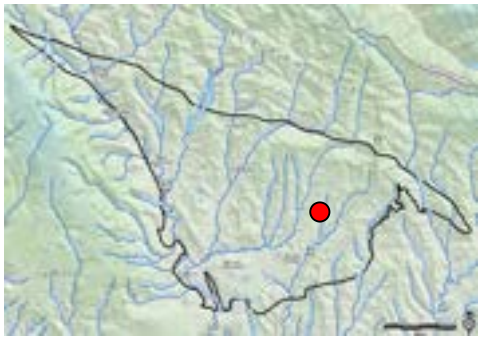


DRAFT

SVWD TW-18
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 715 ft AMSL
Screen Interval: 285-345 ft bgs

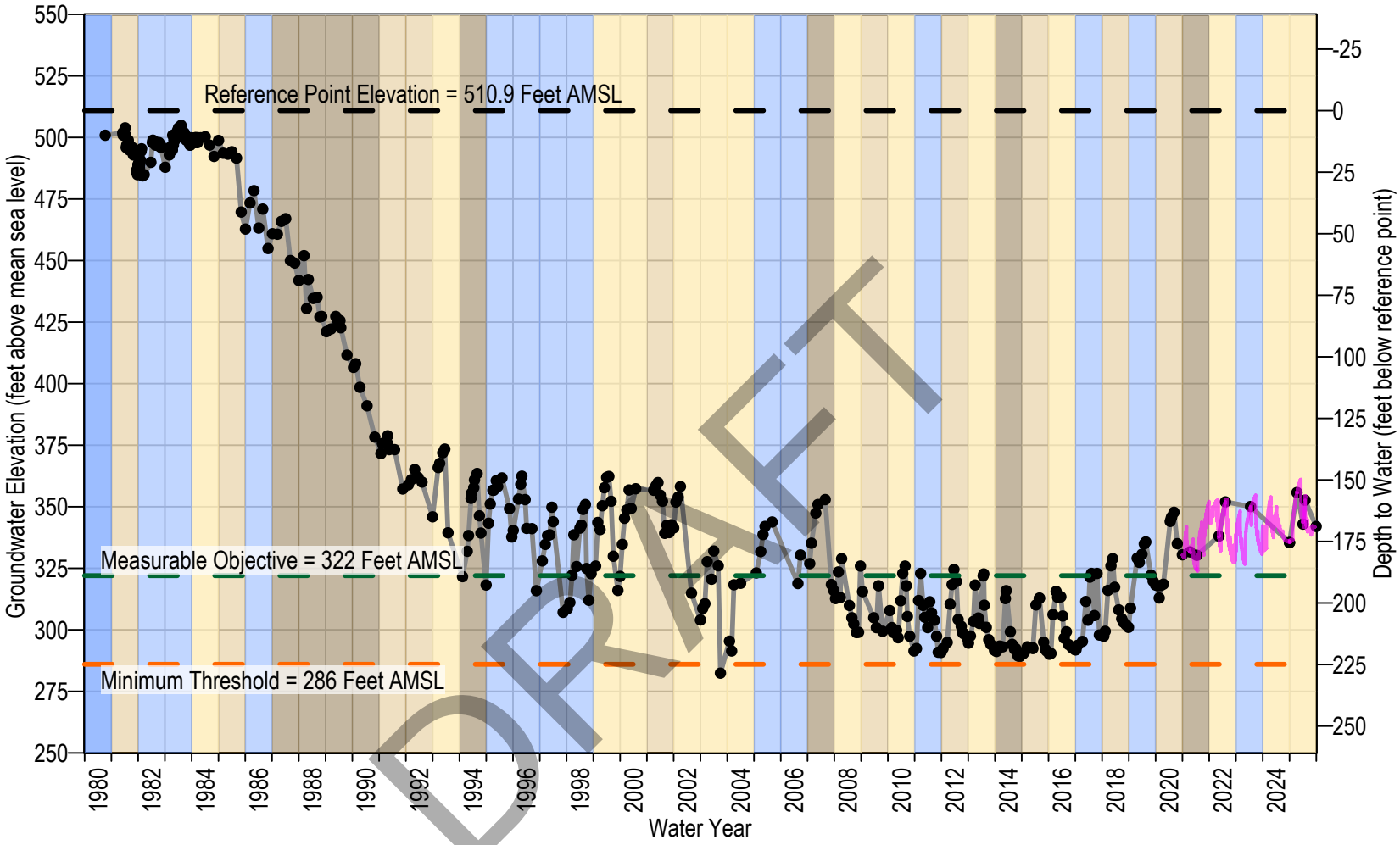
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-4. Hydrograph of SVWD TW-18

MONTGOMERY & ASSOCIATES

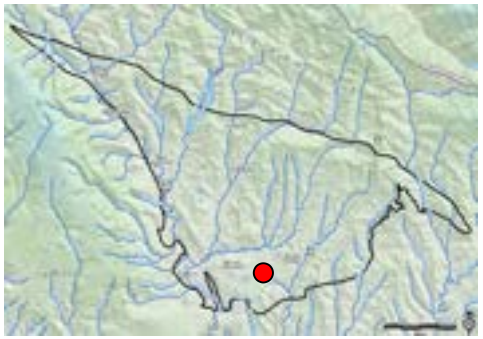


DRAFT

SVWD #10
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

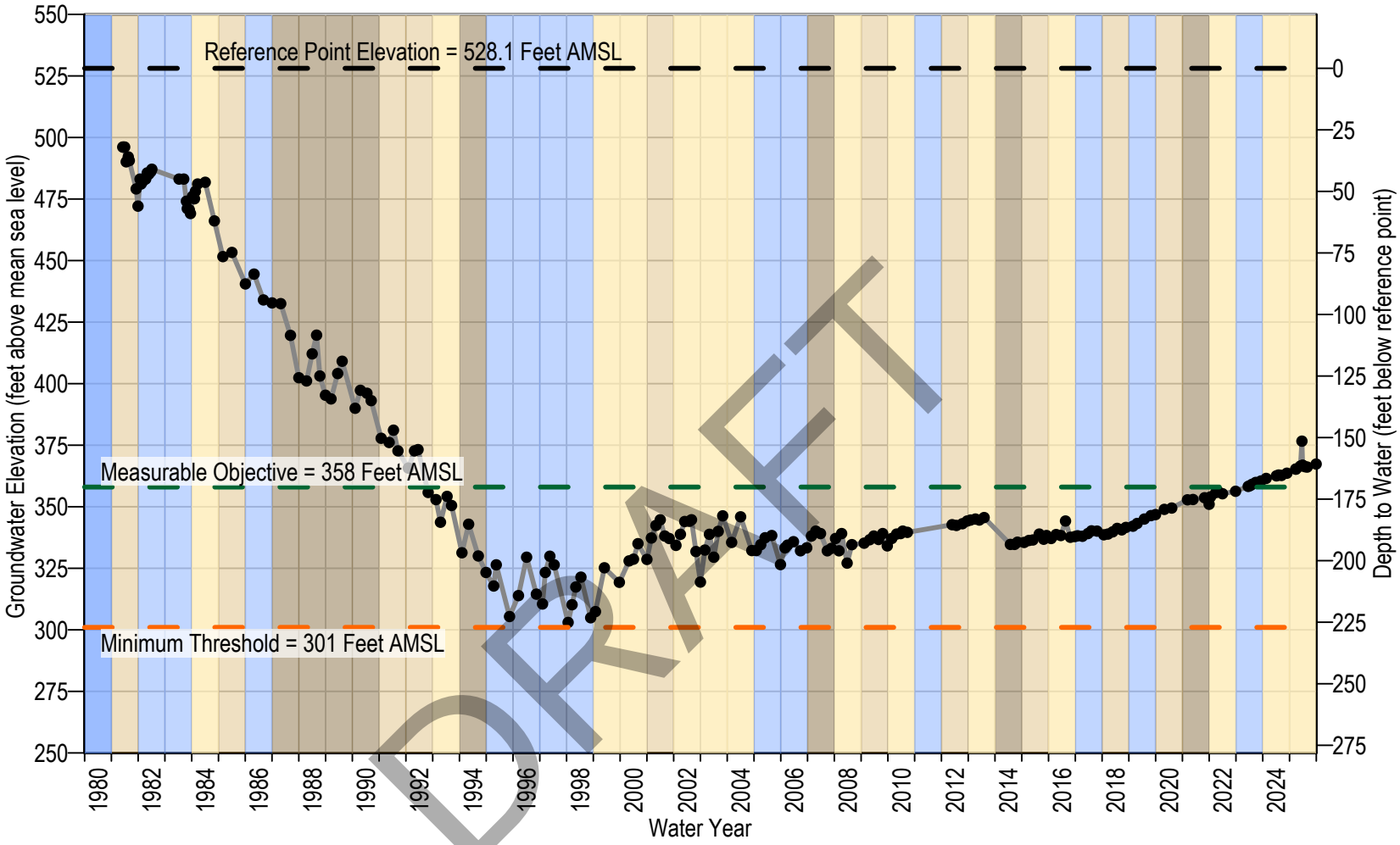
Formation: Unconfined - Santa Margarita, Lompico
Reference Point Elevation: 510.9 ft AMSL
Screen Interval: 190-220, 240-270, 325-355 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-5. Hydrograph of SVWD #10

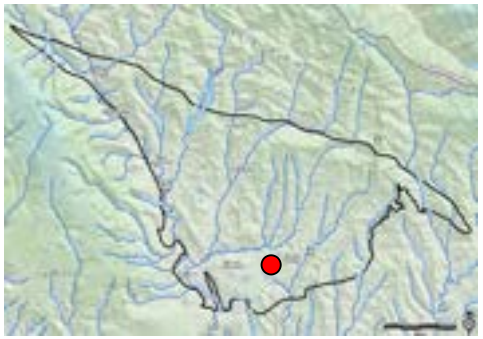


DRAFT

SVWD #9
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Monterey
Reference Point Elevation: 528.1 ft AMSL
Screen Interval: 155-195, 315-355 ft bgs

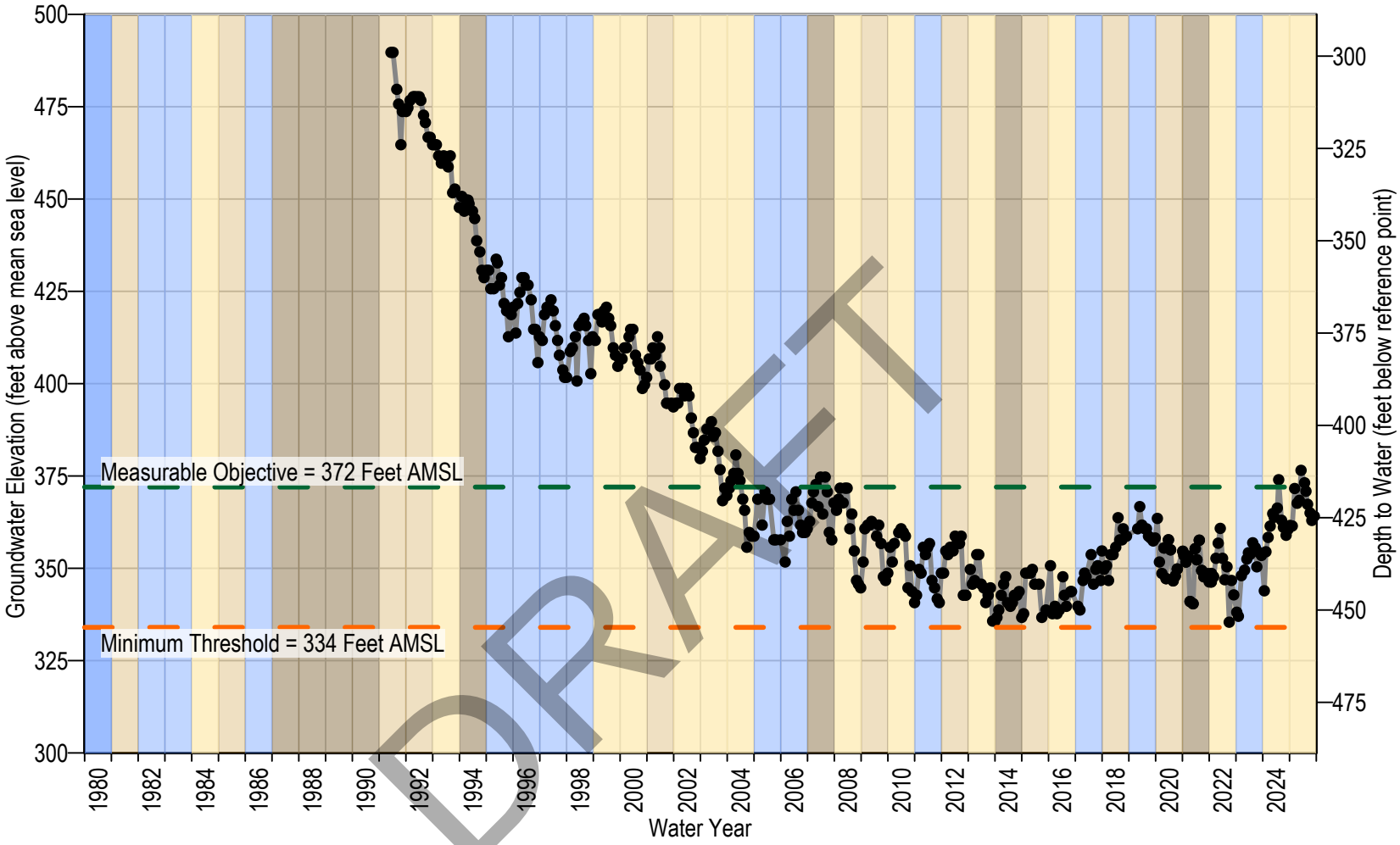
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-6. Hydrograph of SVWD #9

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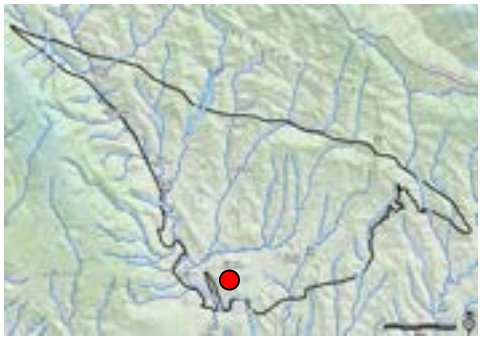


DRAFT

SLVWD Pasatiempo MW-1
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Lompico
Reference Point Elevation: 788.7 ft AMSL
Screen Interval: 599-659 ft bgs

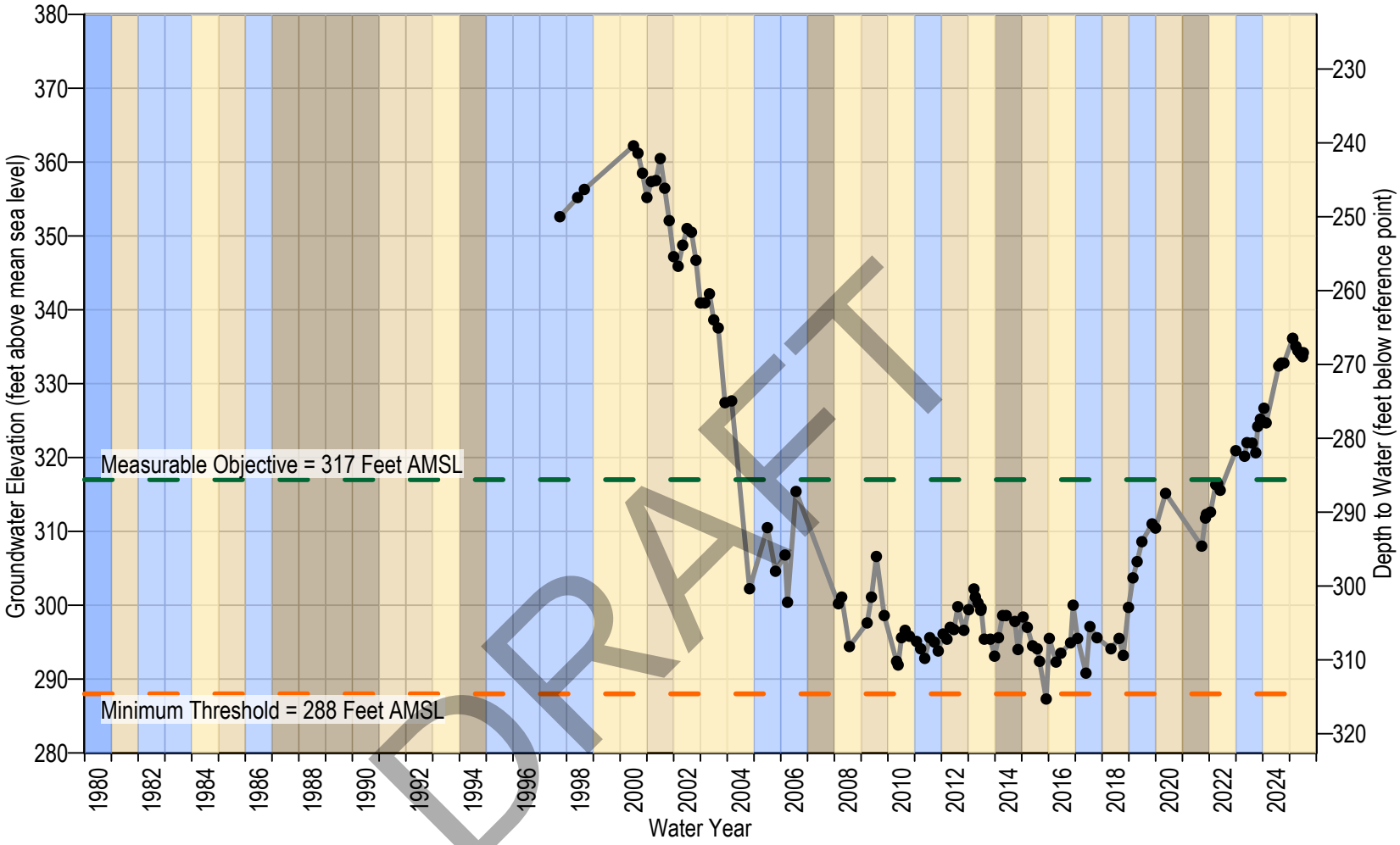
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-7. Hydrograph of SLVWD Pasatiempo MW-1

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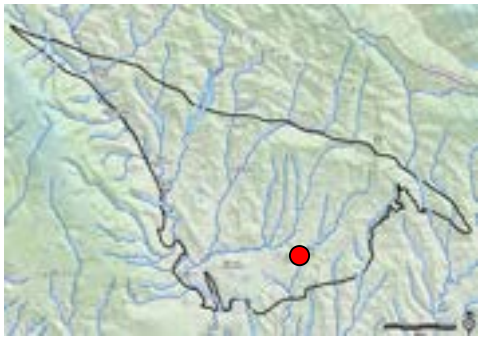


DRAFT

SVWD #11A
Reference Point Elevation
Minimum Threshold
Measurable Objective

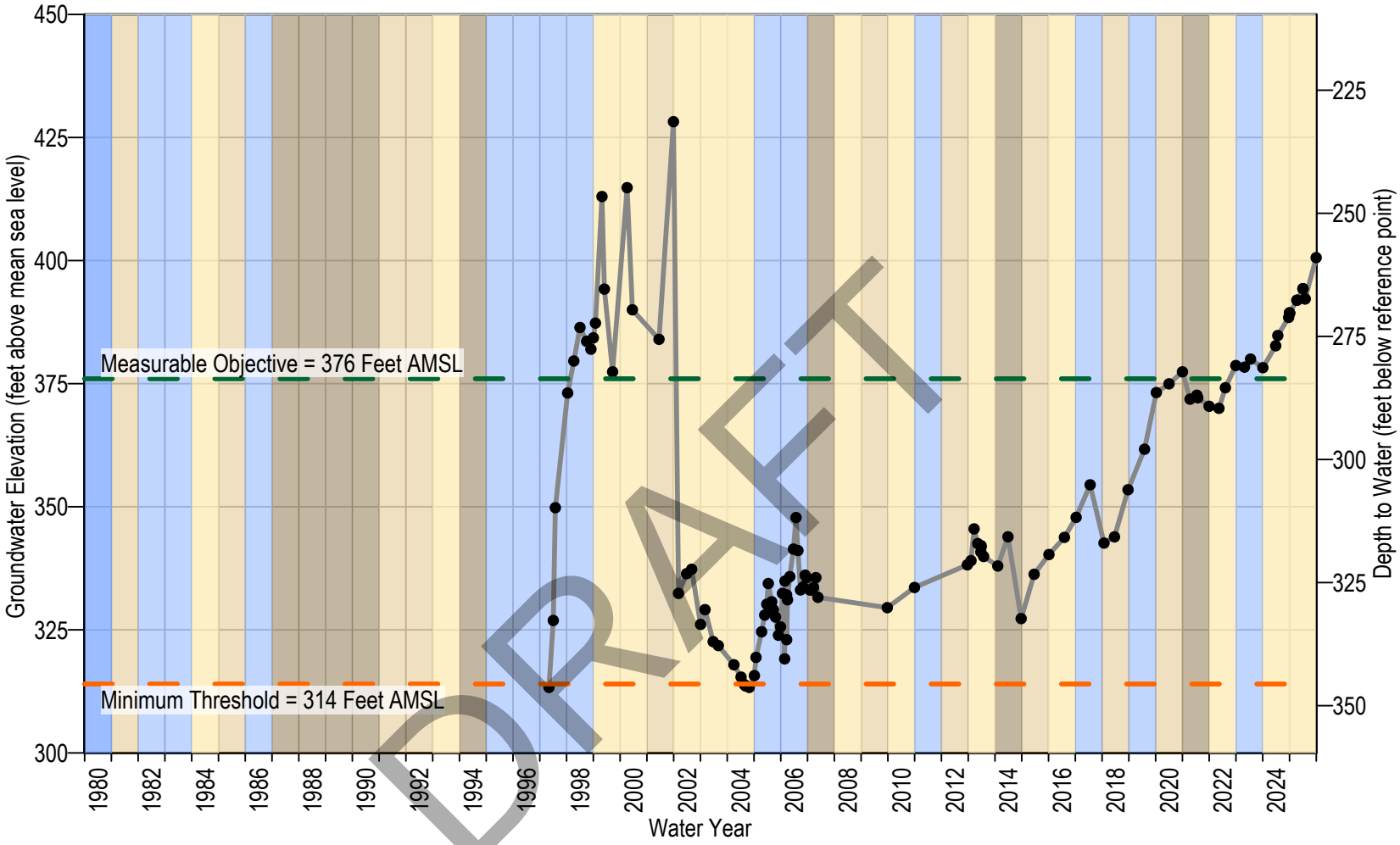
Formation: Confined - Lompico
Reference Point Elevation: 602.6 ft AMSL
Screen Interval: 399-419, 459-469, 495-515 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-8. Hydrograph of SVWD #11A

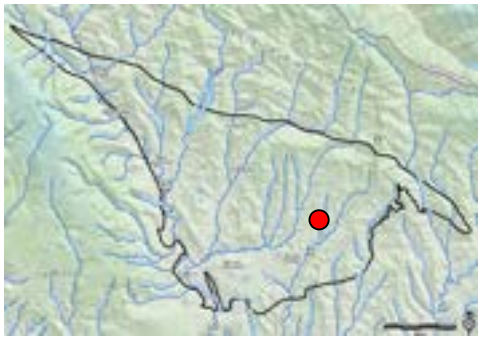


DRAFT

SVWD TW-19
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Lompico
Reference Point Elevation: 659.6 ft AMSL
Screen Interval: 960-1060 ft bgs

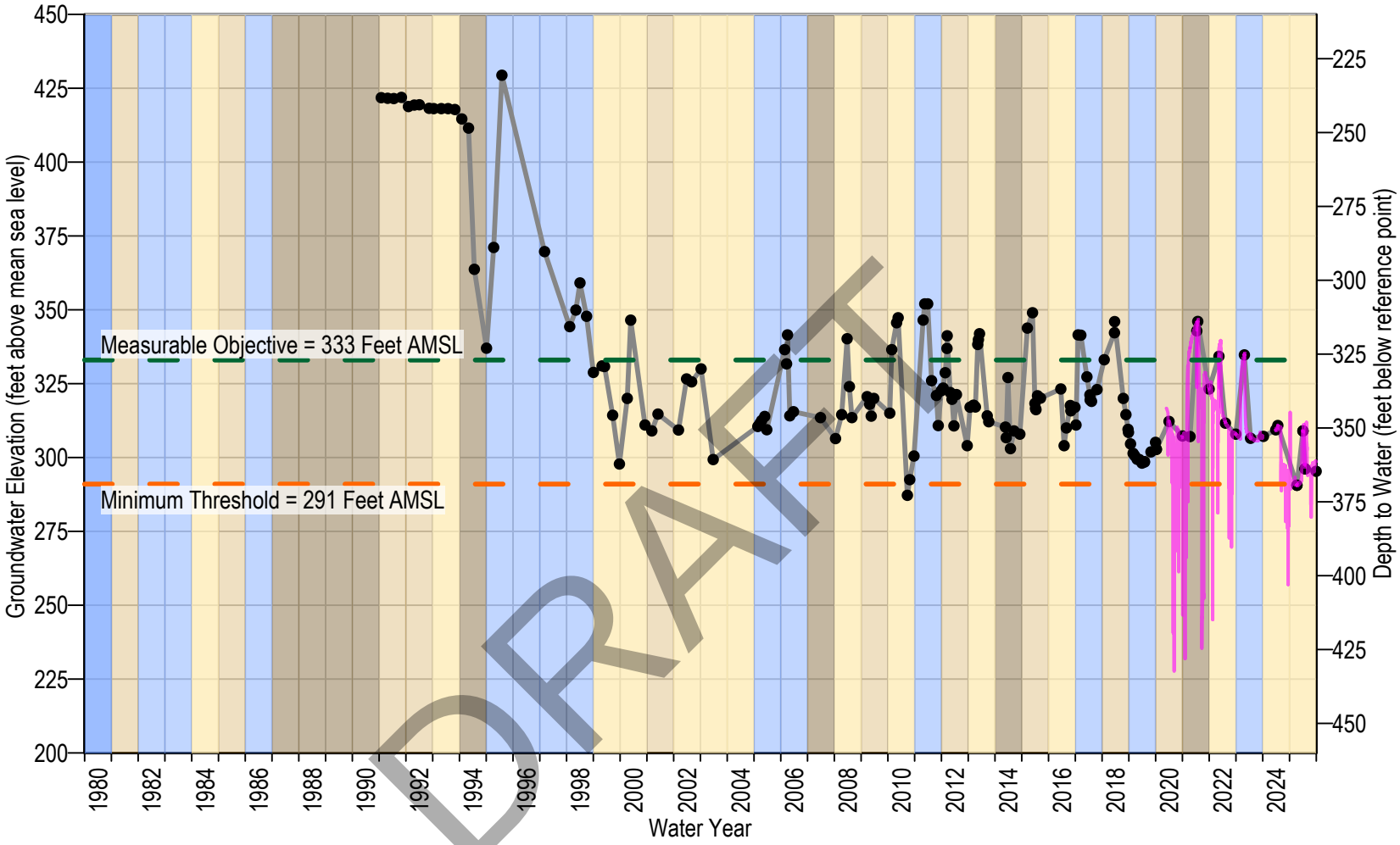
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-9. Hydrograph of SVWD TW-19

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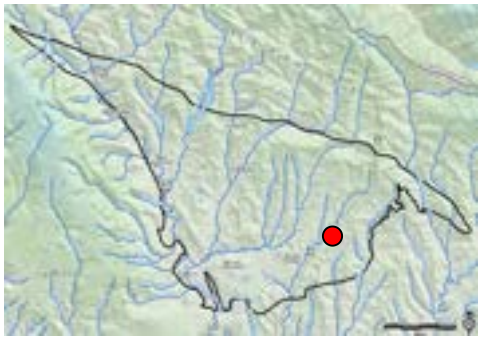
DRAFT

SVWD #15 Monitoring Well
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Lompico, Butano
Reference Point Elevation: 660 ft AMSL
Screen Interval: 700-1,100 ft bgs

Water Year Classification

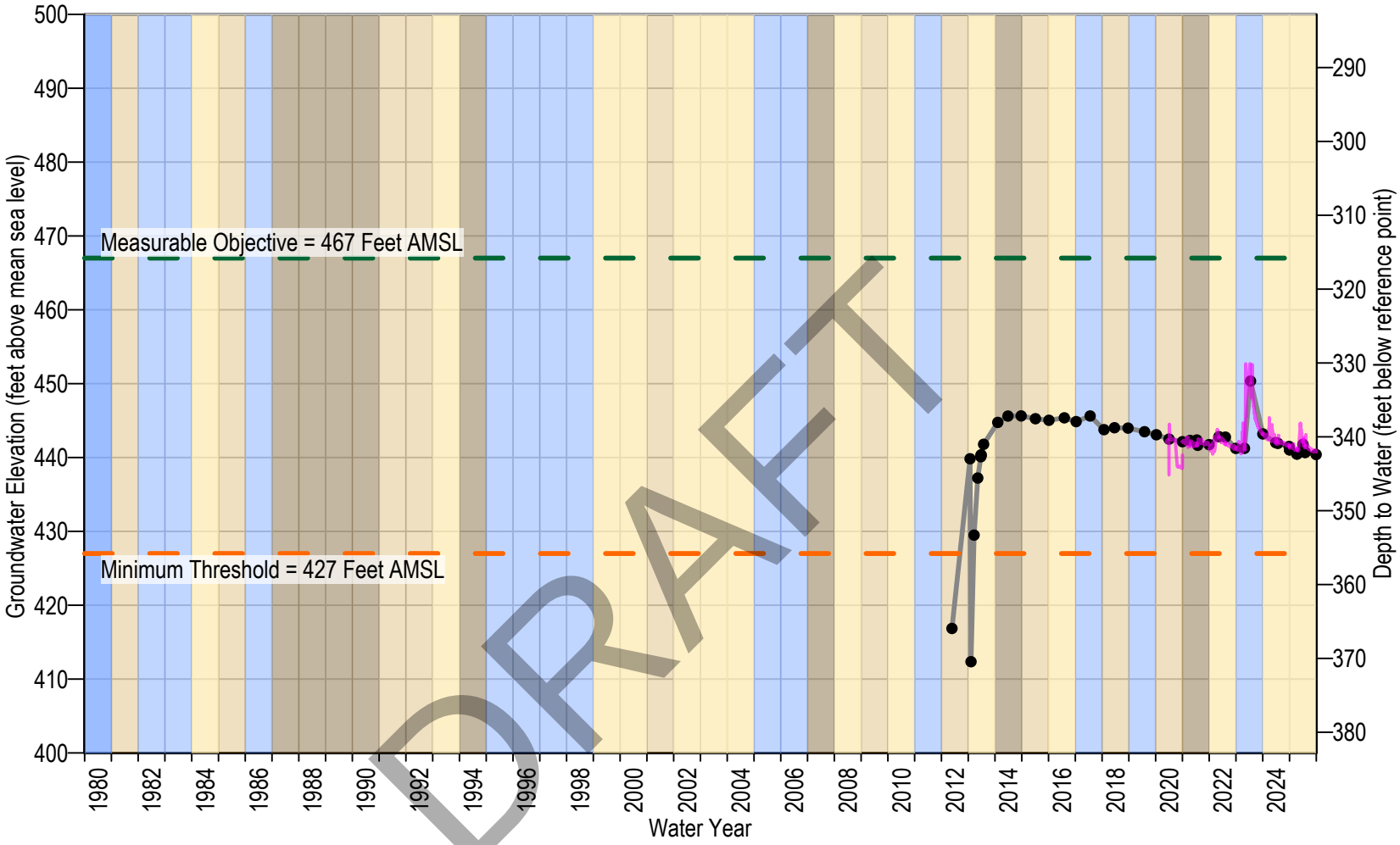
Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-10. Hydrograph of SVWD #15 Monitoring Well

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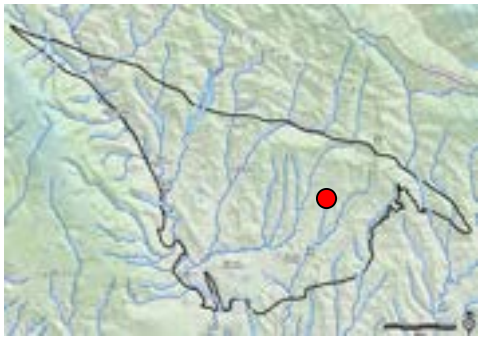


DRAFT

SVWD Canham Well
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Butano
Reference Point Elevation: 782.8 ft AMSL
Screen Interval: 1,281-1,381 ft bgs

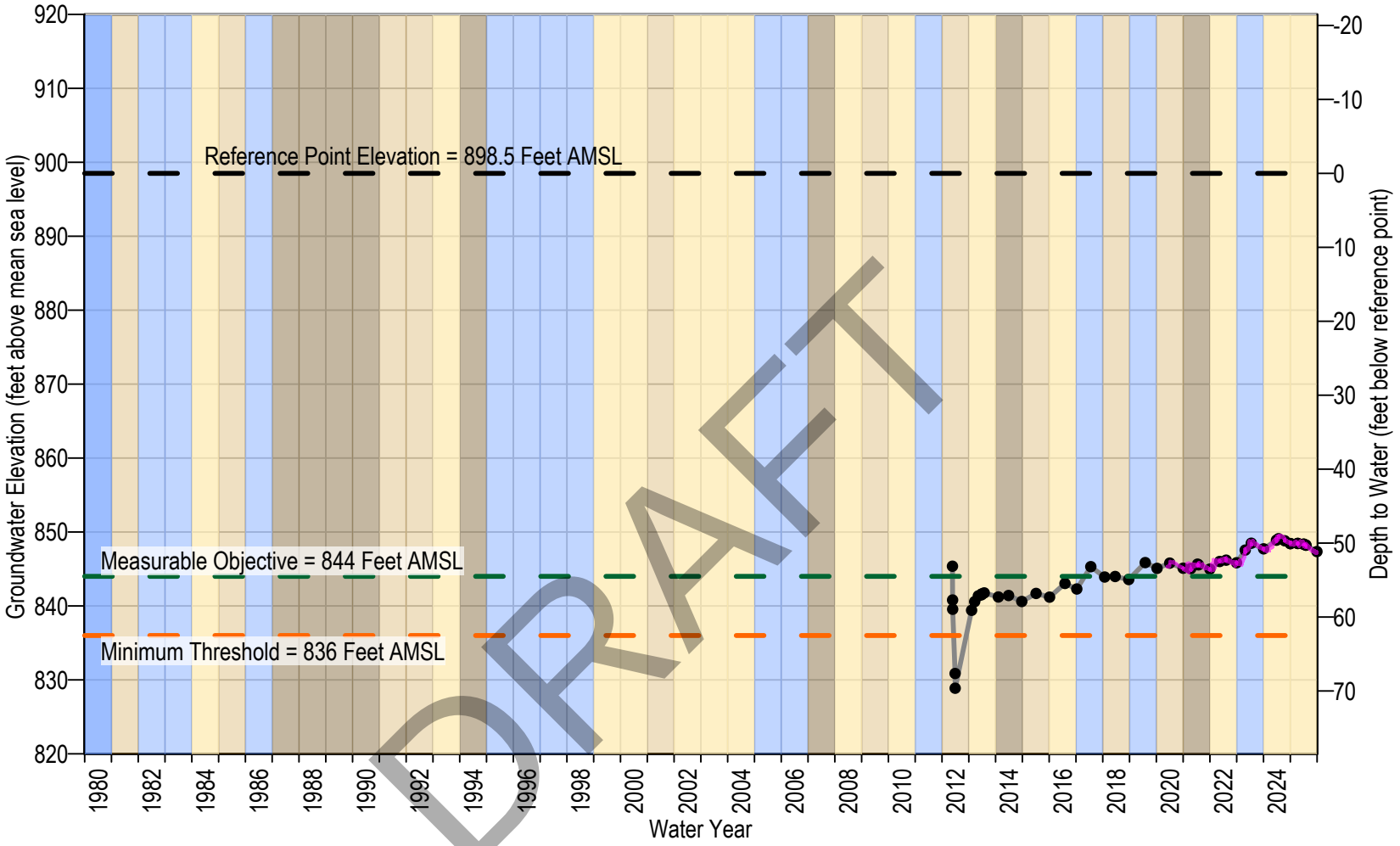
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-11. Hydrograph of SVWD Canham Well

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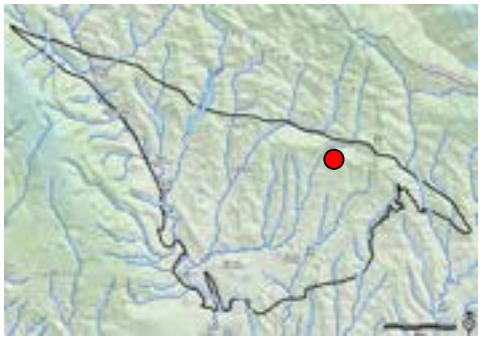
DRAFT

SVWD Stonewood Well
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Butano
Reference Point Elevation: 898.5 ft AMSL
Screen Interval: 799-859 ft bgs

Water Year Classification

Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4A-12. Hydrograph of SVWD Stonewood Well

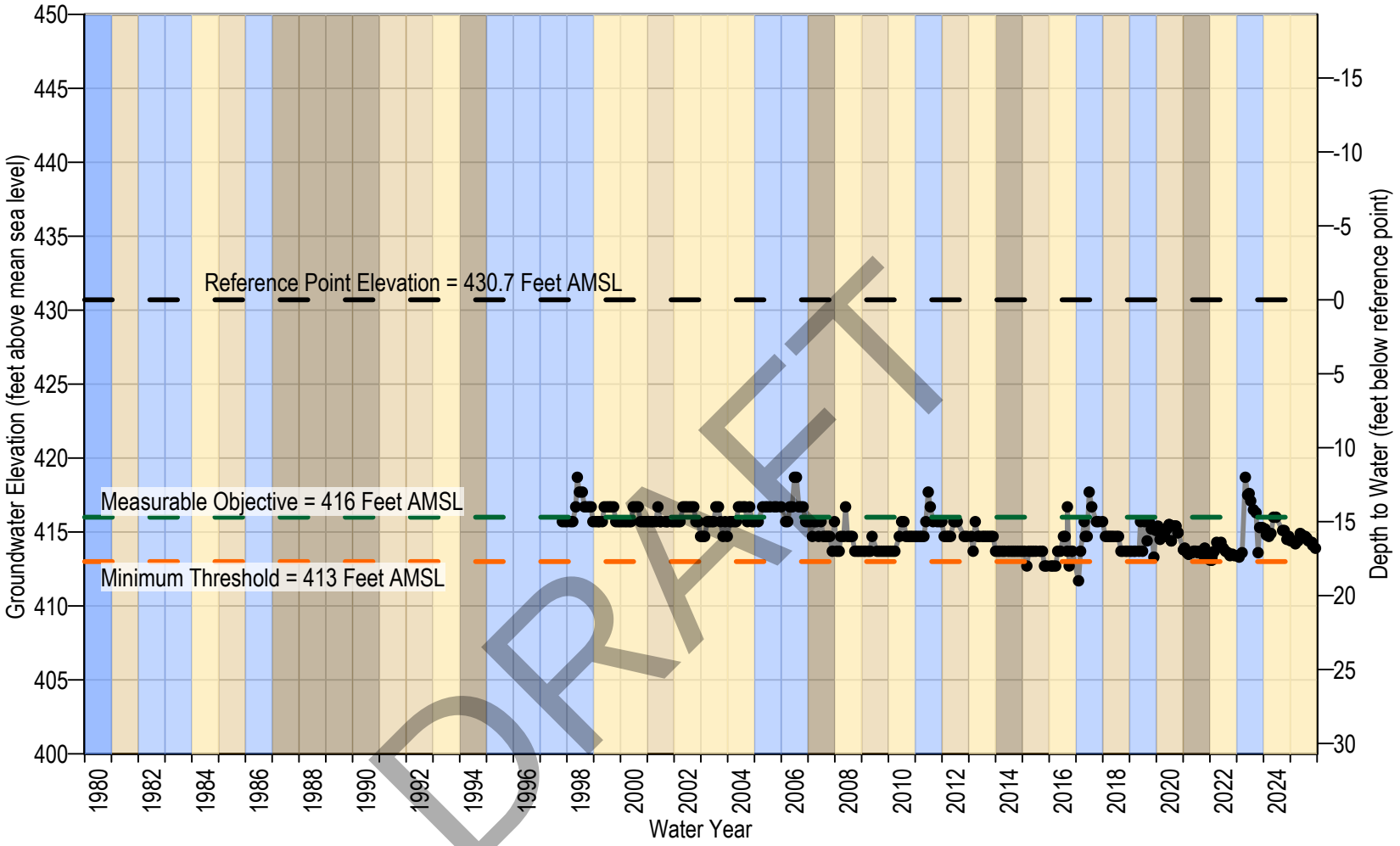
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Appendix 4B

ISW Sustainability Indicator RMP in the 2022 GSP

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SLVWD Quail MW-A
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 430.7 ft AMSL
Screen Interval: 33-88 ft bgs

Water Year Classification

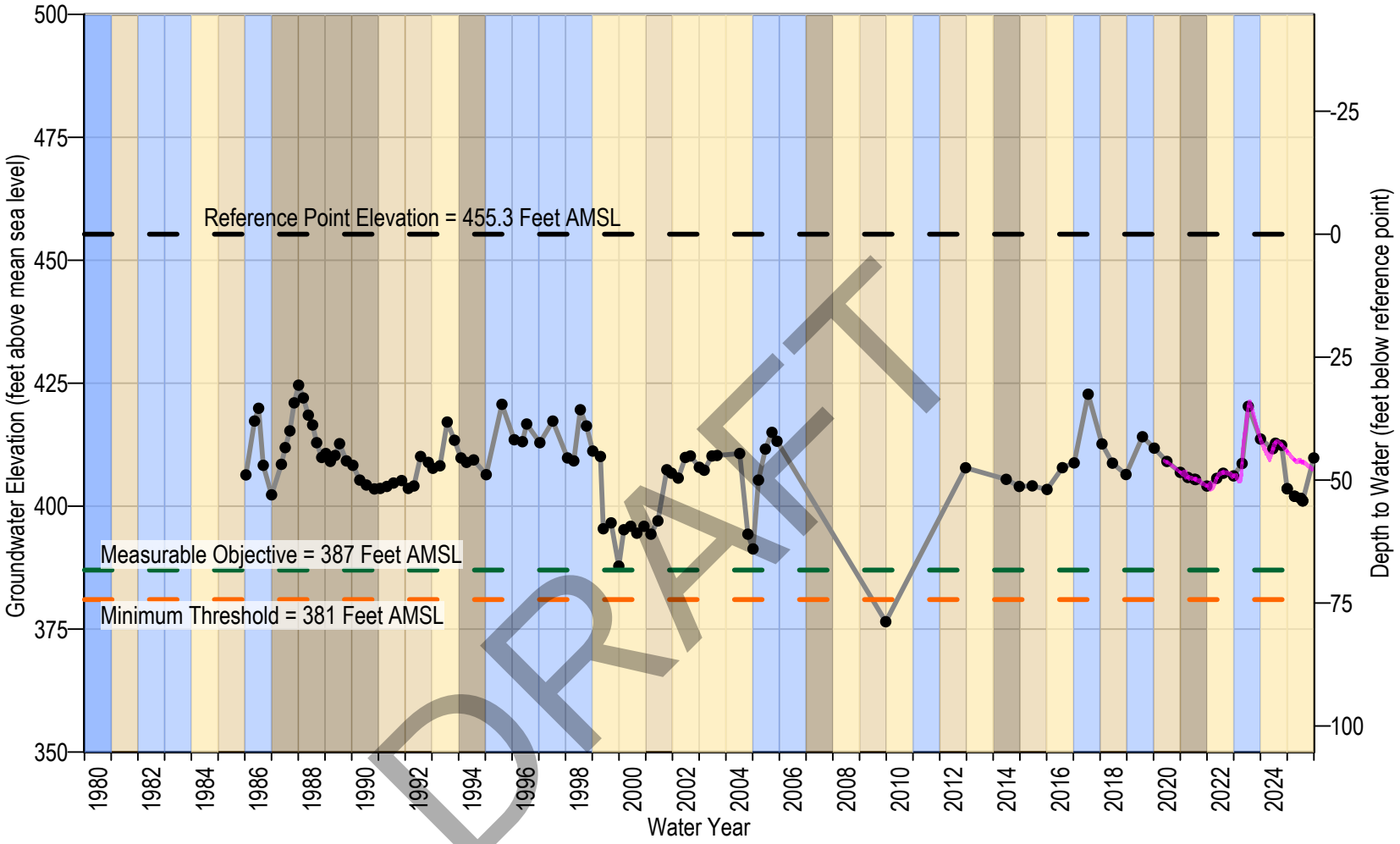
Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4B-1. Hydrograph of SLVWD Quail MW-A

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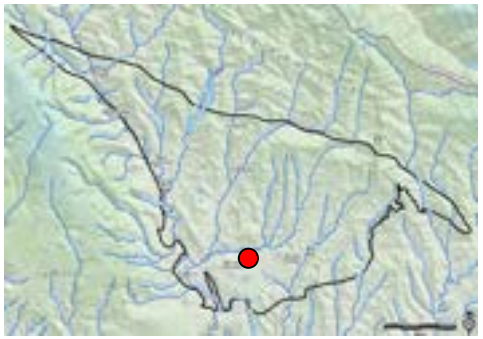


DRAFT

SVWD SV4-MW
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 455.3 ft AMSL
Screen Interval: 50-60 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4B-2. Hydrograph of SVWD SV4-MW

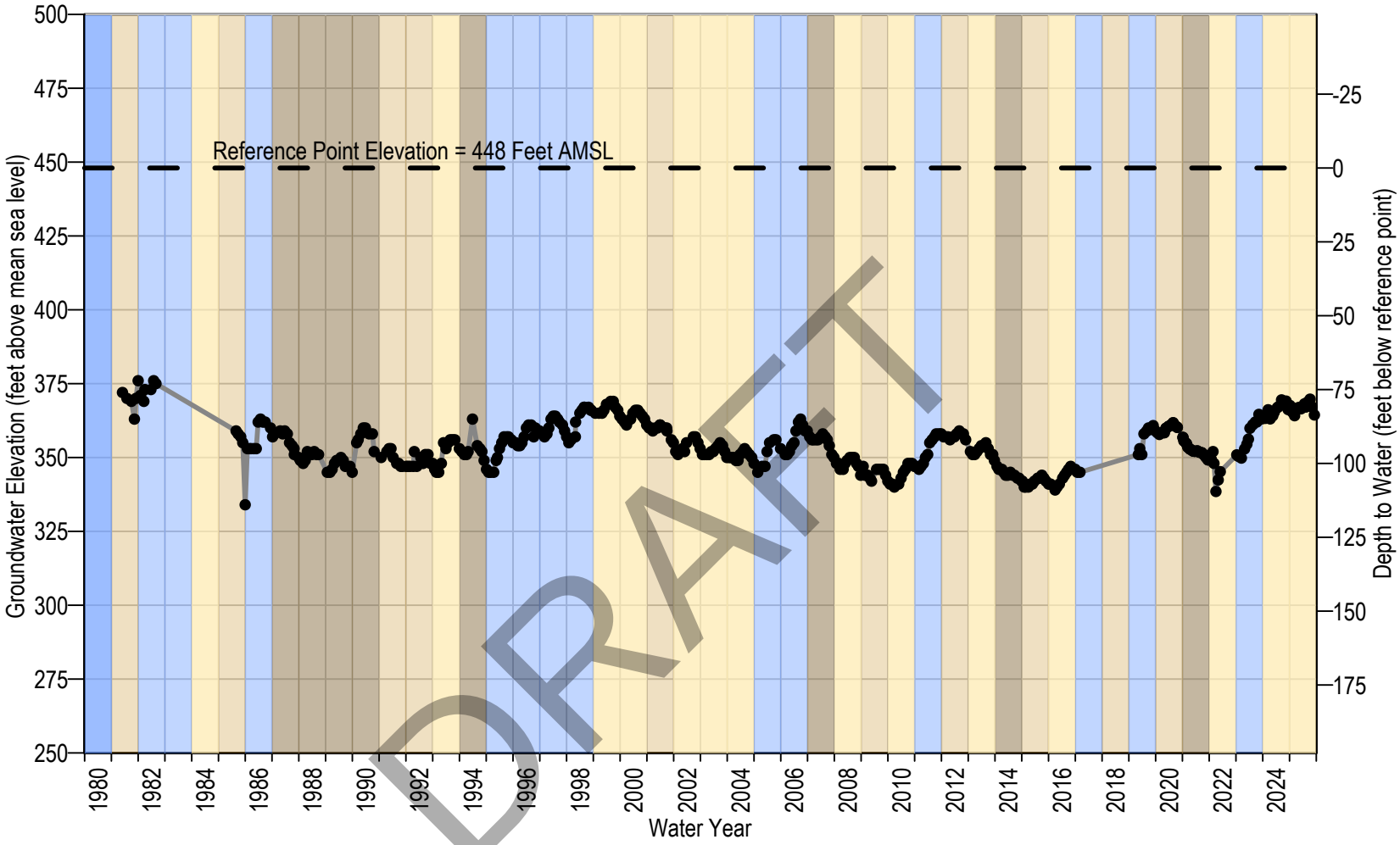
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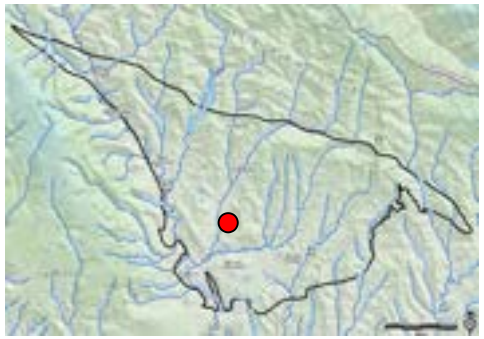
Appendix 4C

Groundwater Level Sustainability Indicator Other GSP Monitoring Locations in the 2022 GSP

DRAFT



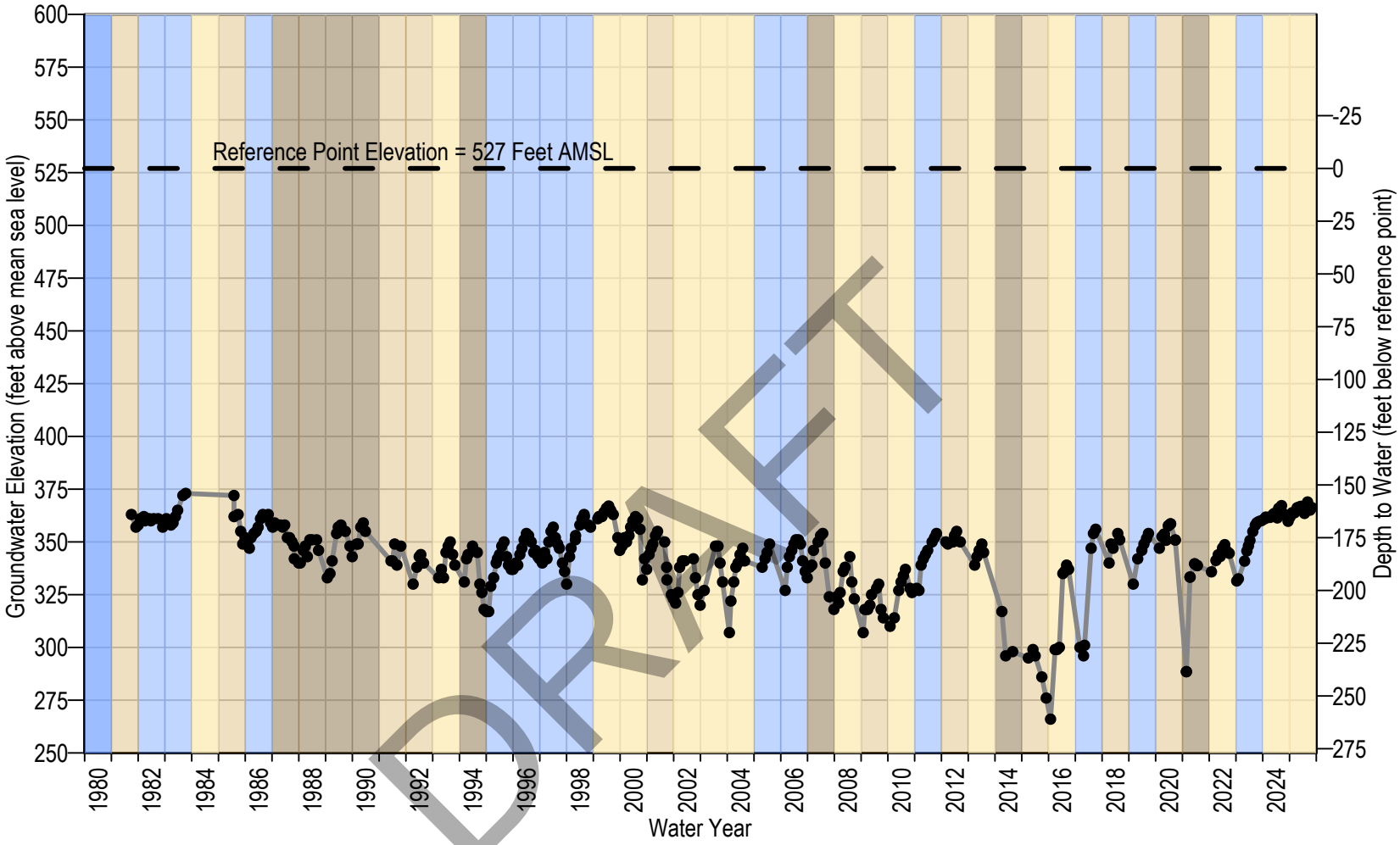
DRAFT



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-1. Hydrograph of SLVWD Olympia #1 (Ferrari)

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SLVWD Olympia #2

Reference Point Elevation

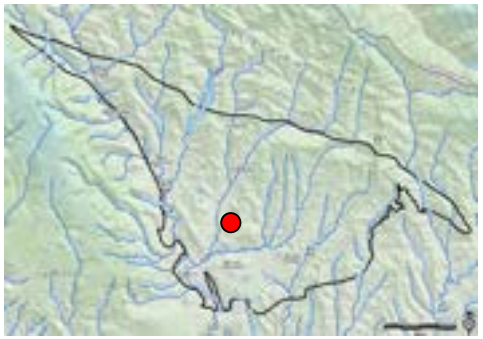
Formation: Unconfined - Santa Margarita

Reference Point Elevation: 527 ft AMSL

Screen Interval: 225-245, 275-298 ft bgs

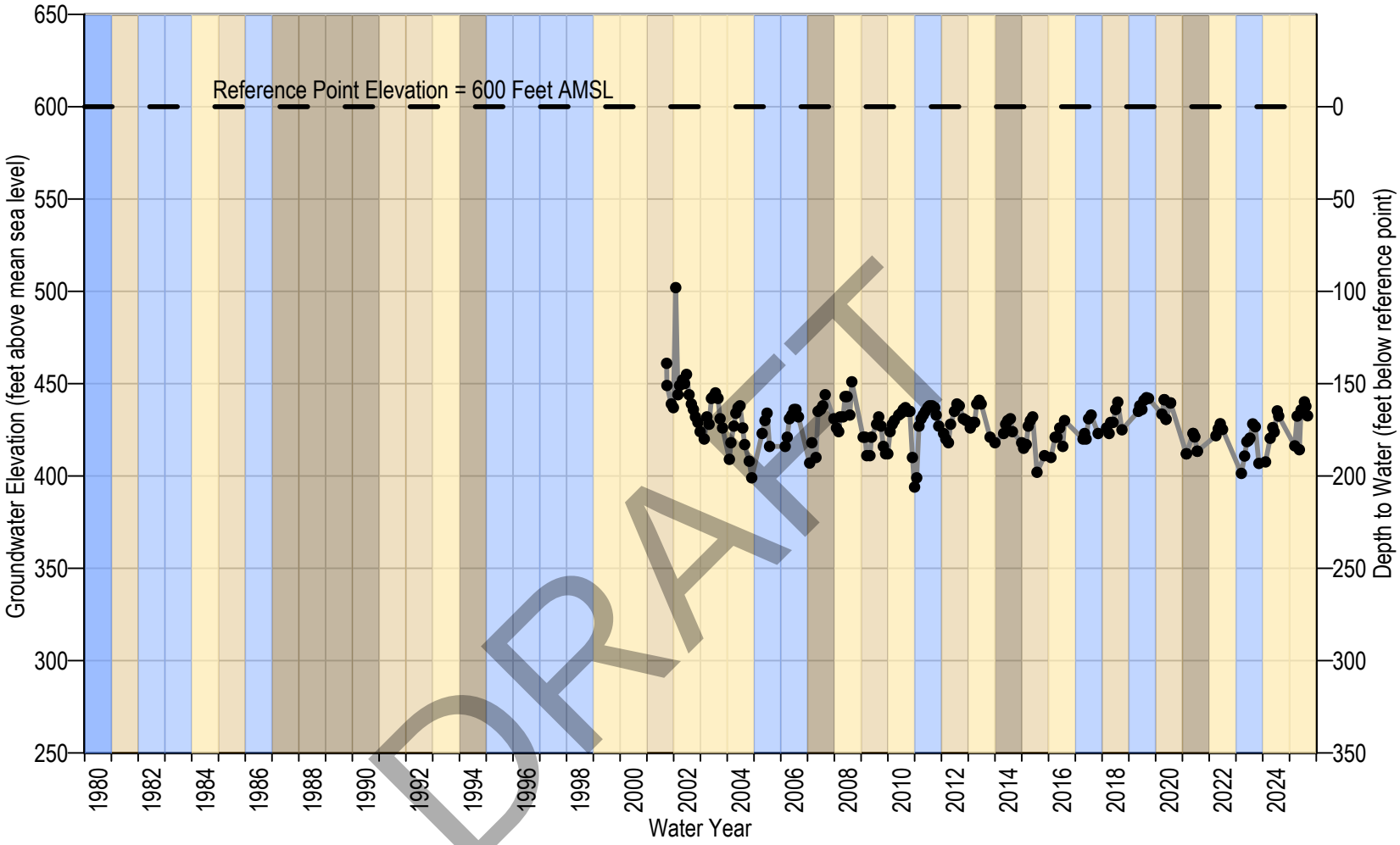
Water Year Classification

Wet | Dry | Normal | Critically Dry

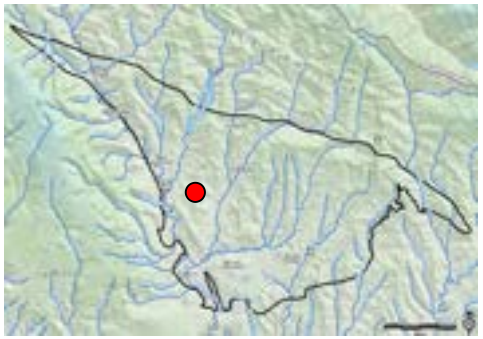


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-2. Hydrograph of SLVWD Olympia #2



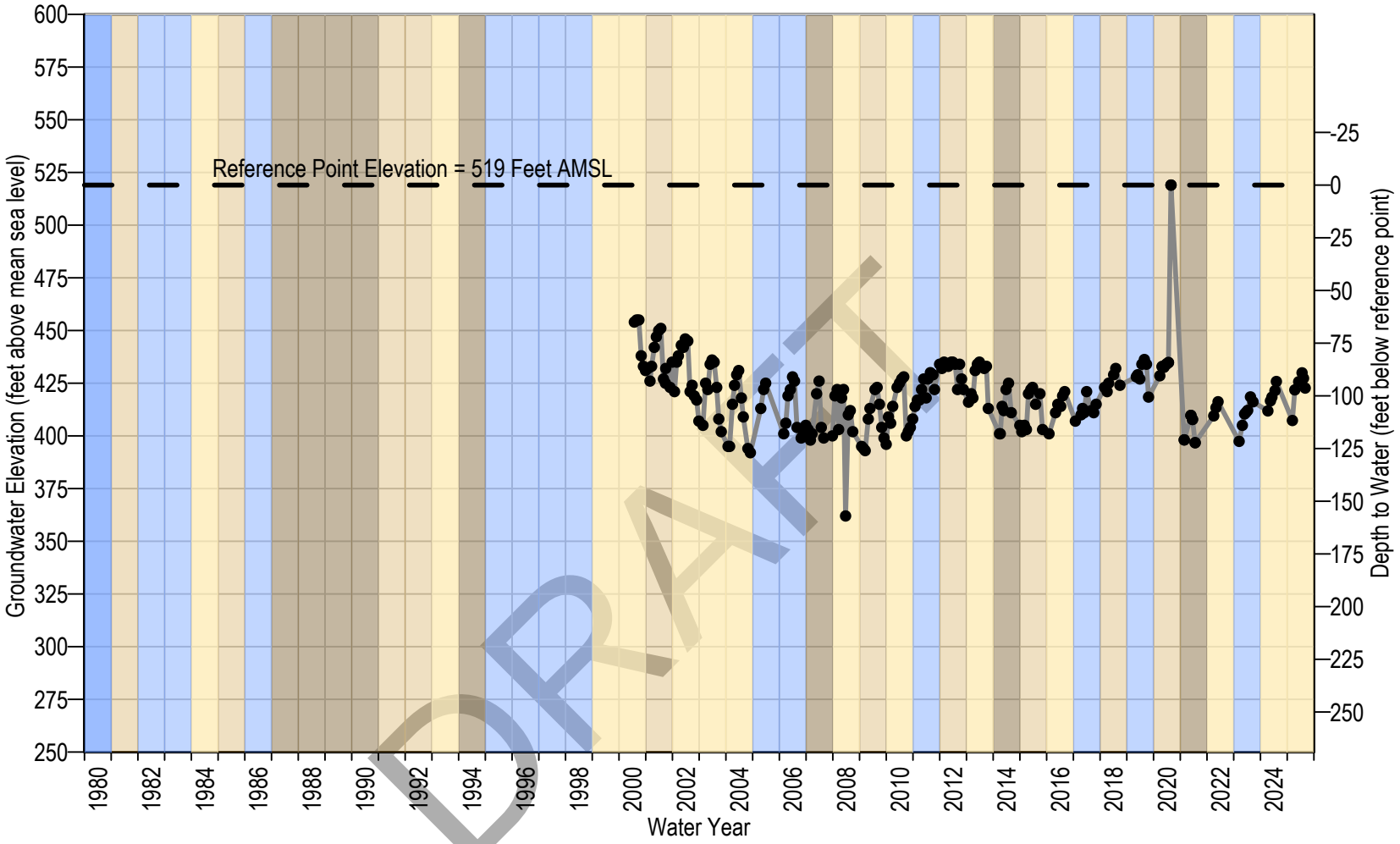
DRAFT



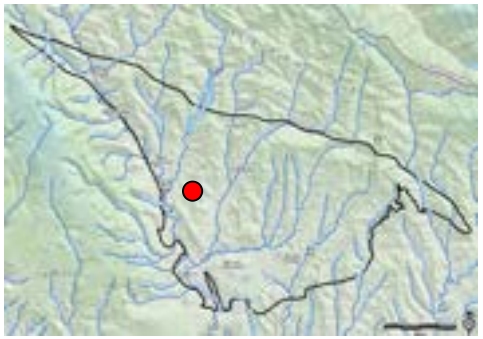
Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-3. Hydrograph of SLVWD Quail #4A

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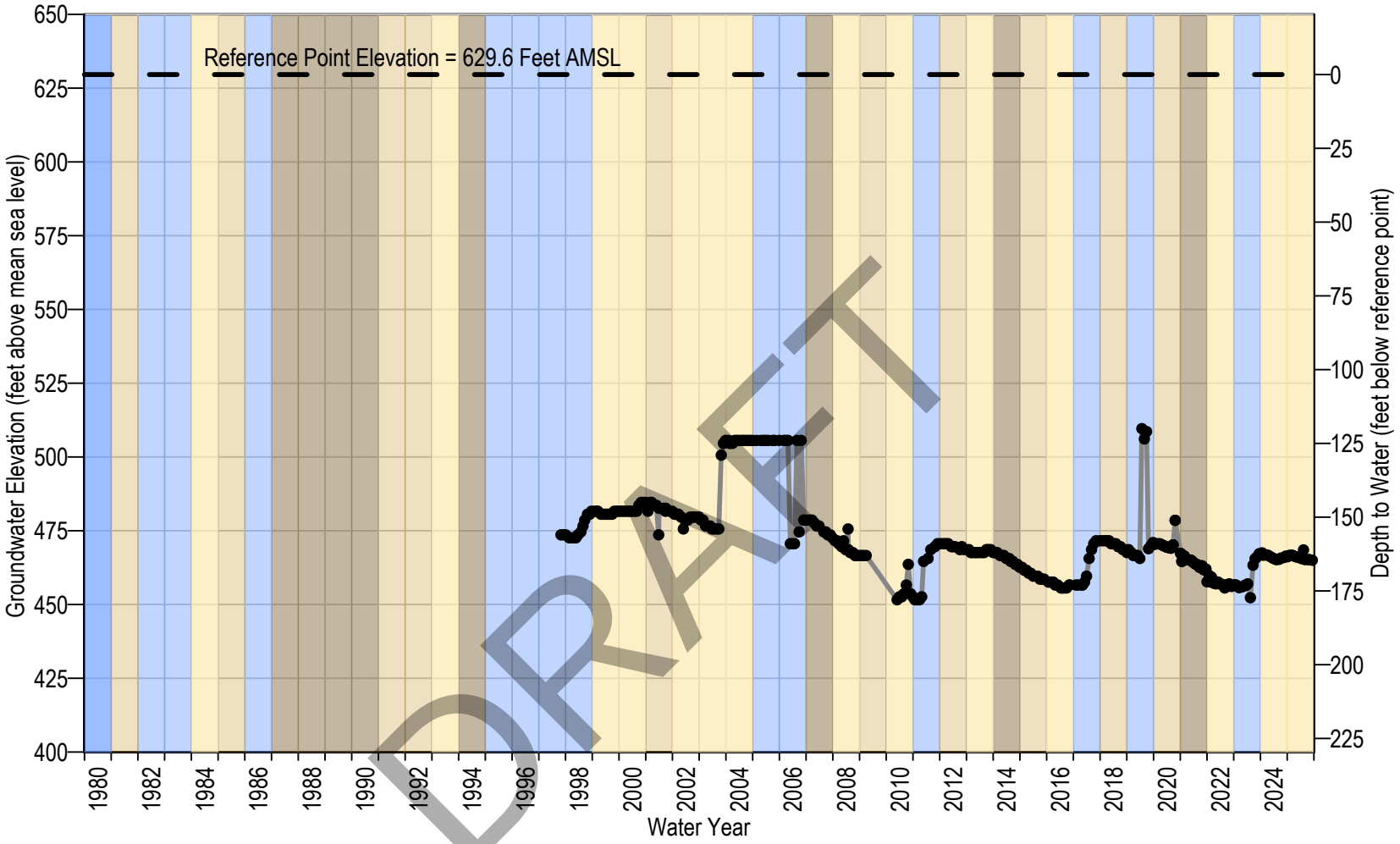
DRAFT



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-4. Hydrograph of SLVWD Quail #5A

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SLVWD Quail MW-C

Reference Point Elevation

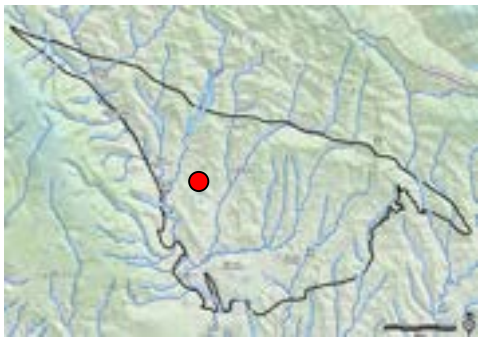
Formation: Unconfined - Santa Margarita

Reference Point Elevation: 629.6 ft AMSL

Screen Interval: 120-220 ft bgs

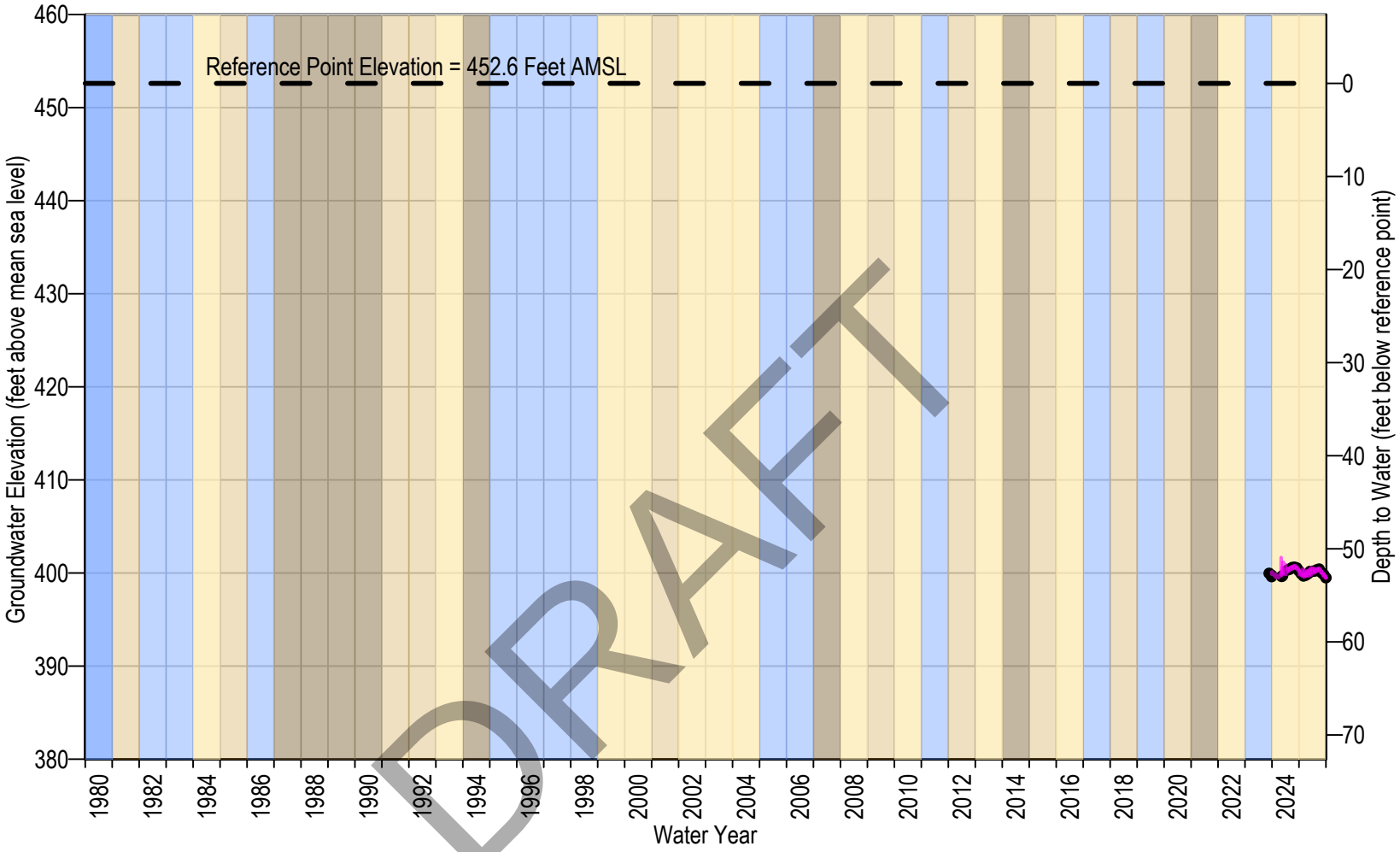
Water Year Classification

Wet | Dry | Normal | Critically Dry

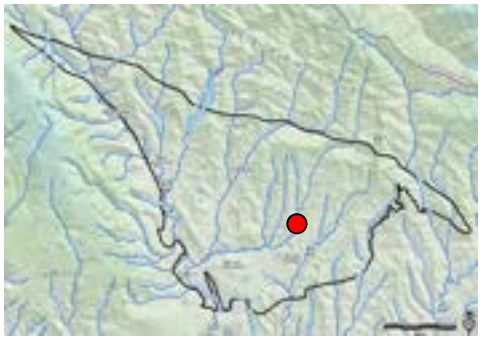


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-5. Hydrograph of SLVWD Quail MW-C

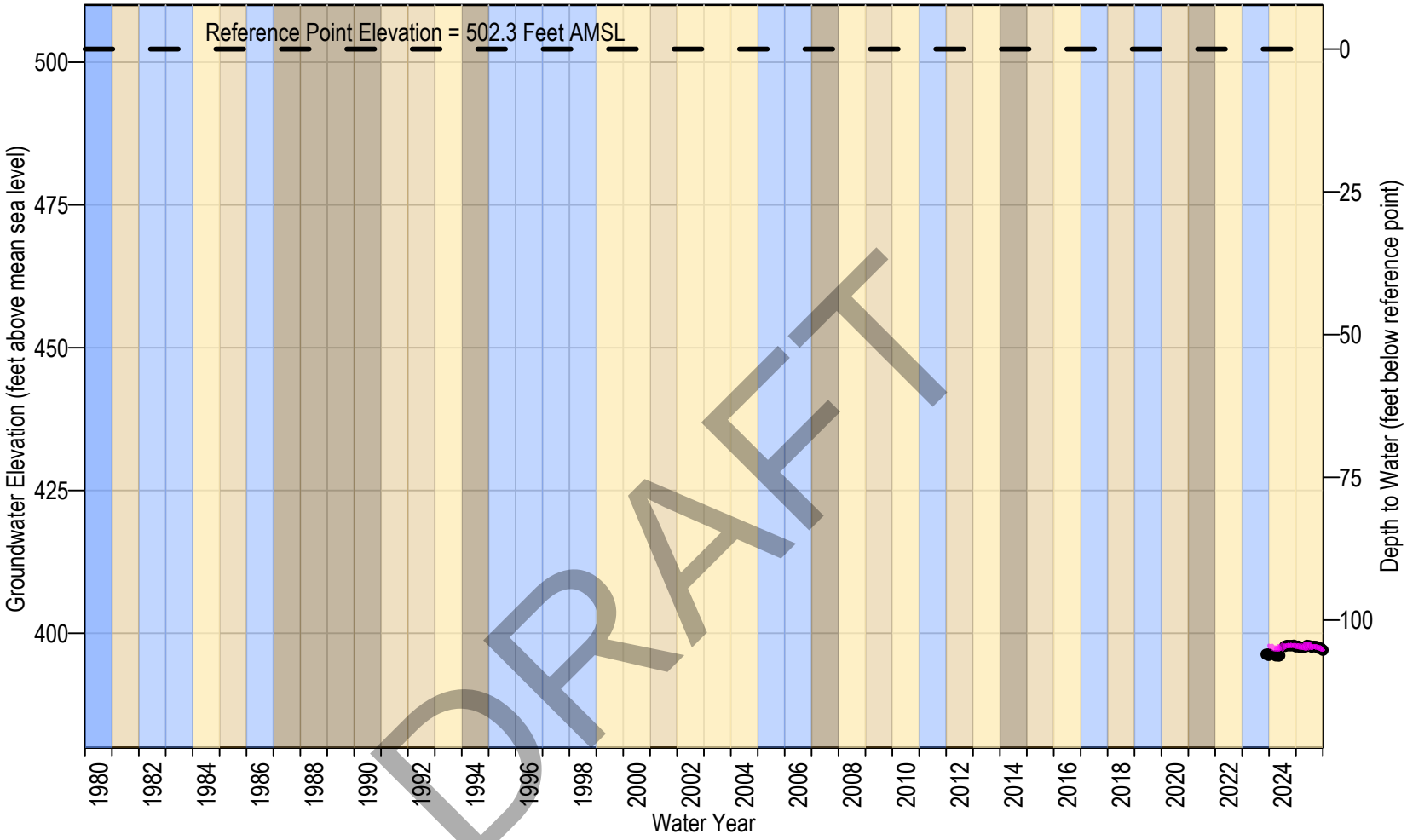


DRAFT

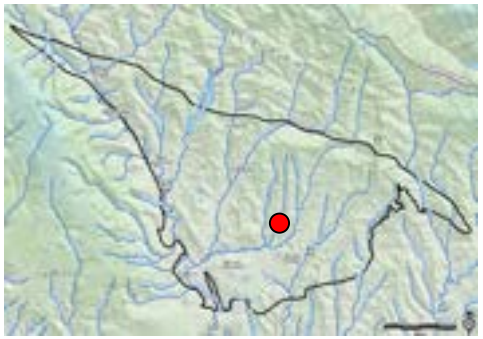


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-6. Hydrograph of SMGWA-2 Bean Creek

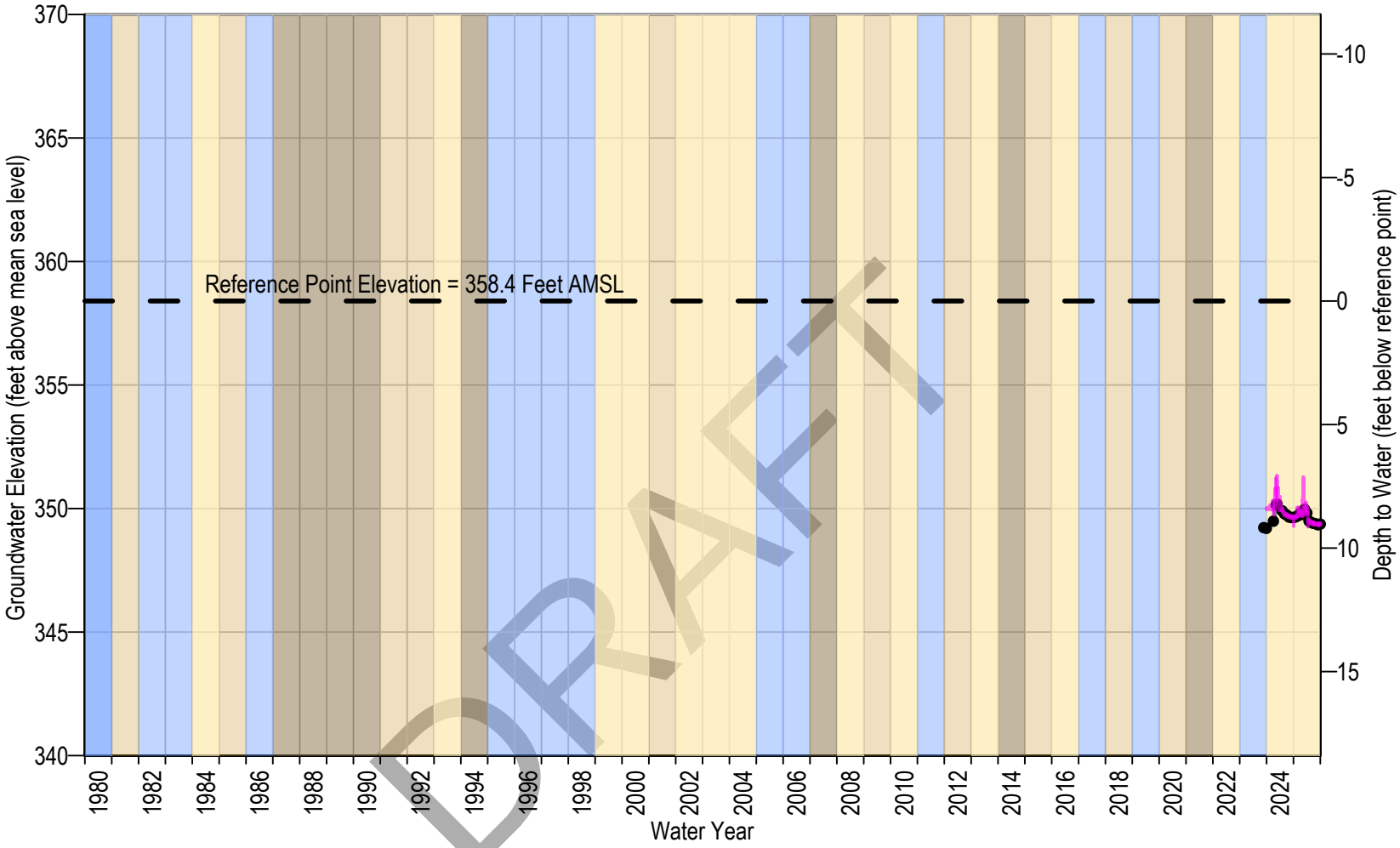


DRAFT



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-7. Hydrograph of SMGWA-3 Ruins Creek

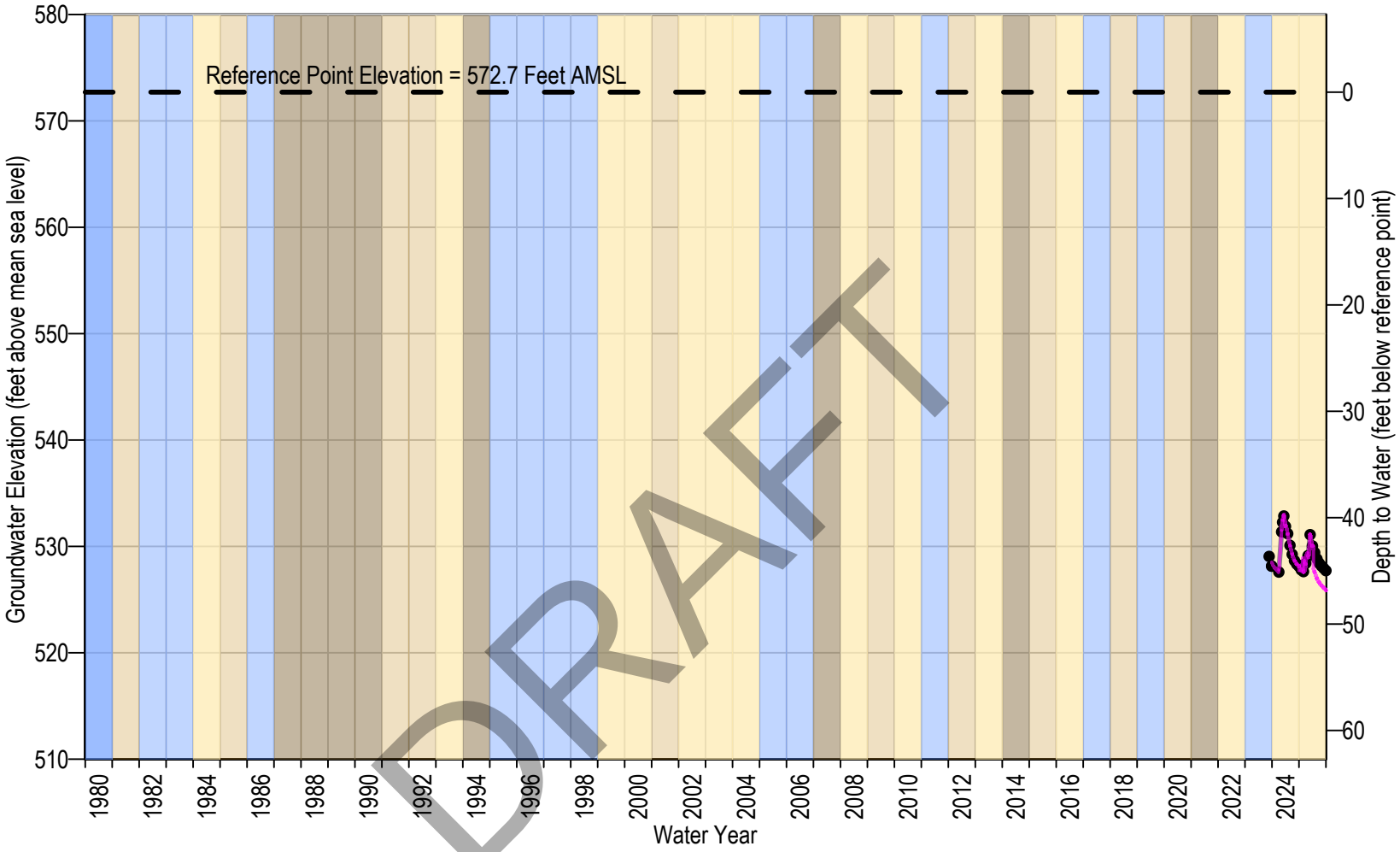


DRAFT

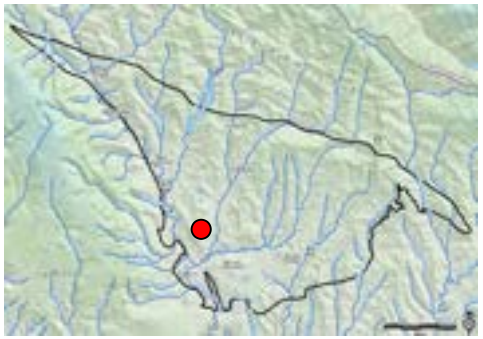


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-8. Hydrograph of SMGWA-4 Nelson Road

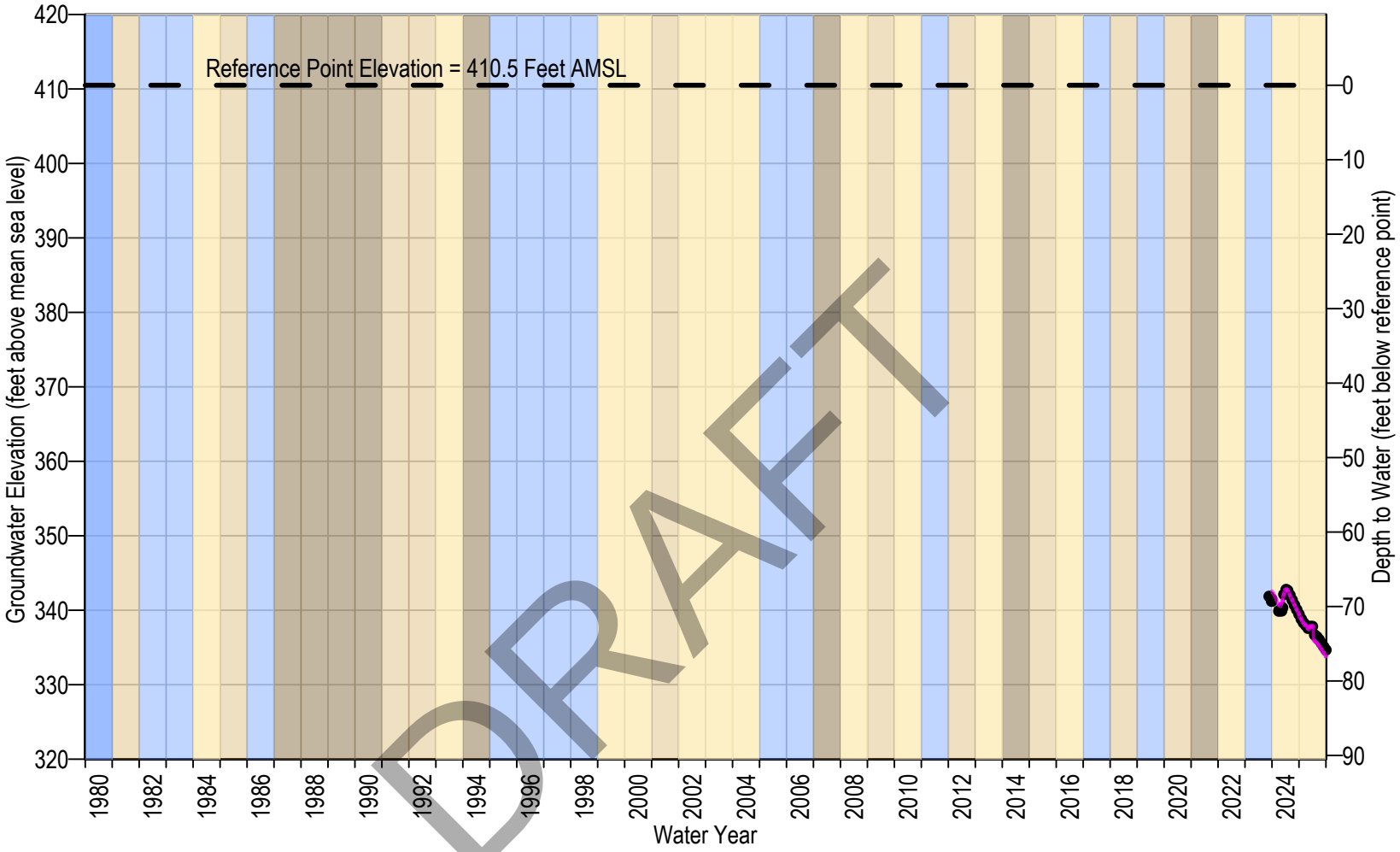


DRAFT

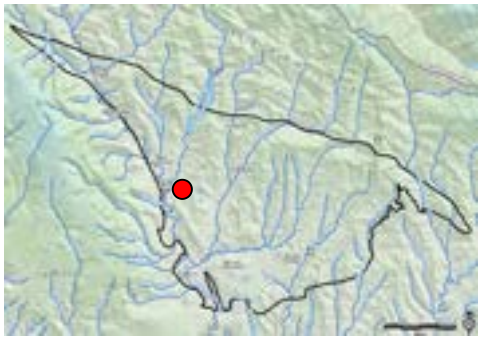


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-9. Hydrograph of SMGWA-5 Bahr Drive

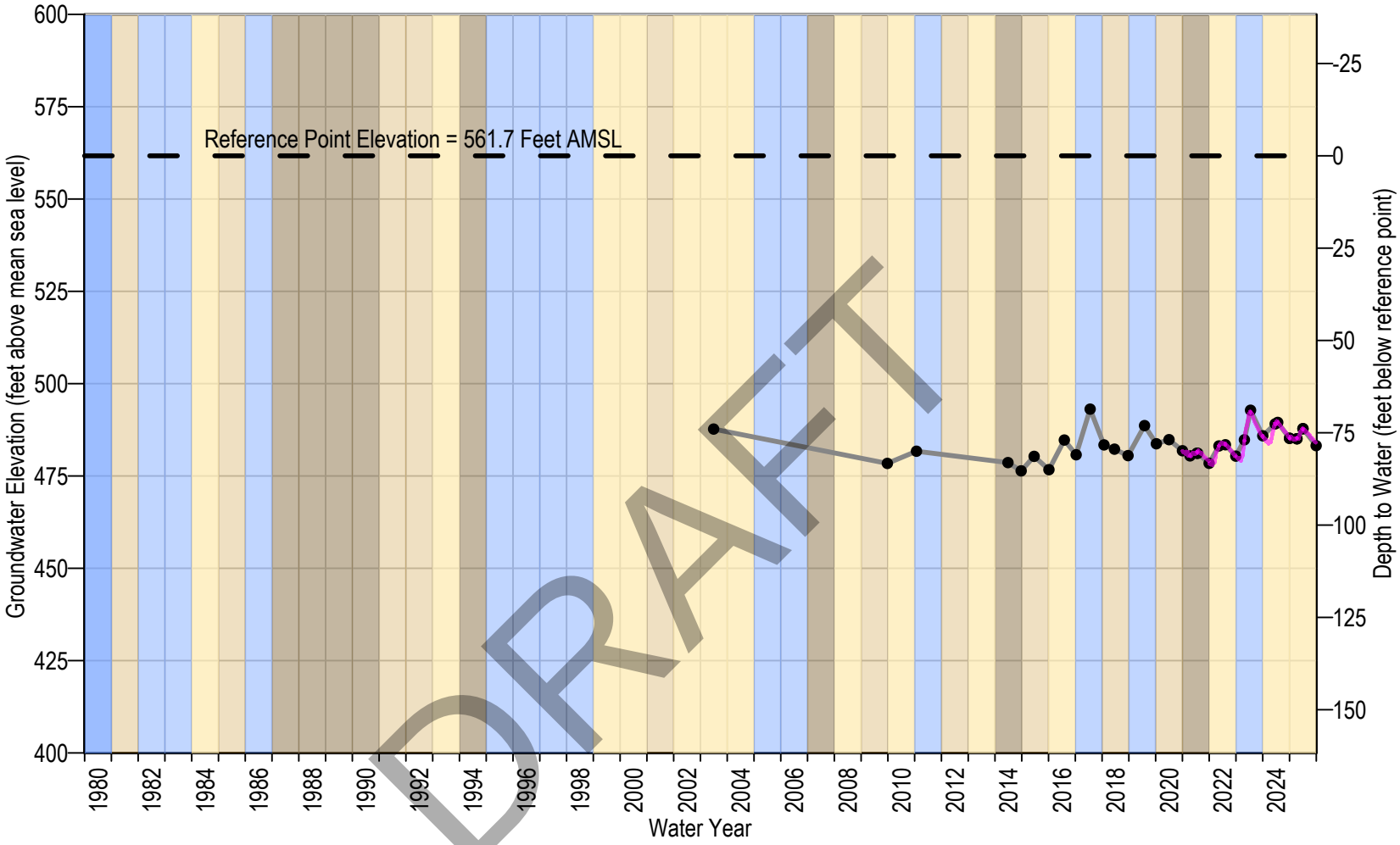


DRAFT

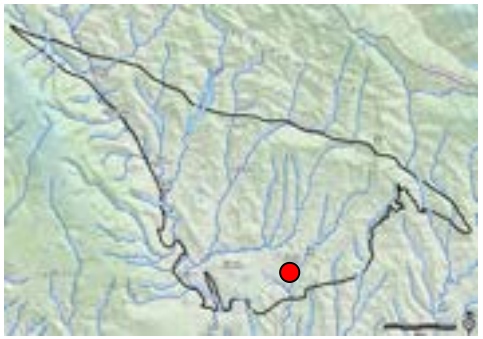


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-10. Hydrograph of SMGWA-6 Quail Hollow

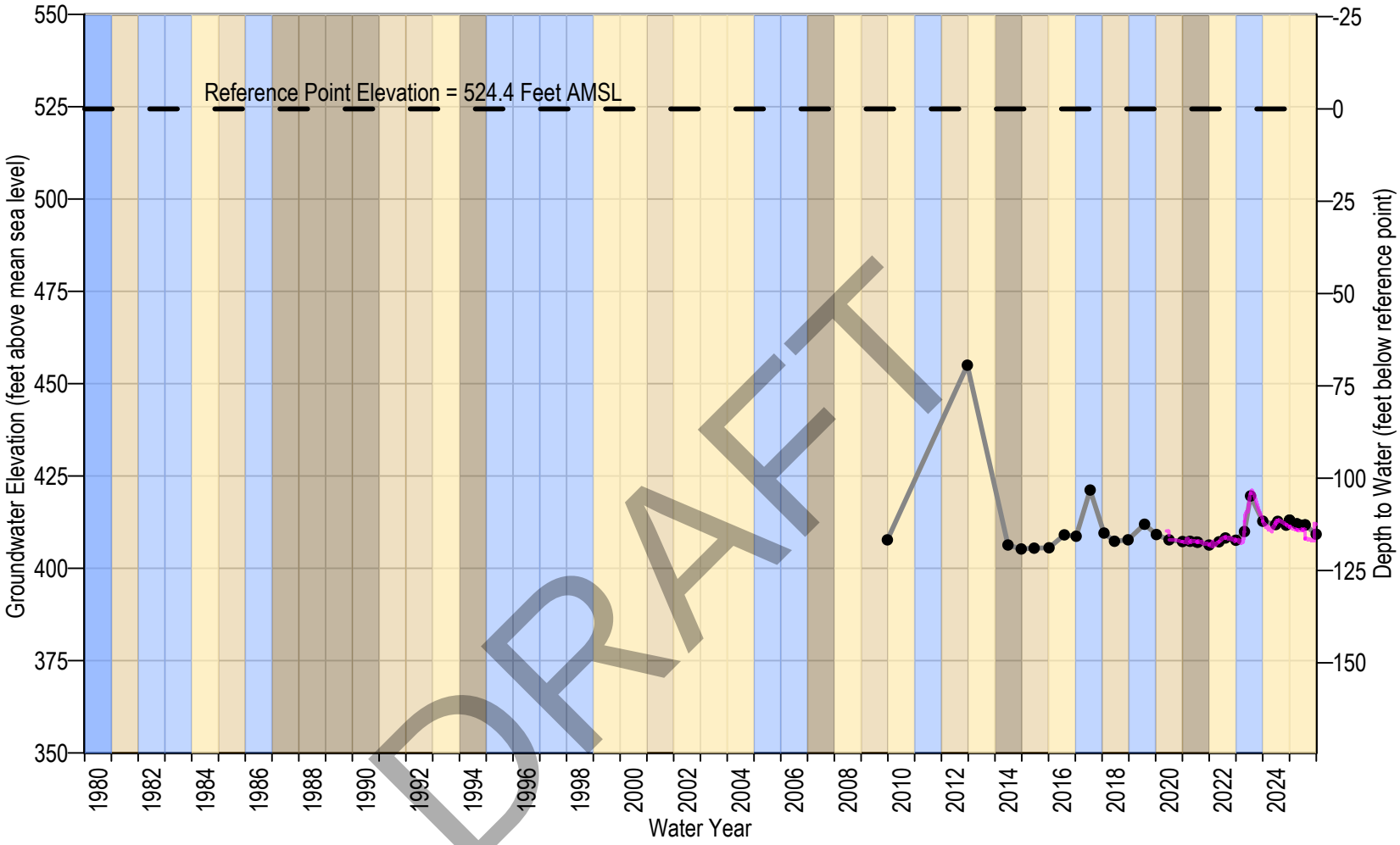


DRAFT

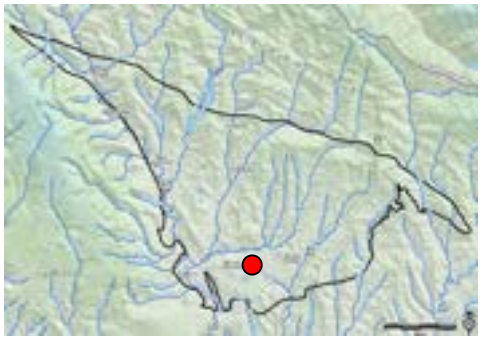


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-11. Hydrograph of SVWD AB303 MW-1



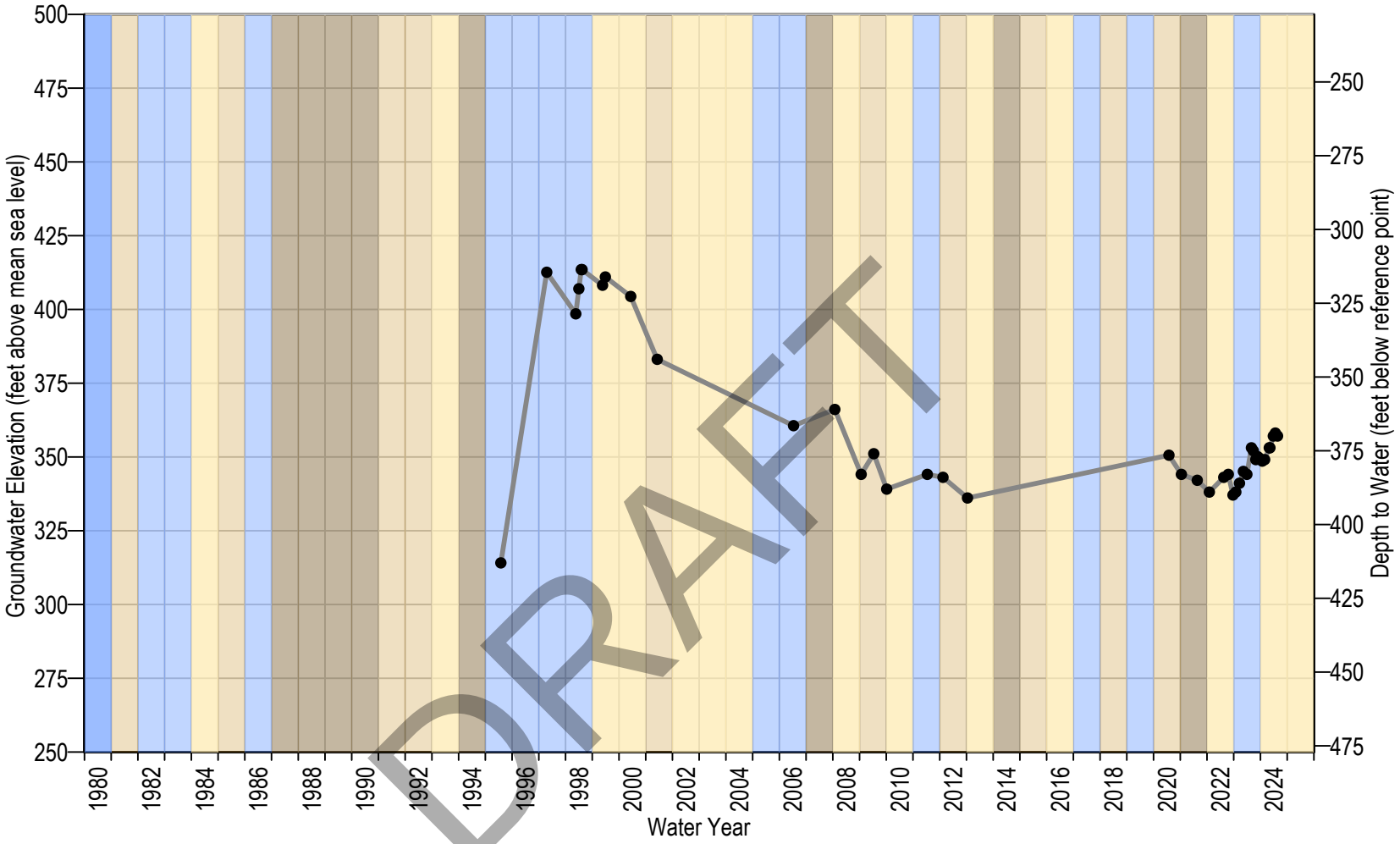
DRAFT

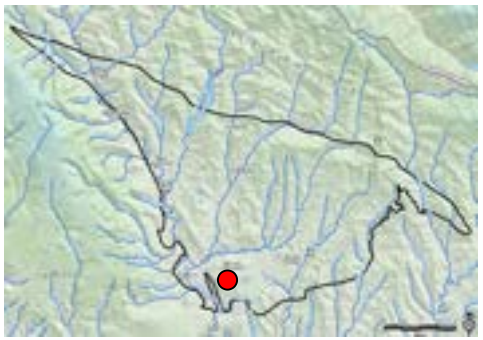


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-12. Hydrograph of SVWD AB303 MW-3B

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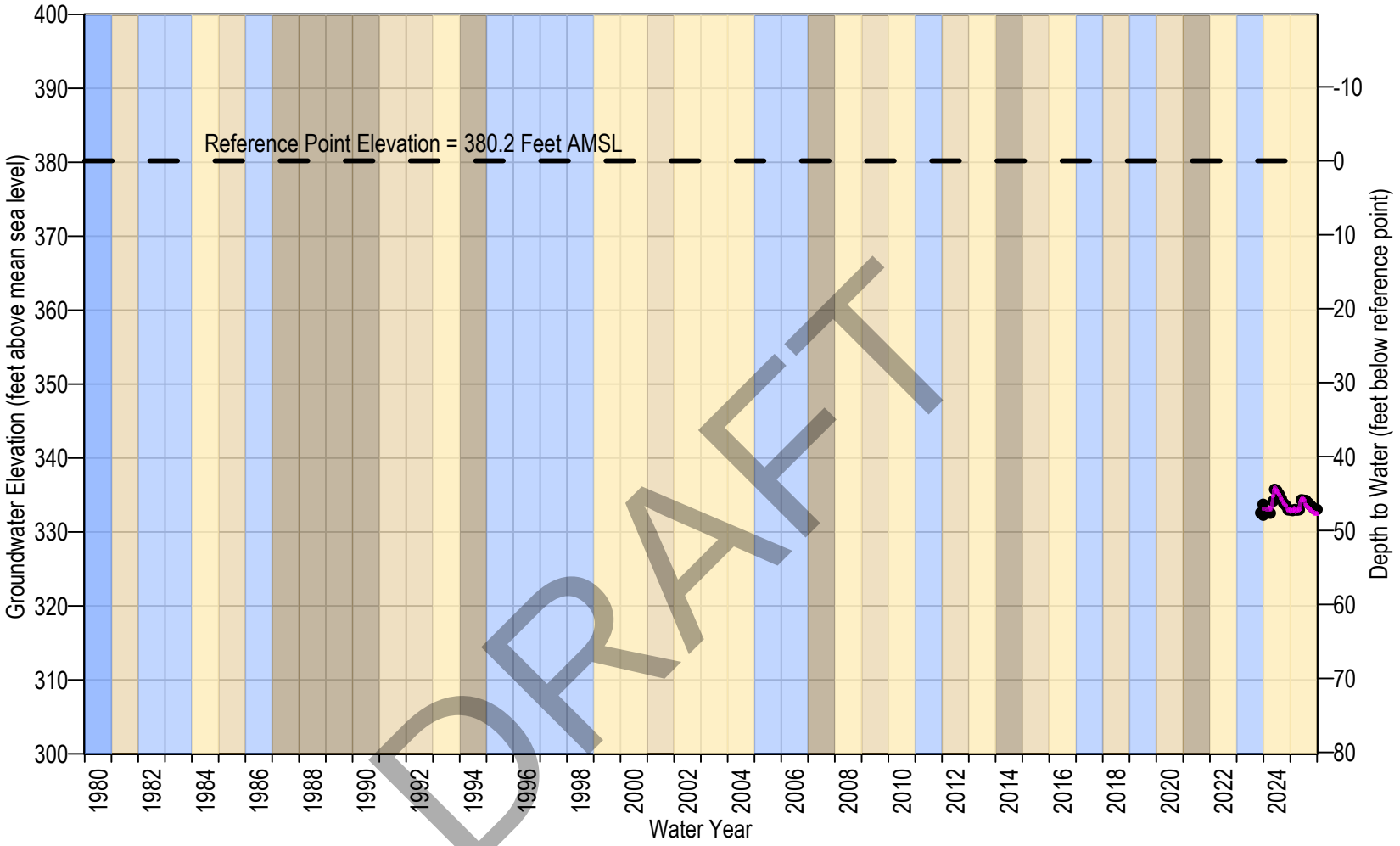




Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-13. Hydrograph of MHA #1

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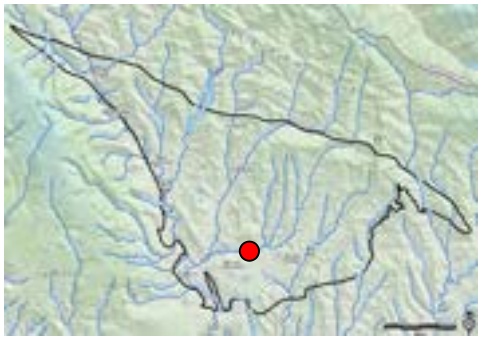
DRAFT

SMGWA-8 Randall Morgan Sandhills Preserve
Transducer
Reference Point Elevation

Formation: Confined - Monterey
Reference Point Elevation: 380.2 ft AMSL
Screen Interval: 155-170 ft bgs

Water Year Classification

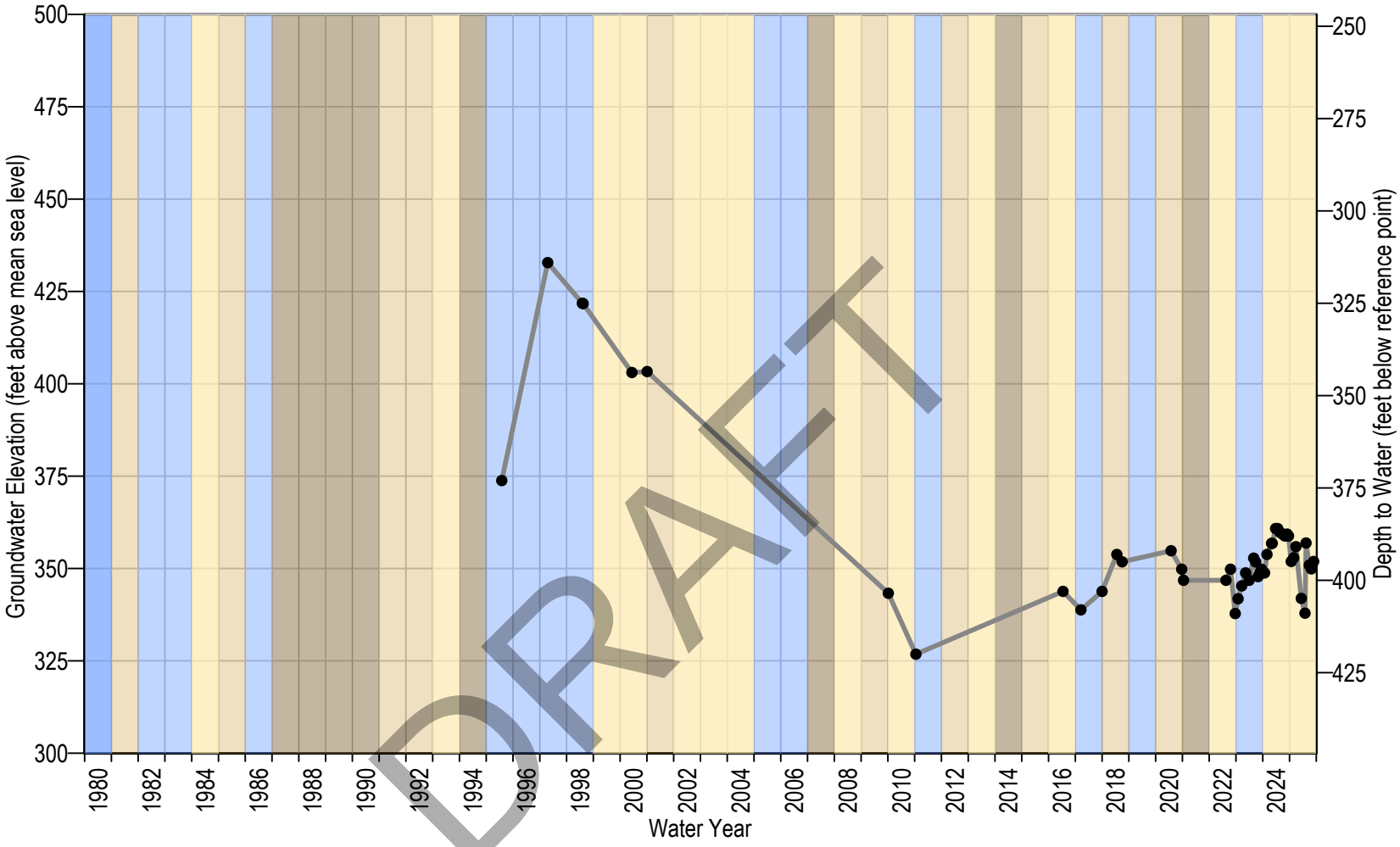
Wet	Dry
Normal	Critically Dry



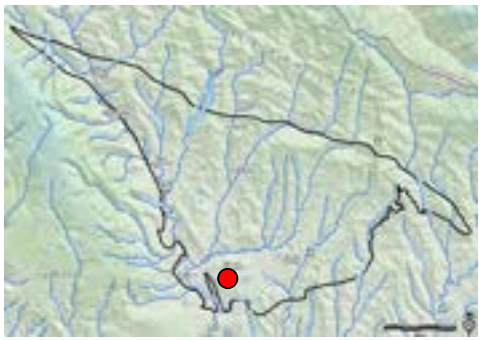
Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-14. Hydrograph of SMGWA-8 Randall Morgan Sandhills Preserve

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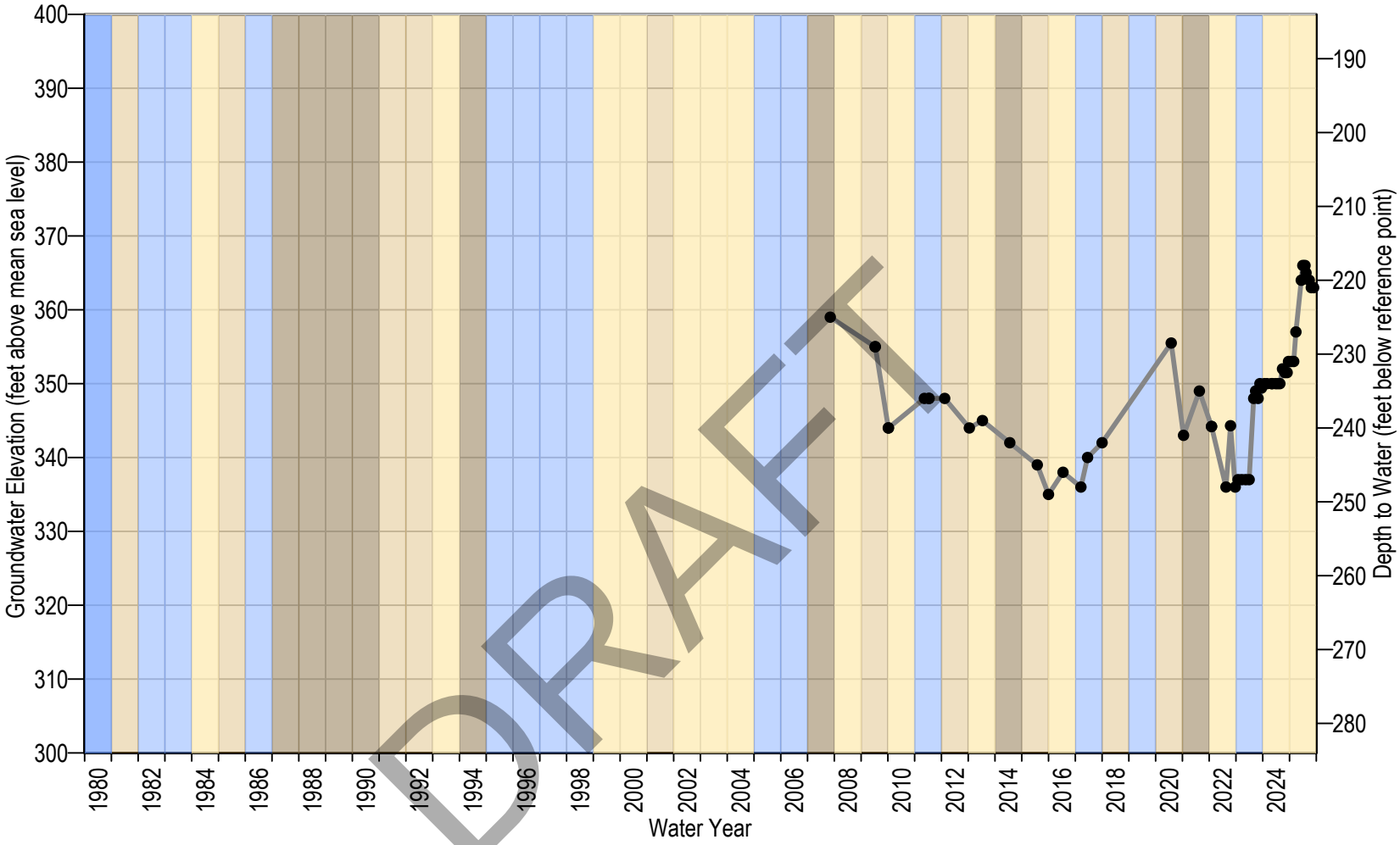


DRAFT

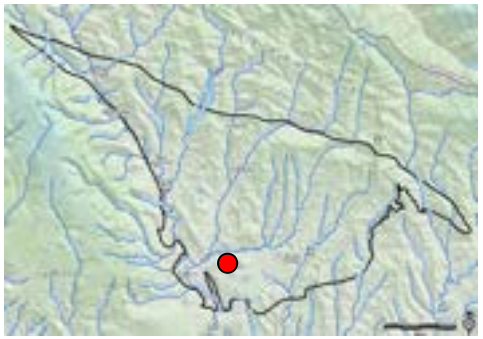


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-15. Hydrograph of MHA #2

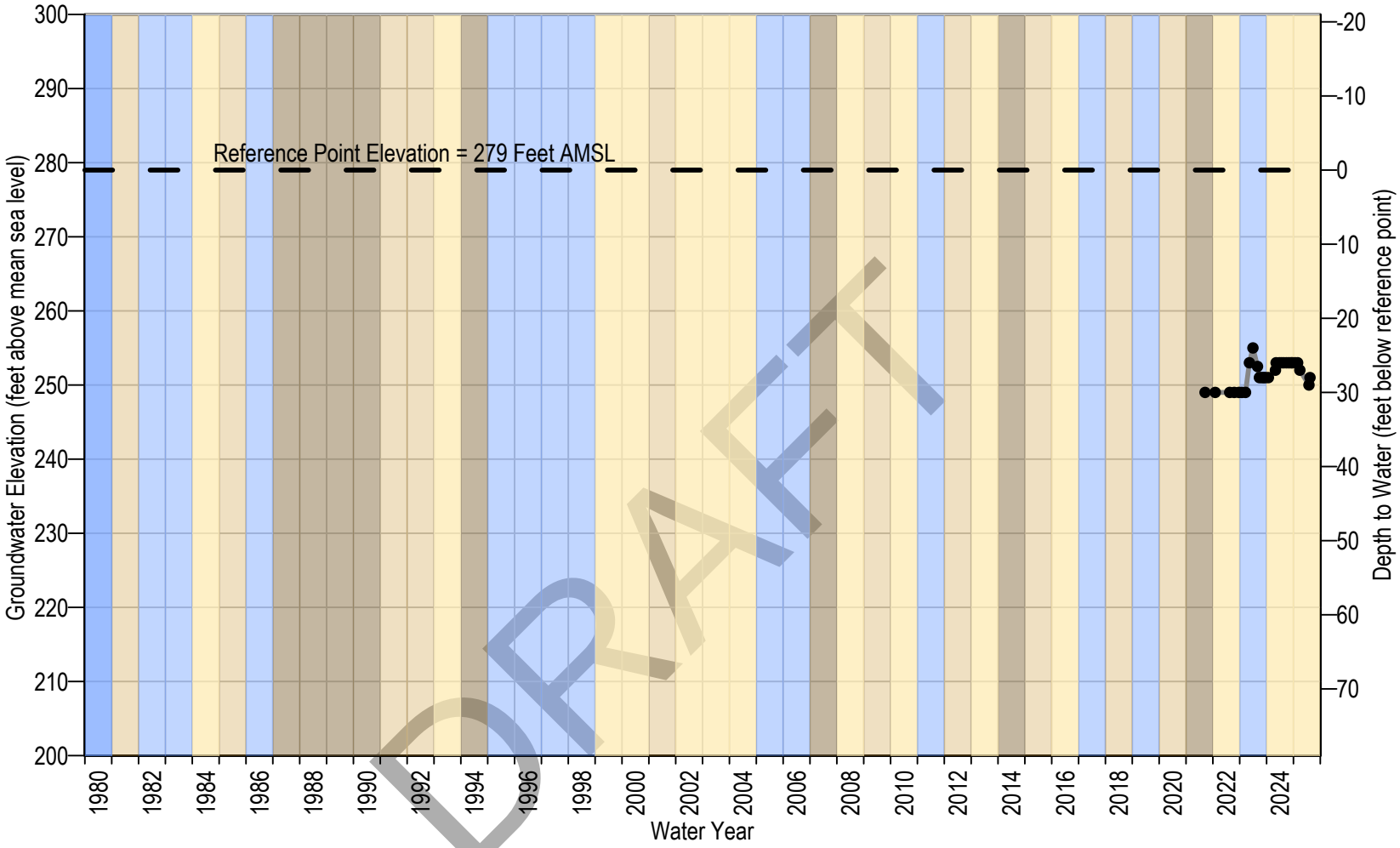


DRAFT

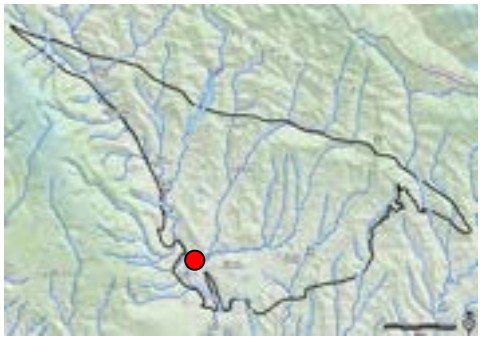


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-16. Hydrograph of MHA #3

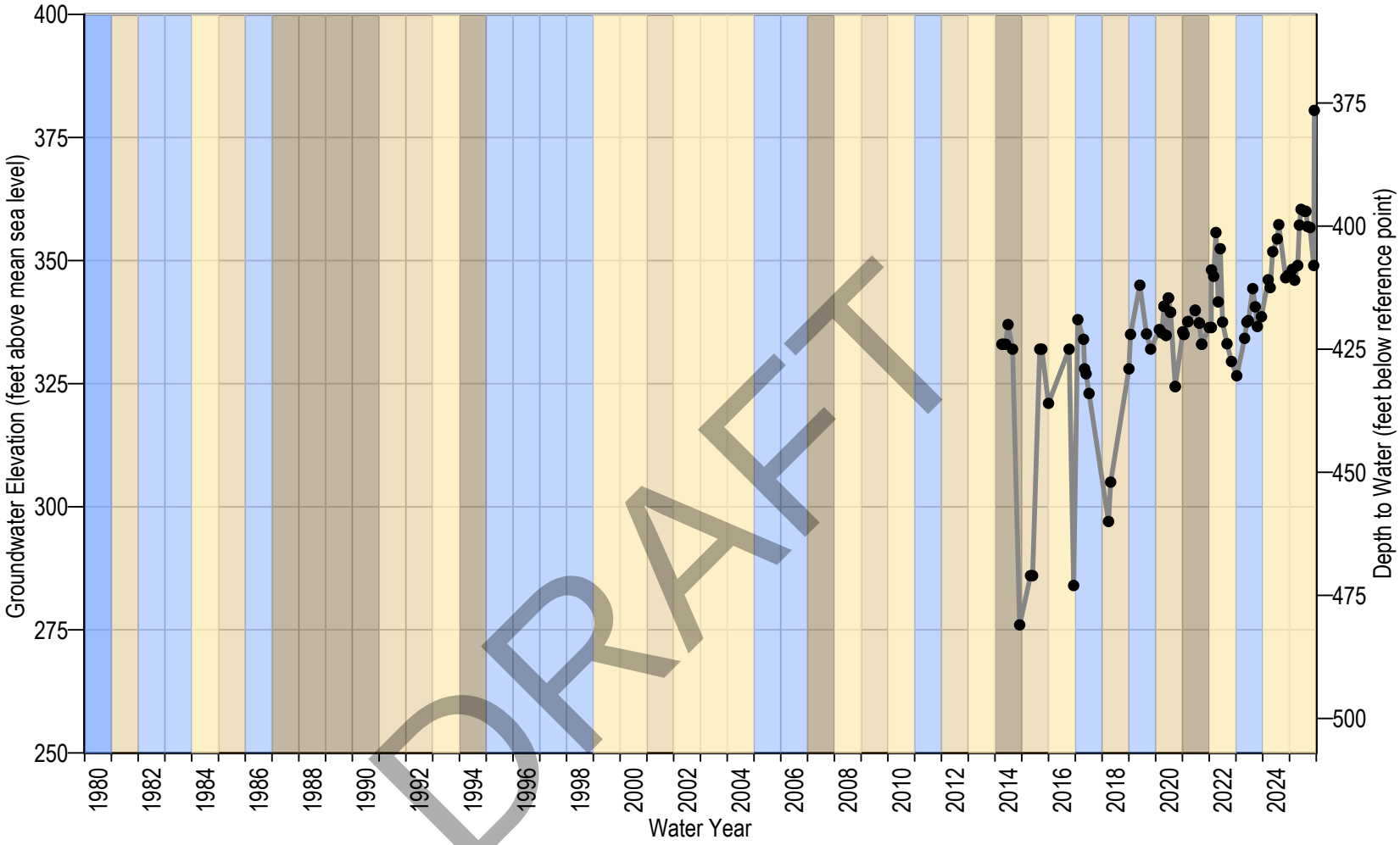


DRAFT

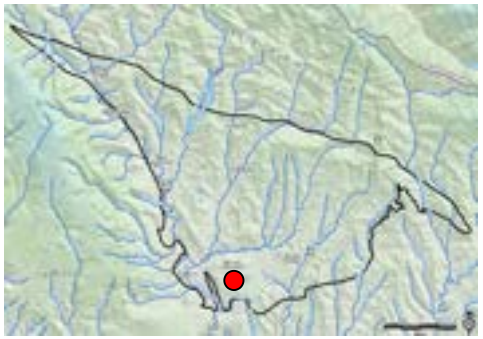


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-17. Hydrograph of MHA-MW1

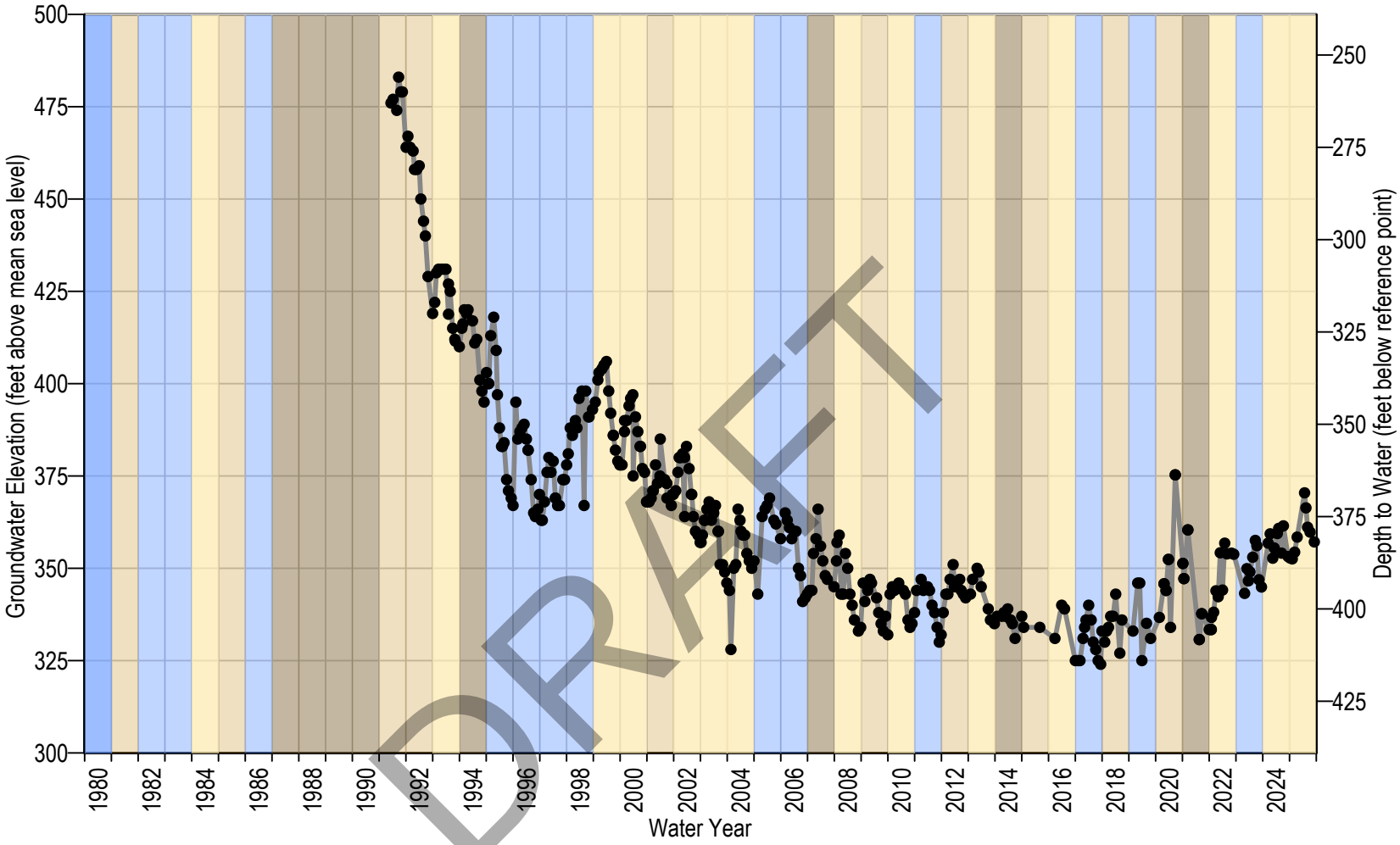


DRAFT

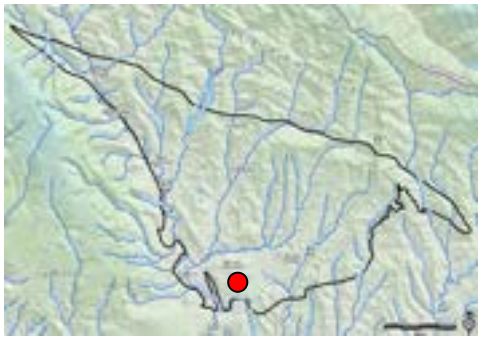


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-18. Hydrograph of SLVWD Pasatiempo #5A



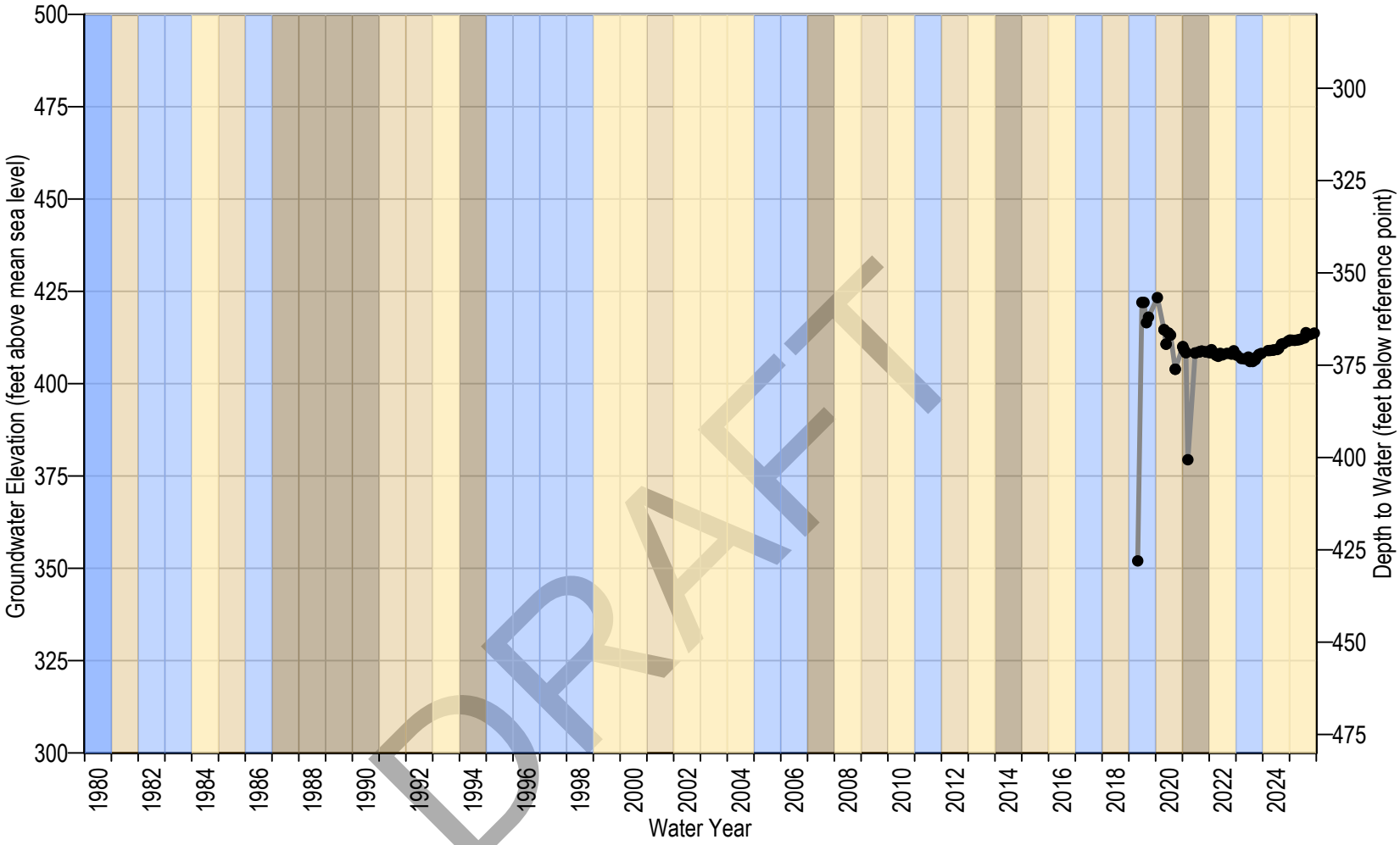
DRAFT



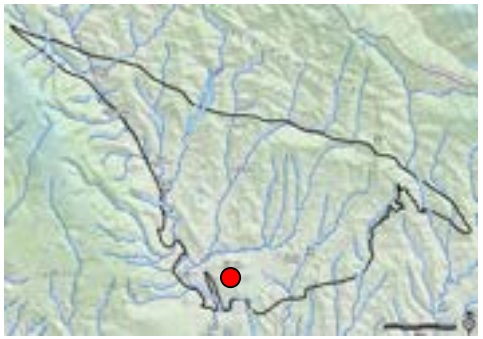
Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-19. Hydrograph of SLVWD Pasatiempo #7

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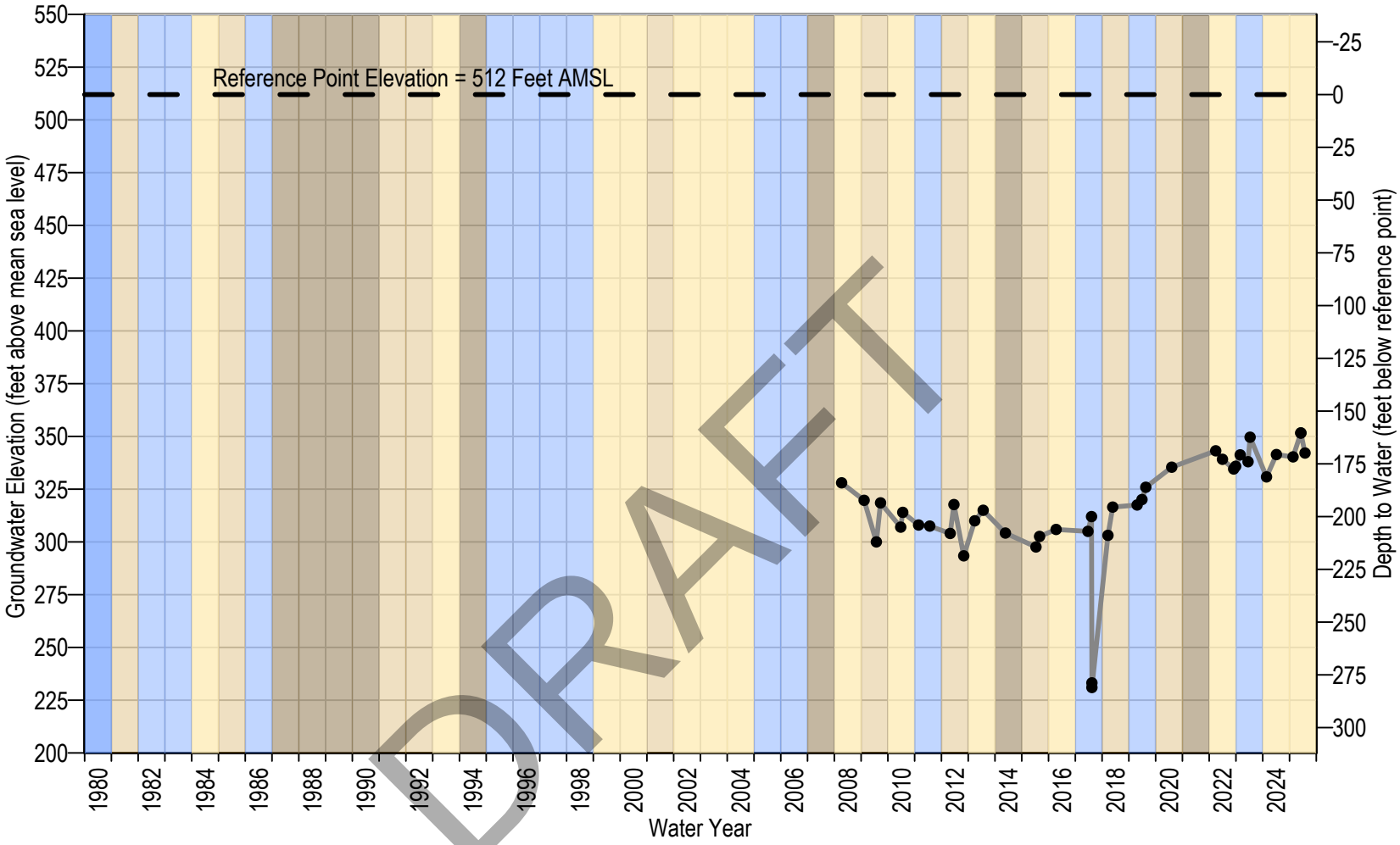


DRAFT



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-20. Hydrograph of SLVWD Pasatiempo #8



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SVWD #10A

Reference Point Elevation

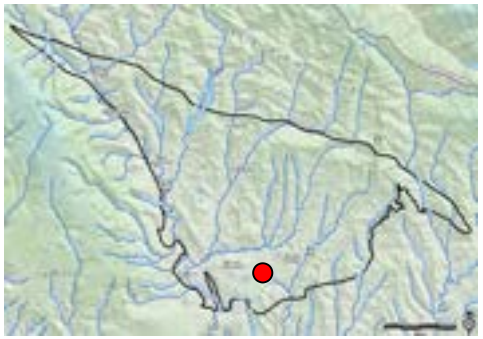
Formation: Confined - Lompico

Reference Point Elevation: 512 ft AMSL

Screen Interval: 282-382, 403-453 ft bgs

Water Year Classification

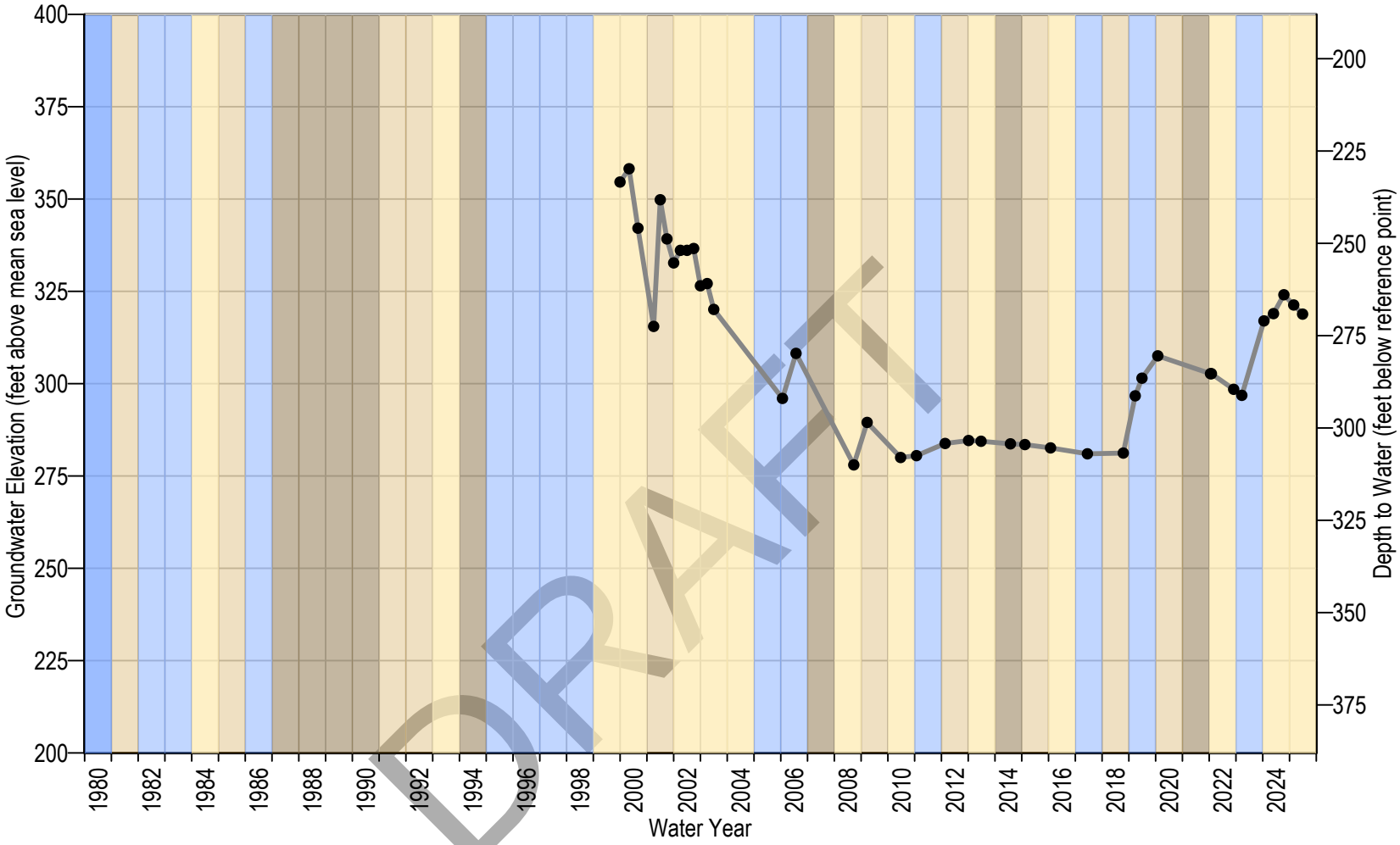
Wet | Dry | Normal | Critically Dry



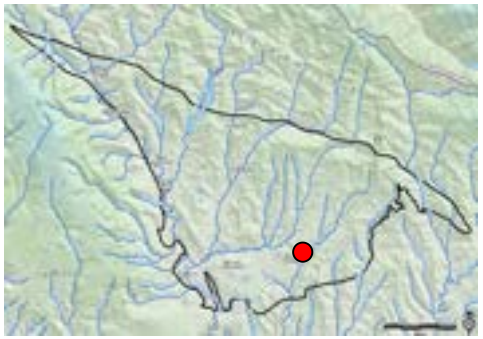
Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-21. Hydrograph of SVWD #10A

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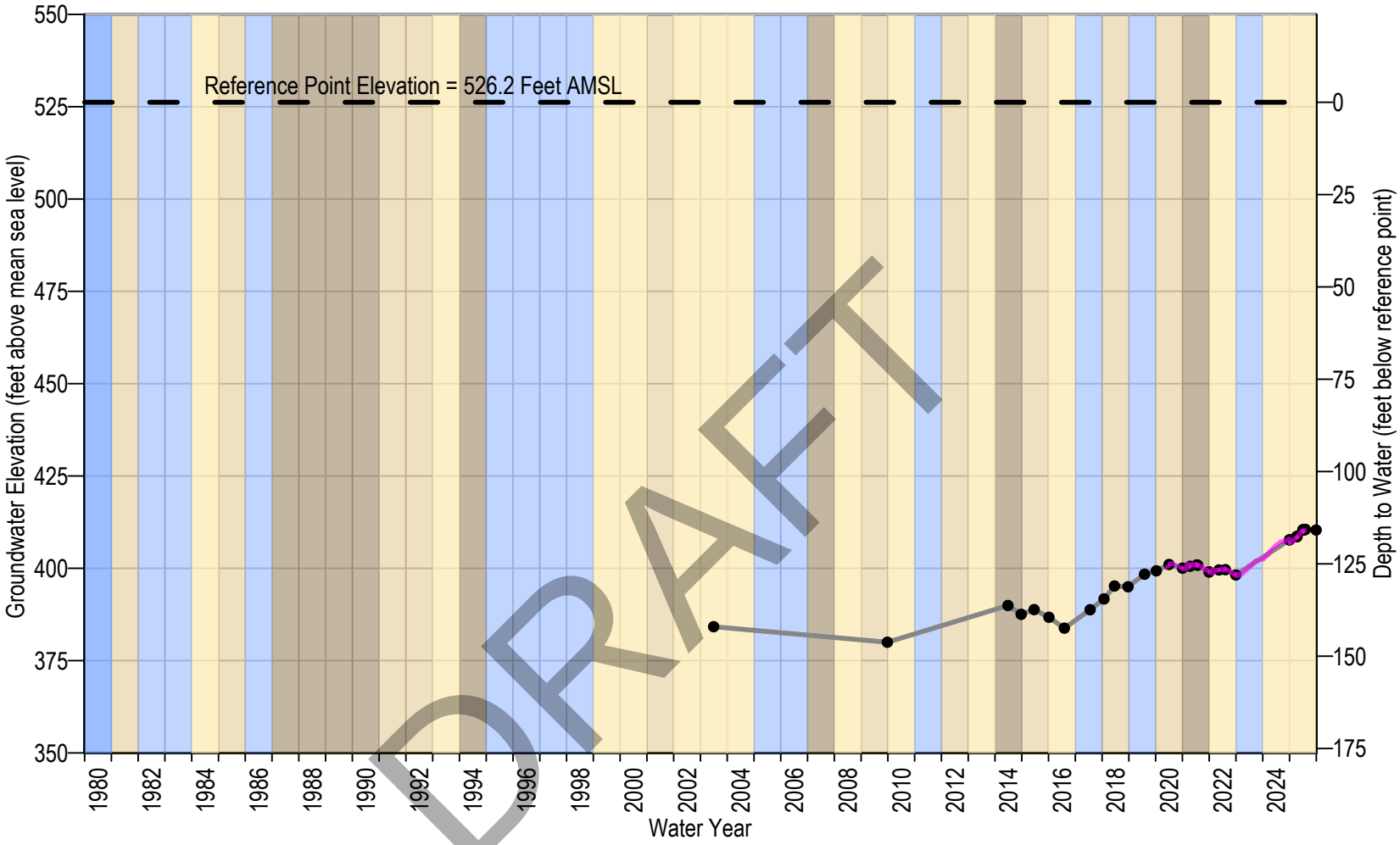


DRAFT

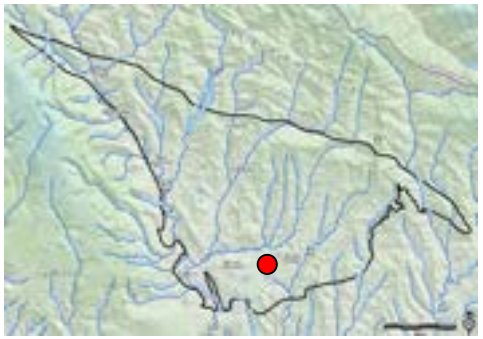


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-22. Hydrograph of SVWD #11B

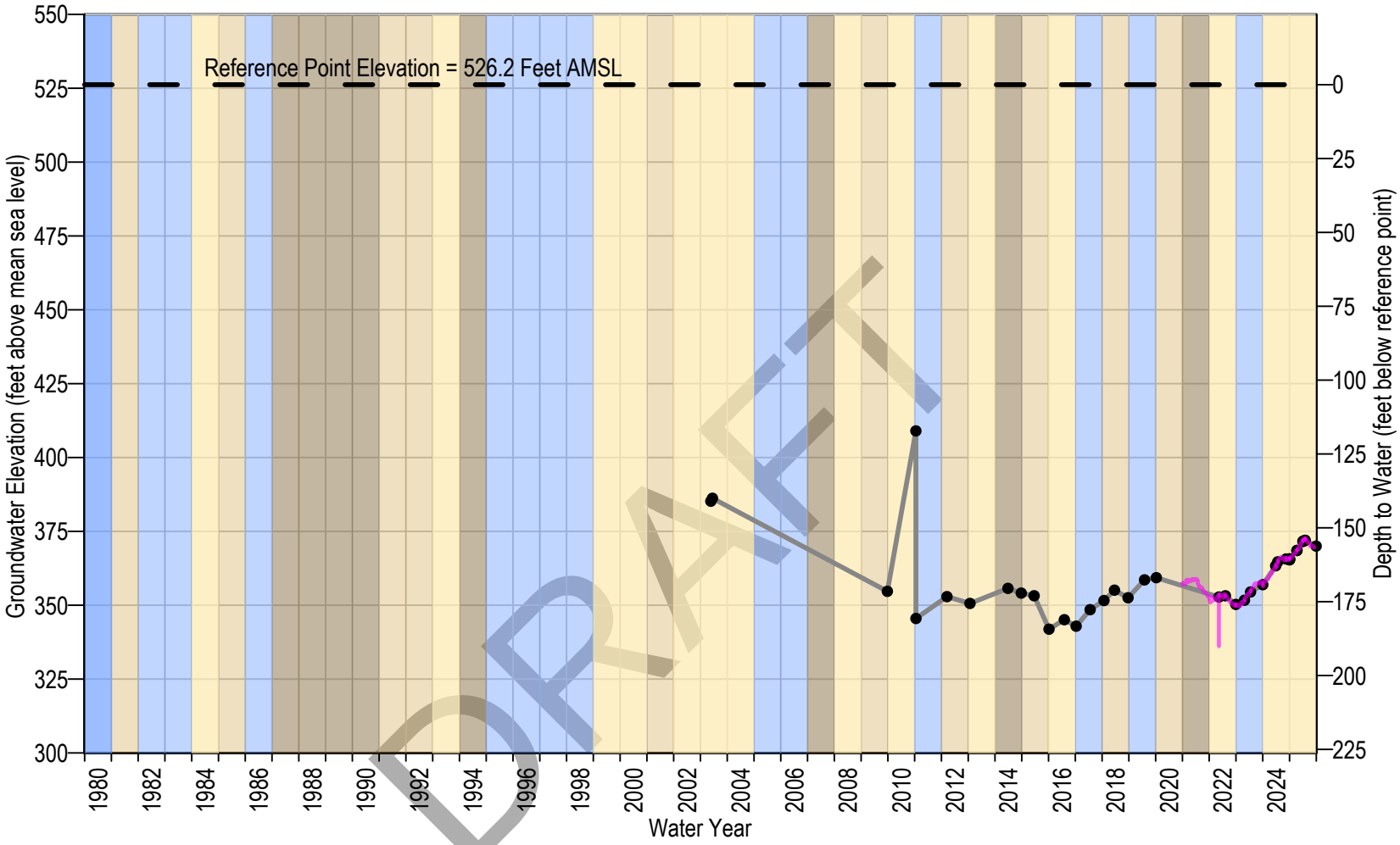


DRAFT

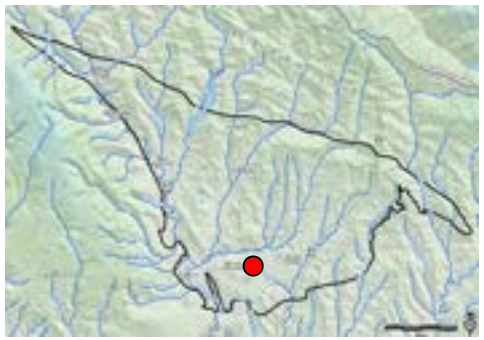


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-23. Hydrograph of SVWD AB303 MW-2

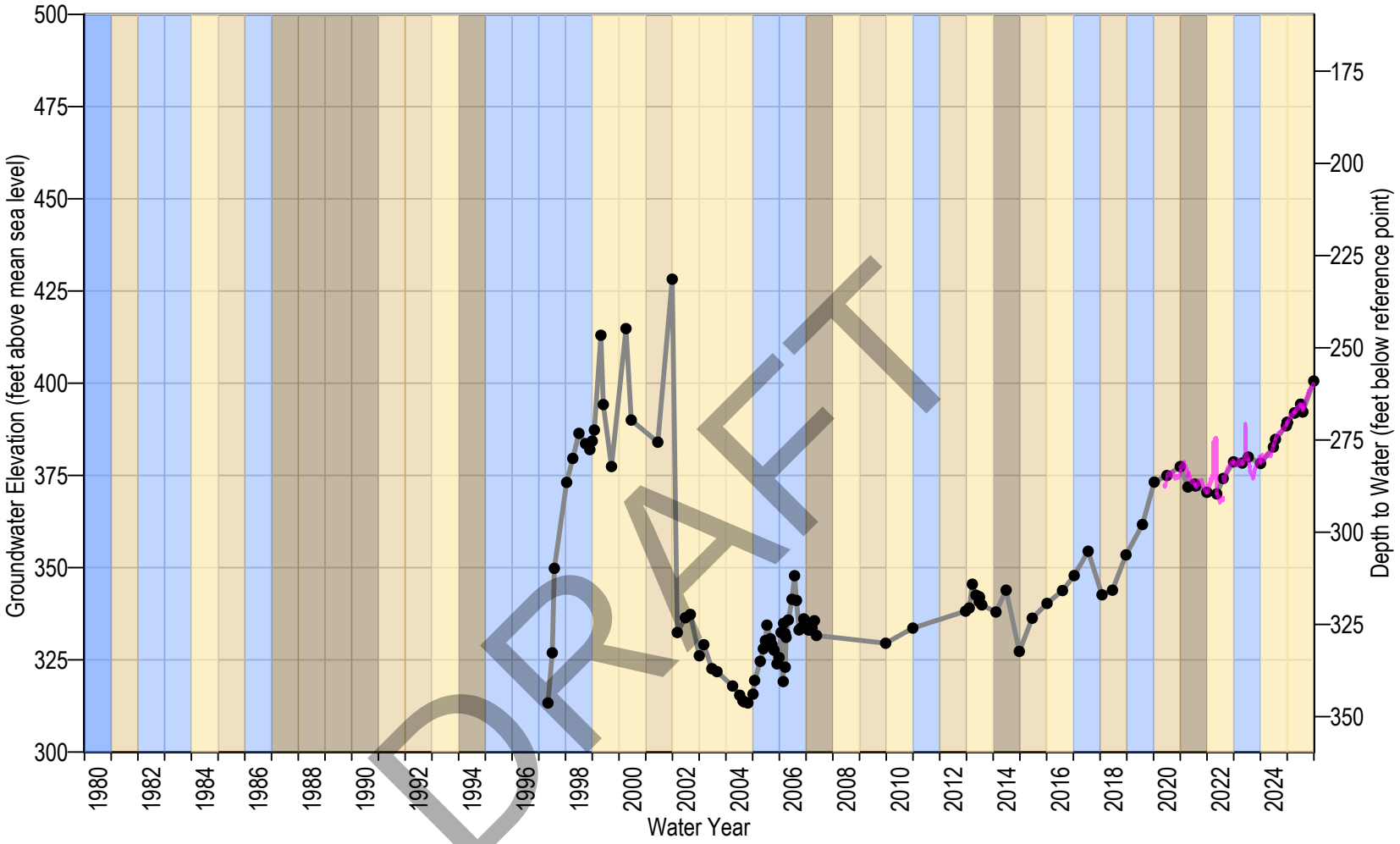


DRAFT

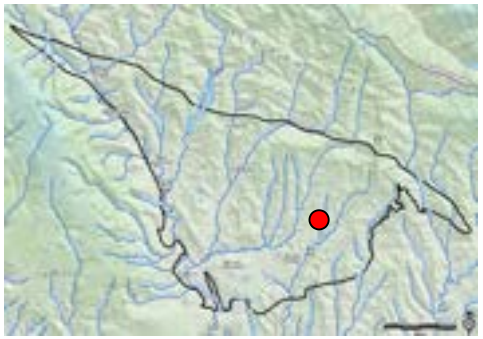


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-24. Hydrograph of SVWD AB303 MW-3A

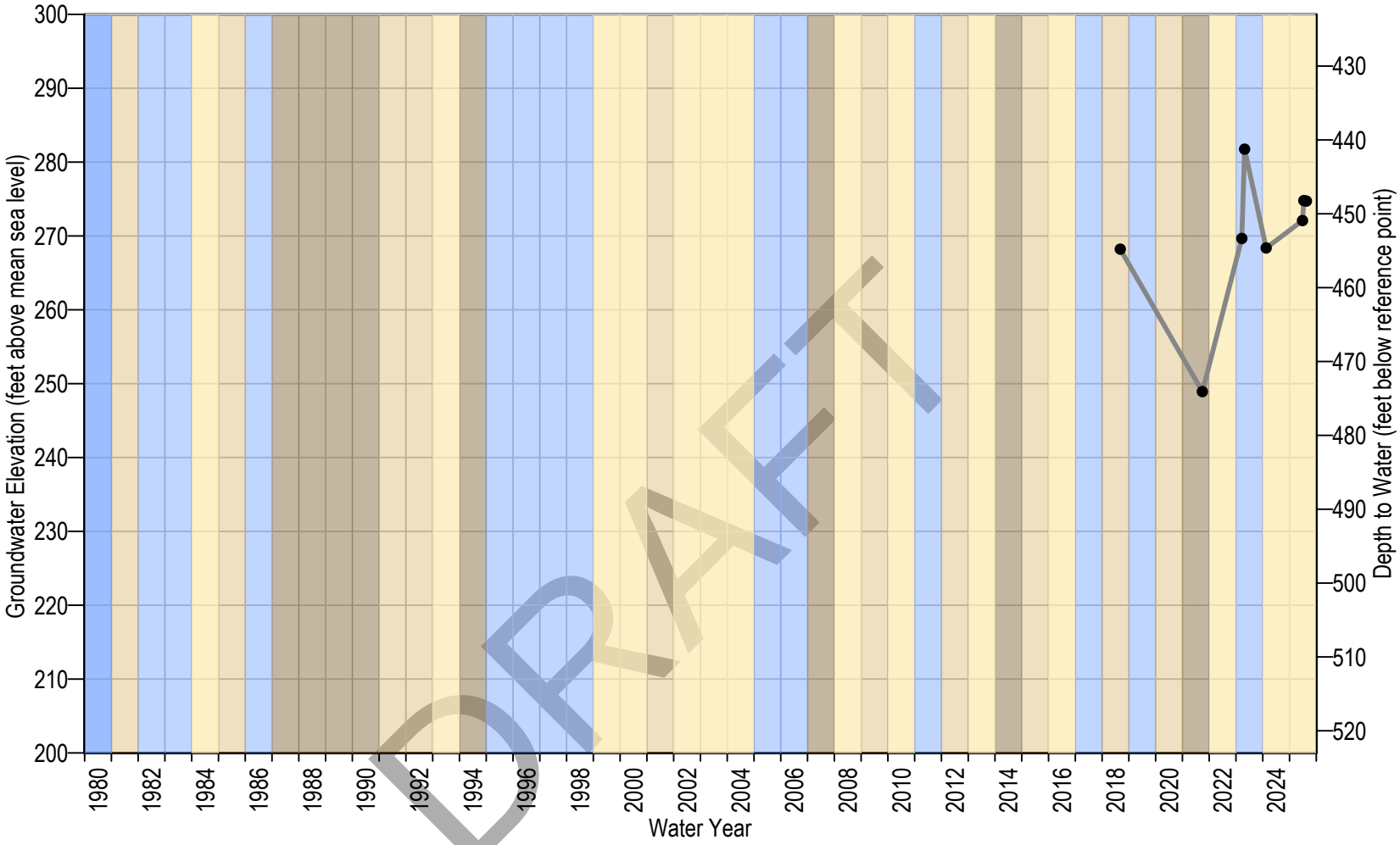


DRAFT

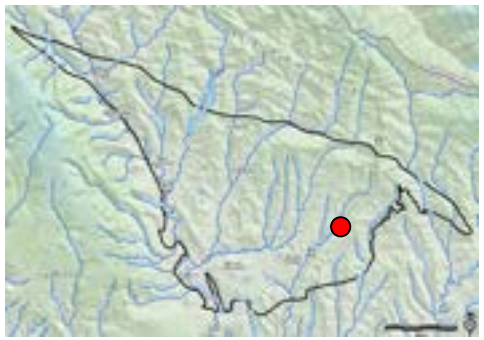


Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4C-25. Hydrograph of SVWD TW-19



DRAFT



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

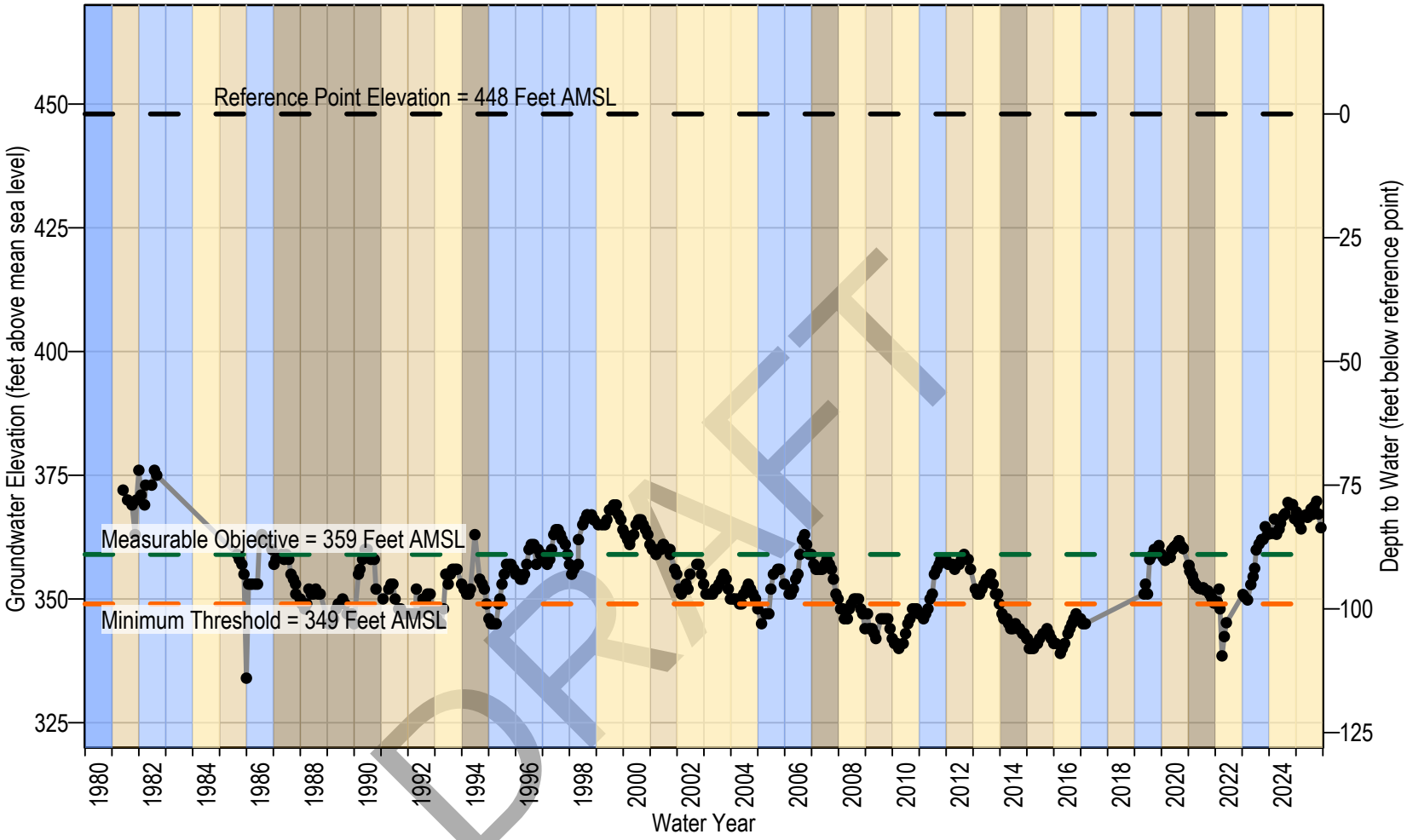
Figure 4C-26. Hydrograph of SVWD Orchard Well

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Appendix 4D

Groundwater Levels and ISW Sustainability Indicator RMP in the 2027 GSP Amendment

DRAFT

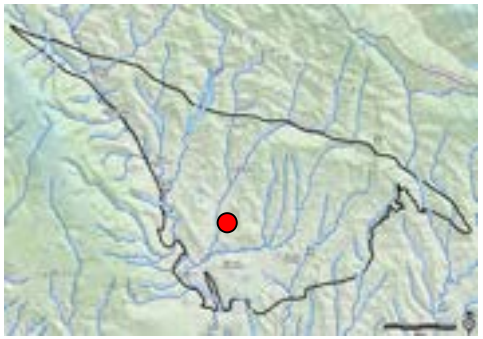


DRAFT

SLVWD Olympia #1 (Ferrari)
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 448 ft AMSL
Screen Interval: 127-157 ft bgs

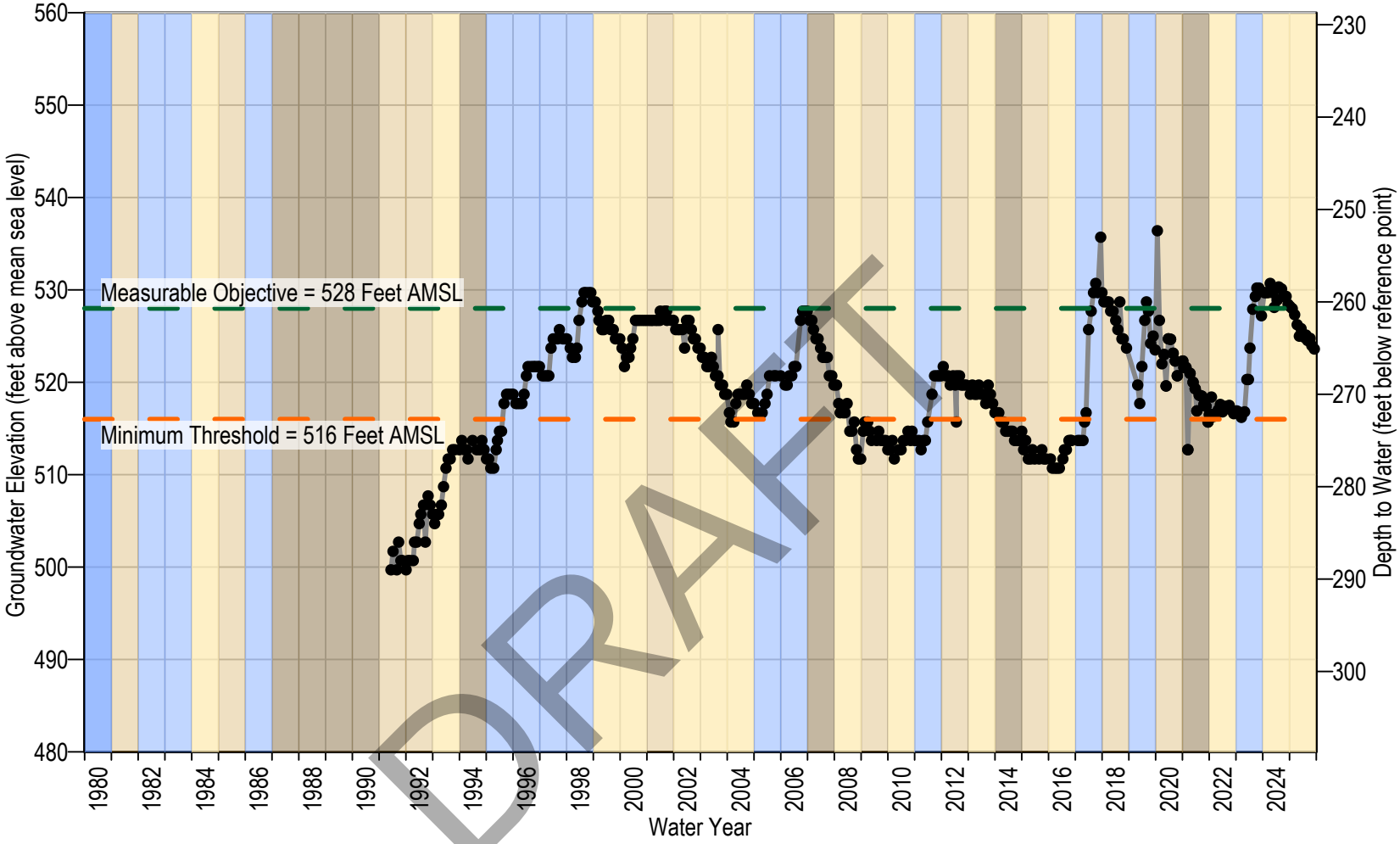
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-1. Hydrograph of SLVWD Olympia #1 (Ferrari)

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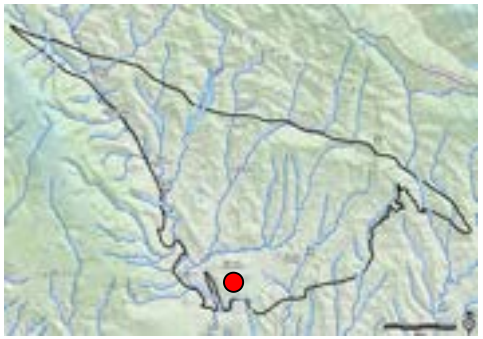


DRAFT

SLVWD Pasatiempo MW-2
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 788.7 ft AMSL
Screen Interval: 254-294 ft bgs

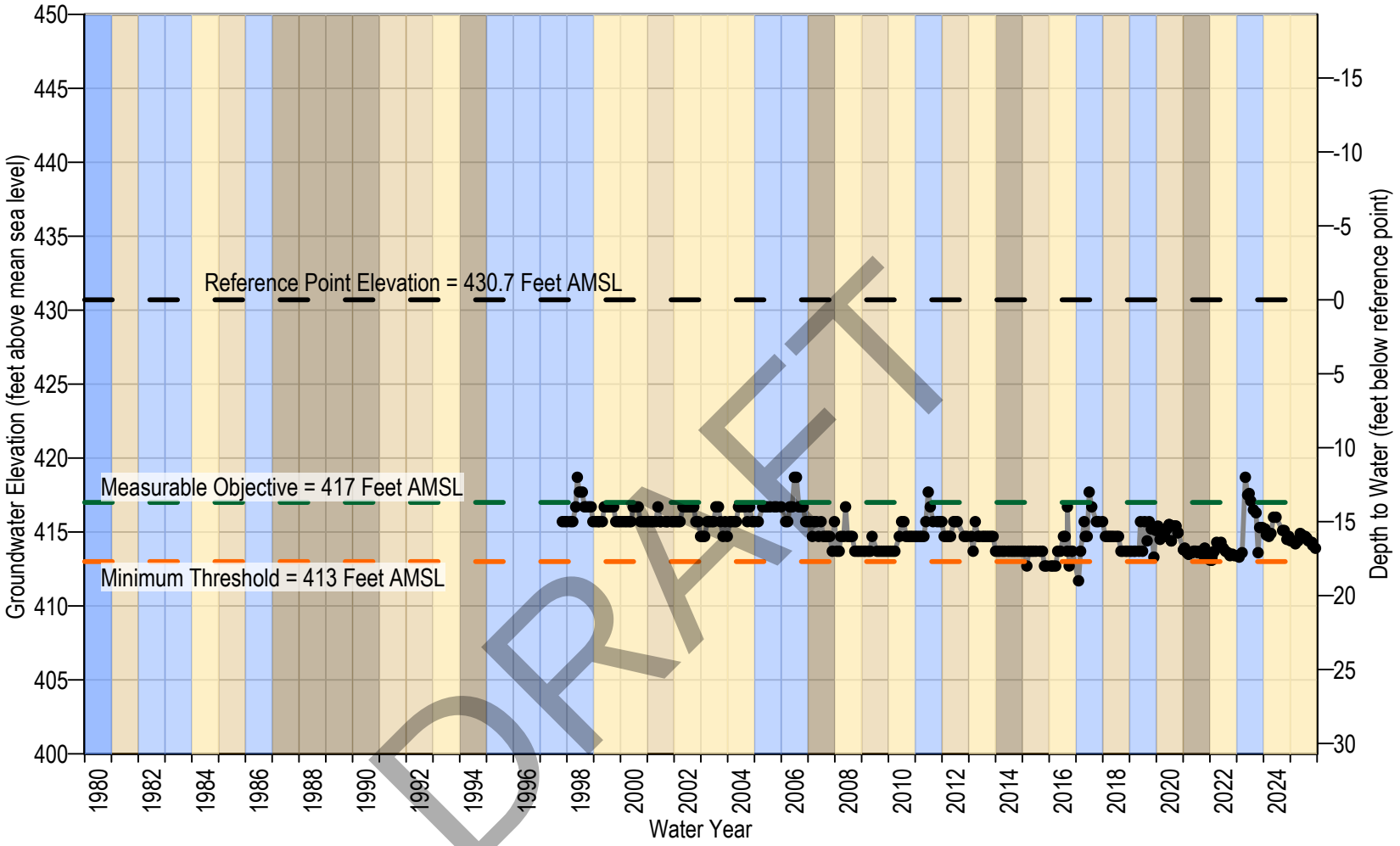
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-2. Hydrograph of SLVWD Pasatiempo MW-2

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DRAFT

SLVWD Quail MW-A
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 430.7 ft AMSL
Screen Interval: 33-88 ft bgs

Water Year Classification

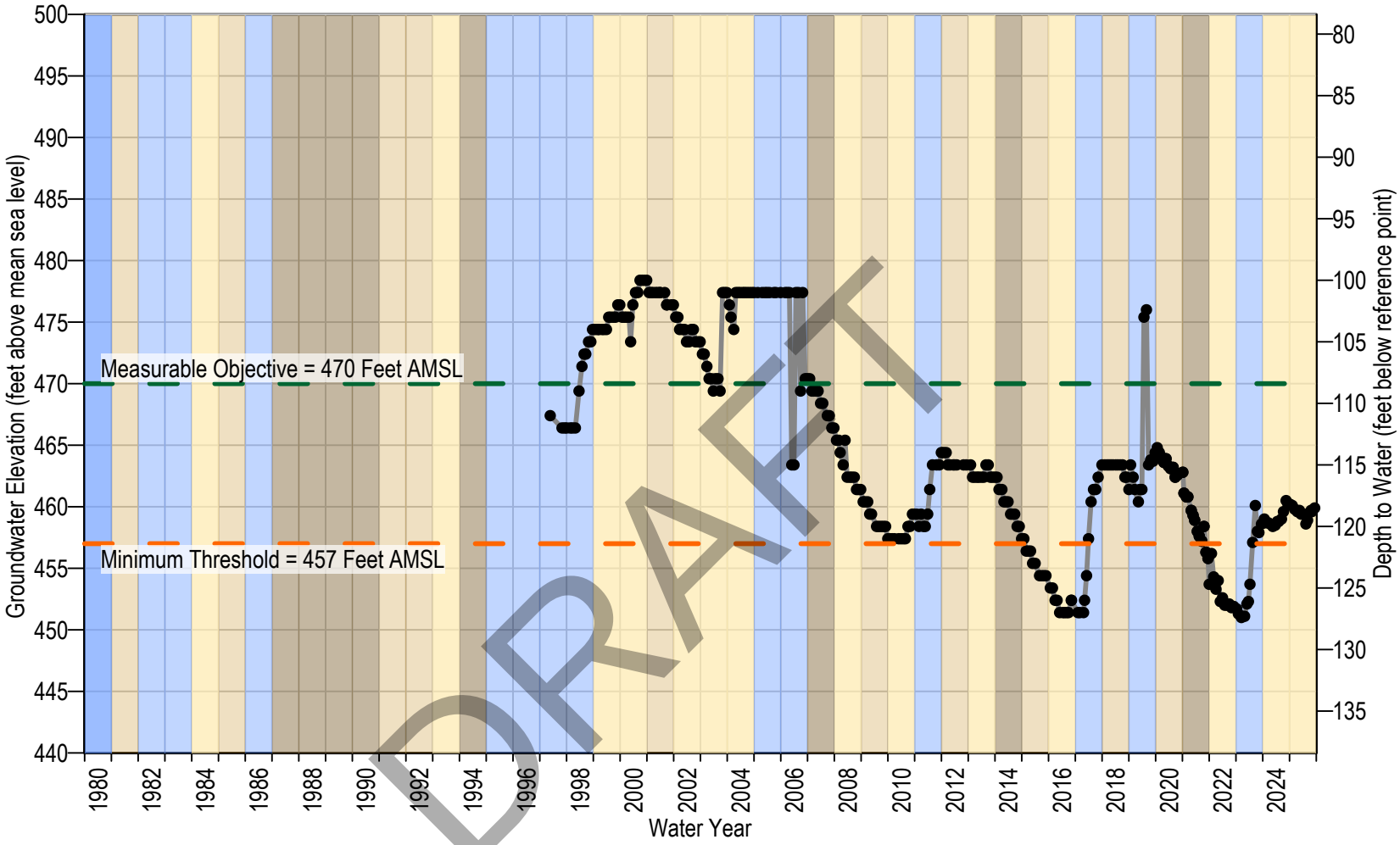
Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-3. Hydrograph of SLVWD Quail MW-A

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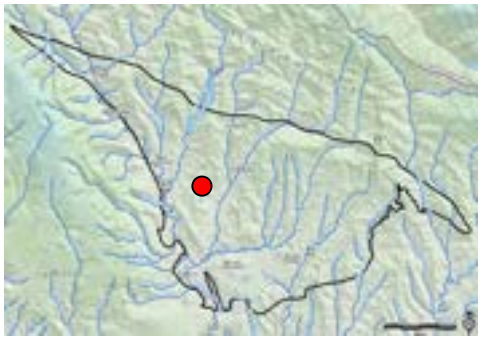


DRAFT

SLVWD Quail MW-B
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 578.4 ft AMSL
Screen Interval: 95-195 ft bgs

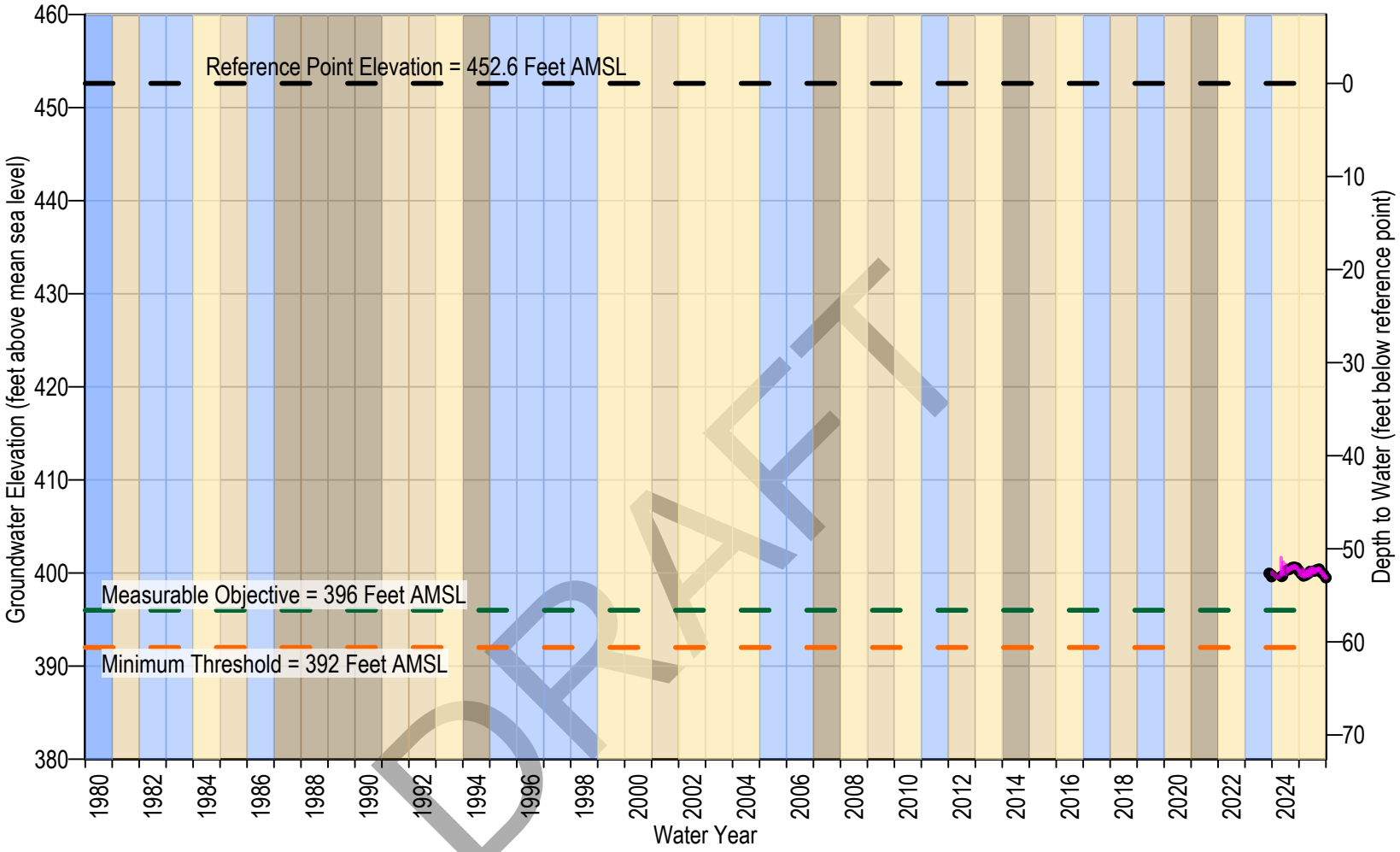
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-4. Hydrograph of SLVWD Quail MW-B

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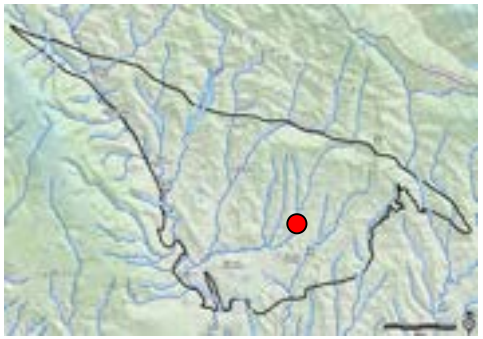
DRAFT

SMGWA-2 Bean Creek
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 452.6 ft AMSL
Screen Interval: 53-68 ft bgs

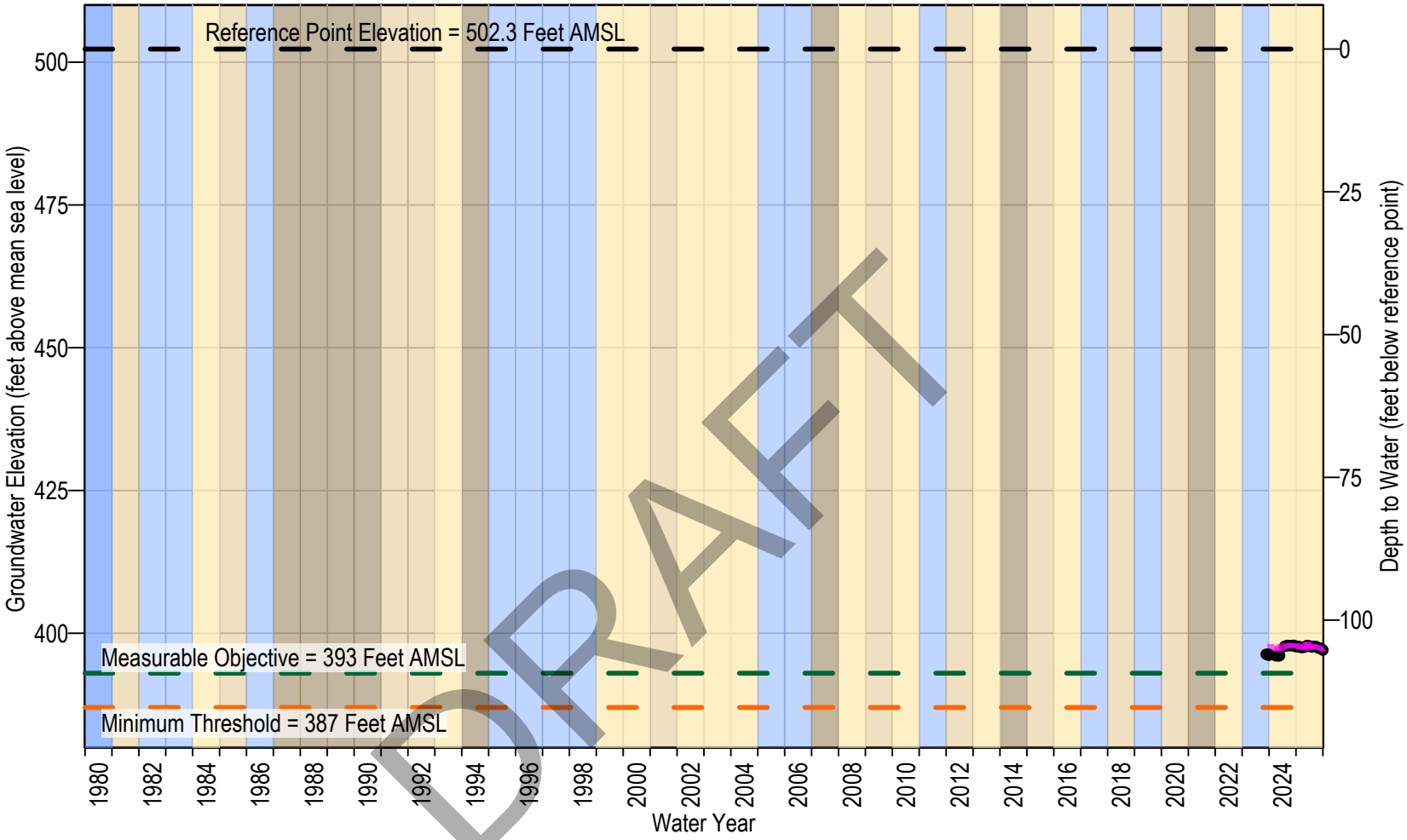
Water Year Classification

Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-5. Hydrograph of SMGWA-2 Bean Creek

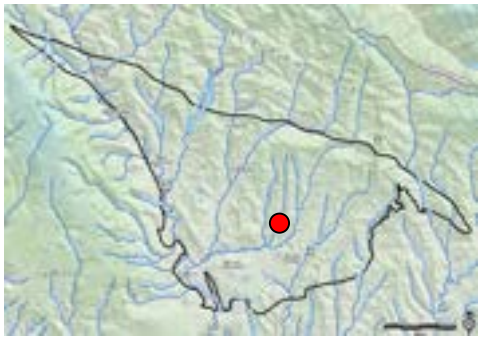


DRAFT

SMGWA-3 Ruins Creek
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

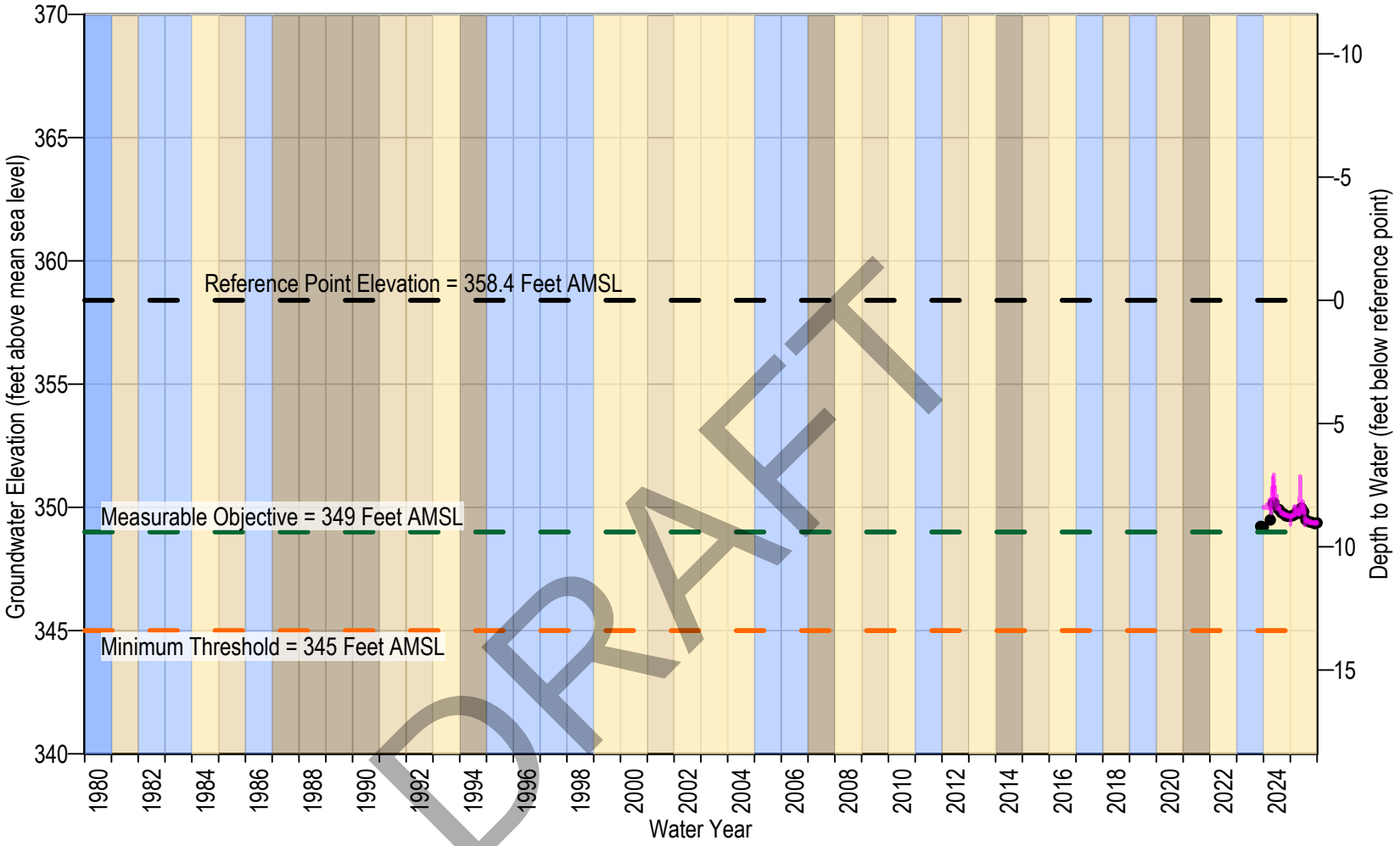
Formation: Unconfined - Santa Margarita
Reference Point Elevation: 502.3 ft AMSL
Screen Interval: 145-160 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-6. Hydrograph of SMGWA-3 Ruins Creek

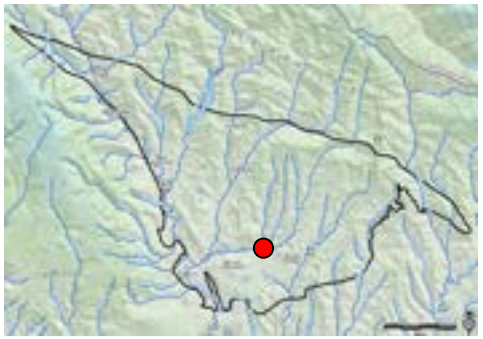


DRAFT

SMGWA-4 Nelson Road
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 358.4 ft AMSL
Screen Interval: 54-69 ft bgs

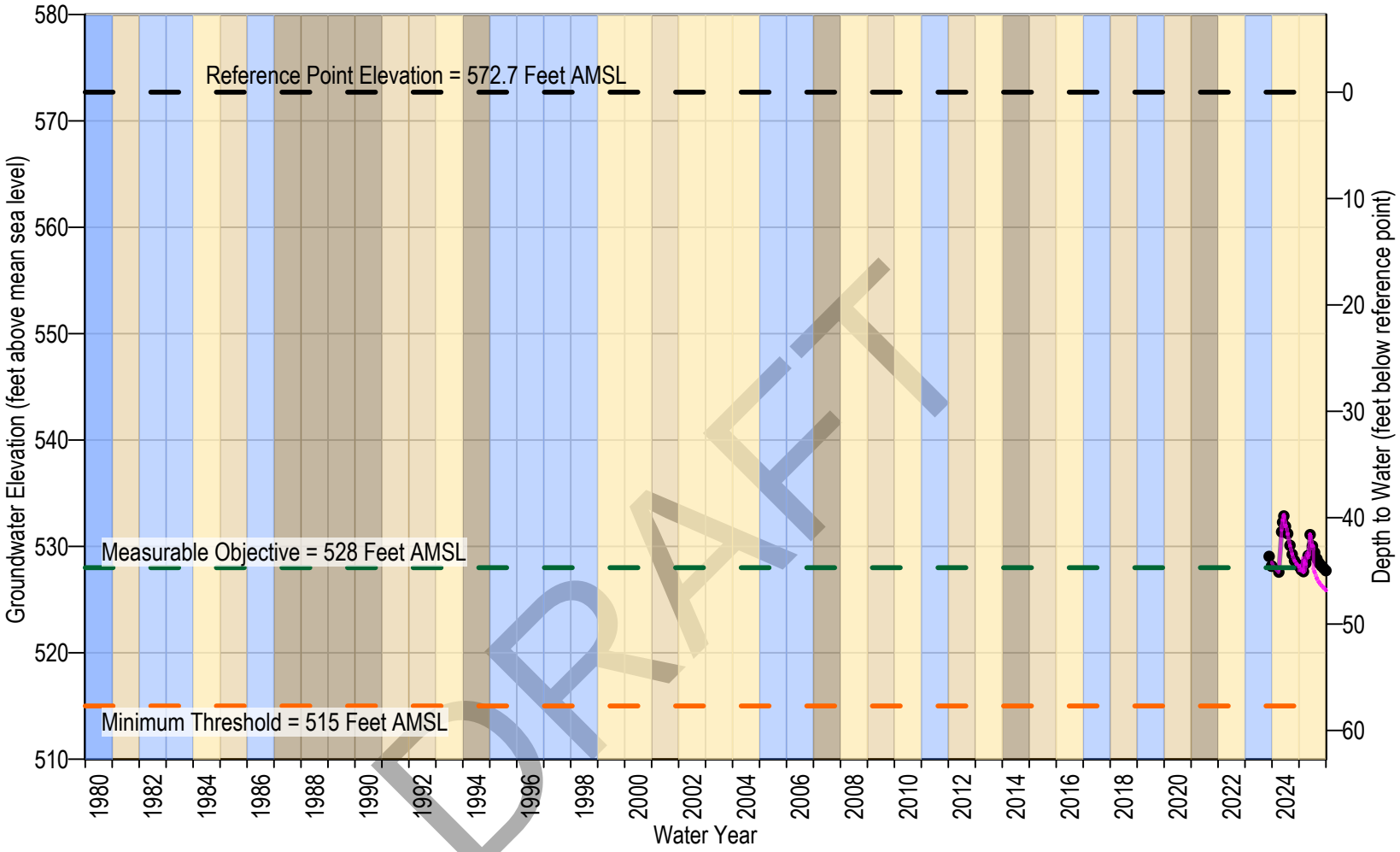
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-7. Hydrograph of SMGWA-4 Nelson Road

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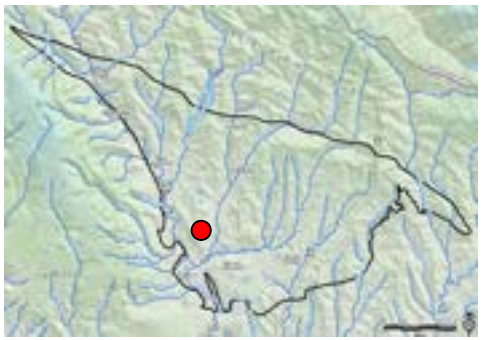
DRAFT

SMGWA-5 Bahr Drive
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 572.7 ft AMSL
Screen Interval: 40-55 ft bgs

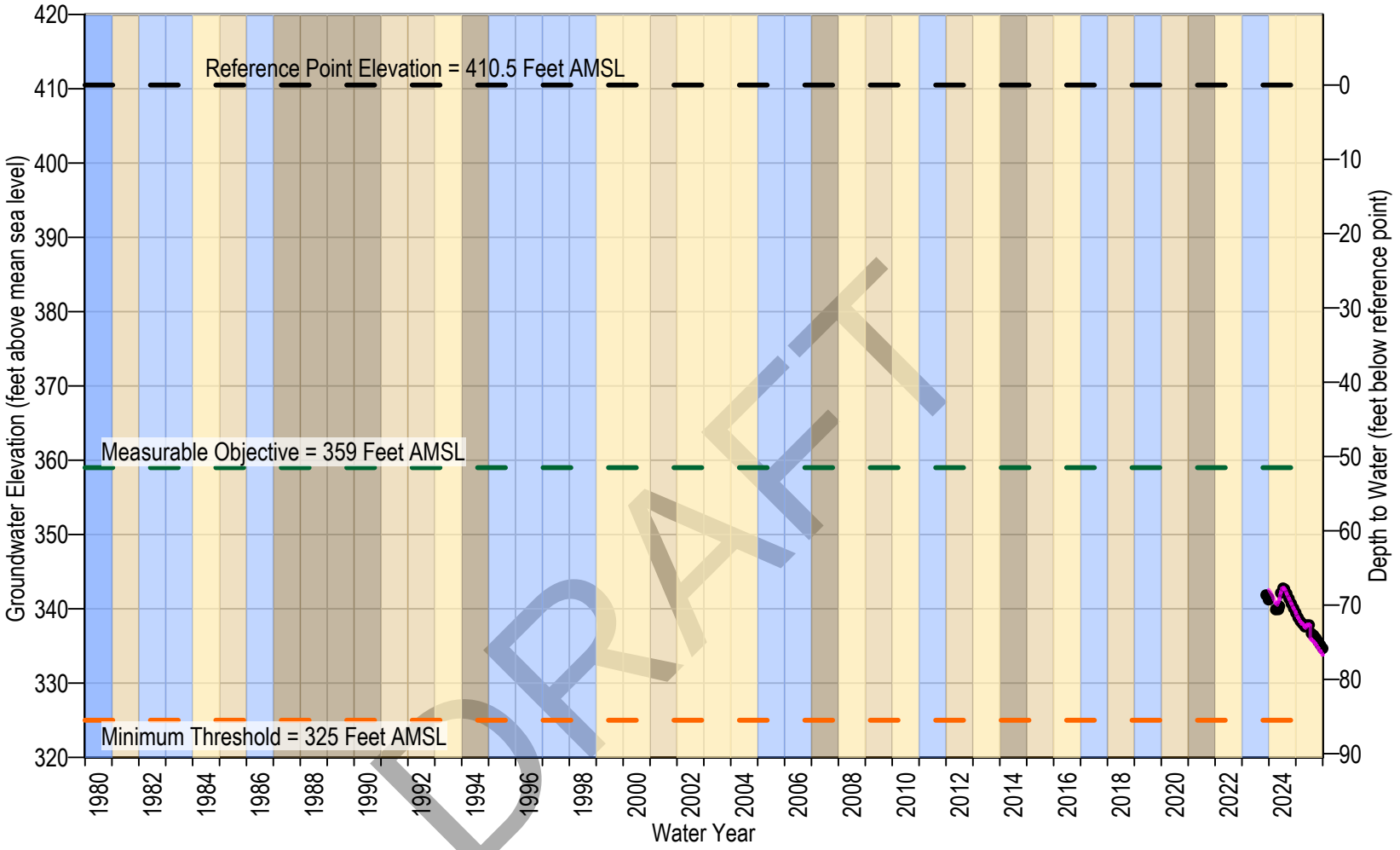
Water Year Classification

Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-8. Hydrograph of SMGWA-5 Bahr Drive

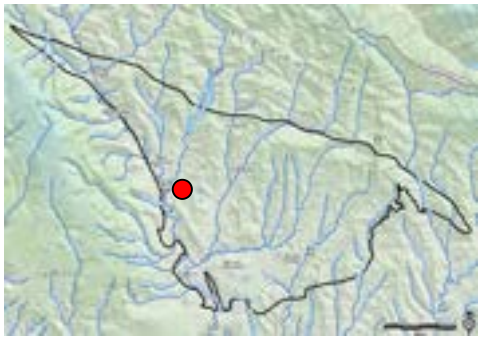


DRAFT

SMGWA-6 Quail Hollow
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

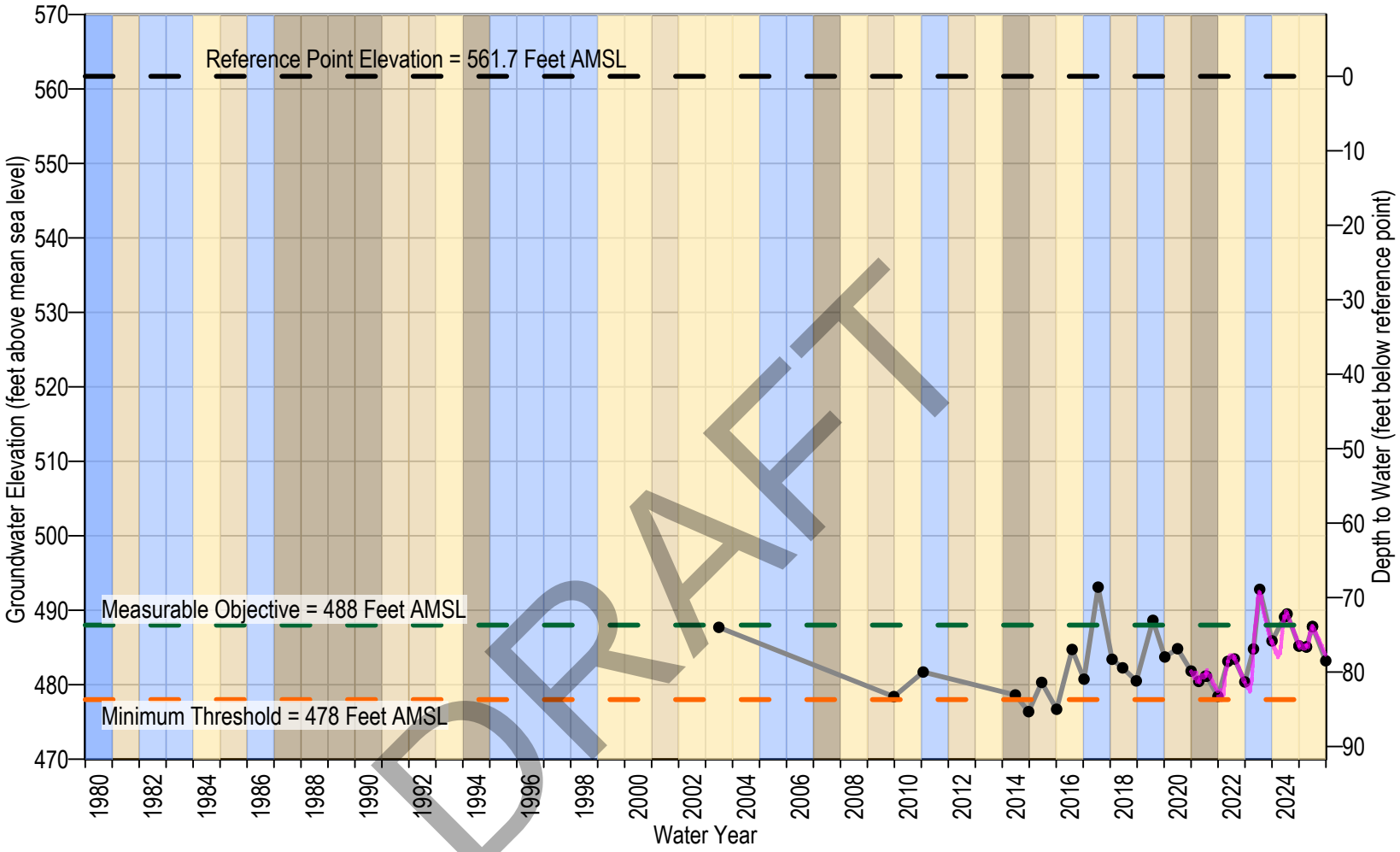
Formation: Unconfined - Santa Margarita
Reference Point Elevation: 410.5 ft AMSL
Screen Interval: 115-130 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-9. Hydrograph of SMGWA-6 Quail Hollow

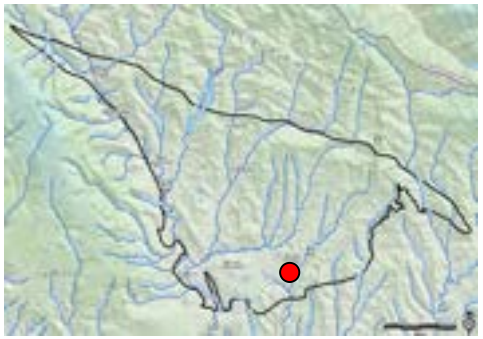


DRAFT

SVWD AB303 MW-1
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Unconfined - Santa Margarita
Reference Point Elevation: 561.7 ft AMSL
Screen Interval: 114-124 ft bgs

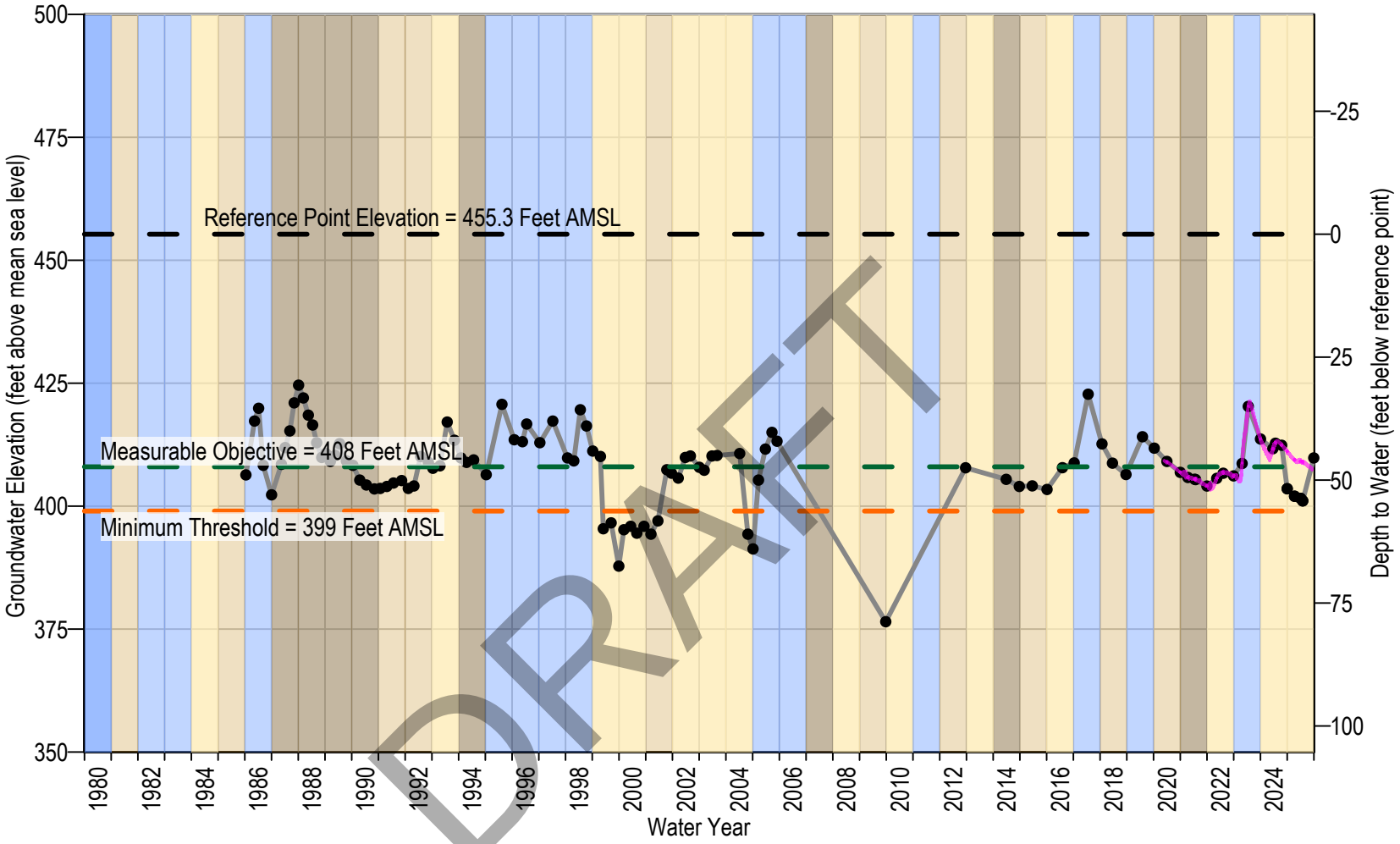
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-10. Hydrograph of SVWD AB303 MW-1

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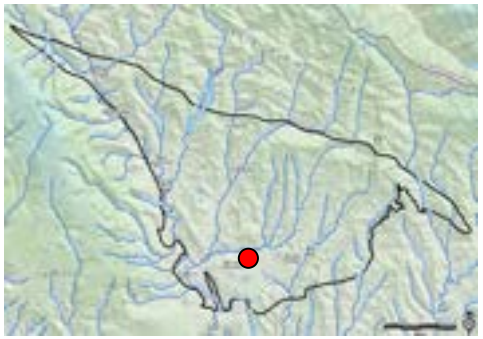


DRAFT

SVWD SV4-MW
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

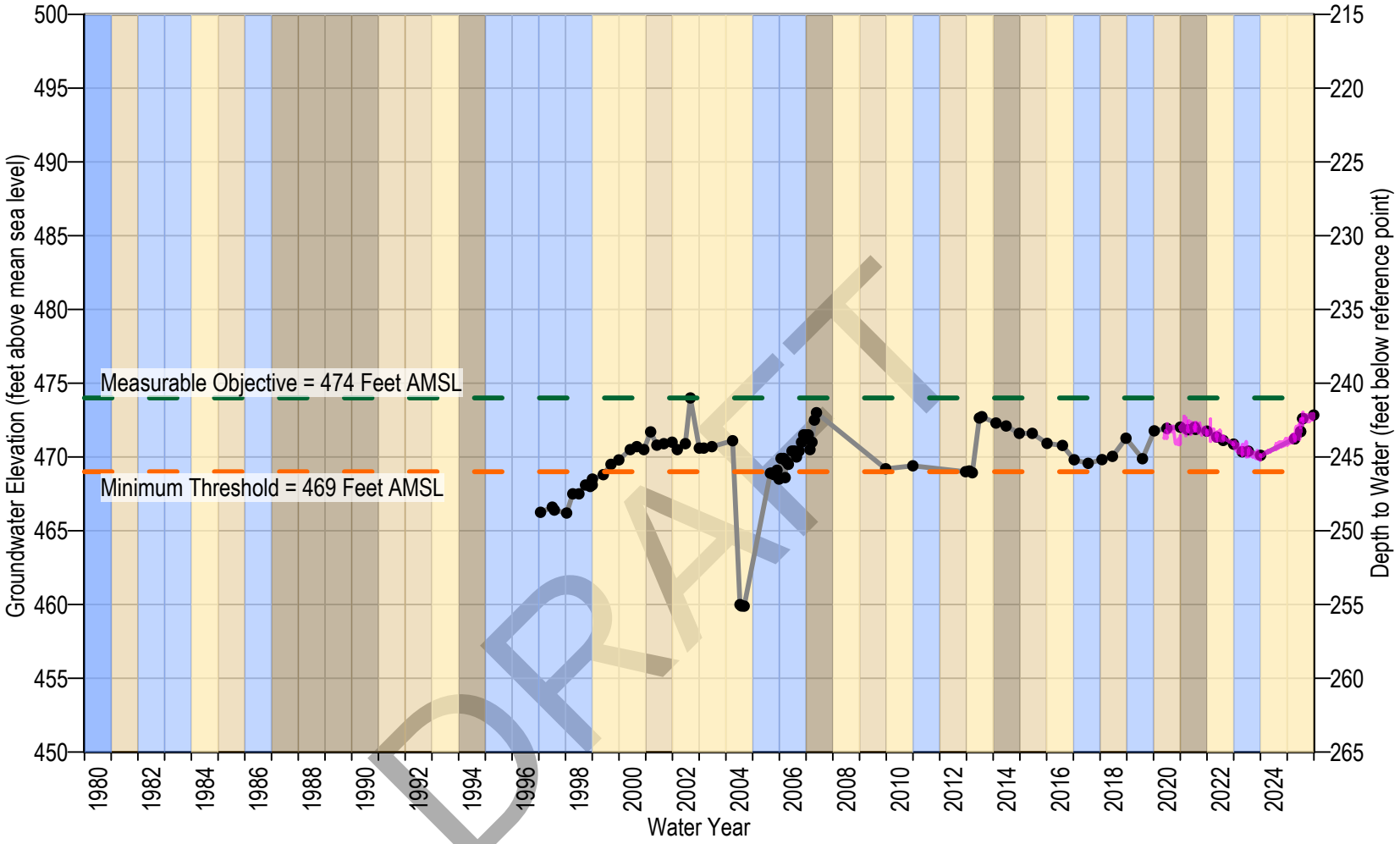
Formation: Unconfined - Santa Margarita
Reference Point Elevation: 455.3 ft AMSL
Screen Interval: 50-60 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-11. Hydrograph of SVWD SV4-MW

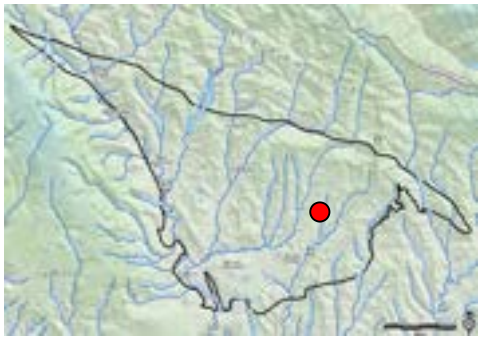


DRAFT

SVWD TW-18
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

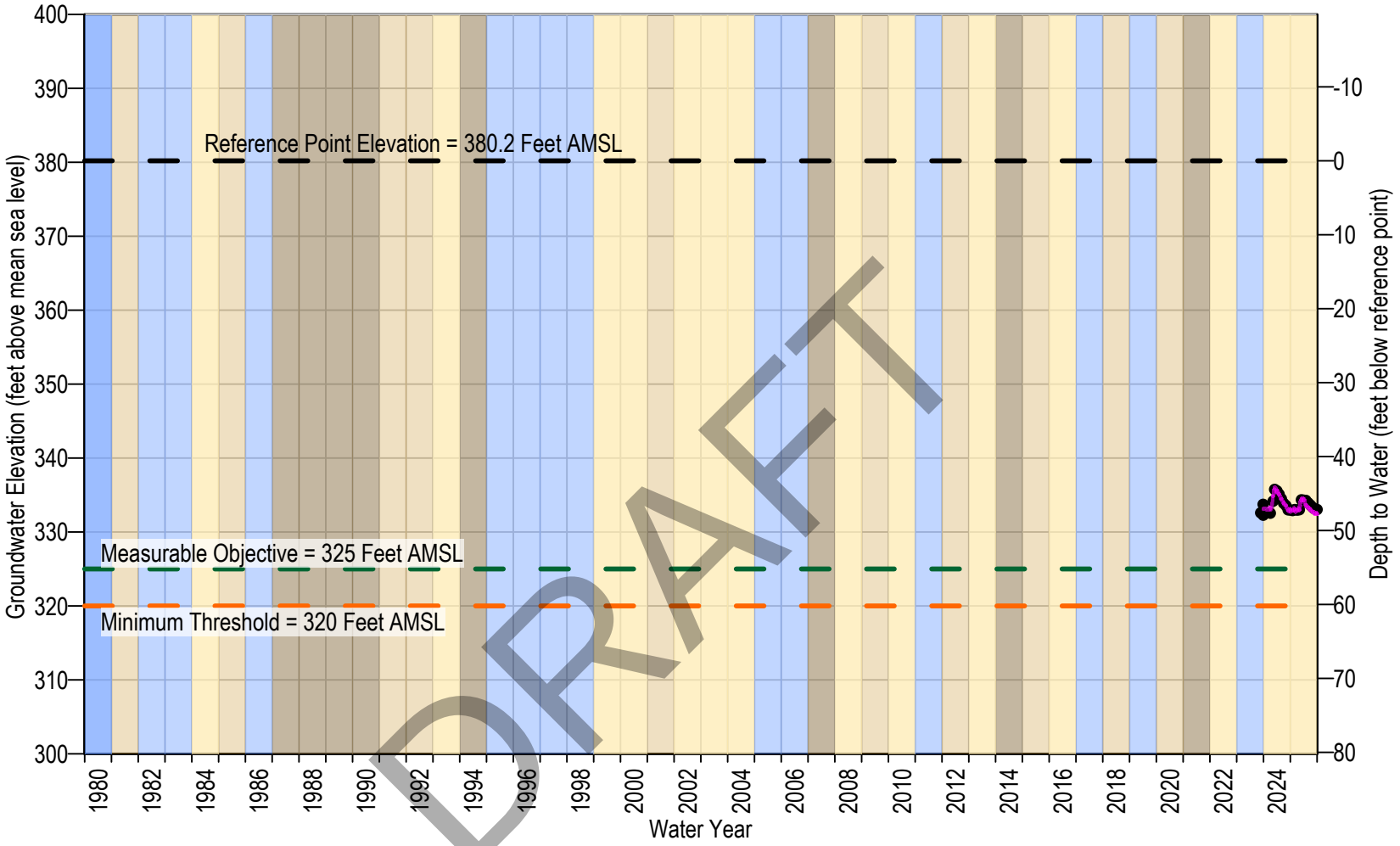
Formation: Unconfined - Santa Margarita
Reference Point Elevation: 715 ft AMSL
Screen Interval: 285-345 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-12. Hydrograph of SVWD TW-18

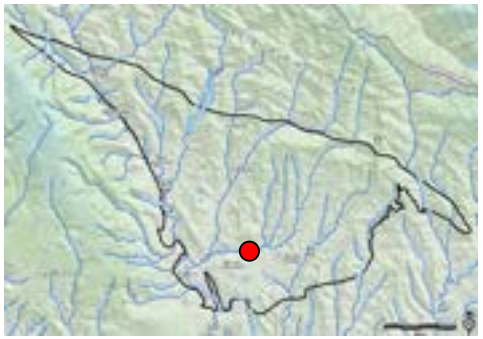


DRAFT

SMGWA-8 Randall Morgan Sandhills Preserve
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Monterey
Reference Point Elevation: 380.2 ft AMSL
Screen Interval: 155-170 ft bgs

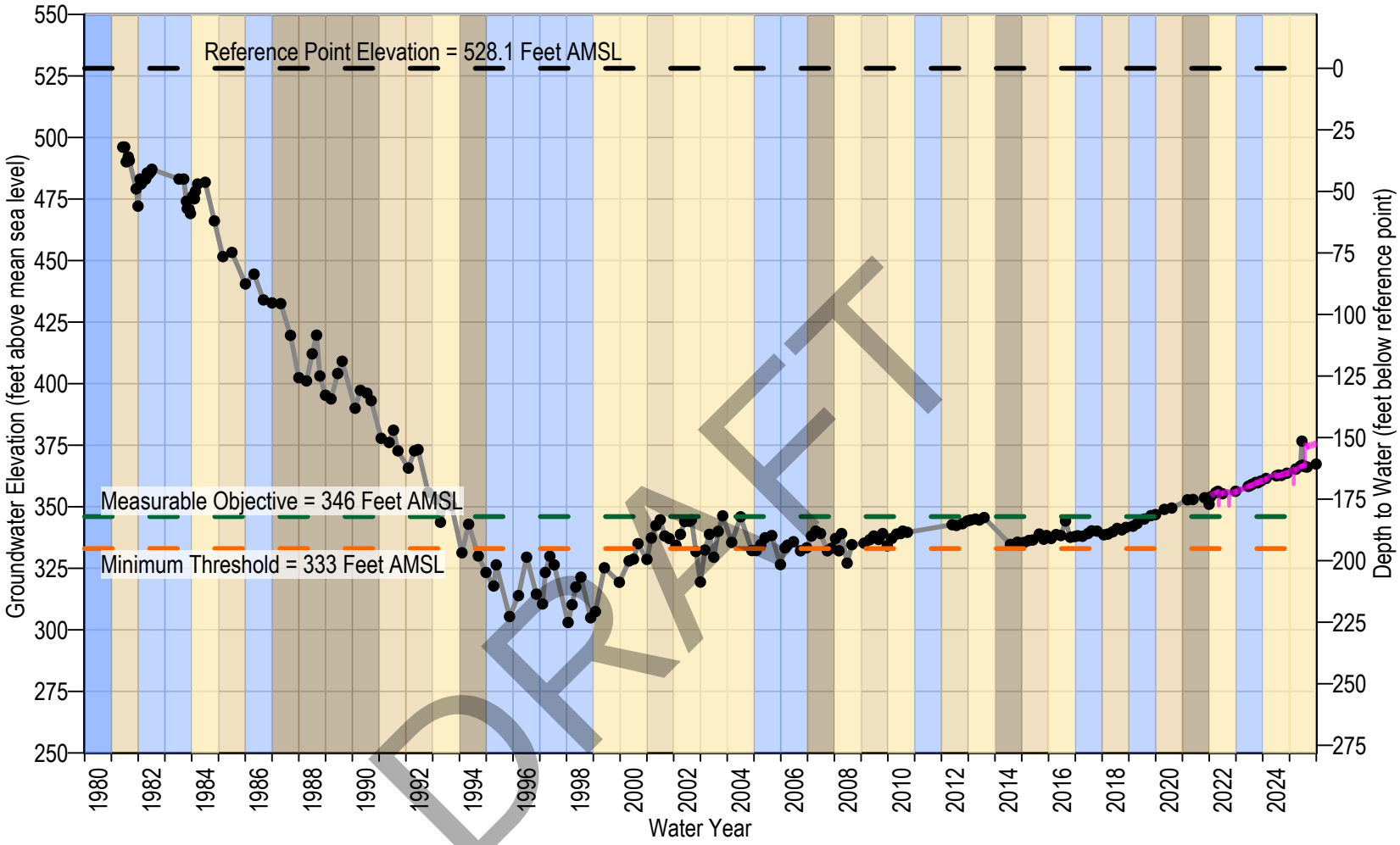
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-13. Hydrograph of SMGWA-8 Randall Morgan Sandhills Preserve

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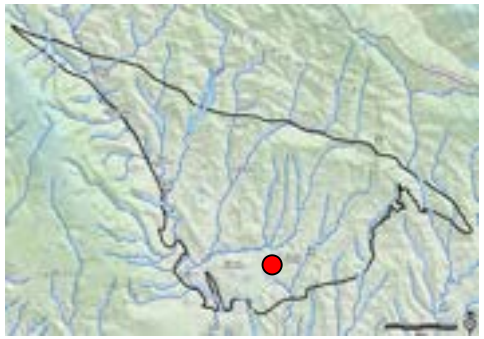


DRAFT

SVWD #9
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

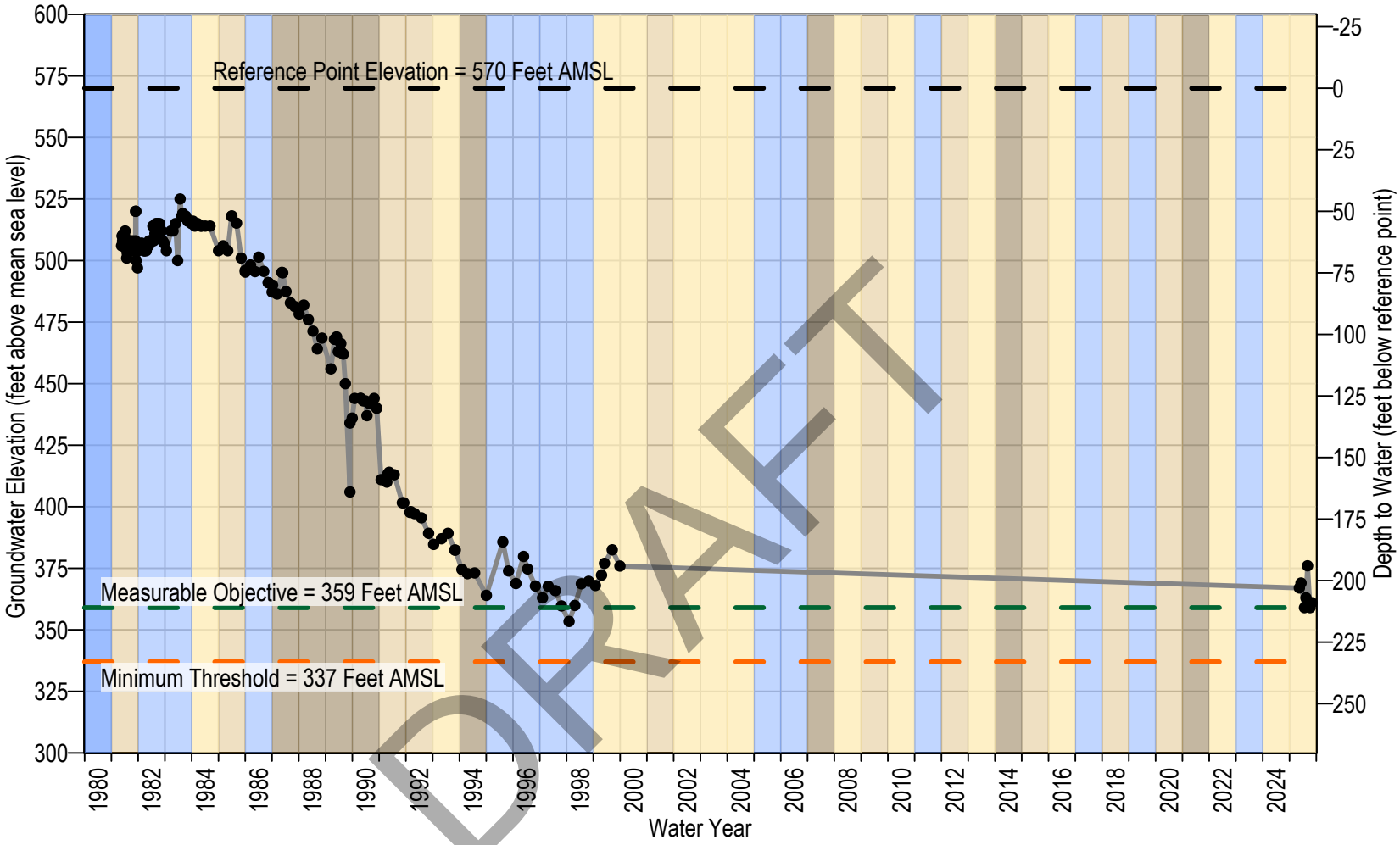
Formation: Confined - Monterey
Reference Point Elevation: 528.1 ft AMSL
Screen Interval: 155-195, 315-355 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-14. Hydrograph of SVWD #9

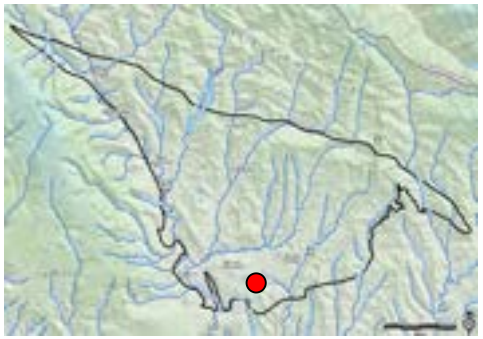


DRAFT

SLVWD Pasatiempo #3 (Estrella)
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Lompico
Reference Point Elevation: 570 ft AMSL
Screen Interval: 23-147, 169-260 ft bgs

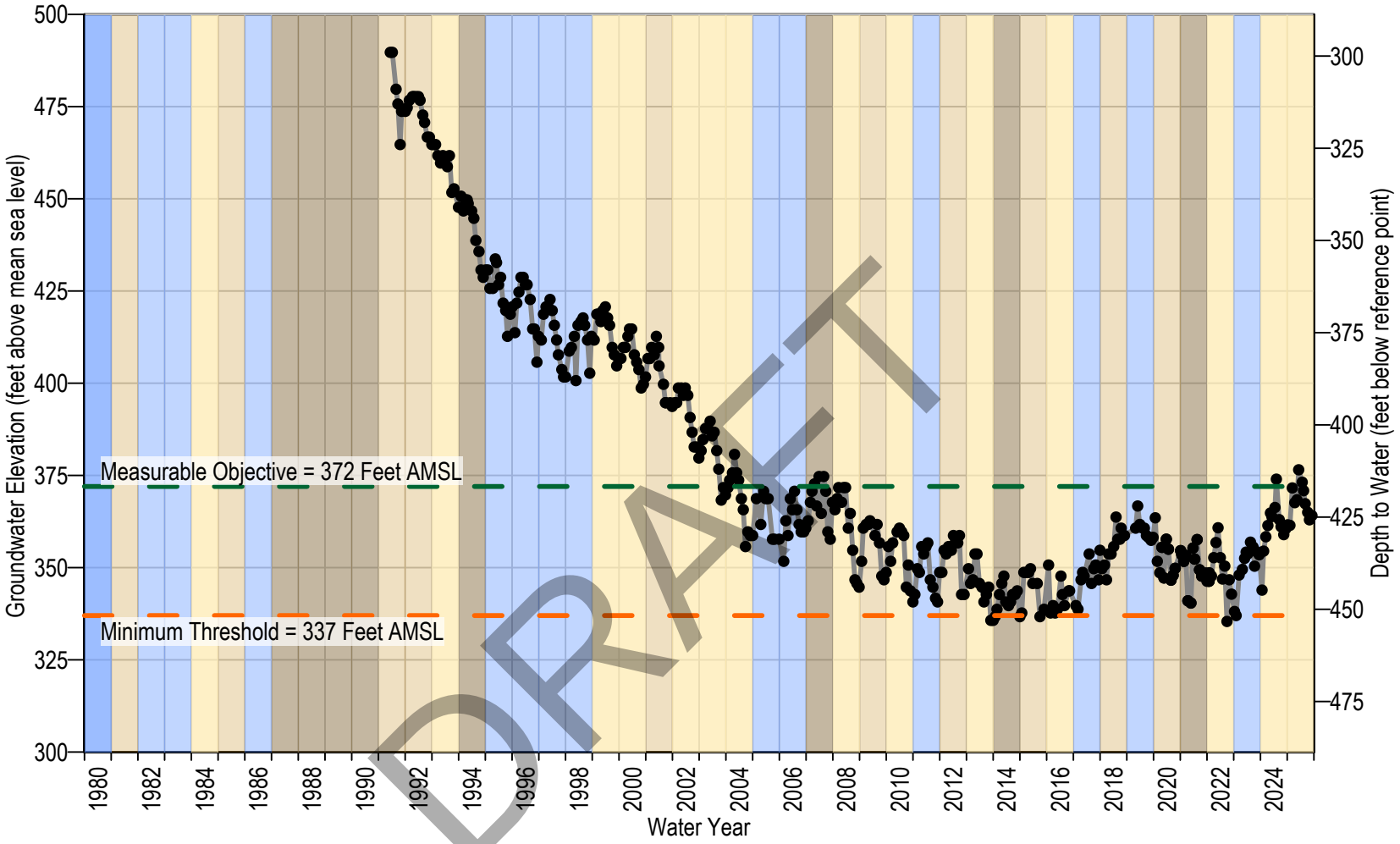
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-15. Hydrograph of SLVWD Pasatiempo #3 (Estrella)

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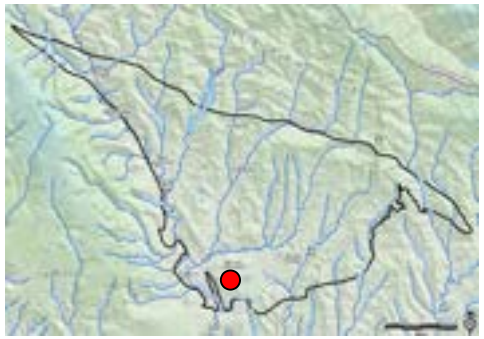
DRAFT

SLVWD Pasatiempo MW-1
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Lompico
Reference Point Elevation: 788.7 ft AMSL
Screen Interval: 599-659 ft bgs

Water Year Classification

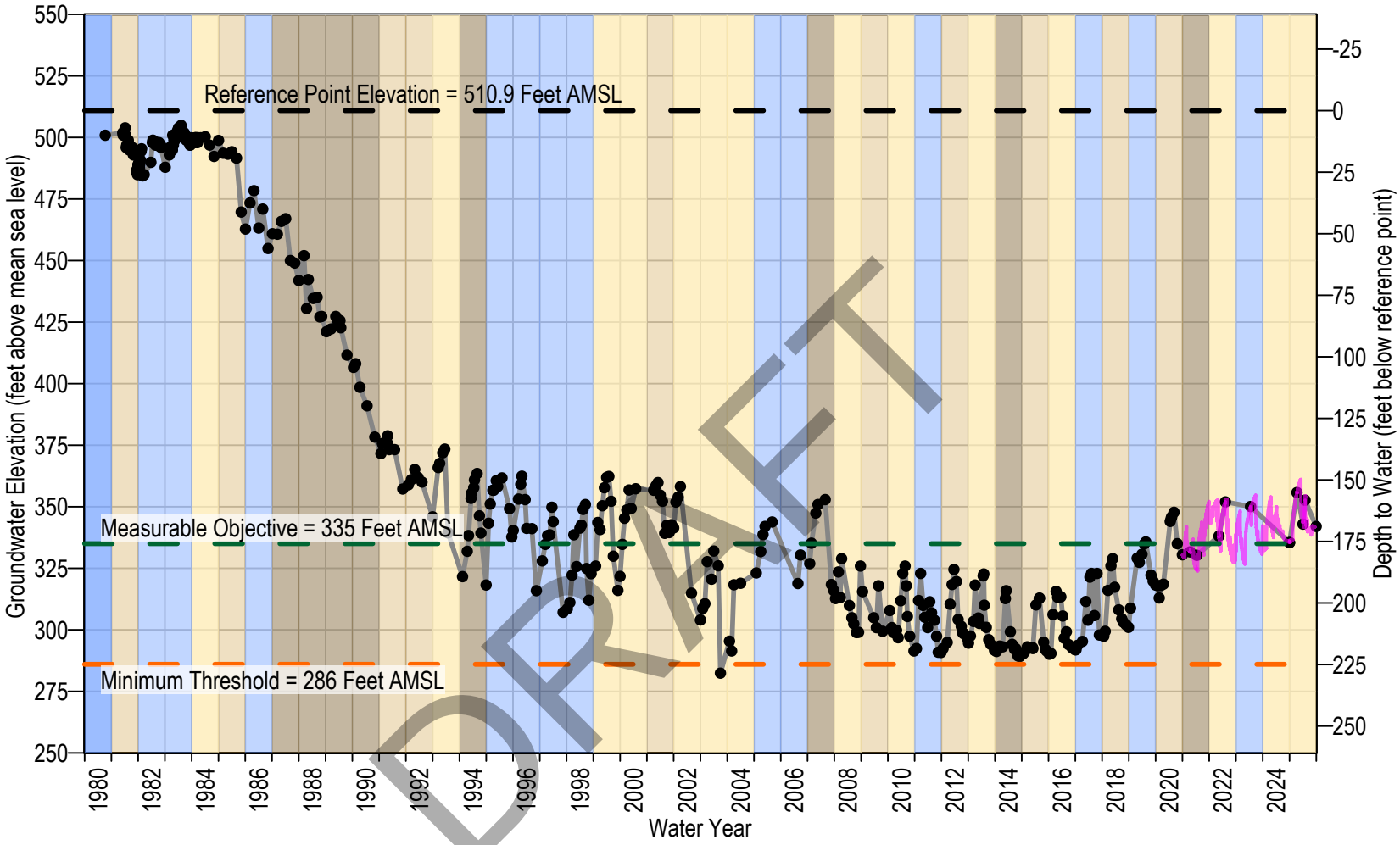
Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-16. Hydrograph of SLVWD Pasatiempo MW-1

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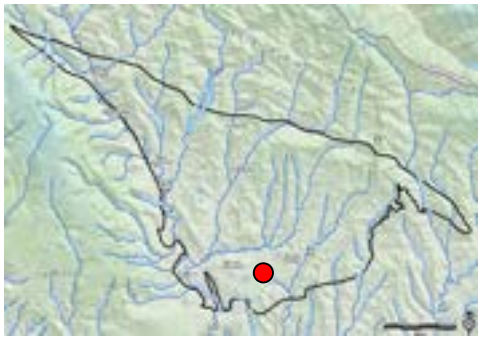


DRAFT

SVWD #10
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

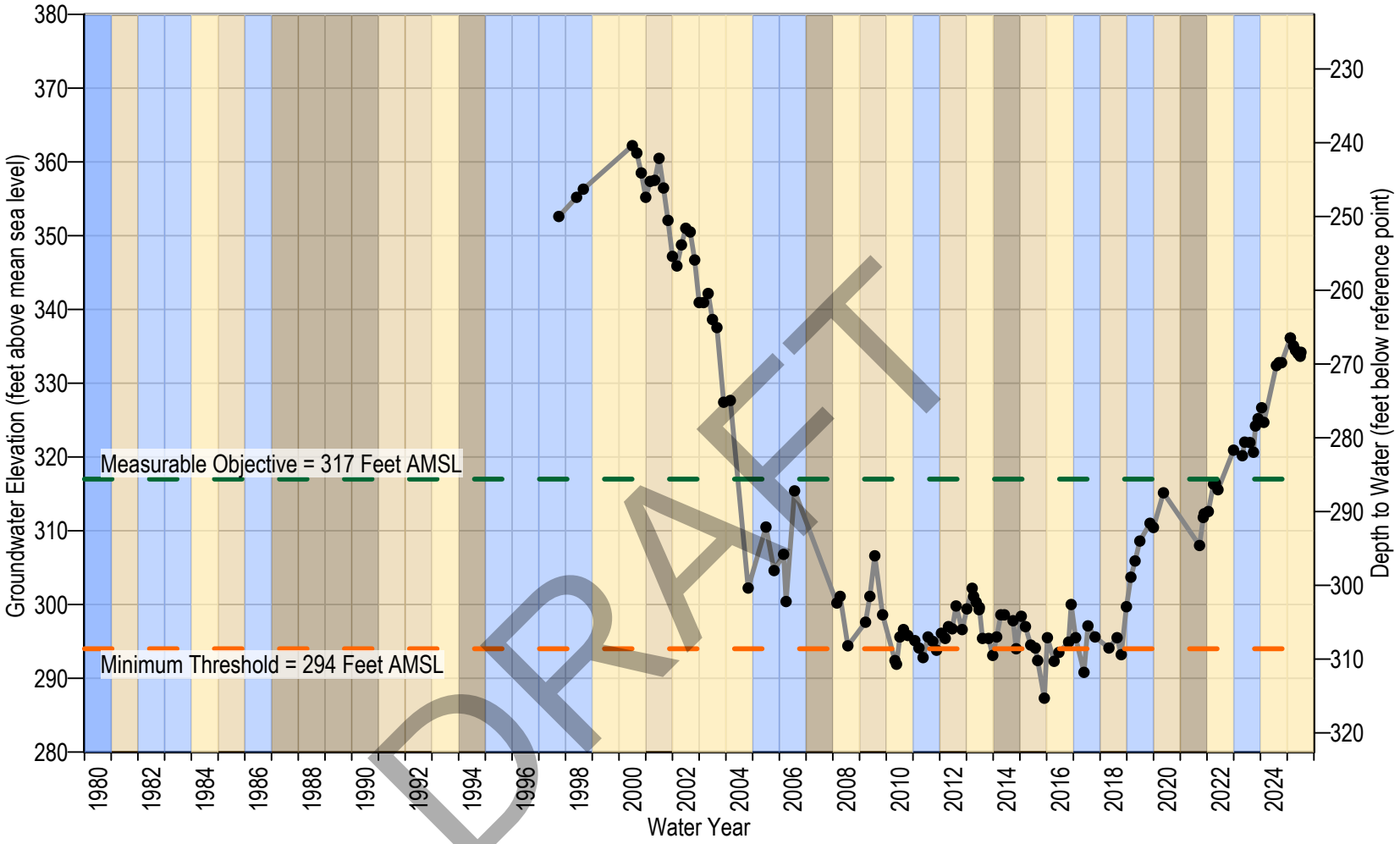
Formation: Confined - Lompico
Reference Point Elevation: 510.9 ft AMSL
Screen Interval: 190-220, 240-270, 325-355 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-17. Hydrograph of SVWD #10

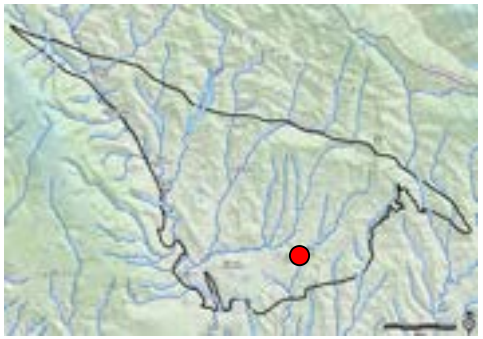


DRAFT

SVWD #11A
Reference Point Elevation
Minimum Threshold
Measurable Objective

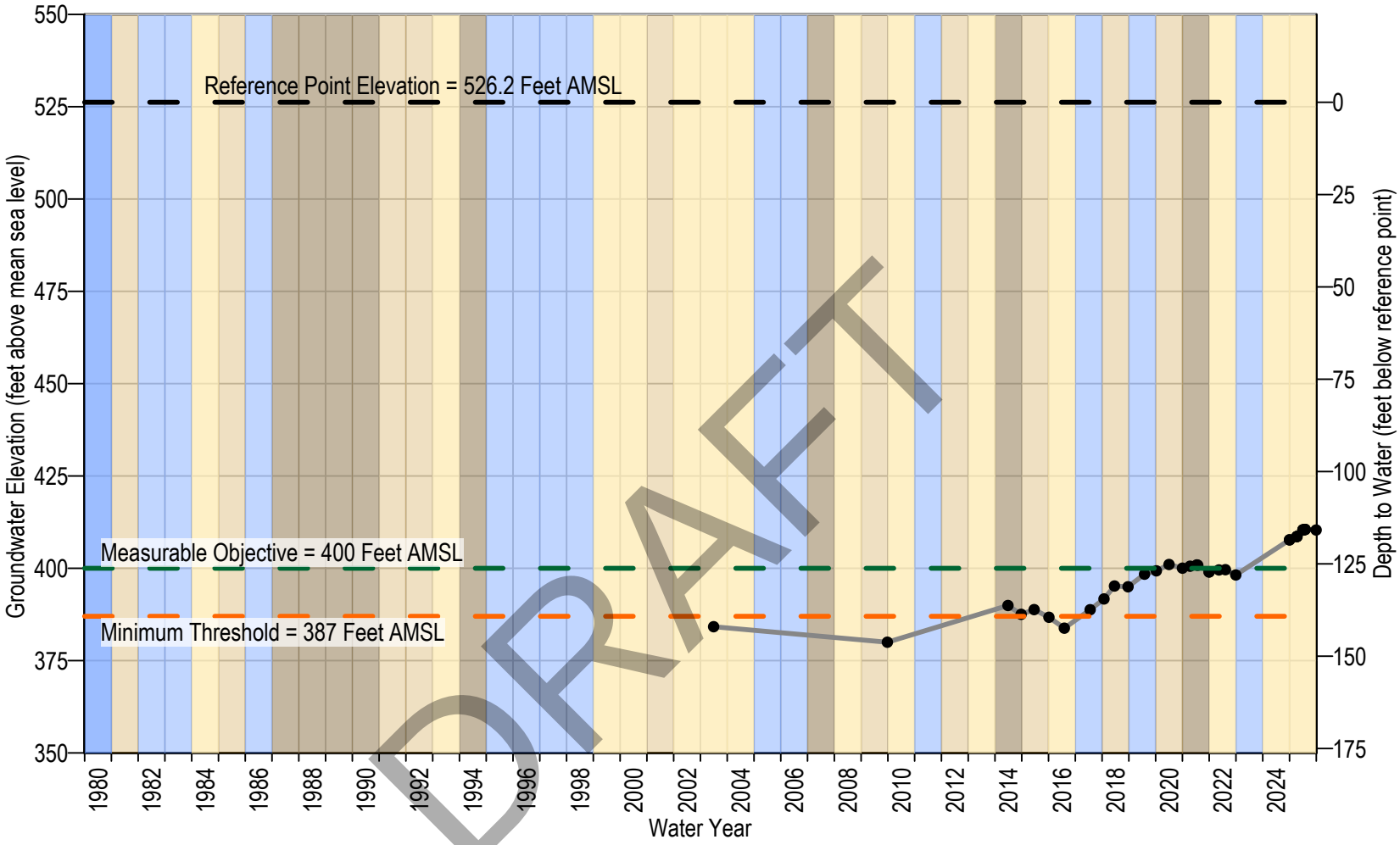
Formation: Confined - Lompico
Reference Point Elevation: 602.6 ft AMSL
Screen Interval: 399-419, 459-469, 495-515 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-18. Hydrograph of SVWD #11A



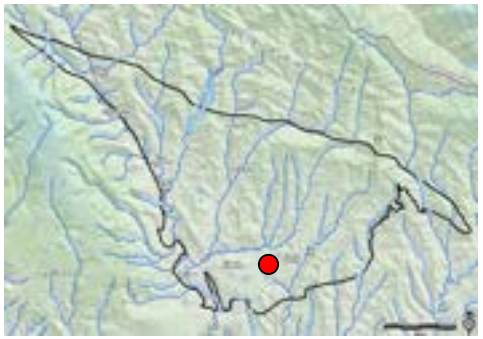
DRAFT

SVWD AB303 MW-2
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Lompico
Reference Point Elevation: 526.2 ft AMSL
Screen Interval: 705-715, 810-850 ft bgs

Water Year Classification

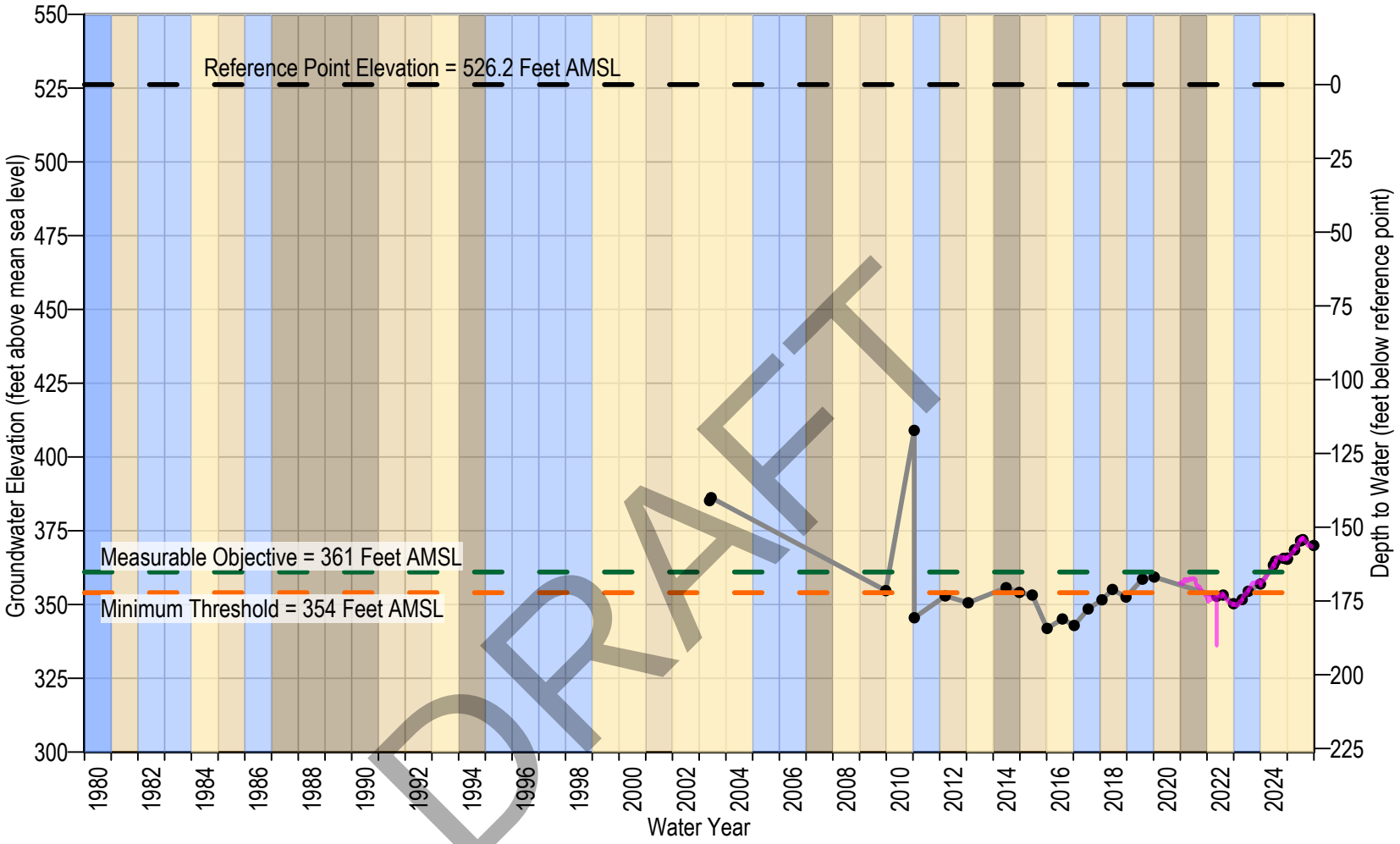
Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-19. Hydrograph of SVWD AB303 MW-2

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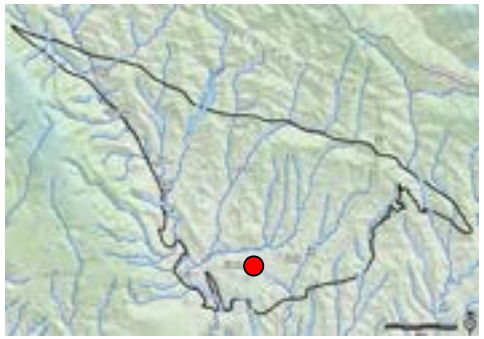


DRAFT

SVWD AB303 MW-3A
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

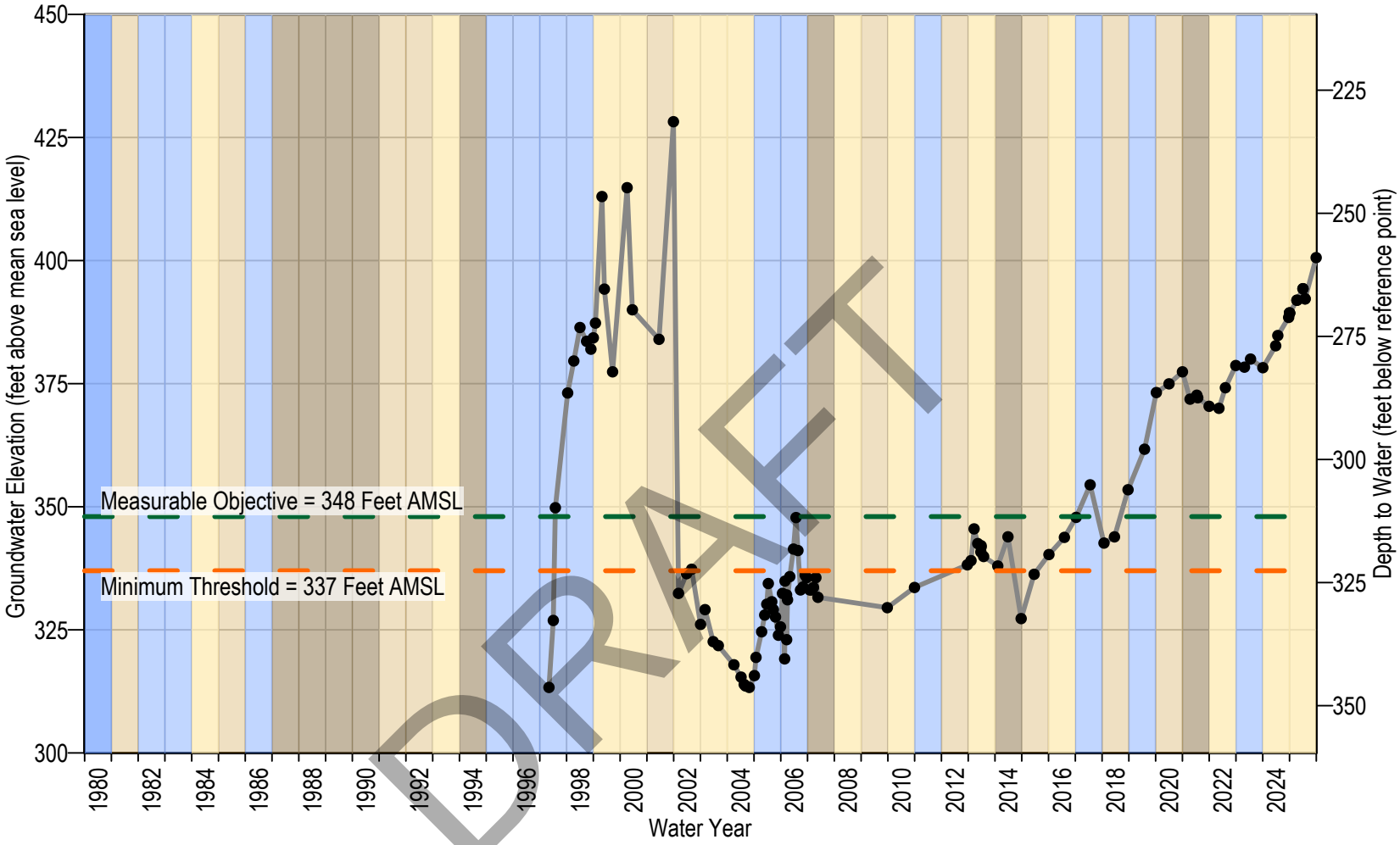
Formation: Confined - Lompico
Reference Point Elevation: 526.2 ft AMSL
Screen Interval: 630-680 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-20. Hydrograph of SVWD AB303 MW-3A

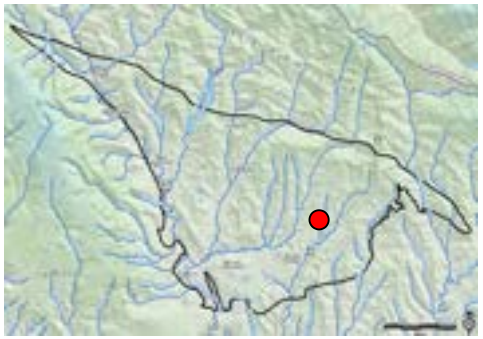


DRAFT

SVWD TW-19
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Lompico
Reference Point Elevation: 659.6 ft AMSL
Screen Interval: 960-1060 ft bgs

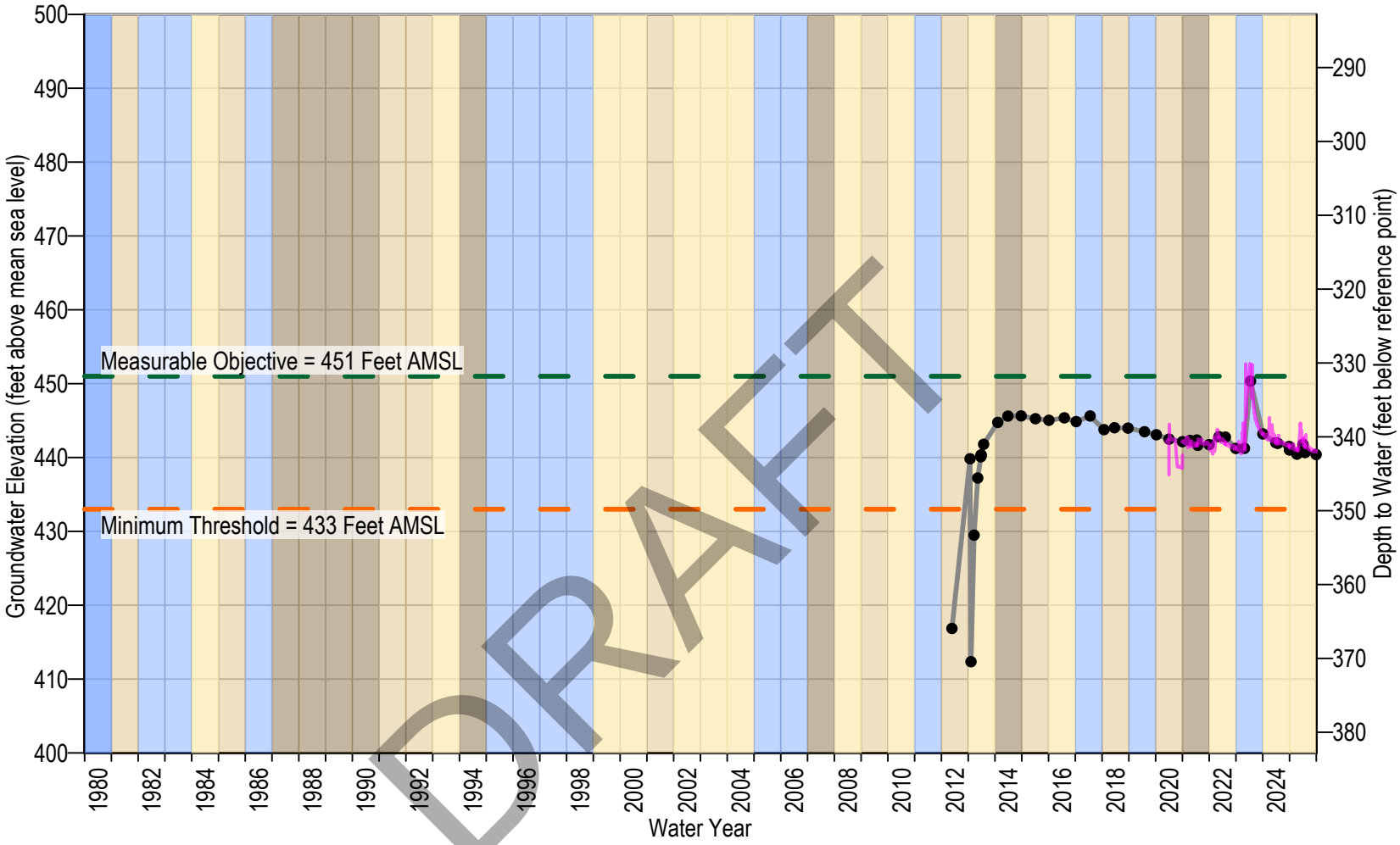
Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-21. Hydrograph of SVWD TW-19

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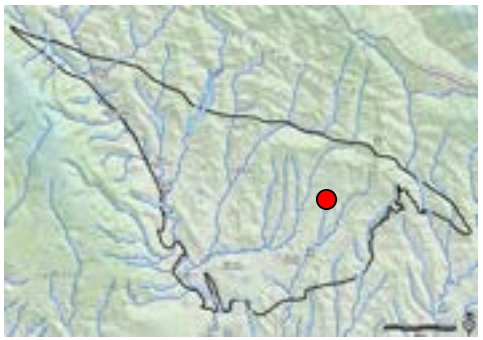


DRAFT

SVWD Canham Well
Transducer
Reference Point Elevation
Minimum Threshold
Measurable Objective

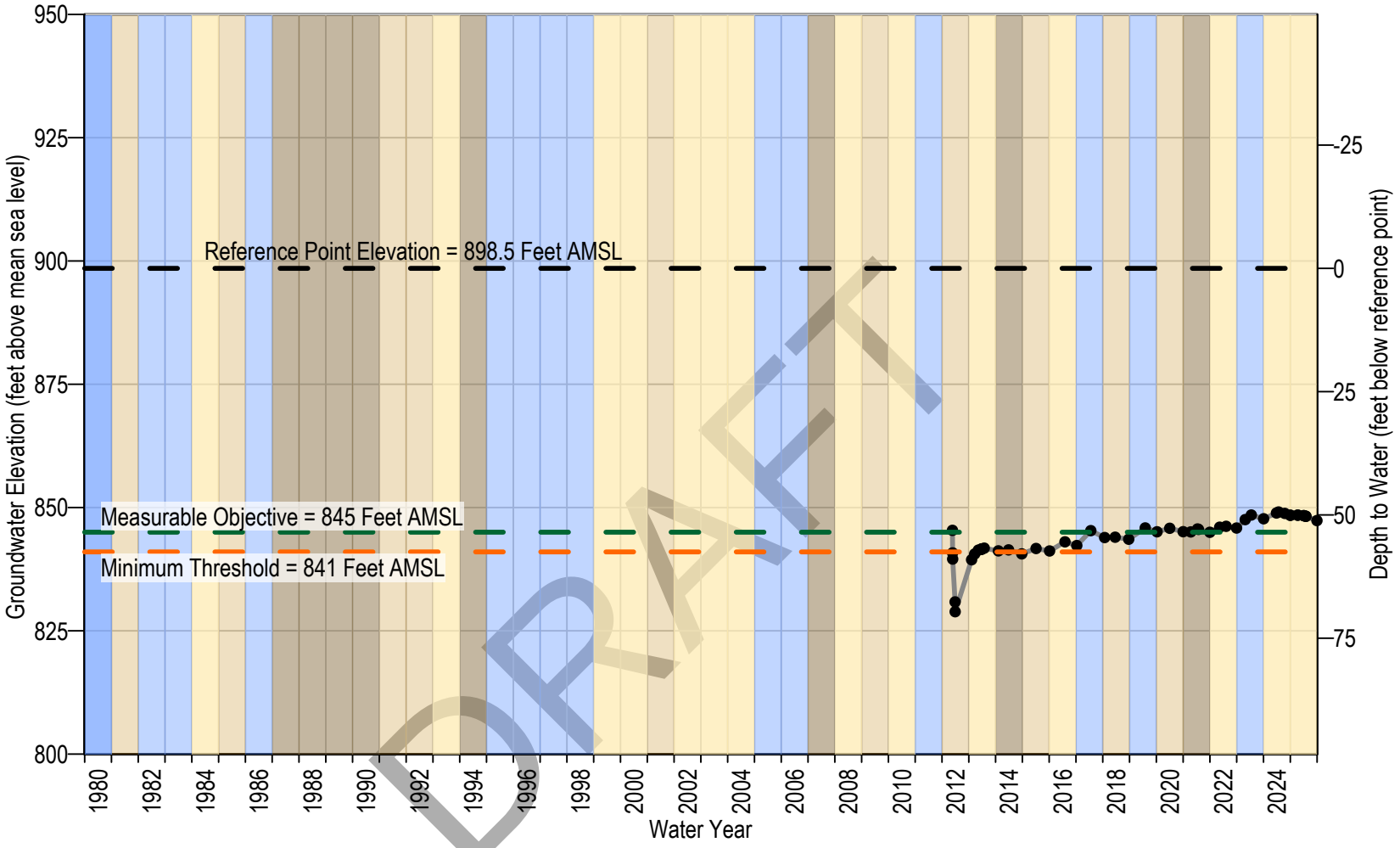
Formation: Confined - Butano
Reference Point Elevation: 782.8 ft AMSL
Screen Interval: 1,281-1,381 ft bgs

Water Year Classification
Wet
Dry
Normal
Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-22. Hydrograph of SVWD Canham Well

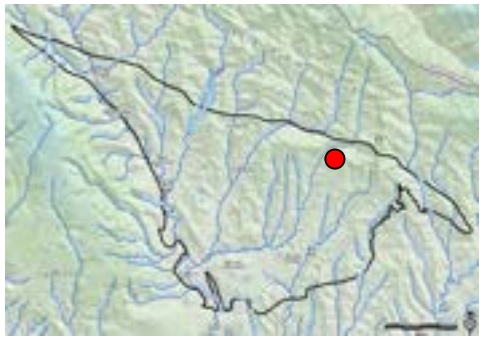


SVWD Stonewood Well
Reference Point Elevation
Minimum Threshold
Measurable Objective

Formation: Confined - Butano
Reference Point Elevation: 898.5 ft AMSL
Screen Interval: 799-859 ft bgs

Water Year Classification

Wet	Dry
Normal	Critically Dry



Note: Reference point is the elevation from which depth to water is measured at a well, typically 1-2 feet above land surface. Pumping measurements are removed from hand soundings but not from transducer data.

Figure 4D-23. Hydrograph of SVWD Stonewood Well

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Appendix 4E

Groundwater Quality Sustainability Indicator RMP Select Chemographs

DRAFT

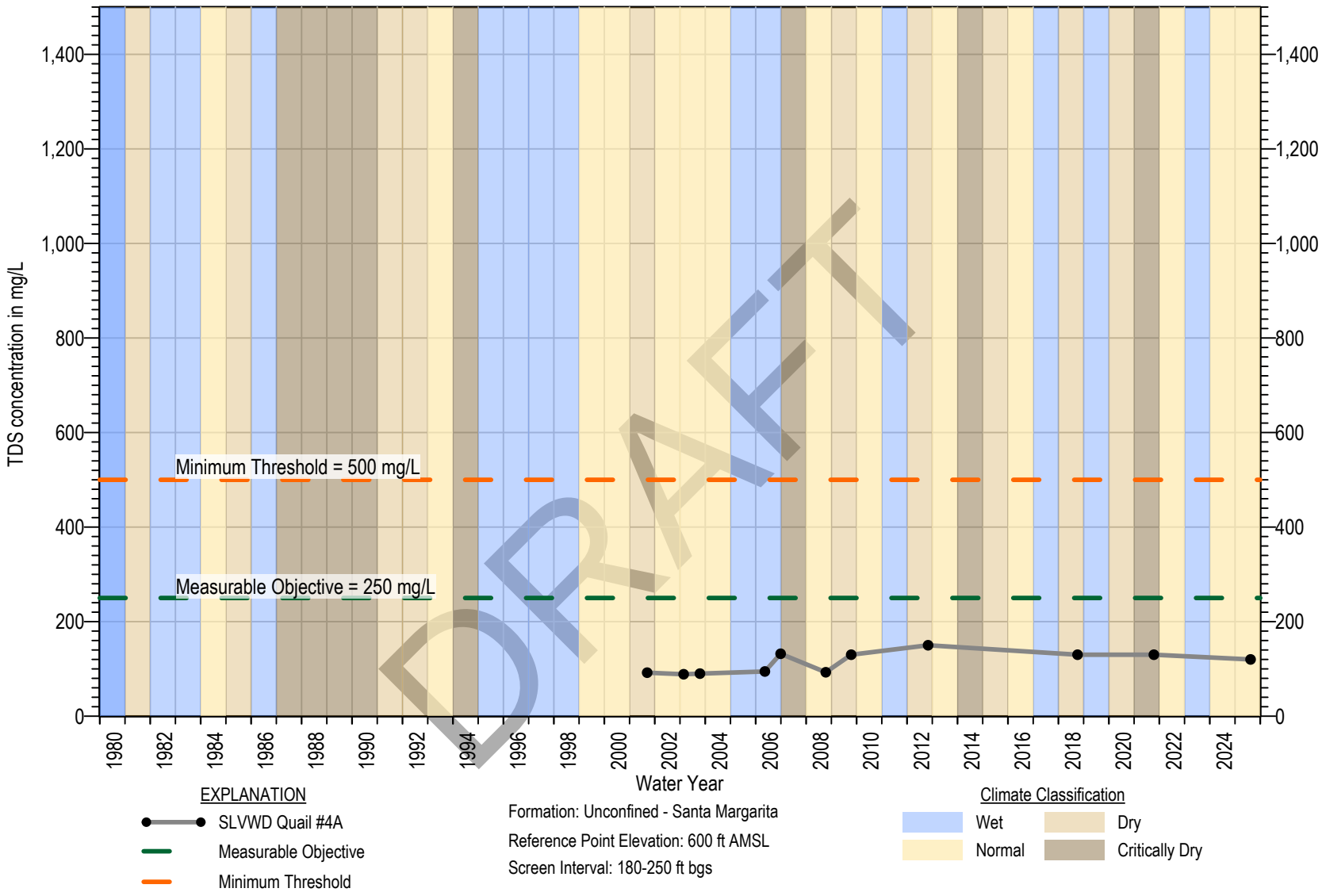


Figure 4E-1. Chemograph of SLVWD Quail #4A

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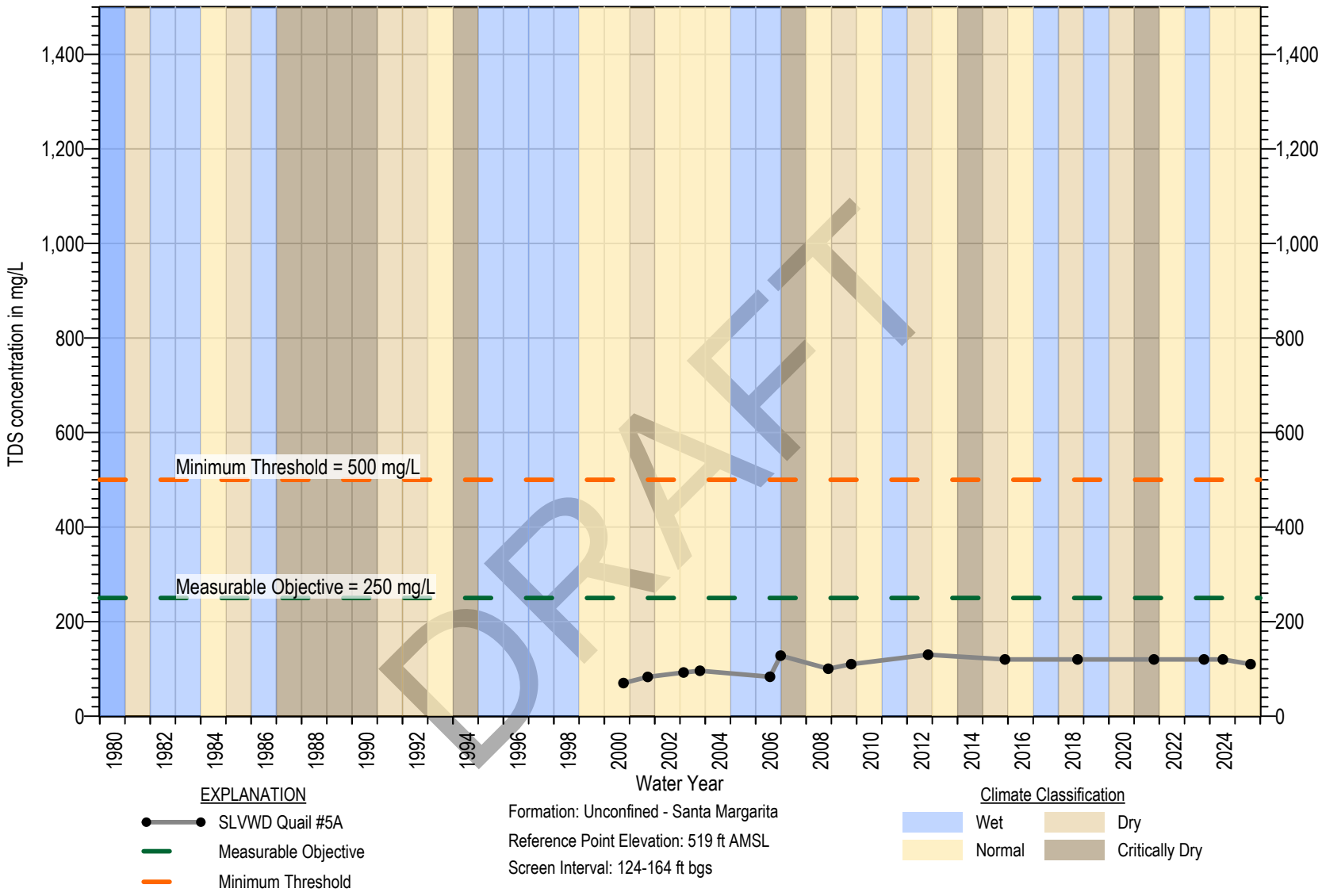


Figure 4E-2. Chemograph of SLVWD Quail #5A

MONTGOMERY & ASSOCIATES

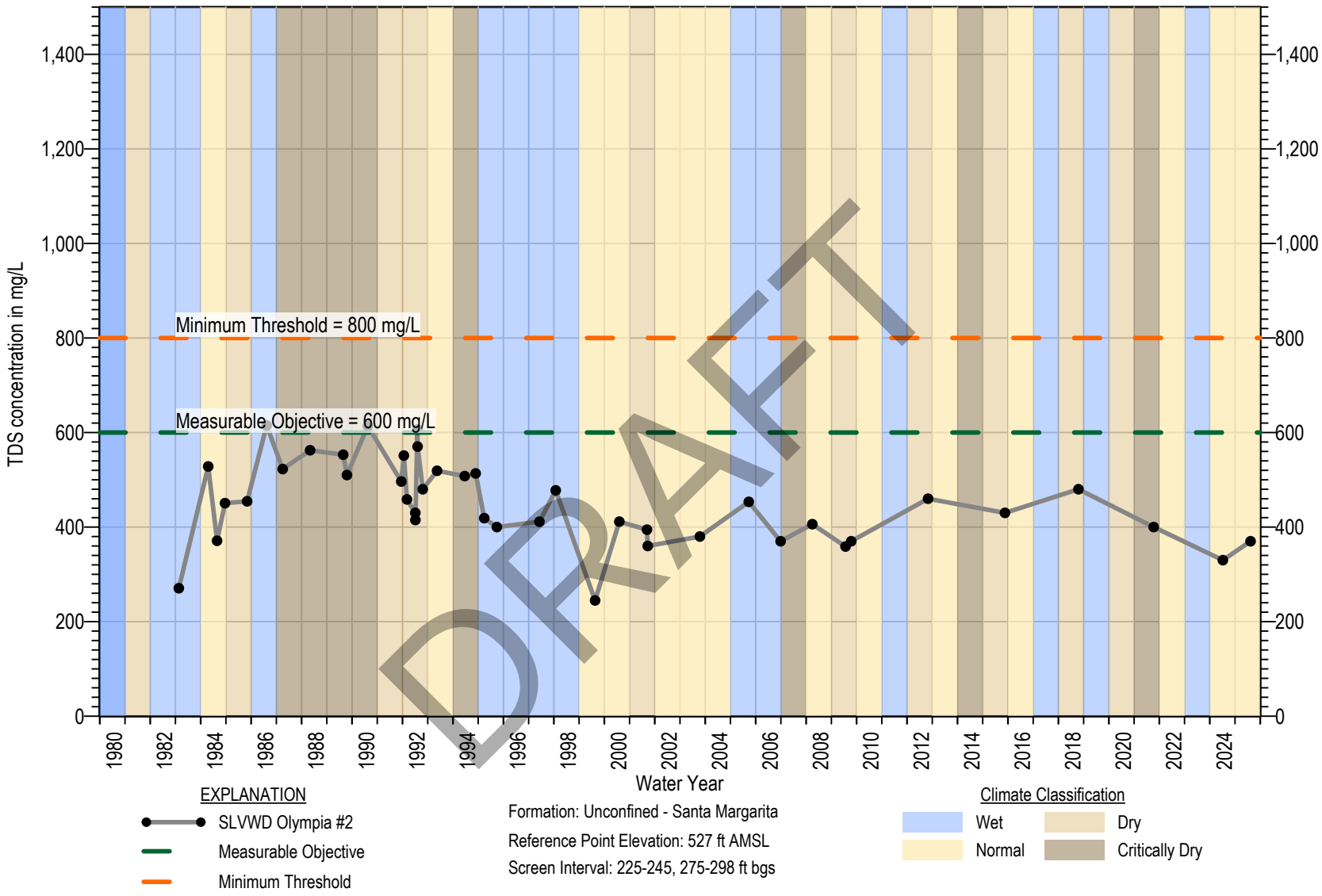


Figure 4E-3. Chemograph of SLVWD Olympia #2

MONTGOMERY & ASSOCIATES

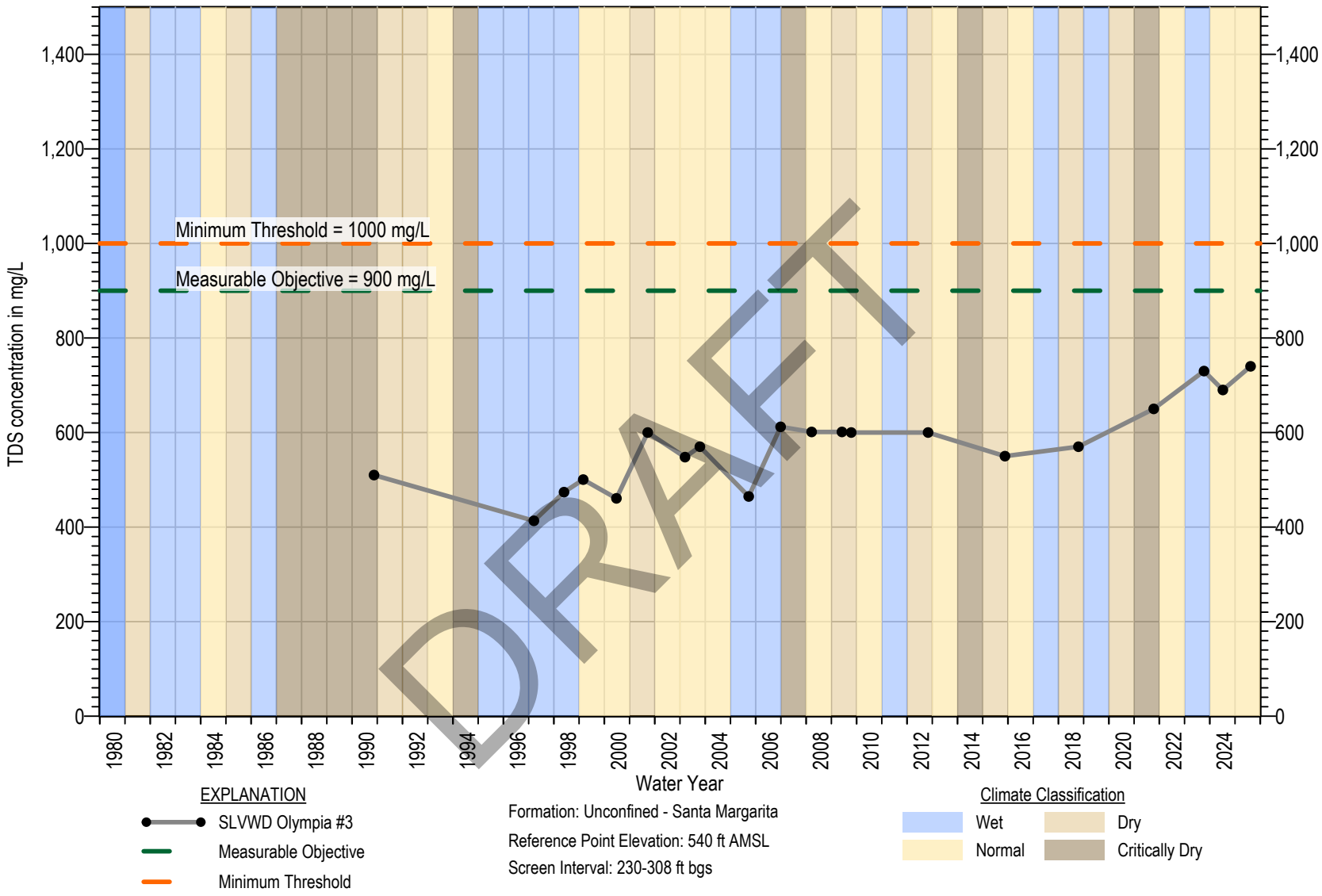


Figure 4E-4. Chemograph of SLVWD Olympia #3

MONTGOMERY & ASSOCIATES

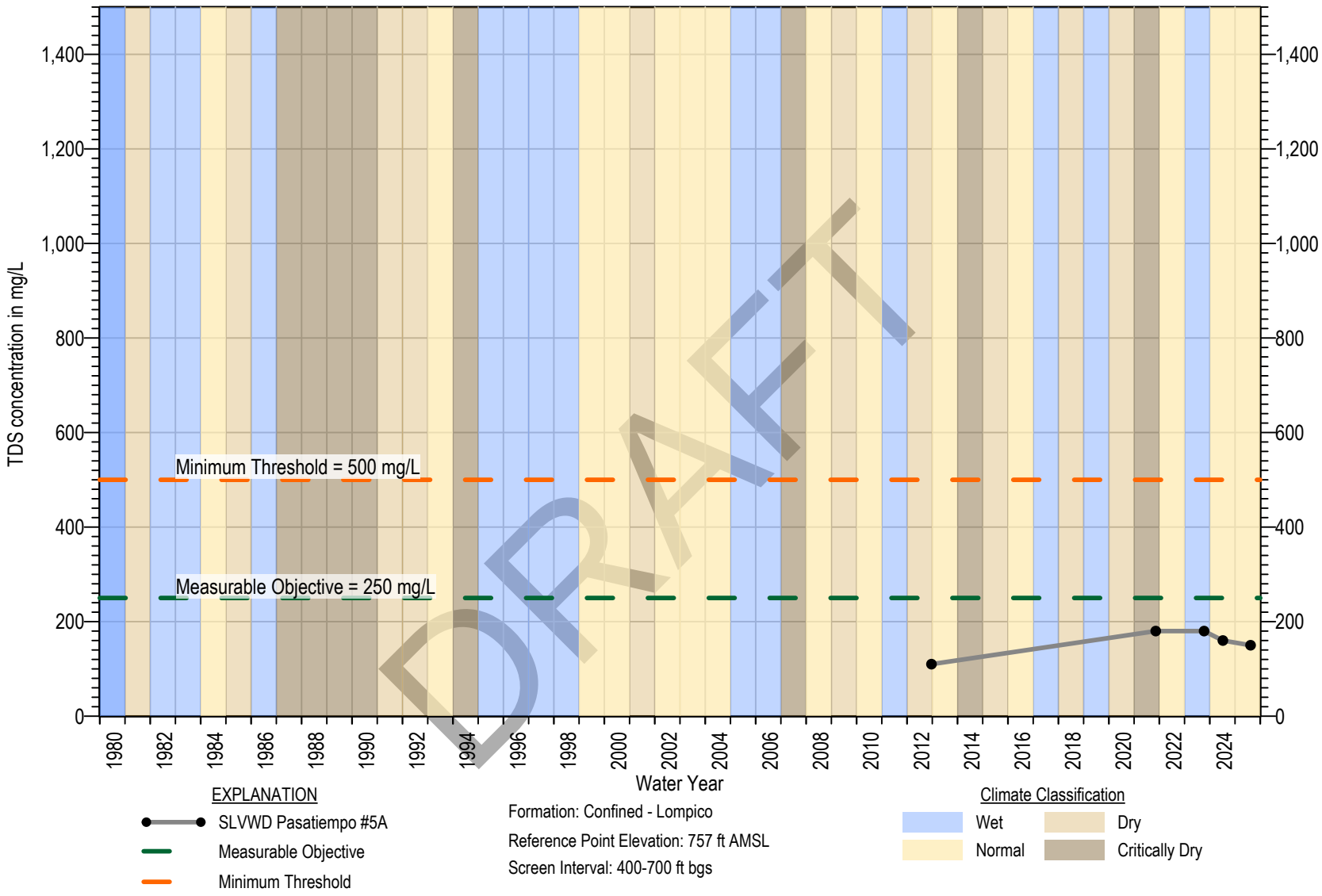
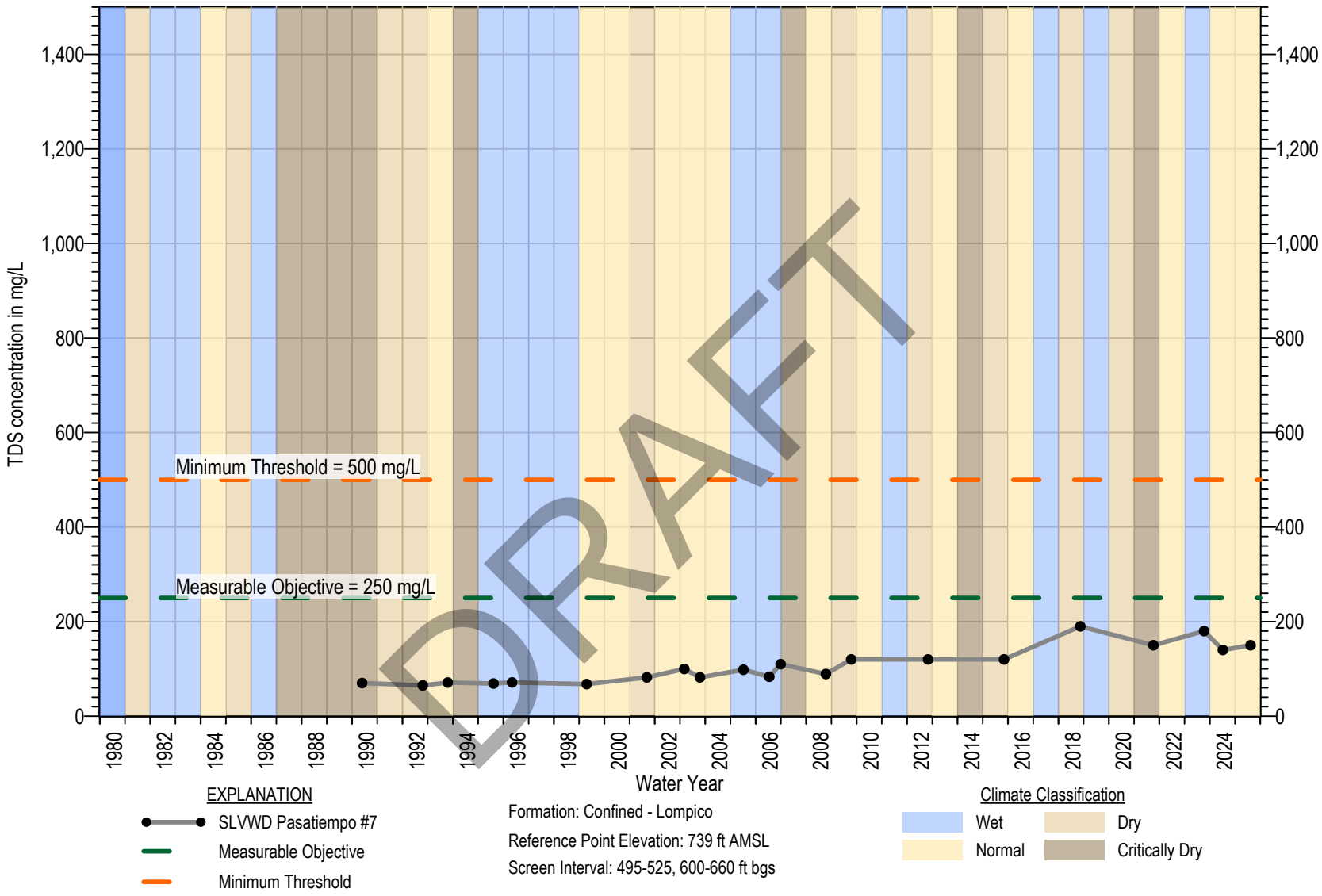


Figure 4E-5. Chemograph of SLVWD Pasatiempo #5A

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DRAFT

Figure 4E-6. Chemograph of SLVWD Pasatiempo #7

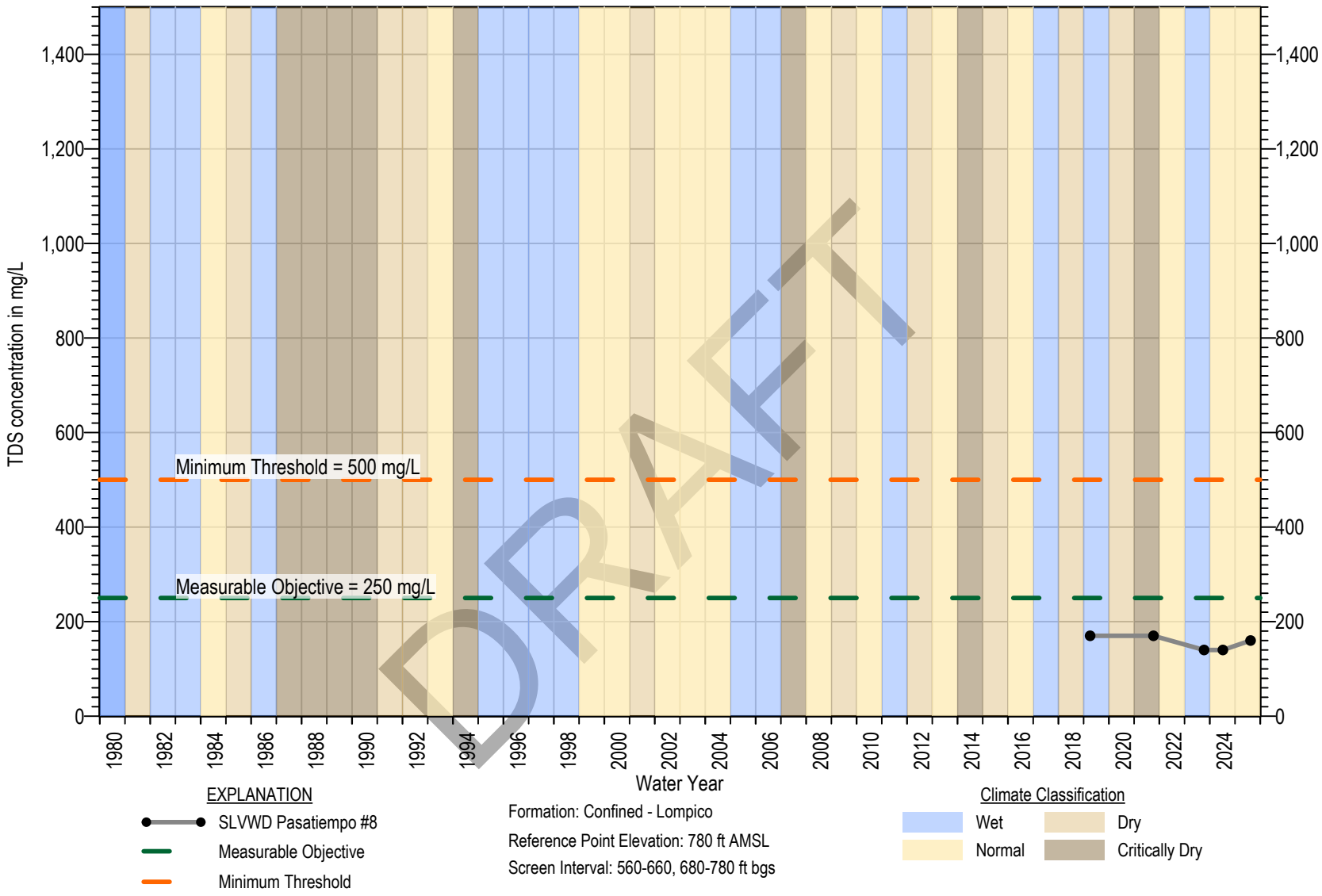


Figure 4E-7. Chemograph of SLVWD Pasatiempo #8

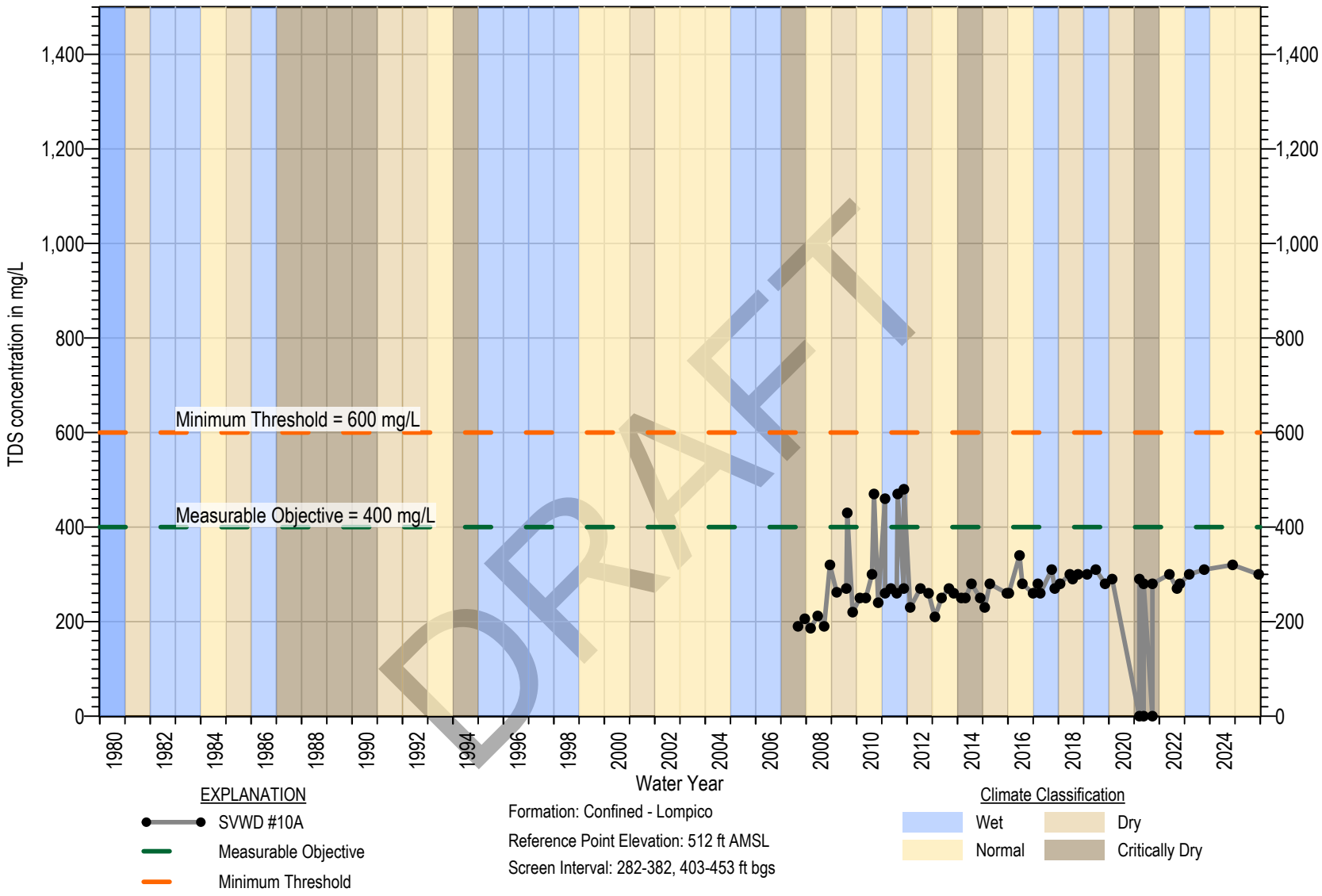


Figure 4E-8. Chemograph of SVWD #10A

MONTGOMERY & ASSOCIATES

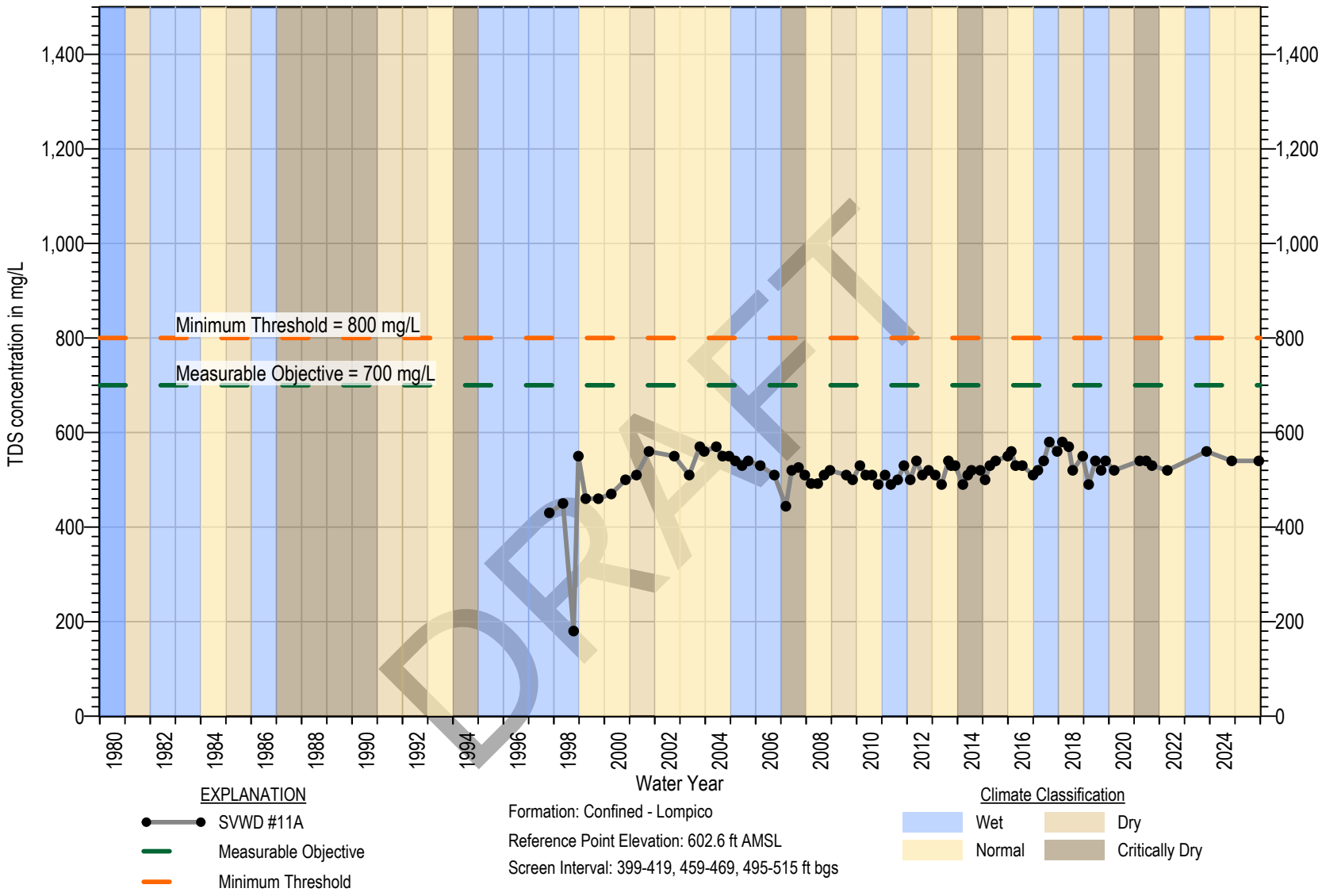


Figure 4E-9. Chemograph of SVWD #11A

MONTGOMERY & ASSOCIATES

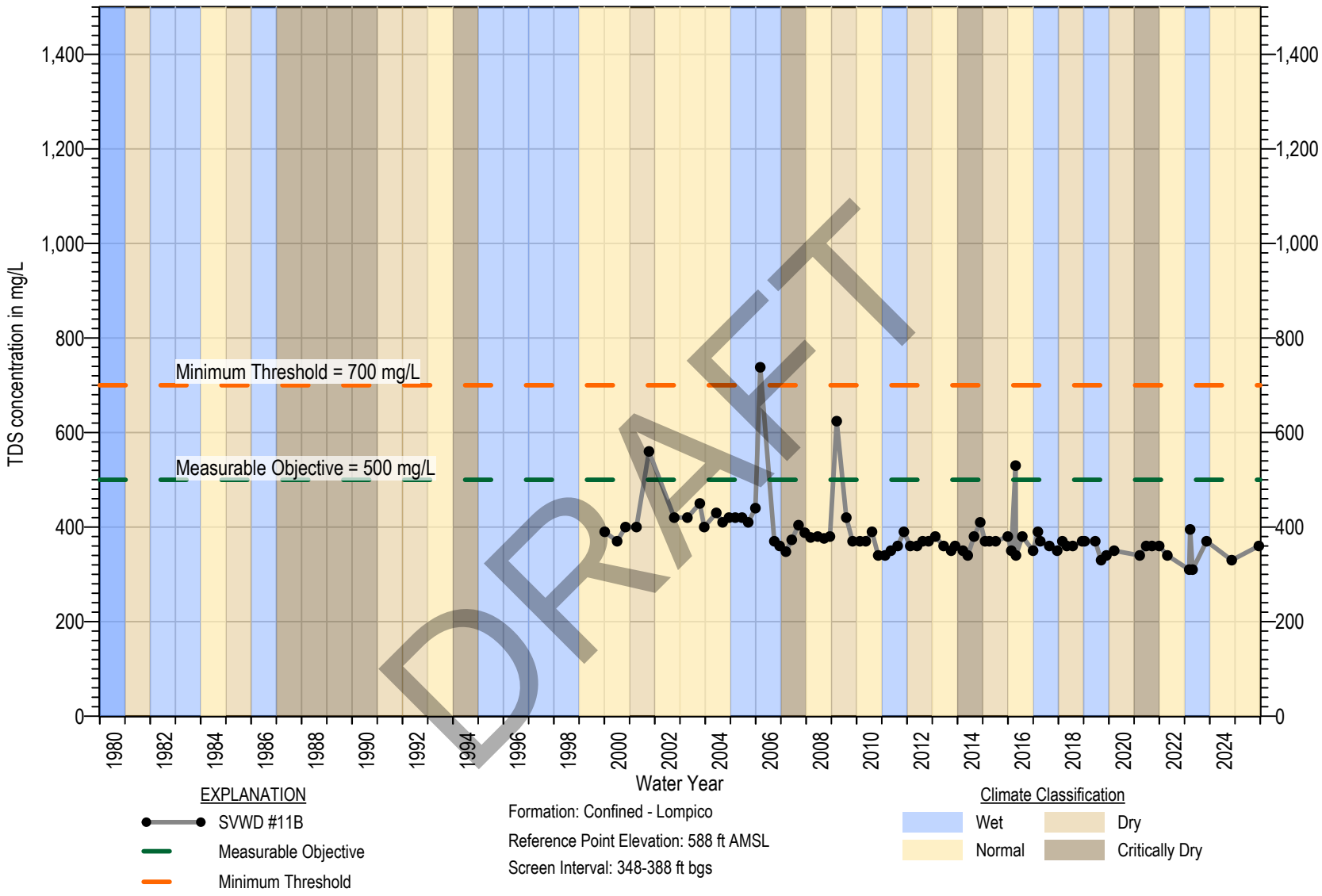


Figure 4E-10. Chemograph of SVWD #11B

MONTGOMERY & ASSOCIATES

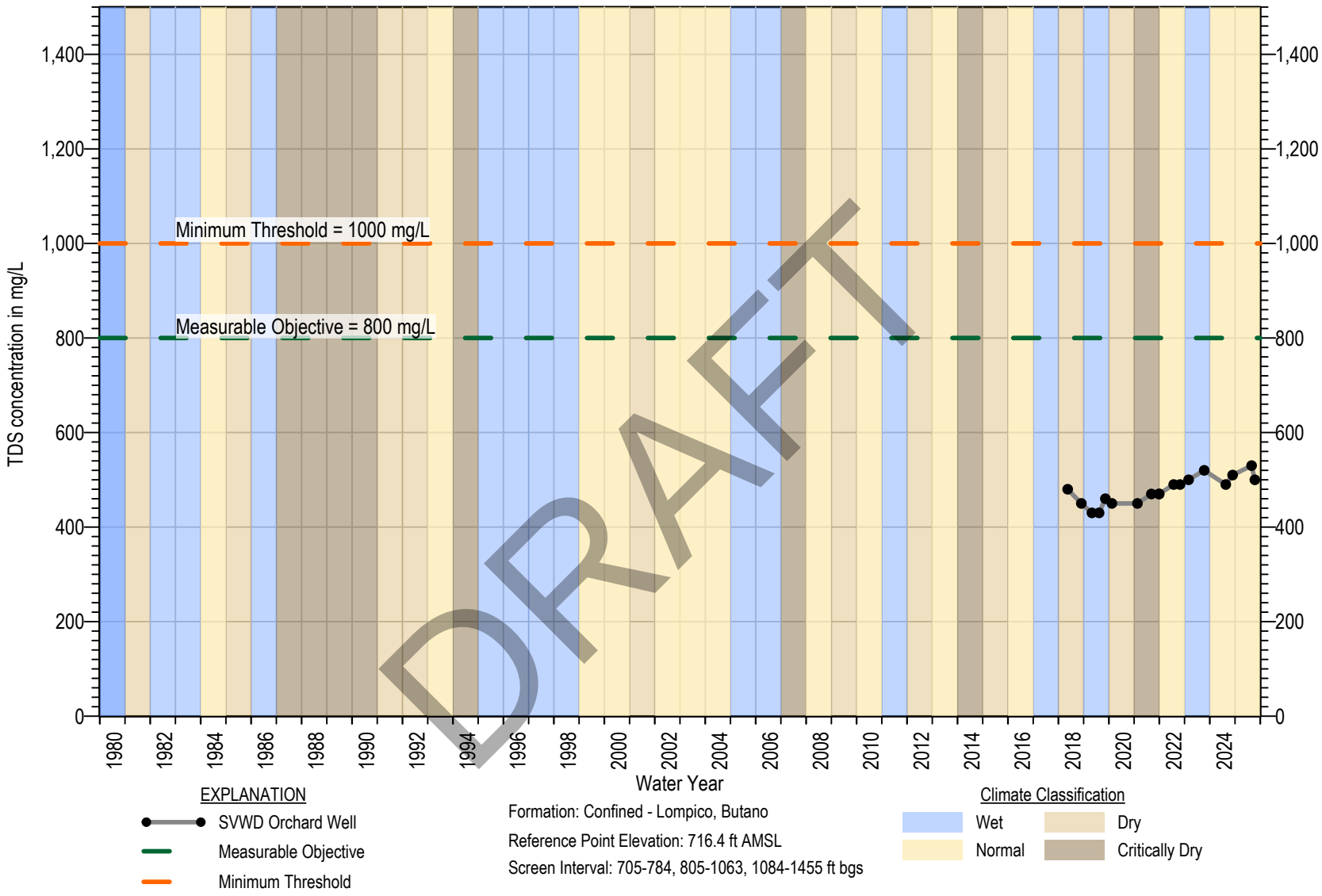


Figure 4E-11. Chemograph of SVWD Orchard Well

MONTGOMERY & ASSOCIATES

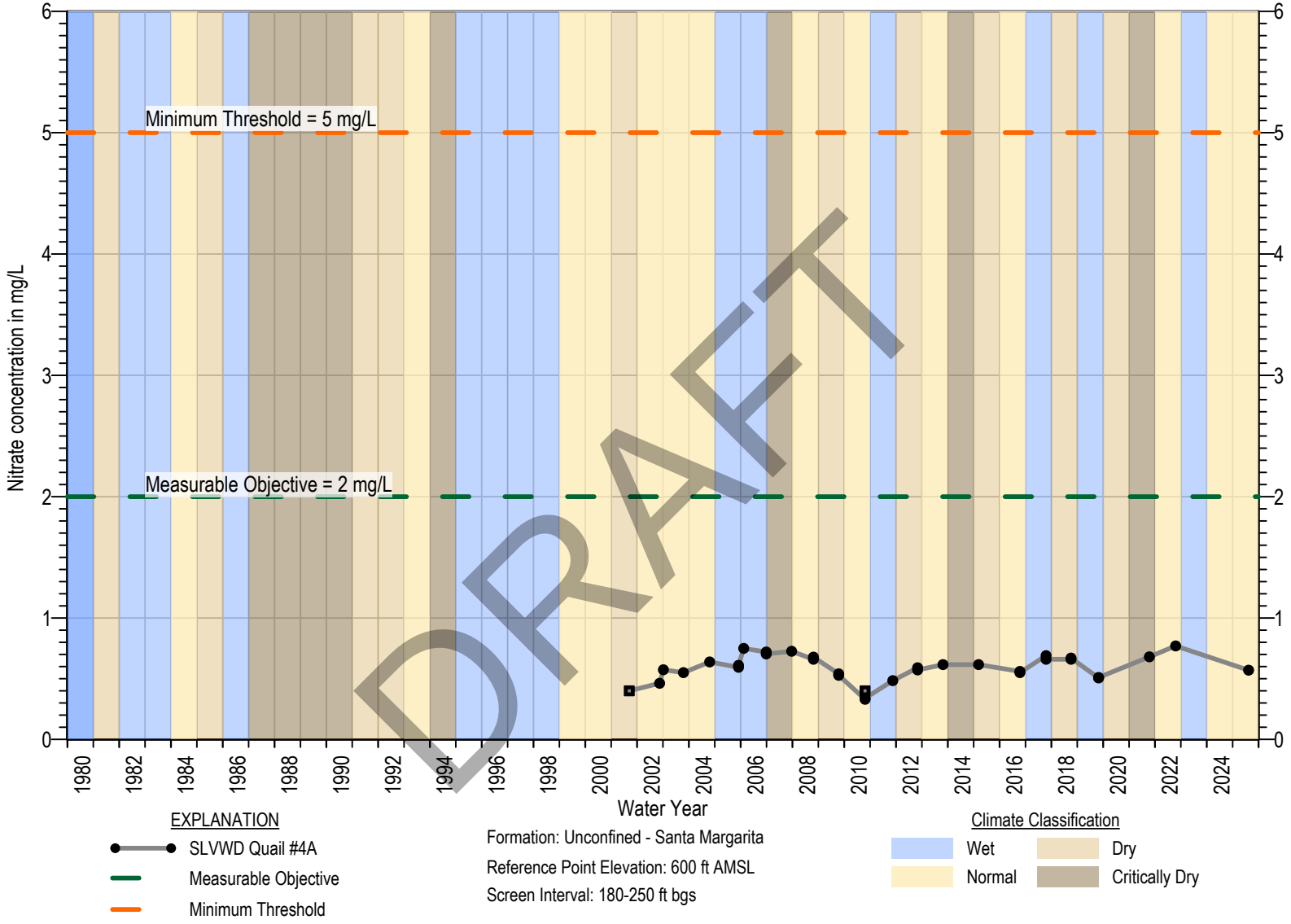


Figure 4E-12. Chemograph of SLVWD Quail #4A

MONTGOMERY & ASSOCIATES

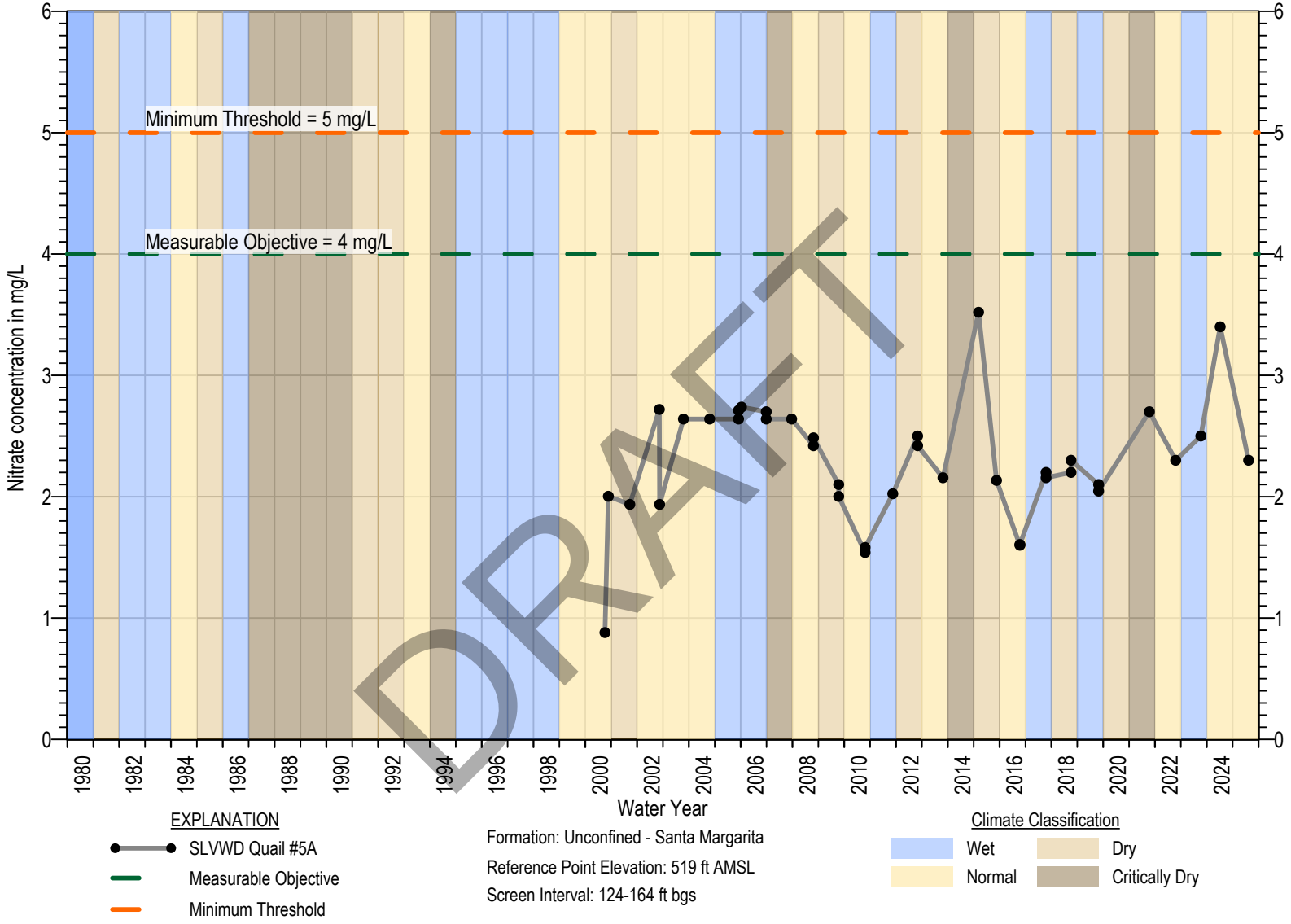
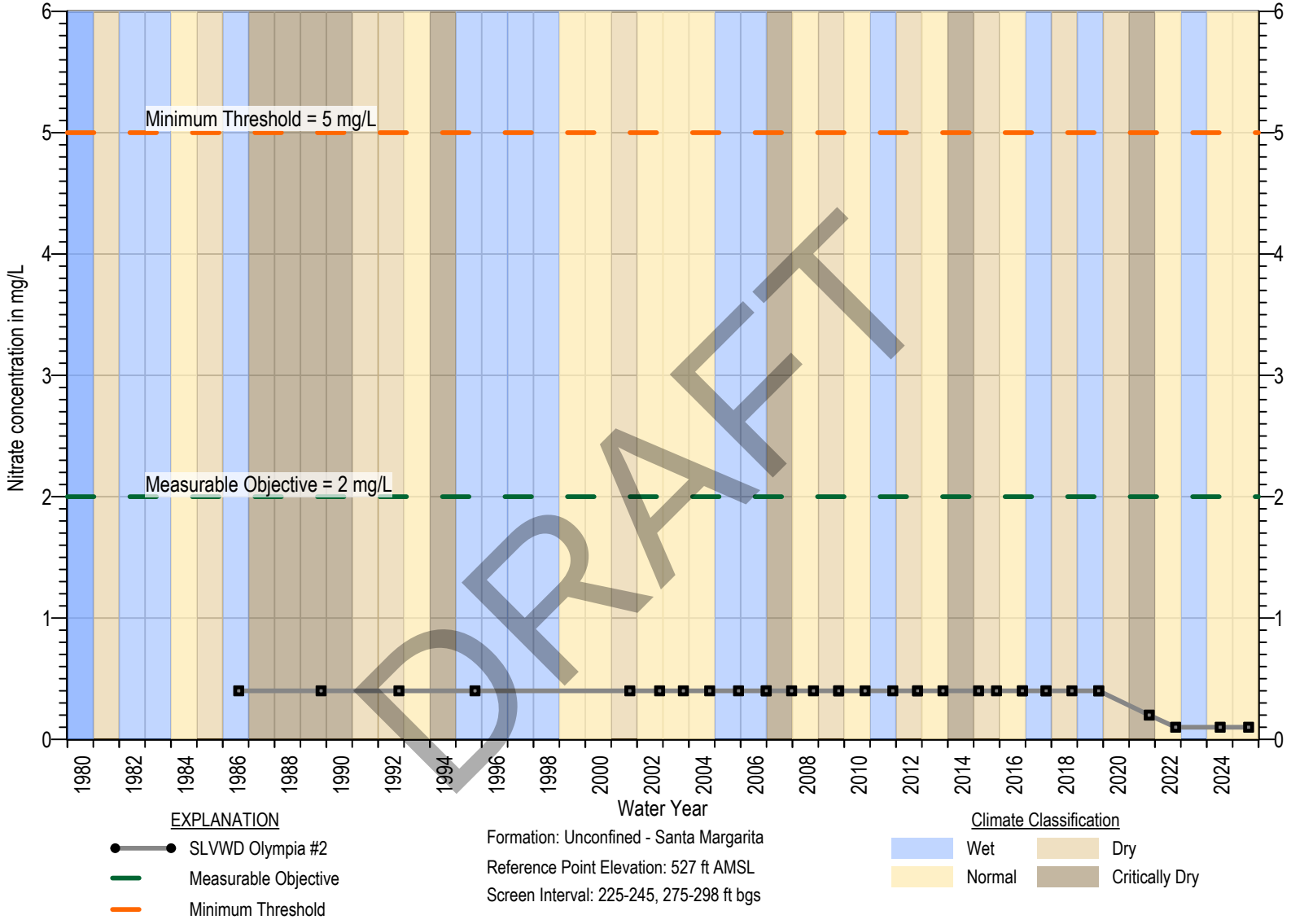


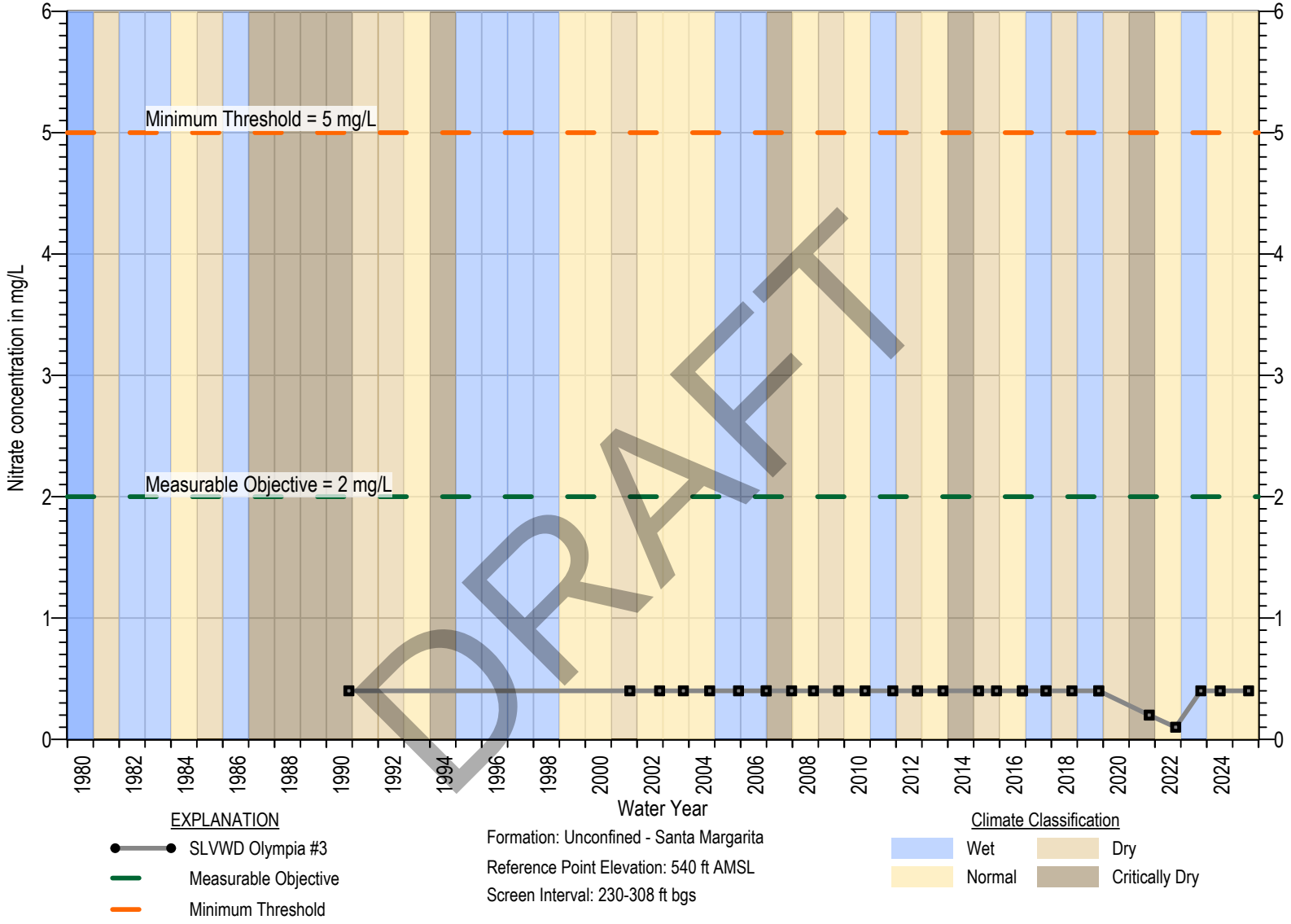
Figure 4E-13 Chemograph of SLVWD Quail #5A

MONTGOMERY & ASSOCIATES



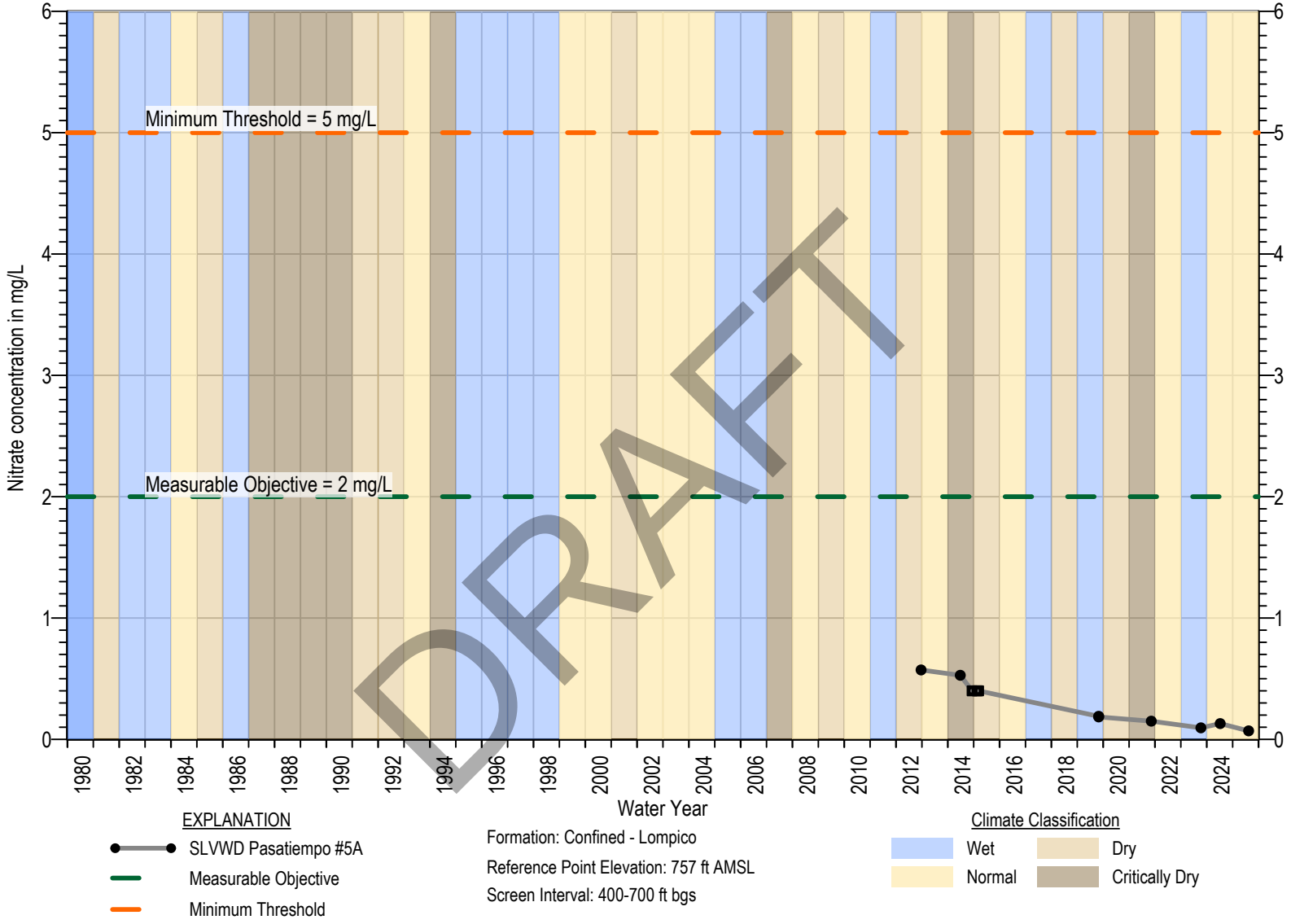
DRAFT

Figure 4E-14. Chemograph of SLVWD Olympia #2



DRAFT

Figure 4E-15. Chemograph of SLVWD Olympia #3



DRAFT

Figure 4E-16. Chemograph of SLVWD Pasatiempo #5A

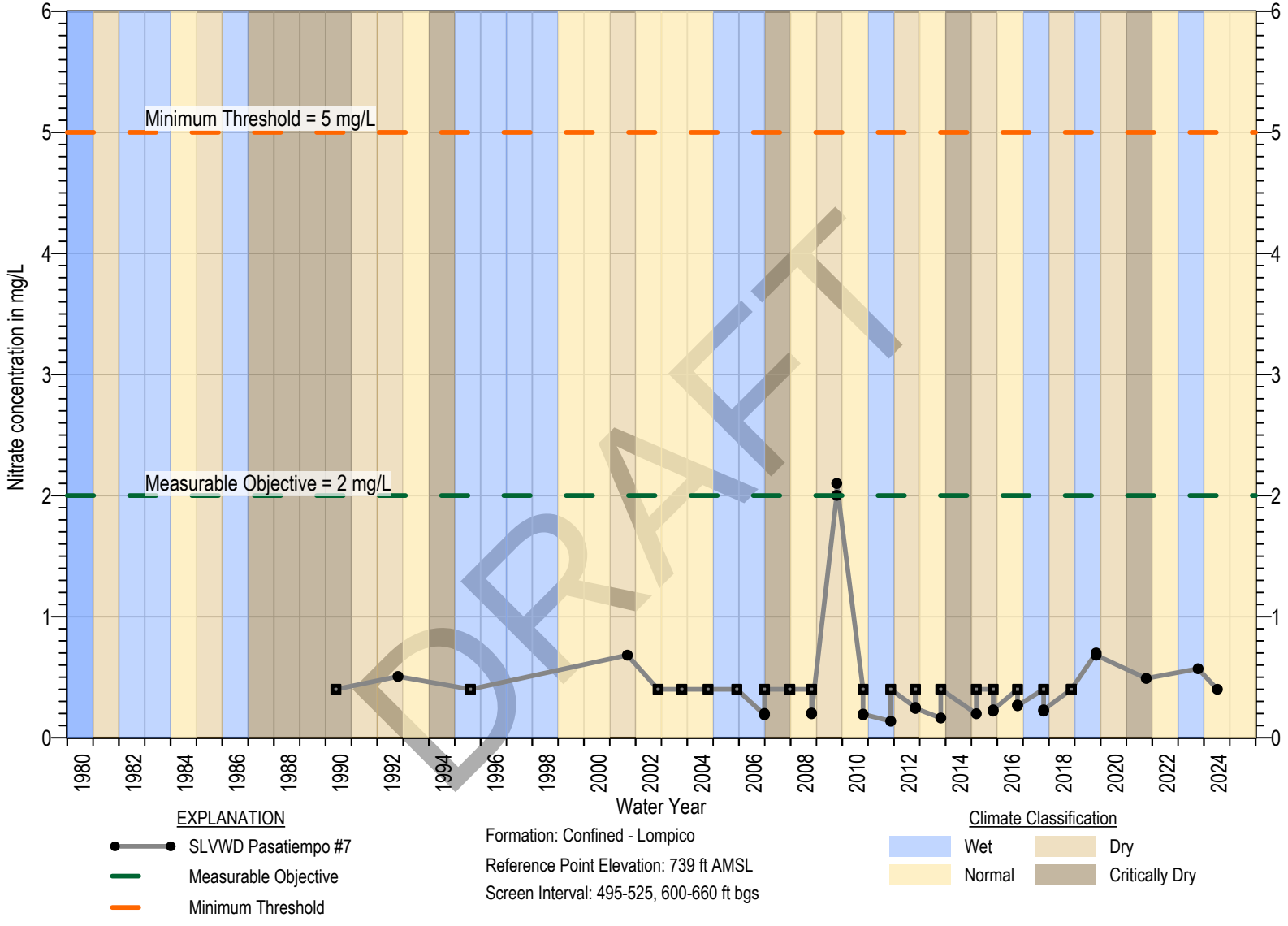


Figure 4E-17. Chemograph of SLVWD Pasatiempo #7

MONTGOMERY & ASSOCIATES

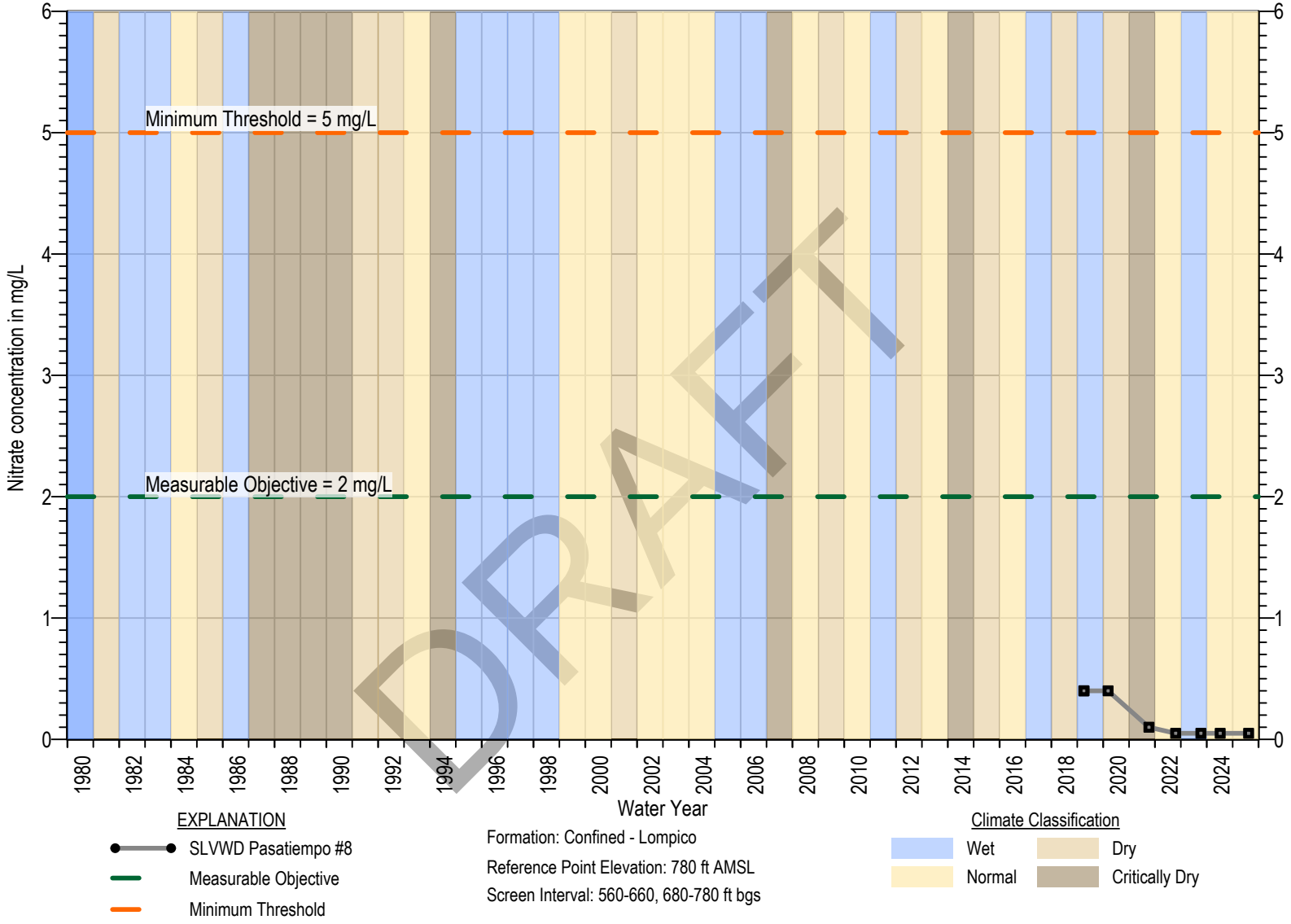


Figure 4E-18. Chemograph of SLVWD Pasatiempo #8

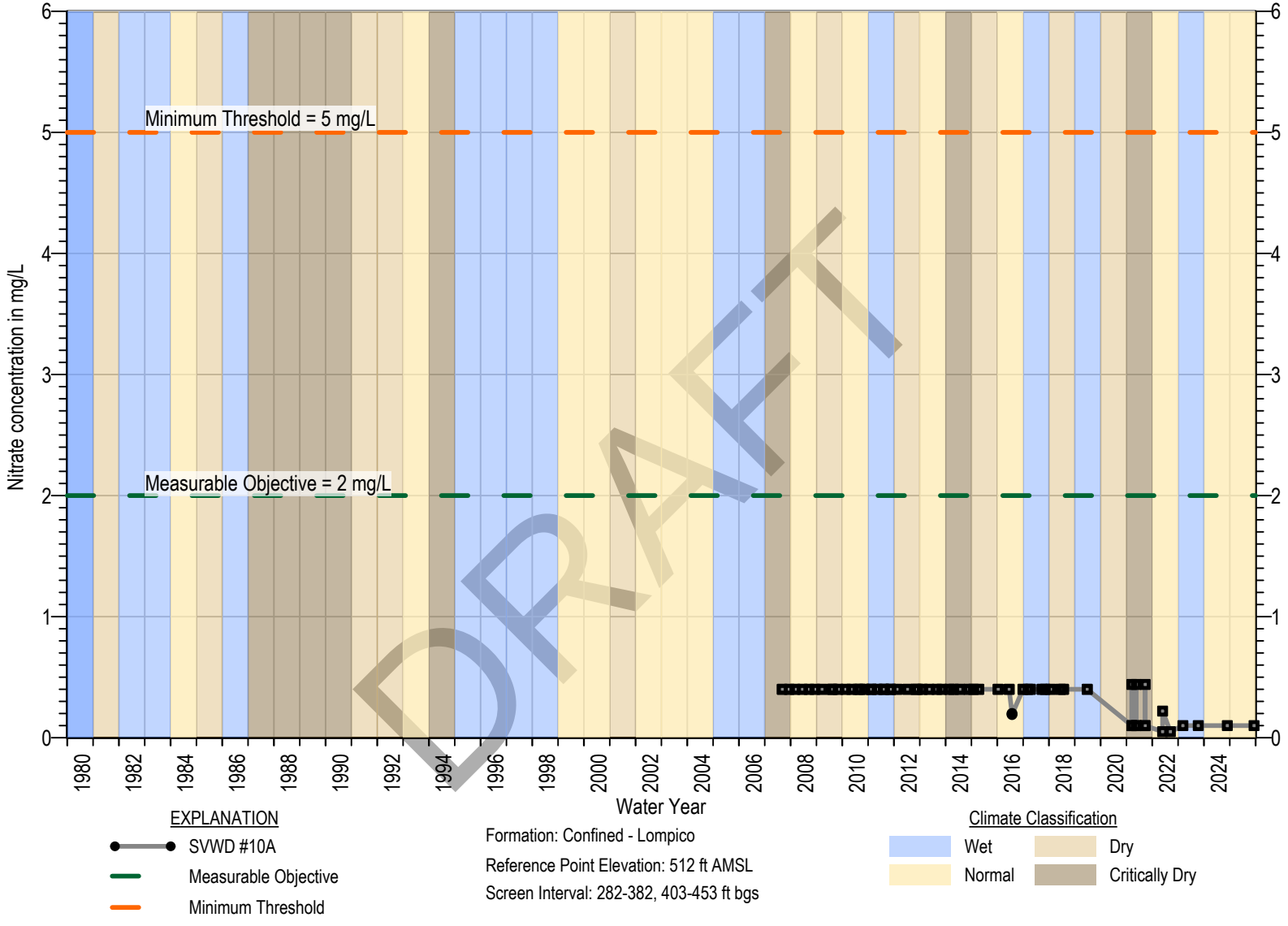


Figure 4E-19. Chemograph of SVWD #10A

MONTGOMERY & ASSOCIATES

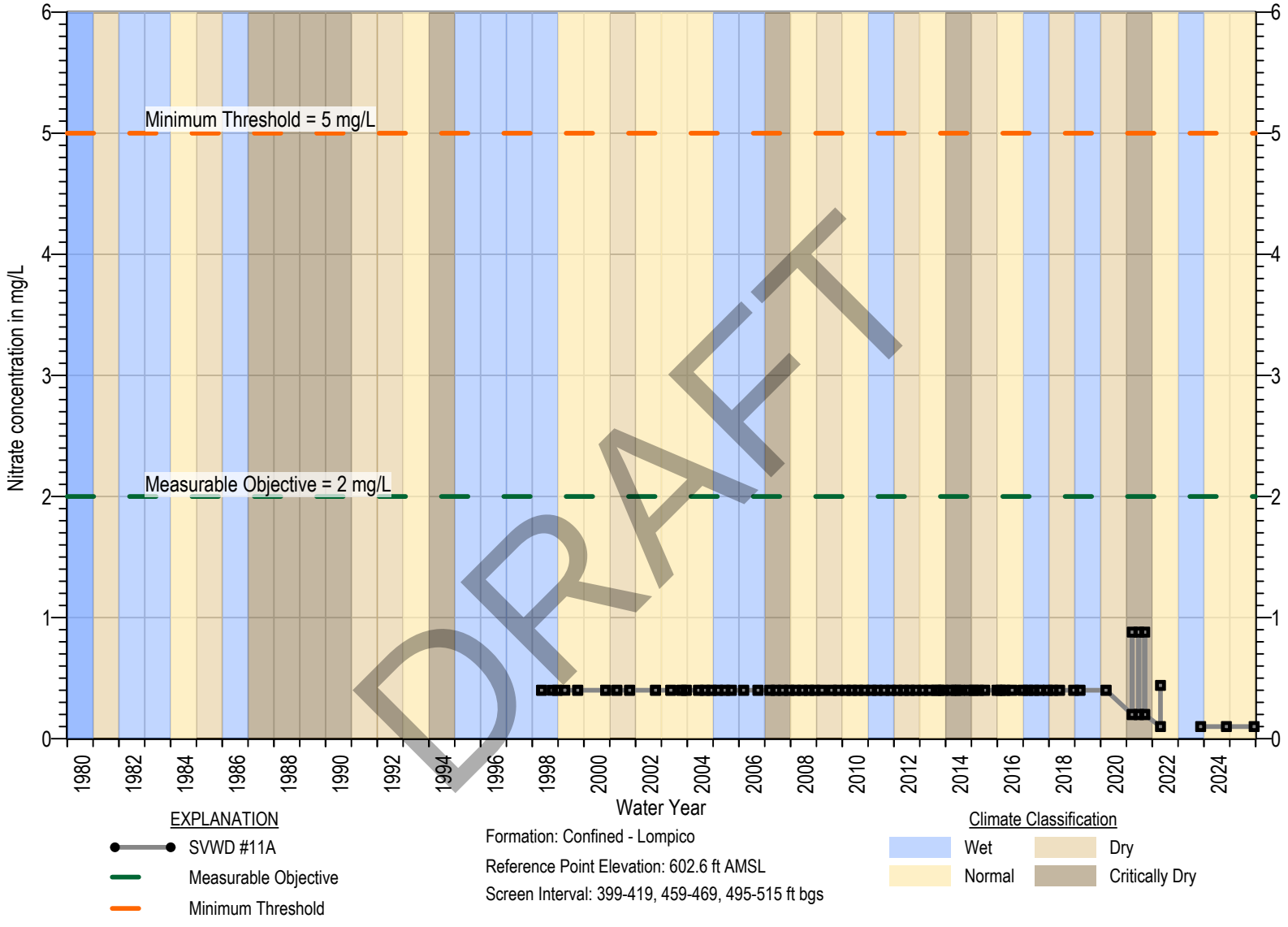
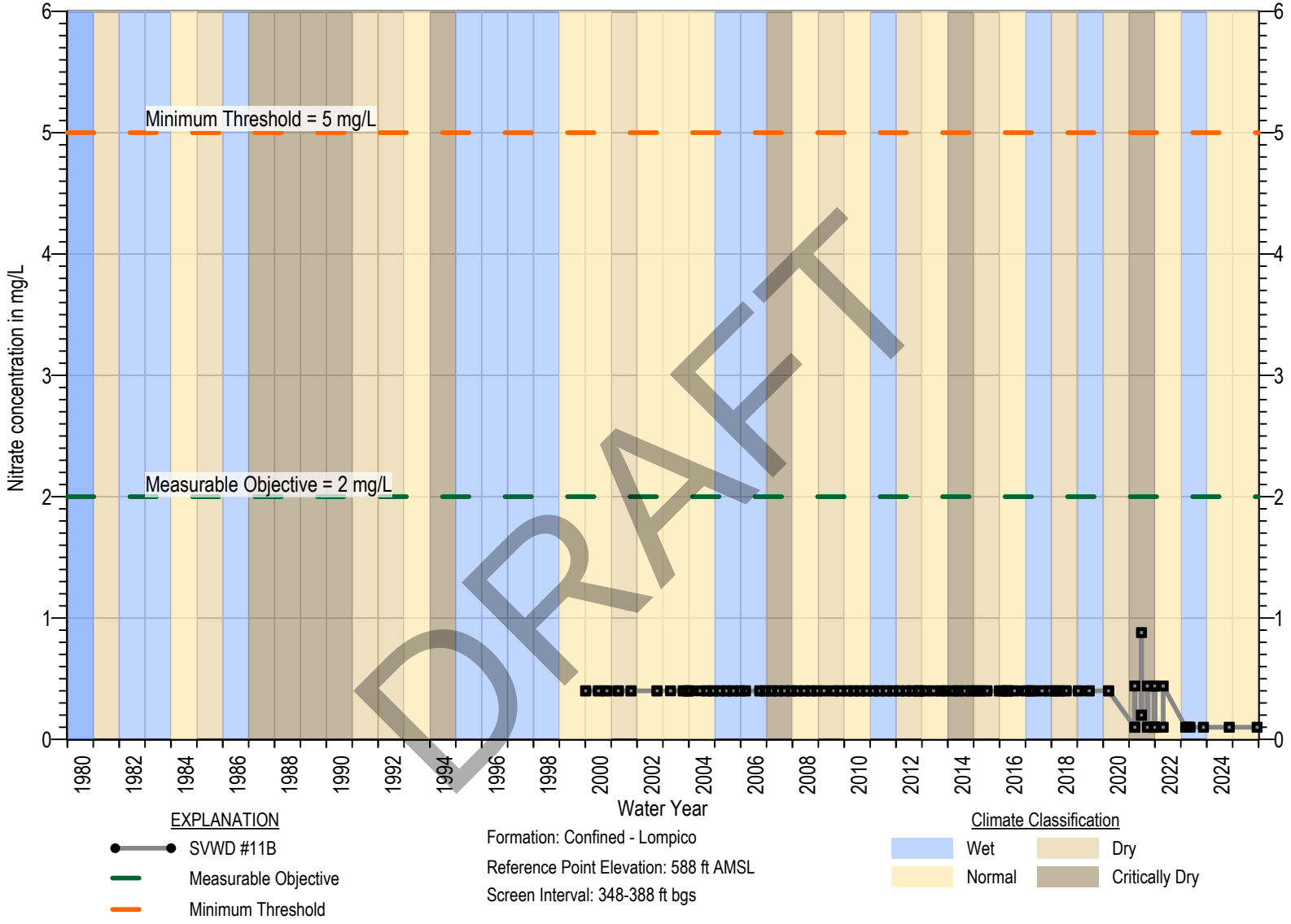


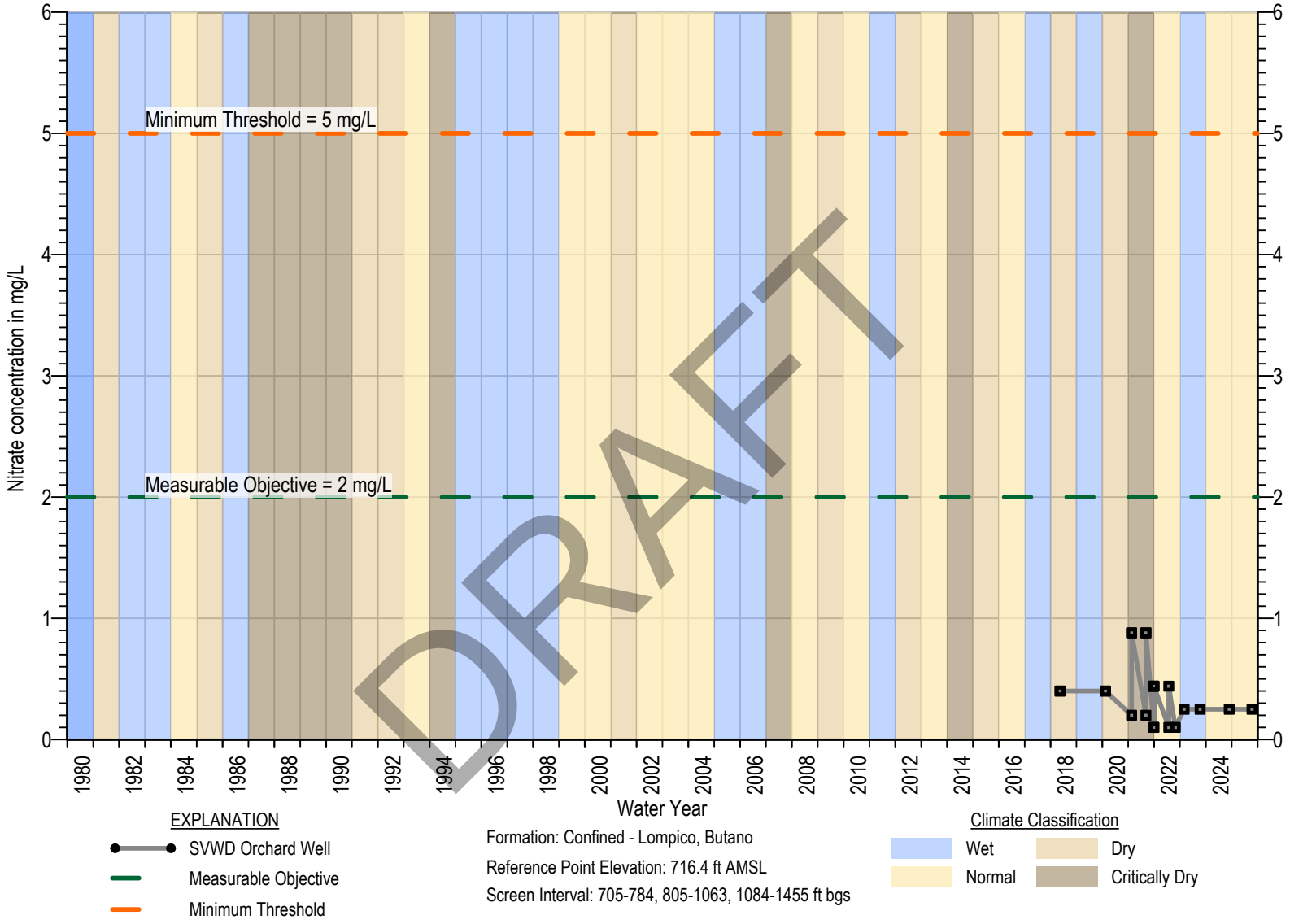
Figure 4E-20. Chemograph of SVWD #11A

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Figure 4E-21. Chemograph of SVWD #11B



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Figure 4E-22. Chemograph of SVWD Orchard Well

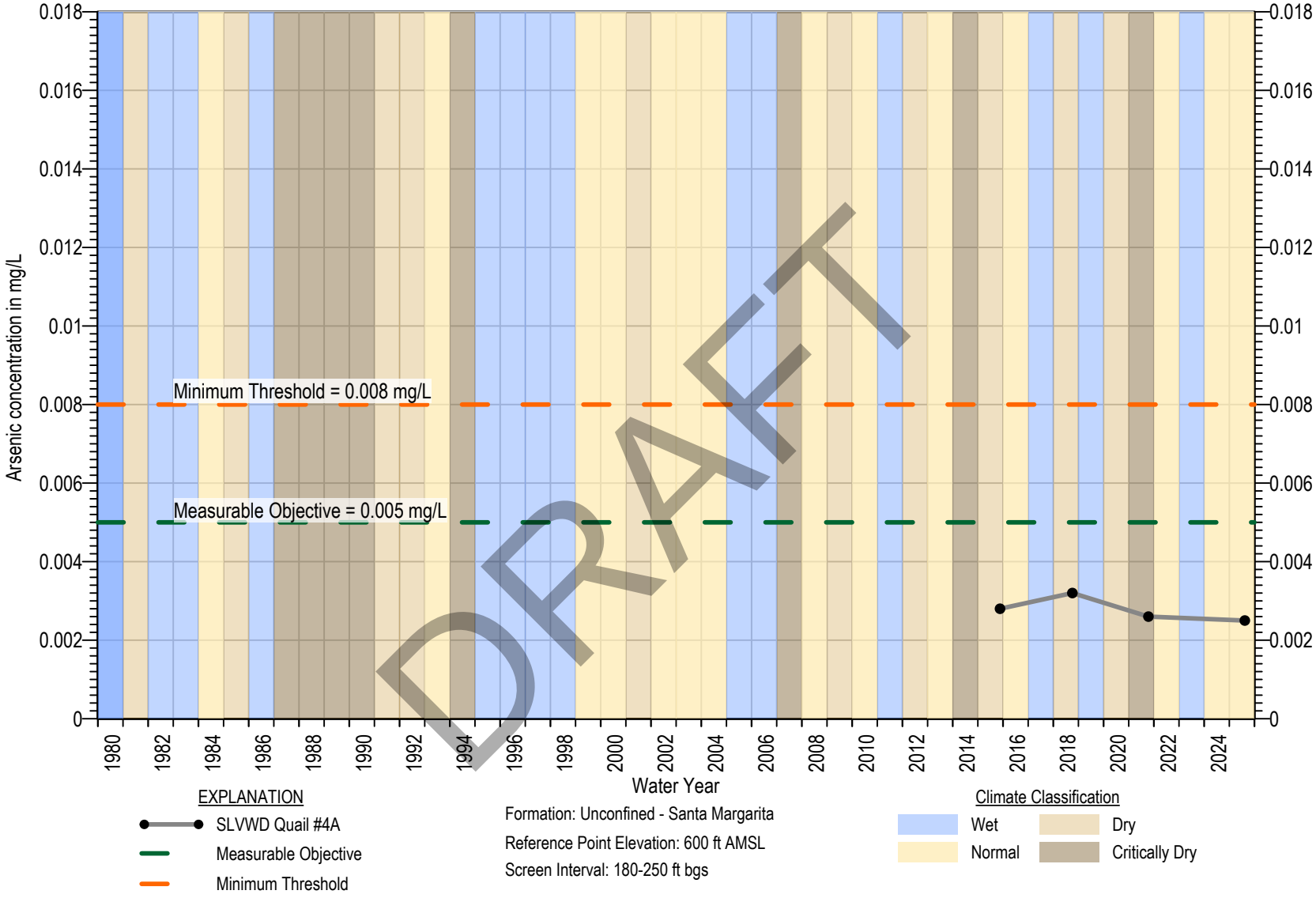


Figure 4E-23. Chemograph of SLVWD Quail #4A

MONTGOMERY & ASSOCIATES

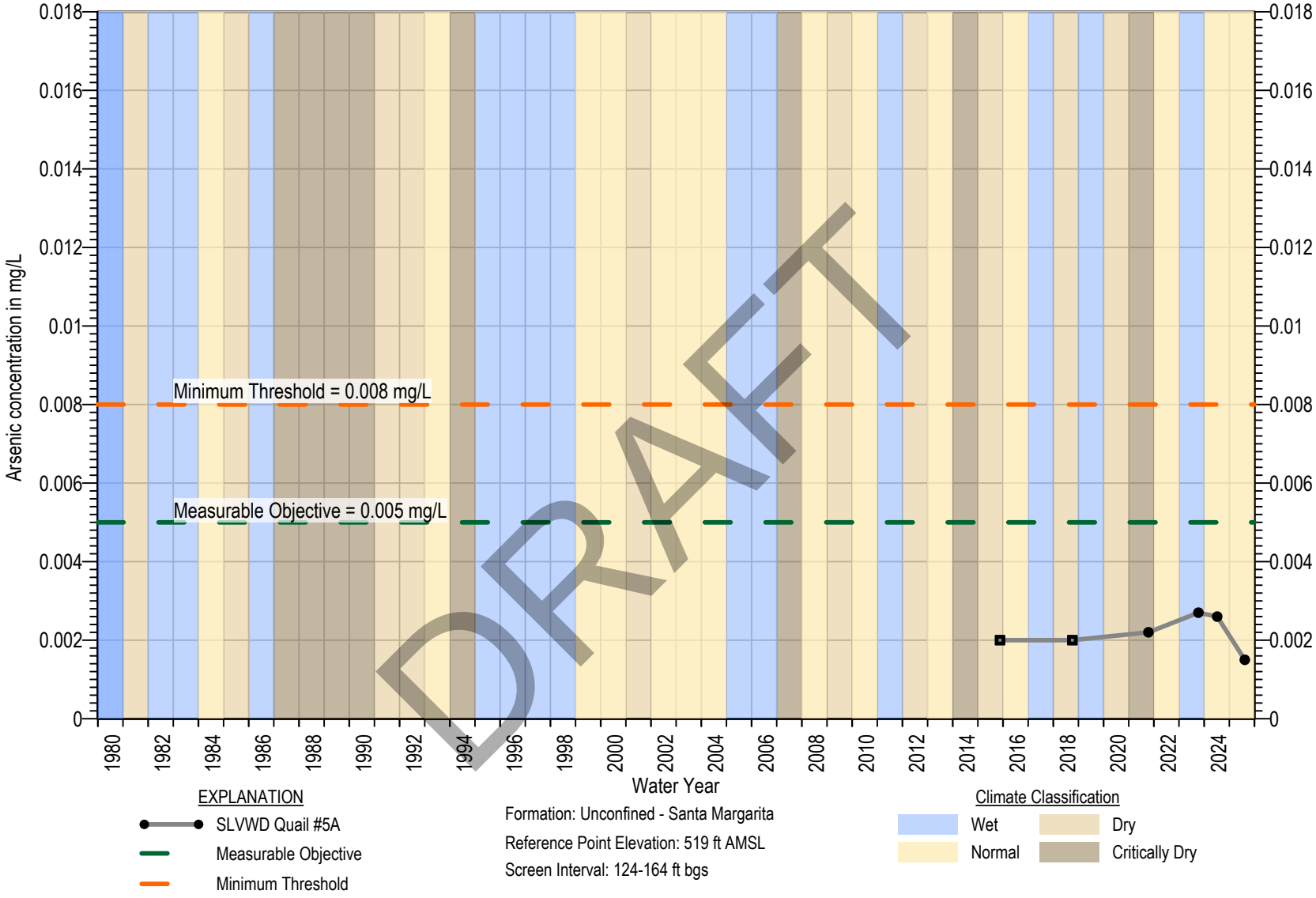
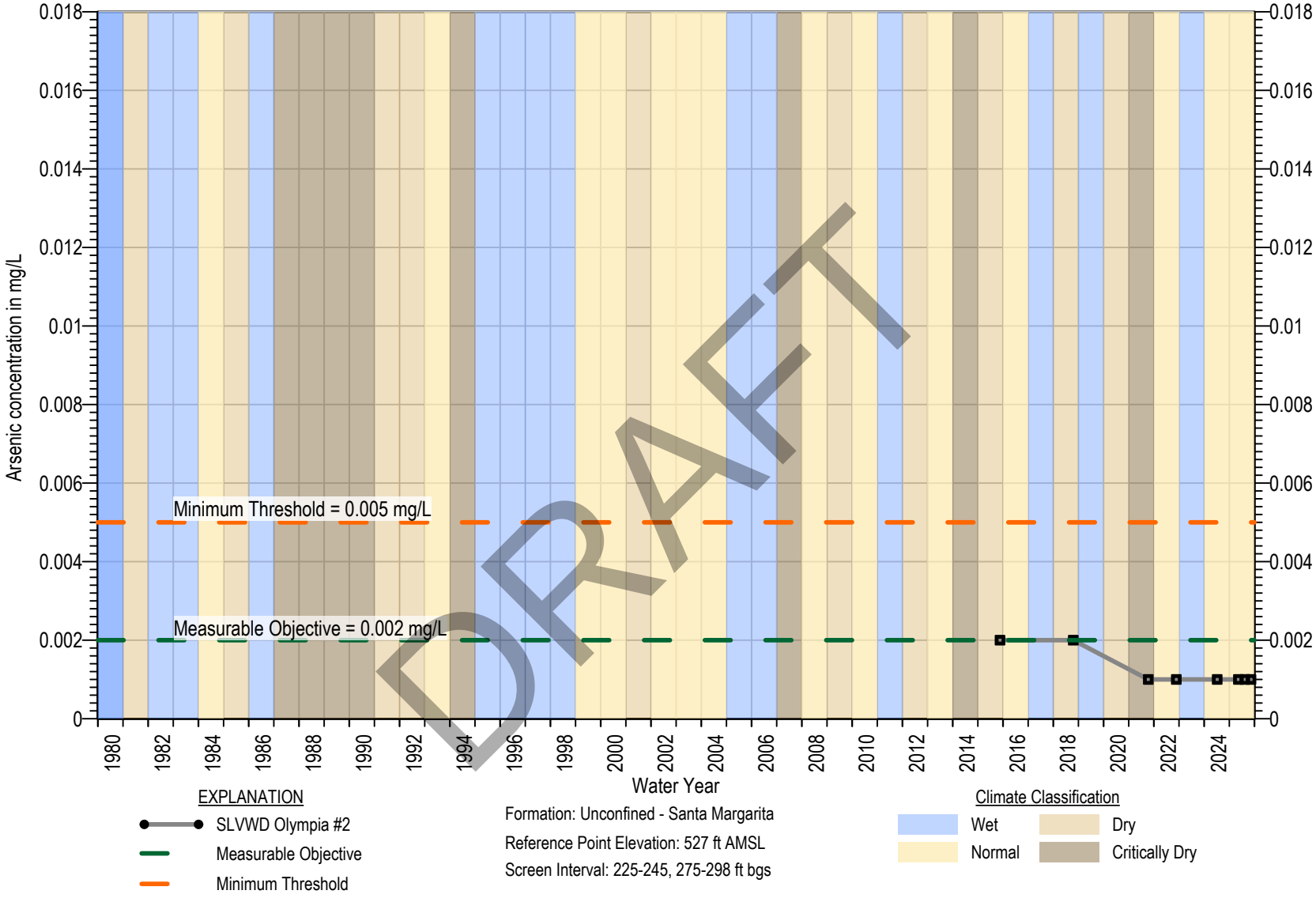


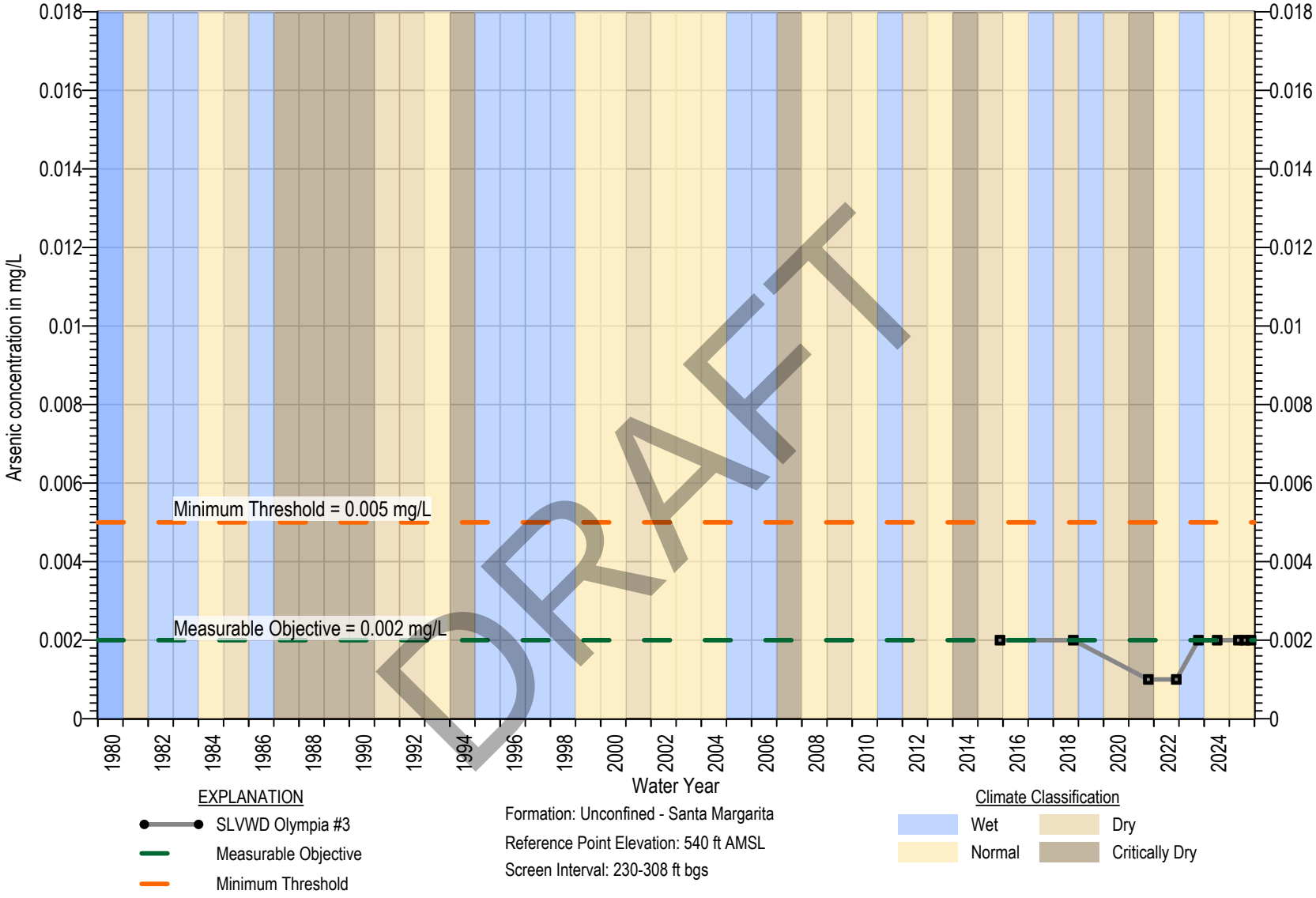
Figure 4E-24. Chemograph of SLVWD Quail #5A

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Figure 4E-25. Chemograph of SLVWD Olympia #2



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Figure 4E-26. Chemograph of SLVWD Olympia #3

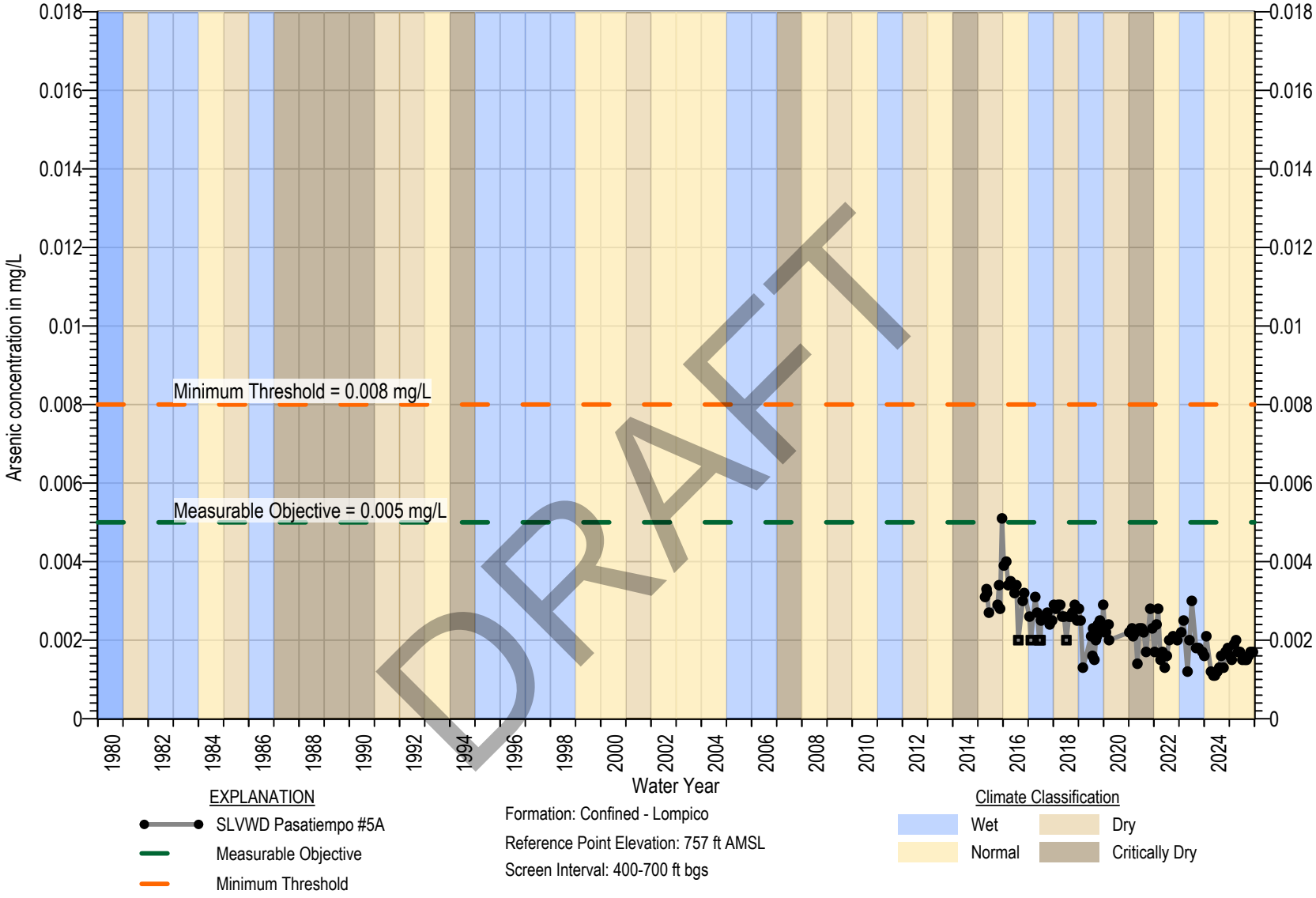


Figure 4E-27. Chemograph of SLVWD Pasatiempo #5A

MONTGOMERY & ASSOCIATES

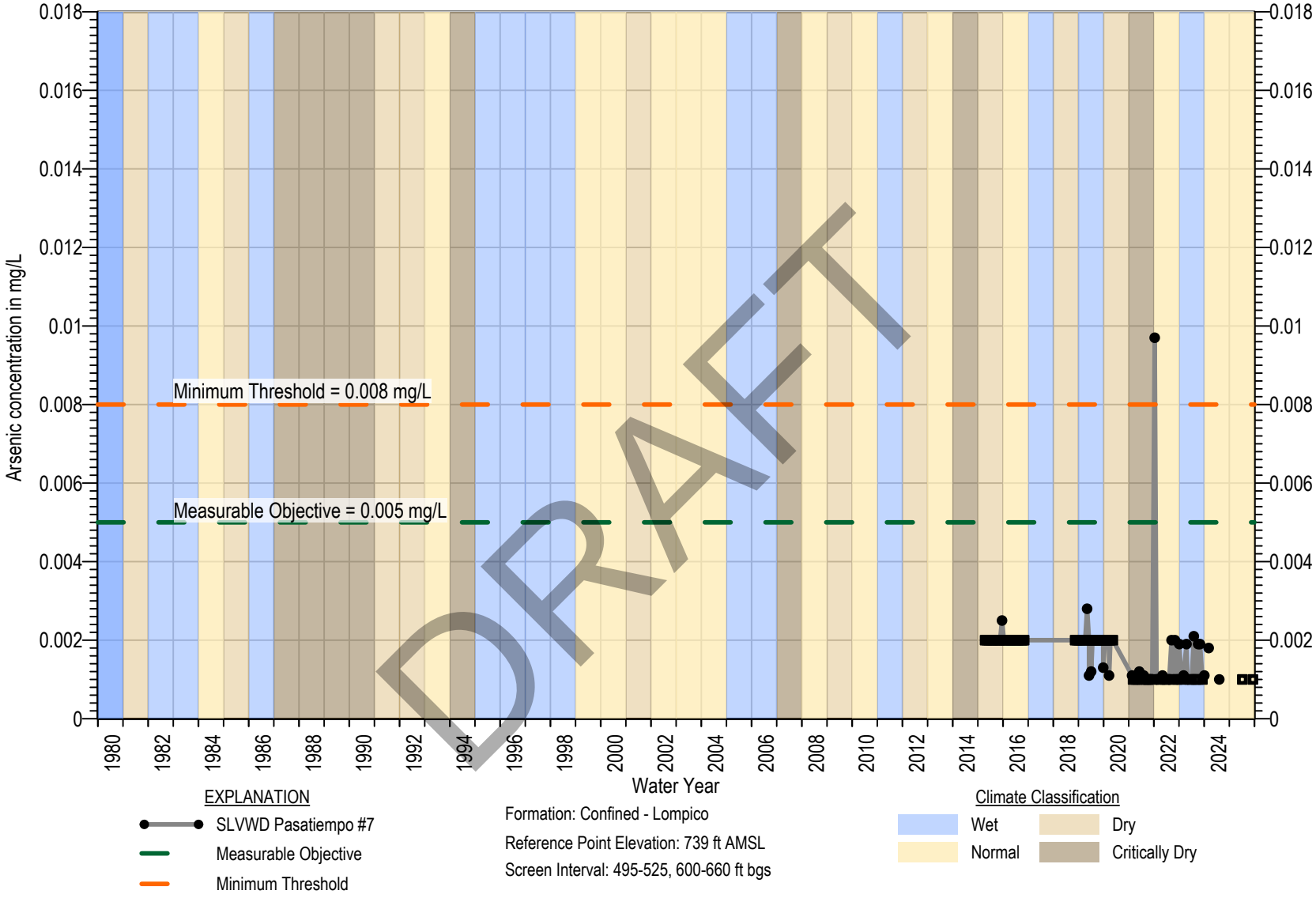


Figure 4E-28. Chemograph of SLVWD Pasatiempo #7

MONTGOMERY & ASSOCIATES

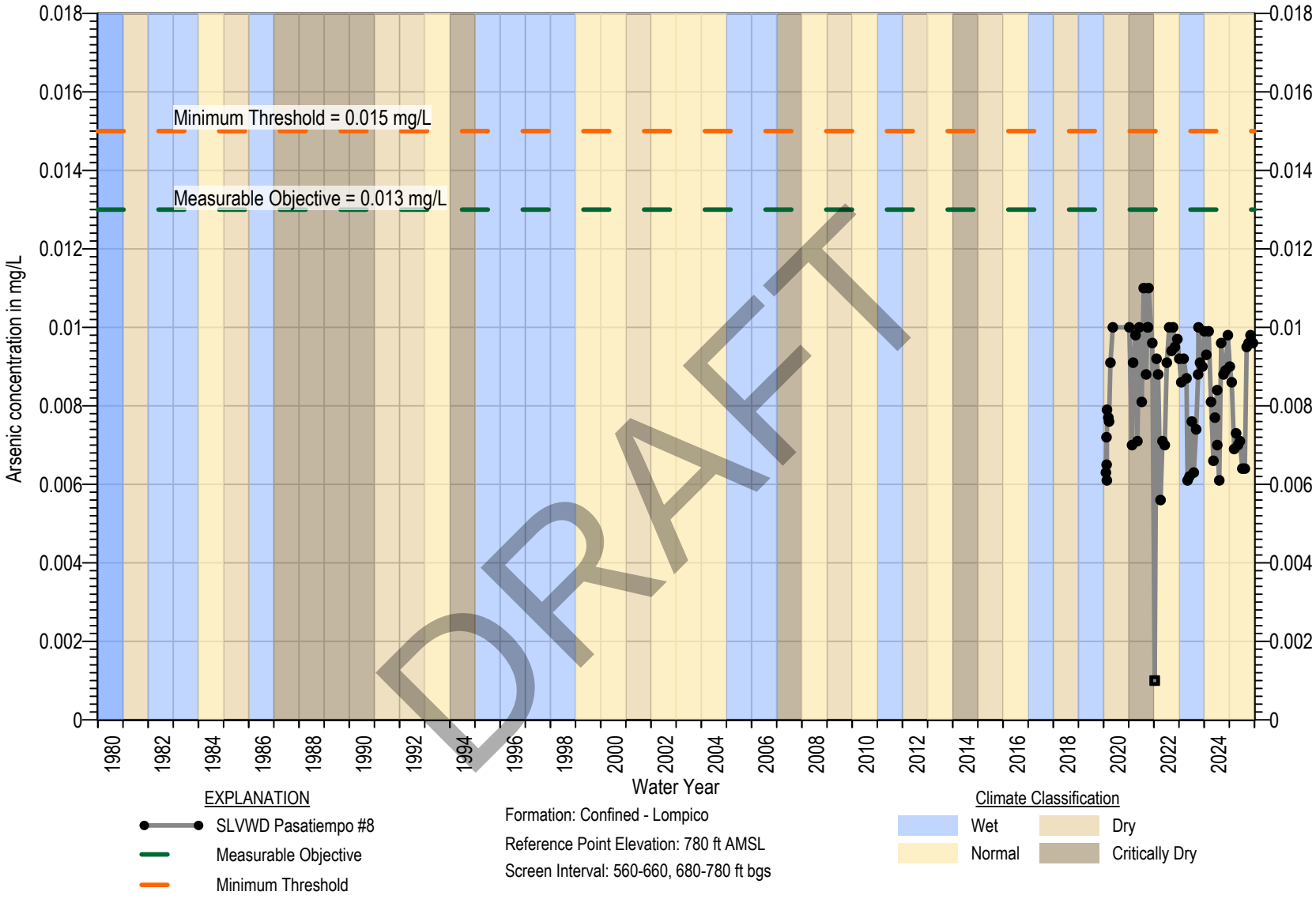


Figure 4E-29. Chemograph of SLVWD Pasatiempo #8

MONTGOMERY & ASSOCIATES

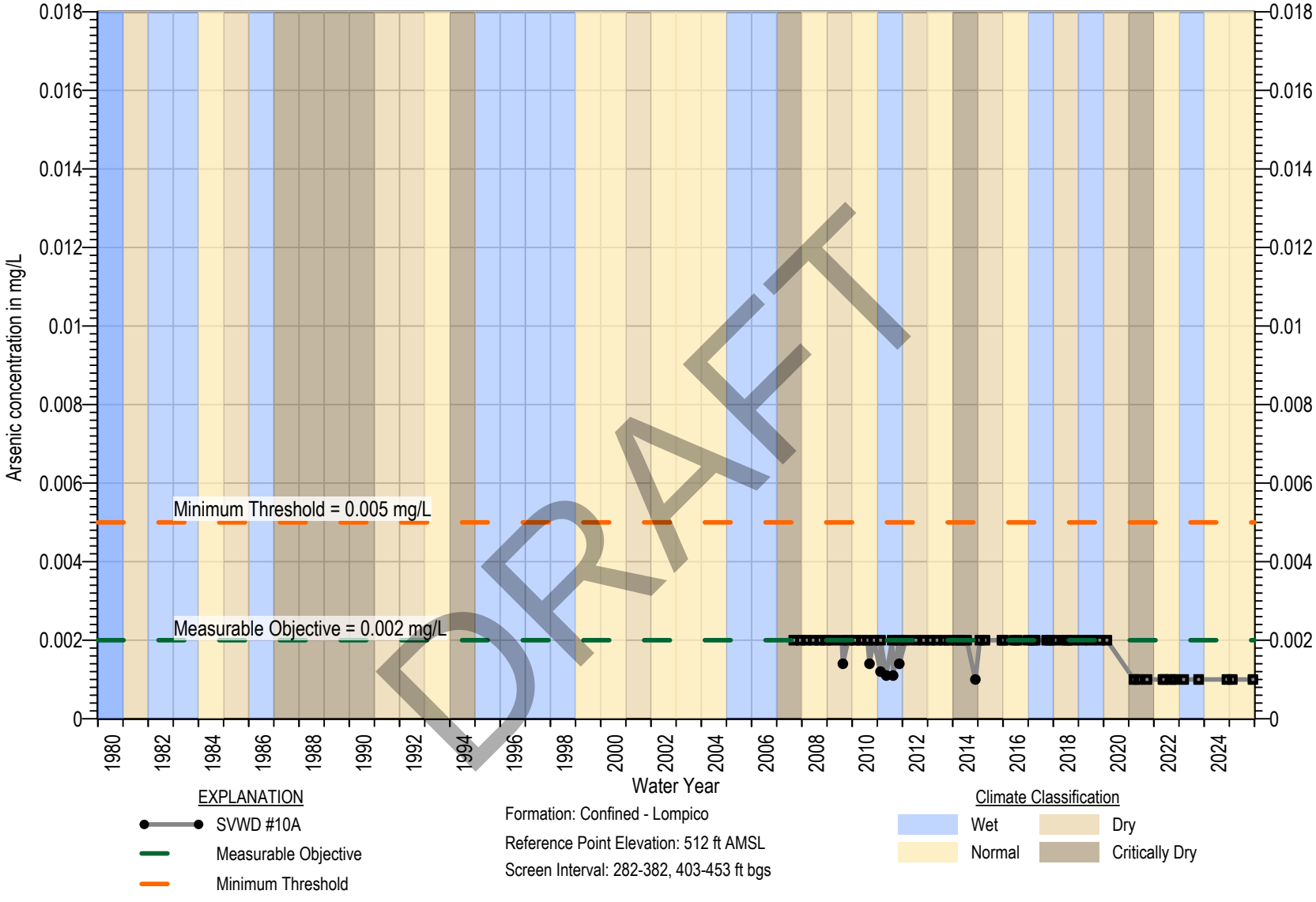


Figure 4E-30. Chemograph of SVWD #10A

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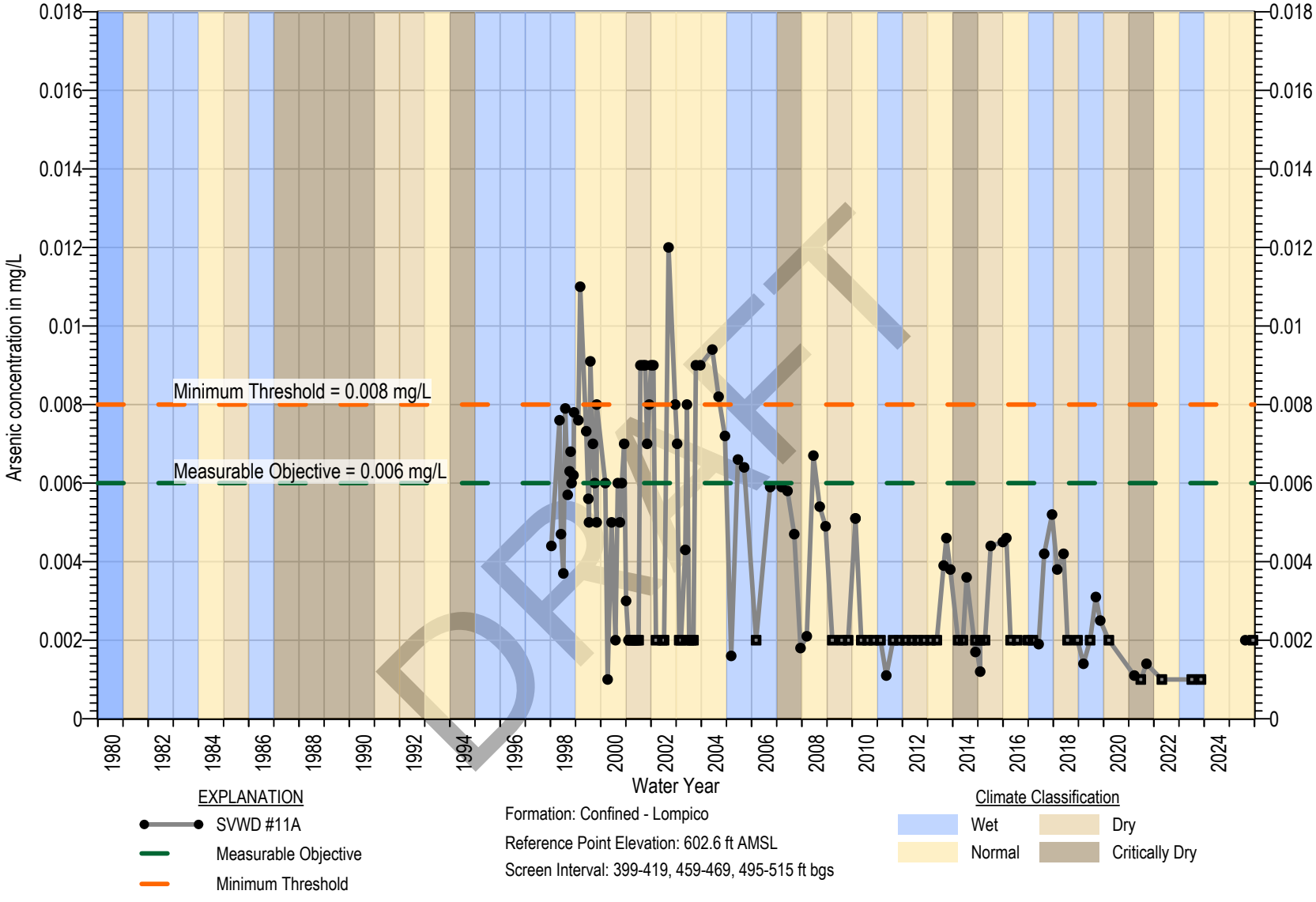


Figure 4E-31. Chemograph of SVWD #11A

MONTGOMERY & ASSOCIATES

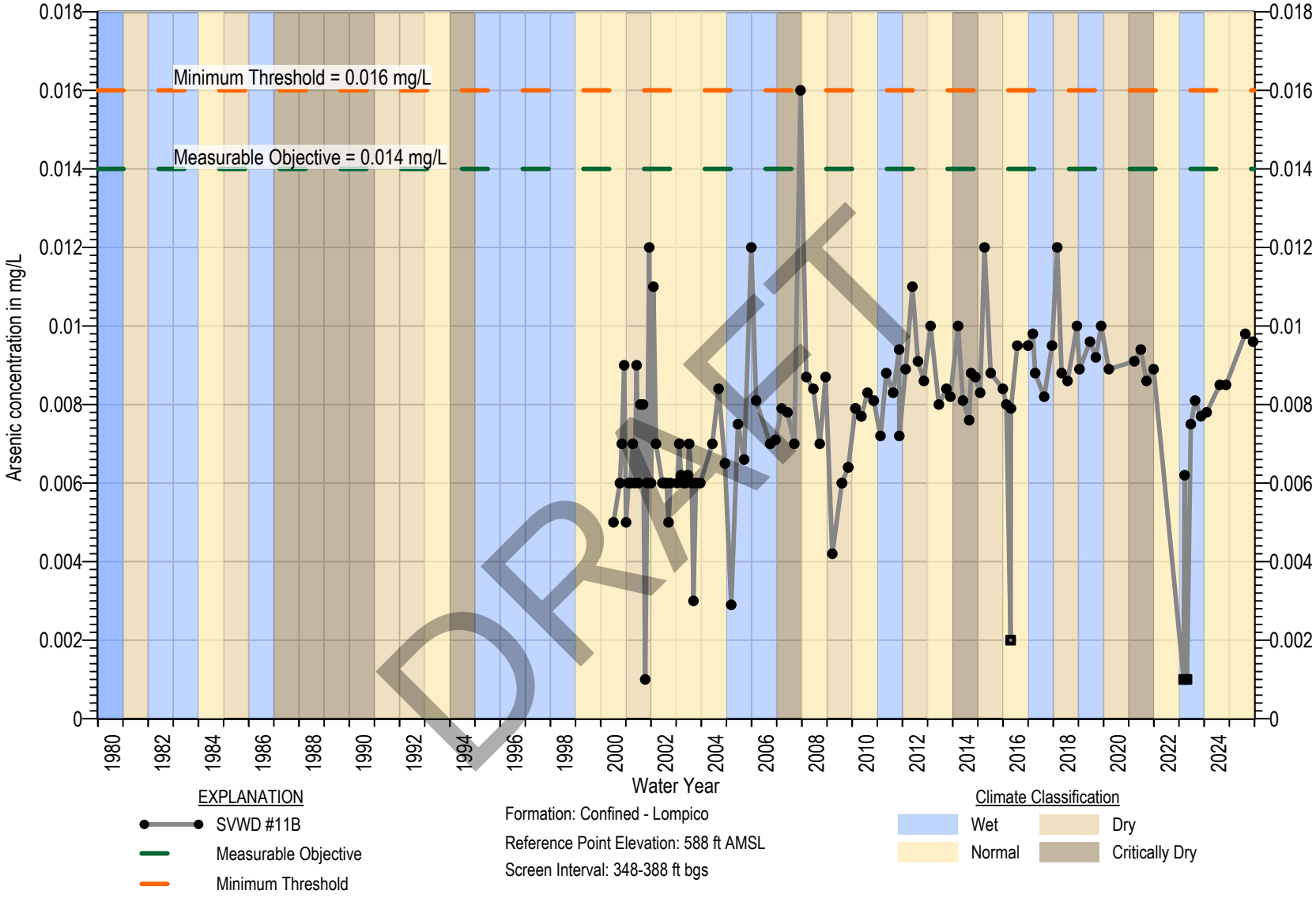
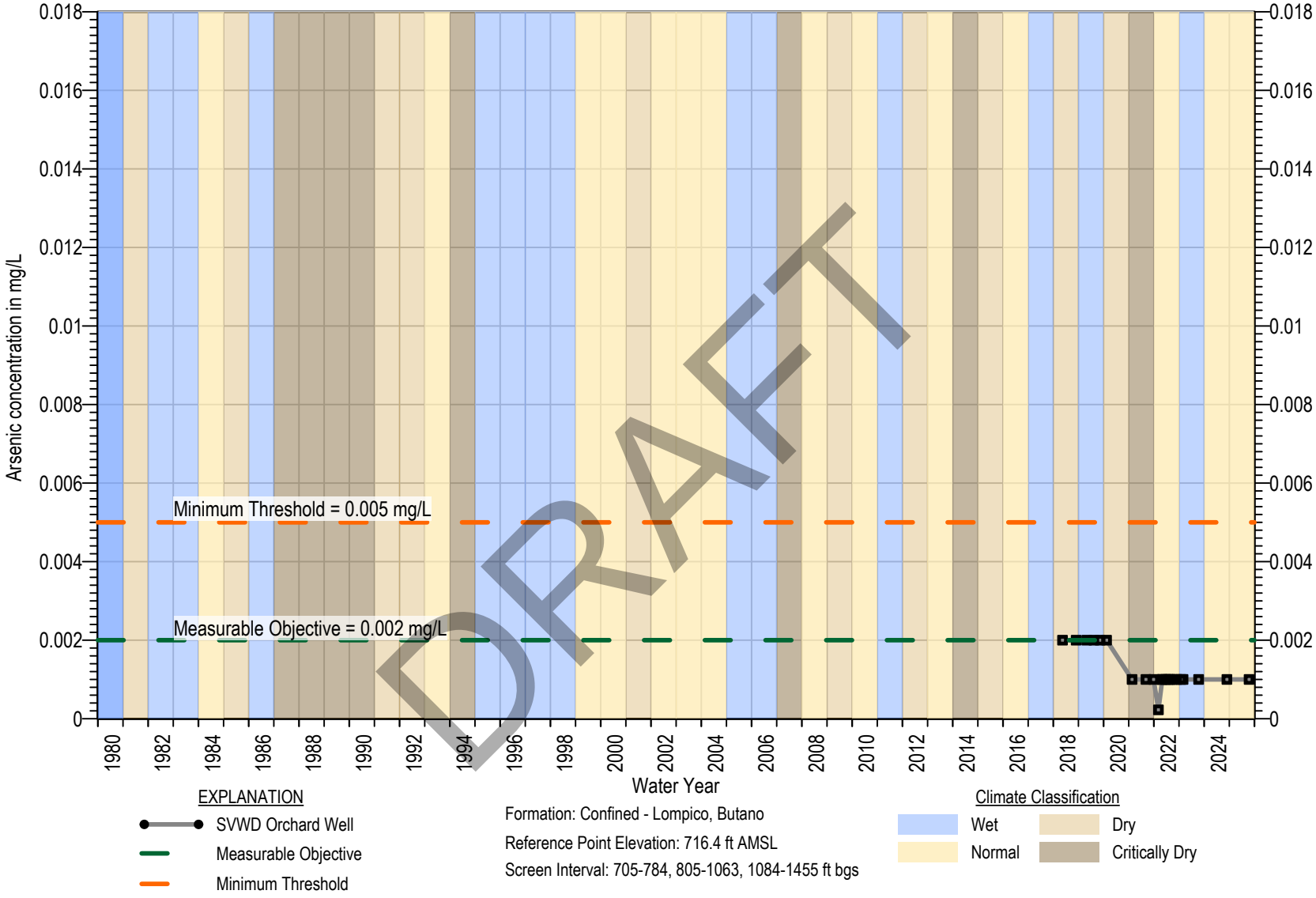


Figure 4E-32. Chemograph of SVWD #11B

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Figure 4E-33. Chemograph of SVWD Orchard Well

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Appendix 6A

Dynamic Spinner Logs for SVWD Sucinto and Grace Way Wells

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PACIFIC SURVEYS

1 11/16" SPINNER SPINNER ANALYSIS FLUID VELOCITY PUMPING CONDITIONS

Job No. 32193

File No.

Company: PACIFIC COAST WELL DRILLING

Well: SVWD GRACE WAY WELL

Field: SCOTTS VALLEY

County: SANTA CRUZ State: CALIFORNIA

Location: 5267 SCOTTS VALLEY DR. GPS: 37.0575 -122.0113

Other Services: STOP COUNTS DOWN RUNS

Sec. Twp. Rge.

Permanent Datum: G.L. Elevation

Log Measured From: G.L. 0' above perm. datum

Drilling Measured From: G.L.

Elevation: K.B. D.F. G.L.

Date	2 MAY, 2025
Run Number	ONE
Depth Driller	960'
Depth Logger	950'
Bottom Logged Interval	950'
Top Log Interval	480'
Time Pumping Prior to Survey	08:00
Pump Set @	540'
Pumping Water Level	325'
Max. Recorded Temp.	78.6 F
Pump Rate (GPM)	650
Time Well Ready	14:30
Time Logger on Bottom	15:30
Equipment Number	PS-7
Location	L.A.
Recorded By	BURGE
Witnessed By	---

Perforation Record

Type	Slot Size	From	To
WIRE WRAP	---	570'	700'
WIRE WRAP	---	720'	950'

Perforation Record

Type	Slot Size	From	To

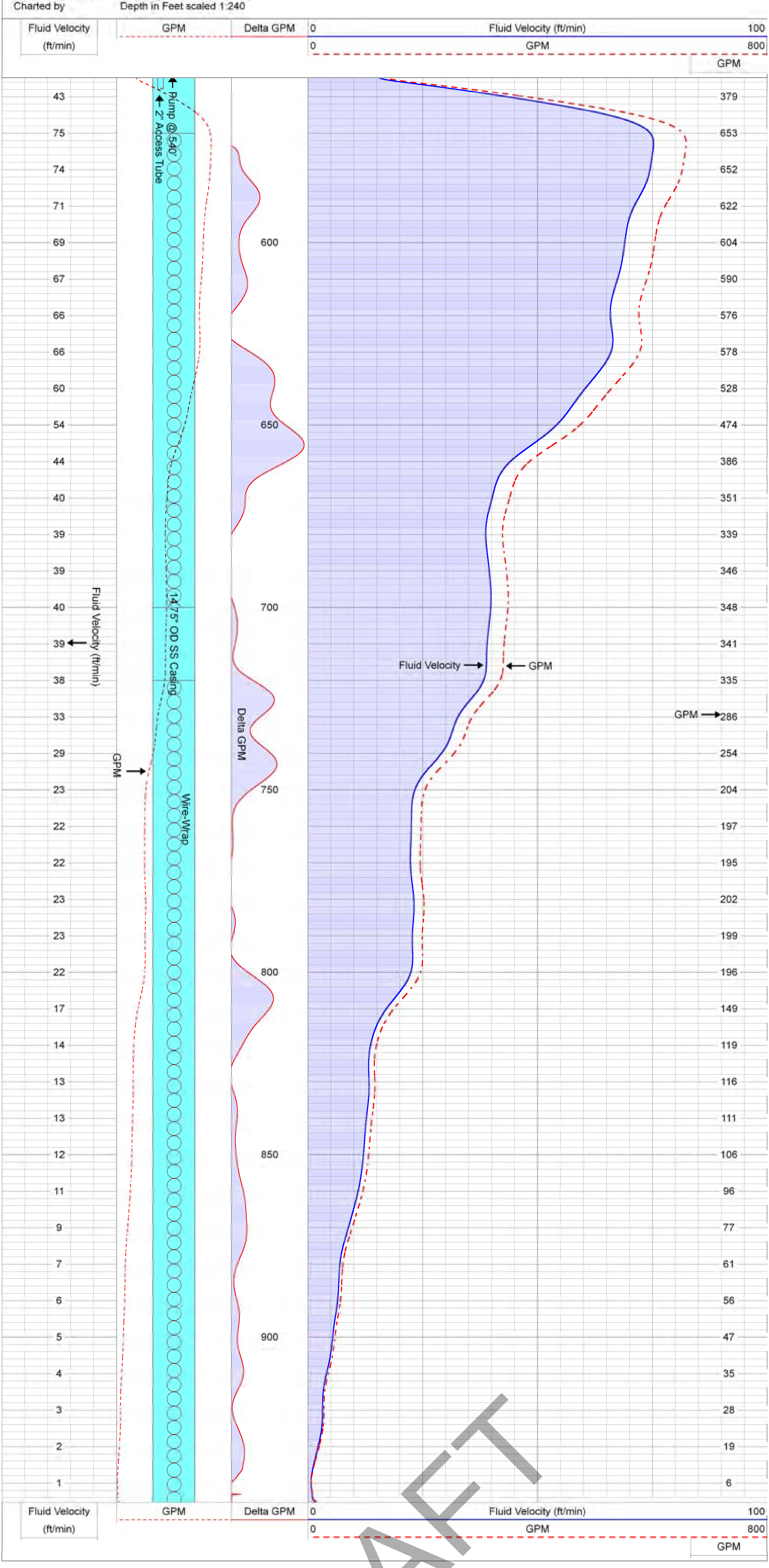
	Size	Wgt/Ft	Top	Bottom
Casing Record				
Surface String				
Camera Tube				
Production String	14.75" OD	---	0'	960'
Liner				

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All interpretations are opinions based on inferences from electrical or other measurements and Pacific Surveys cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Pacific Surveys' general terms and conditions set out in our current Price Schedule.

Comments

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Dataset Pathname	32193_gpm_las
Presentation Format	spinmerg
Dataset Creation	Mon May 12 13:42:04 2025
Charted by	Depth in Feet scaled 1:240



DRAFT

SPINNER LOG ANALYSIS

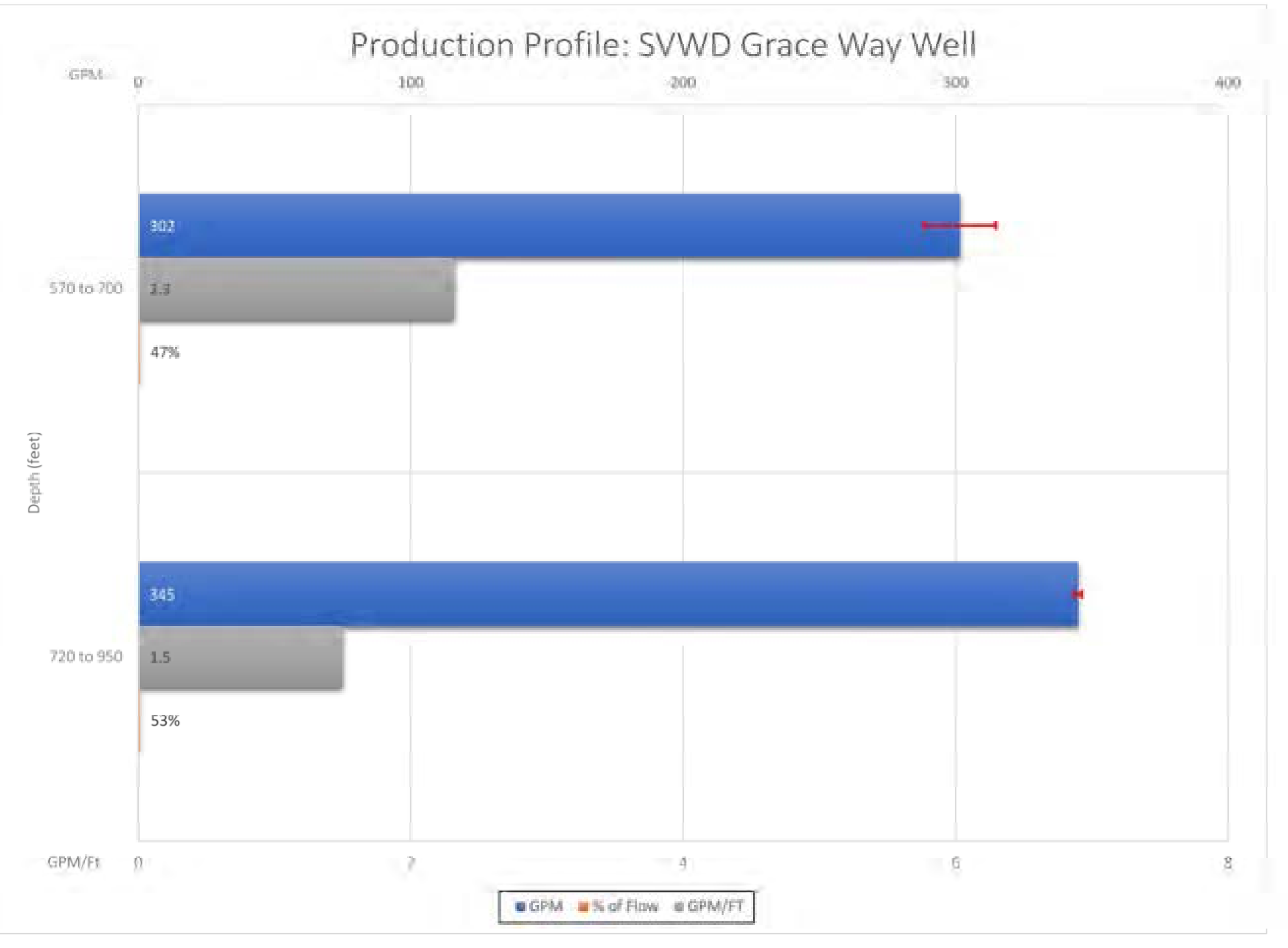
Pacific Surveys
geophysical well logging

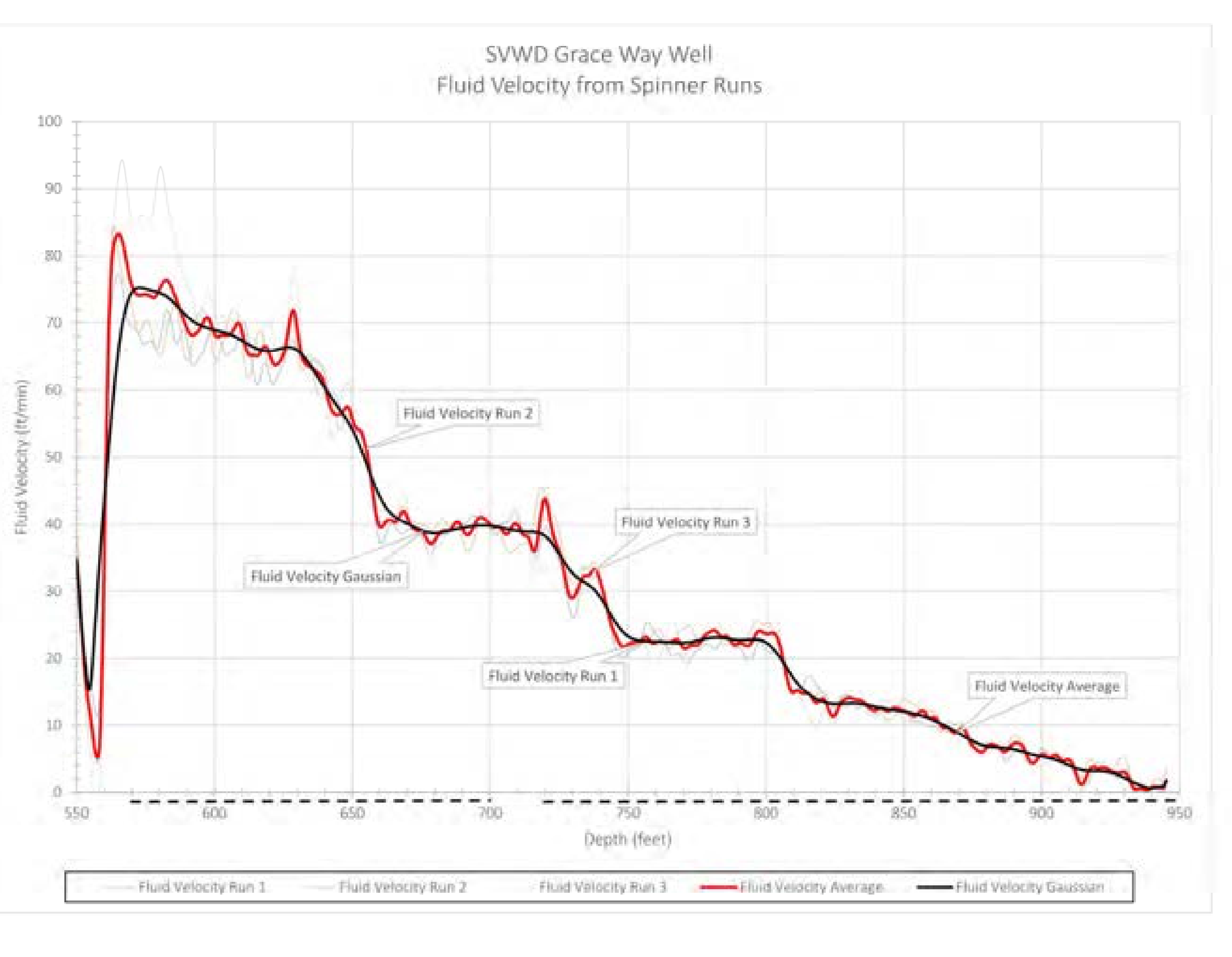
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Well: SVWD Grace Way Well
County: Santa Cruz

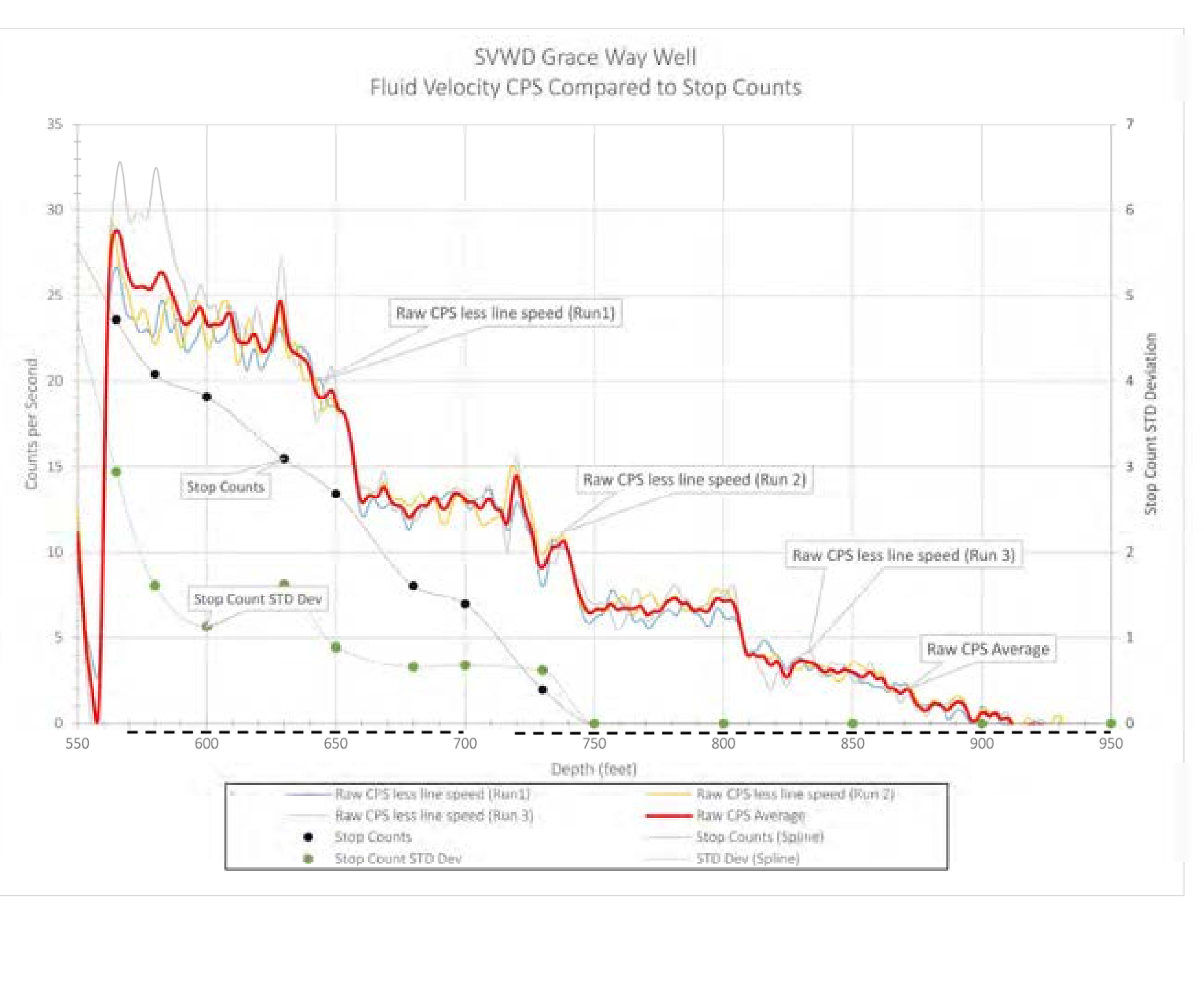
Date: 05/02/2025
Job No. 32193

SURFACE FLOW RATE 647 GPM

PERFORATED DEPTHS	PRODUCTION (GPM)	% OF FLOW (ZONES)	GPM/FT	STD DEV (GPM)	STD ERROR (+/- GPM)
570 to 700	302	47%	2.3	68.2	13.1
720 to 950	345	53%	1.5	15.5	1.4







PACIFIC SURVEYS

SPINNER
SPINNER ANALYSIS
FLUID VELOCITY
PUMPING CONDITION

Job No. 27348

File No.

Company ZIM 24011

Well SVWD SUCINTO WELL

Field SCOTTS VALLEY

County SANTA CRUZ State CA

Location:

311 SUCINTO DR.
GPS: 37.0637 -121.9964

Other Services:

STOP COUNTS DOWN RUN

Sec. Twp. Rge.

Permanent Datum	G.L.		Elevation above perm. datum	Elevation K.B. D.F. G.L.
Log Measured From	G.L.	0'		
Drilling Measured From	G.L.			

Date	9/12/24
Run Number	ONE
Depth Driller	1400'
Depth Logger	N/A
Bottom Logged Interval	1390'
Top Log Interval	820'
Pump Set @	920'
Time Pumping Prior to Survey	22.75 HOURS
Pumping Water Level	724'
Max. Recorded Temp	N/A
Pump Rate (GPM)	350
Time Well Ready	10:00
Time Logger on Bottom	10:45
Equipment Number	PS-10
Location	FNO
Recorded By	FARRELL
Witnessed By	---

Perforation Record				Perforation Record			
Type	Slot Size	From	To	Type	Slot Size	From	To
WIRE-WRAP	0.050"	700'	730'				
WIRE-WRAP	0.050"	780'	1050'				
WIRE-WRAP	0.050"	1070'	1390'				

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	33" OD	1/2" WALL	0'	55'
Camera Tube				
Production String	14" ID	3/8" WALL	0'	1400'
Liner				

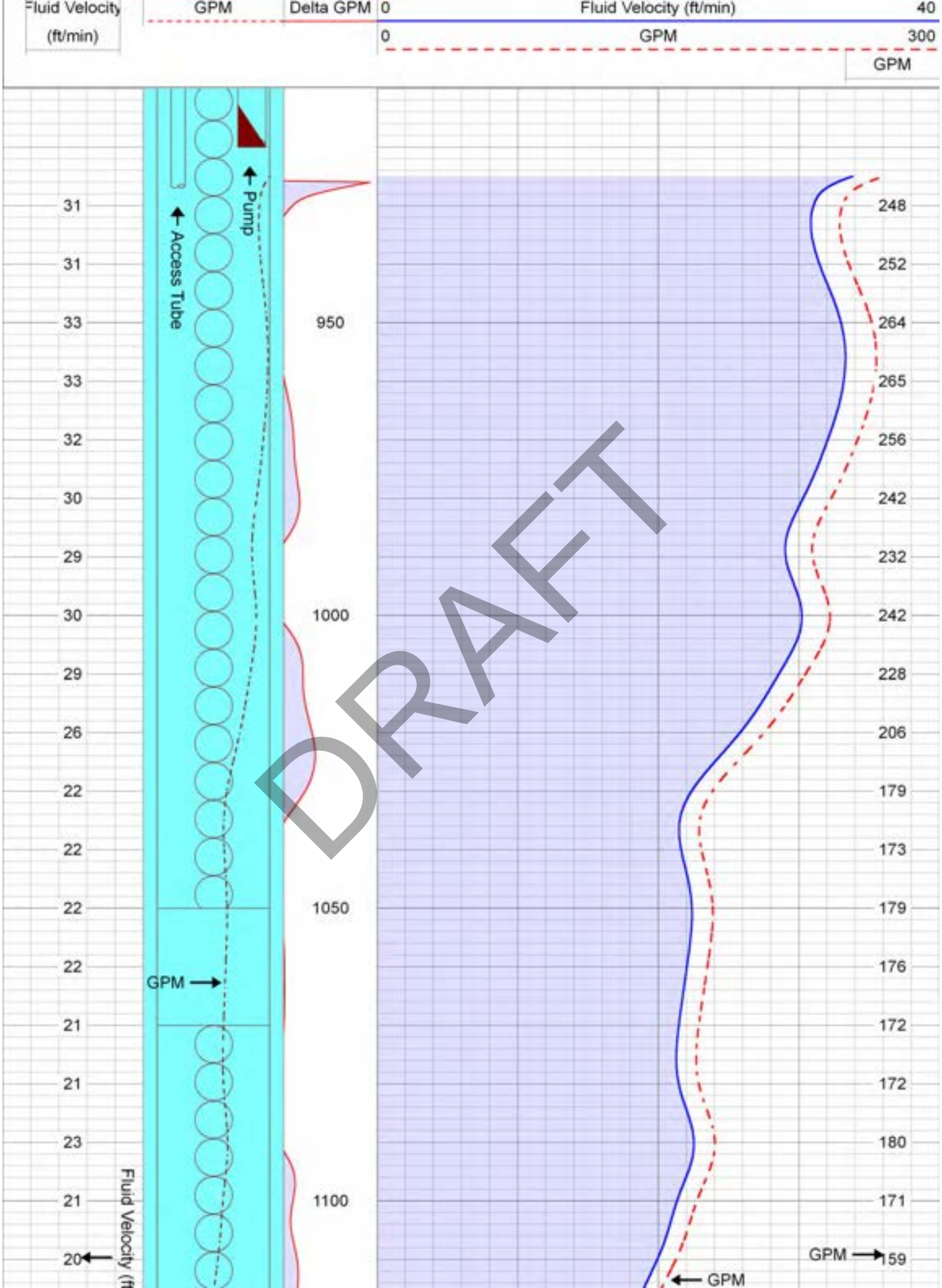
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All interpretations are opinions based on inferences from electrical or other measurements and Pacific Surveys cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Pacific Surveys' general terms and conditions set out in our current Price Schedule.

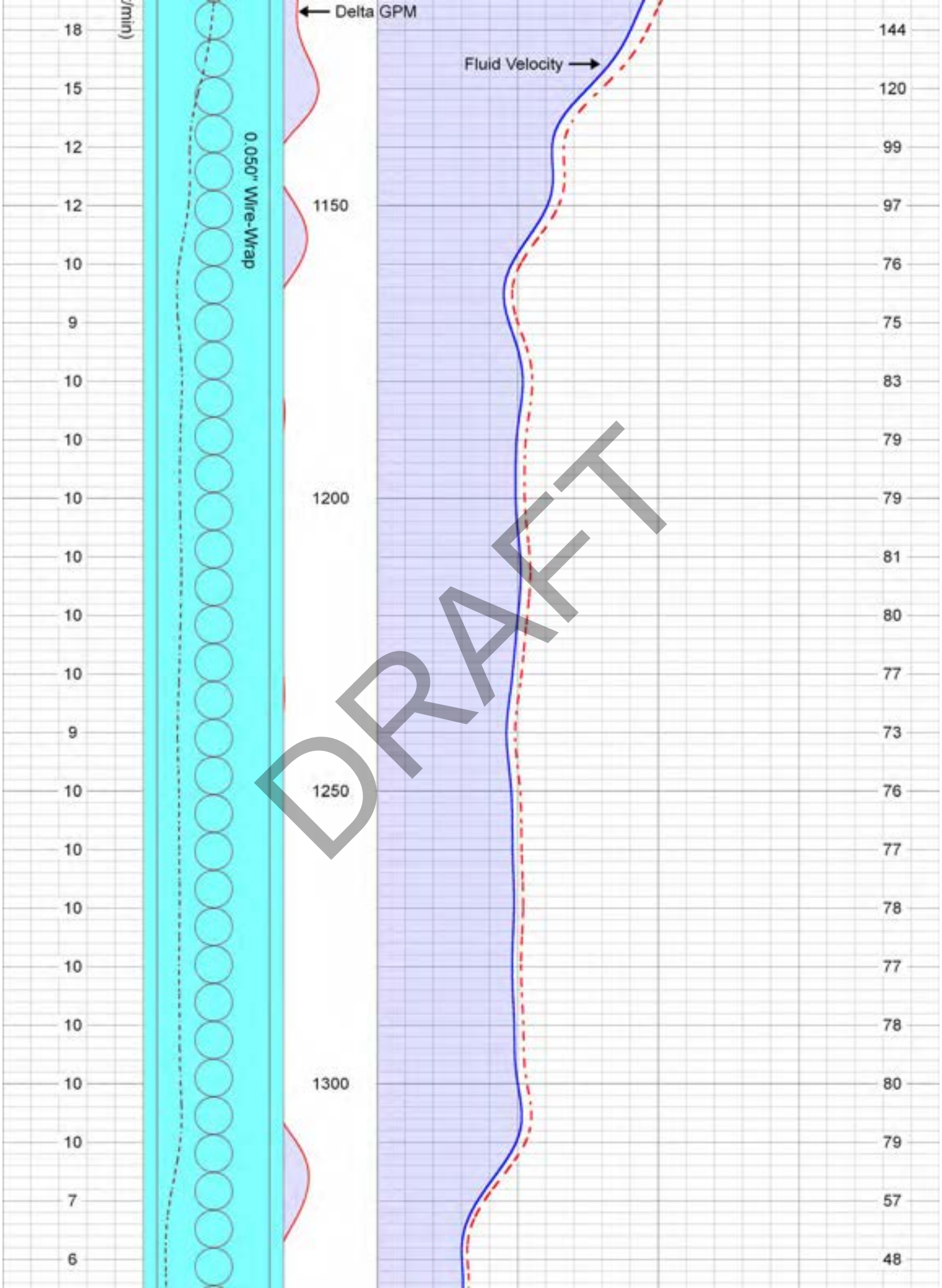
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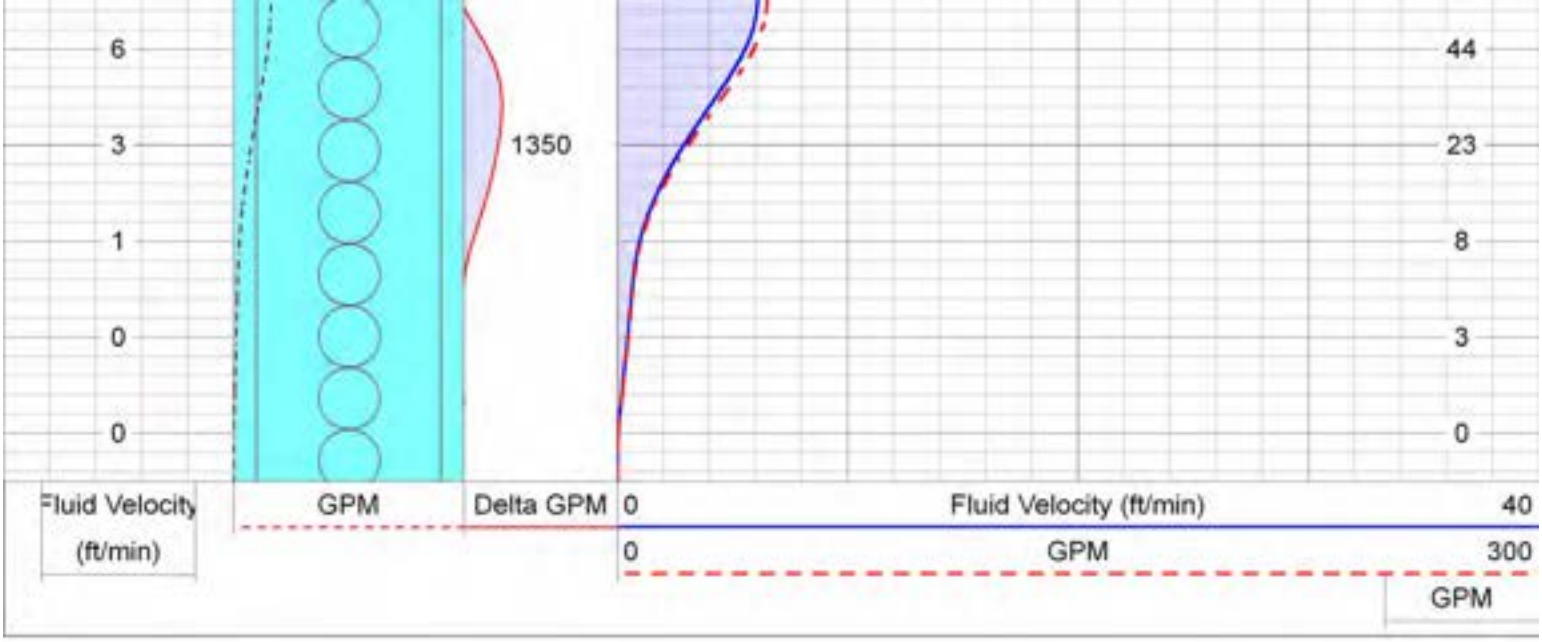
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Dataset Creation Fri Oct 18 11:14:53 2024
Charted by Depth in Feet scaled 1:240


Fluid Velocity (ft/min)
GPM
Delta GPM
0
Fluid Velocity (ft/min)
40
0
GPM
300
GPM
Pump
Access Tube
31
31
33
33
32
30
29
30
29
26
22
22
22
22
21
21
23
21
20
950
1000
1050
1100
GPM
248
252
264
265
256
242
232
242
228
206
179
173
179
176
172
172
180
171
159
GPM
GPM
Fluid Velocity (ft/min)

DRAFT


(ft/min)
Delta GPM
Fluid Velocity
0.050" Wire-Wrap
18
15
12
12
10
9
10
10
10
10
10
9
10
10
10
10
10
10
7
6
1150
1200
1250
1300
144
120
99
97
76
75
83
79
79
81
80
77
73
76
77
78
77
78
80
79
57
48
DRAFT


6
3
1
0
0
1350
44
23
8
3
0
Fluid Velocity
(ft/min)
GPM
Delta GPM
0
Fluid Velocity (ft/min)
40
0
GPM
300
GPM

DRAFT

SPINNER LOG ANALYSIS

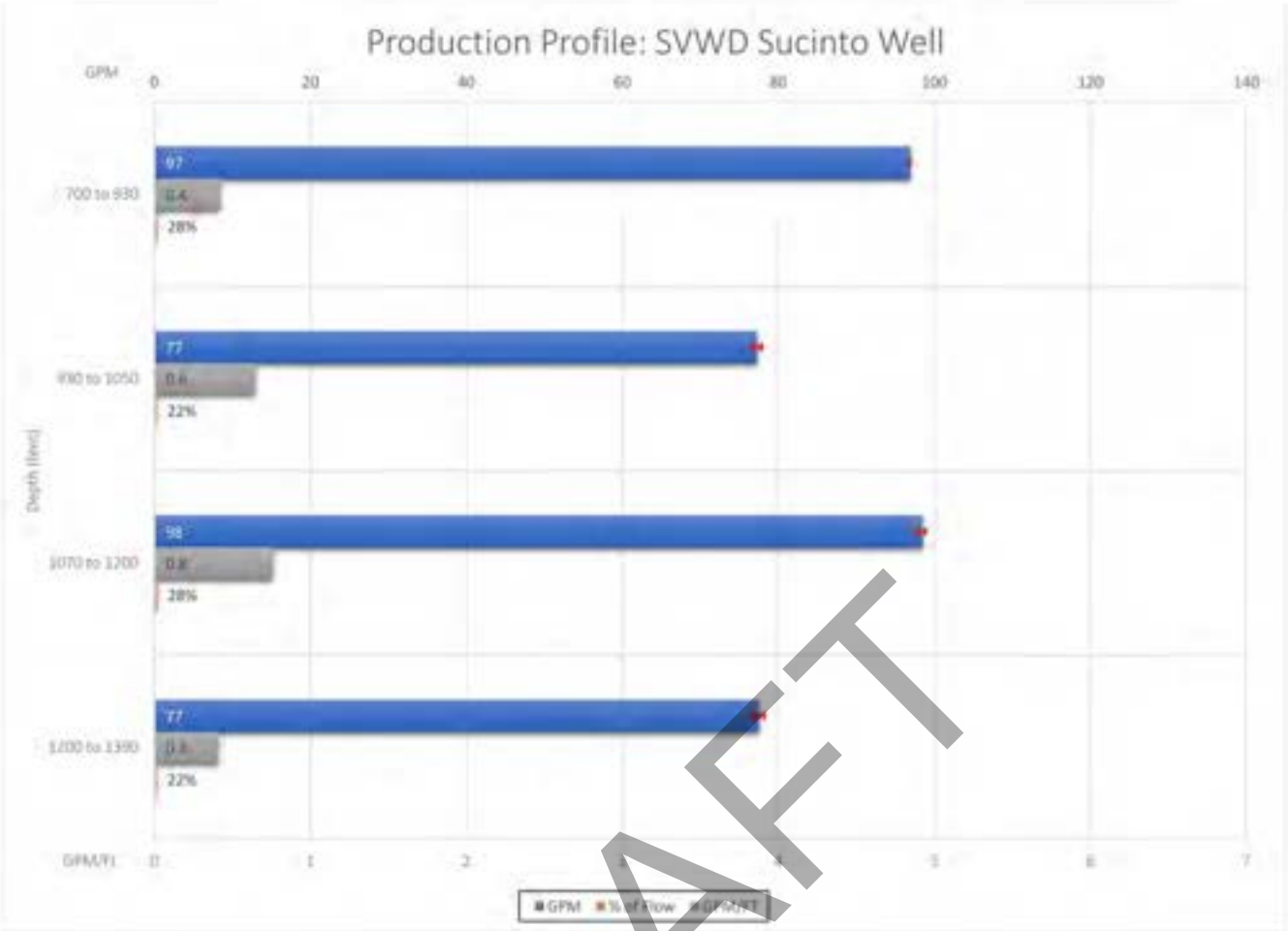
Pacific Surveys
geophysical well logging

Company: ZIM 24011
Well: SVWD Sucinto Well
County: Santa Cruz

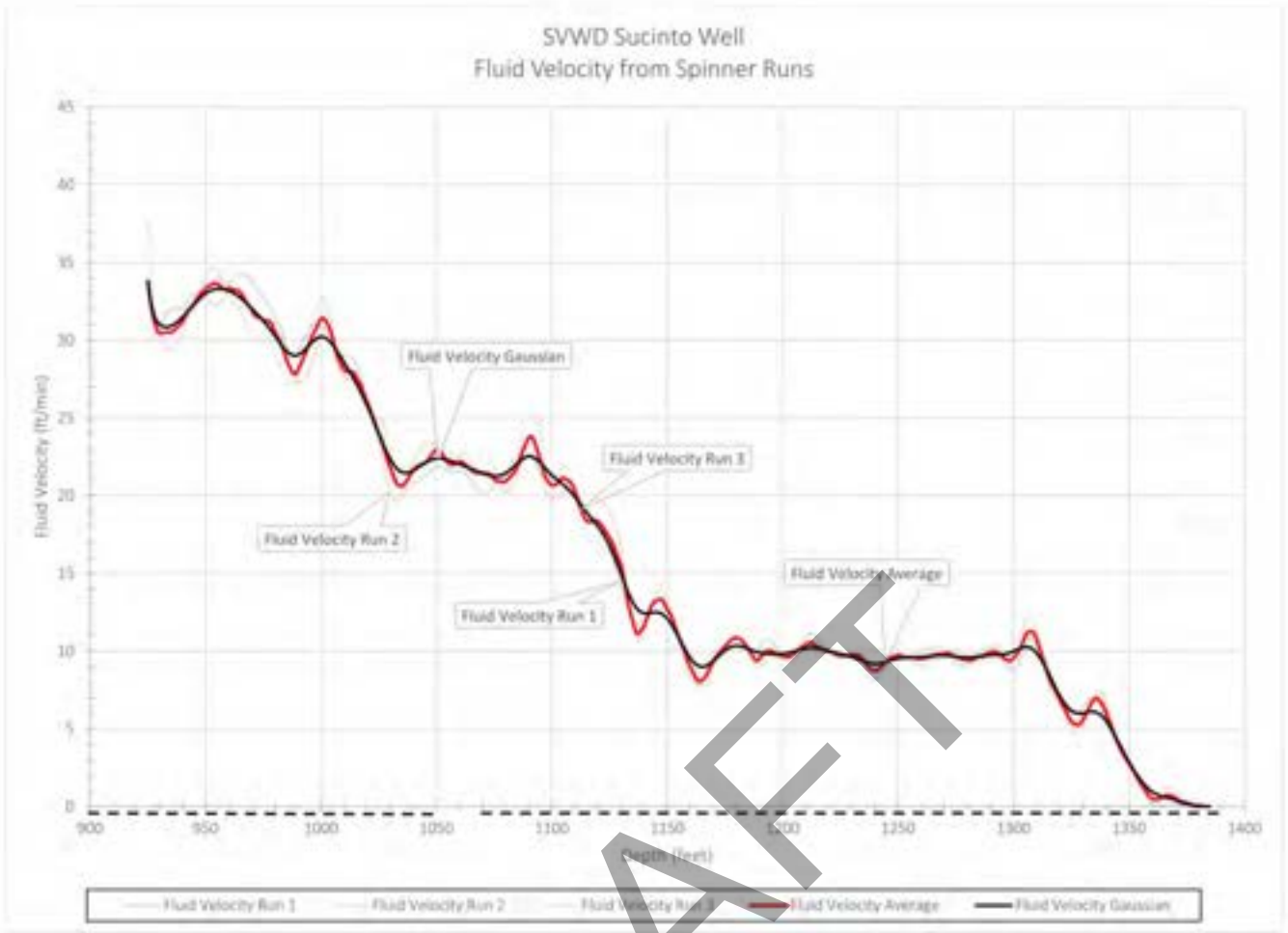
Date: 09/12/2024
Job No. 27348

SURFACE FLOW RATE	350	GPM			
PERFORATED DEPTHS	PRODUCTION (GPM)	% OF FLOW (ZONES)	GPM/FT	STD DEV (GPM)	STD ERROR (+/- GPM)
700 to 930	97	28%	0.4	N/A	N/A
930 to 1050	77	22%	0.6	9.6	0.6
1070 to 1200	98	28%	0.8	6.2	0.4
1200 to 1390	77	22%	0.4	8.0	0.7

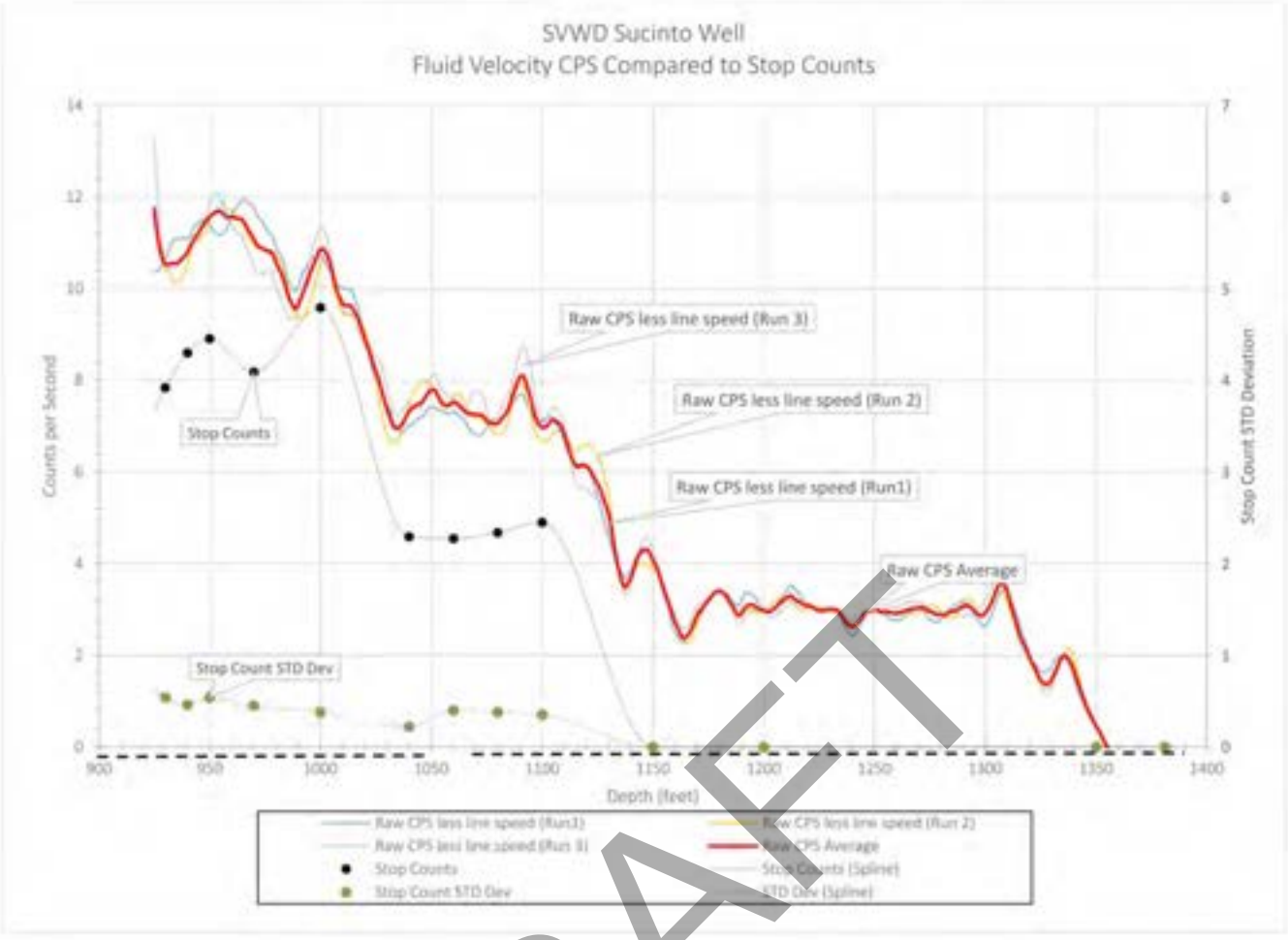
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Production Profile: SVWD Sucinto Well
GPM
0
20
40
60
80
100
120
140
700 to 930
97
0.4
28%
930 to 1050
77
0.6
22%
1070 to 1200
98
0.8
28%
1200 to 1390
77
0.8
22%
Depth (feet)
GPM/Ft
0
1
2
3
4
5
6
7
GPM
% of Flow
GPM/Ft

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SVWD Sucinto Well
Fluid Velocity from Spinner Runs
Fluid Velocity (ft/min)
45
40
35
30
25
20
15
10
5
0
900
950
1000
1050
1100
1150
1200
1250
1300
1350
1400
Depth (feet)
Fluid Velocity Gaussian
Fluid Velocity Run 3
Fluid Velocity Run 2
Fluid Velocity Average
Fluid Velocity Run 1
Fluid Velocity Run 1
Fluid Velocity Run 2
Fluid Velocity Average
Fluid Velocity Gaussian

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SVWD Sucinto Well
Fluid Velocity CPS Compared to Stop Counts
Counts per Second
Stop Count STD Deviation
Depth (feet)
Raw CPS less line speed (Run 3)
Raw CPS less line speed (Run 2)
Raw CPS less line speed (Run1)
Raw CPS Average
Stop Counts
Stop Count STD Dev
Raw CPS less line speed (Run1)
Raw CPS less line speed (Run 3)
Raw CPS less line speed (Run 2)
Raw CPS Average
Stop Counts
Stop Count STD Dev
Stop Counts (Spline)
STD Dev (Spline)

DRAFT

PACIFIC SURVEYS

SPINNER
DOWN RUNS
PUMPING CONDITION

Job No. 27348

File No.

Company ZIM 24011

Well SVWD SUCINTO WELL

Field SCOTTS VALLEY

County SANTA CRUZ State CA

Location:

311 SUCINTO DR.
GPS: 37.0637 -121.9964

Other Services:

STOP COUNTS
ANALYSIS

Sec. Twp. Rge.

Permanent Datum	G.L.		Elevation	Elevation
Log Measured From	G.L.	0'	above perm. datum	K.B.
Drilling Measured From	G.L.			D.F. G.L.

Date	9/12/24
Run Number	ONE
Depth Driller	1400'
Depth Logger	N/A
Bottom Logged Interval	1390'
Top Log Interval	820'
Pump Set @	920'
Time Pumping Prior to Survey	22.75 HOURS
Pumping Water Level	724'
Max. Recorded Temp.	N/A
Pump Rate (GPM)	350
Time Well Ready	10:00
Time Logger on Bottom	10:45
Equipment Number	PS-10
Location	FNO
Recorded By	FARRELL
Witnessed By	---

Perforation Record				Perforation Record			
Type	Slot Size	From	To	Type	Slot Size	From	To
WIRE-WRAP	0.050"	700'	730'				
WIRE-WRAP	0.050"	780'	1050'				
WIRE-WRAP	0.050"	1070'	1390'				

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	33" OD	1/2" WALL	0'	55'
Camera Tube				
Production String	14" ID	3/8" WALL	0'	1400'
Liner				

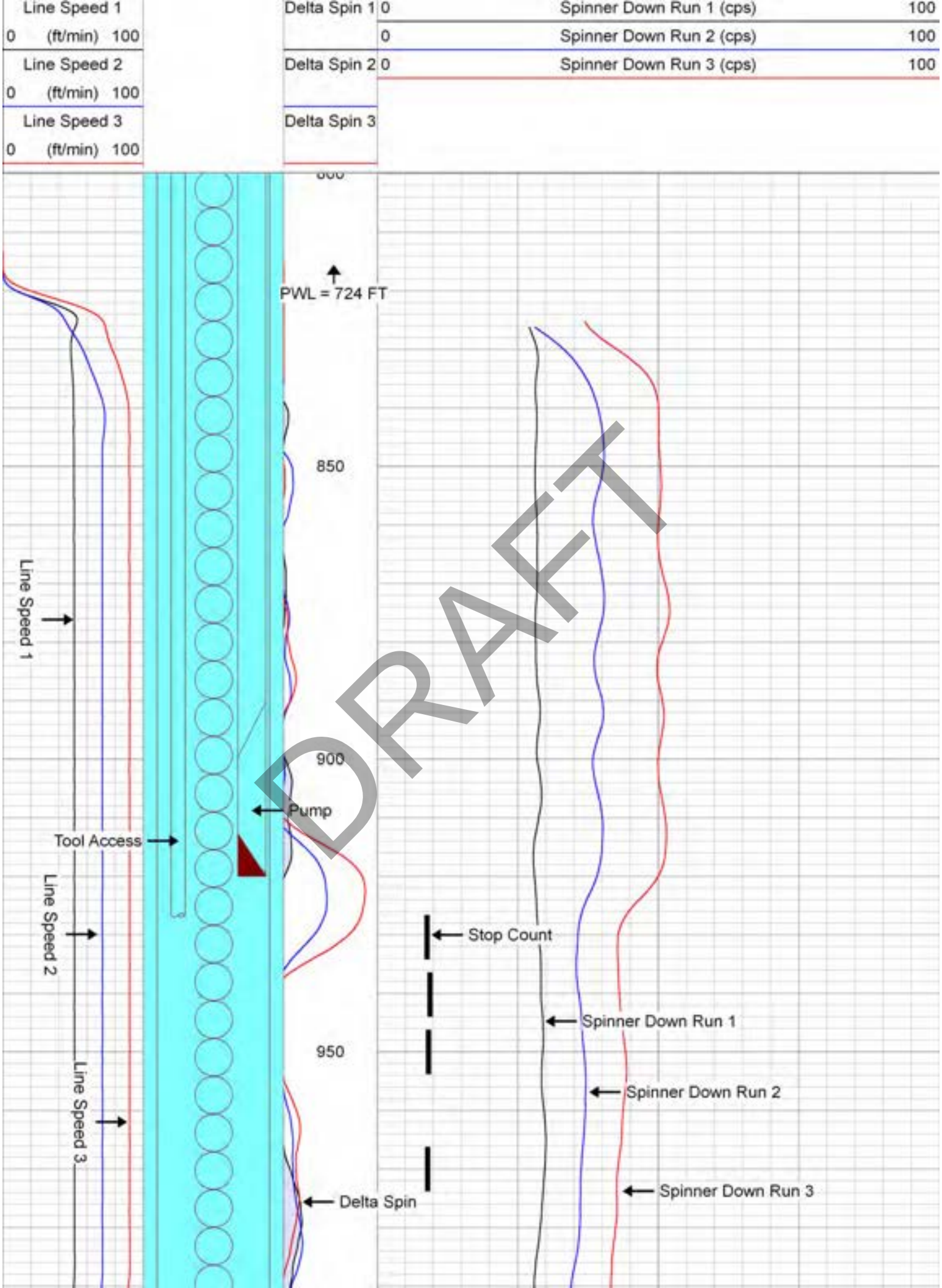
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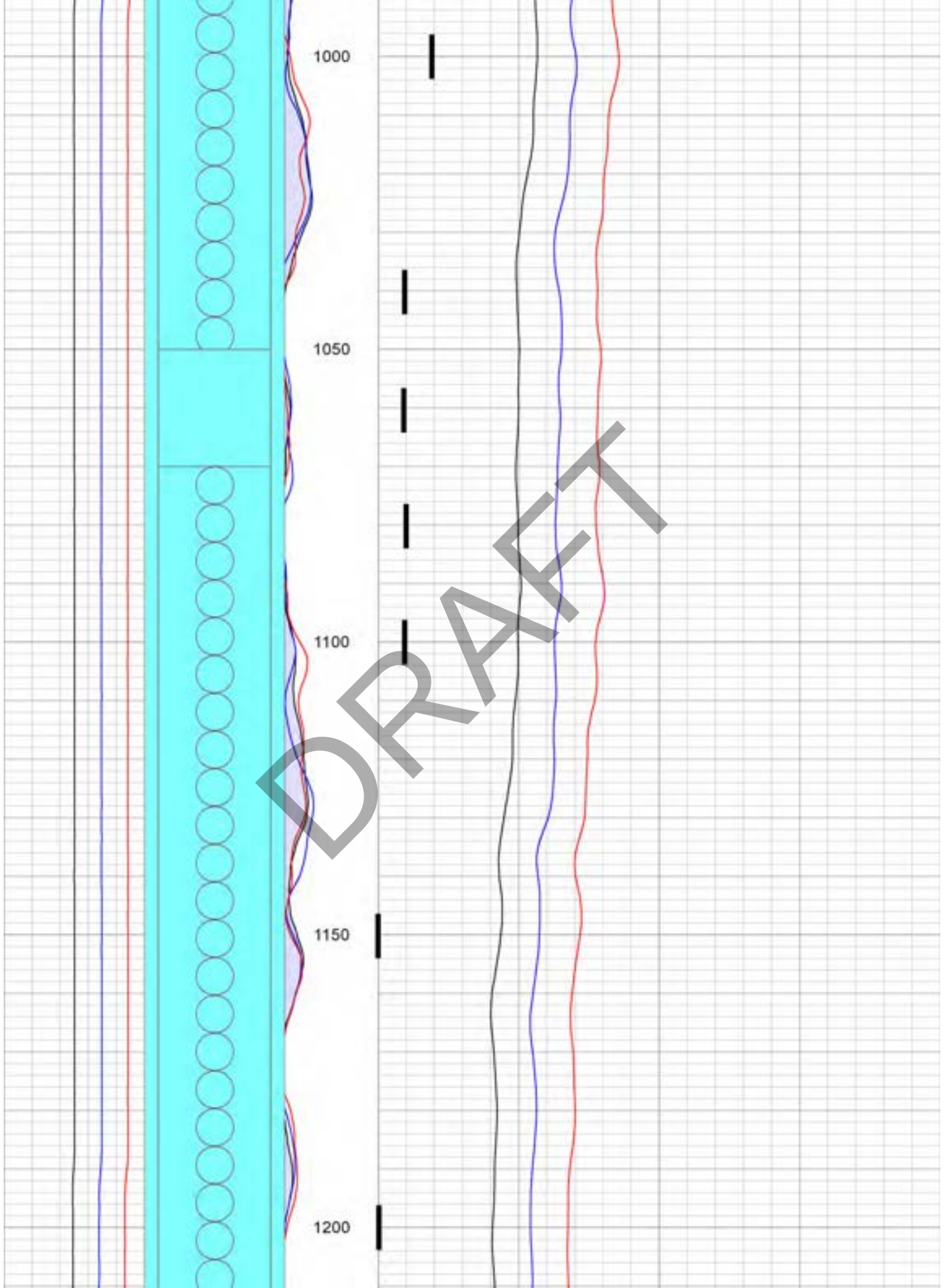
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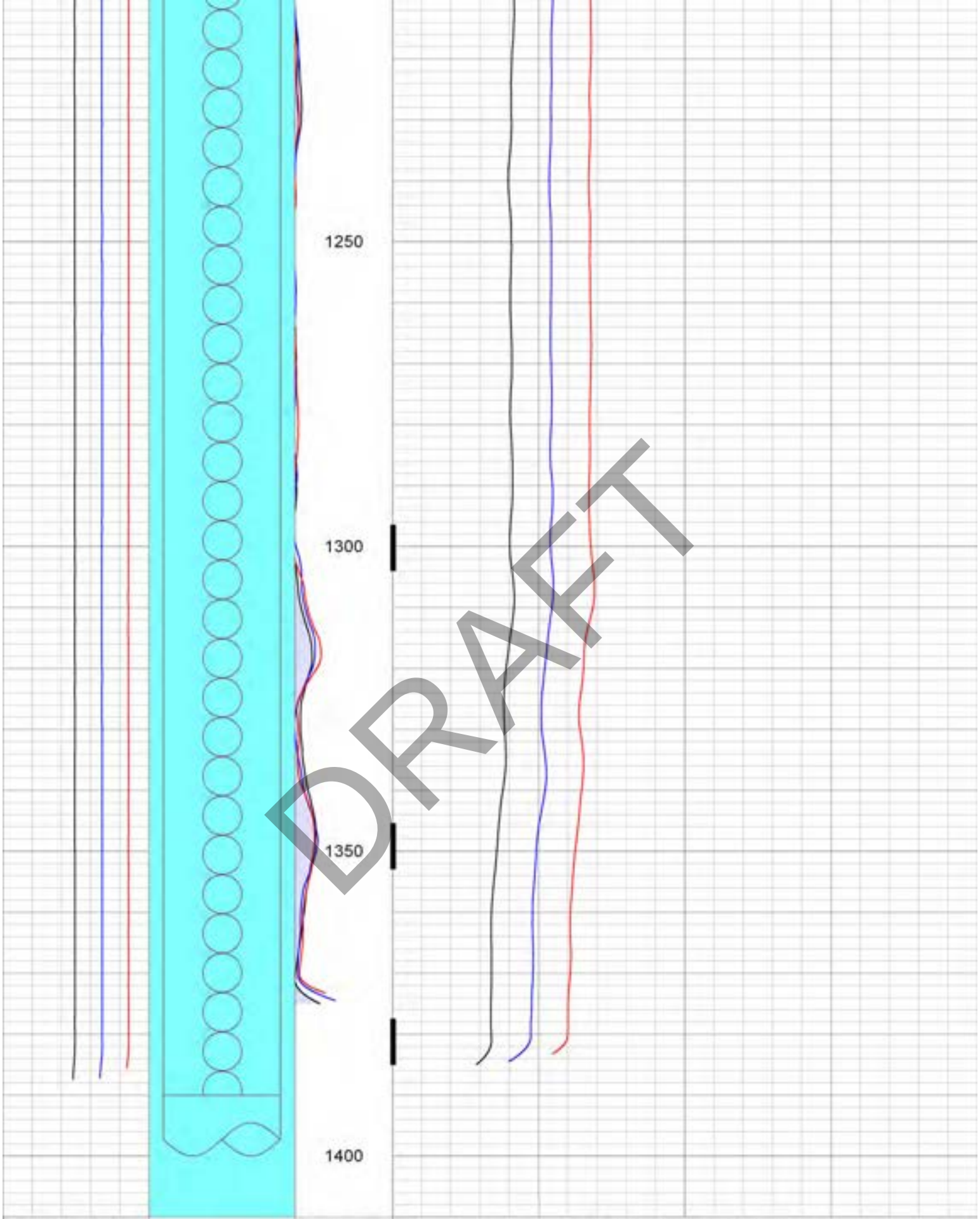
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Comments

Database File	27348.db
Dataset Pathname	spin1
Presentation Format	spinmerg
Dataset Creation	Thu Sep 12 10:53:01 2024
Charted by	Depth in Feet scaled 1:240


Line Speed 1
0 (ft/min) 100
Line Speed 2
0 (ft/min) 100
Line Speed 3
0 (ft/min) 100
Delta Spin 1
Delta Spin 2
Delta Spin 3
0 Spinner Down Run 1 (cps) 100
0 Spinner Down Run 2 (cps) 100
0 Spinner Down Run 3 (cps) 100
PWL = 724 FT
850
900
950
Line Speed 1
Line Speed 2
Line Speed 3
Pump
Tool Access
Stop Count
Spinner Down Run 1
Spinner Down Run 2
Spinner Down Run 3
Delta Spin
DRAFT


1000
1050
1100
1150
1200
DRAFT



DRAFT

Line Speed 1	Delta Spin 1	0 Spinner Down Run 1 (cps)	100
0 (ft/min) 100		0 Spinner Down Run 2 (cps)	100
Line Speed 2	Delta Spin 2	0 Spinner Down Run 3 (cps)	100
0 (ft/min) 100			

Line Speed 3		Delta Spin 3
0 (ft/min) 100		

Filter Report

Database File 27348.db
Dataset Pathname spin1
Dataset Creation Thu Sep 12 10:53:01 2024

Filter Name	Filter Type	Filter Length (ft)
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LTEN	Gaussian	6.00
LSPDRT	None	
FLOWP	Triangle	14.00
FLOWN	Triangle	14.00

DRAFT

PACIFIC SURVEYS

SPINNER
STOP COUNTS
PUMPING CONDITION

Job No. 27348

File No.

Company ZIM 24011

Well SVWD SUCINTO WELL

Field SCOTTS VALLEY

County SANTA CRUZ State CA

Location:

311 SUCINTO DR.
GPS: 37.0637 -121.9964

Sec. Twp. Rge.

Other Services:

DOWN-RUNS
ANALYSIS

Permanent Datum	G.L.		Elevation	Elevation
Log Measured From	G.L.	0'	above perm. datum	K.B.
Drilling Measured From	G.L.			D.F. G.L.

Date	9/12/24
Run Number	ONE
Depth Driller	1400'
Depth Logger	N/A
Bottom Logged Interval	1381'
Top Log Interval	930'
Pump Set @	920'
Time Pumping Prior to Survey	22.75 HOURS
Pumping Water Level	724'
Max. Recorded Temp.	N/A
Pump Rate (GPM)	350
Time Well Ready	10:00
Time Logger on Bottom	11:30
Equipment Number	PS-10
Location	FNO
Recorded By	FARRELL
Witnessed By	---

Perforation Record				Perforation Record			
Type	Slot Size	From	To	Type	Slot Size	From	To
WIRE-WRAP	0.050"	700'	730'				
WIRE-WRAP	0.050"	780'	1050'				
WIRE-WRAP	0.050"	1070'	1390'				

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	33" OD	1/2" WALL	0'	55'
Camera Tube				
Production String	14" ID	3/8" WALL	0'	1400'
Liner				

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Comments

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Presentation Format	spnstop
Dataset Creation	Thu Sep 12 12:20:48 2024
Charted by	Time scaled 30/hour

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				Spin Stop (cps)
0	930			7.6
60	930			8.4
120	930			6.9
Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)

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Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)

DRAFT

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Presentation Format	spnstop
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Charted by	Time scaled 30/hour

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				Spin Stop (cps)

Database File	27348.db
Dataset Pathname	spin_stop970
Presentation Format	spnstop
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Charted by	Time scaled 30/hour

Time (sec)	Depth (ft)	0 Spinner Stop Count (cps) 100	Spin Stop (cps)
0	970		8.1
60	970		7.9
120	970		8.8

Time (sec) Depth (ft) 0 Spinner Stop Count (cps) 100 Spin Stop (cps)

Database File	27348.db
Dataset Pathname	spin_stop1000
Presentation Format	spnstop
Dataset Creation	Thu Sep 12 12:07:21 2024
Charted by	Time scaled 30/hour

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0	1000		9.7
60	1000		9.7
120	1000		10.0

Time (sec) Depth (ft) 0 Spinner Stop Count (cps) 100 Spin Stop (cps)

DRAFT

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Presentation Format	spnstop
Dataset Creation	Thu Sep 12 12:03:48 2024
Charted by	Time scaled 30/hour

Time (sec)	Depth (ft)	0 Spinner Stop Count (cps) 100	Spin Stop (cps)
0	1040		4.8
60	1040		4.6
120	1040		4.1

Time (sec) Depth (ft) 0 Spinner Stop Count (cps) 100 Spin Stop (cps)

Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)

Database File	27348.db
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Presentation Format	spnstop
Dataset Creation	Thu Sep 12 12:00:26 2024
Charted by	Time scaled 30/hour

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				Spin Stop (cps)
0	1060			4.8
60	1060			4.3
120	1060			4.5
Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)

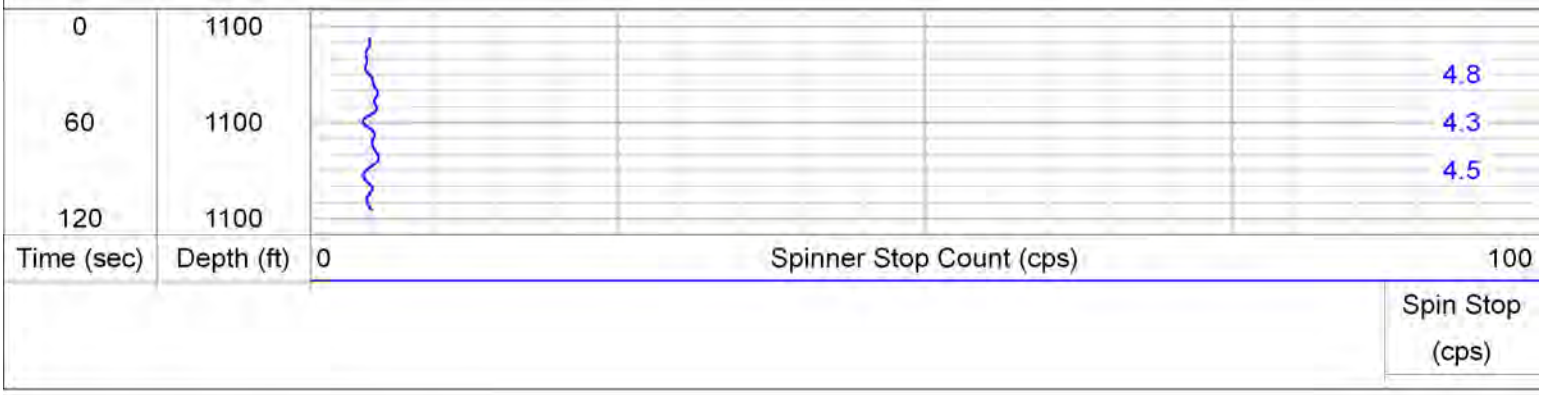
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Charted by	Time scaled 30/hour

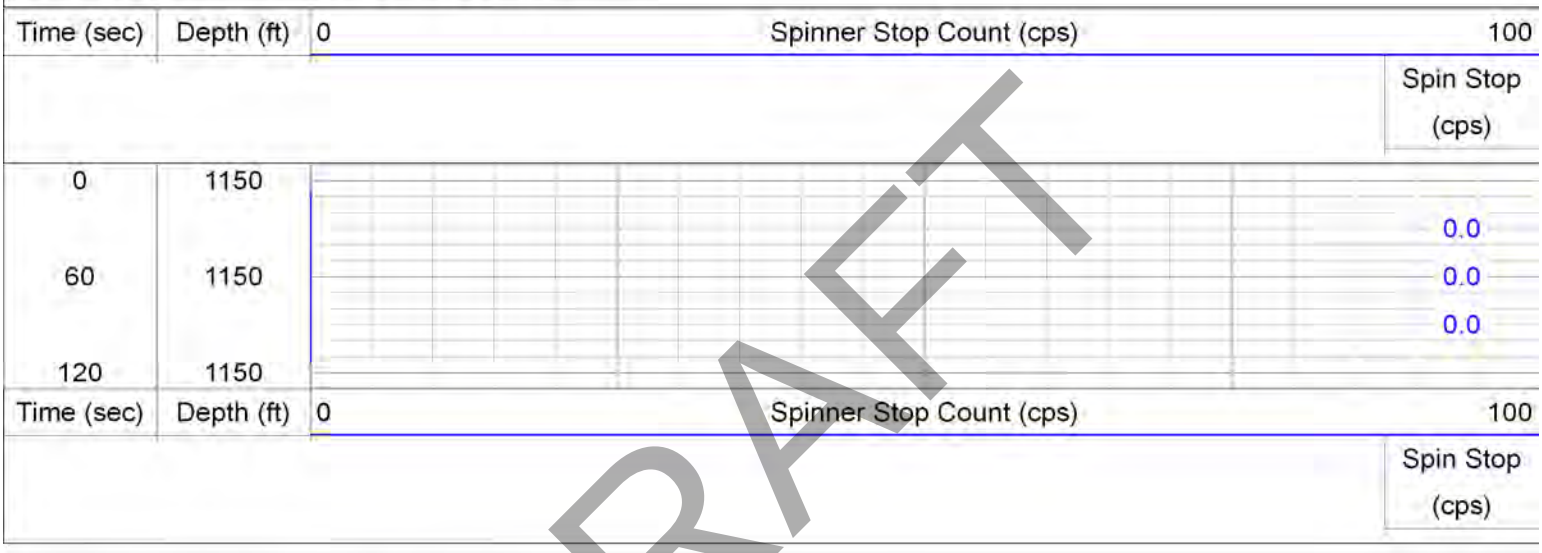
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				Spin Stop (cps)
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60	1080			4.6
120	1080			4.0
Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)

Database File	27348.db
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Presentation Format	spnstop
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Charted by	Time scaled 30/hour

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				Spin Stop (cps)

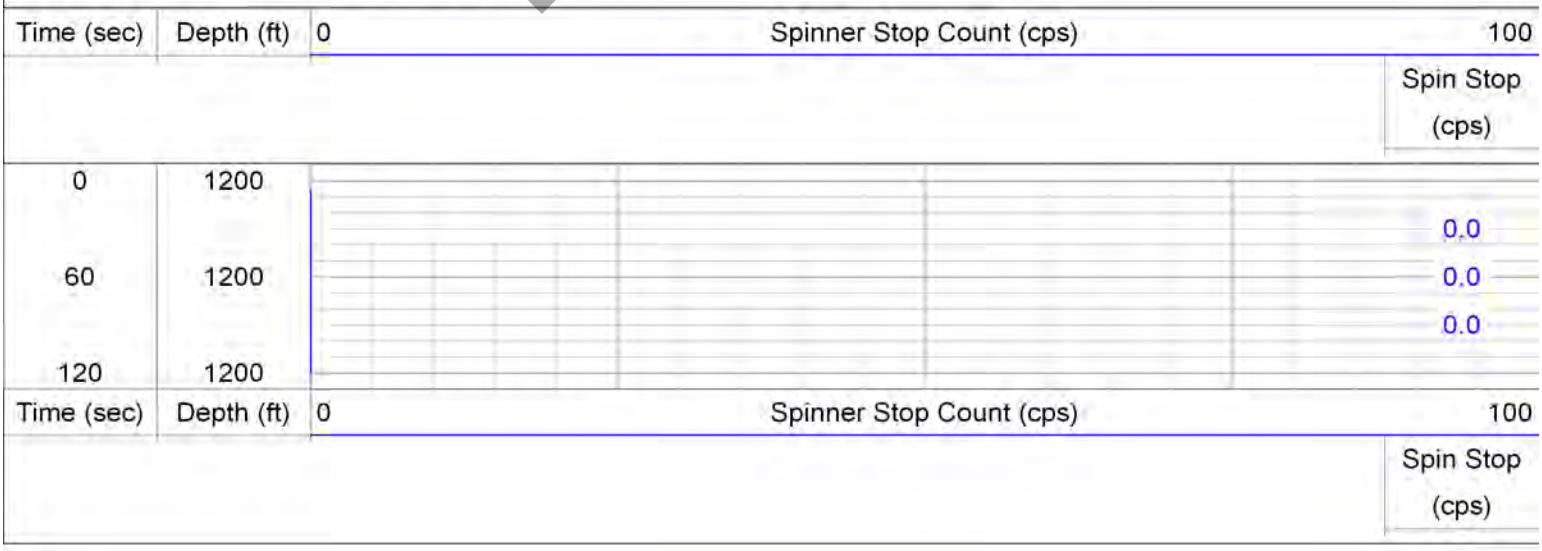


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Charted by	Time scaled 30/hour



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Charted by	Time scaled 30/hour



Database File	27348.db
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Presentation Format	spnstop
Dataset Creation	Thu Sep 12 11:41:33 2024

Dataset Creation	Thu Sep 12 11:41:33 2024
Charted by	Time scaled 30/hour

Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)
0	1300			0.0
60	1300			0.0
120	1300			0.0
Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)

Database File	27348.db
Dataset Pathname	spin_stop1350
Presentation Format	spnstop
Dataset Creation	Thu Sep 12 11:37:01 2024
Charted by	Time scaled 30/hour

Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)
-0	1350			0.0
60	1350			0.0
120	1350			0.0
Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)

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Database File	27348.db
Dataset Pathname	spin_stop1381
Presentation Format	spnstop
Dataset Creation	Thu Sep 12 11:33:37 2024
Charted by	Time scaled 30/hour

Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)
0	1381			0.0
60	1381			0.0
120	1381			0.0
Time (sec)	Depth (ft)	0	Spinner Stop Count (cps)	100
				Spin Stop (cps)

MONTGOMERY & ASSOCIATES

Appendix 7A

Santa Margarita Groundwater Basin **Health Analysis of** Groundwater Dependent Ecosystem**s**

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SANTA MARGARITA BASIN HEALTH ANALYSIS OF GROUNDWATER DEPENDENT ECOSYSTEMS

The GSP identifies depletion of interconnected surface water (ISW) as one of the sustainability indicators for which undesirable results must be avoided. As described in Section 3.7 of the GSP (SMGWA, 2022), groundwater and surface water are interconnected in the Basin and groundwater use could adversely affect beneficial uses, including riparian habitat and groundwater dependent ecosystems (GDEs). The GSP uses groundwater levels near streams as a proxy for monitoring potential depletions and sets minimum thresholds to protect groundwater resources that support ISW and associated GDEs.

Mapped GDEs from the Santa Margarita Basin GSP were used as the spatial basis for this analysis. GDEs in the Basin were primarily identified using The Nature Conservancy's (TNC) database of mapped GDE indicators in the NCCAG dataset (TNC, 2019), which compiles mapped springs, wetlands, ponds, and groundwater-associated vegetation from sources including the National Wetlands Inventory (NWI), National Hydrography Dataset (NHD), and CALVEG/VEGCAMP. All NCCAG identified features are included as GDEs in this analysis (USFWS NWI; USGS NHD; CAL FIRE CALVEG), along with additional GDEs identified by Balance Hydrologics in 2019 based on local expertise and field knowledge (Balance, 2019). In areas lacking groundwater level data, the groundwater model was used to infer likely surface water groundwater connections. Riverine wetlands were not analyzed as part of the Periodic Evaluation because they are predominantly influenced by surface water conditions, which can mask groundwater driven ecological responses.

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An assessment of vegetation health conditions for GDEs was conducted from 2020 to 2025 using Normalized Difference Vegetation Index (NDVI) data. Results indicate that vegetation health remained consistently high throughout the evaluation period, including during drier conditions in WY 2020 and WY 2021. Across the Basin each year, approximately 99% of mapped GDE vegetation was classified as "Very Healthy," with less than 1% of GDEs classified as "Moderately Healthy" or "Poor Health." Minor year to year variability occurred in the same limited GDE locations, with no persistent or widespread declines in vegetation health identified. Table 1 summarizes the percentage of mapped GDE acreage falling within each NDVI-based vegetation health category by water year, and the results described below further characterize temporal and regional patterns during the evaluation period.

GDE Health Areas and Conditions

The GSP presented 3 distinct geographic areas corresponding to upstream, downstream, and quarry influenced portions of the Basin (Figure 1); however, for this analysis they are more

appropriately described as areas associated with different creek systems that support varying types of GDEs. Area 1 encompasses the confluence of Lompico Creek and Zayante Creek, Area 2 focuses on the Bean Creek watershed, and Area 3 includes multiple creeks, with an emphasis on GDEs associated with the West Branch of Carbonera Creek.

These areas are used in this analysis to summarize and compare vegetation health patterns relative to local hydrogeologic and land use conditions. GDE health conditions were evaluated using NDVI and summarized using vegetation health categories based on established NDVI thresholds, ranging from standing water or bare ground to very healthy vegetation. These categories are used throughout this section and the associated figures to describe relative changes in GDE vegetation health over time.

Area 1 encompasses the upper portion of the Basin including the active Quail Hollow Quarry and Quail Hollow Ranch County Park. GDE features in this area consist primarily of springs, groundwater supported wetlands, and quarry ponds, reflecting a combination of natural groundwater discharge areas and anthropogenic landscape features (Figure 2).

Vegetation health in Area 1 remained consistently high throughout the 2020–2025 evaluation period. Between approximately 90 and 96% of mapped GDE vegetation was classified as “Very Healthy” in each year, with the remaining acreage largely classified as “Moderately Healthy.” Less than 1% of mapped GDE vegetation fell within “Unhealthy” or “Poor Health” categories in any individual year, and these instances were limited to the same localized groundwater supported wetland or quarry pond features. No persistent or spatially extensive declines in vegetation health were identified during dry or critically dry years, and conditions remained stable through subsequent normal and wet years. Table 1 summarizes NDVI-based vegetation health results for Area 1.

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Table 7A-1. NDVI-Based Vegetation Health Categories for Groundwater Dependent Ecosystems in Area 1

Vegetation Health Category	NDVI Range	WY2020	WY2021	WY2022	WY2023	WY2024	WY2025
Standing Water or Bare Ground	< 0	0.00%	0.00%	0.00%	0.00%	0.38%	0.00%
Unhealthy	0 – 0.3	0.38%	0.38%	0.38%	0.38%	0.00%	0.38%
Poor Health	0.3 to 0.45	0.10%	0.10%	0.10%	0.00%	0.00%	0.00%
Moderately Healthy	0.45 to 0.6	3.73%	8.98%	6.27%	3.82%	3.82%	3.82%
Very Healthy	0.6 to 1	95.79%	90.54%	93.26%	95.79%	95.79%	95.79%

Area 2 corresponds to the central portion of the Basin, including the closed Olympia and Kaiser Quarries. GDEs in this area include groundwater supported wetlands, springs, ponds, and riparian vegetation (Figure 3).

Vegetation health within Area 2 was consistently high across all evaluation years. Approximately 88 to 97% of mapped GDE vegetation was classified as “Very Healthy” annually, with limited variability among “Moderately Healthy,” “Unhealthy,” or “Poor Health” categories. Minor year to year changes in these lower categories occurred primarily in groundwater supported wetland features and did not exhibit expanding or persistent trends. Overall, vegetation health improved following drier conditions and remained stable during normal and wet years beginning in WY2022, indicating no significant or unreasonable impacts to GDEs associated with groundwater conditions. Table 2 presents vegetation health statistics for Area 2.

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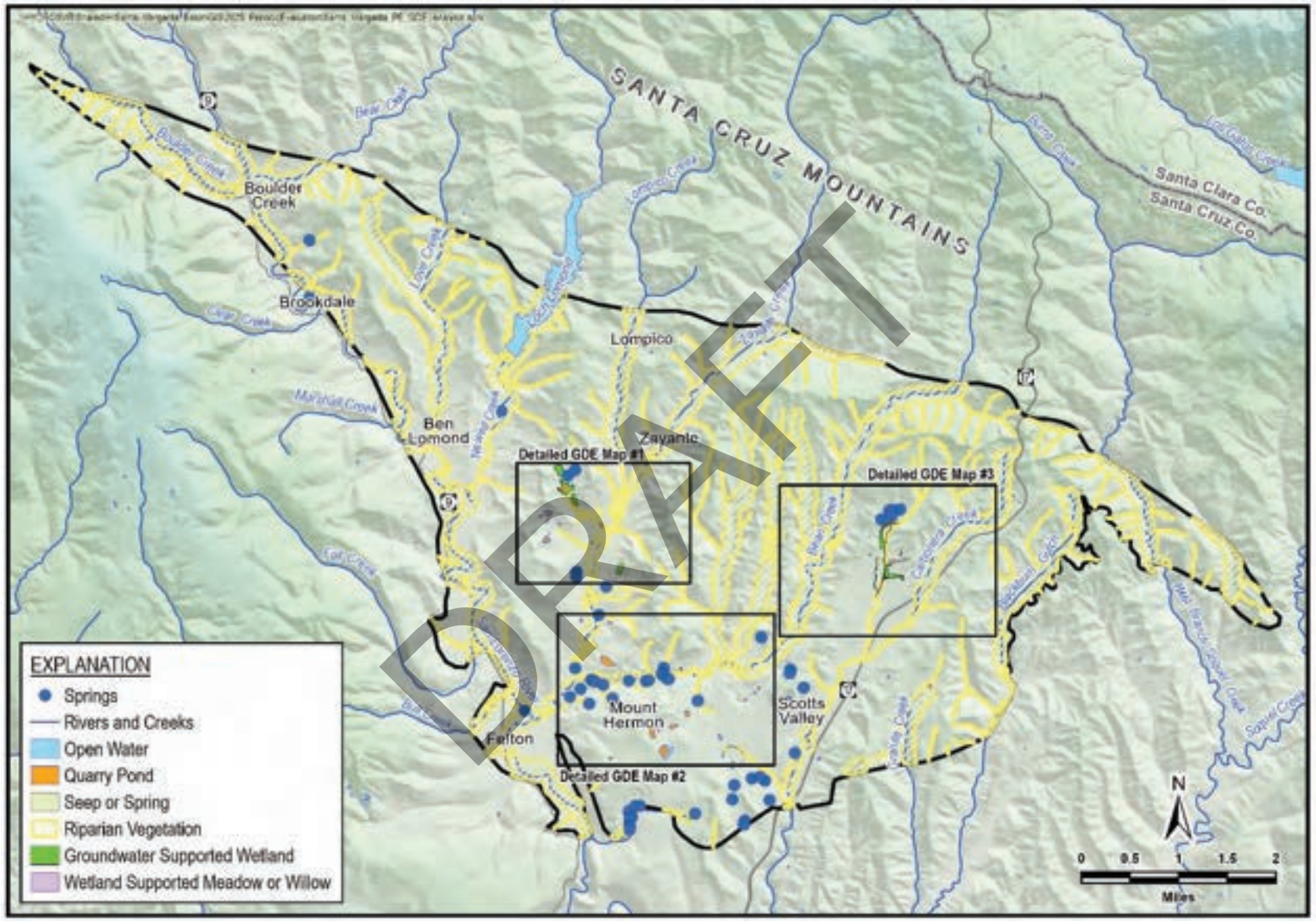


Figure 7A-1. Groundwater Dependent Ecosystems in the Santa Margarita Basin

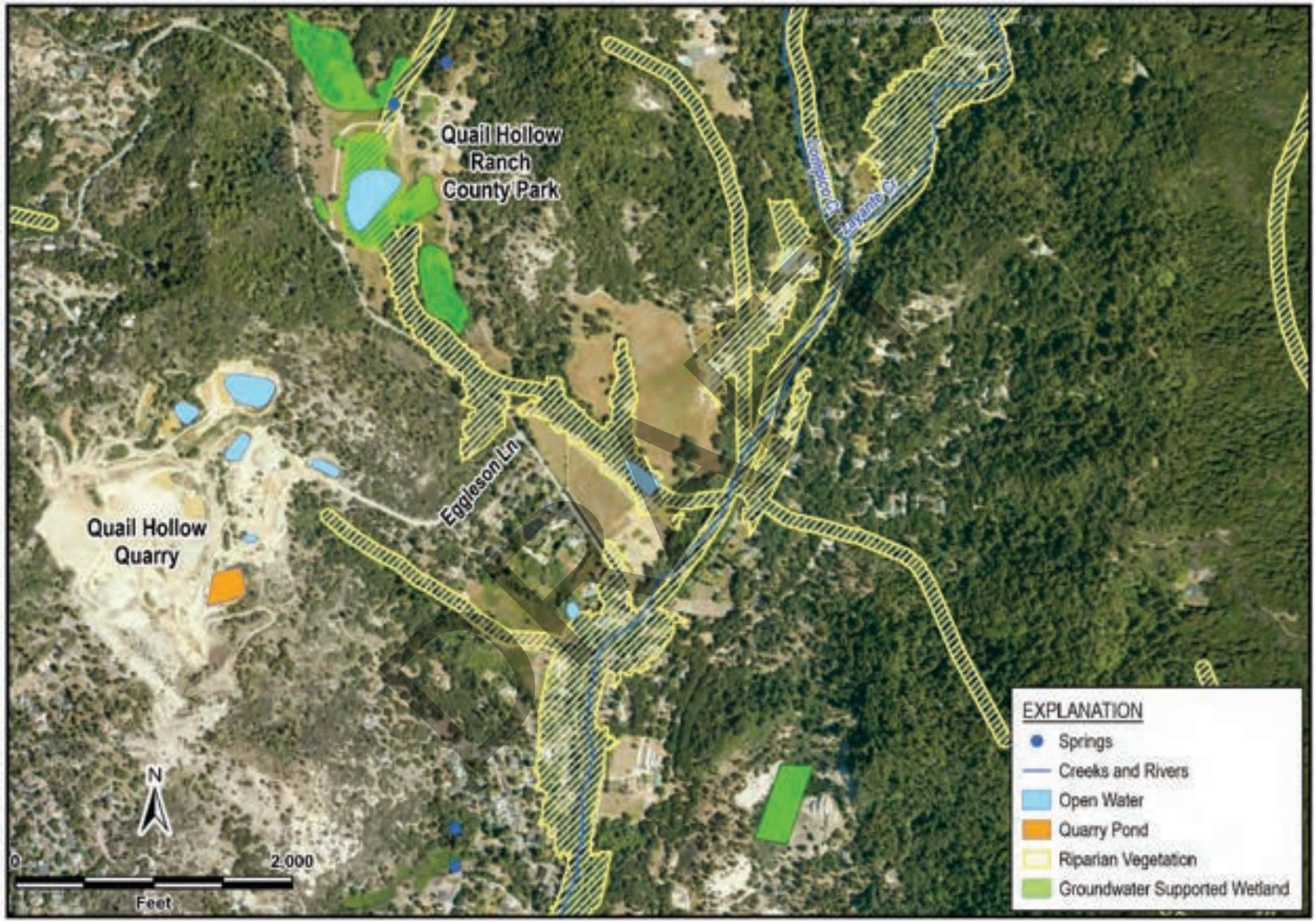


Figure 7A-2. Groundwater Dependent Ecosystems in Area 1



Figure 7A-3. Groundwater Dependent Ecosystems in Area 2

Table 7A-2. NDVI-Based Vegetation Health Categories for Groundwater Dependent Ecosystems in Area 2

Vegetation Health Category	NDVI Range	WY2020	WY2021	WY2022	WY2023	WY2024	WY2025
Standing Water or Bare Ground	< 0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Unhealthy	0 – 0.3	3.49%	3.42%	3.42%	3.42%	0.00%	3.27%
Poor Health	0.3 to 0.45	0.00%	0.07%	0.07%	0.07%	3.49%	0.21%
Moderately Healthy	0.45 to 0.6	7.46%	8.56%	7.46%	0.00%	0.00%	0.00%
Very Healthy	0.6 to 1	89.06%	87.95%	89.06%	96.51%	96.51%	96.51%

Area 3 represents the downstream portion of the Basin near Scotts Valley High School and Glenwood Preserve. Area 3 includes broader riparian corridors, groundwater supported wetlands, and springs (Figure 4).

GDE vegetation health in Area 3 remained high and stable throughout the evaluation period. Between approximately 89 and 97% of mapped GDE vegetation was classified as "Very Healthy" each year, with only minor and recurring variability in lower health categories. Instances of "Moderately Healthy," "Unhealthy," or "Poor Health" classifications were limited in extent and did not increase during dry or critically dry years. No spatially extensive or persistent vegetation health declines were identified, indicating stable GDE conditions in this area during the evaluation cycle. Table 3 summarizes NDVI-based vegetation health results for Area 3.

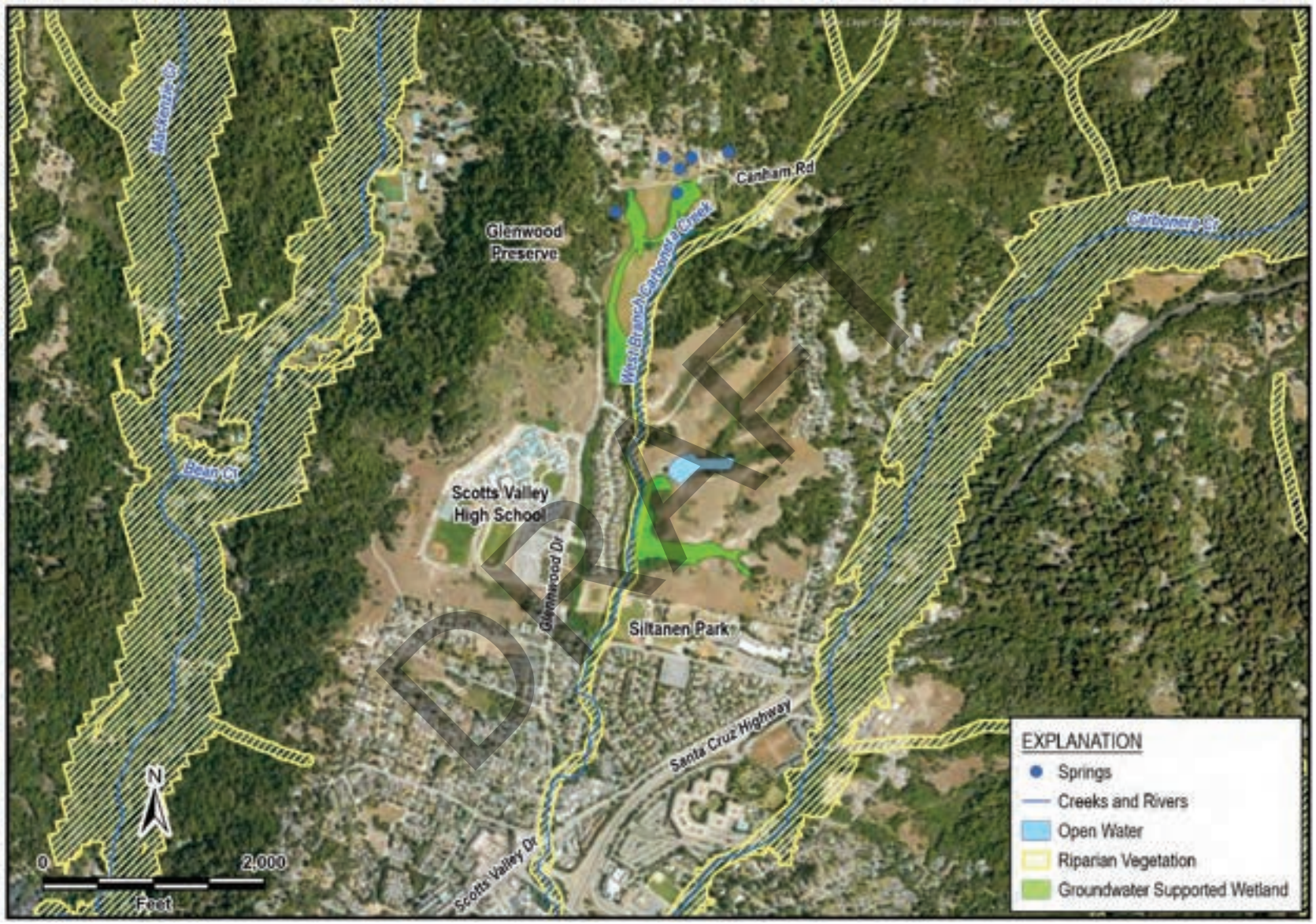
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Table 7A-3. NDVI-Based Vegetation Health Categories for Groundwater Dependent Ecosystems in Area 3

Vegetation Health Category	NDVI Range	WY2020	WY2021	WY2022	WY2023	WY2024	WY2025
Standing Water or Bare Ground	< 0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Unhealthy	0 – 0.3	3.49%	3.42%	3.42%	3.42%	0.00%	3.27%
Poor Health	0.3 to 0.45	0.00%	0.07%	0.07%	0.07%	3.49%	0.21%
Moderately Healthy	0.45 to 0.6	7.46%	8.56%	7.46%	0.00%	0.00%	0.00%
Very Healthy	0.6 to 1	89.06%	87.95%	89.06%	96.51%	96.51%	96.51%

Overall, NDVI-based vegetation health results for mapped GDEs across all 3 areas indicate consistently stable and healthy conditions throughout the 2020–2025 evaluation period. Across the Basin, vegetation health was overwhelmingly classified as “Very Healthy” each year, with minor and recurring variability limited to a small subset of groundwater supported wetlands and quarry pond features. No persistent or worsening trends were identified during dry or critically dry water years, and conditions remained stable through subsequent normal and wet years. Taken together, these results indicate that groundwater conditions during the evaluation period did not result in significant and unreasonable impacts to GDEs in the Basin.

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Figure 7A-4. Groundwater Dependent Ecosystems in Area 3