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CHAPTER 3
CENTRAL MANAGEMENT AREA SUSTAINABLE MANAGEMENT CRITERIA AND MONITORING NETWORK

The Central Management Area Groundwater Sustainability Agency (CMA GSA) has defined the sustainability goal with consideration of the beneficial uses and users of the Basin. This chapter of the GSP presents the sustainability goal including how it was determined and how sustainability will be achieved and maintained through the 50-year planning and implementation horizon. Each component of the Sustainable Management Criteria is presented in a subsection of this Chapter as it applies to the specific conditions of the CMA beginning with the sustainability goal (Section 3.1) followed by the undesirable results pertaining to the sustainability indicators (Section 3.2), minimum thresholds used as indicators of potentially unsustainable conditions (Section 3.3), and measurable objectives marking sustainability (Section 3.4)[1], and effects of sustainable management criteria on neighboring basins (Section 3.5). The monitoring network provides the quantifiable metrics on which the sustainable management criteria are based (Section 3.6). The monitoring network has been configured to assess groundwater conditions within the Basin and fill the data gaps needed to further evaluate the sustainability indicators. The sustainable management criteria defined in this GSP will be periodically re-evaluated through the Sustainable Groundwater Management Act (SGMA)-required annual reports and periodic updates and adjusted as needed to achieve and maintain sustainability in accordance with the sustainability goal.

3.1 Sustainability Goal

The sustainability goal for the Santa Ynez River Valley Groundwater Basin is to sustainably manage the groundwater resources in the Western, Central, and Eastern Management Areas for current and future beneficial users of groundwater. The absence of undesirable results, defined as significant and unreasonable effects of groundwater conditions, throughout the planning horizon

- [1] A sustainability indicator refers to "any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results" (Title 23 CCR Section 351(ah)).
- A minimum threshold means "a numeric value for each sustainability indicator used to define undesirable results" (Title 23 CCR Section 351(t)).
- A measurable objective means "specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin" (Title 23 CCR Section 351(s)).

will indicate that the sustainability goal has been achieved. Sustainable management will be defined as groundwater management that:

(1) Maintains long-term groundwater elevation at levels adequate to support existing and anticipated beneficial uses,
(2) Maintains a sufficient volume of groundwater in storage to ensure groundwater availability during periods of drought and recovery during wet climate conditions,
(3) Maintains water quality conditions to support ongoing beneficial use of groundwater for agricultural, municipal, domestic, and industrial and environmental supply.

The groundwater resource will be managed through management actions and projects implemented by the respective Groundwater Sustainability Agencies. Management of the Basin will be supported by monitoring (where appropriate) groundwater levels, groundwater in storage, groundwater quality, land surface elevations, interconnected surface water, and seawater intrusion. If significant and unreasonable effects are identified resulting from groundwater pumping, management actions will be taken to mitigate the undesirable results within 20 years of the adoption date(s) for the three Groundwater Sustainability Plans submitted for the Basin. The GSAs will adaptively manage any projects and management actions to ensure the GSP is effective and undesirable results are avoided.

The sustainability goal for the CMA was developed using historical data, including groundwater elevations, groundwater in storage, and groundwater quality, discussed in detail in Chapter 2. The Buellton Upland and Santa Ynez River Alluvium are the two Subareas that compose the CMA. Water levels and groundwater in storage within the Santa Ynez River Alluvium Subarea fluctuate primarily in response to existing water rights and environmental regulations (Section 3.1.1 and Chapter 2). Additional groundwater elevation is needed in the Buellton Upland Subarea of the CMA. Existing groundwater elevation data in the CMA is limited to isolated areas in the western and southeastern one third of the Subarea. The need for additional data has been identified as a data gap (Groundwater Conditions TM, Section 1.3). Groundwater elevation data at the few locations has been collected since the 1940s. The direction of groundwater flow is from north to south across the Subarea toward the Santa Ynez River (Groundwater Conditions TM, Section 1.2.1). Although there is adequate aerial distribution of water quality monitoring wells within the Buellton Upland Subarea, data gaps exist related to well construction information and historical trends of some constituents (Section 3.6, Monitoring Network). Although an upper and lower aquifer have been identified within the Santa Ynez River Alluvium Subarea, east of the Buellton Bend, the aerial extent and depth of the two aquifers is also identified as a data gap.

Groundwater well hydrographs and basin storage calculations indicate that, within the Buellton Upland Subarea of the Basin, groundwater extractions and storage have historically fluctuated in response to climate and that the Subarea recovers readily from dry periods (CMA Groundwater

Conditions Memo). There has been no net change in groundwater storage from 1982 through 2020. Water quality within the Buellton Aquifer is at or below the Water Quality Objectives established in the RWQCB Basin Plan (CCWQCP) for relevant constituents (Chapter 2). Although there are water quality data gaps in the Buellton Upland, the historical and current data suggest that undesirable results have not occurred historically and are not currently occurring within the areas of the Buellton Upland for which groundwater conditions are known with respect to any of the SGMA sustainability indicators (Section 3.1.2.).

3.1.1 The Santa Ynez River Alluvium

Alluvium upstream of the Lompoc Narrows is part of the subflow of the river, which is regulated by the California State Water Resources Control Board (SWRCB). Because subflow is considered surface water, the Santa Ynez River Alluvium would not be classified as a principal aquifer or managed by a GSP under SGMA. The Santa Ynez River Alluvium Subarea is regulated by water rights orders and environmental regulations, the compliance with which require management of Santa Ynez River flows and storage within the Santa Ynez River Alluvium via releases from Cachuma Reservoir. Water within the Santa Ynez River Alluvium is classified as surface water (**Figure 3-1**). Although the Santa Ynez Alluvium Subarea is within the DWR-defined Santa Ynez River Valley Groundwater Basin (DWR Basin No. 3-15), the CMA GSA does not have authority to manage conditions within the Santa Ynez River Alluvium related to water levels, water quality, groundwater in storage, subsidence, and interconnected surface and groundwater. To the extent that there is connectivity between the Santa Ynez Alluvium and the Buellton Upland Subarea, achieving and maintaining sustainable conditions within the Buellton Upland Subarea will benefit sustainability within the Santa Ynez River Alluvial Subarea.

3.1.2 Buellton Aquifer Data Gaps

Data and information that is currently and historically available for the Buellton Aquifer Subarea is summarized in Chapter 2 (Groundwater Conditions). Data gaps in the Subarea include temporal and spatial groundwater elevation data used to evaluate and monitor groundwater in storage, surface and groundwater connectivity, and GDEs. As part of GSP implementation, the CMA GSA will identify, additional existing wells that are suitable for reducing data gaps within the subarea (Section 3.6, Monitoring Network and Chapter 4, Projects and Management Actions). Wells for the monitoring program will be selected based on location, use, accessibility, and availability of construction information. Where possible, they will be non-producing wells to best obtain readings representative of static groundwater conditions within the aquifer. Wells fulfilling the appropriate requirements will be added to the GSA monitoring program along with the four existing volunteer wells included in the current CASGEM program within the Buellton Upland Subarea. Where necessary to collect adequate data to evaluate the sustainability indicators, additional representative monitoring wells (RMWs) may be constructed. Such RMWs may include piezometers proximal to potential GDEs and monitoring wells in areas where none are available. Adding at least two more additional wells to the RMWs is scheduled to be implemented within two years of GSP submittal to DWR. Based on data and information obtained through the addition of monitoring capabilities within the CMA, the sustainable management criteria presented below will be modified as appropriate through the GSP periodic updates to achieve sustainability according to the stated Sustainability Goal (Section 3.1).

The extent of the Buellton Aquifer underlying Santa Ynez River Alluvium, and exact number of wells pumping from which aquifer, in the Santa Ynez River Alluvium subarea is also a data gap. Where the Buellton Aquifer underlies the Santa Ynez River Alluvium, sustainable management criteria relevant to the Buellton Aquifer will apply to the wells that pump in part or in whole from the Buellton Aquifer. The current estimated extent of the Buellton Aquifer within the Santa Ynez River Alluvium Subarea is the reach east of Buellton Bend within the CMA and for wells deeper than 130 feet, which is estimated to represent roughly 15% of all wells within Santa Ynez River Alluvium subarea. As part of the implementation of this GSP, the CMA GSA will identify criteria to determine which aquifer is being pumped based on the current aerial geophysical study recently surveyed in November 2020 and aquifer properties described in the HCM. A program will be established for well owners in this area to register their wells as either part of the Buellton Aquifer or totally within the Santa Ynez River Alluvium (Chapter 4, Projects and Management Actions).

3.2 Undesirable Results

Under SGMA, undesirable results occur when the effects caused by groundwater conditions occurring throughout the CMA cause significant and unreasonable impacts to any of six sustainability indicators:

- Significant and Unreasonable Chronic Lowering of Groundwater Levels
- Significant and Unreasonable Reduction of Groundwater in Storage
- Significant and Unreasonable Seawater Intrusion
- Significant and Unreasonable Degradation of Water Quality Resulting from Groundwater Withdrawal
- Significant and Unreasonable Land Subsidence Resulting from Groundwater Withdrawal
- Significant and Unreasonable Reduction of Interconnected Surface Water and Groundwater Resulting from Groundwater Withdrawal

The CMA GSA has evaluated sustainability indicator using the data and processes compiled for this GSP and with consideration of the beneficial uses and users within the CMA. The CMA GSA is required to characterize undesirable results for each indicator unless "*undesirable results to one or more sustainability indicators are not present and are not likely to occur in the basin*," (23 CCR 354.26 (d)). Except for seawater intrusion, each of the six sustainability indicators has the potential to occur within the CMA and each has been evaluated regarding undesirable results. No undesirable results are currently occurring within the Buellton Upland Subarea related to any of the sustainability indicators as a result of groundwater extraction. Because groundwater usage and conditions may lead to undesirable results, the CMA GSA has defined significant and unreasonable results for each applicable sustainability indicator. Each of the sustainability indicators for which there are data gaps or too little data to fully evaluate the related undesirable results will be further defined by the development of additional monitoring capabilities through GSP implementation (Section 3.1.2).

3.2.1 Chronic Lowering of Groundwater Levels – Undesirable Results

Chronic lowering of groundwater levels is an indicator that is applicable to, but not occurring within, the CMA. Chronic lowering of groundwater levels in the Buellton Upland would occur in the form of lowered groundwater elevations that significantly and unreasonably reduce the total volume of water in storage, eliminate or reduce the ability of production wells to economically access groundwater, or cause disconnection from surface water that sustains habitat or groundwater dependent ecosystems (GDEs). Beneficial uses within the CMA are presented in Chapter 2 and include municipal and domestic supply, agriculture, and industry, and environmental uses, all of which are supplied, at least in part by groundwater. The primary cause of groundwater conditions that would lead to chronic lowering of groundwater levels is groundwater production more than natural and artificial recharge over a period that contains both wet and dry water years. Groundwater elevations in the CMA will be used to determine whether significant and unreasonable reduction of groundwater storage occurs. Historical data indicates there has not been any loss in total groundwater in storage over the last 49 years, a period containing both wet and dry climate cycles (Section 2, Groundwater Conditions)

In the Buellton Upland Subarea, groundwater extractions, monitored since 1994, peaked in 2015 with recent drought conditions at approximately 4,600 AFY (Section 2, Groundwater Conditions). Groundwater elevation hydrographs from monitoring wells in the Buellton Upland Subarea generally indicate historical low elevations during previous drought periods including the early 1970s, late 1990s (CMA Groundwater conditions TM, Figures 1-4AB). Groundwater elevation generally recovers readily from low levels in response to wet or average precipitation (7N/33W-36J1, 7N/32W-31M1, 6N/32W-06K1, Appendix A Hydrographs) indicating that there has not historically been chronic lowering of groundwater levels. Throughout the period, groundwater extractions correlated approximately with climate, increasing during dry periods and decreasing during wet periods (CMA Groundwater conditions TM, Figure 2-4).

There is not current or historical evidence of widespread undesirable results related to declining groundwater levels including groundwater elevations dropping below well design capacity or impacts to or loss of GDEs. In accordance with the Santa Ynez River Water Conservation District (SYRWCD) policy, groundwater production and well status (active or inactive) is reported by groundwater users including for agriculture, municipal, and domestic well owners (Stetson 2020). **Figure 3-2** illustrates that the number of inactive wells has remained relatively constant throughout the period of record including through historical and recent droughts, suggesting that wide-spread undesirable results resulting from chronic groundwater level decline have not occurred. The historical groundwater pumping presented in Section 2 Water Budget also indicates no decrease in groundwater pumping over time, also suggesting that wide-spread undesirable results resulting from chronic groundwater level decline have not occurred. This is also consistent with input from water users in the CMA during the GSA and CAG meetings that no significant and unreasonable effects associated with groundwater level decline have been observed historically in the CMA.

Based on historical groundwater elevation data, the undesirable result related to water level decline is the groundwater level at which beneficial uses may be disrupted by groundwater levels dropping below the tops of screens. Conditions that threaten long-term groundwater accessibility for agricultural, municipal, and domestic supply correspond to static water levels that stabilize within the perforated sections of a groundwater extraction well. Static groundwater elevations that reside within the perforated sections of an extraction well may lead to pump failure from entrained air or insufficient net positive suction head (Driscoll, 1968; Roscoe Moss, 1990). In addition, the introduction of entrained air may increase well screen fouling from increased biological activity and geochemical reactions that lead to mineral precipitation (Driscoll, 1968; Schneiders, 2003).

Figure 3-3 is a well impact analysis indicating that groundwater levels that drop 10 feet below 2020 conditions result in about 30 percent of the top of municipal and domestic well screens becoming exposed. This remains the case to about 20 feet below 2020 water levels. The criteria for undesirable results related to declining groundwater is the level at which about one third of municipal and domestic well screens become exposed with consideration of historical low groundwater levels and allowance for operational flexibility. This well impact analysis along with agreement with historical low water elevations was accepted by the CMA GSA Committee as the basis for establishing undesirable results and minimum thresholds. Data Gaps related to groundwater levels and groundwater in storage in the Buellton Upland will be addressed with implementation of an expanded monitoring program (Section 3.1.2).

3.2.2 Reduction of Groundwater in Storage – Undesirable Results

Reduction of groundwater in storage is an undesirable result that is applicable to, but not occurring within, the CMA. Reduction of groundwater in storage is related to chronic lowering of groundwater levels (Section 3.2.2). The primary cause of reduction of groundwater in storage would be groundwater production in excess of natural and artificial recharge during a climate period containing both wet and dry water years. Significant and unreasonable reduction of groundwater in storage would impact beneficial uses and users of groundwater in the Buellton Upland Subarea by limiting the volume of groundwater available for domestic, municipal, industrial, and agricultural supplies.

Groundwater elevation is used as a proxy for groundwater in storage in this GSP. Based on well construction information, historical groundwater production, and water level data, the undesirable result for groundwater in storage is equivalent to that for groundwater levels, i.e. the groundwater level at which about thirty percent of the top of domestic and municipal well screens become exposed (Section 3.3). A review of groundwater elevation data in the CMA indicate that groundwater storage in the Buellton Upland has rebounded after each dry period since the mid-1980s and increased during wet periods. An indicator of undesirable results related to reduction of storage would be a net decline in storage over a period containing both wet and dry cycles. There was no net change in groundwater storage during the historical period from 1982 through 2018 (CMA Groundwater Conditions TM, Figure 2-4, Draft CMA Water Budget TM). There is no historical evidence of widespread negative impacts related to diminished water in storage even during extended dry periods (Section 3.2.2). In addition, the availability of imported water to the City of Buellton from the State Water Project provides operational flexibility for reduction of groundwater in storage to the extent that it remains available during drought conditions occurring in Central California (Chapter 2).

Data Gaps related to groundwater levels and groundwater in storage in the Buellton Upland will be addressed with implementation of an expanded monitoring program (Section 3.1.2, Chapter 4)

3.2.3 Seawater Intrusion – Undesirable Results

Seawater intrusion is a sustainability indicator that is not applicable to the CMA. The western boundary of the CMA is over 15 miles inland from the coast and groundwater elevations have remained above 200 feet msl for the period of record (CMA HCM Draft TM, Figures 1-3 through 1-5CD). Because sea water intrusion is a sustainability indicator that is not applicable to the CMA, there are no undesirable result defined for its occurrence.

3.2.4 Degradation of Water Quality – Undesirable Results

Degradation of water quality is an undesirable result that is applicable to the CMA but not occurring in the Buellton Aquifer. Water quality is monitored throughout the Buellton Upland Subarea and within the Santa Ynez River Alluvium Subarea where wells are completed within the Buellton Aquifer (**Figure 3-4**). Groundwater quality data within the Buellton Upland is geographically sufficient but limited temporally to the recent past (**Table 3-1**). As such, there are data gaps with regard to potential relationships between groundwater quality, level, and pumping. There could be multiple causes for possible future degraded water quality besides groundwater pumping, including wastewater treatment and agricultural and industrial sources (Haas et. al, 2019). Groundwater served by the City of Buellton for municipal supply is treated in compliance with Title 22 of the California Code of Regulations (Chapter 2). The sustainable management criteria for groundwater quality are based primarily on the Central Coast Basin Water Quality Control Plan (CCWQCP) prepared by the California State Water Boards (CMA Groundwater Conditions TM, Section 3). Water quality within the Buellton Upland Subarea meets most Water Quality Objectives (WQOs) established by the CCWQCP. Undesirable results related to groundwater quality are defined as water quality for any constituent of concern that is not sufficient for the beneficial uses within the Basin.

3.2.4.1 Point Source Pollutants

All known point sources of contamination related to industrial releases have been managed in compliance with applicable State laws and regulations. All but two sites within the CMA have been remediated and closed per the applicable regulations (CMA Groundwater Conditions TM). The two remaining sites are within the Santa Ynez Alluvial Subarea and not subject to CMA GSA oversite (Figure 3-1, CMA Groundwater Conditions TM). Undesirable results associated with point sources of contamination is overseen by the State Water Resources Control Board and are not established as part of this Plan. Any project management or actions under this GSP will not influence plume migration and negatively influence groundwater quality.

3.2.4.2 Constituents of Potential Concern

Constituents of potential concern within the CMA include TDS, chloride, sulfate, boron, sodium, and nitrate (CMA Groundwater Conditions TM). **Table 3-1** lists the Water Quality Objectives (WQOs) established for each constituent according to the CCWQCP. Note that the WQOs are averages for monitoring well samples collected throughout the CMA for the period 2015 to 2018 and are designated according to the beneficial uses within the CMA (CMA Groundwater Conditions, Section 3.1.1). Median water quality concentrations for individual constituents are calculated for the years 2015 to 2018. Time-series graphs of historical groundwater quality data for relevant constituents by well are included as **Appendix B** and summarized in **Table 3-2**.

Table 3-1: Median Groundwater Quality Objectives (mg/L) and average 2015-2018 salt and nutrient concentrations (mg/L) in the Buellton Aquifer CMA

Salinity as Total Dissolved Solids (TDS)			Chloride		Sulfate		Boron		Sodium		Nitrate as N		
Objective (mg/L)	SMC (mg/L)	Average 2015-2018	Objective (mg/L)	Average 2015-2018	Objective (mg/L)	Average 2015-2018	Objective (mg/L)	Average 2015-2018	Objective (mg/L)	Average 2015-2018	Objective (mg/L)	MCL (mg/L)	Average 2015-2018
1,500	1,000	379	150	58	700	77	0.5	NA	100	41	1	10	3.5

Total Dissolved Solids (TDS) Undesirable Results

Agriculture use is the predominant beneficial use of groundwater within the CMA (Chapter 2, Section x). Based on crop types and crop sensitivities within the CMA, the undesirable result for TDS is evaluated based on the SMCL of 1,000 mg/L instead of WQO of 1,500 mg/L (Section 3.3.4). This more restrictive threshold allows for future crop types that may be more sensitive to salinity and reduces the need to extract and apply additional water to flush soils.

Nitrate Undesirable Results

Sources of nitrate within the CMA Subarea may include septic systems, fertilizer, animal waste, and wastewater. Although the forms of nitrogen potentially found in groundwater include nitrate, nitrite, and ammonia, nitrate is the predominate concern within the Subarea (CMA Groundwater Conditions TM, Section 3.4.6). The maximum contaminant level (MCL) for nitrate in drinking water is 10 mg/L for nitrate as nitrogen. High levels of Nitrate is considered to be undesirable for other uses, including watering of livestock and sensitive crop irrigation, at concentrations exceeding 100 mg/L and 5 to 30 mg/L, respectively (CMA Groundwater Conditions TM). The CCWQCP WQO is for nitrate and nitrite as nitrogen is 1 mg/L for the Buellton Upland Subarea. Because the most sensitive use of groundwater within the CMA is potentially untreated groundwater served through domestic wells, undesirable result for water quality degradation related to groundwater production is a nitrate concentration of 10 mg/L, the MCL for potable water. The median nitrate concentration in the Buellton Upland Subarea was 3.5 from 2015 to 2018, below the 10 mg/L, threshold. Therefore, nitrate concentration does not present an undesirable result within the Subarea.

Other Constituents of Potential Concern

Median groundwater quality concentrations for the relevant constituents are in all cases below the objectives or modified objectives for TDS and Nitrate (**Table 3-1**). Constituent concentrations measured in individual representative wells for the period of available record indicate occasional exceedance of the objectives for isolated measurements in individual wells (**Table 3-2**). In every well and for each constituent, the most recent sample analysis is below the objectives, except the TDS concentration which was near 1,000 mg/L for one well (**Table 3-2**). Based on these data, undesirable results are not occurring within the Buellton Aquifer with respect to groundwater quality.

Table 3-2: Historical Water Quality Summary, Representative Monitoring Wells

DMS ID	Well ID	State ID	Approximate	Approximate TDS Range	Most Recent TDS	Currently Exceeds TDS MO?	Approximate Cl- Range	Most Recent Cl-	Currently Exceeds Cl- MO?	Approximate SO4 Range	Most Recent SO4	Currently Exceeds SO4 MO?	Approximate NA Range	Most Recent NA	Currently Exceeds NA MO?	Approximate N Range	Most Recent N	Currently Exceeds N MO?
3173	AGL020021622	7N/33W-36	2014 - 2018	200 - 520	200	No	30 - 90	30	No	15 - 175	15	No	26 - 70	28	No	2.0 - 11.5	?	?
3137	AGL020001355	7N/32W-31	2014 - 2018	180 - 240	180	No	30 - 40	30	No	15	15	No	32 - 31	31	No	2.5 - 3.1	2.5	No
3337	AGL020014946	7N/32W-35	2014 - 2018	380 - 650	440	No	40 - 70	40	No	90 - 220	120	No	32 - 58	35	No	0.5 - 18.5	0.5	No
3076	AGL020008330	6N/32W-3	2014 - 2018	990 - 1220	980	No	110 - 130	130	No	200 - 415	210	No	78 - 150	78	No	2.0 - 20	2	No
909	Buellton Well 09	6N/32W-12K02	1992 - 2019	660 - 780	740	No	45 - 60	60	No	180 - 250	225	No	42 - 60	58	No	0.2 - 4.8	1.7	No

Notes: All concentrations are mg/L,

TDS = Total Dissolved Solids, WQ Objective = 1,000

CL- = Chloride, WQ Objective = 150

SO4 = Sulfate, WQ Objective = 700

NA = Sodium, WQ Objective = 100

N = Nitrate, WQ Objective = 10

3.2.5 Land Subsidence – Undesirable Results

Inelastic land subsidence is an undesirable result not currently occurring or likely to occur in the future within the CMA. Groundwater production from the CMA may result in significant and unreasonable land subsidence if the subsidence "*substantially interferes with surface land uses*" (California Water Code, Section 10721(x)(5)). Subsidence related to groundwater extraction can occur with groundwater elevations maintained below previous historical low water levels and in the presence of extensive fine-grained sediments.

No significant historical or recent land subsidence has been documented in the CMA (USGS 2021) and although Basin aquifers include fine grained materials that, if unsaturated, may be susceptible to collapse, these are not thought to be laterally extensive enough to pose a significant risk of land subsidence (CMA HCM TM). InSAR land surface elevation data has documented total vertical displacement of from about 0.25 inches of land surface rise to about a 0.5 inches of land surface subsidence since January 2015. There is no evidence of historical infrastructure failure attributable to inelastic land subsidence from groundwater extraction (Draft SYGSP Land Subsidence Memo). Note that subsidence may occur from forces other than those related to groundwater extraction, including tectonic forces.

Land subsidence from groundwater extraction is not expected to become an undesirable result within the CMA due to hydrogeologic conditions that are not conducive to land subsidence and because SMCs for other sustainability indicators will preclude the lowering of groundwater levels significantly below the historical low elevation. The undesirable result is defined as land subsidence resulting from groundwater extraction that substantially interferes with surface land uses.

3.2.6 Depletion of Interconnected Surface Water – Undesirable Results

There are no perennial rivers, creeks, or wetlands within the CMA. Ephemeral channels include the Santa Ynez River, Zaca Creek, Santa Rosa Creek, and related tributaries (Section 2, HCM). Available hydrographs within the Buellton Upland Subarea indicate historical groundwater depths that are greater than 50 feet below ground surface (Section 2, Groundwater Conditions). Based on the locations of potential GDEs, hydrographs from existing wells, and the ephemeral nature of the creeks and tributaries of the Buellton Upland Subarea, depletion of interconnected surface water is an undesirable result that is not occurring.

Underflow within the Santa Ynez River Alluvium Subarea is defined as surface water and regulated by the State. As such, surface water flow and connectivity to the underlying groundwater is influenced by releases from Cachuma Reservoir (Chapter 2, Hydrogeologic Conceptual Model). Ground and surface water within the Santa Ynez River Alluvium Subarea is monitored extensively and reported in accordance with State Water Resources Control Board (SWRCB) Water Rights Order 2019-0148. Because surface water releases through the Cachuma reservoir to the CMA are managed under the SWRCB WR 2019-0148 and the diversions of water from Santa Alluvium subarea are under jurisdiction of the SWRCB, depletion of surface water within the Santa Ynez River Alluvium Subarea is not within the purview of the CMA GSA and under jurisdiction of the SWRCB. Therefore, sustainable management criteria have not been set for interconnected surface water and groundwater for the Santa Ynez River Alluvium Aquifer.

Groundwater Dependent Ecosystems

Potential GDEs from the Natural Communities Commonly Associated with Groundwater (CCAG) datasets were screened to eliminate wetland and vegetation identified in the database that were not GDEs. Screening was based, in part, on hydrographs from existing monitoring wells in which the depth to groundwater has historically exceeded the 30-foot depth identified by the Nature Conservancy as representative of groundwater conditions that may sustain common phreatophytes and wetland ecosystems (Rohde et al. 2018). The resulting locations of potential GDEs, those communities that could not definitely be eliminated from the NCCAG database, is shown on **Figure 3-5**. Potential GDEs exist only within the Santa Ynez River Alluvium Subarea and in a small area at the south end of Santa Rosa Creek. There is no indication of undesirable results related to this potential GDE at the downstream end of Santa Rosa Creek. Groundwater depth related to the potential GDE is a data gap that the CMA GSA will fill with the installation and monitoring of a piezometer in the vicinity of this potential GDE (Chapter 4, Projects and Management Actions).

For the eastern area of the Santa Ynez River Alluvium that overlies the Buellton Aquifer, there is no indication of undesirable results and that historical groundwater elevations in the overlying Santa Ynez River Alluvium Aquifer were sufficient to support habitat and ecosystem health along the Santa Ynez River due to managed releases from Cachuma Reservoir (Jones and Stokes, 2000).

3.2.7 Defining Undesirable Results

Groundwater conditions within the CMA are monitored by several agencies including the City of Buellton, United States Bureau of Reclamation, United States Geologic Survey, and Santa Barbara County (CMA Groundwater Conditions TM, Section 1.1). Groundwater quality data is from multiple publicly available sources including the Irrigated Lands Regulatory Program, the State Water Resources Control Board, the United States Environmental Protection Agency, and the United States Geological Survey (Chapter 2). Groundwater elevation and groundwater quality measurements will continue to be collected from these sources as in the past. A subset of 11 wells from the broader monitoring programs have been selected, based on location, historical record, accessibility, and construction information as representative monitoring wells (RMWs) to evaluate the sustainable management criteria related to undesirable results within the CMA. Undesirable results related to chronic declines in groundwater elevation and significant and unreasonable loss of groundwater in storage will be tied to groundwater levels and determined using 6 of the 11 RMWs (**Table 3-3**). Undesirable results related to significant and unreasonable degradation of water quality will be determined using 8 of 11 RMWs (**Table 3-3**). Undesirable results associated with land subsidence will be quantified by comparing InSAR data and continuous GPS data to groundwater elevation trends measured at the RMWs.

3.3 Minimum Thresholds

This section describes the minimum thresholds established for chronic lowering of groundwater levels, significant and unreasonable reduction of groundwater in storage, degraded water quality, disconnected surface and groundwater, and land subsidence related to groundwater withdrawals that substantially interferes with surface land uses. The minimum thresholds described below avoid undesirable results related to the beneficial uses within the CMA. Data gaps are noted where applicable and will be filled with the implementation of the GSP through the projects and management actions described in Chapter 4. Because undesirable results are not currently occurring within the CMA, interim milestones are not established.

Table 3-3 – Representative Monitoring Wells						
RMW Name	WQ Well ID	DB Well ID	Subarea	Principal Aquifer	Screen Interval (ft bgs)	Sustainability Indicator(s) Monitored
7N/33W-36J1	NA	82	Buellton Upland	Buellton Aquifer	Unknown	GW level, GW in Storage
7N/32W-31M1	NA	75	Buellton Upland	Buellton Aquifer	Unknown	GW level, GW in Storage
6N/31W – 7F1	NA	90	Santa Ynez River Alluvium	Buellton Aquifer	Unknown	GW level, GW in Storage
6N/32W-12K1, 12K2	Buellton Well 09	909	Santa Ynez River Alluvium	Buellton Aquifer	Unknown	GW level, GW in Storage, WQ
7N/32W-35	AGL020014946	3337	Buellton Upland	Buellton Aquifer	Unknown	WQ, GW Level (Future), GW in Storage (Future)
6N/32W - 7	AGL020036041	3220	Buellton Upland	Buellton Aquifer	120 -300	WQ, GW Level (Future), GW in Storage (Future)
7N/33W-36	AGL020021622	3173	Buellton Upland	Buellton Aquifer	Unknown	WQ
7N/32W-31	AGL020001355	3137	Buellton Upland	Buellton Aquifer	330 – 810 (Multiple)	WQ
6N/32W-3	AGL020008330	3076	Santa Ynez River Alluvium	Buellton Aquifer	280 - 480	WQ
6N/31W-8	AGL020028450	3139	Buellton Upland	Buellton Aquifer	Unknown	WQ (Future?)
6N/32W – 9G1			Santa Ynez River Alluvium	Santa Ynez River Alluvium Aquifer	NA	Interconnected Surface Water
6N/32W – 13G2			Santa Ynez River Alluvium	Santa Ynez River Alluvium Aquifer	NA	Interconnected Surface Water
6N/32W – 17R1			Santa Ynez River Alluvium	Santa Ynez River Alluvium Aquifer	8 - 28	Interconnected Surface Water

NA - Not Applicable

Table 3-4:
Minimum Thresholds at Representative Monitoring Wells

RMW	WQ ID	Chronic Decline in Groundwater Levels and Groundwater in Storage (ft MSL)	Chronic Decline in Groundwater Levels Trigger Point (ft MSL)	Reduction of Groundwater Storage (ft MSL)	Degradation of Water Quality (mg/L) TDS/Cl-/SO4/NA/N
7N/33W-36J1	NA	357	362	357	NA
7N/32W-31M1	NA	359	364	359	NA
6N/31W – 7F1	NA	292	297	292	NA
6N/32W-12K1, 12K2	Buellton Well 09	276	281	276	1,000/150/700/100/10
7N/32W-35	AGL020014946	TBD	TBD	TBD	1,000/150/700/100/10
6N/32W - 7	AGL020036041	TBD	TBD	TBD	1,000/150/700/100/10
7N/33W-36	AGL020021622	NA	NA	NA	1,000/150/700/100/10
7N/32W-31	AGL020001355	NA	NA	NA	1,000/150/700/100/10
6N/32W-3	AGL020008330	NA	NA	NA	1,000/150/700/100/10
6N/31W-8	AGL020028450	NA	NA	NA	1,000/150/700/100/10

Notes: All concentrations are mg/L, TBD - To Be Determined, NA - Not Applicable
TDS = Total Dissolved Solids, WQ Objective = 1,000
CL- = Chloride, WQ Objective = 150
SO4 = Sulfate, WQ Objective = 700
NA = Sodium, WQ Objective = 100
N = Nitrate, WQ Objective = 10

3.3.1 Chronic Lowering of Groundwater Levels – Minimum Thresholds

Minimum threshold groundwater elevations at the 4 RMWs (**Appendix A**) were established to: (i) protect municipal, agricultural, and domestic groundwater users and supply, (ii) prevent potential land subsidence, and (iii) maintain 2015 levels of water quality and surface water-groundwater connection along the Santa Ynez River. The rationale in choosing the minimum thresholds to prevent significant and unreasonable results in the CMA has two major components: 1) the minimum threshold water level will be set to limit the impact on existing groundwater well screen intervals; and 2) the minimum threshold should not be more than 15-feet below basin-wide current 2020 water levels.

Available data indicates that historical low groundwater elevations were about 15 to 20 feet below current 2020 levels with no undesirable results occurring at that time. In addition, a well impact analysis was developed to evaluate static water levels associated with the top of well screens for domestic, municipal, and agricultural beneficial uses. Based on the above considerations, the minimum threshold for chronic lowering of groundwater levels in the Buellton Upland Aquifer was chosen by the CMA GSA to be 15 feet below 2020 groundwater levels in half of the RMWs for a period of two consecutive non-drought[2] years (**Table 3-4** and **Appendix A**). 15 feet below 2020 groundwater elevations is the level at which 30 percent of domestic and municipal wells would begin to entrain air into the screens and is established with consideration of operational flexibility and beneficial use types within the basin. About 10 percent of agricultural wells would be impacted at this level.

Groundwater levels within the Buellton Upland Aquifer respond readily to precipitation events. Therefore, the occurrence of the minimum threshold for two non-drought years was selected to allow for short term dry periods which would not result in the occurrence of undesirable results. GSA management actions (Section 4) will be planned to accommodate drought periods and ensure short-term impacts can be offset by increases in groundwater levels or storage during normal or wet periods. The criteria of half of the RMPs wells addresses the GSA management on basin-scale water level conditions.

Minimum threshold water levels for RMWs, 7N/32W-35, and 6N/32W-36 will be established with the collection of additional data and at least two additional RMPs will be established to fill existing data gaps within the Buellton Upland Subarea in the areas shown on **Figure 3-1** and described in further detail in Chapters 4 and 5. Groundwater elevations measured at each of the RMPs will be reported to DWR in the annual reports that will follow the submittal of this GSP.

Chronic Lowering of Groundwater Levels Trigger Point

To allow adequate time for the implementation of projects and management actions to address declining water levels prior to the occurrence of minimum thresholds, a "trigger point" has been established to begin preliminary management actions to mitigate the chronic lowering of groundwater levels. The trigger point is activated with groundwater levels reaching 5 feet above the established minimum thresholds in half of the RMWs for a period of 1 year (**Table 3-4**). In addition, another early contingency management trigger will be when the capacity of municipal water supplies are impacted by greater than 20%. For example, for the Upper Aquifer, this will occur when the City of Buellton's municipal total well pumping capacity is reduced by 20% due to groundwater level decline. This will trigger early management actions such as requesting water rights releases from the Cachuma Reservoir (see Section 4 for more details and discussion).

[2] 2 or more consecutive years that are classified as Dry or Critically Dry (Section 2) will be defined as drought years. All other year types and combination of year types will be defined as non-drought years for the purpose of defining undesirable results under this groundwater sustainability plan.

3.3.2 Reduction in Groundwater Storage – Minimum Thresholds

Undesirable results related to groundwater storage is not occurring in the CMA and has not occurred historically (Section 3.2.3). There is a direct correlation between the volume of groundwater in storage and groundwater levels at the RMWs. Therefore, groundwater levels in the Buellton Upland Aquifer will be used as a proxy for significant and unreasonable loss of groundwater in storage with minimum thresholds defined as the decline of water levels to 15 feet below 2020 groundwater levels in half of the RMWs for a period of two consecutive non-drought years (**Table 3-4**). The proposed Buellton Upland groundwater monitoring program will provide additional elevation data with which to implement this sustainable management criteria (Chapter 4).

Reduction in Groundwater in Storage Trigger Point

As with the undesirable result of the chronic lowering of groundwater levels, a trigger point for the reduction of groundwater in storage has been established to begin preliminary management actions to mitigate loss of groundwater in storage. The trigger point is activated with groundwater levels reaching 10 feet below the 2020 groundwater levels in half of the RMWs for a period of 1 year (**Table 3-4**). Projects and management actions appropriate to declining water levels and reduction of groundwater in storage will be implemented with the occurrence of the trigger point (Chapter 4).

3.3.3 Seawater Intrusion – Minimum Thresholds

Sea water intrusion is a sustainability indicator that is not applicable to the CMA, therefore there is no minimum threshold is established for its occurrence.

3.3.4 Degraded Water Quality – Minimum Thresholds

Sustainable management criteria related to degraded groundwater quality are based largely on the WQOs from the CCWQCP (Section 3.2.5). Undesirable results for degradation of groundwater quality are not currently occurring within the Buellton Upland Aquifer and available data indicates that recent concentrations of the identified constituents of concern are below the objectives set (**Table 3-2**). With the exception of total dissolved solids and nitrate, the minimum thresholds applied to groundwater quality within the Buellton Upland are the Median Groundwater Quality Objectives from the CCWQCP. The minimum thresholds are the SMCL and MCL for total dissolved and nitrate, respectively (Section 3.4.4). Undesirable results for water quality occur with exceedance of any of the relevant constituents at half of the RMWs (**Figure 3-4**, **Table 3-4**). The criteria of half of the RMPs wells addresses the GSA management on basin-scale water level conditions.

3.3.5 Land Subsidence – Minimum Thresholds

Inelastic land subsidence is not presently nor is it likely to become an undesirable result within the CMA (Section 3.2.6). The CMA is at low risk for groundwater subsidence due to the absence susceptible fine-grained materials (Section 2, Groundwater Conditions). Minor changes in land surface elevations since the SGMA benchmark of 2015 likely result from forces unrelated to groundwater production because both land subsidence and rise have been noted and the hydrogeology does not include areas of thick, extensive clay that is typically prone to collapse. Localized lowering of land surface elevation may have occurred from causes other than groundwater withdrawal, including tectonic movement, slope failure, and excavation or grading for construction. In addition, the minimum threshold established for decline of water levels would preclude substantial land subsidence because thresholds are near historical low water elevations. The GSA proposes to monitor publicly available land subsidence satellite and continuous GPS data and report changes on a three year basis (Chapter 2, Groundwater Conditions). The land subsidence minimum threshold is a decline of six inches from the 2015 land surface elevation resulting from groundwater extractions and that interferes with land uses or infrastructure. Land use and infrastructure disruption will be determined by communication with relevant agencies and beneficial use representatives including the City of Buellton, Santa Ynez River Water Conservation District, CalTrans, and the Central Coast Water Authority.

3.3.6 Depletions of Interconnected Surface and Groundwater – Minimum Thresholds

Interconnected ground and surface water and GDEs within the Buellton Upland Subarea were screened as described in Section 3.2.7 (**Figure 3-5**). No undesirable results are currently occurring. The CMA GSA will fill data gaps related to groundwater elevation near the identified potential GDEs with the installation and monitoring of a piezometer proximal to the potential GDE at the lower end of Santa Rosa Creek. An adaptive management approach is proposed for this area consisting of evaluation of groundwater conditions and management of groundwater extractions and potentially nearby well construction. If the potential GDE is determined to be an actual GDE, the minimum threshold would be groundwater levels that drop below 15 feet bgs at the GDE location for a period of one year and corresponding with a decline in GDE health.

For the eastern area of the Santa Ynez River Alluvium that overlies the Buellton Aquifer, the minimum threshold would be groundwater levels in the Santa Ynez River Alluvium aquifer that drop below 15 feet bgs at the GDE location for a period of one year and corresponding with a decline in GDE health (**Appendix C**).

3.3.7 Relationship between Minimum Thresholds and Relationship to Other Sustainability Indicators

Groundwater levels are used as a proxy for the sustainability indicators of groundwater in storage and groundwater dependent ecosystems. The RMWs established for evaluating undesirable results related to declining water level and loss of groundwater in storage monitor groundwater level in the Buellton Aquifer. Those established to monitor groundwater dependent ecosystems are shallow wells that monitor groundwater level in the Santa Ynez Alluvial Aquifer. The minimum thresholds established for each are independent. Where there is a data gap in the connectivity between the two aquifers in the eastern part of the Santa Ynez Alluvial Subarea, the projects and management actions described in Chapter 4 will contribute to an understanding of the degree and impact of connectivity. Based on this information, sustainability criteria may be revised.

In addition, water levels in the Santa Ynez Alluvial Aquifer is influenced by the State regulations described in Chapter 1, Plan Area Description. Groundwater elevation in RMWs in the aquifer has not historically declined below the minimum threshold established and is unlikely to do so in the future (**Appendix C**). Where a potential GDE exists outside of the Santa Ynez River Alluvial Subarea, the data gap of groundwater level will be addressed through projects and management actions and the minimum threshold adjusted, if appropriate.

The source of applicable constituents and the relationship between them and groundwater level is a data gap for groundwater quality in the CMA. Therefore, it is not currently possible to evaluate the potential interaction between WQ and minimum thresholds set for the other sustainability indicators.

3.4 Measurable Objectives

Measurable objectives are “quantifiable goals for the maintenance and improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin” (23 CCR §351. Definitions). Based on the sustainability goal (Section 3.1) and undesirable results (Section 3.2) for the CMA, measurable objectives were set for the relevant sustainability indicators (**Table 3-5**).

Table 3-5:
Measurable Objectives at Representative Monitoring Wells

RMW	WQ ID	Chronic Decline in Groundwater Levels and Groundwater in Storage Measurable Objective (ft MSL)	Reduction of Groundwater Storage Measurable Objective (ft MSL)	Degradation of Water Quality (mg/L) TDS/Cl-/SO4/NA/N
7N/33W-36J1	NA	379	379	NA
7N/32W-31M1	NA	402	402	NA
6N/31W – 7F1	NA	307	307	NA
6N/32W-12K1, 12K2	Buellton Well 09	301	301	1,000/150/700/100/10
7N/32W-35	AGL020014946	TBD	TBD	1,000/150/700/100/10
6N/32W - 7	AGL020036041	TBD	TBD	1,000/150/700/100/10
7N/33W-36	AGL020021622	NA	NA	1,000/150/700/100/10
7N/32W-31	AGL020001355	NA	NA	1,000/150/700/100/10
6N/32W-3	AGL020008330	NA	NA	1,000/150/700/100/10
6N/31W-8	AGL020028450	NA	NA	1,000/150/700/100/10

Notes: All concentrations are mg/L, TBD - To Be Determined, NA - Not Applicable
TDS = Total Dissolved Solids, WQ Objective = 1,000
CL- = Chloride, WQ Objective = 150
SO4 = Sulfate, WQ Objective = 700
NA = Sodium, WQ Objective = 100
N = Nitrate, WQ Objective = 10

3.4.1 Chronic Lowering of Groundwater Levels – Measurable Objectives

Chronic lowering of groundwater levels is an undesirable result that is not occurring and has not occurred historically within the Buellton Upland (Section 3.2.2). The measurable objective for groundwater levels is the 2011 groundwater level at each RMW. The year 2011 was chosen because it preceded recent drought conditions and followed a ten-year period of near normal climatic conditions (Chapter 2, Groundwater Conditions). The 2011 groundwater levels ranged from near historical high to near historical mean elevations in Buellton Upland Aquifer RMWs (A Chapter 2, Groundwater Conditions). Measurable objectives are achieved with the 2011 groundwater elevation reached or exceeded in half of the RMWs.

Current water levels in many of the existing RMWs are near the respective 2011 groundwater elevation (6N/31W – 7F1). At some RMW locations, the current groundwater level is approximately 30 feet below the 2011 groundwater elevation (7N/32W-31M1). Current water levels in three of the RMWs are within 10 feet of the measurable objective. Undesirable results are not occurring related to declining groundwater levels (Section 3.2) and trigger points have been established to prevent the occurrence of undesirable results. The sustainability goal for the CMA is currently being achieved with allowance for operational flexibility. Therefore, interim milestones have not been established.

With its implementation, the groundwater monitoring program for the Buellton Upland Aquifer will provide adequate data to assess the measurable objective for chronic lowering of groundwater levels. Existing monitoring wells will be used to evaluate sustainable management criteria until additional wells are added through the proposed expansion of the monitoring (Chapter 4 and 5).

3.4.2 Reduction of Groundwater in Storage – Measurable Objectives

Groundwater elevation is used as a proxy for groundwater in storage. Undesirable results for reduction of groundwater in storage have not occurred within the Buellton Upland (Section 3.2.2). The measurable objective for groundwater in storage is the 2011 groundwater level, which is the same MO used for groundwater levels (**Table 3-5**). Interim milestones for the reduction of groundwater in storage are not established because the sustainability goal for the CMA is currently being met (Section 3.4.1).

3.4.3 Seawater Intrusion– Measurable Objectives

There is no measurable objective established related to sea water intrusion because it is a sustainability indicator that is not applicable to the CMA.

3.4.4 Degraded Water Quality – Measurable Objectives

Undesirable results for degradation of groundwater quality are not currently occurring within the Buellton Upland Aquifer and current water quality is well below applicable standards (Section 3.2.5). Except for total dissolved solids and nitrate, the measurable objectives applied to groundwater quality within the Buellton Upland are the Median Groundwater Quality Objectives from the CCWQCP. The measurable objectives are the SMCL and MCL for total dissolved solids and nitrate, respectively (Section 3.4.4). Measurable objectives are not specifically set for water quality but are understood to coincide with the minimum thresholds established. Distinct water quality minimum thresholds will be reevaluated with annual and periodic updates of this GSP and may be established if, over the period of implementation, constituents of concern exhibit an increasing trend approaching the measurable objectives.

3.4.5 Land Subsidence – Measurable Objective

Undesirable results related to land subsidence have not occurred historically and are not likely to occur within the CMA. Land subsidence monitoring will rely on publicly available InSAR and continuous GPS data (Section 3.2.6). The measurable objective is land subsidence of less than two inches as compared to 2015 InSAR data resulting from groundwater extraction.

3.4.6 Depletions of Interconnected Surface Water and Groundwater – Measurable Objectives

Additional groundwater level data is needed proximal to the identified potential GDE (Section 3.2.7) and is identified as a data gap for the CMA. As a mitigation, a potential project for the CMA is the installation of a piezometer in the vicinity of the GDE. The measurable objective would be set after determining existing conditions through filling of the data gap, if appropriate. For the eastern area of the Santa Ynez River Alluvium that overlies the Buellton Aquifer, the measurable objective would be groundwater levels in the Santa Ynez River Alluvium aquifer that drop below 5 feet below the channel thalweg elevation (**Appendix C**). Groundwater elevations 5 feet below the channel thalweg would ensure that the soil would be wet and be able to provide water for the GDEs along the riparian corridor.

3.5 Effects of Sustainable Management Criteria on Neighboring Basins

The CMA has limited connectivity to the EMA to the east and the WMA to the West. There are no adjacent alluvial groundwater basins to the north or south of the CMA. Because the three management areas are sub-areas of the larger Basin, the GSPs for each management area have been coordinated for consistency. Where CMA connectivity is through the Santa Ynez River, the shallow groundwater stored within the alluvium is treated as surface water. In these cases, sustainability indicators are subject to applicable state laws and regulations not within the jurisdiction of the CMA GSA (Section 3.1.1).

An additional area of connectivity between the CMA and EMA is north of the City of Solvang (Chapter 2, HCM). In these areas, groundwater subflow from the Careaga Sand formation may discharge to the CMA from the EMA (Chapter 2, HCM). Average historical subflow to the CMA from the adjacent MAs is approximately 90 AFY, less than three percent of the average total groundwater inflow of 3,550 AFY (Chapter 2, Water Budget). In addition, the EMA is hydrogeologically upgradient of the CMA. Therefore, the CMA will not impact the EMA.

The CMA is hydrogeologically upgradient from the WMA and the average historical outflow from the CMA is approximately 690 AFY, which is two percent of the average total groundwater recharge of 31,030 AFY to the WMA (WMA GSP). In addition, the water level minimum threshold within the Santa Rita Upland is five feet lower than the CMA, thereby maintaining a groundwater gradient toward the WMA. Groundwater levels are several hundred feet higher within the Santa Rosa Creek drainage compared to the Santa Rita Creek drainage, which indicates that there might be some structural impediment to flow near the surface divide between the two upland basins. Results from the AEM geophysics study currently being compiled for the project area is expected to provide additional data, but currently no subflow is assumed in the upland area (Chapter 2).

Groundwater within the CMA is of better quality than groundwater in the WMA (Chapter 2) and will not negatively impact groundwater quality in the WMA. There is minimal groundwater exchange between the EMA and CMA and the EMA is upgradient from the CMA. Therefore, groundwater quality within the CMA will not negatively impact that of the EMA.

3.6 Monitoring Network

This chapter of the GSP describes the existing monitoring networks within the CMA that are currently used to collect groundwater levels and water quality data, and the recommended CMA monitoring networks that will be used to monitor five of the applicable sustainability indicators in accordance with SGMA and the SMCs described above. The remaining sustainability indicator, seawater intrusion, does not apply to the CMA, as presented in the Hydrogeologic Conceptual Model (HCM) and Groundwater Conditions (GC) technical memoranda due to the inland location of the CMA from the ocean (greater than 20 river-miles). The recommended CMA Monitoring Networks were developed to support GSA decision making to achieve groundwater sustainability goals and objectives outlined in Chapter 3.1.

First, existing monitoring networks within the CMA for groundwater levels and water quality are described, and the wells from those existing networks that are part of the *California Statewide Groundwater Elevation Monitoring* (CASGEM) and the *Groundwater Ambient Monitoring and Assessment Program* (GAMA) are identified. Using the existing groundwater level and water quality monitoring networks within the CMA, recommended CMA monitoring networks were developed, and a subset of those wells were selected for Representative Monitoring.

Data gaps identified in Chapter 2 and discussed as part of the SMCs in Chapter 3.1, were considered during development of the recommended CMA monitoring networks. Those data gaps are described, followed by a brief description of how they will be addressed. Detailed approaches to address the identified data gaps are included in Chapter 4, Projects and Management Actions.

3.6.1 Monitoring Networks Objectives

The objectives of the CMA monitoring networks are to identify and select representative monitoring wells to collect data to support monitoring of groundwater conditions and detection of potential undesirable results, and to achieve sustainability goals. As stated in the SGMA[3], the monitoring networks will do the following:

- Demonstrate progress toward achieving measurable objectives described in the GSP;
- Monitor impacts to the beneficial uses or users of groundwater;
- Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds;
- Quantify annual changes in water budget components.

The monitoring network plan presented herein for the CMA GSA, is intended to monitor for the five applicable sustainability indicators[4] and their associated undesirable results, listed below:

- Chronic lowering of groundwater levels;
- Reduction in groundwater storage;
- Degraded water quality;
- Land subsidence; and
- Depletions of interconnected surface water.

As described in Chapters 2 and 3.1, seawater intrusion is not applicable in the CMA and an associated monitoring network was not developed.

3.6.2 CMA Basin Conditions

The CMA Basin Setting is described in detail in the HCM, GC, and Water Budget chapters of this GSP. A summary of CMA conditions that were considered during the development of the monitoring networks are described below, including hydrogeologic conditions, land uses and historical groundwater conditions.

The CMA covers an area of 21,020 acres, split between two subareas: the Santa Ynez River Alluvium (SYRA) and the Buellton Upland. The SYRA comprises an area of approximately 6,800 acres of mostly flat land adjacent to the Santa Ynez River. The Buellton Upland comprises

[3] 23 CCR § 254.34(b)
[4] 23 CCR § 254.26

approximately 14,220 acres of rolling hills located north of the Santa Ynez River, underlain by the Buellton Aquifer.

The principal aquifer within the CMA is the Buellton Aquifer. The Buellton Aquifer, as described in the 3D Geologic Model and HCM, is comprised of relatively coarse-grained sedimentary rocks identified as the Paso Robles Formation, and the Careaga Sandstone. Locally, these two geologic formations are compressed into a wide synclinal fold. The Buellton Aquifer varies in spatial distribution and vertical thickness within the CMA and hydraulic conductivity within the principal aquifer ranges from 1 to 10 feet per day, with an average thickness of 1,325 feet in the Buellton Upland, and 825 feet in areas that underlie the Santa Ynez River Alluvium subarea.

Water is also observed in the Santa Ynez River channel, alluvium, and adjacent terrace deposits (alluvium), herein referred to as the SYRA. Since 1973, as part of the California State Water Resources Control Board (SWRCB) Order WR 73-37, the water observed in the SYRA has been managed by the SWRBC and is considered Santa Ynez River streamflow or surface water. In accordance with the Order WR 73-37 and the SGMA, the water observed in the SYRA is not considered a principal aquifer of the CMA. Although the SYRA is not considered a principal aquifer within the CMA, SYRA wells are considered in the CMA monitoring network to collect data to support sustainable groundwater management decision making by the CMA GSA, and to evaluate sustainable management criteria.

The primary groundwater users within the CMA are agricultural (80% of the volume of groundwater pumped) and municipal and domestic use (20% of the volume of groundwater pumped).[5] The aerial extent of agricultural users within the CMA are shown on HCM Figure 5-1. Agriculture land uses comprise approximately 3,180 acres (15%) of the CMA; approximately 1,380 acres (10%) of which are located in the Buellton Upland subarea; and approximately 6,800 acres (27%) are located in the SYRA subarea.

3.6.3 Existing Monitoring Networks

Groundwater level and water quality networks are actively monitored within the CMA and these data are used to evaluate changes in groundwater levels, calculate estimates of groundwater in storage, assess changes in groundwater quality and to understand surface water conditions. The details of those existing monitoring networks are presented below. Additionally, the existing networks were evaluated and used to develop the recommended CMA monitoring networks to support GSA decision making to sustainably manage groundwater in accordance with established

[5] Five-year averages for Fiscal Year (FY) 2015-16 through FY2019-20 for Santa Ynez River Water Conservation District Zone D corresponding to the Buellton Aquifer. Source is Stetson (2021) Forty-Third Annual Engineering and Survey Report on Water Supply Conditions of the Santa Ynez River Water Conservation District 2020-2021.

SMCs, within the CMA. The following subsections summarize the existing monitoring networks for the period of 2015-2021.

Groundwater Levels

The County of Santa Barbara (COSB)[6] , the United States Bureau of Reclamation (USBR), and the City of Buellton currently collect groundwater elevation data (groundwater levels) from their respective monitoring networks within the Basin. The monitored wells are shown in aerial view on **Figure 3-6** and summarized below in **Table 3-6**.

Table 3-6
Summary of Existing Groundwater Elevation Monitoring Network Wells
Spring 2015 through Spring 2021

Monitoring Network	Monitoring Frequency	Buellton Aquifer	SYRA
COSB (formerly USGS)[7]	Biannual	3	5
USBR	Monthly	0	10
City of Buellton	Monthly	1	3
	Totals:	4	18

Of the wells monitored within the CMA for groundwater levels, as summarized above in **Table 3-6**, data collected from some of them are also submitted to the CASGEM program. The CASGEM wells are summarized below in **Table 3-7**, including the principal aquifer their data represent, their assigned State identification (ID) number, their USGS ID, CASGEM ID and CASGEM type (mandatory or voluntary monitoring) and their monitoring frequency.

Table 3-7
List of CMA CASGEM Wells
Spring 2015-Spring 2021

Principal Aquifer	Monitoring Frequency	State ID	CASGEM Well ID	CASGEM vs. Voluntary Monitoring	Master Site ID	USGS Well ID
SYRA	Semiannual	6N/32W-11L4	49137	Voluntary	346120N1202200W001	343644120131101
SYRA	Semiannual	6N/32W-16P3	38300	Voluntary	345955N1202570W001	343544120151801

[6] Groundwater levels are collected by the Santa Barbara County Water Agency which is one of five divisions of the Santa Barbara County Public Works Department, which in turn is one of several departments under the County of Santa Barbara.
[7] Prior to 2019, the COSB monitoring network data was collected by the United States Geological Survey (USGS).

SYRA	Semiannual	6N/32W-18H1	24991	Voluntary	346036N1202812W001	343613120164501
Buellton Aquifer	Semiannual	7N/32W-31M1	23681	Voluntary	346392N1202953W001	343821120173601
Buellton Aquifer	Semiannual	7N/33W-36J1	23895	Voluntary	346400N1202998W001	343824120175201
SYRA	Semiannual	6N/31W-17F1	38798	Voluntary	346025N1201720W001	343609120101201
SYRA	Semiannual	6N/31W-17F3	49121	Voluntary	346020N1201690W001	343608120101001
Buellton Aquifer	Semiannual	6N/31W-7F1	49120	CASGEM	346150N1201870W001	343655120111201
SYRA	Semiannual	6N/32W-2Q1	49119	Voluntary	346220N1202140W001	343719120124901
Buellton Aquifer	Monthly	6N/32W-12K2	--	--	City of Buellton	343649120114401

Additional historical groundwater elevation data exists for wells not included in the existing groundwater monitoring network, i.e. for wells that may have been monitored in the past but are no longer part of the current monitoring network[8]. Available data from those wells have been incorporated into the Data Management System (DMS), as described in Chapter 1[9]. Additionally, detailed summaries and analysis of available historical groundwater elevation data are included in Chapter 2 discussions of CMA groundwater condition.

Groundwater Storage

The existing groundwater level monitoring network (described above) and the collected data are used to estimate annual changes to groundwater storage within the Santa Ynez River Water Conservation District (SYRWCD). The estimated changes to groundwater storage are included in the SYRWCD Annual Reports, which are available at the Lompoc Public Library and on the SYRWCD website for public access. Groundwater storage estimates utilize the data collected from the groundwater level monitoring network shown on **Figure 3-6** and summarized in **Table 3-6** and **Table 3-7.**

Groundwater Quality

Groundwater Quality refers to the measurement of naturally occurring and anthropogenically influenced chemical compounds in groundwater. These compounds have the potential to adversely affect groundwater chemistry (groundwater quality). As described in Chapter 2, the groundwater quality in the Buellton Aquifer is generally of better quality than the groundwater quality in the SYRA which is present at shallower depths (closer to the ground surface).

[8] Wells may be removed from monitoring programs over time due to land development, change in ownership or access, well destruction, well redundancy, lack of well completion or screen interval information, or other applicable criteria.

[9] The DMS and the associated Data Management Plan (DMP) describe available CMA data and resources considered.

Groundwater quality data is currently collected from wells within the CMA as part of Public Water System Reporting and the California Irrigated Lands Reporting Program (ILRP). Some of the data collected from these wells are also reported to the GAMA Program. The CMA wells included in these programs and monitored for groundwater quality are shown on **Figure 3-7** and summarized below in **Table 3-8**.[10]

Table 3-8
Summary of Existing CMA Groundwater Quality Monitoring Networks
Spring 2015 through Spring 2021

Monitoring Network	Monitoring Frequency	Buellton Aquifer	SYRA Aquifer	Total Participating Wells
Public Water Systems Reporting	Quarterly	3	5	8
Irrigated Lands Regulatory Program	Annual/Biannual	12	23	35
Subtotal of Principal Aquifer Wells:		15	28	43

Municipal water systems, including the City of Buellton and other small public water companies, also report the collected groundwater quality data to the Safe Drinking Water Information System (SDWIS) and Drinking Water Information Clearinghouse (DRINC), which are the federal (EPA) and state (SWRCB) websites, respectively. In the CMA, the Public Water System wells provide representative data for both the Buellton Aquifer and the SYRA. Commercially irrigated agricultural lands are required to periodically submit groundwater quality data to the ILRP and within the CMA there are participating wells that provide data for both the Buellton Aquifer and the SYRA, as listed above in **Table 3-8**.

Seawater Intrusion

Seawater intrusion is not applicable to the CMA due to the inland location and distance between the CMA and the ocean (greater than 20 river miles), as described in both the HCM and GC portions of the basin setting.

Land Subsidence

Land subsidence monitoring has been conducted recently (since 2015) for the CMA using remote sensing Interferometric Synthetic Aperture Radar (InSAR) data which tracks vertical elevation

[10] Sites are included if there were at least one or more Total Dissolved Solids measurements during the period 2015-2021. ILRP are grouped by reporting site.

changes to an accuracy of approximately 16-millimeters. These satellite data are collected by the European Space Agency (ESA) and processed by TRE ALTAMIRA Inc. under contract with the DWR. Since June 2015, data has been collected and made publicly available monthly. These data are used to evaluate and estimate monthly and annual land surface elevation changes since data collection was initiated in 2015.

In addition to the available InSAR data, a USGS CGPS station (BUEG) was installed near the city of Buellton and has been collecting vertical displacement data since January 2015 as shown on **Figure 1-8**. Land subsidence has not been observed within the CMA by any of the GSA member agencies; nor has subsidence affected any of the existing water infrastructure within the CMA, as indicated in the HCM and GCTM.

Surface Water Monitoring

Surface water monitoring within the Basin is conducted through stream gauges placed along the Santa Ynez River and confluences of key tributaries. Currently there are no active USGS stream gages within the CMA boundaries, however there are three active USGS stream gages located up and downstream from the CMA (Section 2, GCTM Figure 6-1) which allow for estimation of streamflow or surface water conditions within the CMA. **Table 3-9** (below) summarizes the existing stream gauges that provide data that contribute to evaluation of CMA surface water conditions. Locations for USGS stream gages within the immediate vicinity of the CMA are shown in GCTM Figure 6-1.

Table 3-9

USGS Stream Gages relevant to the CMA

Status	USGS Gage Name	Gage Number	Start Year	End Year	Upstream or Downstream of the CMA
Active	SANTA YNEZ R A SOLVANG CA	11128500	1929	2021 (active)	Upstream
Active	ZACA C NR BUELLTON CA	11129800	1964	2021 (active)	Upstream
Active	SANTA YNEZ R A NARROWS NR LOMPOC CA	11133000	1952	2021 (active)	Downstream

Additionally, as described in Chapter 2, Basin Conditions, SWRCB Order WR 73-37 has determined that water observed in the SYRA is surface water associated with the Santa Ynez River. Wells screened in the SYRA are considered surface water wells and are monitored by the USBR on a monthly basis. The data collected from the SYRA wells by the USBR are reported to the SYRWCD and used to manage surface water flows in accordance with the SWRCB Order WR 73-37 and as described in Chapter 3.1.1.

A variety of data sources are available for the CMA and they are used to estimate current surface water conditions within the CMA, and to assist with compliance with SWRCB Order WR 73-37. The available data sources and their uses are listed below.

- Upstream conditions of Lake Cachuma and Bradbury Dam operations, including imports from State Water Project water, are monitored by USBR on a daily basis.
- The Central Coast Water Authority (CCWA) which operates the pipeline which transports State Water Project water (HCM Figure 4-6) to the Basin, monitors the State Water Project deliveries to the watershed.
- Precipitation in the CMA is measured at the Buellton Fire Station and data for Water Year 1955-present (2021) and is published by the Santa Barbara County Flood Control & Water Conservation District.

3.6.4 CMA Monitoring Network

The recommended CMA Monitoring Network is discussed in the following subsection and supplements **Table 3-3, Representative Monitoring Wells**, described above in Section 3.2. The recommended monitoring network was developed to facilitate data collection to support early identification of groundwater changes that could potentially result in undesirable results, as well as to guide the CMA GSA toward their established groundwater sustainability goals over the implementation horizon. The recommended network, including the filling of identified data gaps, is intended to identify temporal trends in groundwater conditions. The data collected from the recommended monitoring networks will support the established SMCs and guide the GSA in decision making on projects and management actions within the CMA, as warranted.

Groundwater Levels

As described above, the groundwater level monitoring network is focused on the Buellton Aquifer and not the Santa Ynez River Alluvium Aquifer, in accordance with SWRCB Order WR 73-37. The existing wells monitored by the COSB, USBR and the City of Buellton are all included in the recommended CMA monitoring networks due to the limited number of wells available.

Table 3-10, below, summarizes the existing wells in the primary Buellton Aquifer identifying whether the monitored wells are part of the existing State of California Department of Water Resources CASGEM program, identifying well names (includes CASGEM names or State well IDs), the principal aquifer each well is screened in and the frequency of monitoring.

Table 3-10.
Buellton Aquifer Wells Groundwater Level Data
Spring 2015-Spring 2021

Subarea	Principal Aquifer	DBID	State ID	USGS ID	CASGEM ID	CAS-GEM Type	Frequency
Buellton Upland	Buellton Aquifer	82	7N/33W-36J1	343824120175201	23895	Voluntary	Biannual
Buellton Upland	Buellton Aquifer	75	7N/32W-31M1	343821120173601	23681	Voluntary	Biannual
Santa Ynez Alluvium	Buellton Aquifer	90	6N/31W-7F1	343655120111201	49120	CASGEM	Biannual
Santa Ynez Alluvium	Buellton Aquifer	909	6N/32W-12K2	343649120114401	-	n/a	Monthly

The distribution of existing wells across the principal aquifer indicates sufficient monitoring is feasible by utilizing the existing wells, with a few exceptions in the Buellton Upland subarea, as described below.

Groundwater Levels Data Gaps

Alluvial canyons within the Buellton Upland subareas of the CMA are not currently included in the existing Groundwater Level monitoring network, as shown by the polygons lacking well locations on **Figure 3-1**. Obtaining access to existing groundwater wells in these areas and adding them to the recommended Groundwater Level monitoring program could potentially fill these identified data gaps. Efforts to determine whether wells exist in these areas, and if so, how public outreach would be conducted to gather well information is included in Chapter 4, Projects and Management Actions.

In addition, data gaps exist on the well construction information for the representative monitoring wells. This data gap will be addressed in Chapter 4, Projects and Management Actions by performing video surveys in representative monitoring wells to confirm well construction.

Groundwater Storage

The data collected from the Groundwater Level monitoring network will be used to evaluate changes in groundwater levels within the Buellton Aquifer and to estimate changes in groundwater storage. Therefore, the Groundwater Level and Groundwater Storage monitoring networks are considered equivalent and the collected data will be used to evaluate both sustainability indicators for identification of potential undesirable results.

If additional wells are added to the groundwater level network, the estimated groundwater in storage calculations will be modified to include those wells, as appropriate.

Groundwater Storage Data Gaps

Data gaps identified in the Groundwater Level monitoring network in the Buellton Uplands are equivalent to data gaps identified for the Groundwater Storage monitoring network. Filling the identified data gaps to meet the data needs for the Groundwater Level monitoring program will likewise meet the data needs of the Groundwater Storage monitoring program. Details are described in Chapter 4, Project and Management Actions**.**

Seawater Intrusion

Seawater intrusion is not applicable to the CMA and therefor a monitoring network is not needed or recommended in the CMA.

Land Subsidence

As described in Chapter 2, Groundwater Conditions, land subsidence has not been historically observed, existing water infrastructure have not been affected by land subsidence, and geologic properties of the aquifer indicate that land subsidence due to groundwater withdrawal are unlikely. Based on these findings, an extensive direct-measurement monitoring network for potential Land Subsidence is not recommended within the CMA. However, alternate approaches to Land Subsidence monitoring using InSAR data will be implemented.

InSAR coverage for the Santa Ynez River Alluvium and Buellton Upland subareas of the CMA are sufficient and will be evaluated for indications of ongoing or permanent land subsidence. InSAR uses radar returns to measure total vertical displacement of the land surface from all causes.

Additionally, it is recommended that CCWA be contacted. Since 1997 CCWA has operated the large-scale water supply infrastructure in the basin: the pipeline which carries SWP water through the CMA to the City of Buellton and Lake Cachuma (HCM Figure 4-6). CCWA would likely be able to affirm if negative outcomes are occurring such as differential settling.

A potential land subsidence result from either of these indirect monitoring methods would need to be evaluated relative to groundwater pumping and levels to determine if it is resulting to due land subsidence from groundwater withdrawal or some other causal source.

Land Subsidence Data Gaps

No Land Subsidence Data Gaps are identified as the existing and recommended monitoring network provide sufficient coverage.

Groundwater Quality

It is recommended to continue to use the existing Groundwater Quality well network, monitored by the public water systems and by commercial irrigation within the CMA. The GSA will collect data from these programs annually to support evaluation of groundwater quality trends and tracking groundwater management progress to reach CMA sustainability goals. Representative Wells are identified to monitor groundwater quality as presented on **Figure 3-4 and Table 3-3**. The distribution of existing wells across the principal aquifer indicates sufficient monitoring is feasible by utilizing the existing wells. There are a few locations in the Buellton Upland subarea, as described below that would be improved by adding additional wells.

Groundwater Quality Data Gaps

As shown on **Figure 3-4** there are a few locations based on distribution of wells that would be improved by adding additional groundwater quality monitoring.

The primary data gap for groundwater quality is the continuation of data collection at existing ILRP sites. Many of the program wells have relatively few measurements which is a concern for use of wells as part of representative future monitoring and tend to fall out of the monitoring network if different criteria are used to define the network. If ILRP wells are identified as part of the representative monitoring network, it is recommended that the GSP work with the private landowners to plan to collect this data.

Additionally, it is recommended that improved well location and construction information be collected for all of the wells that are set as representative water quality monitoring wells. This data gap will be addressed in Chapter 4, Projects and Management Actions by performing video surveys in representative monitoring wells to confirm well construction.

Effort to determine whether wells exist in these areas, and if so, how public outreach would be conducted to gather well information will be included in the Projects and Management Actions chapter.

Surface Water Depletions

The DWRs Emergency Regulations Section 354.28 (b) states that,

> *(6) Depletions of interconnected surface water. The minimum threshold for depletions of interconnected surface water shall be the volume of surface water depletions caused by groundwater use that has significant and unreasonable adverse impacts on beneficial uses of the surface water. The minimum threshold established for depletions of interconnected surface water shall be supported by the following:*
>
> > *(A) The location, quantity, and timing of depletions of interconnected surface water.*
> >
> > *(B) A description of the groundwater-surface water model used to quantify surface water depletion.*

Item (6)(B) requires a numerical model to estimate the depletions of interconnected surface water, not the use of a monitoring network to measure depletions of interconnected surface water. Therefore, the Surface Water Depletion monitoring network will include two primary elements.

- Use of groundwater level monitoring as presented on **Figures 3-1** and **3-5** as a proxy to evaluate potential Surface Water Depletions, and
- Evaluation of potentially appropriate stream gauge installation locations within the CMA to support numerical modeling estimates.

Additionally, data from existing up-stream gauges (located in the EMA) will be utilized to assess potential Surface Water Depletions and relationships to groundwater conditions changes. These monitoring data will be used to guide the CMA in groundwater management decisions to support the sustainability goals outlined in Section 3.1.

For the entire Santa Ynez River Valley Groundwater Basin (all three Management Areas), a streamflow gage is proposed near the mouth of the Santa Ynez River near the estuary in order to measure the total surface water outflow from the entire system. Previously the USGS had a gage called "Santa Ynez River at Barrier near Surf" (USGS Gage ID 11135500) but this gage was discontinued in 1965. By restarting measurements at this historical site, the total surface water budget can be tracked from Bradbury Dam to the Pacific Ocean.

3.6.5 Monitoring Protocols

To fulfill the additional monitoring recommended below, monitoring protocols will be conducted in accordance with DWR's *Monitoring Networks and Identification of Data Gaps BMP,* which uses DWR's 2010 publication of *California Statewide Groundwater Elevation Monitoring (CASGEM) Program Procedures for Monitoring Entity Reporting* (Appendix A) for the groundwater level sampling protocols. This publication includes protocols for equipment selection, setup, use, field evaluation, and sample collection techniques.

Monitoring Network Data Gaps

Data gaps for groundwater levels are identified within the CMA for the Buellton Aquifer in the Buellton Upland subarea. The limited number of wells screened in the Buellton Aquifer in the Buellton Upland limit the GSA ability to evaluate current and historical groundwater levels conditions, and associated groundwater management decisions or actions. Plans to fill the identified data gap are discussed in detail in Chapter 4 of this GSP, Projects and Management Actions, and are briefly summarized below.

Additionally, an identified data gap exists near the confluence of Santa Rosa Creek and the Santa Ynez River, where GDEs are mapped at the boundaries of the Buellton Upland and the Santa Ynez River Alluvium subareas. The lack of well data or a stream gauge at this location limits the GSA ability to evaluate current conditions related to the groundwater-surface-water connection and the associated GDEs in this area.

Plans to Fill Identified CMA Data Gaps

Ideal spatial locations within the Buellton Upland are identified on **Figure 3-1** where access to non-production wells screened in the Buellton Aquifer would provide useful data to the GSA to evaluate current groundwater level conditions, and support sustainable groundwater management decisions in alignment with the Sustainability Goals described in Section 3.1.

Generally, the project would identify parcels within the specific portions of the Buellton Upland subarea where data would be useful to fill the identified data gaps. The project will describe outreach efforts to engage the parcel owners to better understand whether groundwater wells exist, and their condition, in the target areas. If groundwater wells do exist, access to the well completion information will be requested from well owners, if available. If well construction information is unavailable and parcel owners agree, well inspection activities may be conducted to evaluate well construction. If groundwater wells do not exist, or are not completed in a manner that would provide useful data, the GSA may consider the potential to install new groundwater wells in the target areas in an effort to close the identified data gaps.

For the identified data gap near the confluence of Santa Rosa Creek and the Santa Ynez River, installation of a piezometer may be appropriate if an existing well is not present or available, to evaluate the groundwater-surface-water connection and the associated GDEs identified in this area.

Chapter 4 also includes identification of, and application for, grant funding from DWR for support projects that will address the identified CMA data gaps.

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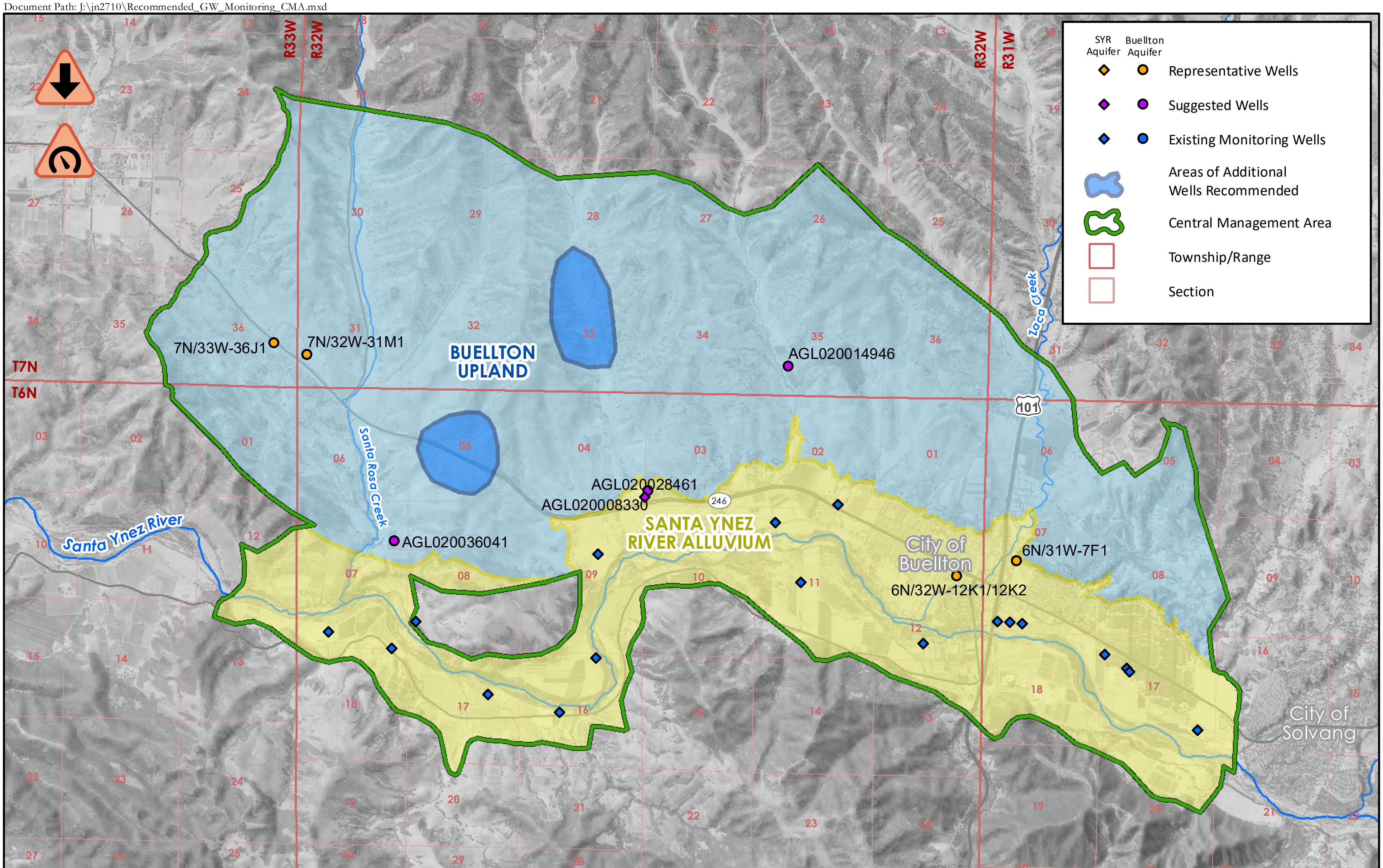
Document Path: J:\jn2710\Recommended_GW_Monitoring_CMA.mxd



Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

STETSON ENGINEERS INC.

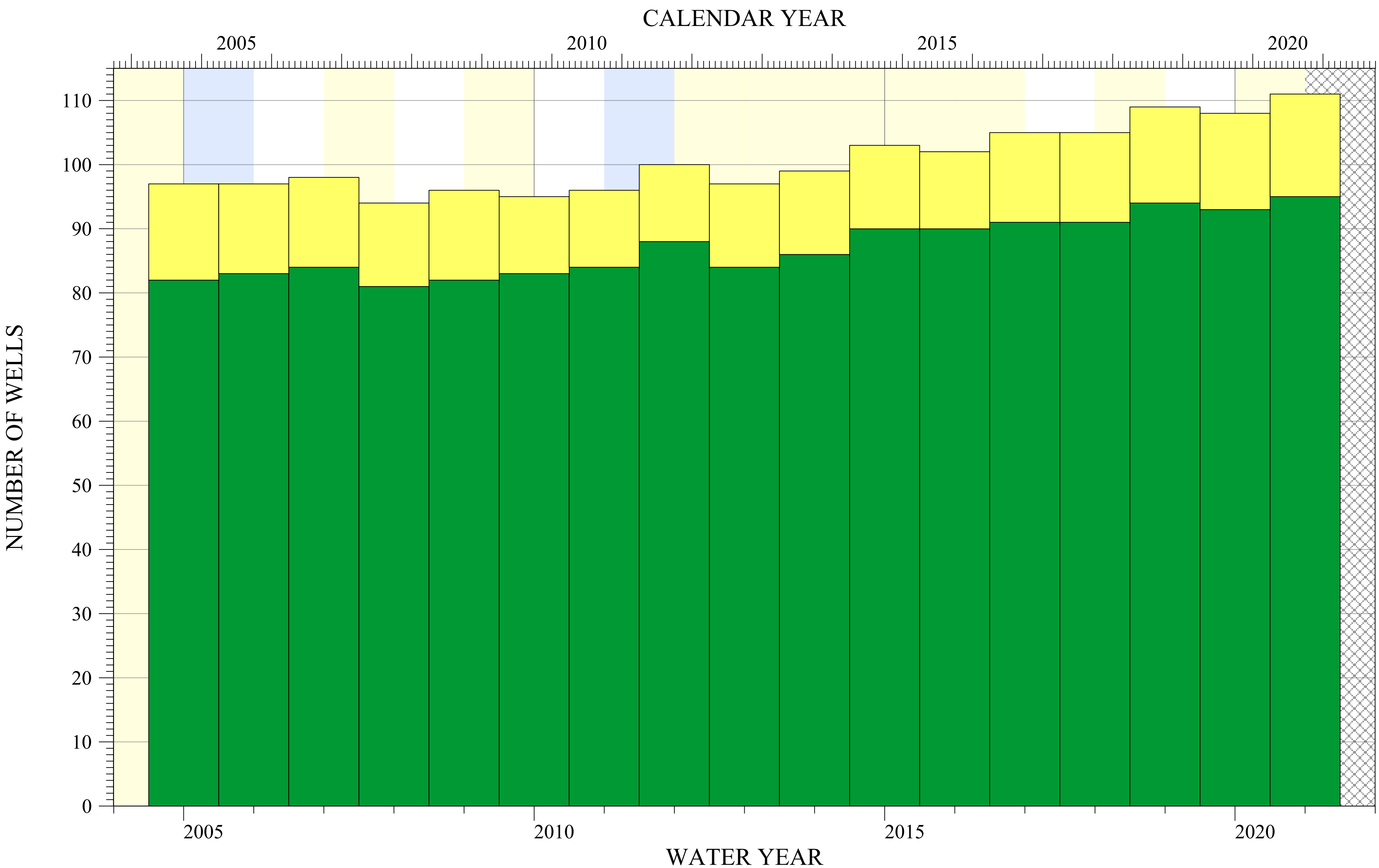
CMA MONITORING NETWORK AND REPRESENTATIVE MONITORING WELLS FOR GROUNDWATER LEVELS AND GROUNDWATER STORAGE

DRAFT

0 0.5 1 Miles

N

FIGURE 3-1



District Zone A, Santa Ynez River Alluvium, Excluded

Source: Santa Ynez River Water Conservation District (2005-2021)

I:\DATA\2710\Analyses\2021-04 Timeseries Active Inactive Wells\CMA SMC Fig 3-02 Wells Timeseries.grf 6/8/2021 M. McCammon

STETSON ENGINEERS INC.

CMA Santa Ynez River Valley Groundwater Basin Central Management Area Groundwater Sustainability Agency

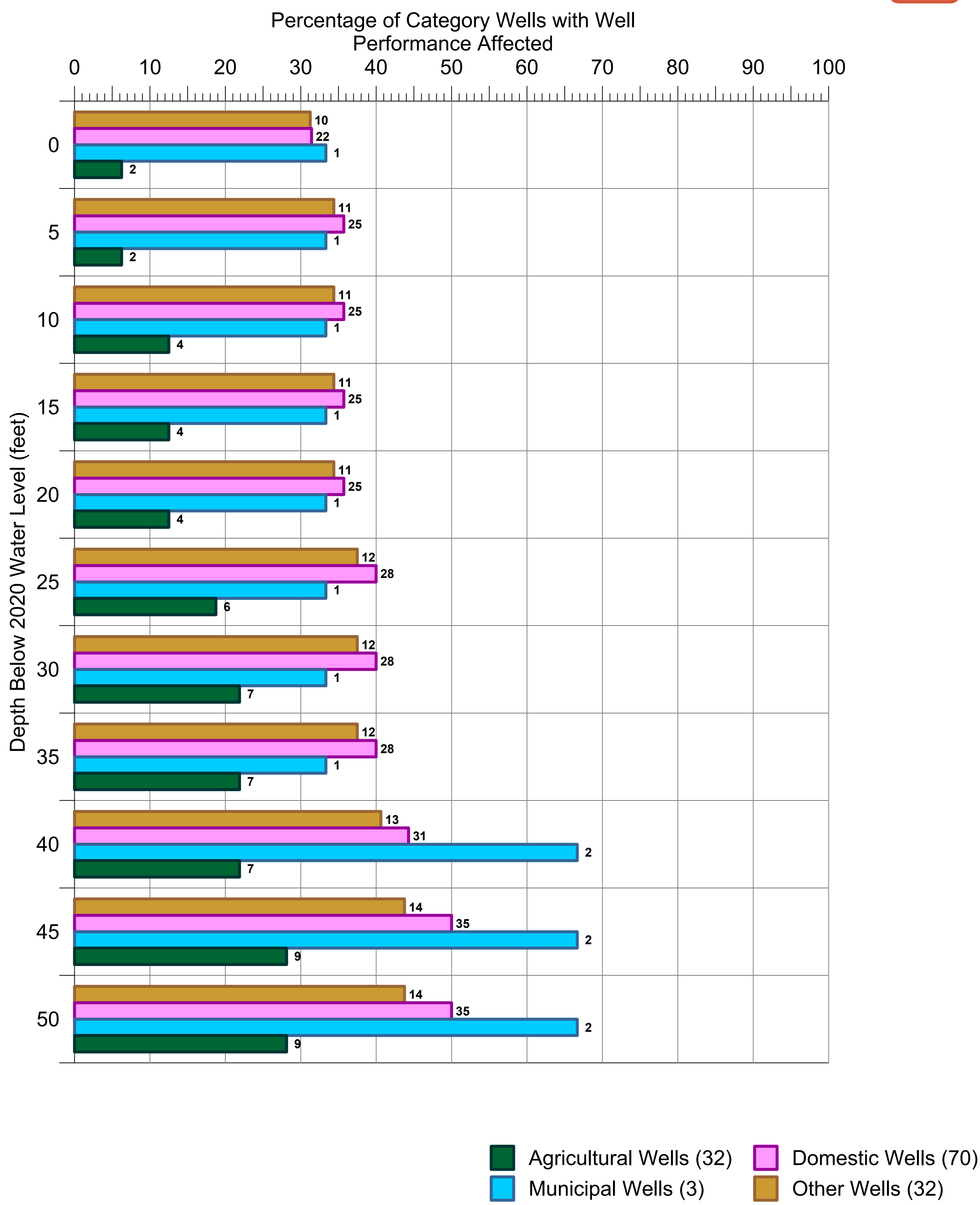
REGISTERED
ACTIVE AND INACTIVE WELLS
DISTRICT ZONE D

DRAFT
6/8/2021

Water Year Type (1942-2020)
- Wet
- No Data
- Above/Below Normal
- Dry / Critically Dry

Well Type
- Active
- Inactive

FIGURE 3-2



Other = Well use not recorded on well log or used for observation/ cathodic protection only.

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5/19/2021

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CMA
Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

WELL PERFORATIONS RELATIVE TO BUELLTON AQUIFER SPRING 2020 WATER DEPTH (TOP 50 FT)

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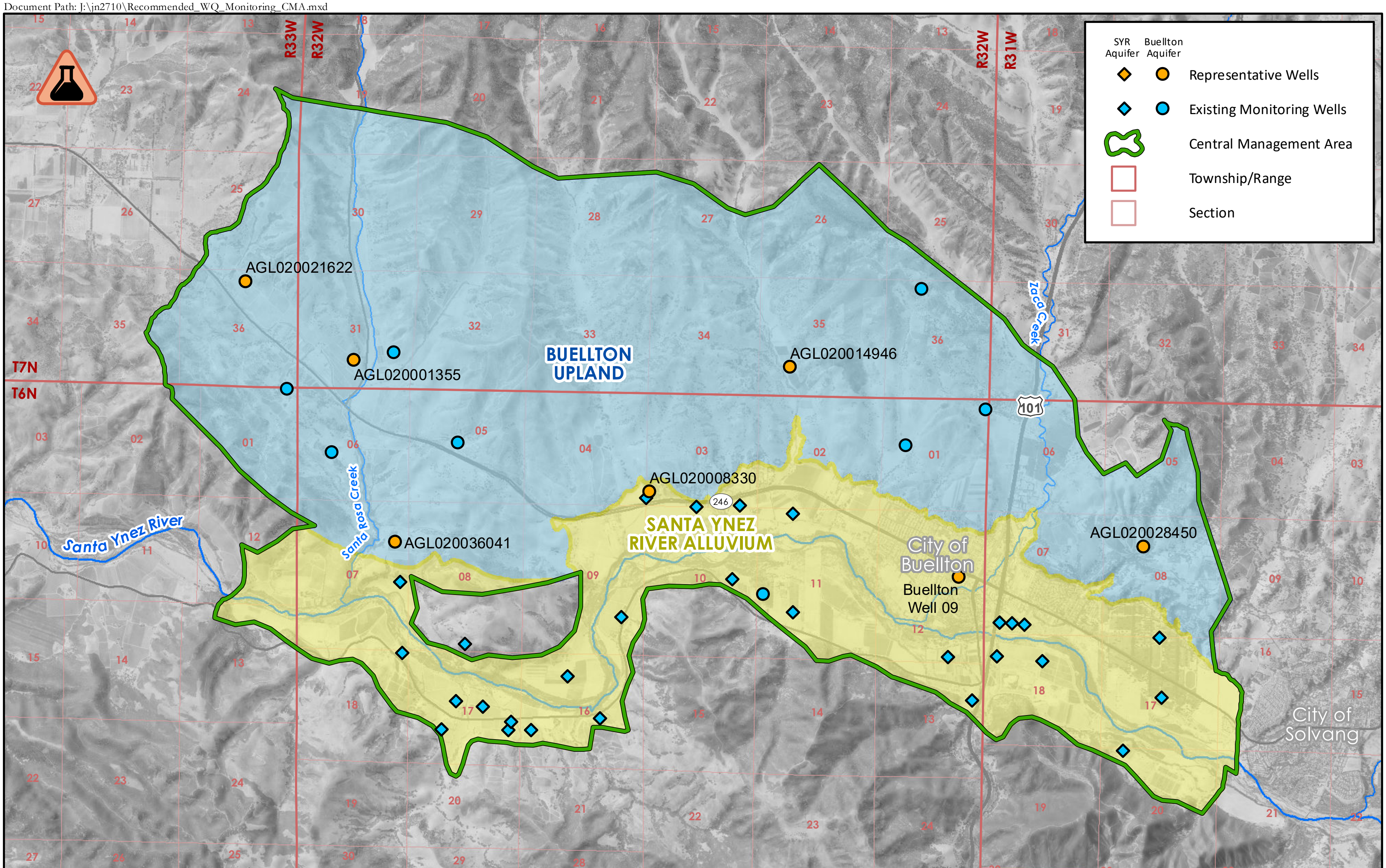

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CMA

Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

CMA MONITORING NETWORK AND REPRESENTATIVE MONITORING WELLS FOR WATER QUALITY

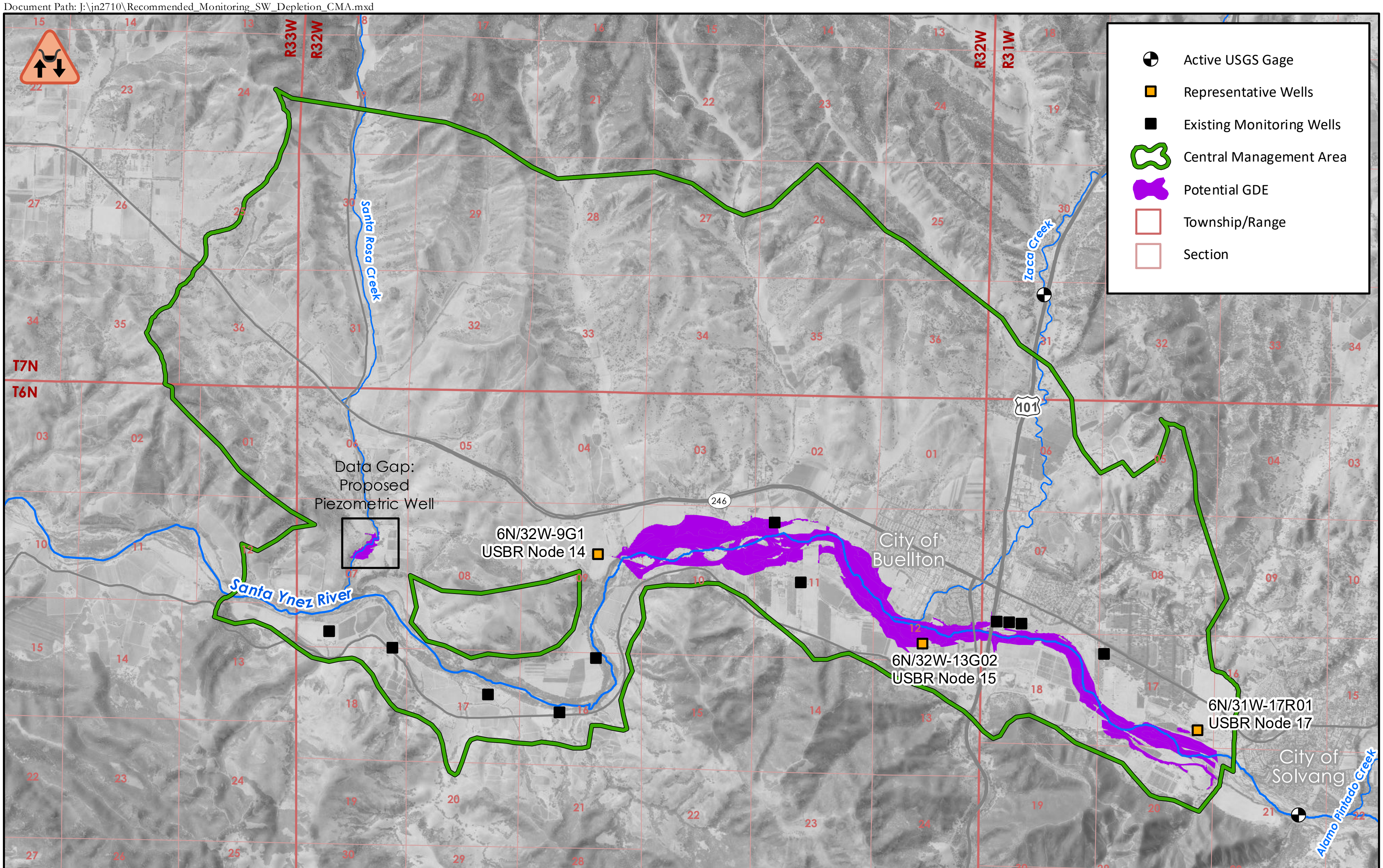
DRAFT

0 0.5 1 Miles

N

FIGURE 3-4

Document Path: J:\jn2710\Recommended_Monitoring_SW_Depletion_CMA.mxd



Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

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CMA MONITORING NETWORK AND REPRESENTATIVE MONITORING FOR GROUNDWATER DEPENDENT ECOSYSTEMS

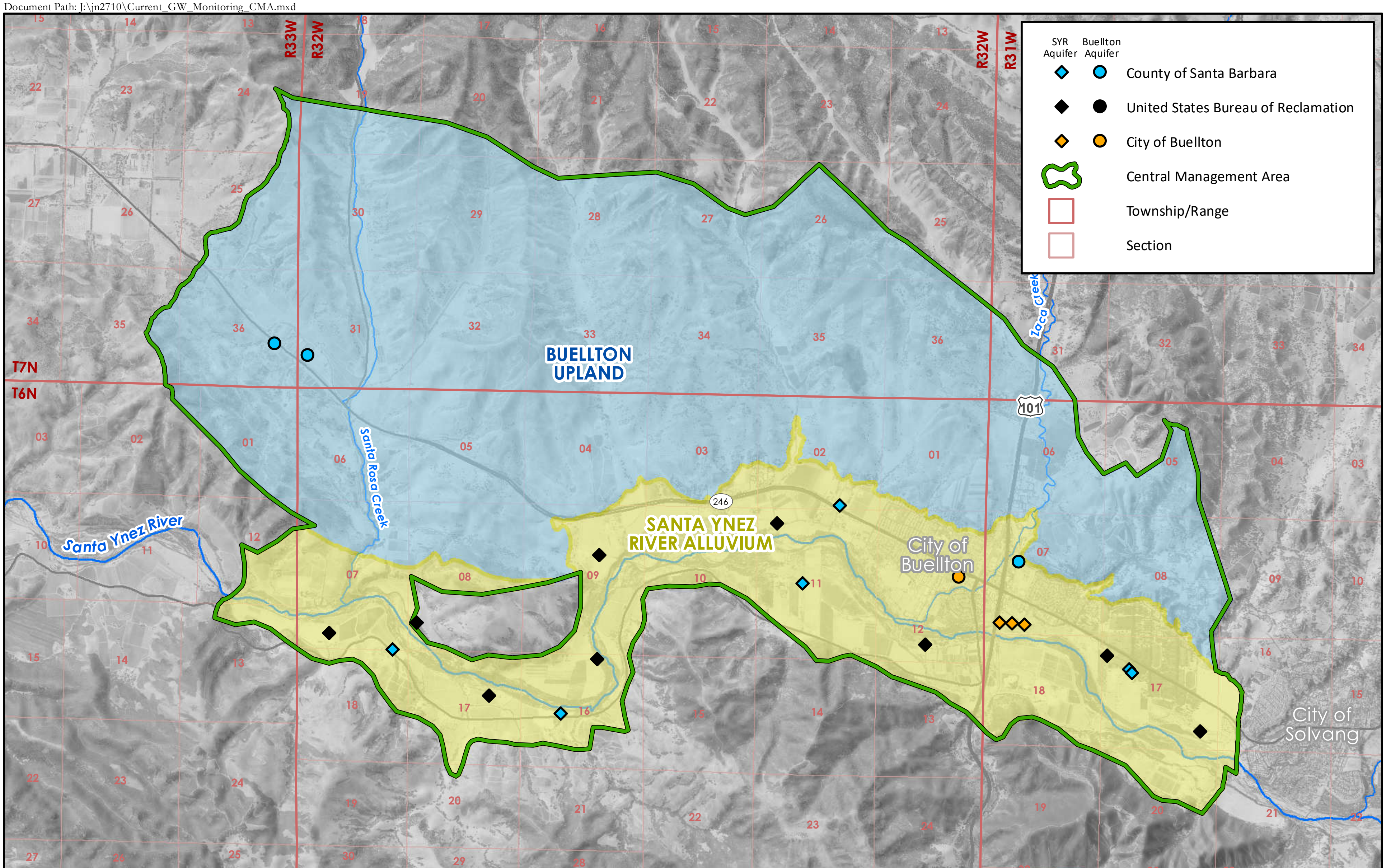
DRAFT

0 0.5 1 Miles

N

FIGURE 3-5

Document Path: J:\jn2710\Current_GW_Monitoring_CMA.mxd



Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

STETSON ENGINEERS INC.

CURRENT GROUNDWATER LEVEL MONITORING PROGRAMS

DRAFT

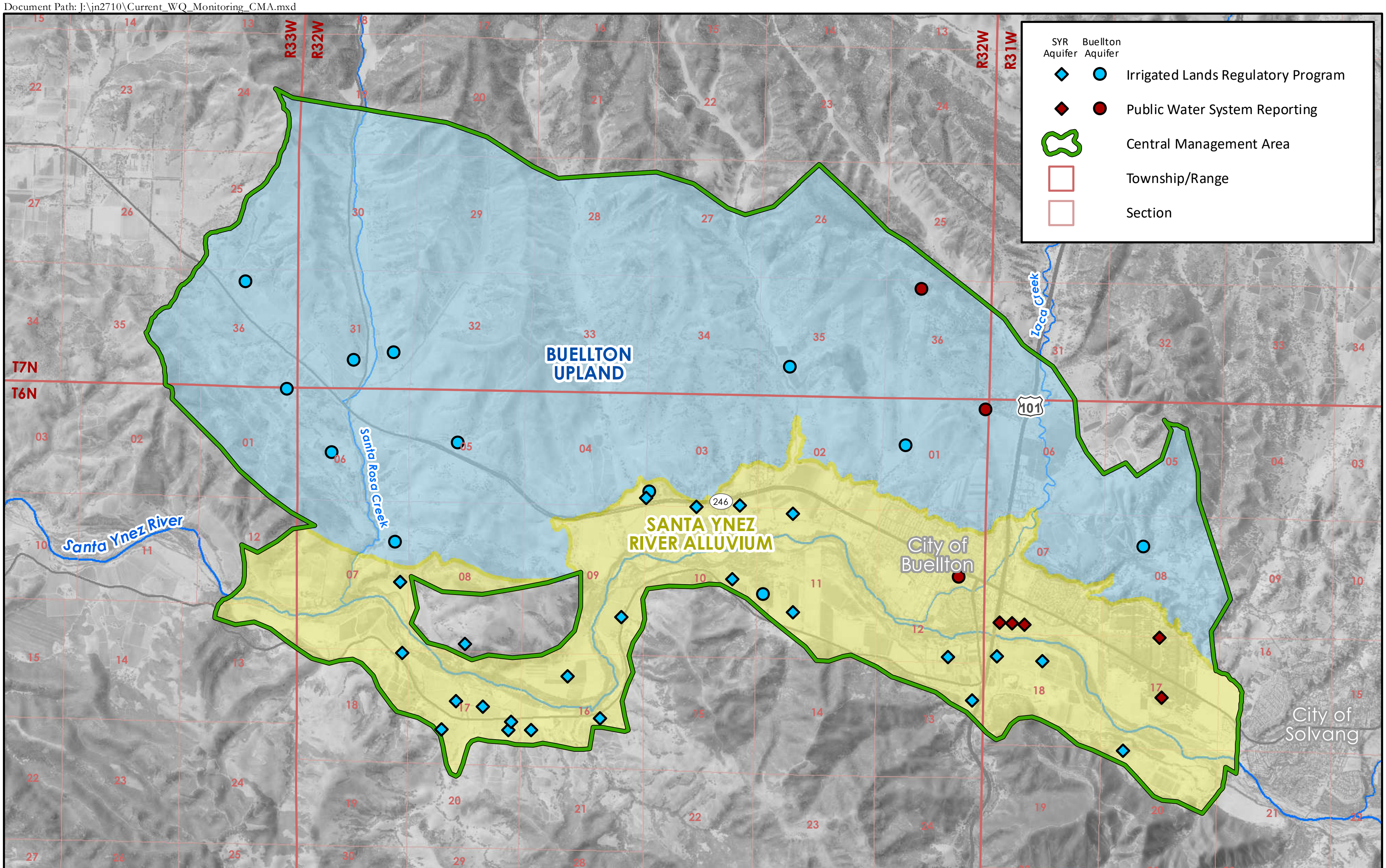
0 0.5 1 Miles

N

Note:
Wells shown were monitored 2015-2021.

FIGURE 3-6

Document Path: J:\jn2710\Current_WQ_Monitoring_CMA.mxd



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CMA
Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

CURRENT WATER QUALITY MONITORING PROGRAMS

DRAFT

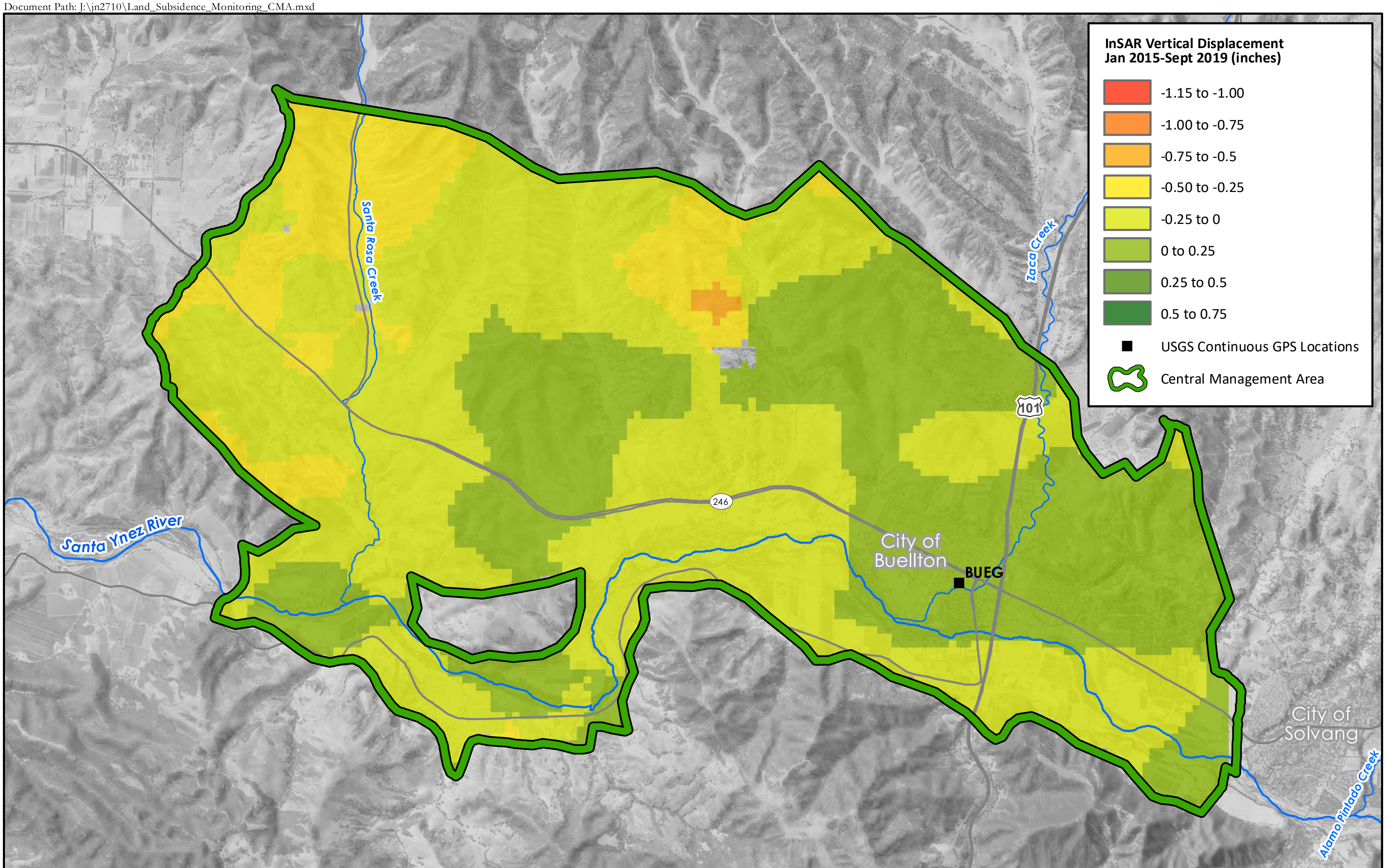
0 0.5 1 Miles

N

Note:
Wells shown were monitored 2015-2021.

FIGURE 3-7

Document Path: J:\jn2710\Land_Subsidence_Monitoring_CMA.mxd



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DUDEK

CMA
Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

LAND SUBSIDENCE MONITORING
WITHIN CENTRAL MANAGEMENT AREA

DRAFT

0 0.5 1 Miles

N

Sources:
USGS National Elevation Dataset, 2002
NAIP (2018)
Dudek (2020), DWR (2020)

FIGURE 3-8

SUSTAINABLE MANAGEMENT CRITERIA
CENTRAL MANAGEMENT AREA

APPENDIX A: CHRONIC DECLINE IN GROUNDWATER LEVELS
GROUNDWATER LEVEL HYDROGRAPHS

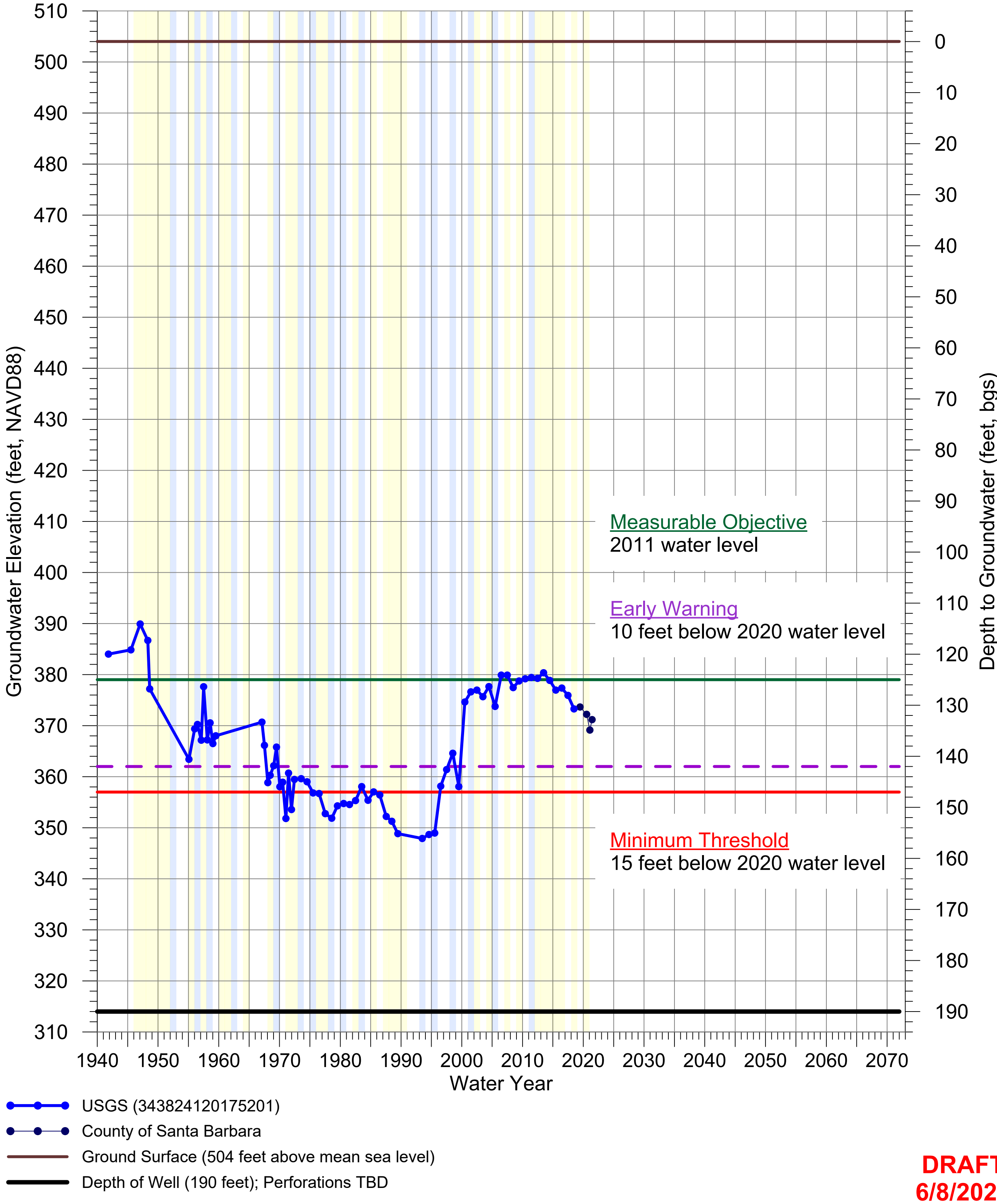
This appendix includes historical hydrographs of the representative wells for monitoring groundwater level decline, as well as the established sustainable management criteria of the measurable objective, early warning, and minimum threshold. All included wells are in the Buellton Aquifer, and the Appendix is organized into two sections based on location: Buellton Upland subarea and Santa Ynez River Alluvium Subarea.

LIST OF ACRONYMS AND ABBREVIATIONS

BGS	below ground surface
CASGEM	California Statewide Groundwater Elevation Monitoring
CMA	Central Management Area
FT	feet
NAVD88	North American Vertical Datum of 1988
USBR	United States Bureau of Reclamation
USGS	United States Geologic Survey
WL	Water Level

CASGEM ID
25268
Voluntary

CMA Representative Monitoring Well
for Buellton Aquifer
(Buellton Upland Subarea)
7N/33W-36J1



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6/8/2021

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STETSON ENGINEERS INC.

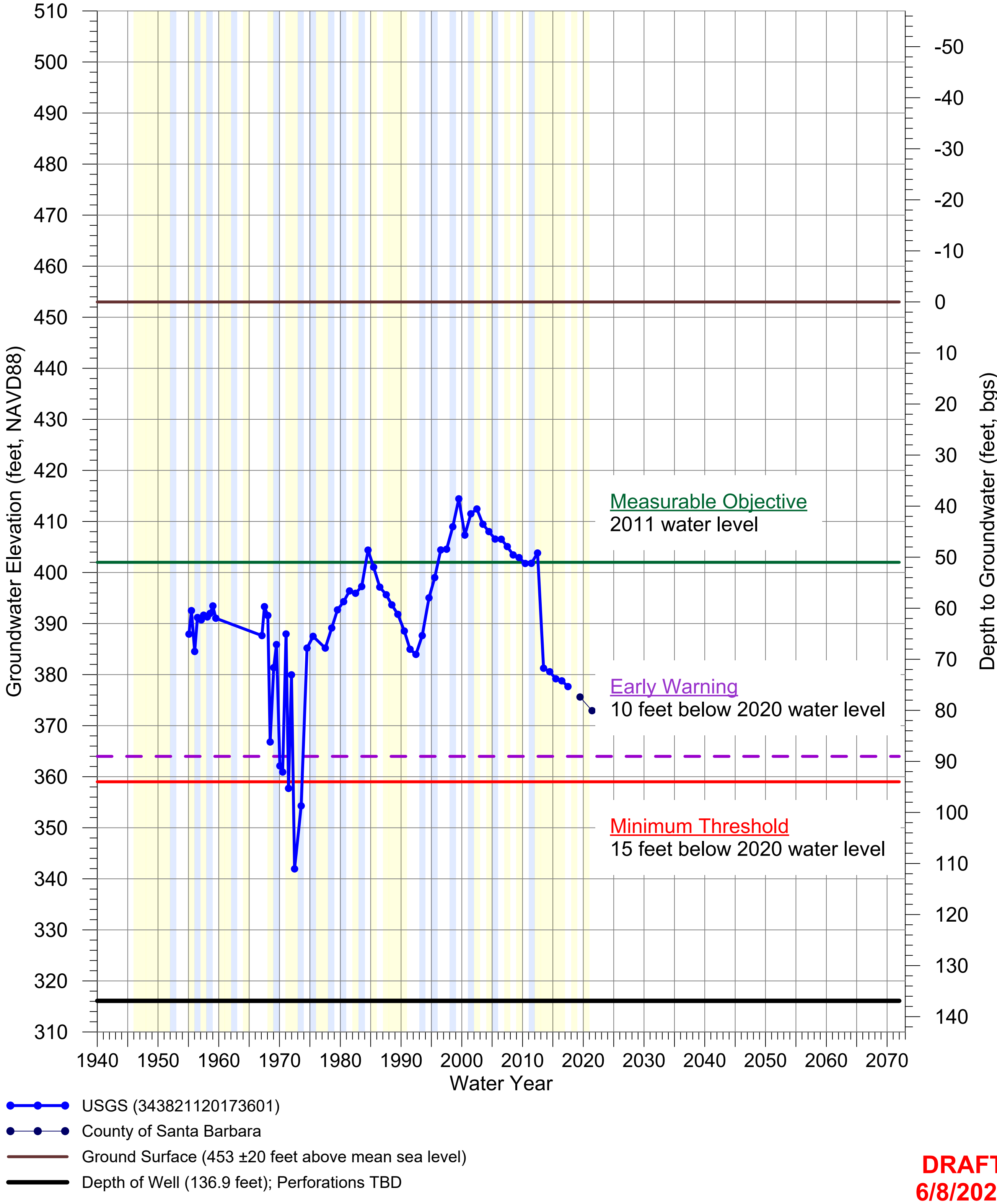
CMA
Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

REPRESENTATIVE MONITORING WELL
Buellton Aquifer - Buellton Upland

Water Year Type (1942-2020)
- Wet
- Above/Below Normal
- Dry / Critically Dry

CASGEM ID
23681
Voluntary

**CMA Representative Monitoring Well
for Buellton Aquifer
(Buellton Upland Subarea)
7N/32W-31M1**



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6/8/2021**

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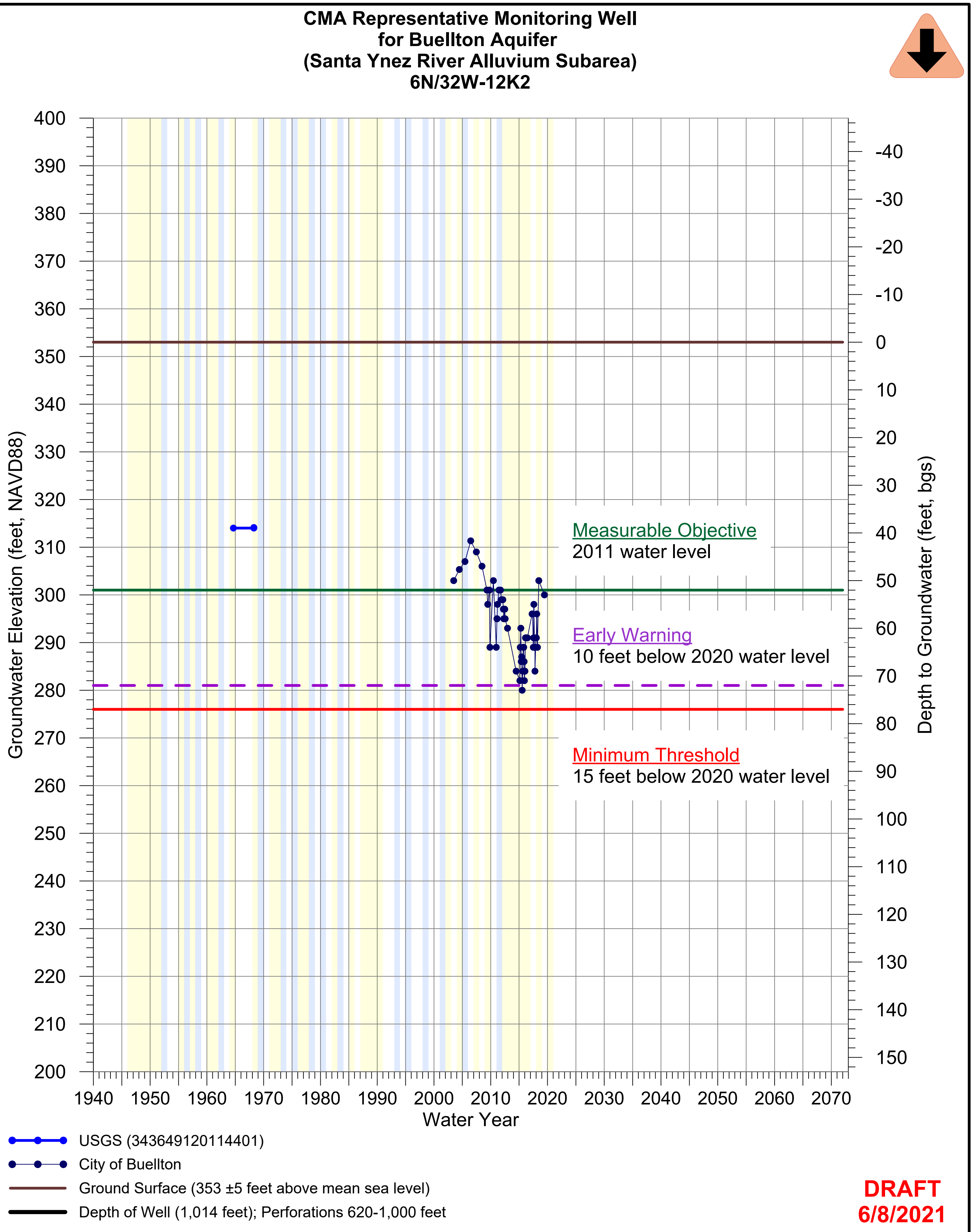
CMA
Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

**REPRESENTATIVE
MONITORING WELL
Buellton Aquifer - Buellton Upland**

Water Year Type (1942-2020)
Wet
Above/Below Normal
Dry / Critically Dry

FIGURE A2-01



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STETSON ENGINEERS INC.

CMA
Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

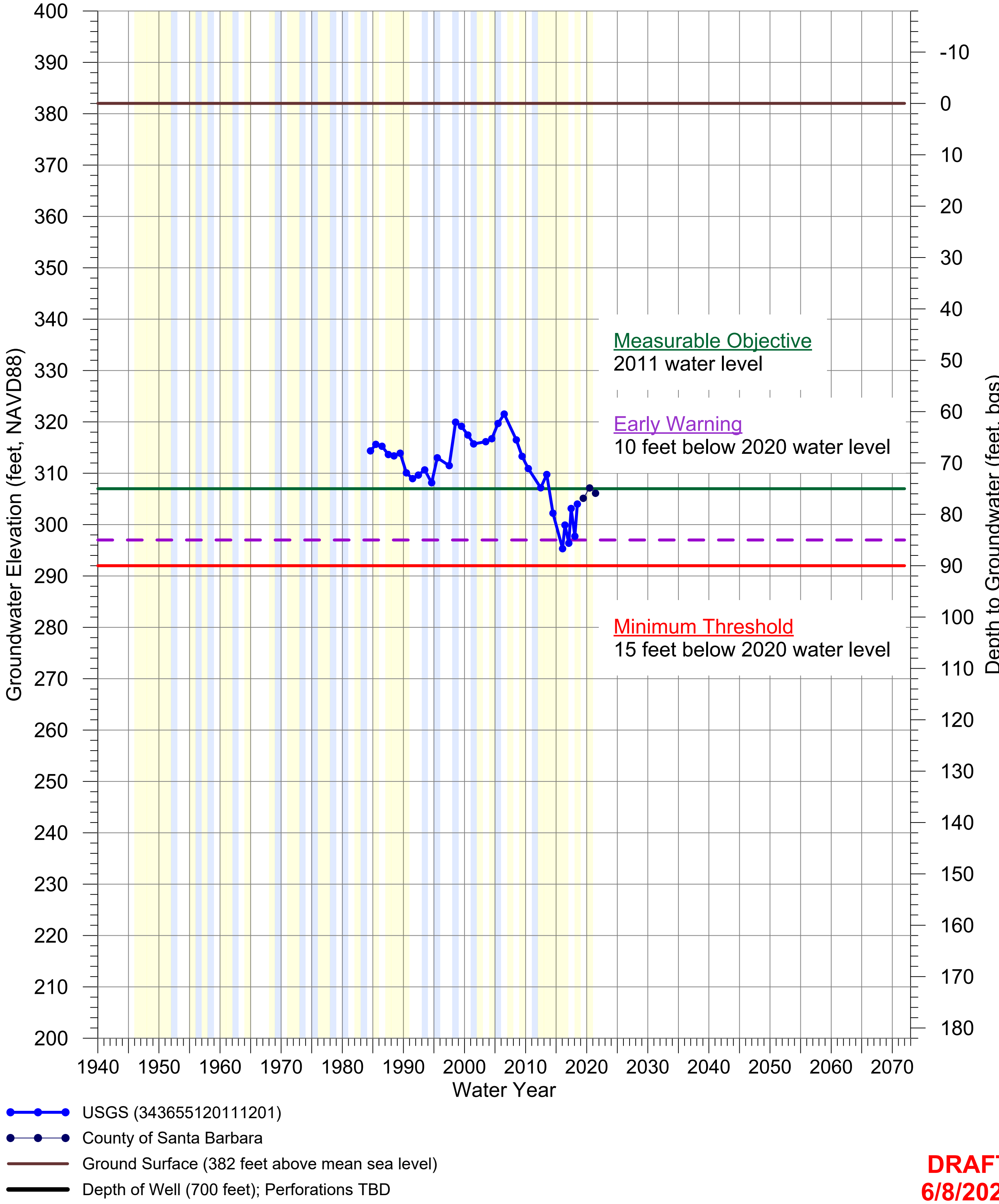
REPRESENTATIVE MONITORING WELL
Buellton Aquifer
Santa Ynez River Alluvium

Water Year Type (1942-2020)

- Wet
- Above/Below Normal
- Dry / Critically Dry

CASGEM ID
49120
CASGEM

CMA Representative Monitoring Well
for Buellton Aquifer
(Santa Ynez River Alluvium Subarea)
6N/31W-7F1



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STETSON ENGINEERS INC.

CMA
Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

REPRESENTATIVE MONITORING WELL
Buellton Aquifer
Santa Ynez River Alluvium

Water Year Type (1942-2020)

Wet
Above/Below Normal
Dry / Critically Dry

SUSTAINABLE MANAGEMENT CRITERIA
CENTRAL MANAGEMENT AREA

APPENDIX B: DEGRADED GROUNDWATER QUALITY TIME SERIES GRAPHS

This appendix includes concentration time series graphs of groundwater quality for the representative wells in the monitoring network for degraded water quality as well as the established sustainable management criteria of the measurable objective, early warning, and minimum threshold. Organization is first by constituent, then by subarea, and then west to east within each subarea. The following constituents are included in this appendix:

- Salinity as Total Dissolved Solids (TDS)
- Chloride (Cl)
- Sulfate (SO_4)
- Sodium (Na)
- Nitrate as Nitrogen (NO_3 as N) with logarithmic scale

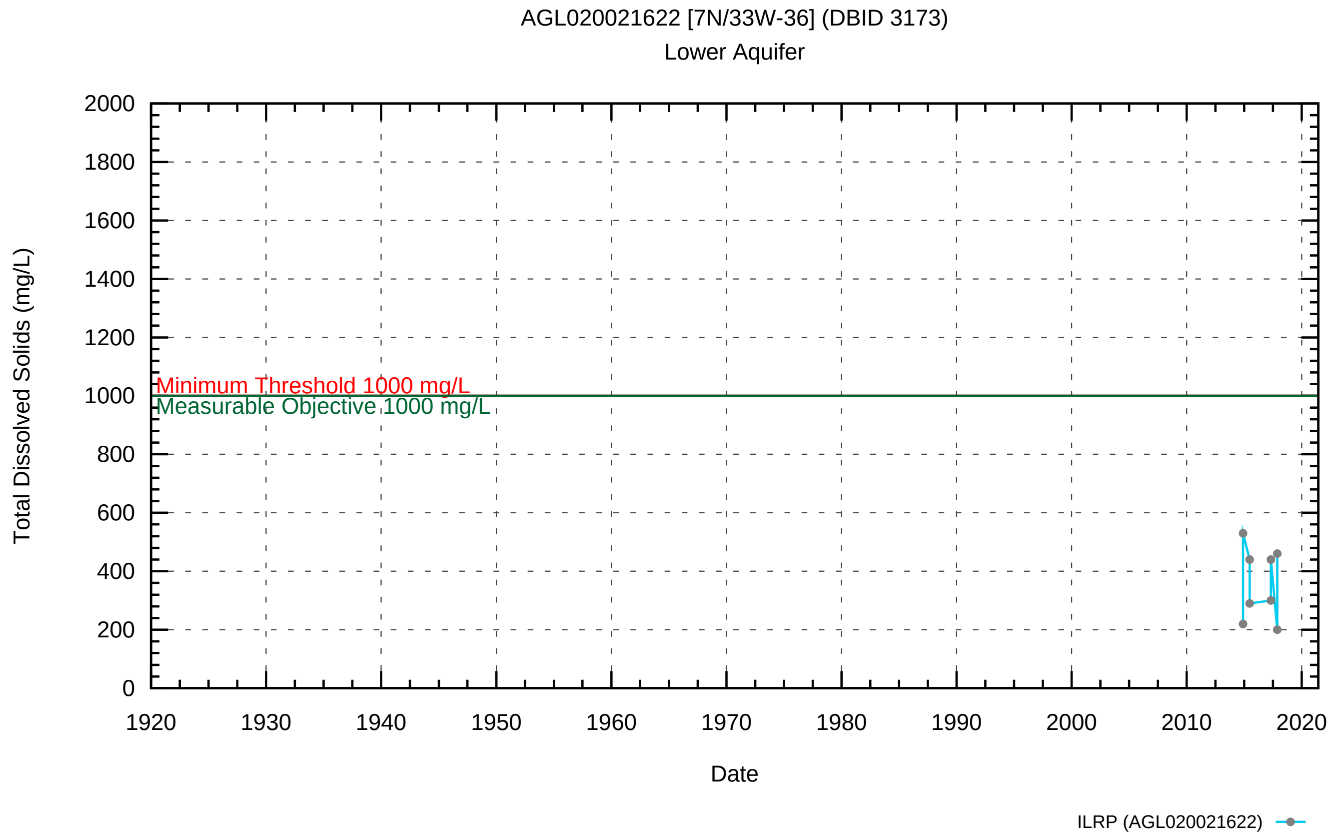
Null values are not plotted. Particular wells may not have historical measuments for all constituents.

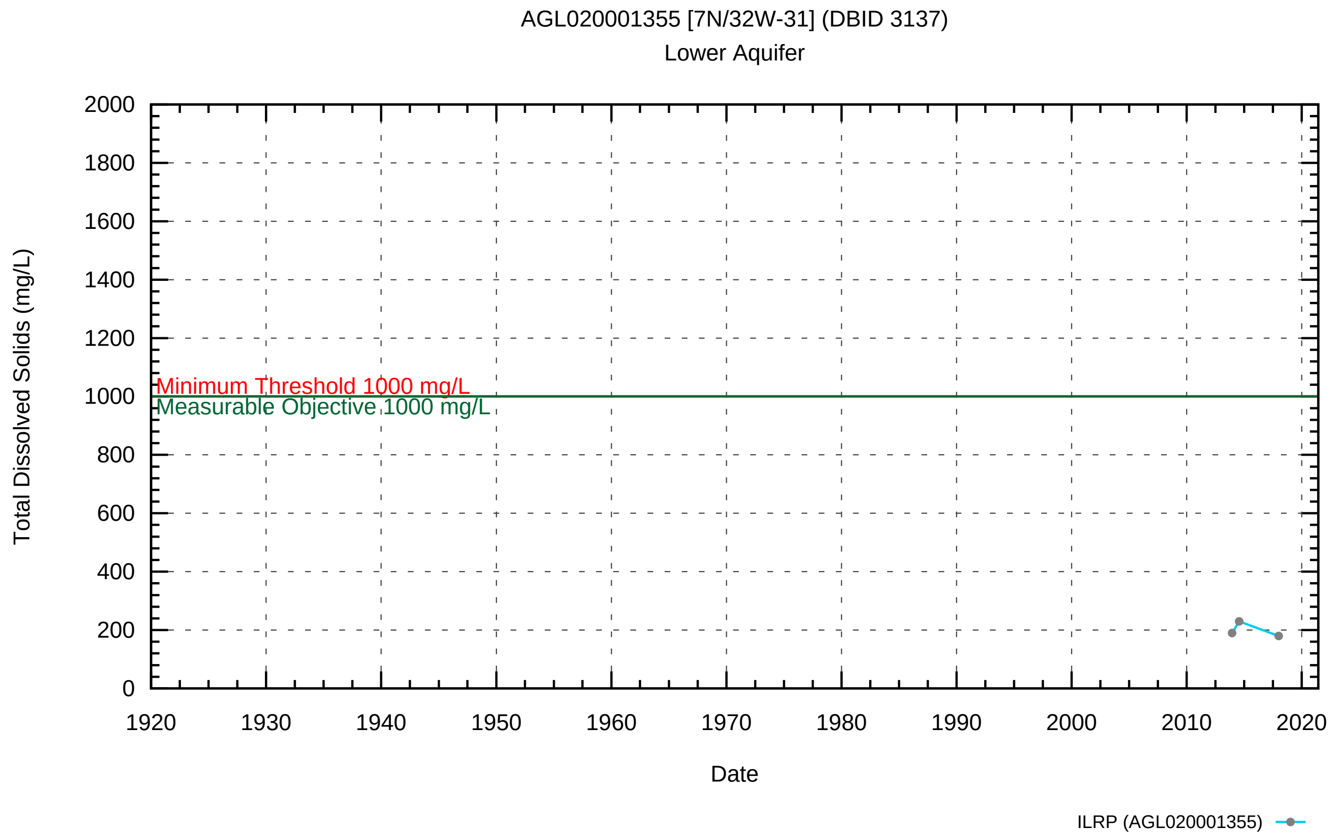
For Nitrate a logarithmic scale is used. Reporting source of value is shown. Values of Nitrate as Nitrate were converted to their Nitrogen composition. Values of Nitrate and Nitrite as Nitrogen (NO_3+NO_2 as N) are also included on graphs.

LIST OF ACRONYMS AND ABBREVIATIONS

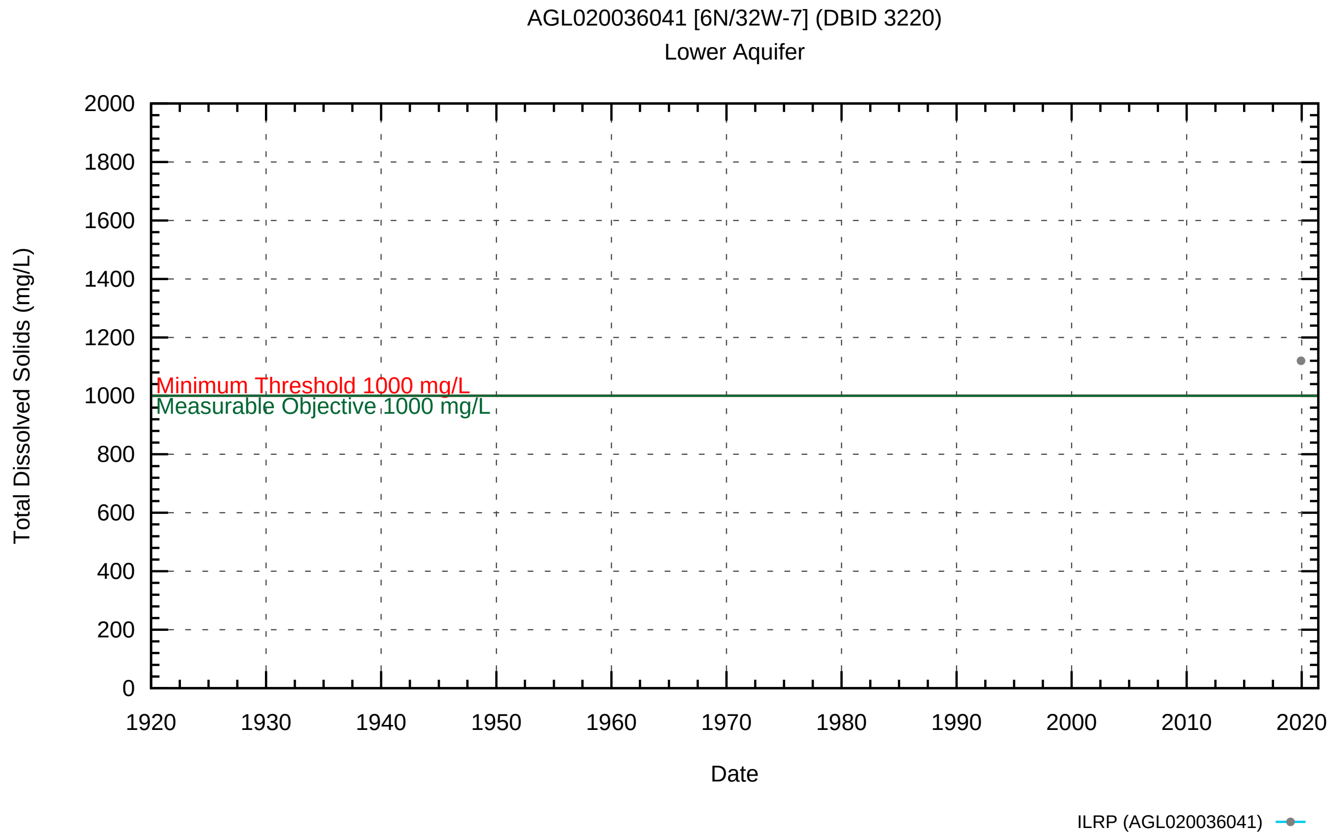
BGS	below ground surface
CASGEM	California Statewide Groundwater Elevation Monitoring
CMA	Central Management Area
FT	feet
NAVD88	North American Vertical Datum of 1988
USBR	United States Bureau of Reclamation
USGS	United States Geologic Survey
WL	Water Level

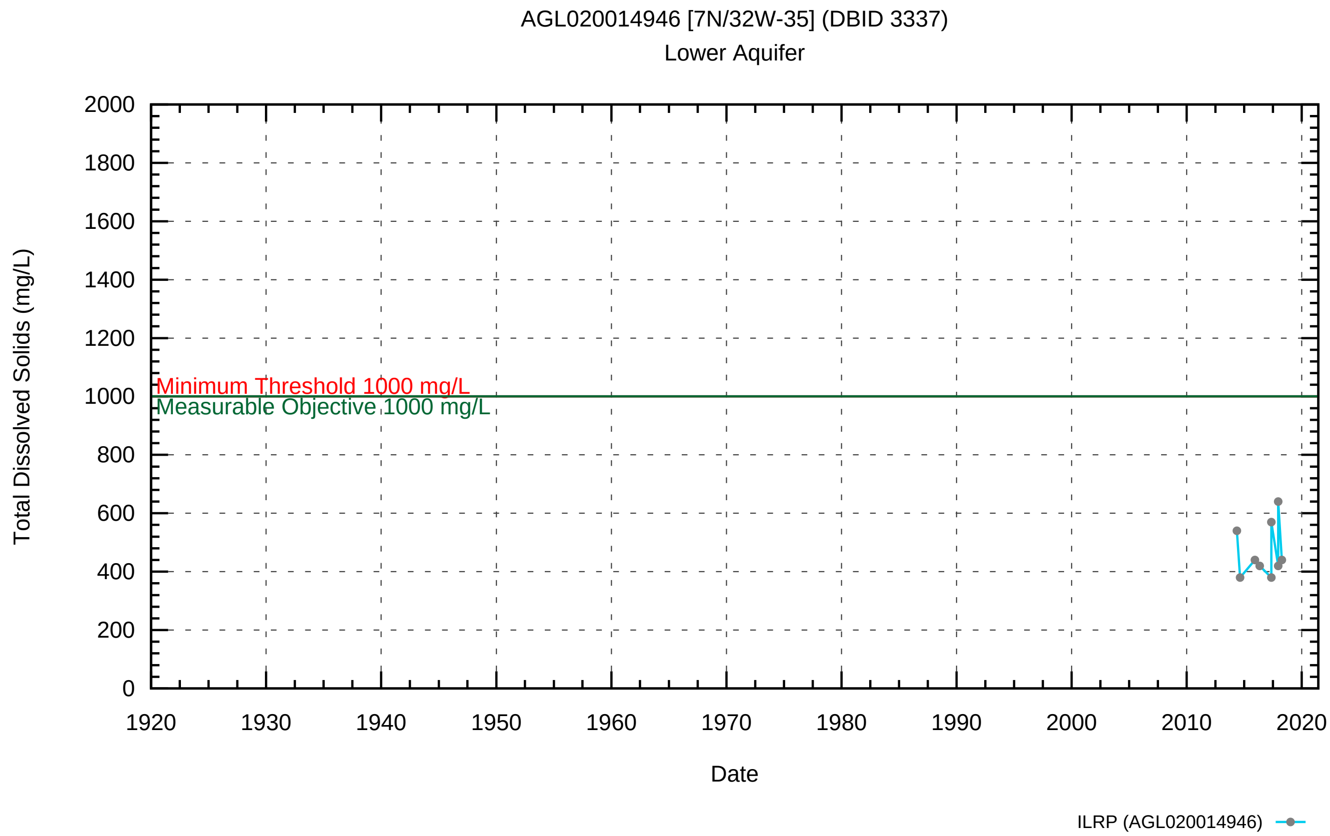
CMA: Buellton Uplands - Total Dissolved Solids



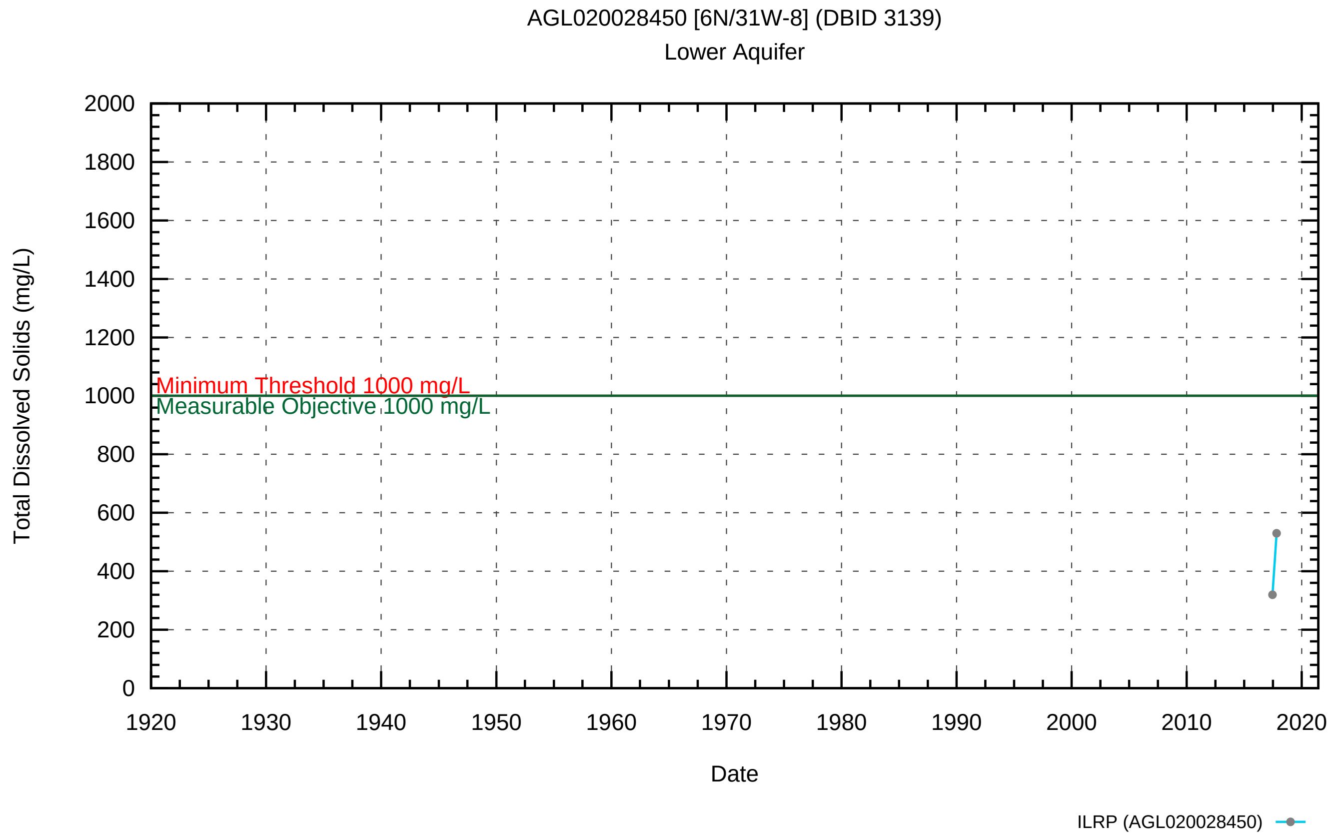


CMA: Buellton Uplands - Total Dissolved Solids

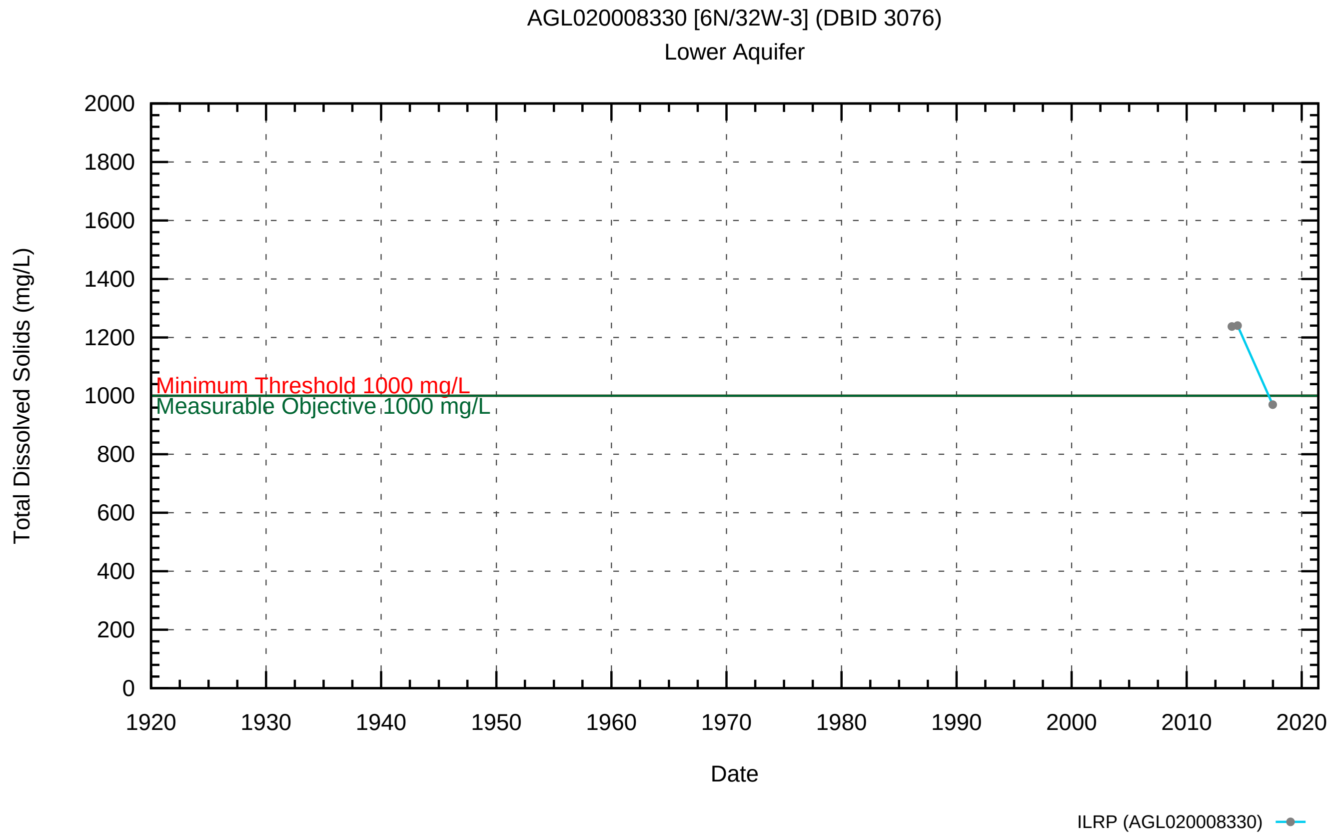


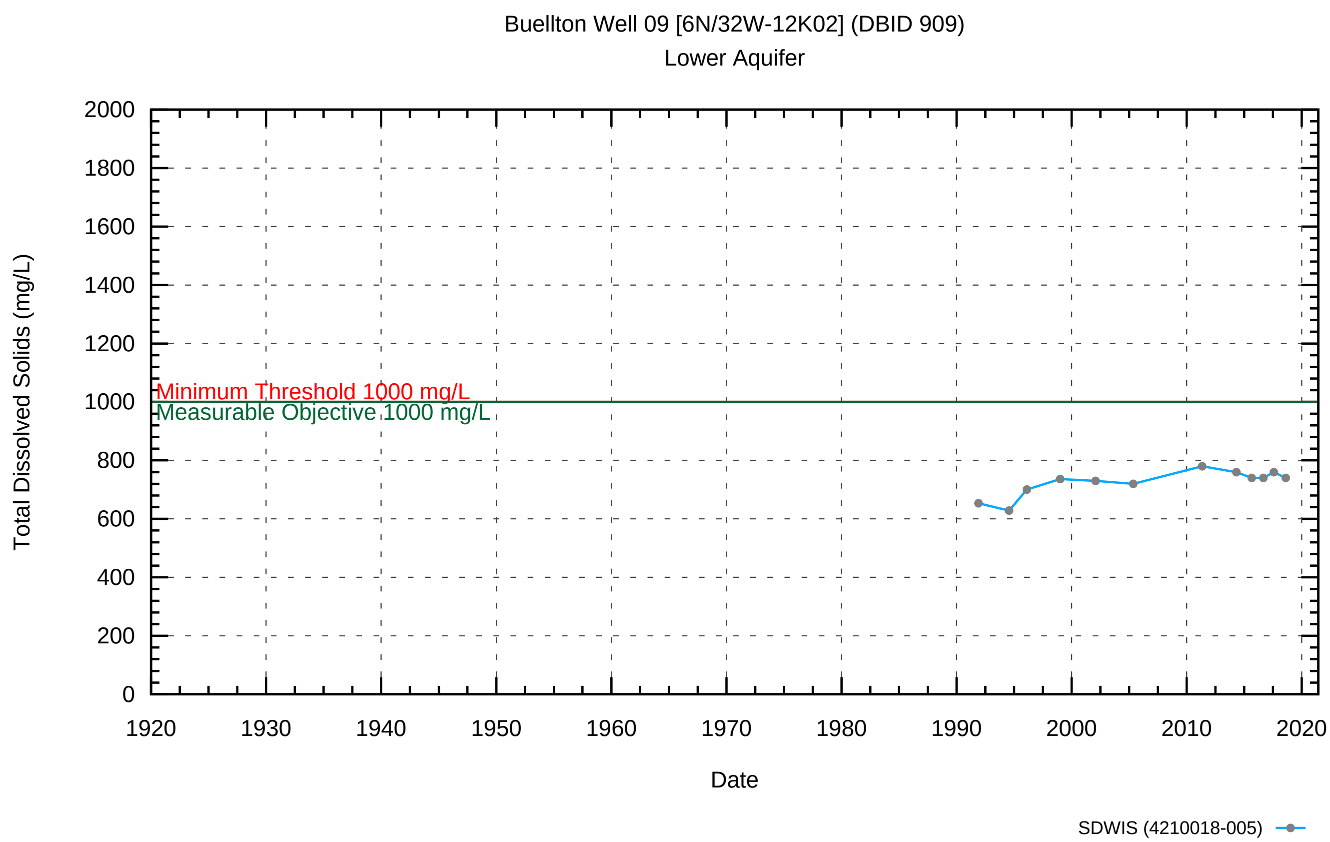


CMA: Buellton Uplands - Total Dissolved Solids

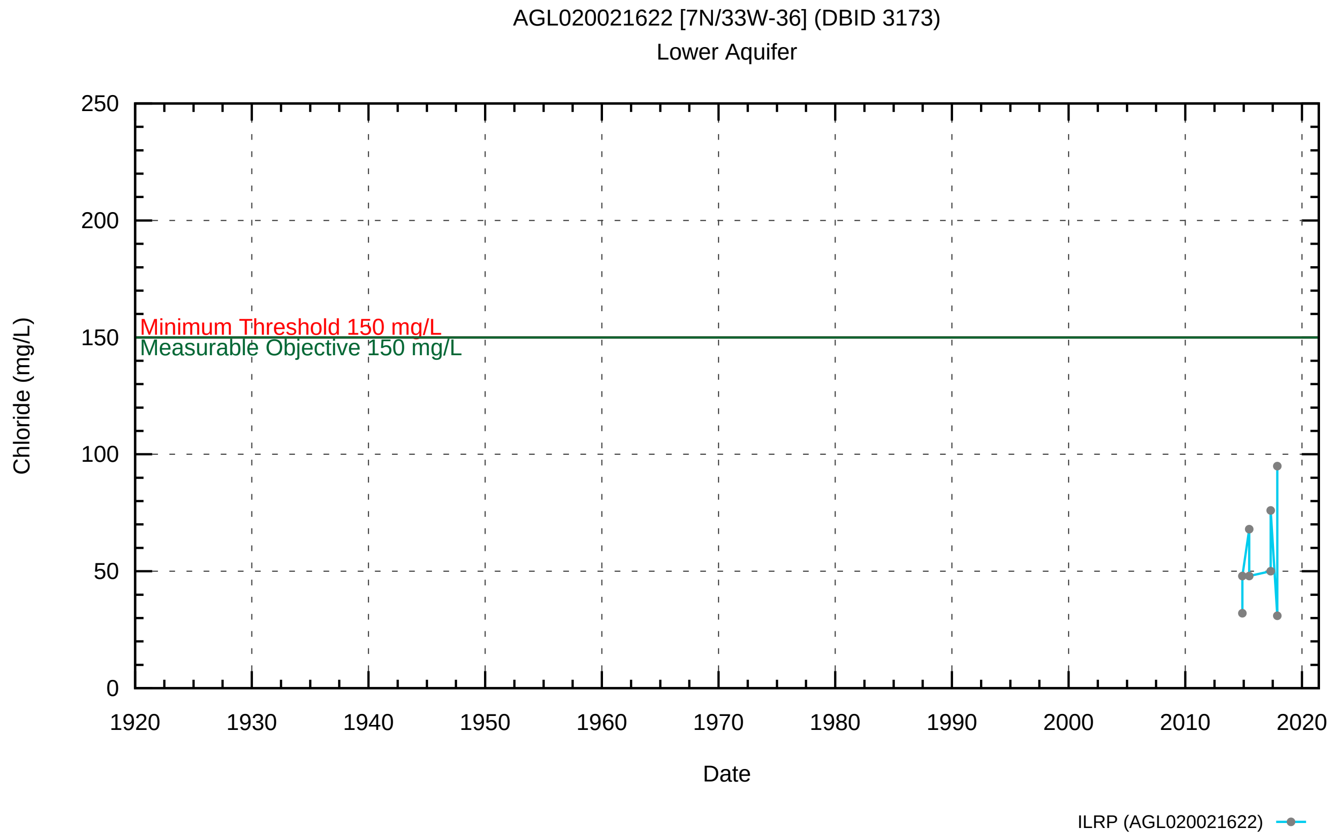


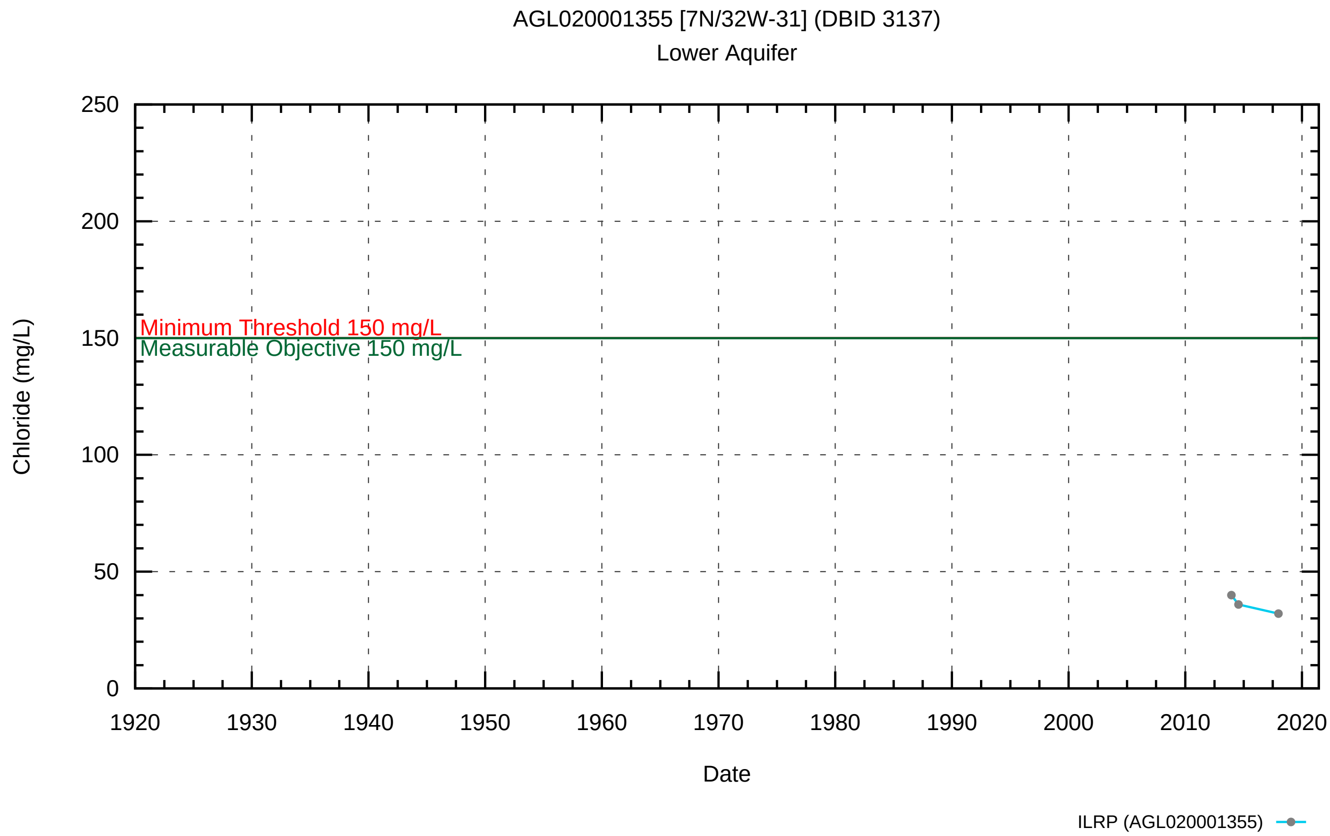
CMA: Santa Ynez River - Total Dissolved Solids





CMA: Buellton Uplands - Chloride





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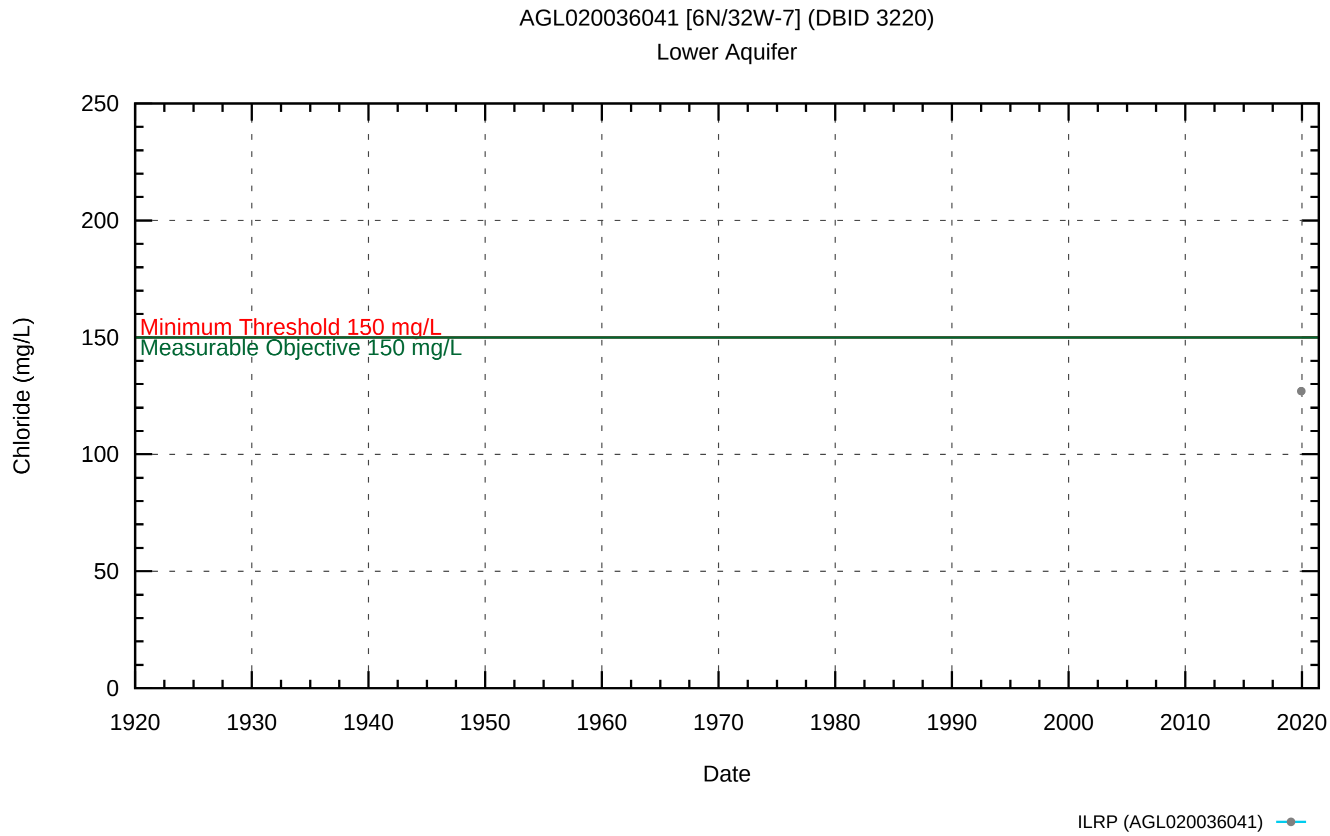

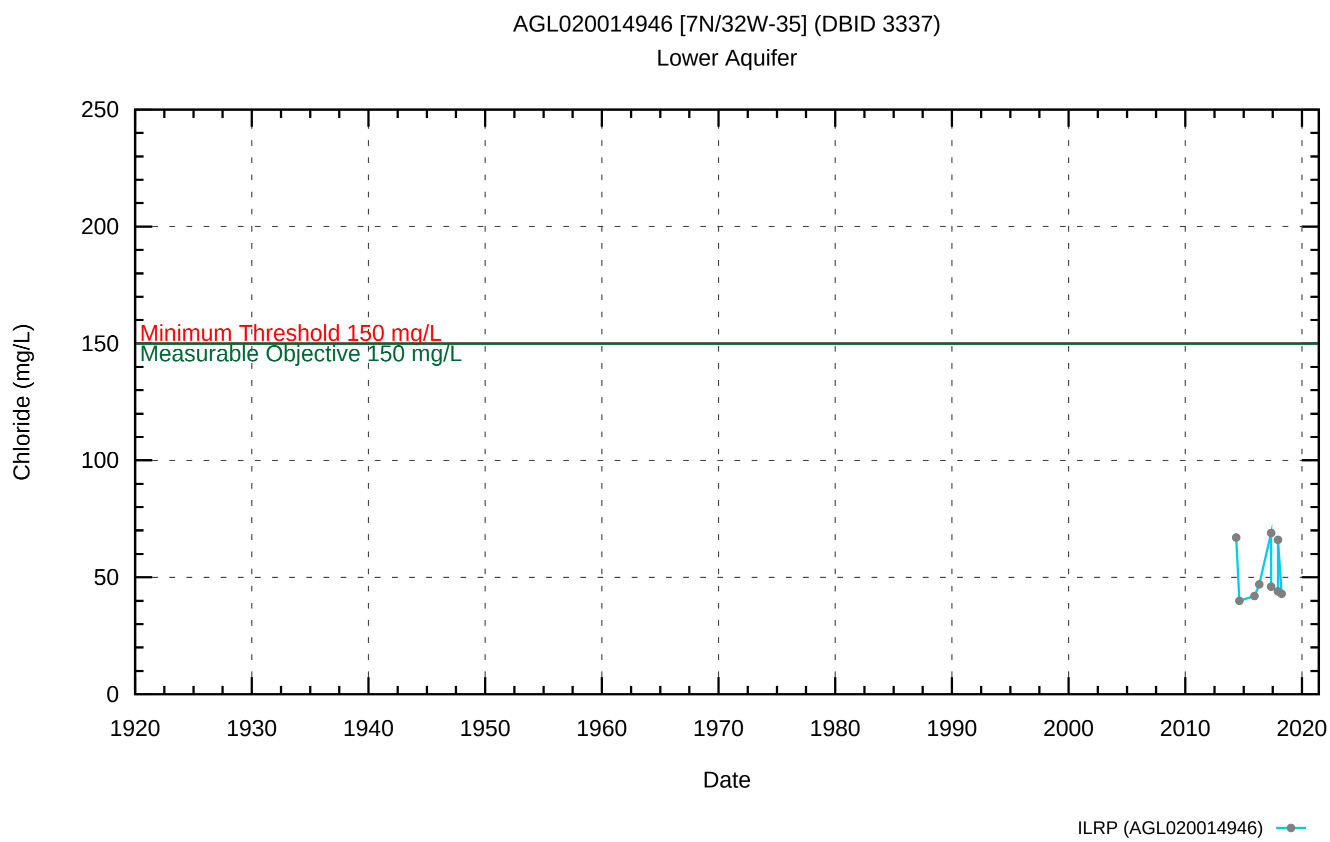

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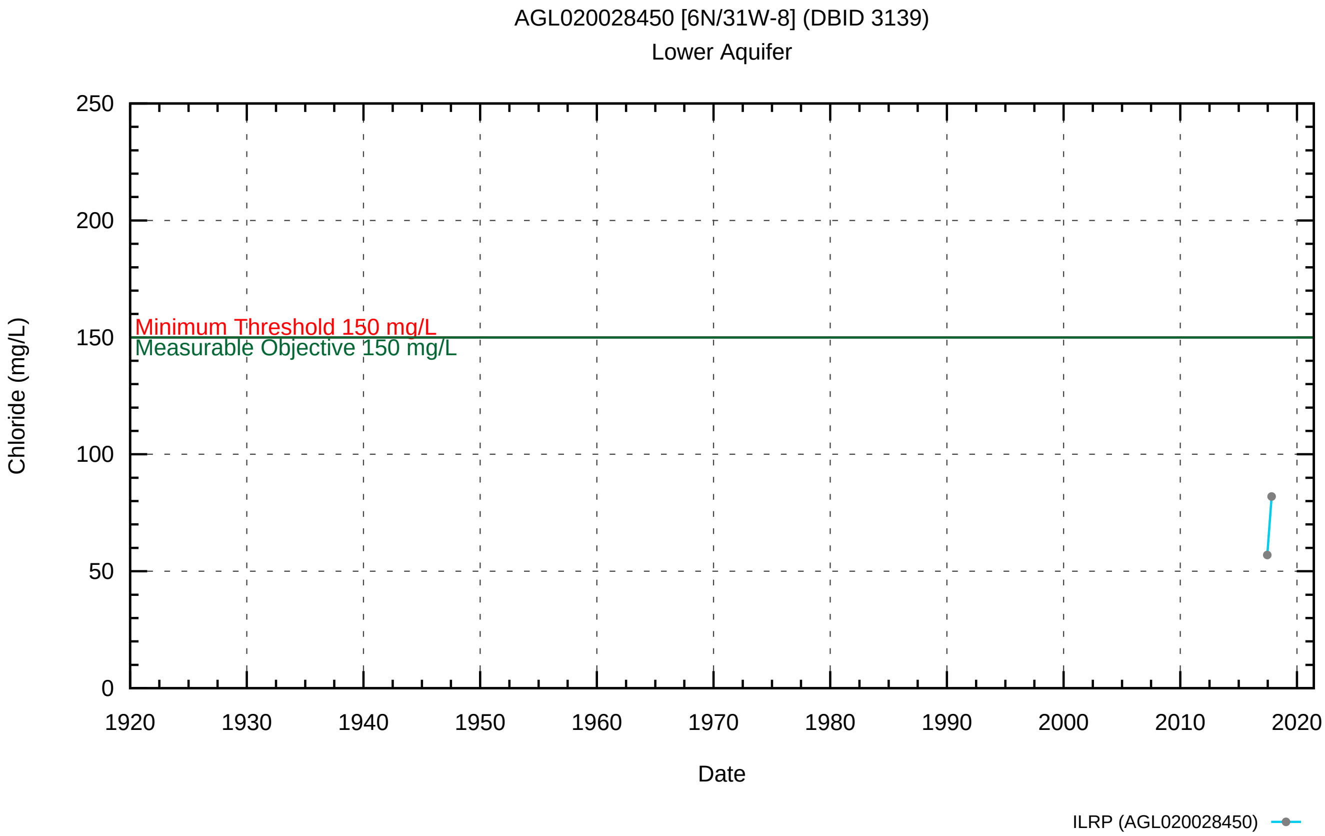
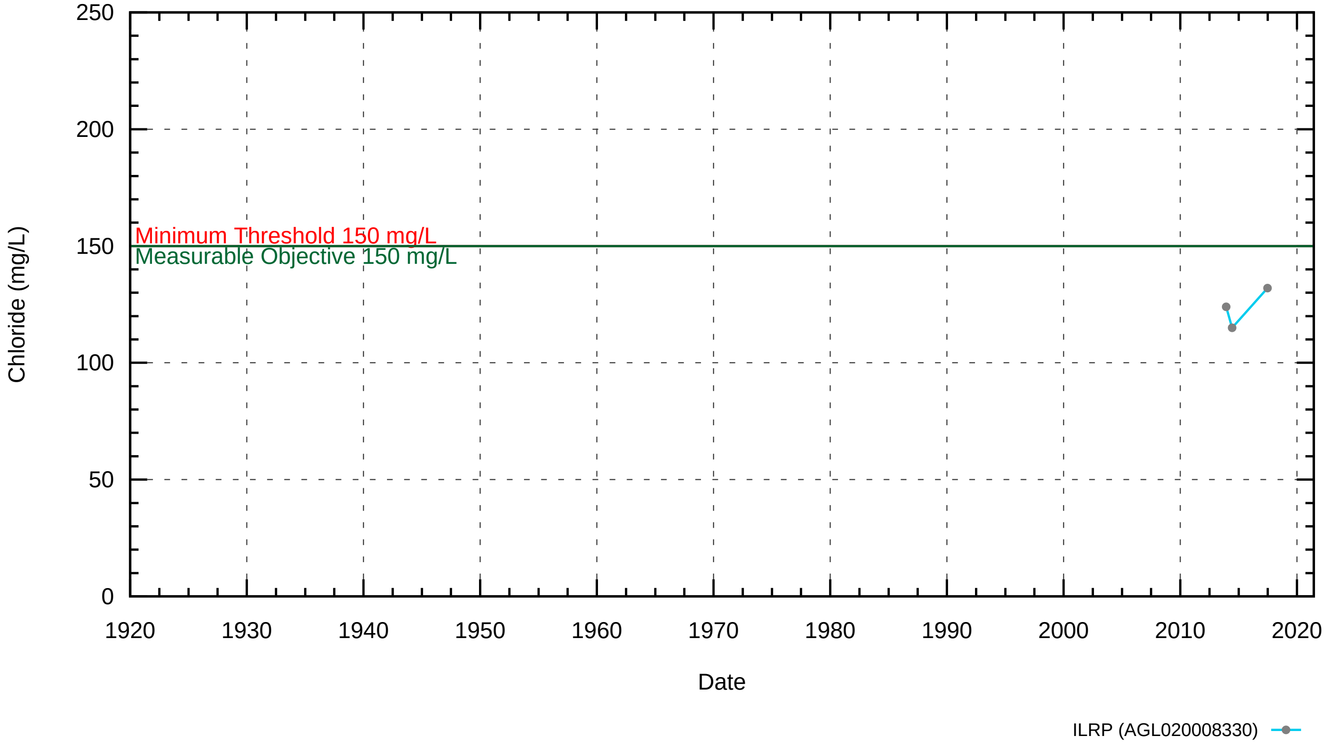
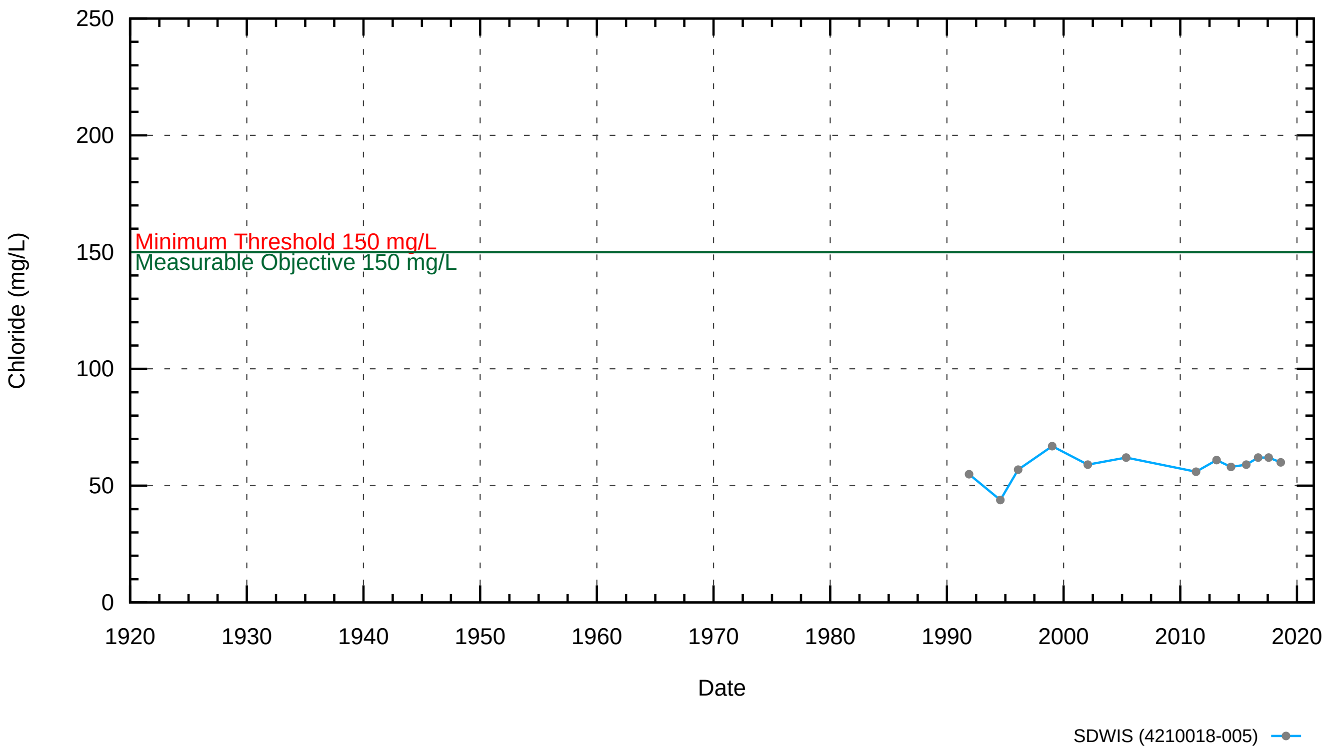


CMA: Santa Ynez River - Chloride

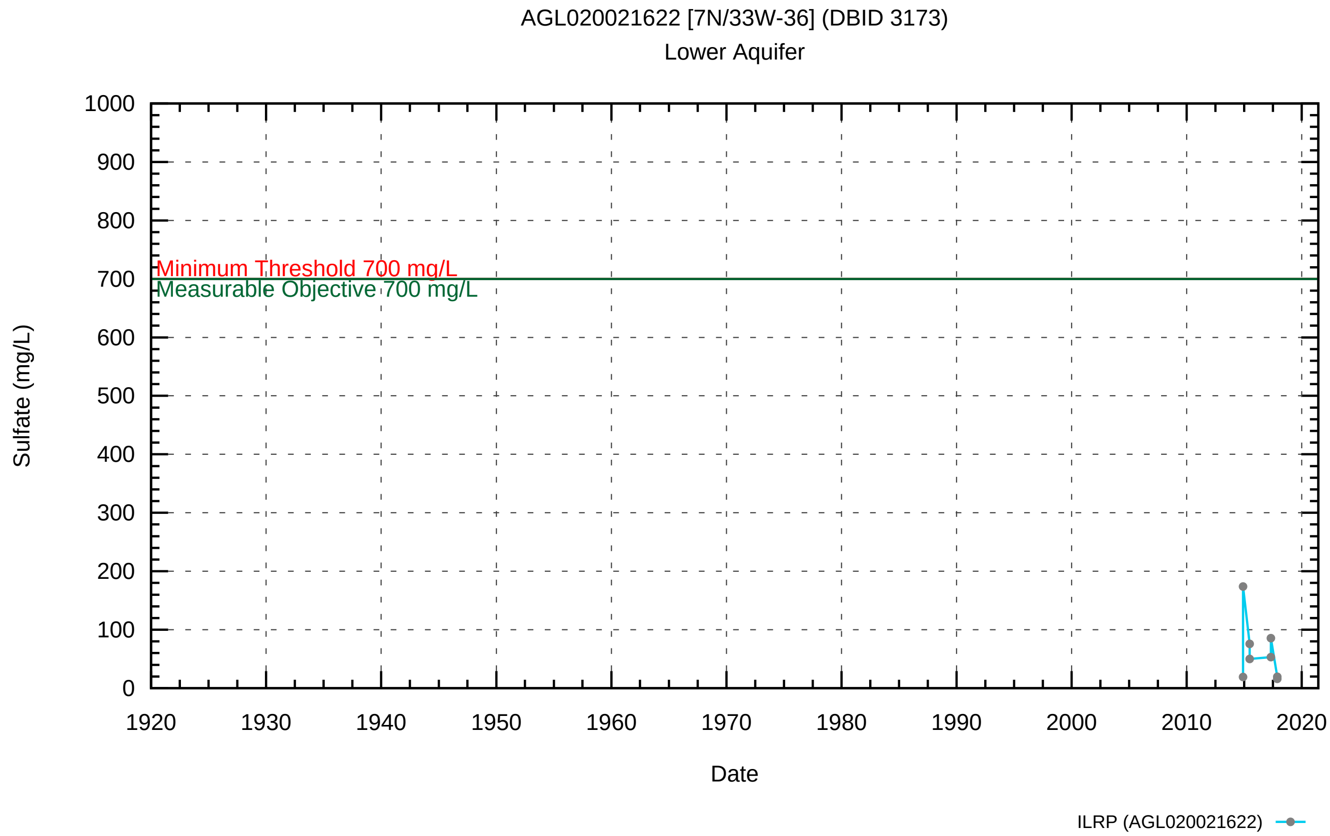
AGL020008330 [6N/32W-3] (DBID 3076)
Lower Aquifer

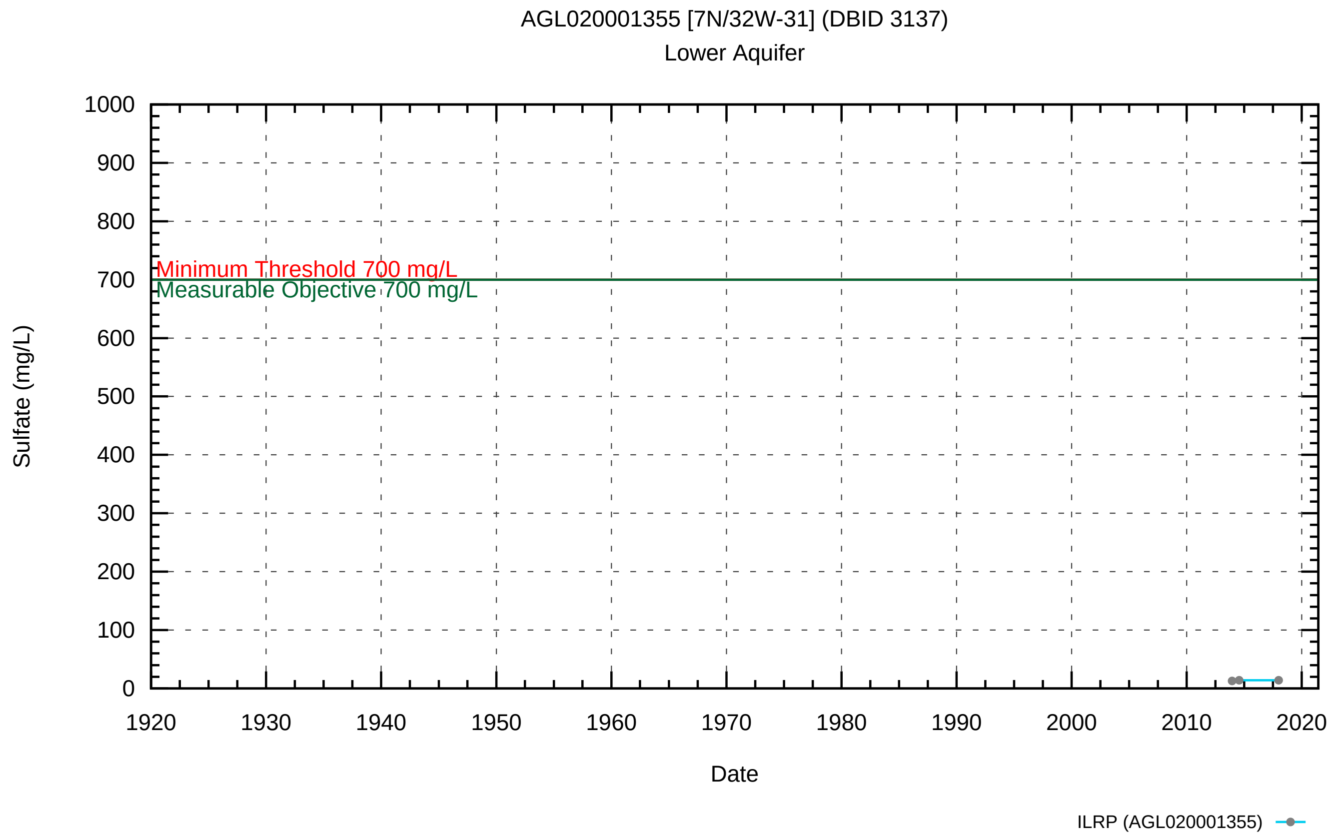


Buellton Well 09 [6N/32W-12K02] (DBID 909)
Lower Aquifer



CMA: Buellton Uplands - Sulfate





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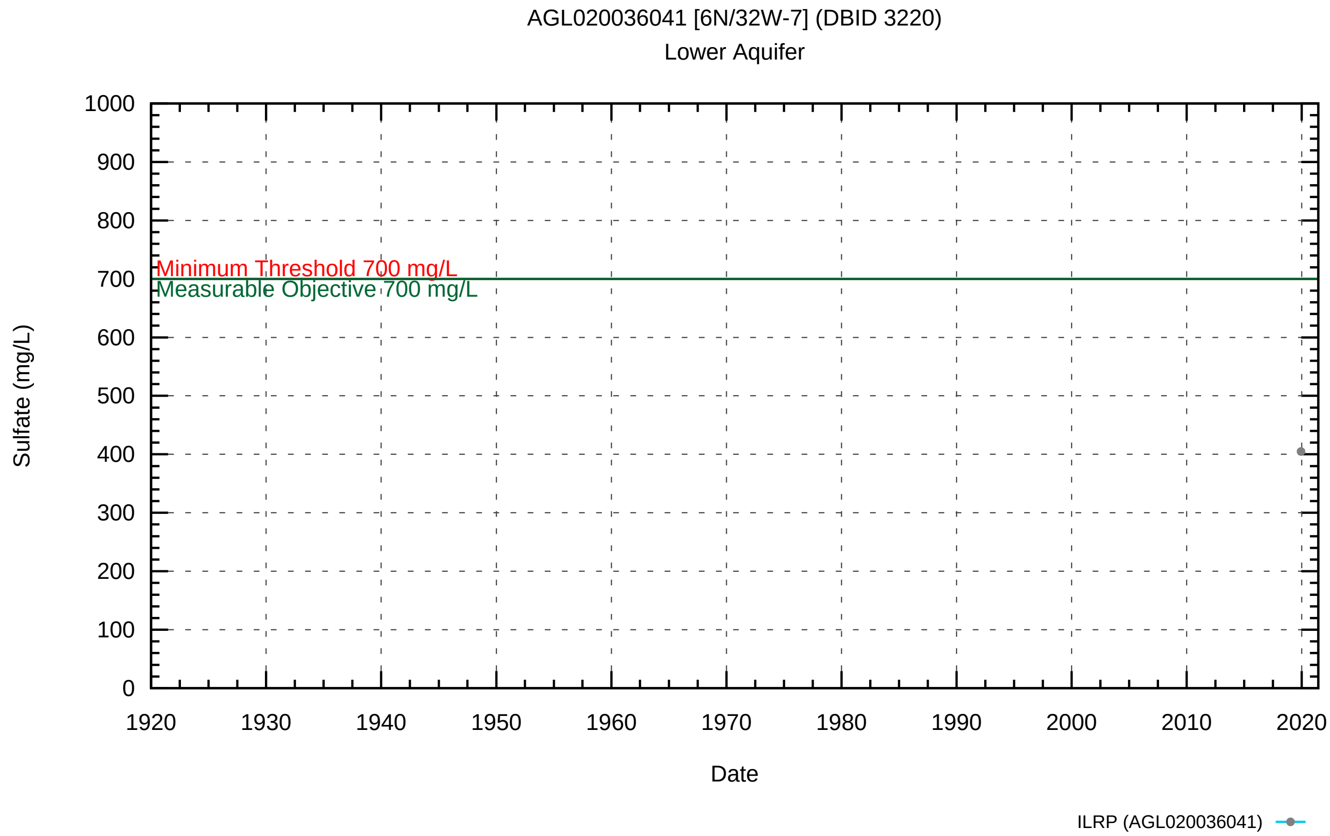

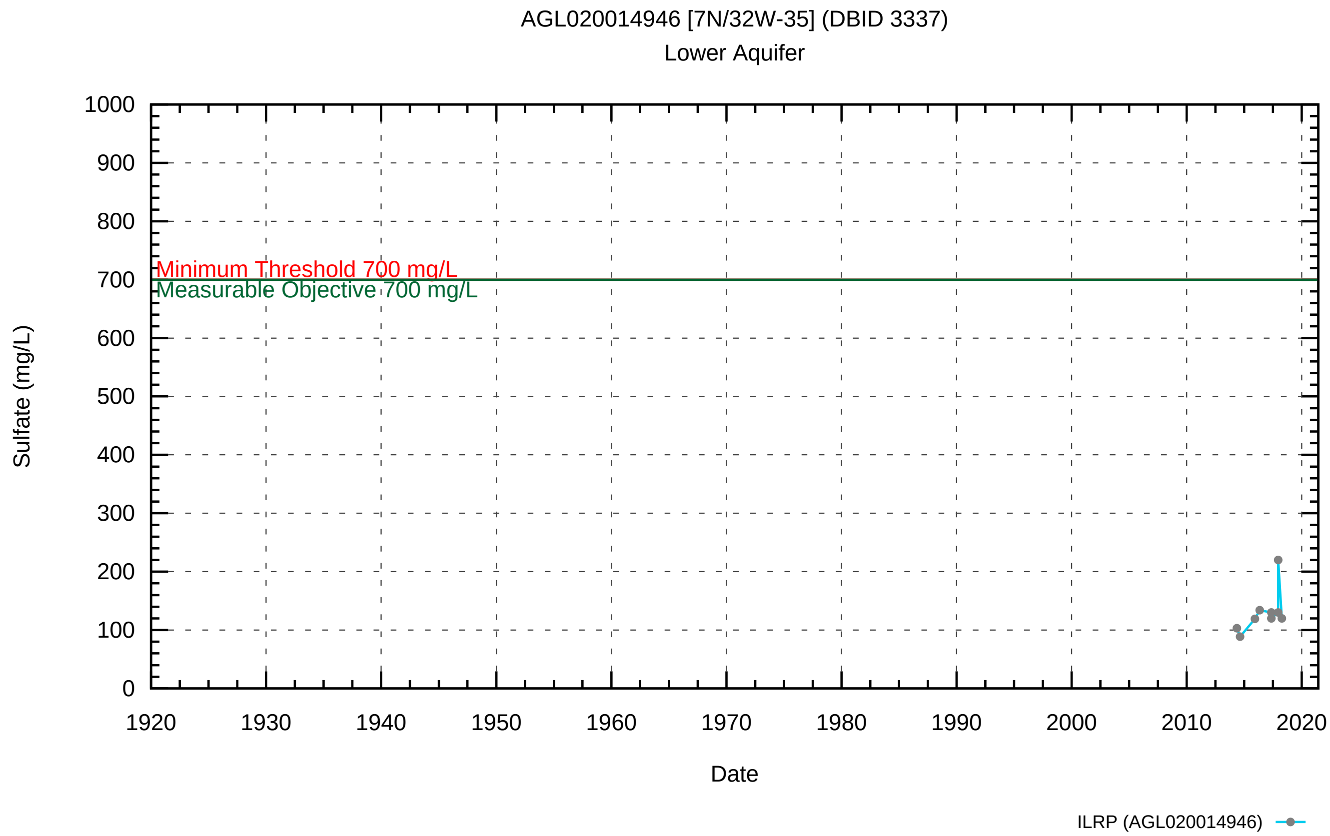

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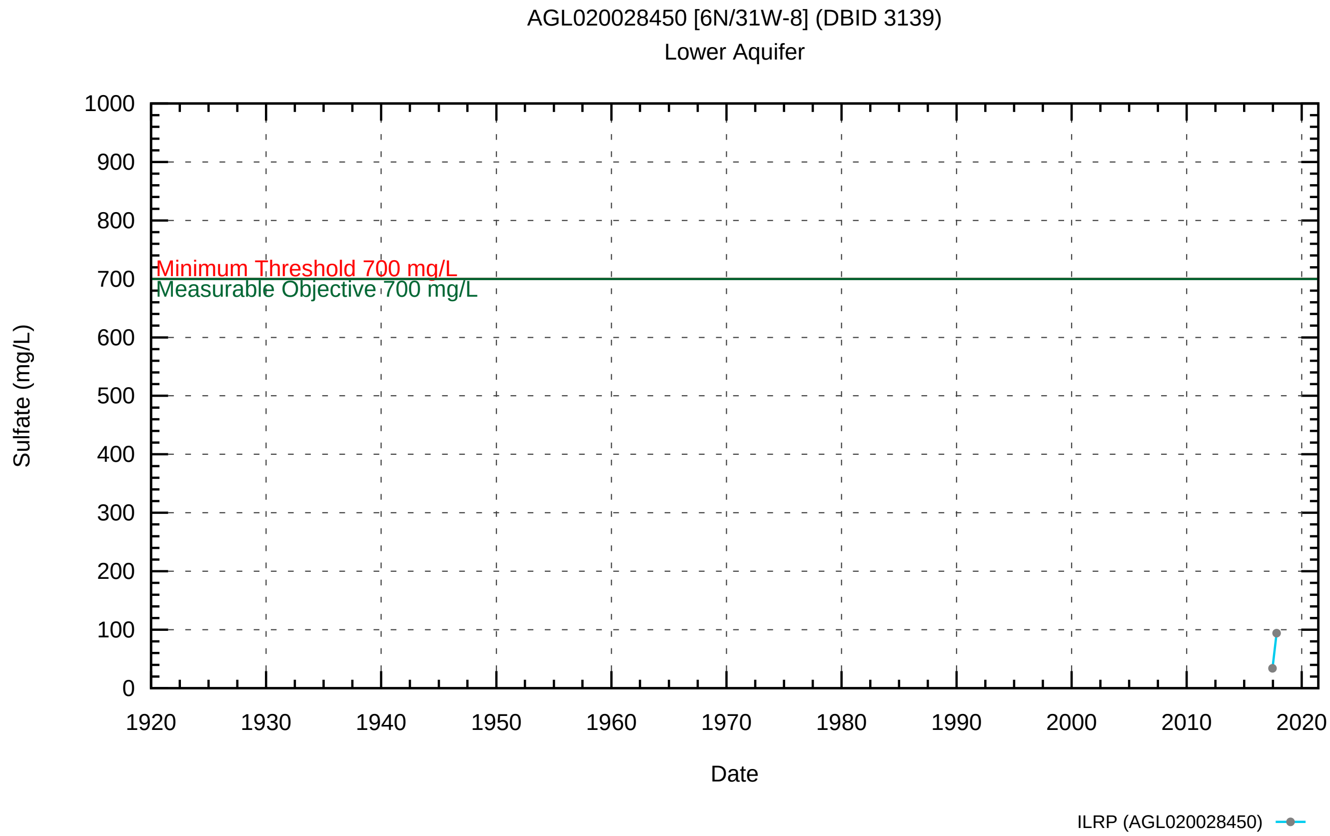
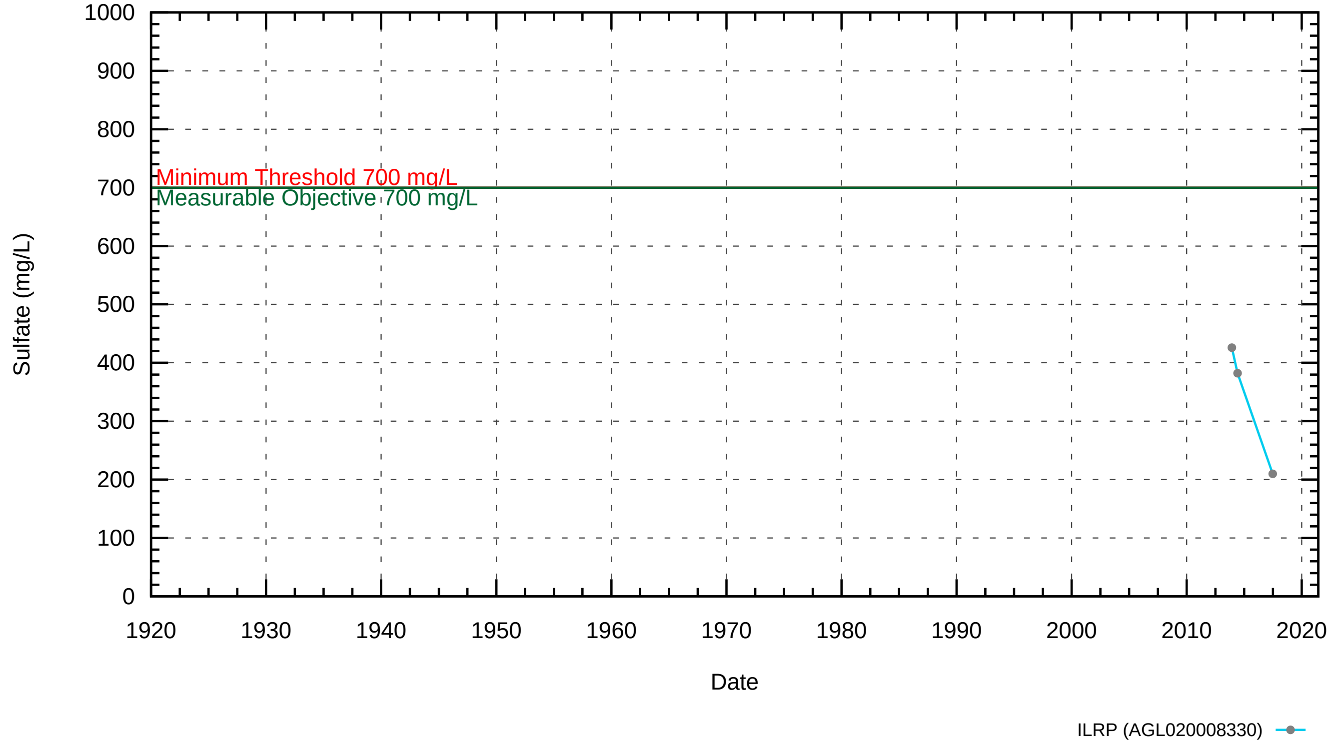
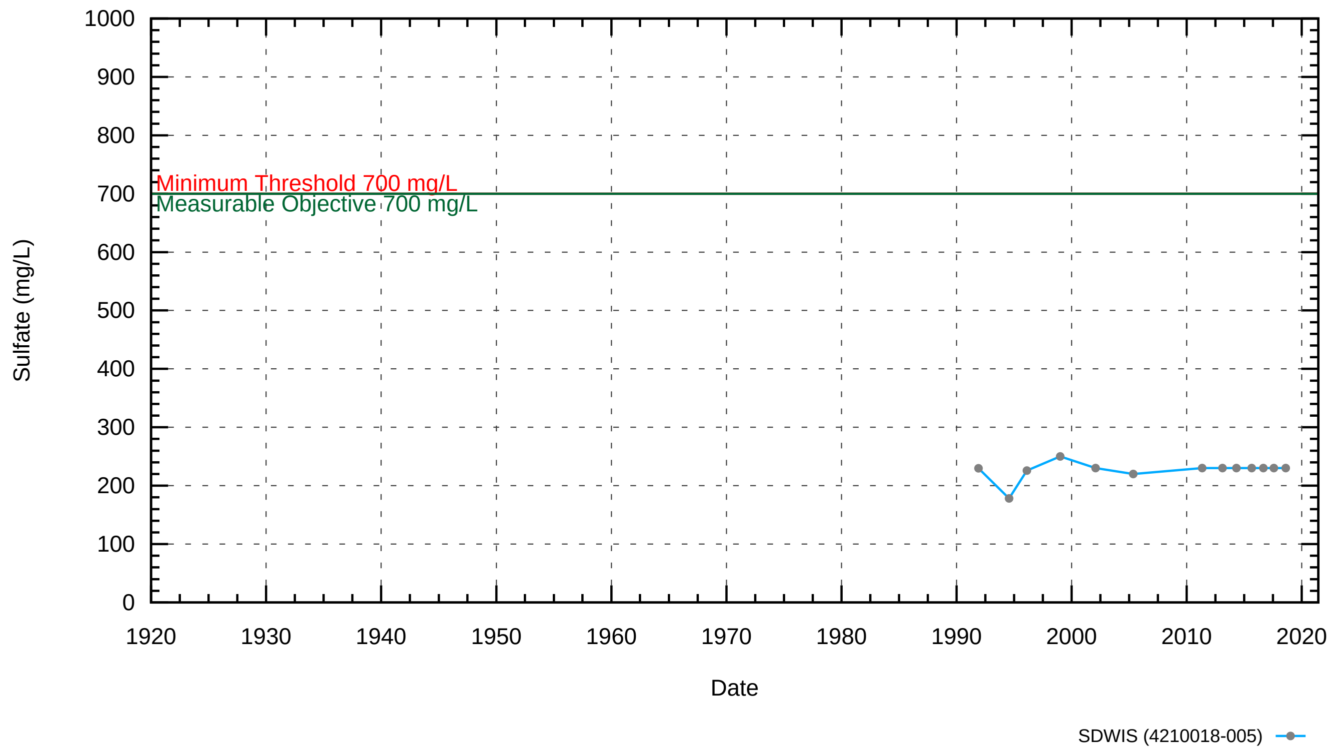


CMA: Santa Ynez River - Sulfate

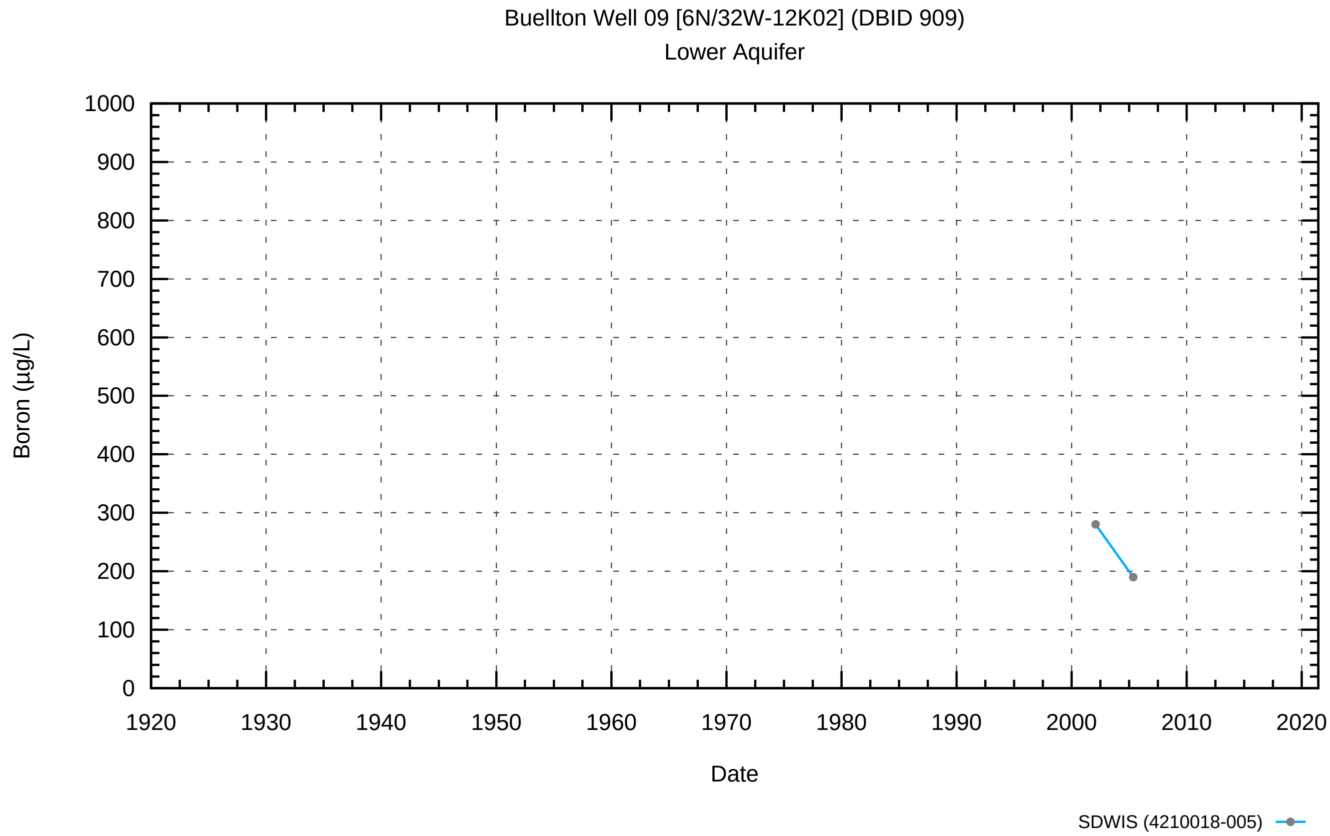
AGL020008330 [6N/32W-3] (DBID 3076)
Lower Aquifer



Buellton Well 09 [6N/32W-12K02] (DBID 909)
Lower Aquifer



CMA: Santa Ynez River - Boron



CMA: Buellton Uplands - Sodium

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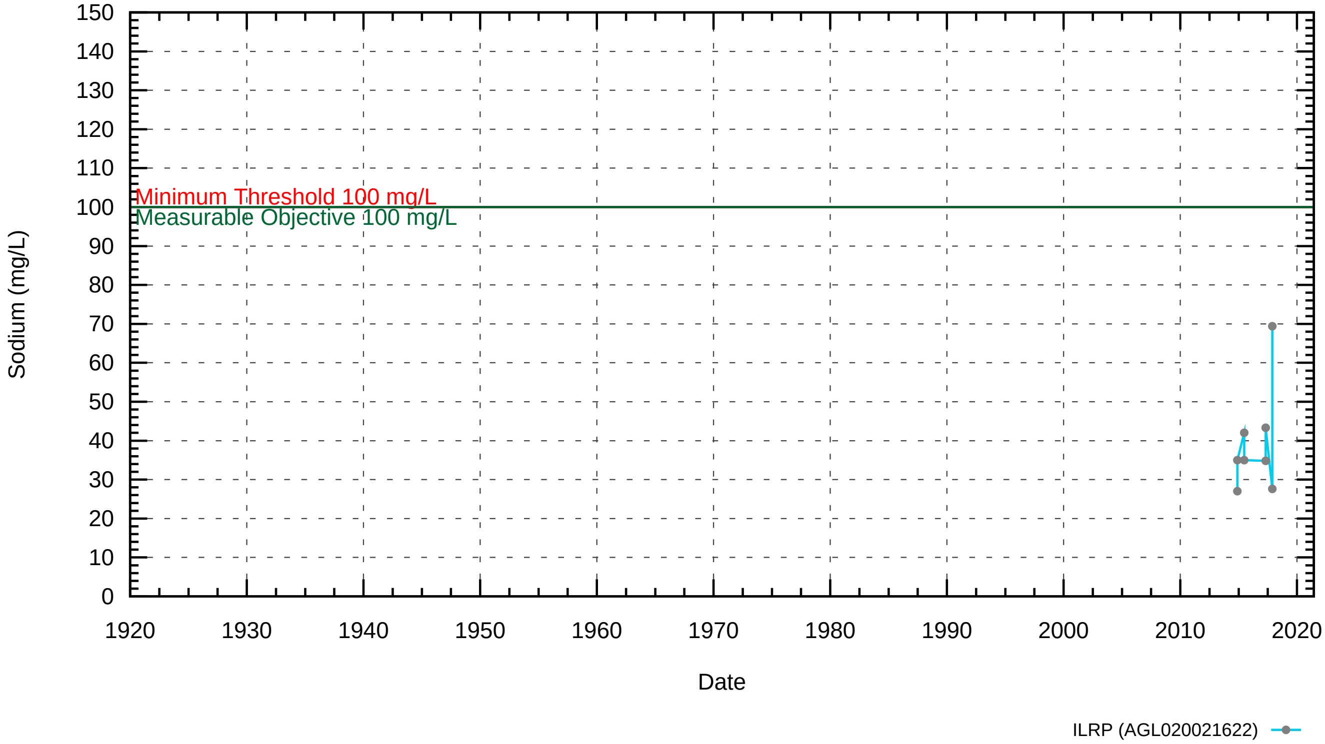
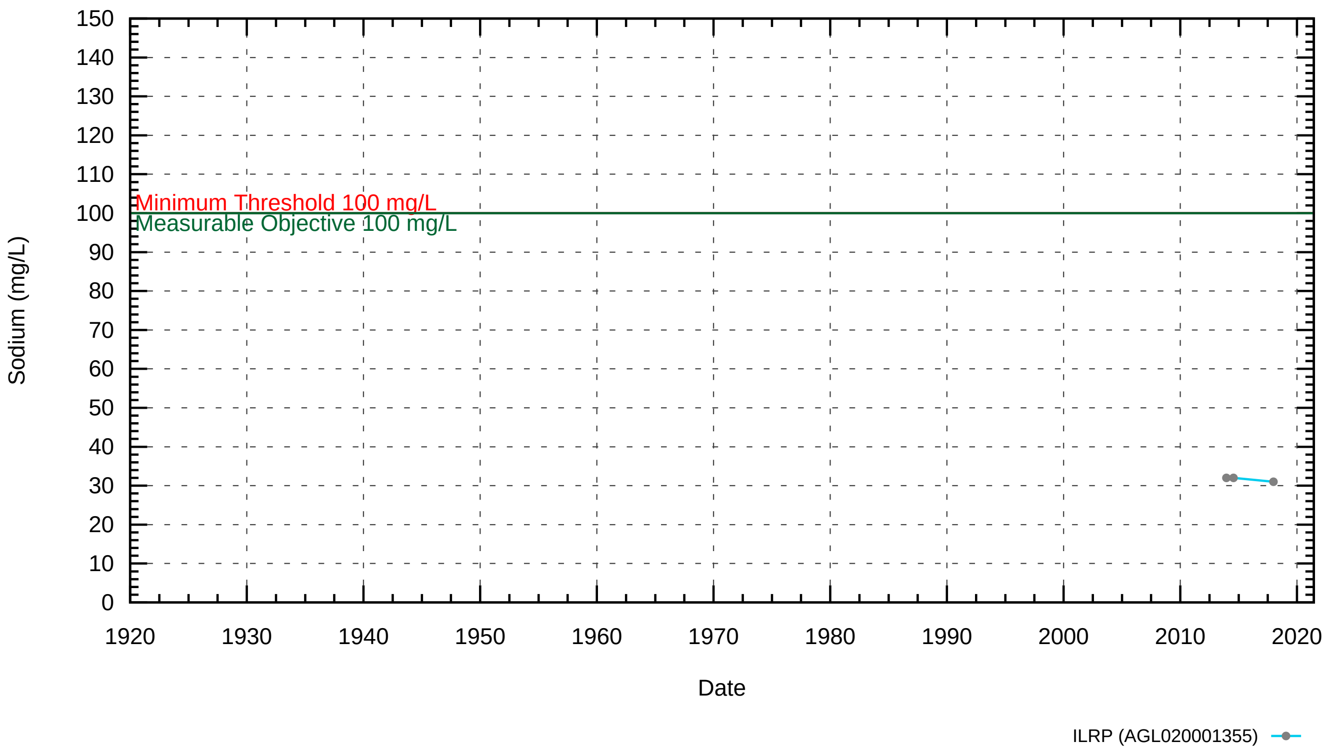
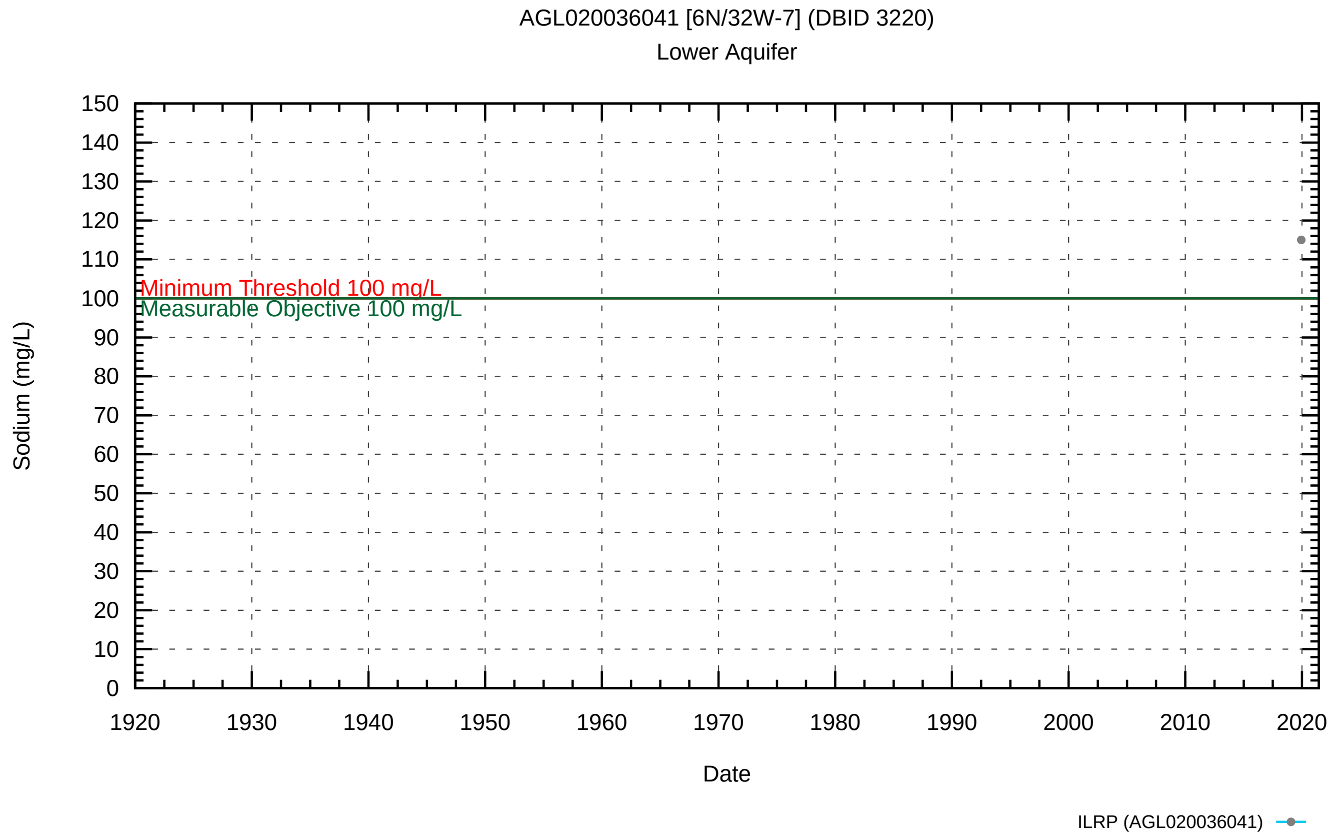
Lower Aquifer

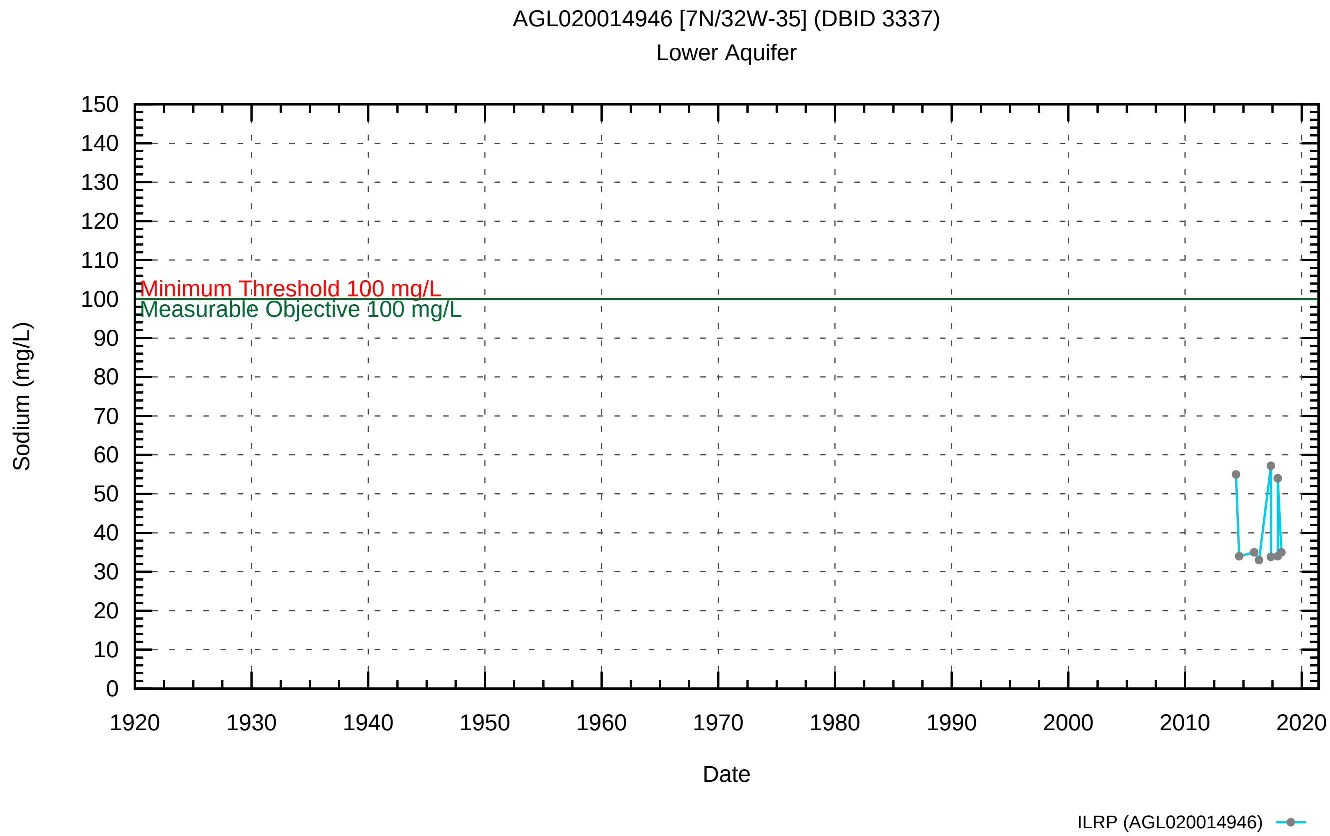


AGL020001355 [7N/32W-31] (DBID 3137)
Lower Aquifer

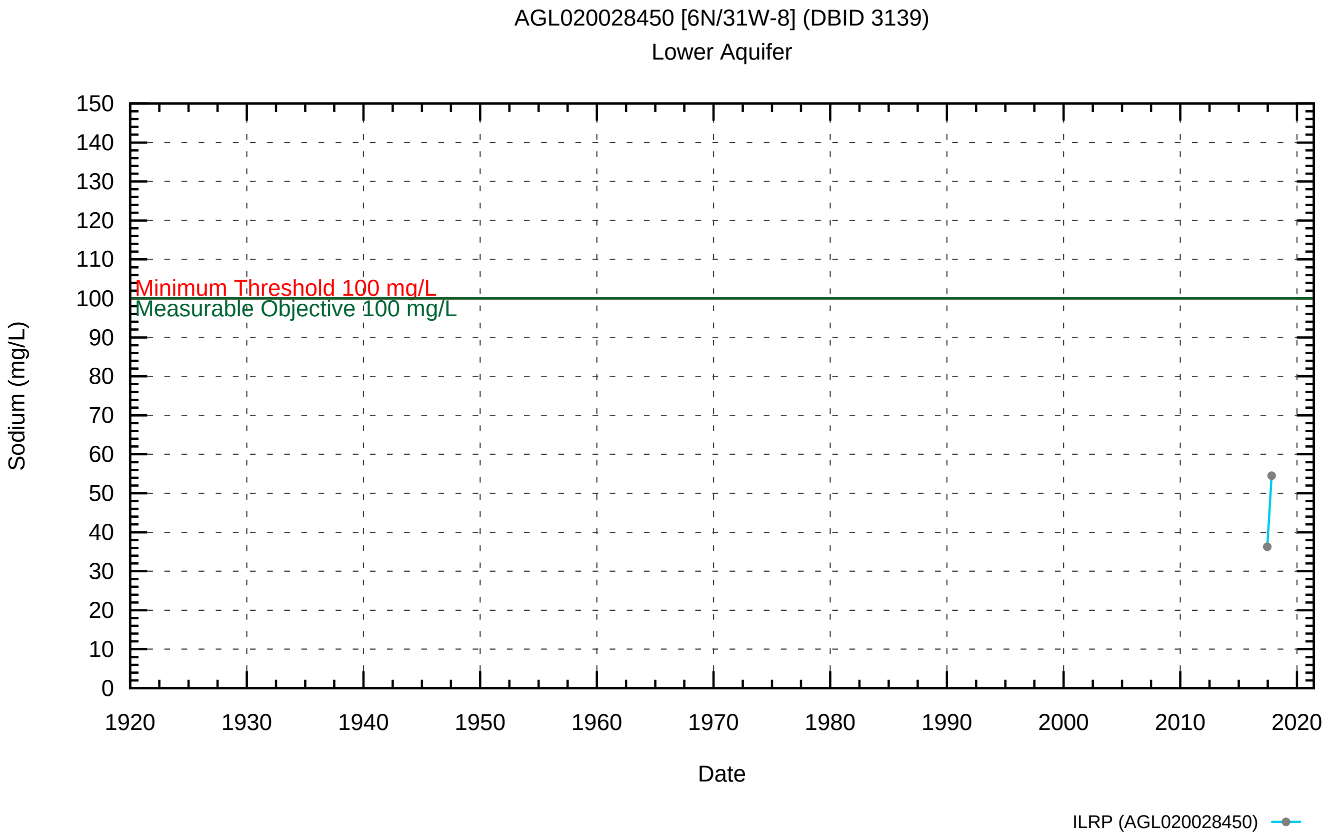


CMA: Buellton Uplands - Sodium

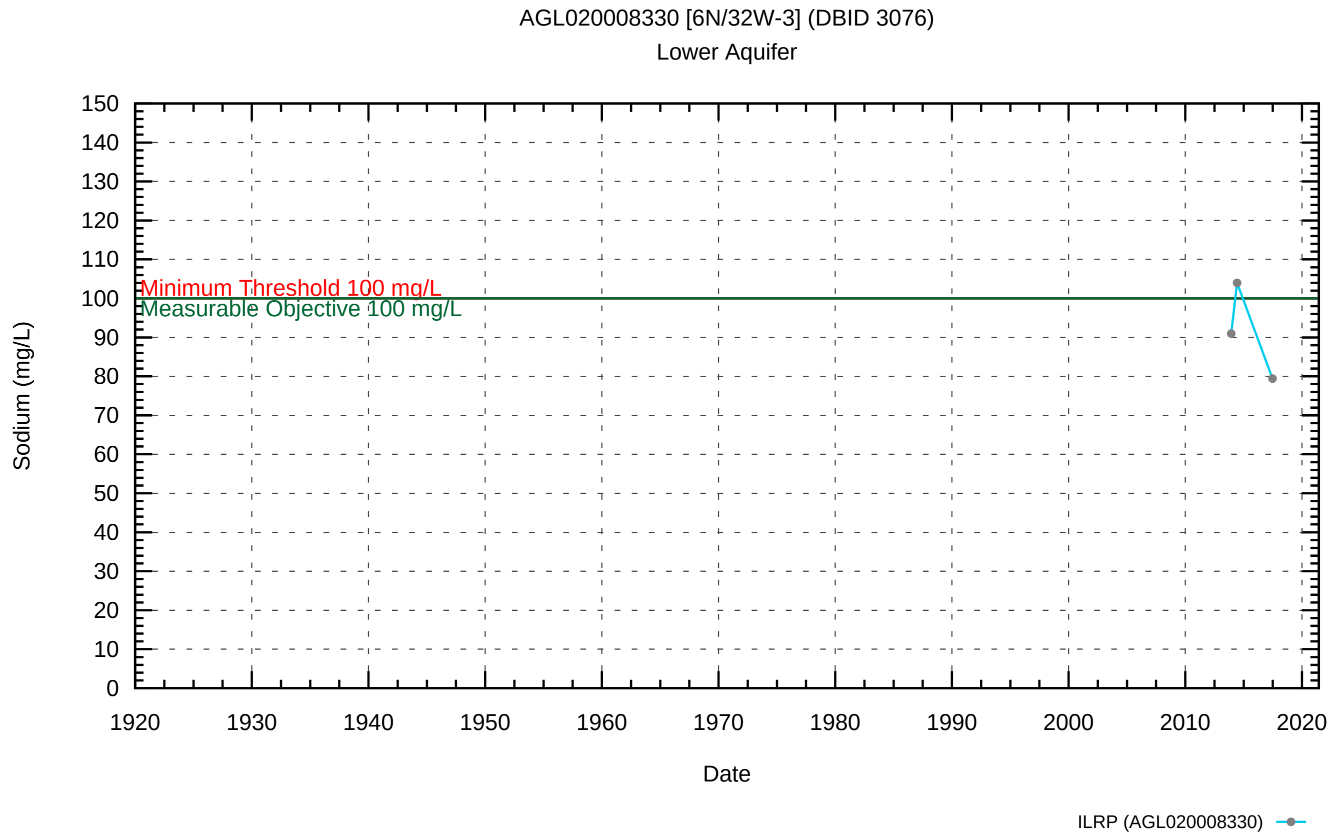


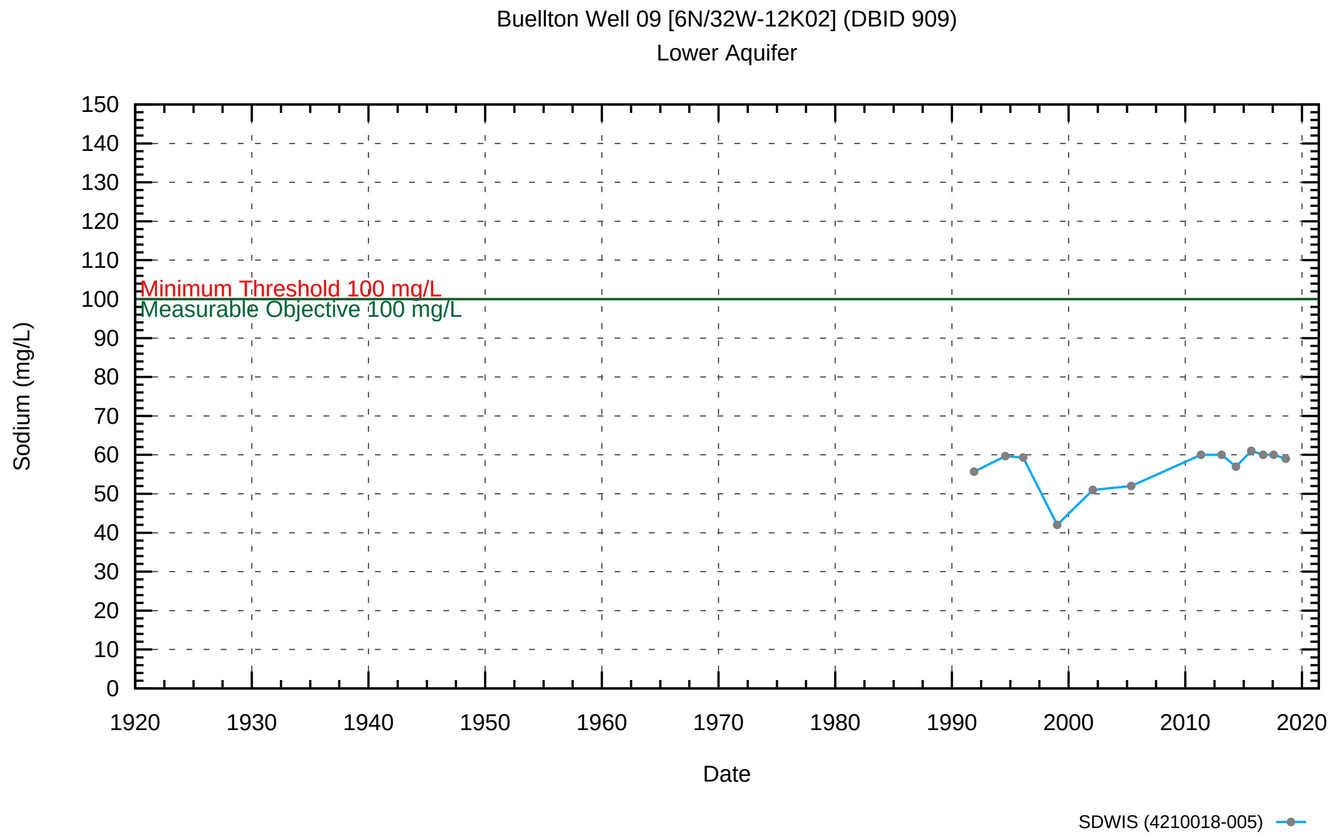


CMA: Buellton Uplands - Sodium

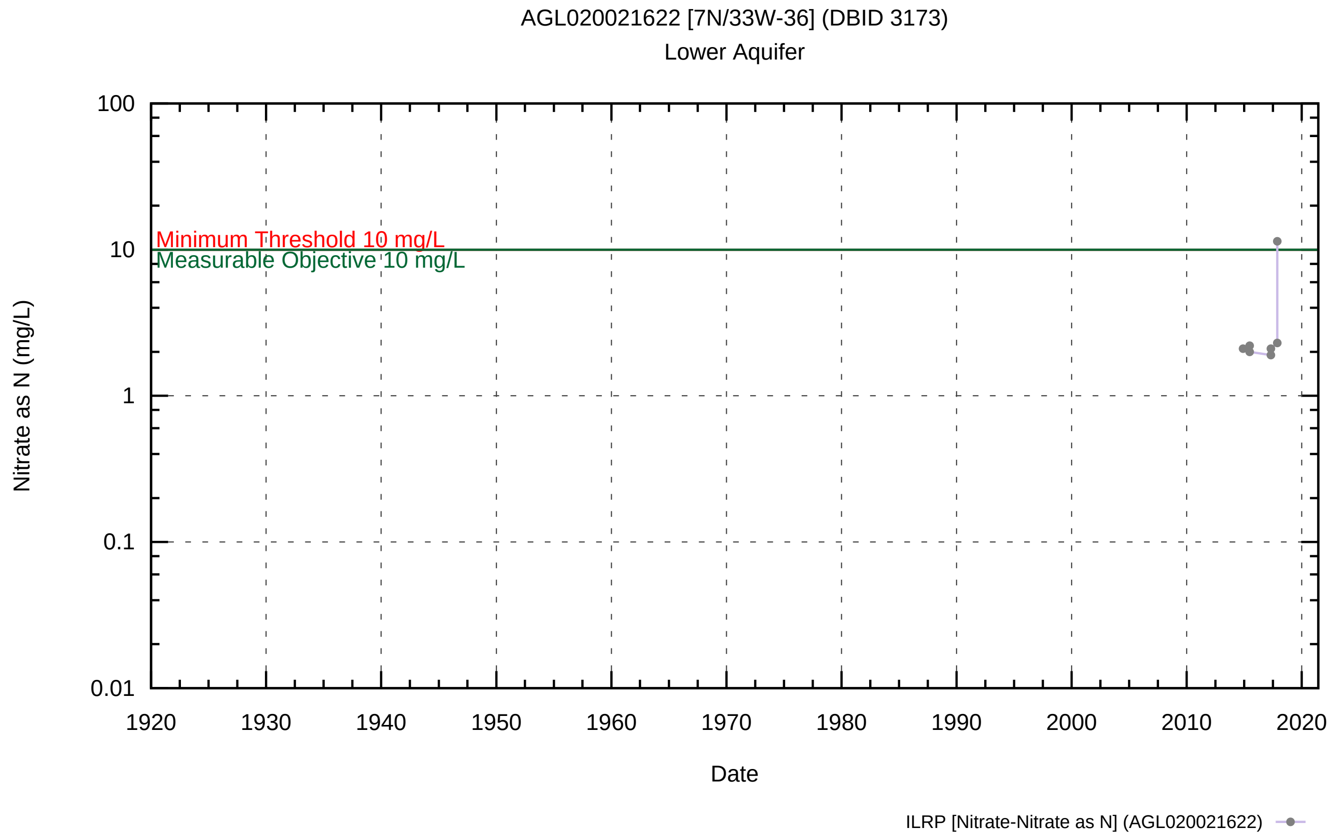


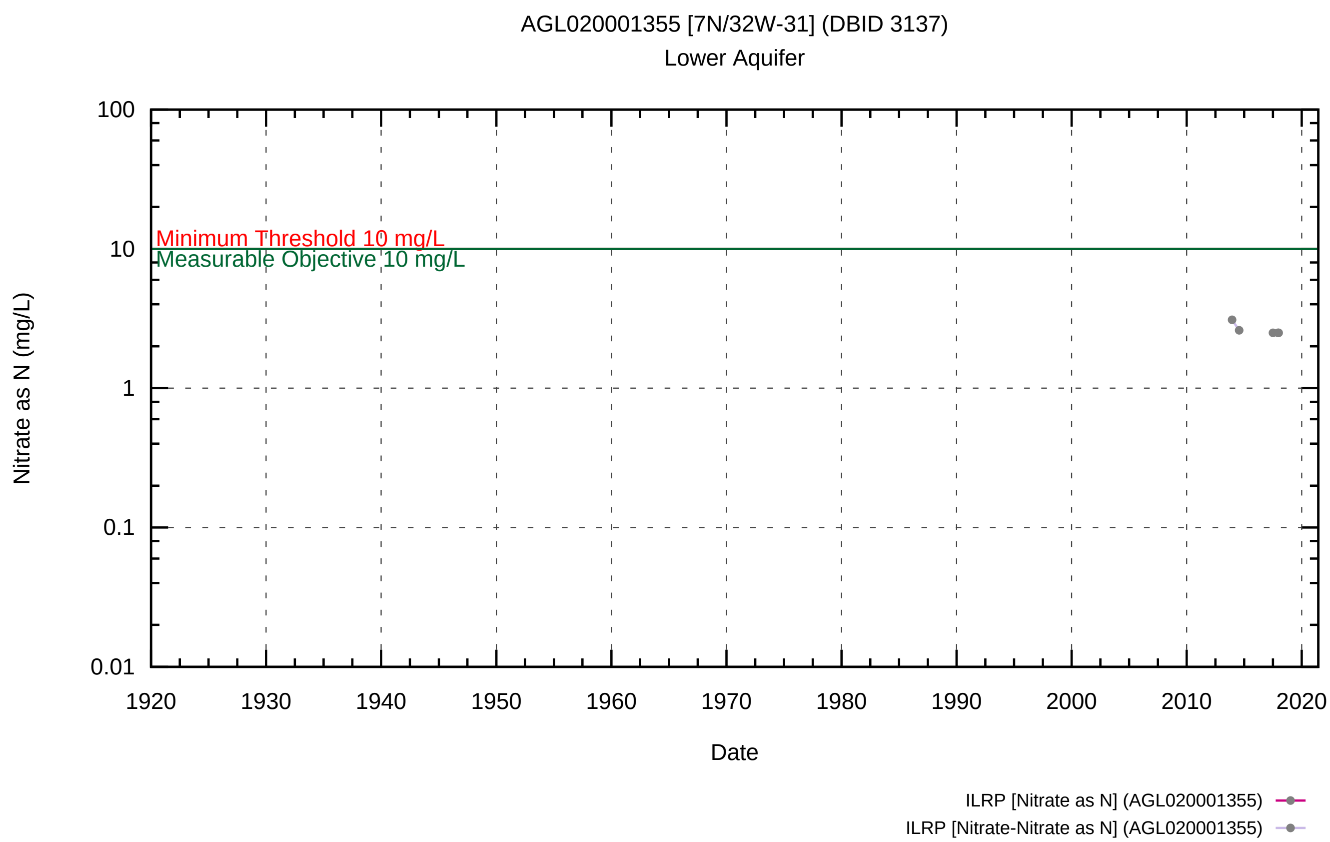
CMA: Santa Ynez River - Sodium



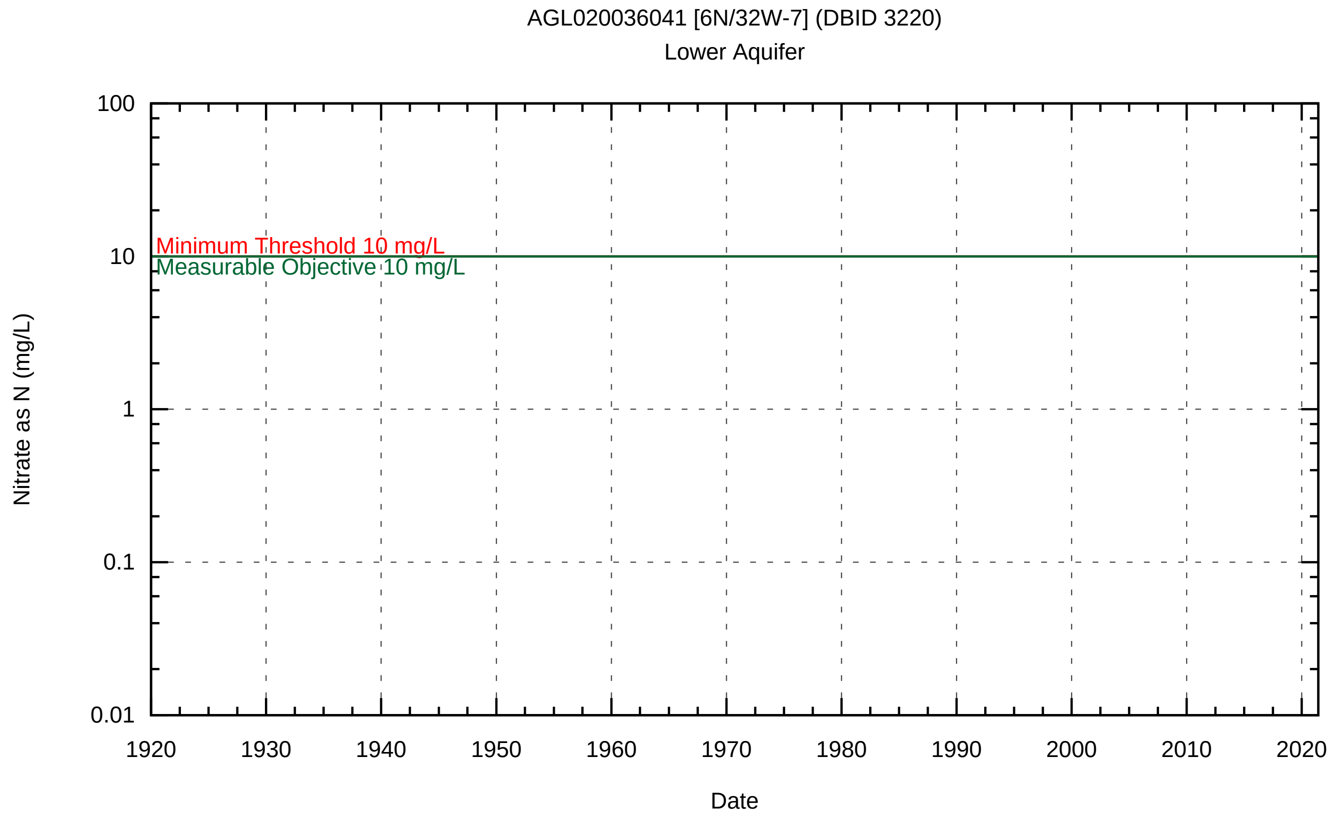


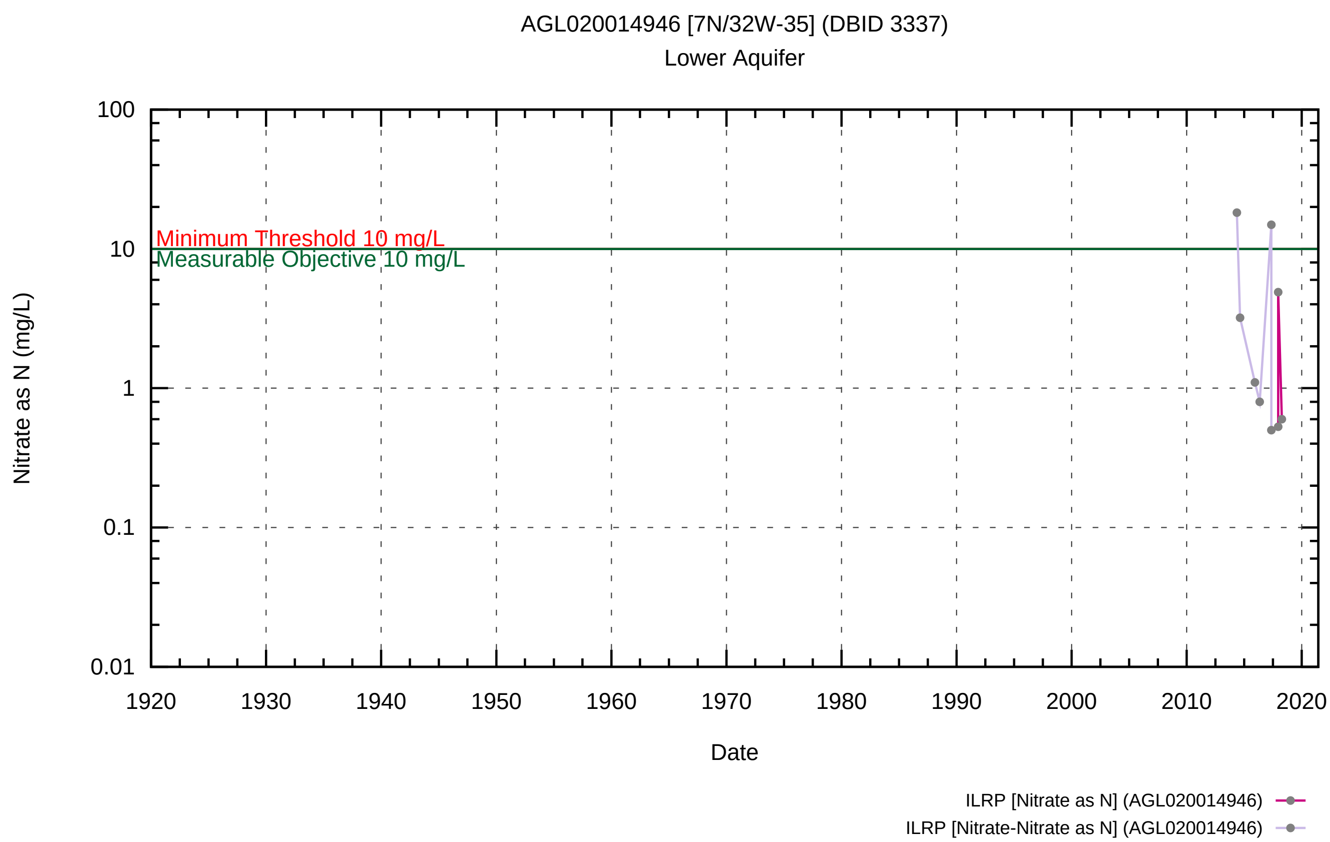
CMA: Buellton Uplands - Nitrate



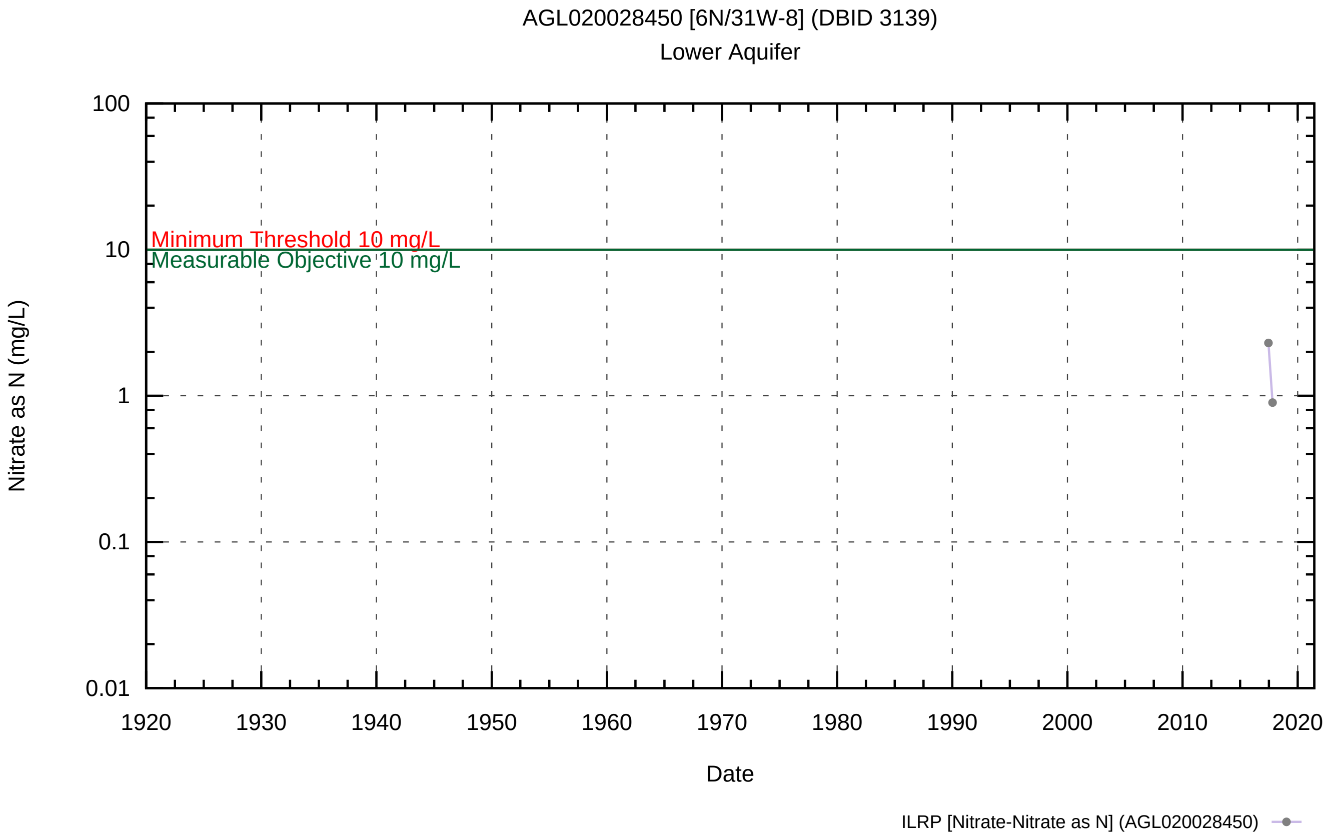


CMA: Buellton Uplands - Nitrate

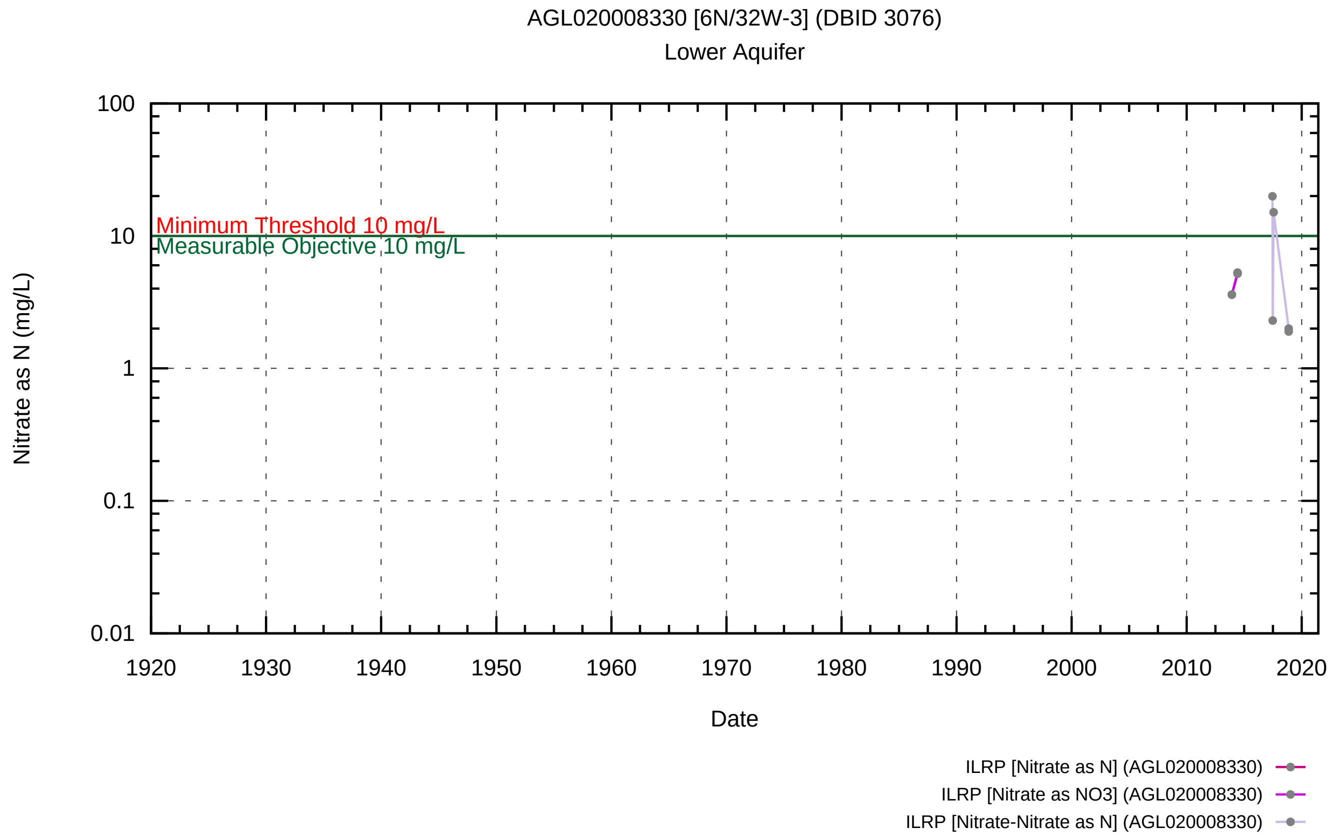


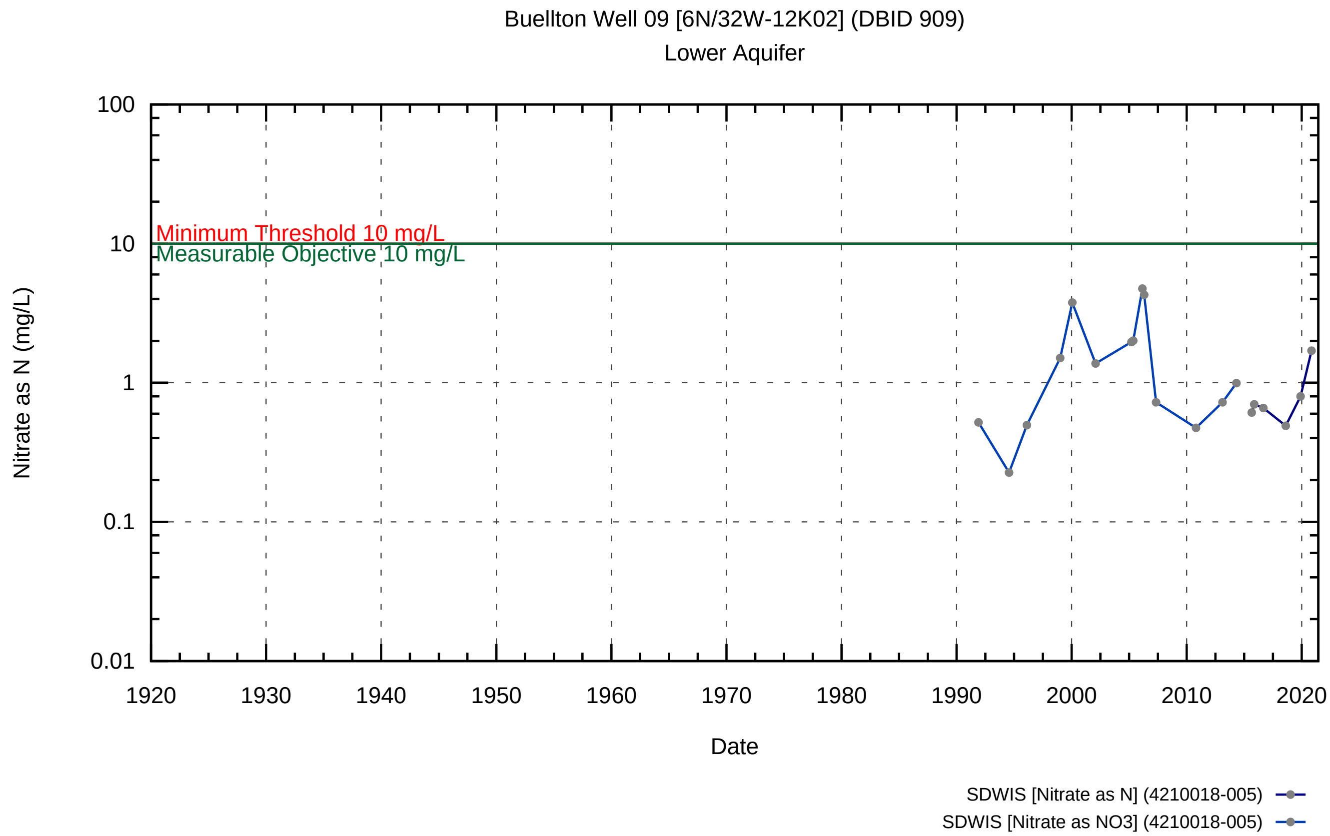


CMA: Buellton Uplands - Nitrate



CMA: Santa Ynez River - Nitrate





SUSTAINABLE MANAGEMENT CRITERIA
CENTRAL MANAGEMENT AREA

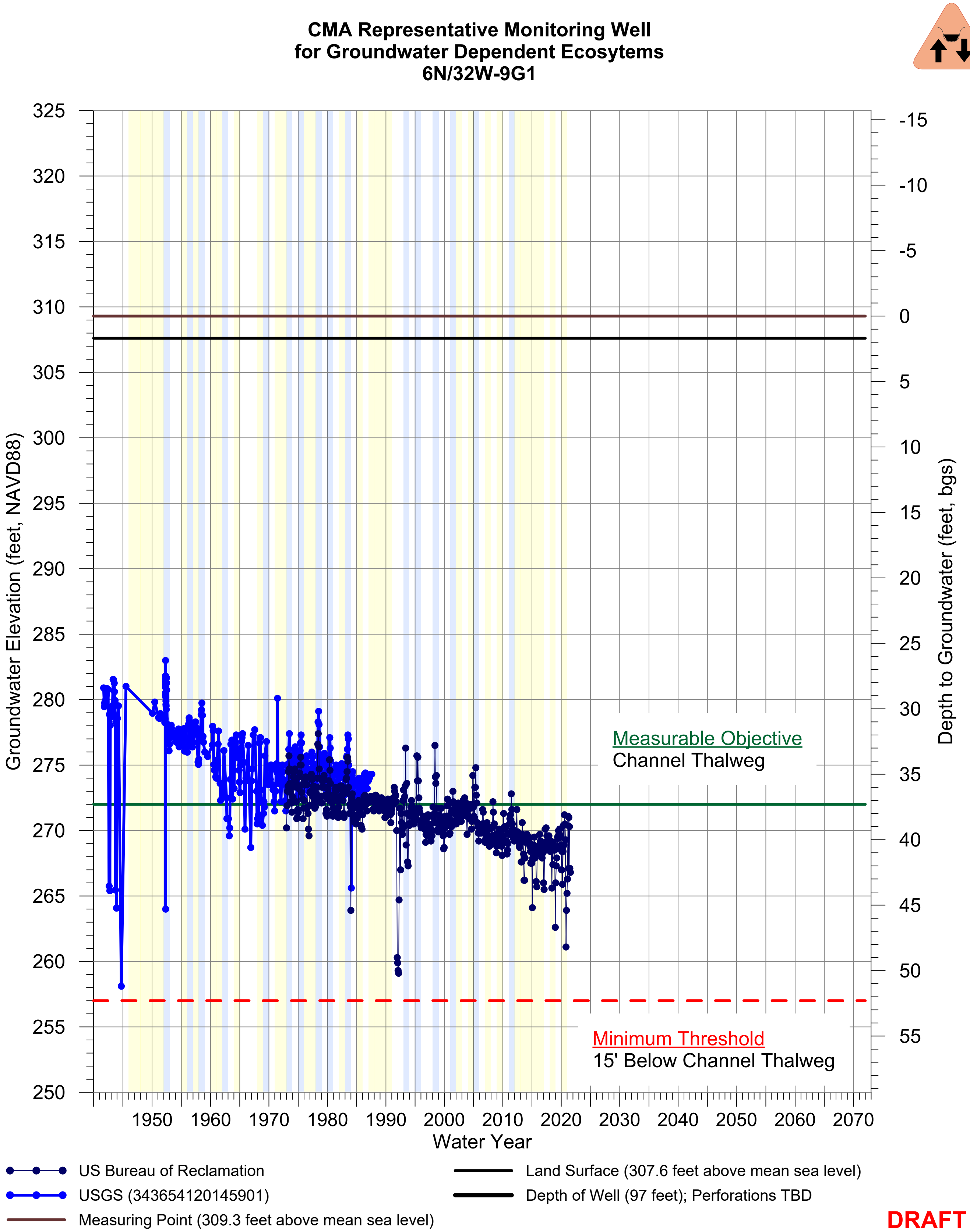
APPENDIX C: SURFACE WATER DEPLETION GROUNDWATER LEVEL HYDROGRAPHS

This appendix includes historical hydrographs of the representative wells for monitoring potential surface water depletion as well as the established sustainable management criteria of the measurable objective, early warning, and minimum threshold.

LIST OF ACRONYMS AND ABBREVIATIONS

BGS	below ground surface
CASGEM	California Statewide Groundwater Elevation Monitoring
CMA	Central Management Area
FT	feet
NAVD88	North American Vertical Datum of 1988
USBR	United States Bureau of Reclamation
USGS	United States Geologic Survey
WL	Water Level

FIGURE C-01



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6/8/2021

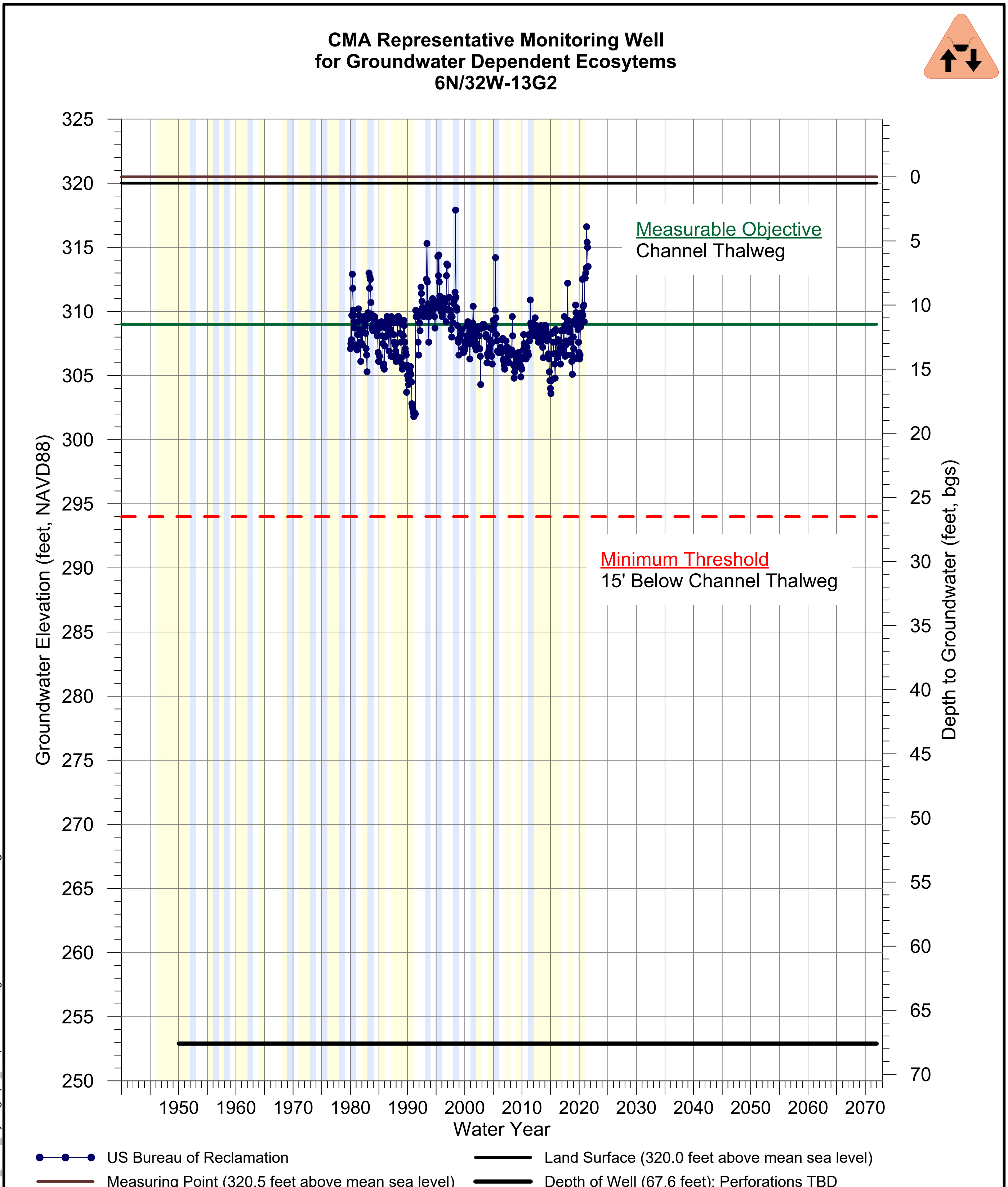
F:\DATA\2710\Monitoring\SMC\GDE\CMA_GDE_Hydrograph_Grapher\CMA Fig C-01 LP-U 1120 9G1.grf 6/8/2021 M. McCammon

STETSON ENGINEERS INC.

CMA
Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

REPRESENTATIVE MONITORING WELL GROUNDWATER DEPENDENT ECOSYSTEMS

Water Year Type (1942-2020)
- Wet
- Above/Below Normal
- Dry / Critically Dry



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6/8/2021

STETSON ENGINEERS INC.

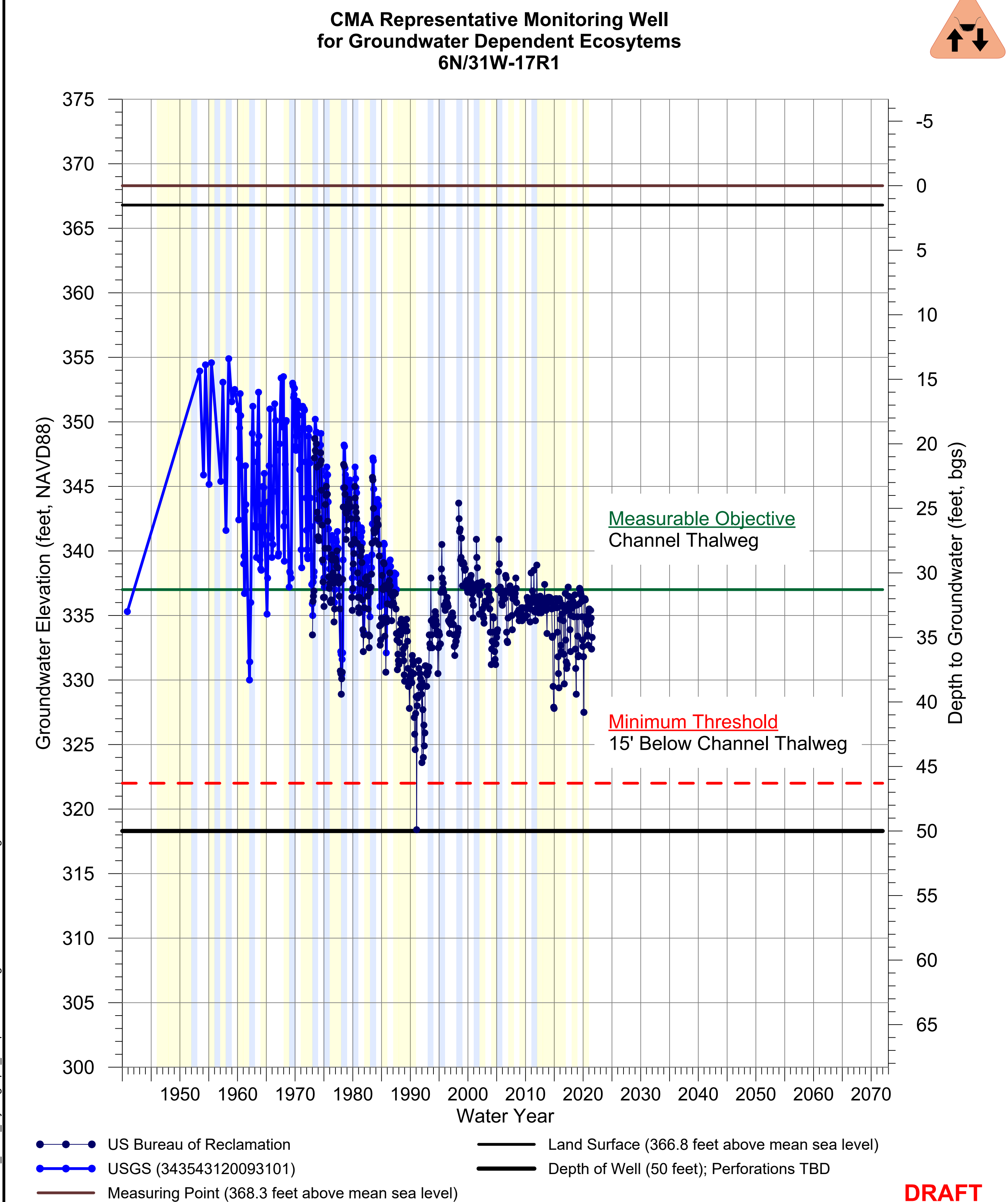
CMA
Santa Ynez River Valley Groundwater Basin
Central Management Area
Groundwater Sustainability Agency

REPRESENTATIVE MONITORING WELL GROUNDWATER DEPENDENT ECOSYSTEMS

Water Year Type (1942-2020)

- Wet
- Above/Below Normal
- Dry / Critically Dry

FIGURE C-03



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6/8/2021

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CMA
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Central Management Area
Groundwater Sustainability Agency

REPRESENTATIVE MONITORING WELL GROUNDWATER DEPENDENT ECOSYSTEMS

Water Year Type (1942-2020)

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