



# EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

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Keith Bussman

## Board of Directors

### AGENDA

Wednesday, September 9, 2026

10:30 a.m. – 12:00 p.m.

San Joaquin County Council of Governments

555 E. Weber Avenue, Stockton, CA 95202

#### **I. Call to Order/Pledge of Allegiance & Roll Call**

#### **II. Additions to the Agenda**

*(The Board may add an item to the agenda if, upon a two-thirds vote, the Board finds that there is a need for immediate action on the matter and the need came to the attention of the Authority after the posting of this Agenda)*

#### **III. Public Comment**

*(Members of the public may address the Board on any matter related to the Authority that is not included on the Agenda. Comments are limited to three (3) minutes per person.)*

#### **IV. Action Items**

- A. Approval of August 12, 2026, Meeting Minutes - [Page 3](#)
- B. Review and take action to direct staff to respond to Department of Water Resources' request for clarification by submitting Technical Memorandums on the following: - [Page 6](#)
  - i. Groundwater Level – Sustainable Management Criteria
  - ii. Monitoring & Reporting
  - iii. Land Subsidence – Sustainable Management Criteria
  - iv. Groundwater Quality
  - v. Interconnected Surface Water – Sustainable Management Criteria
  - vi. Plan Implementation (incl. Domestic Well Mitigation Program)
- C. Review and take action to give direction to staff regarding Effective Precipitation Methodology for Annual Net Groundwater Impact Accounting Framework –Greg Young, Zanjero - [Page 150](#)

**EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY**  
**Board of Directors Meeting**  
**AGENDA**  
*(Continued)*

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**V. Authority Staff/Agency Reports**

- A. Staff Report – Julia D. Berry, ESJGWA Executive Director
- B. Chelsea Spier, Department of Water Resources - [Page 164](#)

**VI. Directors' Comments and Project Status Reports**

**VII. Adjournment**

**Next Meeting**

October 14, 2026

San Joaquin County Council of Governments  
555 E. Weber Avenue, Stockton, CA 95202

*Items on the Agenda may be taken in any order.*

*Action may be taken on any item listed on the Agenda.*

*Writings relating to open session Agenda items that are distributed to members of the Board of Directors will be available for inspection at the San Joaquin County Public Works Water Resources office, excluding writings that are not public records or are exempt from disclosure under the California Public Records Acts.*

*Agendas and Minutes may also be found at <http://www.ESJGroundwater.org>*

*Note: If you need disability-related modification or accommodation in order to participate in this meeting, please contact San Joaquin County Public Works Water Resources Staff at (209) 468-3089 at least 48 hours prior to the start of the meeting.*

**ZOOM LINK:**

<https://sjcog.zoom.us/j/82989811836>

Phone One Tap:

**+16694449171,,82989811836#**

DIAL: +1 669 444 9171

Meeting ID: 829 8981 1836

Passcode: 903992

**EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY**

**Board of Directors**

**Meeting Minutes**

**August 12, 2026**

**I. CALL TO ORDER/PLEDGE OF ALLEGIANCE & SAFETY ANNOUNCEMENT/ROLL CALL**

The Eastern San Joaquin Groundwater Authority (GWA) Board Meeting convened at the Council of Governments building at 555 E. Weber Ave. Stockton, CA 95202. At approximately 10:30 a.m., the meeting was called to order by Chairperson Holmes.

**In attendance were Directors and Alternates:** Craig Stevens, Richard Wagner, Michael Blower, Mike Henry, Scot Moody, Paul Canepa, Keith Bussman, Dante Nomellini, Christy McKinnon, Douglas Smith, Vice Chair Mel Panizza and Chair Robert Holmes

**Directors Absent:** George Biagi, Alan Nakanishi, Regina Lackey, Gary Tofenelli, Myron Blanton, Jason Colombini, and Dean Ruiz

**Members of the Public in attendance:** Executive Director, Julia Berry, Chelsea Spier, Glenn S., Kevin King, TJ S., K. Saifuddin, Gavin Cline, Justin Hopkins, Ron Skaggs, Mary Elizabeth, Alex Chetley, Brandon Nakagawa, Jennifer Spaletta, Melissa Anna, Brittany Harker, Liliana Selke, Maria Razo, Michael Miller, Sam Cunningham, Elba Mijango, Koriala Rasnik, Tim Gobler, Wes Henson, Louie Brichetto Jr., Danile de Graaf, Hope Paulin, Nait Vann Alviar, Ethan Andrews, RM and ER.

**II. ADDITIONS TO THE AGENDA**

No additions were added to the agenda.

**III. PUBLIC COMMENT**

Mary Elizabeth provided a public comment.

**IV. PRESENTATIONS**

**1. Coastal Cleanup, Selinda Centeno – San Joaquin County Public Works**

Selinda covered the contents of her presentation on the annual Coastal Cleanup event.

**A. ACTION ITEMS**

**1. Approval of July 8, 2026, Meeting Minutes**

**Motion:** Michael Blower

**Second:** Paul Canepa

**Vote was unanimous**

2. **Member GSA Assessments – Approve the table of increased dues for ESJGWA Members which allocates an additional \$167,000 in costs using the allocation formula currently in use by the ESJGWA.**

**Motion:** Paul Canepa

**Second:** Michael Blower

**Vote was unanimous**

3. **Budget Amendment – Adopt a revised budget with the following:**
  - a. **Budget amendment to reflect a \$167,000 increase in spending authority and an create a new budget item “2025 Periodic Evaluation/GSP Response,” and**
  - b. **Reclassify \$17,000 from budget item “Model Development and Support” to budget item “2025 Periodic Evaluation/GSP Response”**

**Motion:** Michael Blower

**Second:** Scot Moody

**Vote was unanimous**

4. **Well Mitigation Program – Review and consider action to adopt a resolution approving the amended and restated Eastern San Joaquin Subbasin Program for Domestic Well Mitigation**

A motion was made to adopt the resolution and directed staff to modify the language in in the Program to extend the response time to the applicant from 15 days to 30 days of receipt, and correct minor grammatical errors and typos.

**Motion:** Paul Canepa

**Second:** Michael Blower

**AYES:** Craig Stevens, Richard Wagner, Michael Blower, Scot Moody, Paul Canepa, Keith Bussman, Mel Panizza, Robert Holmes, Dante Nomellini, Christy McKinnon, Douglas Smith

**NOES:** Mike Henry

**The vote passed**



**V. Authority Staff/Agency Reports**

**1. Julia D. Berry, ESJGWA Executive Director**

Julia shared the following updates:

- Responses to DWR are due October 1. Six responses were required, and technical memoranda will be prepared by staff and consultants with review and input by the GSAs. The technical memoranda will be presented to the Board of Directors on September 9th for review and submittal.

**2. Chelsea Spier, Department of Water Resources**

Chelsea reviewed relevant program information and grant funds available in the future from DWR.

**VI. Directors' Comments and Project Status**

Mel Panizza thanks Julia Berry for attending Stockton East Water District meeting.

**VII. Adjournment at 11:47am**



# EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

September 9, 2026

Monica Salais, P.E.  
California Department of Water Resources  
715 P Street, 8th Floor  
Sacramento, CA 95814

**Subject: Eastern San Joaquin Subbasin (No. 5-022.01)—Response to April 17, 2026 Additional Information Request Regarding the 2025 Periodic Review**

Dear Ms. Salais:

On behalf of the Eastern San Joaquin Groundwater Authority (Authority), enclosed are seven technical memoranda prepared in response to the California Department of Water Resources' (DWR) request for additional information related to its periodic review of the Eastern San Joaquin Subbasin's 2025 Periodic Evaluation and 2025 Groundwater Sustainability Plan (GSP) Amendment.

DWR initially communicated its request in a letter dated April 17, 2026. Meetings were subsequently held on May 11, 2026, July 9, 2026 and August 6, 2026, during which Authority and GSA staff, attorneys, and consultants met and conferred with DWR staff as part of the process of preparing responses to DWR's request for clarification. These meetings provided an opportunity for DWR to further explain the matters requiring clarification and for the Authority and its member GSAs to ask questions and discuss the scope and substance of the requested responses.

Based on the April 17, 2026 letter and the subsequent discussions with DWR staff, the Authority prepared technical memoranda addressing the following subjects:

1. Groundwater Levels Sustainable Management Criteria;
2. Monitoring and Reporting;
3. Land Subsidence Sustainable Management Criteria;
4. Groundwater Quality;
5. Interconnected Surface Water Sustainable Management Criteria; and
6. Plan Implementation.

The technical memoranda were developed through a collaborative process involving staff, attorneys, and consultants representing the Authority and all 16 GSAs within the Eastern San Joaquin Subbasin. Initial drafts were prepared by Authority staff and consultants and circulated to the staff, attorneys, and consultants for each GSA for review and comment. Comments were received from the GSAs and incorporated into the memoranda. When appropriate, revised drafts were recirculated to GSA staff, attorneys, and consultants for further review and input.



## EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

This process provided each GSA with a meaningful opportunity to review the technical analyses and explanations, identify issues relevant to its service area or operations, and contribute to the Authority's response to DWR. The resulting memoranda reflect the collective input of the GSAs and the coordinated position of the Eastern San Joaquin Subbasin.

The seven technical memoranda were circulated to the GSAs in final form before the Authority's September 9, 2026 Board of Directors meeting. The memoranda were also included in the publicly available meeting packet distributed to the Authority's interested-parties list, allowing members of the public and other interested parties to review them in advance of the meeting.

At its September 9, 2026 meeting, the Authority's Board of Directors reviewed the technical memoranda and directed staff to respond to DWR's request for additional information by submitting the enclosed memoranda.

The Authority appreciates DWR's engagement throughout this process and the opportunity to provide additional information in support of its periodic review. Please contact the Authority if you have any questions or require further information.

Sincerely,

Julia D. Berry  
Executive Director  
Eastern San Joaquin Groundwater Authority

Enclosures:  
Seven Technical Memoranda

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# TECHNICAL MEMORANDUM

**TO:** Monica Salais, PE (Department of Water Resources)

**CC:** Julia Berry (ESJGWA)

**PREPARED BY:** Woodard & Curran

**REVIEWED BY:** Eastern San Joaquin Groundwater Sustainability Agencies

**DATE:** September 2, 2026

**RE:** DWR Request for Clarification on Groundwater Level SMC

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In an April 17, 2026 letter, the California Department of Water Resources (DWR) requested additional information regarding the Eastern San Joaquin (ESJ) Groundwater Subbasin's (Subbasin) 2024 Groundwater Sustainability Plan Amendment (2024 GSP Amendment) and 2025 Periodic Evaluation (PE). The DWR letter addressed six topics; this Technical Memorandum (TM) addresses Topic 1 which requests clarification of the Sustainable Management Criteria (SMCs) for groundwater levels (GWLs).

In their letter, DWR requested clarification on the following:

- a) **SMC update justification:** Provide justification for the change in minimum thresholds (MTs), measurable objectives (MOs), and interim milestones (IMs) for groundwater levels.
- b) **Undesirable result clarification:** Clarify the undesirable result (UR) definition.
- c) **Minimum thresholds and impact analyses:** Provide justification regarding the usage of the well impact and groundwater dependent ecosystem (GDE) analyses to justify the MTs.
- d) **Interim milestones:** Provide clarification on whether the Subbasin has been meeting IMs.

During a subsequent meeting between the ESJ Groundwater Authority (GWA), Woodard & Curran, and DWR on May 11, 2026, DWR further elaborated on these clarification requests. This TM has been prepared to provide responses and clarifications with each of the following sections summarizing each DWR information request and provide the corresponding response.

## 1. Overview of SMCs in the 2024 GSP Amendment

The SMCs for groundwater levels are described in Chapter 3, pages 3-3 to 3-13 of the 2024 GSP Amendment. The SMCs consist of definitions of (1) Undesirable Results (URs), (2) Minimum Thresholds (MTs), (3) Measurable Objectives (MOs), and (4) Interim Milestones (IMs).

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## 1.1 Undesirable Results

A UR is considered to occur during implementation of the 2024 GSP Amendment when groundwater levels for at least 25 percent of representative monitoring wells used to monitor groundwater levels fall below their MTs for two consecutive years (2024 GSP Amendment, Section 3.3.1.1.2, pg. 3-4). A percentage is used to accommodate an expanding Representative Monitoring Network (RMN). For example, the 2020 GSP included 20 wells in the RMN for groundwater levels, so MT exceedances for two consecutive years in five wells would constitute a UR. While the 2024 GSP Amendment now includes more wells in the RMN, the number of wells needing to exceed their MT will increase to constitute a UR, but the same percentage of wells applies.

## 1.2 Minimum Thresholds

### Approach for Existing Wells with Historical Data

The MTs for the chronic lowering of groundwater levels are the shallower of the following at each representative monitoring well site:

- The 2015 groundwater elevation low with a buffer equal to 100 percent of the historical groundwater level range applied, or
- The 10th percentile domestic well total depth of wells within a three-mile radius of the representative monitoring well (2024 GSP Amendment, Section 3.3.1.2, p. 3-5).

### Corrected Approach for Newly Constructed Wells

The 2024 GSP Amendment also proposed an approach for how the GWA will determine the MTs for newly constructed wells that may be added to the RMN in the future. As discussed further in Section 2a, the methodology proposed in the 2024 GSP Amendment relied on the assumption that simulated groundwater levels in Water Year (WY) 2015 were higher than groundwater levels experienced in a more recent dry or critical water year. When this approach was applied (as described in Section 2a, below), it was determined that the approach to setting SMCs for new wells required revision. Rather than relying on the model-simulated groundwater levels, the revised approach relies on recent dry or critical groundwater levels and a Subbasin-wide operational flexibility applied, equal to a buffer of 100 percent of the observed range based on data from the WY 2012-WY 2016 drought.

## 1.3 Measurable Objectives and Interim Milestones

The MO for the chronic lowering of groundwater levels at each representative monitoring site is defined as the 2015 groundwater elevation low value. For wells without 2015 groundwater level data, the MO was updated as discussed in Section 2a.

The IMs are determined by five-year, stepwise groundwater elevation targets between the current condition and the MO as defined in Section 3.3.3.3 of the 2024 GSP Amendment (p. 3-22, 3-23).

- For wells with sufficient historical data, current conditions were defined using Fall 2015 groundwater elevations.

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- If Fall 2015 groundwater level data were unavailable, the average of Fall 2013, Fall 2014, and Fall 2016 groundwater levels were used to define current conditions.
  - Where the current groundwater level was equal to the MO, the IMs were set equal to the MO for 2025, 2030, 2035, and 2040.
  - Where the current groundwater elevations differed from the MO, the IMs were assumed to remain similar to current conditions for the first 10 years (the time that has elapsed since the implementation of the Sustainable Groundwater Management Act [SGMA]) and then progresses linearly toward the MO over the remainder of the planning horizon.

## **2. Response to Comment #1**

*"Provide additional information further explaining the rationale for the development of groundwater level sustainable management criteria for new wells, including explanation of how the combined utilization of observed and simulated groundwater levels is an analog to the historical well methodology; please consider implementation of an interim approach to establish SMCs while data collection is taking place. Also provide an explanation of how the revised approaches consider the avoidance of undesirable results and impacts to beneficial uses and users. Please detail the methods used to establish interim milestones."*

### **2.1 SMC for Newly Constructed Wells**

Two new, recently-constructed monitoring wells (NSJWCD-01E and SEWD-1D) were added to the GWL RMN in the 2024 GSP Amendment; however, there were insufficient data available at that time to develop SMCs for these wells. The 2024 GSP Amendment also included an explanation, as noted by DWR, of a proposed methodology for establishing SMCs for these (and other new) wells using a combination of observed and simulated groundwater levels. Since publication of the 2024 GSP Amendment, sufficient groundwater level data have been collected to develop SMCs for these wells; therefore, in response to DWR's comment, new SMCs were calculated for these wells using the methodology described below.

#### **2.1.1 Data Quality Review**

Historically, there has been various accessibility challenges for NSJWCD-01E and SEWD-1D that have made monitoring a challenge. In November 2024, San Joaquin County carried out site assessments of both wells. At that point, well lock on NSJWCD-01E was removed from the wellhead to improve GWA access and a wasp nest was observed within the conductor casing, both of which restricted the ability to monitor the well since it was constructed in 2021. The site visit also confirmed that the planned In-Situ pressure transducer at the SEWD-01 well cluster had not yet been installed; the equipment remained in storage following staff turnover. Both well sites are now accessible and are being monitored semi-annually by the GWA. Any monitoring challenges at these wells will be documented annually through the annual reporting process.

Since site accessibility issues were resolved, new groundwater level data have been collected from both wells that were first reviewed as part of the SMC-setting process to confirm the quality of the data. Hydrographs for these two new wells are included in Appendix A of this TM.

#### **2.1.2 New Sustainable Management Criteria**

For each of the two new representative monitoring wells, SMCs were established using observed groundwater level conditions from WY 2022. WY 2022 was selected as a substitute for WY 2015 as it was a

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recent critical water year. The MO for the two wells was established as the highest groundwater elevation during WY 2022, while the MT was set as the lowest groundwater elevation during WY 2022 minus 15 feet of operational flexibility.

The 15 feet of operational flexibility reflects the magnitude of groundwater level fluctuations observed during the WY 2012-WY 2016 drought at RMN wells with sufficient historical data. Those wells exhibited, on average, groundwater levels decline of approximately 13.1 feet during the drought period followed by subsequent recovery in wet years. Therefore, a value of 15 feet was adopted as a reasonable and conservative estimate of operational groundwater level variability for new wells added to the GWL RMN.

The resulting SMCs for each of the two new RMN well are summarized in **Table 1**, along with IMs developed, consistent with the methodology described in Section 1c. This updated methodology was used for NSJWCD-01E and SEWD-01D and will also be applied to future additions to the representative monitoring wells that do not have 2015 data available. The equations representing this process are as follows (note that all groundwater levels are in elevations at mean sea level (msl)):

$$\text{Minimum Threshold} = \text{Observed Recent Dry/Critical GWL} - 15\text{-foot Operational Flexibility}$$

$$\text{Measurable Objective} = \text{Observed Recent Dry/Critical GWL}$$

This methodology differs from the approach described in the Technical Memorandum No. 1 – Groundwater Levels, included the 2024 GSP Amendment, which proposed establishing SMC using model-simulated adjustments between recent wet or dry/critical year groundwater levels and the historical reference year of 2015. The original approach contained in the GSP Amendment was intended for wells with limited observations. However, using simulated values to adjust observed groundwater levels at these two new wells did not produce representative results because the simulated 2015 groundwater levels were higher than the recent observed groundwater levels. The 2024 methodology assumes simulated 2015 groundwater levels are lower than recent conditions, an assumption which analysis at these two wells shows is not always appropriate. It should be noted that just because 2015 simulated groundwater levels are higher than observed recent conditions after 2015, it does not represent a poor calibration of the model but rather an incorrect assumption in the original methodology.

Given that four rounds of observed data are now available for both NSJWCD-01E and SEWD-1D, SMCs were instead established directly from measured groundwater levels. This approach results in SMCs that are transparent, reproducible, and representative of observed conditions at each monitoring well.

**Table 1** also includes the IMs developed for these wells. Section 2c describes in further detail how these were developed based on the current condition. The current condition represents the average of the available fall seasonal low groundwater levels collected since well installation.

**Table 1: New SMC for Wells Added in the 2025 GSP Amendment**

| Well      | Minimum Threshold (ft. msl) | Basis for MT               | Measurable Objective (ft. msl) | Current Condition (ft. msl) | Interim Milestones (ft. msl) |       |       |
|-----------|-----------------------------|----------------------------|--------------------------------|-----------------------------|------------------------------|-------|-------|
|           |                             |                            |                                |                             | 2025                         | 2030  | 2035  |
| NSJWCD-01 | -82.2                       | Observed Groundwater level | -53.9                          | -63.9                       | -63.9                        | -63.9 | -58.9 |
| SEWD-01   | -89.0                       | Observed Groundwater level | -57.9                          | -69.8                       | -69.8                        | -69.8 | -63.8 |

## 2.2 Impacts to Beneficial Uses and Users

An analysis to evaluate the potential impacts to beneficial uses and users was prepared following the same methodology described in Appendix 3-C of the 2024 GSP Amendment. Potential impacts to domestic wells, public supply wells, public supply wells within a Community Water System (CWS), and potential groundwater dependent ecosystems (GDEs) were evaluated using the proposed SMC for the two new representative monitoring wells.

For the well impact analysis, the assessment methodology involves compiling an inventory of active wells with known construction information and filtering it to include wells drilled after 1974. (Wells constructed prior to 1974 were considered to be at the end of their operational lifespan.) Wells were categorized by use (domestic, public supply, and public supply wells within CWSs), and a three-mile impact zone was delineated around each representative monitoring well, as shown in **Figures 1 through 3**. Within each impact zone, the 10<sup>th</sup> percentile total well depth was calculated for each well category to represent the threshold below which approximately 90 percent of wells are expected to remain deeper.

Potential impacts were evaluated by comparing the groundwater elevation associated with each representative monitoring well MT to the 10<sup>th</sup> percentile total well depth within the corresponding impact zone. Domestic and public supply wells with total completed depths above the representative monitoring well MT were identified as potentially impacted under UR conditions.

In the 2024 GSP Amendment, impacts to potential GDEs were assessed in a manner consistent with the analysis completed for well impacts. The mapping relied on the Natural Communities Commonly Associated with Groundwater (NCCAG) database, from which additional refinements were made to remove areas where groundwater levels were deeper than 30 feet below the ground surface (ft bgs) and areas with access to alternate water supplies that may not be dependent on groundwater. The criterion of 30 ft bgs represents the average maximum rooting depth for the majority of phreatophytes. If the vegetation is not able to access groundwater within its rooting depth, then it is assumed that the ecosystem is not a potential GDE. Further detail on the approach taken to map potential GDEs can be found in Section 2.2.7 of the 2024 GSP Amendment.

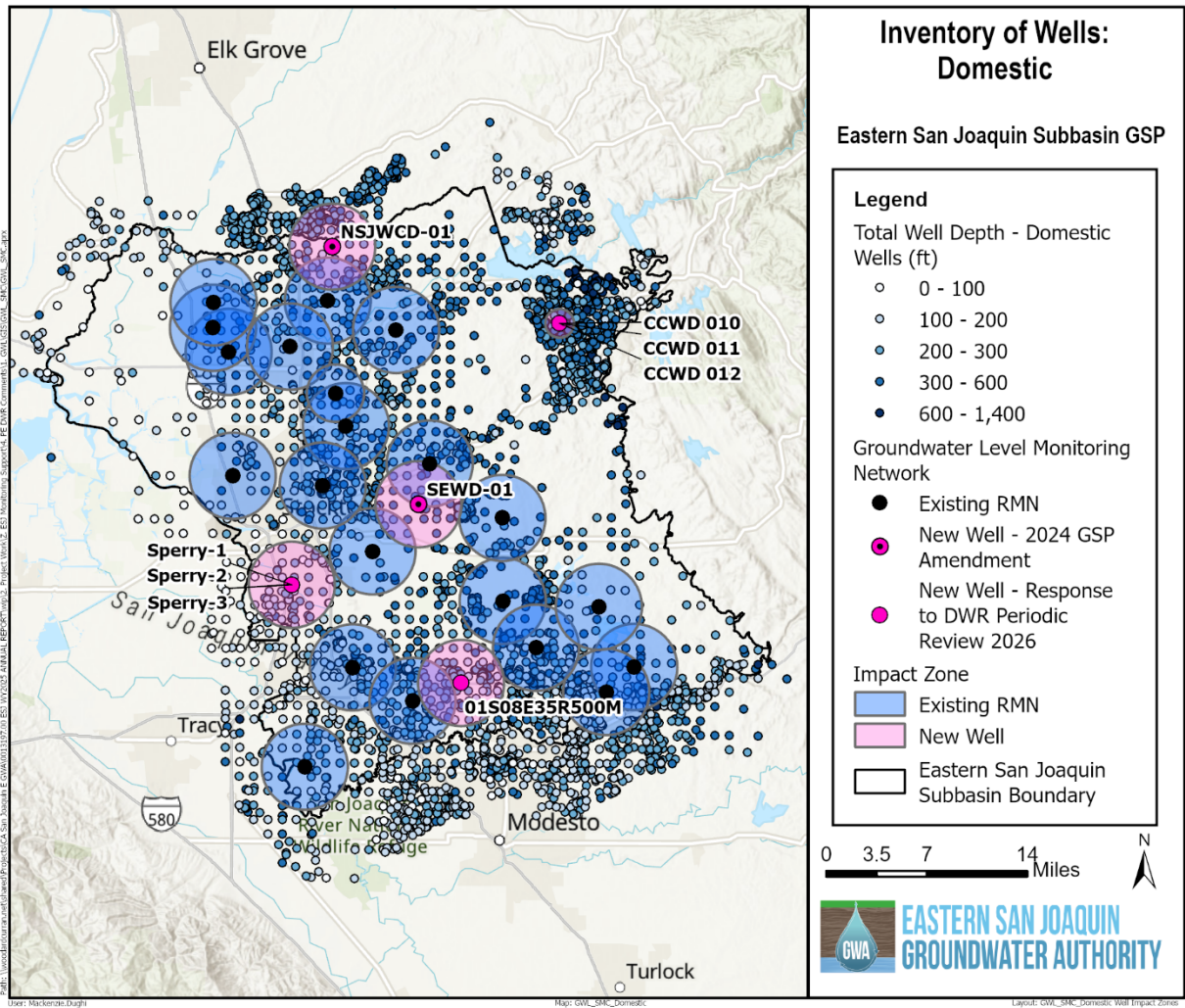
To assess possible impacts on potential GDEs across the Subbasin, the total number of potential GDE polygons identified in the NCCAG dataset within each impact zone radii was counted. A count of potential GDEs polygons was assessed, rather than an acreage, due to concerns about how reliable the exact acreages are of the polygon delineations in the NCCAG dataset. The rooting depth threshold plays a similar role as



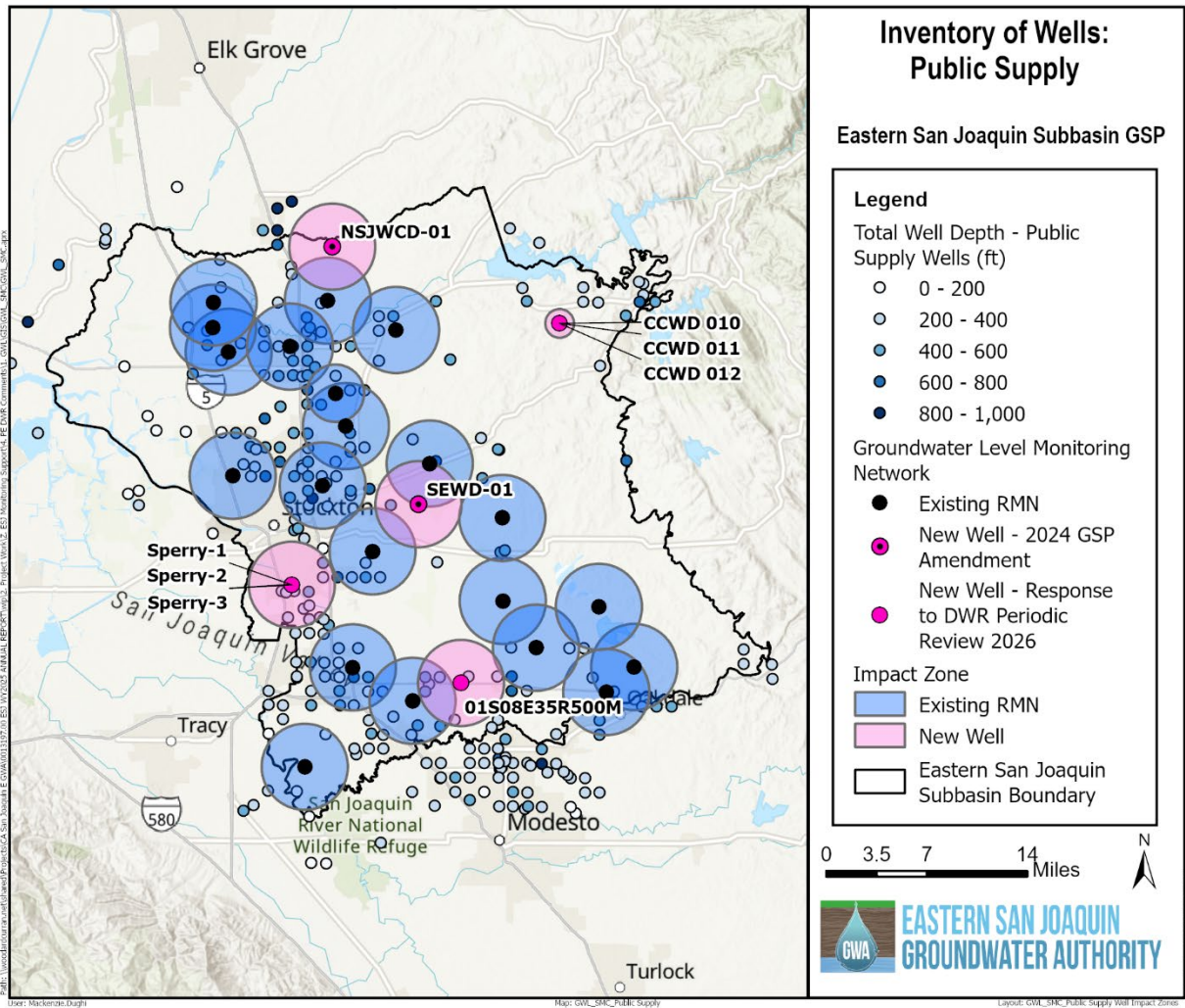
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the 10th percentile threshold in the well impacts analysis by defining at what groundwater level there is an impact or not. It is assumed that if the groundwater level falls below 30 ft bgs at the RMN well, all identified potential GDEs within the impact zone would be impacted. Like in the well impact analysis, the impacts are conservatively assumed to be uniform throughout the full impact zone. If a potential GDE falls anywhere within an impact zone, it is designated as either potentially "impacted" or "not impacted" under UR conditions, depending on where the groundwater level falls in relation to the rooting depth threshold. **Figure 4** shows the mapped potential GDEs overlaid with the RMN and associated impact zones. Those wells that have potential GDEs within a 3-mile radius are shaded in pink.

The analysis was updated using the revised SMCs developed for the new representative monitoring wells, and the results are presented in Section 6. Because additional representative monitoring wells are added to the RMN as part of this response to comments, the results for all newly added wells are consolidated in Section 6 for ease of review.

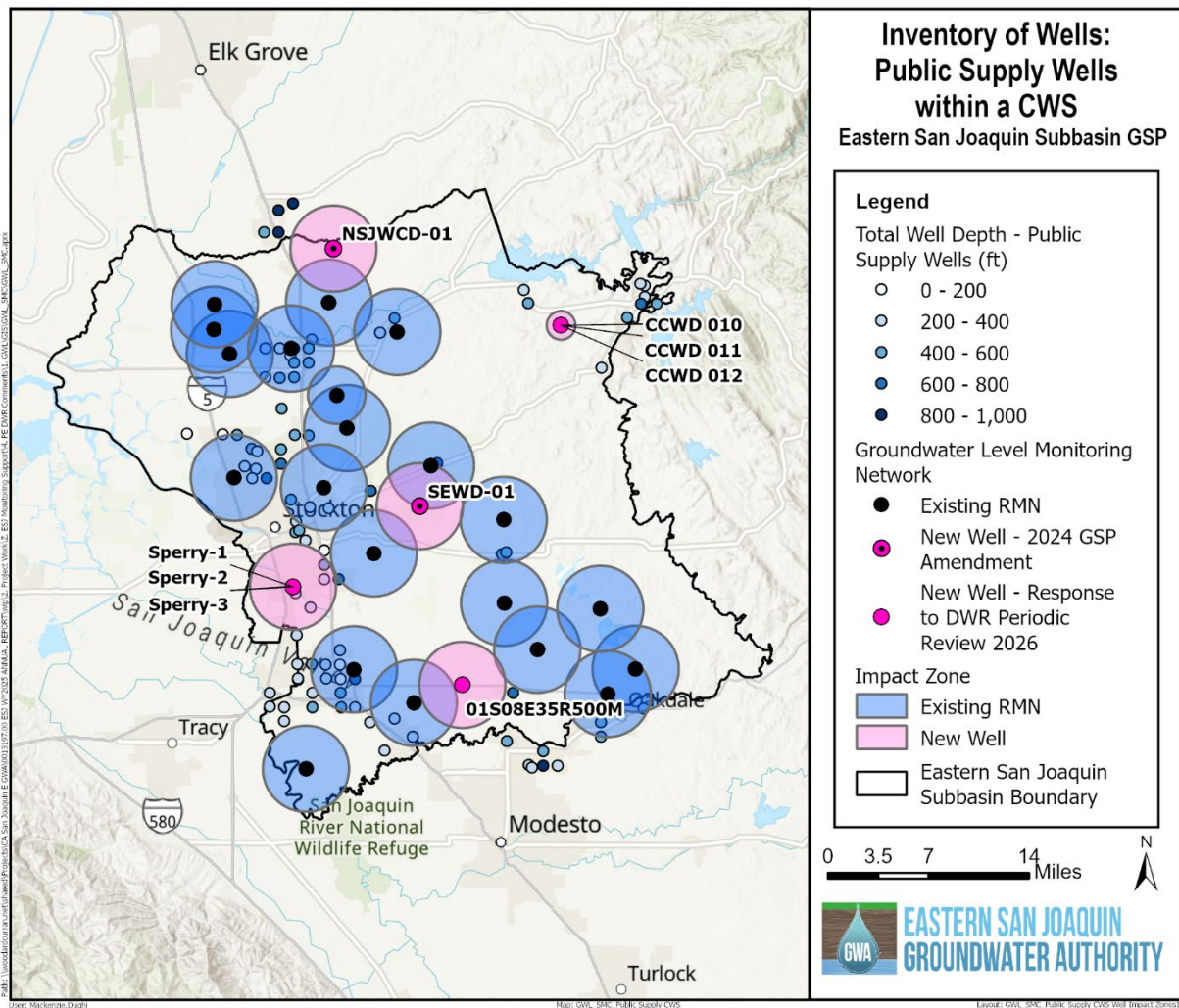


**Figure 1: Inventory of Domestic Wells with Identified Impact Zones**

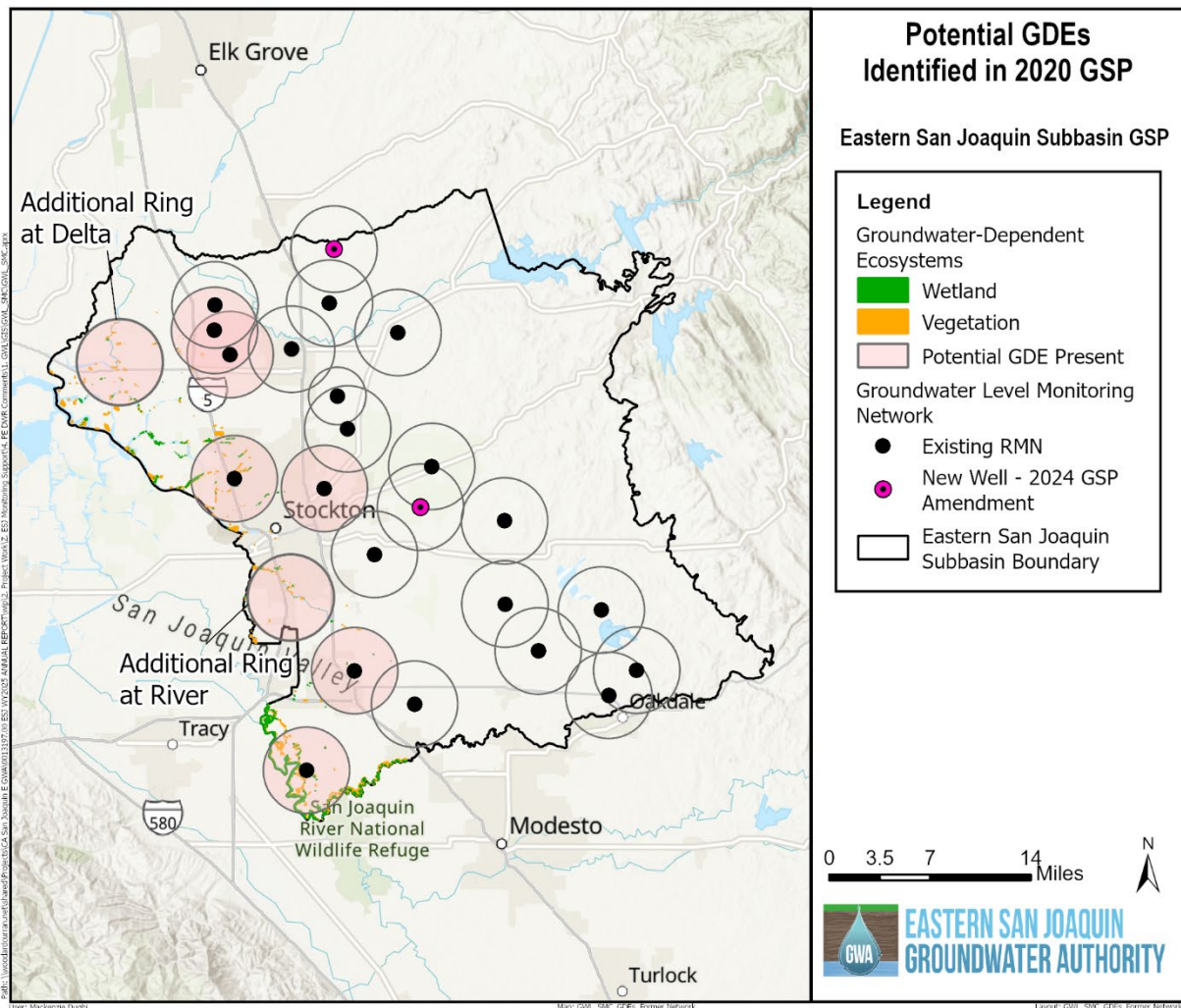


**Figure 2: Inventory of Public Supply Wells with Identified Impact Zones**





**Figure 3: Inventory of Public Supply Wells within a Community Water System with Identified Impact Zones**



**Figure 4: Locations of Potential Groundwater Dependent Ecosystems with Identified Impact Zones**

### 2.3 Method to Establish Interim Milestones

Consistent with the methodology described in Section 1c, IMs were established as five-year, stepwise groundwater level targets between the current condition and MO. These are shown in Table 1. Because the newly constructed or newly added representative monitoring wells lack the historical groundwater level record used to define “current conditions” commensurate with that described in the 2024 GSP Amendment, current conditions were instead defined using the average of the available Fall seasonal low groundwater levels collected since well construction. The IMs were then developed by maintaining current conditions for the first 10 years, followed by a linear progression toward the MO over the remainder of the planning horizon, consistent with the approach described in Section 3.3.3.3 of the 2024 GSP Amendment (p. 3-22, 3-23). The resulting current conditions and IMs for the two new representative monitoring wells are summarized in Table 1.

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It should be noted that these SMC were established based on 4 years of data. The resultant SMC may be re-evaluated in the future once a larger data set has been obtained.

### **3. Response to Comment #2**

*"Provide additional information describing which ESJWRM version(s), or scenario, will be utilized to establish SMCs for new wells, including the timing of required model updates to support SMC development. Please describe any anticipated lag induced by utilizing the ESJWRM to simulate recent water years when setting SMCs for new wells. Please also describe how any ESJWRM-related lag associated with setting SMCs is protective of beneficial uses and users, especially in the context of requiring a minimum of 4 years of groundwater data collection prior to setting SMCs."*

New representative monitoring wells added to the groundwater elevation RMN with sufficient historical groundwater level data will have SMCs established using the methodology defined in Section 1 of this TM. For newly constructed wells without sufficient historical data, SMCs will be determined using the methodology described in Section 2a of this TM. As was described in both Section 1 and 2a, the revised methodology no longer relies on the Eastern San Joaquin Water Resources Model (ESJWRM) to establish SMCs for newly constructed representative monitoring wells. Therefore, the model version selection, simulation lag, and model update frequency are no longer factors in the development of SMCs for any wells.

The ESJWRM version used to support the 2024 GSP Amendment was Version 3.0, with the hydrologic time series extended through WY 2023. Version 3.0 represents the third major update and recalibration of the ESJWRM since its development for the original (2020) GSP. Following completion of a major model update, the annual reporting process includes extending the model hydrology one additional water year to incorporate the most recent available conditions; however, the model is not recalibrated as part of these annual updates. The most recent model extension was ESJWRM Version 3.0, associated with the 2024 GSP Amendment, with hydrology extended through WY 2025 but calibrated through WY 2023. The new SMCs presented in this TM were established using observed groundwater level data and did not rely on ESJWRM. Should future updates to SMC methodology require model support, the most current ESJWRM version available at the time of development will be utilized.

### **4. Response to Comment #3**

*"Demonstrate the potential impacts to other sustainability indicators, such as subsidence."*

#### **4.1 Groundwater Quality**

As part of the annual reporting process, trends in groundwater levels and trends in groundwater quality are analyzed together. The two most recent annual reports do not indicate a corresponding decline in groundwater quality associated with declining groundwater levels. This analysis will continue to be completed each year as part of the annual reporting process. As a result, any change will be tracked annually to identify and avoid potential impacts to groundwater quality as a result of changes in groundwater levels.

#### **4.2 Subsidence**

A similar analysis could be completed for subsidence as is completed for groundwater quality as part of the annual reporting process. If subsidence benchmark locations and/or continuous GPS (CGPS) stations can be reasonably associated with nearby monitoring wells equipped with transducers, then an effective comparison could be made to track the impact of declining groundwater levels on subsidence (if any).

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### **4.3 Storage**

Management of reduction in groundwater storage is performed using groundwater levels as a proxy. Therefore, any persistent declines in groundwater levels represent an impact to groundwater storage.

### **4.4 Interconnected Surface Water**

Similar to groundwater storage, interconnected surface water (ISW) is currently managed using groundwater levels as a proxy. The relationship between declining groundwater levels and impacts to ISW is tracked directly because the current ESJ ISW SMCs use groundwater levels as their metric. The ISW RMN currently consists of a subset of six groundwater level RMN wells located within five miles of connected surface waters, plus six recently constructed shallow monitoring wells specifically sited to fill data gaps in understanding of stream-aquifer interactions. The six newly constructed ISW RMN wells do not yet have established SMCs because of their limited period of record. Until sufficient monitoring data are available to establish SMC, protection of ISW is maintained through the six operational ISW RMN wells with established SMCs, which serve as the basis for interim UR determination. Declining groundwater levels near connected streams are detected through the same monitoring and annual reporting process used for the groundwater level sustainability indicator, and an undesirable result for ISW would be identified before stream depletions become significant and unreasonable.



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## 5. Response to Comment #4

*"Clarify the quantitative undesirable result definition, especially in the context of a continuously expanding chronic lowering of groundwater levels RMN, and how the application of the undesirable result definition considers significant and unreasonable effects the basin is trying to avoid. Also describe how impact analyses will be adjusted, should the quantitative definition of undesirable results be updated."*

The quantitative UR definition for the chronic lowering of groundwater levels is based on the percentage of representative monitoring sites with groundwater levels that fall below their MTs for two consecutive years, rather than the total number of wells included in the RMN. As a result, the UR definition itself does not change as the RMN expands but, rather, becomes more representative of the Subbasin as a whole. This approach ensures that the UR definition remains consistent and applicable as monitoring coverage improves over time.

The application of the UR definition is informed by a comprehensive impacts analysis completed for domestic wells, public supply wells, CWS wells, and potential GDEs. To provide context for the selected UR definition, the analysis evaluated impacts across a range of hypothetical UR definitions, including scenarios where approximately 14%, 24%, 38%, and 48% of representative monitoring wells reached their MT. This approach allowed the GSAs to evaluate how potential impacts to beneficial uses and users change under both more protective and less protective UR definitions. As DWR notes, an analysis corresponding to a 25% scenario was not prepared. At the time the analysis was completed, the RMN consisted of 21 representative monitoring wells. Because 25% of 21 wells would be 5.25 wells, the analysis was performed using five wells, representing the closest whole-number approximation.

The results of the analyses summarized in the 2024 GSP Amendment indicated that impacts remained limited across the range of scenarios evaluated. For domestic wells, estimated impacts ranged from approximately 0.5% to 0.9% of wells within the analysis areas. For public supply wells, estimated impacts ranged from approximately 0.6% to 1.2%, while impacts to CWS wells remained approximately 1.7% or less across all scenarios evaluated. Under the current UR definition, fewer than 1% of domestic wells and public supply wells and fewer than 2% of CWS wells had the potential to be impacted.

Potential impacts to GDEs were found to be similarly limited. The analysis found that approximately 2.3% of identified potential GDE polygons could be impacted under the current UR definition, while even the most conservative scenarios evaluated resulted in less than 5% of identified potential GDE polygons. The analysis therefore demonstrated that even under more protective UR definitions, impacts to domestic wells, public supply wells, CWS wells, and potential GDEs remain relatively small. Collectively, these results provide confidence that the existing UR definition is protective of beneficial uses and users. Section 6 of this TM discusses how this analysis is expanded beyond those areas analyzed in the 2024 GSP Amendment.

If representative monitoring wells are added to the RMN in the future, the corresponding impact analyses can be expanded to evaluate conditions within newly monitored areas. However, the underlying quantitative UR definition is not currently anticipated to change because it is based on a percentage of representative monitoring wells rather than a fixed numbers of wells. Future annual reports may incorporate updated impact analyses for newly added wells as additional monitoring data become available, if DWR would find it useful.



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## 6. Response to Comment #5

*"Provide an explanation for how the well impact analysis considers (or is representative) of the areas outside of the 3-mile "Impact Zone" radii."*

Beyond the impacts around the RMN wells, as described in Section 5 above, the 2024 GSP Amendment also looked at two additional "hypothetical" impact zones in sensitive areas: one along the San Joaquin River and one in the Sacramento-San Joaquin River Delta (Delta). Results from the hypothetical radii analysis indicate that potential impacts remain limited even under UR definitions that are more protective than the current UR definition. Figure 4 shows where these two hypothetical impact zones were located.

The 2024 GSP Amendment impact analysis included 4,855 domestic wells, 165 public supply wells, and 58 public supply wells within CWSs. DWR noted that this represents less than 50% of the total domestic wells within the Subbasin. In response to DWR's comments, the GWA has expanded the RMN by adding new representative monitoring wells in areas identified by DWR as having a high density of domestic wells. Updated impact analyses were completed for each newly added well with SMCs developed as part of this TM. Expanding the impact analyses in this manner increases the spatial coverage of the evaluation while maintaining the same analytical methodology described in the 2024 GSP Amendment. Details on these newly added wells and the corresponding impact analysis results are included in the following sections.

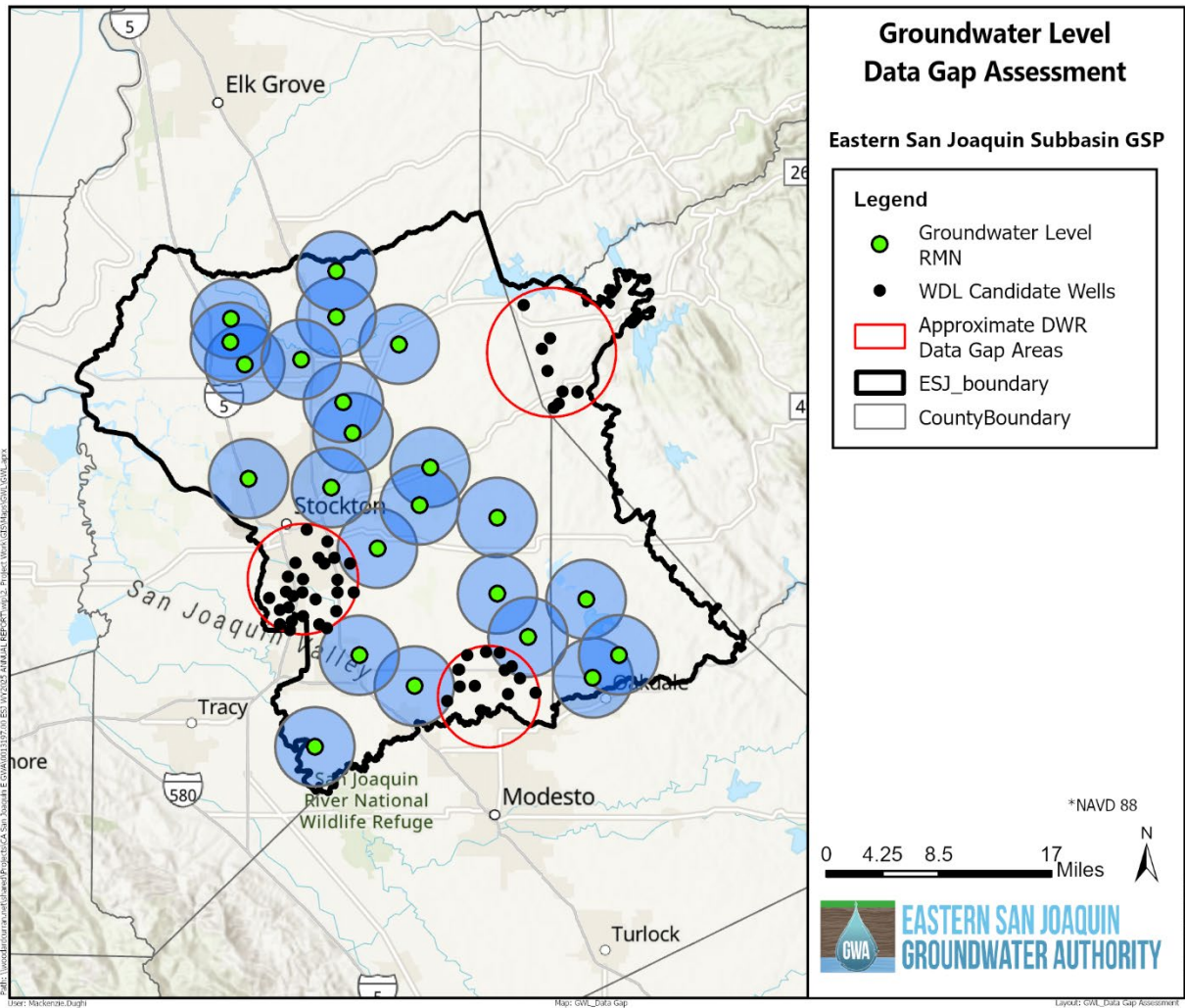
Over time and with the expansion of the RMN for groundwater levels, additional data will become available that will aid in further assessing potential impacts on areas not covered by the zone analyses conducted to date. In the interim, the Subbasin GSAs have developed and is currently implementing a Dry Domestic Well Mitigation program that will mitigate for any basin-management related domestic well impacts that may occur.

### 6.1 New RMN Wells in Data Gap Areas

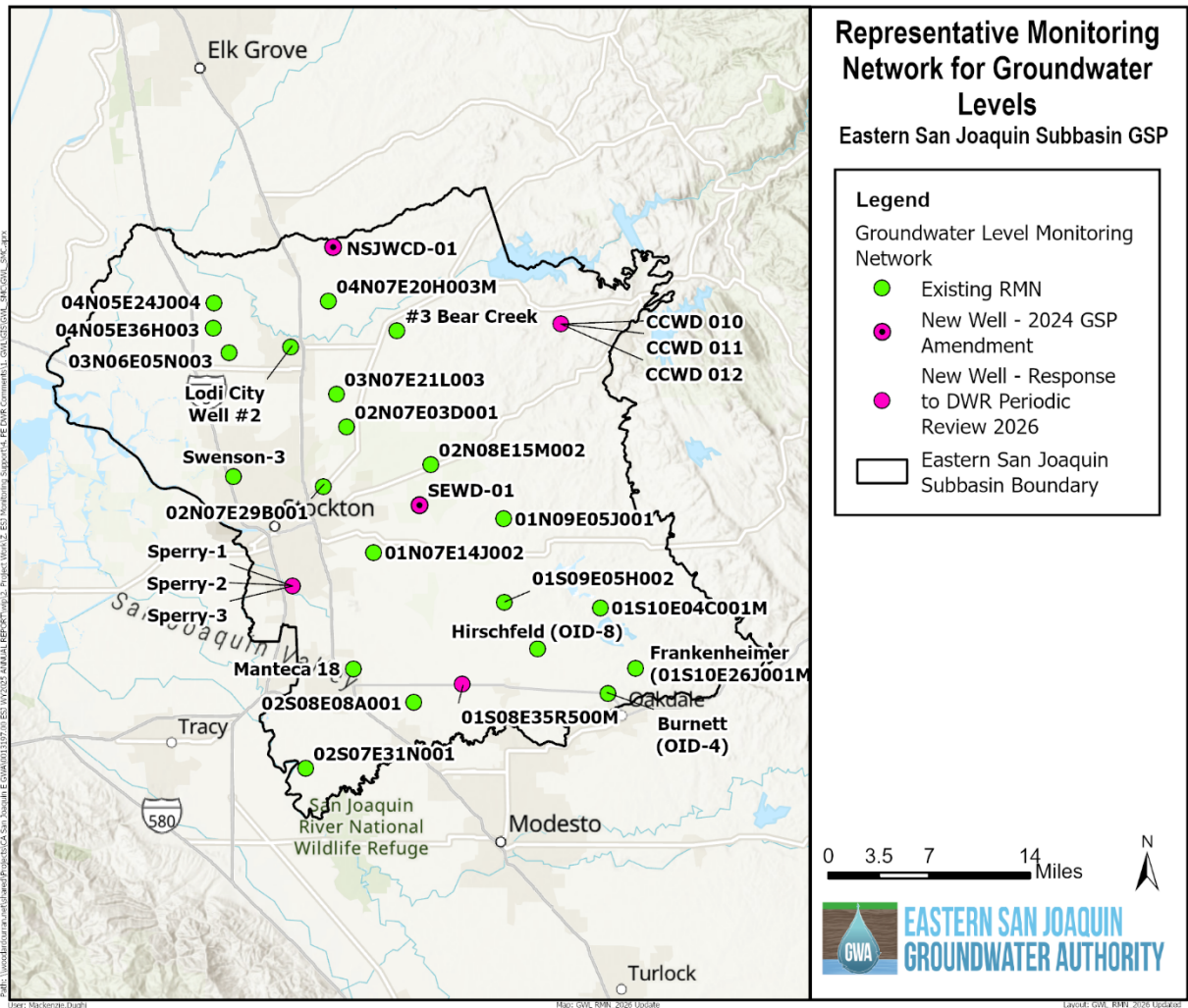
DWR identified three groundwater level monitoring data gap areas containing a high number of domestic wells that were not incorporated into the original impact analysis. In response, a data gap assessment was conducted to evaluate candidate representative monitoring wells within each of the DWR-identified data gap areas. Candidate wells identified within the DWR-identified data gaps areas are shown in **Figure 5** and were selected from wells with publicly available groundwater level data available in Water Data Library (WDL). Selection was based on data availability, historical groundwater level record, accessibility, well construction, and participation in an existing monitoring program.

Based on this evaluation, the GWA selected the Sperry wells (Sperry-1, 2, and 3) in the western data gap area, the CCWDs (CCWD 010, 011, and 012) in the eastern data gap area, and 01S08E35R500M in the southern data gap area for addition to the RMN. These additional representative monitoring well sites provide groundwater level monitoring across multiple depth intervals while improving spatial coverage with the DWR-identified data gap areas. **Figure 6** shows the updated groundwater level RMN, including the newly added wells. The groundwater level RMN now consists of 30 representative monitoring wells in total.

**Table 2** shows the Site Code, total well depth, and range of available data for the wells in the updated RMN (at the time of the development of this TM).



**Figure 5: Data Gaps Identified by DWR and Candidate Wells**



**Figure 6: Updated Representative Monitoring Network for Groundwater Levels**

**Table 2: New Wells within Data Gaps**

| Well          | Site Code          | Well Depth (ft. bgs) | Data Range  |
|---------------|--------------------|----------------------|-------------|
| 01S08E35R500M | 377993N1210526W002 | 240                  | 2018 - 2026 |
| CCWD 010      | 381628N1209292W001 | 390                  | 2012 - 2024 |
| CCWD 011      | 381628N1209292W002 | 350                  | 2012 - 2024 |
| CCWD 012      | 381628N1209292W003 | 135                  | 2012 - 2024 |
| Sperry-1      | 378972N1212936W001 | 460                  | 2014 - 2025 |
| Sperry-2      | 378972N1212936W002 | 282                  | 2014 - 2025 |
| Sperry-3      | 378972N1212936W003 | 124                  | 2014 - 2025 |

## 6.2 New Sustainable Management Criteria

Wells included in the groundwater level representative monitoring network were selected based on their historical groundwater level record, quality of the data, accessibility for monitoring, type of well, and depth. For each of the newly added representative monitoring wells, groundwater level SMCs were developed using the methodology used to develop SMCs based on the availability of historical groundwater level data.

The Sperry (Sperry-1, 2, and 3) and CCWD (CCWD 010, 011, and 012) wells have sufficient historical groundwater level data to establish SMCs using the methodology described in Section 1 and in the 2024 GSP Amendment. For the Sperry wells, MTs were set using the observed 2015 groundwater level low with a buffer equal to 100 percent of historical range, and MOs were established using the observed 2015 groundwater level low, consistent with the GSP methodology. For each Sperry well, the groundwater level-based MT was more protective of beneficial uses and users than the MT based on the 10<sup>th</sup> percentile of domestic well depth in the area.

For the CCWD wells, data indicate substantially greater variability in groundwater levels in this portion of the Subbasin than in other areas. Like other parts of the Subbasin (e.g., the peat soils near the Delta, Corcoran Clay in southwest corner of the Subbasin, and basin deposits in the central Subbasin), the foothills on the eastern margin of the Subbasin have a unique geologic setting. Consolidated igneous and metamorphic bedrock of the Sierra Nevada forms the eastern boundary of the Subbasin and is overlain westward by dissected uplands, alluvial fan deposits, and younger valley-fill sediments. Aquifers in the foothills are thin and pinch out as the water-bearing units dip westward at high angles. The near-surface Calaveras River Fan deposits (Figure 2-10, 2-13, and 2-15 of the 2024 GSP Amendment) consist of alternating layers of mixed coarse material derived from the erosion of the Sierra Nevada consolidated igneous units (Eastern San Joaquin Groundwater Authority, 2024a). Hydrostratigraphic dynamics in fractured rock aquifers in this region are generally poorly understood. As such, the methodology used for calculating MTs for other representative monitoring wells that is based on domestic well depth and comparing them to historical groundwater levels was designed for continental basin deposits hydrogeology, and is not suited for the dynamic and variable hydrogeology of the foothills. The calculations at the CCWD wells reflect this difference. For example, using the GSP methodology, the 10<sup>th</sup> percentile

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domestic well depth would result in an MT approximately 40 feet higher in elevation than the MO for CCWD 10 and CCWD 11. Variability in groundwater levels and, therefore, depths of domestic wells, are likely reflective of these hydrogeologic conditions. Therefore, following a similar approach used for existing RMN well 03N07E21L003, a 1-mile radius was used to better represent the local conditions around the CCWD wells. One mile was selected based on the approximate distance to CCWD 014, which is completed over a comparable screened interval but exhibits substantially different groundwater levels than those measured at CCWD 010 and CCWD 011. Expanding the radius beyond 1 mile would incorporate wells completed under different hydrogeologic conditions that are not representative of groundwater conditions at the CCWD wells.

For CCWD 010, the 10<sup>th</sup> percentile domestic well depth was more protective than the groundwater level-based MT. For CCWD 011 and 012, the groundwater level-based MT was more protective than the MT based on the 10<sup>th</sup> percentile domestic well depth. IMs were subsequently developed following the methodology described in Section 1c, resulting in IMs that are equivalent to the MOs.

The 01S08E35R500M representative monitoring well does not have sufficient historical groundwater level data to apply the GSP methodology for establishing SMC. Therefore, SMCs and IMs for 01S08E35R500M were established using the approach described in Section 2, which is based on observed groundwater levels collected since well installation.

**Table 3** summarizes the new proposed SMCs for these seven new wells added to the RMN. Hydrographs showing observed groundwater levels and the proposed SMCs are included in Appendix A.



**Table 3: New SMC for Data Gap Wells**

| Well              | 10 <sup>th</sup><br>Percentile<br>Domestic<br>Well<br>Depth<br>(ft. msl) | 2015<br>GWL Low<br>+ Buffer<br>(ft. msl) | Minimum<br>Threshold<br>(ft. msl) | Basis for<br>MT                                                          | Measur-<br>able<br>Objective<br>(ft. msl) | Current<br>Condition<br>(ft. msl) | Interim Milestones<br>(ft. msl) |           |           |
|-------------------|--------------------------------------------------------------------------|------------------------------------------|-----------------------------------|--------------------------------------------------------------------------|-------------------------------------------|-----------------------------------|---------------------------------|-----------|-----------|
|                   |                                                                          |                                          |                                   |                                                                          |                                           |                                   | 2025                            | 2030      | 2035      |
| 01S08E35<br>R500M | -48.7                                                                    | -1.5                                     | -1.5                              | GWL                                                                      | 17.3                                      | 16.2                              | 16.2                            | 16.2      | 16.8      |
| CCWD 010          | 67.8                                                                     | 39.9                                     | 67.8                              | 10 <sup>th</sup><br>Percentile<br>Domestic<br>Well<br>Depth <sup>1</sup> | 92.8                                      | 92.8                              | 92.8                            | 92.8      | 92.8      |
| CCWD 011          | 67.8                                                                     | 79.0                                     | 79.0                              | GWL                                                                      | 90.4                                      | 90.4                              | 90.4                            | 90.4      | 90.4      |
| CCWD 012          | 67.8                                                                     | 142.8                                    | 142.8                             | GWL                                                                      | 153.7                                     | 153.7                             | 153.<br>7                       | 153.<br>7 | 153.<br>7 |
| Sperry-1          | -95.1                                                                    | -32.7                                    | -32.7                             | GWL                                                                      | -19.9                                     | -19.9                             | -19.9                           | -19.9     | -19.9     |
| Sperry-2          | -95.1                                                                    | -29.0                                    | -29.0                             | GWL                                                                      | -15.3                                     | -15.3                             | -15.3                           | -15.3     | -15.3     |
| Sperry-3          | -95.1                                                                    | -30.6                                    | -30.6                             | GWL                                                                      | -13.8                                     | -13.8                             | -13.8                           | -13.8     | -13.8     |

### 6.3 Impacts to Beneficial Uses and Users

For all nine new RMN wells (Table 2 wells, NSJWCD-01, and SEWD-01), the 2024 GSP Amendment impact analysis was updated and expanded to assess impacts on beneficial uses and users. The updated analysis looks at the potential impacts of undesirable results on 5,774 domestic wells, representing approximately 57% of the domestic wells within the Subbasin. It is important to note that, while the GSP estimates there are about 10,000 domestic wells within the Subbasin, this number is approximate. The wells included in this analysis have been filtered in order to best represent actual impacts to current beneficial users. Wells drilled before 1974 are presumed to no longer be in service and therefore were filtered out. Wells without reported depths have been excluded from this analysis because a comparison between groundwater level and well depth could not be performed. **Table 4** shows an updated version of Table 3 contained in Appendix 3-C of the 2024 GSP Amendment incorporating the expanded impact analysis.

The results of the additional impact analyses are shown in **Table 5**, **Table 6** and **Table 7**, below. Two UR scenarios are shown: one with seven wells (23% UR) below the MT and one with eight wells (27% UR) below the MT, in order to show the range of impacts slightly below and slightly above the established UR. Results indicate that impacts to beneficial users continue to be limited at the locations of the new representative

<sup>1</sup> A radius of one mile was used for well CCWD 010 to better reflect the variable groundwater levels and well depths in this part of the Subbasin.



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monitoring wells. Estimated impacts to domestic wells are less than 1% overall. Impacts to public supply wells are estimated at approximately 1.6%, and no public supply wells within CWSs are estimated to be impacted.

Based on this expanded impact analysis, potential impacts remain minimal, even with the addition of new representative monitoring wells in the high-density domestic well zones identified by DWR. This supports the conclusion that areas outside the impact zones are not expected to experience a greater frequency or magnitude of impacts than those identified within the analyzed zones.

**Table 4: Updated Well Detail for Impacts Analysis, by Type**

| <b>Well Type</b>                                | <b>Total Number<br/>Within Impact<br/>Zone<sup>1</sup></b> | <b>Well Depth<br/>Range<br/>Within Impact<br/>Zone (ft bgs)<sup>1</sup></b> | <b>Well Depth<br/>Average<br/>Within Impact<br/>Zone (ft bgs)<sup>1</sup></b> |
|-------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Domestic Wells                                  | 5,774                                                      | 5 - 1,300                                                                   | 247                                                                           |
| Public Supply Wells                             | 190                                                        | 72 - 856                                                                    | 357                                                                           |
| Public Supply Wells –<br>Community Water System | 66                                                         | 72 - 720                                                                    | 356                                                                           |

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<sup>1</sup> A one-mile radius is analyzed for CCWD 010, 011, and 012, consistent with the SMC development approach.

**Table 5: Impacts on Domestic Wells Under Undesirable Results Conditions**

|                                                   | <b>DOMESTIC WELLS</b>                      |                              |            |
|---------------------------------------------------|--------------------------------------------|------------------------------|------------|
|                                                   | Number of RMN Wells at MT:                 | 8                            | 7          |
|                                                   | <b>% of RMN Wells at MT:</b>               | <b>27%</b>                   | <b>23%</b> |
|                                                   | <i>Total Number of Wells Within Radius</i> | Number of Dry Domestic Wells |            |
| 01S09E05H002                                      | 139                                        | 1                            | 1          |
| 01N07E14J002                                      | 120                                        | 0                            | 0          |
| Swenson-3                                         | 62                                         | 0                            | 0          |
| 02N08E15M002                                      | 144                                        | 2                            | 2          |
| #3 Bear Creek                                     | 165                                        | 0                            | 0          |
| Lodi City Well #2                                 | 196                                        | 0                            | 0          |
| Manteca 18                                        | 328                                        | 2                            | 2          |
| 04N07E20H003M                                     | 321                                        | 0                            | 0          |
| 03N07E21L003                                      | 121                                        | 0                            | 0          |
| Hirschfeld (OID-8)                                | 524                                        | 7                            | 7          |
| Burnett (OID-4)                                   | 479                                        | 4                            | 4          |
| 02S07E31N001                                      | 175                                        | 2                            | 2          |
| 02S08E08A001                                      | 303                                        | 2                            | 2          |
| 02N07E03D001                                      | 363                                        | 0                            | 0          |
| 01N09E05J001                                      | 162                                        | 0                            | 0          |
| 02N07E29B001                                      | 627                                        | 1                            | 1          |
| 04N05E36H003                                      | 97                                         | 0                            | 0          |
| 03N06E05N003                                      | 142                                        | 1                            | 1          |
| 04N05E24J004                                      | 74                                         | 0                            | 0          |
| 01S10E26J001M                                     | 268                                        | 2                            | 2          |
| 01S10E04C001M                                     | 45                                         | 0                            | 0          |
| 01S08E35R500M                                     | 249                                        | 2                            | 1          |
| CCWD 010                                          | 94                                         | 5                            | 5          |
| CCWD 011                                          | 94                                         | 7                            | 7          |
| CCWD 012                                          | 94                                         | 1                            | 1          |
| NSJWCD-01                                         | 211                                        | 0                            | 0          |
| SEWD-01                                           | 80                                         | 1                            | 1          |
| Sperry-1                                          | 285                                        | 1                            | 1          |
| Sperry-2                                          | 285                                        | 1                            | 1          |
| Sperry-3                                          | 285                                        | 1                            | 1          |
| <b>TOTALS (Within RMN Radii)</b>                  | <b>5774</b>                                | <b>43</b>                    | <b>42</b>  |
| <b>% of Domestic Wells Dry (Within RMN Radii)</b> |                                            | 0.7%                         | 0.7%       |

Note: CCWD 10-12 and Sperry 1-3 are nested wells and therefore, the number of wells within the radius is only counted once in the total.

**Table 6: Impacts on Public Supply Wells Under Undesirable Results Conditions**

|                                                        | PUBLIC SUPPLY WELLS                 |                                   |          |
|--------------------------------------------------------|-------------------------------------|-----------------------------------|----------|
|                                                        | Number of RMN Wells at MT:          | 8                                 | 7        |
|                                                        | % of RMN Wells at MT:               | 27%                               | 23%      |
|                                                        | Total Number of Wells Within Radius | Number of Dry Public Supply Wells |          |
| 01S09E05H002                                           | 0                                   | 0                                 | 0        |
| 01N07E14J002                                           | 5                                   | 0                                 | 0        |
| Swenson-3                                              | 7                                   | 0                                 | 0        |
| 02N08E15M002                                           | 2                                   | 0                                 | 0        |
| #3 Bear Creek                                          | 4                                   | 0                                 | 0        |
| Lodi City Well #2                                      | 28                                  | 0                                 | 0        |
| Manteca 18                                             | 17                                  | 0                                 | 0        |
| 04N07E20H003M                                          | 8                                   | 0                                 | 0        |
| 03N07E21L003                                           | 4                                   | 0                                 | 0        |
| Hirschfeld (OID-8)                                     | 5                                   | 0                                 | 0        |
| Burnett (OID-4)                                        | 5                                   | 0                                 | 0        |
| 02S07E31N001                                           | 2                                   | 0                                 | 0        |
| 02S08E08A001                                           | 11                                  | 0                                 | 0        |
| 02N07E03D001                                           | 11                                  | 0                                 | 0        |
| 01N09E05J001                                           | 3                                   | 0                                 | 0        |
| 02N07E29B001                                           | 24                                  | 1                                 | 1        |
| 04N05E36H003                                           | 9                                   | 0                                 | 0        |
| 03N06E05N003                                           | 13                                  | 0                                 | 0        |
| 04N05E24J004                                           | 4                                   | 0                                 | 0        |
| 01S10E26J001M                                          | 3                                   | 0                                 | 0        |
| 01S10E04C001M                                          | 0                                   | 0                                 | 0        |
| 01S08E35R500M                                          | 7                                   | 0                                 | 0        |
| CCWD 010                                               | 3                                   | 0                                 | 0        |
| CCWD 011                                               | 3                                   | 2                                 | 2        |
| CCWD 012                                               | 3                                   | 0                                 | 0        |
| NSJWCD-01                                              | 0                                   | 0                                 | 0        |
| SEWD-01                                                | 1                                   | 0                                 | 0        |
| Sperry-1                                               | 14                                  | 0                                 | 0        |
| Sperry-2                                               | 14                                  | 0                                 | 0        |
| Sperry-3                                               | 14                                  | 0                                 | 0        |
| <b>TOTALS (Within RMN Radii)</b>                       | <b>190</b>                          | <b>3</b>                          | <b>3</b> |
| <b>% of Public Supply Wells Dry (Within RMN Radii)</b> |                                     | 1.6%                              | 1.6%     |

Note: CCWD 10-12 and Sperry 1-3 are nested wells and therefore, the number of wells within the radius is only counted once in the total.

**Table 7: Impacts on CWS Wells Under Undesirable Results Conditions**

|                                              | COMMUNITY WATER SYSTEM WELLS        |                         |          |
|----------------------------------------------|-------------------------------------|-------------------------|----------|
|                                              | Number of RMN Wells at MT:          | 8                       | 7        |
|                                              | % of RMN Wells at MT:               | 27%                     | 23%      |
|                                              | Total Number of Wells Within Radius | Number of Dry CWS Wells |          |
| 01S09E05H002                                 | 0                                   | 0                       | 0        |
| 01N07E14J002                                 | 0                                   | 0                       | 0        |
| Swenson-3                                    | 7                                   | 0                       | 0        |
| 02N08E15M002                                 | 1                                   | 0                       | 0        |
| #3 Bear Creek                                | 2                                   | 0                       | 0        |
| Lodi City Well #2                            | 15                                  | 0                       | 0        |
| Manteca 18                                   | 13                                  | 0                       | 0        |
| 04N07E20H003M                                | 1                                   | 0                       | 0        |
| 03N07E21L003                                 | 0                                   | 0                       | 0        |
| Hirschfeld (OID-8)                           | 0                                   | 0                       | 0        |
| Burnett (OID-4)                              | 2                                   | 0                       | 0        |
| 02S07E31N001                                 | 0                                   | 0                       | 0        |
| 02S08E08A001                                 | 4                                   | 0                       | 0        |
| 02N07E03D001                                 | 3                                   | 0                       | 0        |
| 01N09E05J001                                 | 3                                   | 0                       | 0        |
| 02N07E29B001                                 | 3                                   | 0                       | 0        |
| 04N05E36H003                                 | 0                                   | 0                       | 0        |
| 03N06E05N003                                 | 3                                   | 0                       | 0        |
| 04N05E24J004                                 | 0                                   | 0                       | 0        |
| 01S10E26J001M                                | 1                                   | 0                       | 0        |
| 01S10E04C001M                                | 0                                   | 0                       | 0        |
| 01S08E35R500M                                | 0                                   | 0                       | 0        |
| CCWD 010                                     | 1                                   | 0                       | 0        |
| CCWD 011                                     | 1                                   | 0                       | 0        |
| CCWD 012                                     | 1                                   | 0                       | 0        |
| NSJWCD-01                                    | 0                                   | 0                       | 0        |
| SEWD-01                                      | 0                                   | 0                       | 0        |
| Sperry-1                                     | 7                                   | 0                       | 0        |
| Sperry-2                                     | 7                                   | 0                       | 0        |
| Sperry-3                                     | 7                                   | 0                       | 0        |
| <b>TOTALS (Within RMN Radii)</b>             | <b>66</b>                           | <b>0</b>                | <b>0</b> |
| <b>% of CWS Wells Dry (Within RMN Radii)</b> |                                     | 0.0%                    | 0.0%     |

Note: CCWD 10-12 and Sperry 1-3 are nested wells and therefore, the number of wells within the radius is only counted once in the total.

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## 6.4 Limitations of Analysis

The well impacts analysis was intentionally designed to be conservative. Further detail on assumptions and methods can be found in Appendix 3-C of the 2024 GSP Amendment. The following is a summary of the major assumptions made; they should be considered in the interpretation of these results:

- For simplicity, the analysis assumed that groundwater levels and associated impacts are uniform throughout each impact zone. Under this assumption, a well located two miles from a representative monitoring well was considered to experience the same groundwater conditions as a well located 0.5 miles from a representative monitoring well.
- The 10th percentile well depth within each impact zone was used as the threshold for evaluating impacts. This represents the depth at which 90% of wells are deeper and follows the same general approach used for domestic well analysis in the 2020 GSP.
- The UR scenario represents a group of representative monitoring wells whose groundwater levels drops to their MT. Wells with groundwater levels closest to their MTs are assumed to reach their MTs first.
- The analysis conservatively considered the impacts associated with a single year of undesirable results even though the GSP defines a UR as MT exceedances at 25% of the RMN for two consecutive years.
- A well was assumed to go dry if the groundwater level at the representative monitoring well fell to below the total completion depth of that well. For many domestic wells, screened interval information is not readily available.

There are many different combinations of representative monitoring wells whose groundwater levels could drop to their MTs, and this estimation of impacts does not represent all possible combinations. This analysis represents an estimation of potential impacts to beneficial users based on the data and tools available.

## 7. Response to Comment #7

*"Provide further justification for the usage of groundwater level RMN 3-mile impact zones for evaluation of GDE impacts when only four of those zones overlap with potential GDEs."*

The analysis included in the 2024 GSP Amendment relating to the potential for URs was specifically designed to be a first step at assessing impacts in a consistent manner across a range of beneficial users (wells and GDEs). The analysis for GDEs used the same impact zones as those assessed for domestic wells, public supply wells, and public supply wells within CWSs. Two additional hypothetical radii were assessed in sensitive areas to improve coverage of the analysis: one in the area adjacent to the Delta and one along the San Joaquin River. Those results are included in Appendix 3-C of the 2024 GSP Amendment. The location of the two additional radii are shown in Figure 4 in this TM. The hypothetical radius that was along the San Joaquin River has been replaced by the analysis adding Sperry 1, 2, and 3 wells in the RMN. This same desktop analysis was expanded for the updates to the RMN described in this TM in order to be comprehensive in response to DWR's comment. There are now a total of 30 wells within the RMN (including two multi-completion wells) for the ESJ Subbasin, as shown in **Figure 6**.

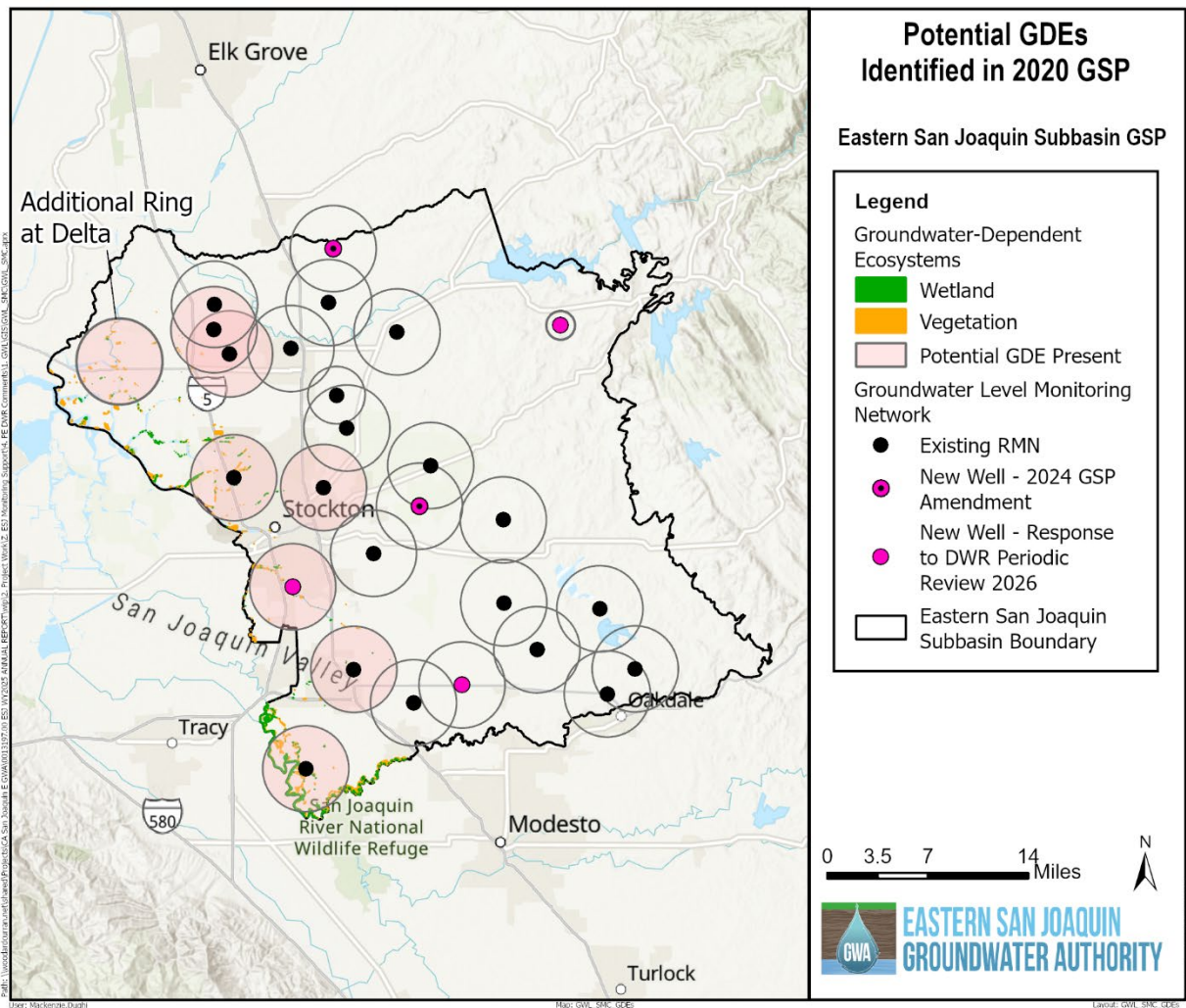
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The 2024 GSP Amendment analysis found no impacts at the Delta hypothetical well location, likely because the groundwater levels are very close to the ground surface. Including the two hypothetical radii, the 2024 GSP Amendment analyzed 673 potential GDEs, 602 of which were within RMN impact zones. Potential GDEs overlapped eight impact zones, seven of which were at RMN well locations.

In the expanded analysis, 41 additional potential GDEs are included in the impact zone of the newly added Sperry wells. Potential GDEs overlap eight impact zones, seven of which are at RMN well locations, as shown in **Figure 7**. Only four of those zones indicate possible impacts to GDEs under UR conditions (seven or eight representative monitoring wells with groundwater levels at their respective MTs). The potential impacts in those four zones are summarized in **Table 8**.

It is important to note that this desktop analysis serves only as an initial step toward identifying where potential GDEs might be at a higher risk of being impacted. The analysis is meant to provide the Subbasin GSAs with a starting point as they prioritize field verification activities. Once the location of GDEs within the Subbasin are confirmed, a more comprehensive impacts analysis of undesirable result conditions can be prepared. This could be included in the next Periodic Evaluation, if DWR agrees that is an appropriate timeline.





**Figure 7: Mapping of Potential Groundwater Dependent Ecosystems and Expanded Impact Zones**

**Table 8: Updated Impacts on Potential Groundwater Dependent Ecosystems Under Undesirable Results Conditions**

|                                                                               |                                              |            |
|-------------------------------------------------------------------------------|----------------------------------------------|------------|
| <i>Number of RMN Wells at MT:</i>                                             | 8                                            | 7          |
| <b>% of RMN Wells at MT:</b>                                                  | <b>27%</b>                                   | <b>23%</b> |
| Representative Monitoring Network Impact Zones that May be Impacted           | Count of Potential GDEs that May be Impacted |            |
| Manteca 18                                                                    | 8                                            | 8          |
| 02N07E29B001                                                                  | 1                                            | 1          |
| 03N06E05N003                                                                  | 5                                            | 5          |
| Sperry Wells 1,2, and 3                                                       | 41                                           | 41         |
| <b>TOTALS (Within RMN Radii)</b>                                              | <b>55</b>                                    | <b>55</b>  |
| % of Potential GDEs that May be Impacted, of 643 Potential GDEs Subbasin-wide | 8.6%                                         | 8.6%       |

## 8. Response to Comment #8

*"Please clarify whether the Subbasin has been meeting its interim milestones."*

**Table 9** compares the most recent groundwater level measurements at each representative monitoring well to their applicable 2025 IM. Of the 30 representative monitoring wells evaluated, 14 are currently above their 2025 IM, while 16 are below. Of the 16 wells currently below their 2025 IM, 13 are located in the eastern and central portions of the Subbasin. This area is predominantly agricultural, and groundwater pumping to meet irrigation demand is a primary driver of groundwater level conditions in this portion of the Subbasin (**Figure 8**). Wells in the western portion of the Subbasin are predominantly above their 2025 IMs.

IMs are planning targets established to demonstrate progress toward the MO; therefore, groundwater levels below the 2025 IM do not necessarily indicate unsustainable groundwater conditions but rather that progress toward the IMs should be considered together with long-term groundwater level trends and the relationship of groundwater levels to the established MTs.

The GWA recognizes that the recently-submitted Periodic Evaluation had internal inconsistency relative to groundwater levels above or below IMs. An errata to the Periodic Evaluation can be provided to DWR upon request.

Hydrographs for all 30 representative monitoring network wells, with their SMC, are included in Appendix A.

**Table 9: Status of Most Recent Water Level Data in Comparison to SMC**

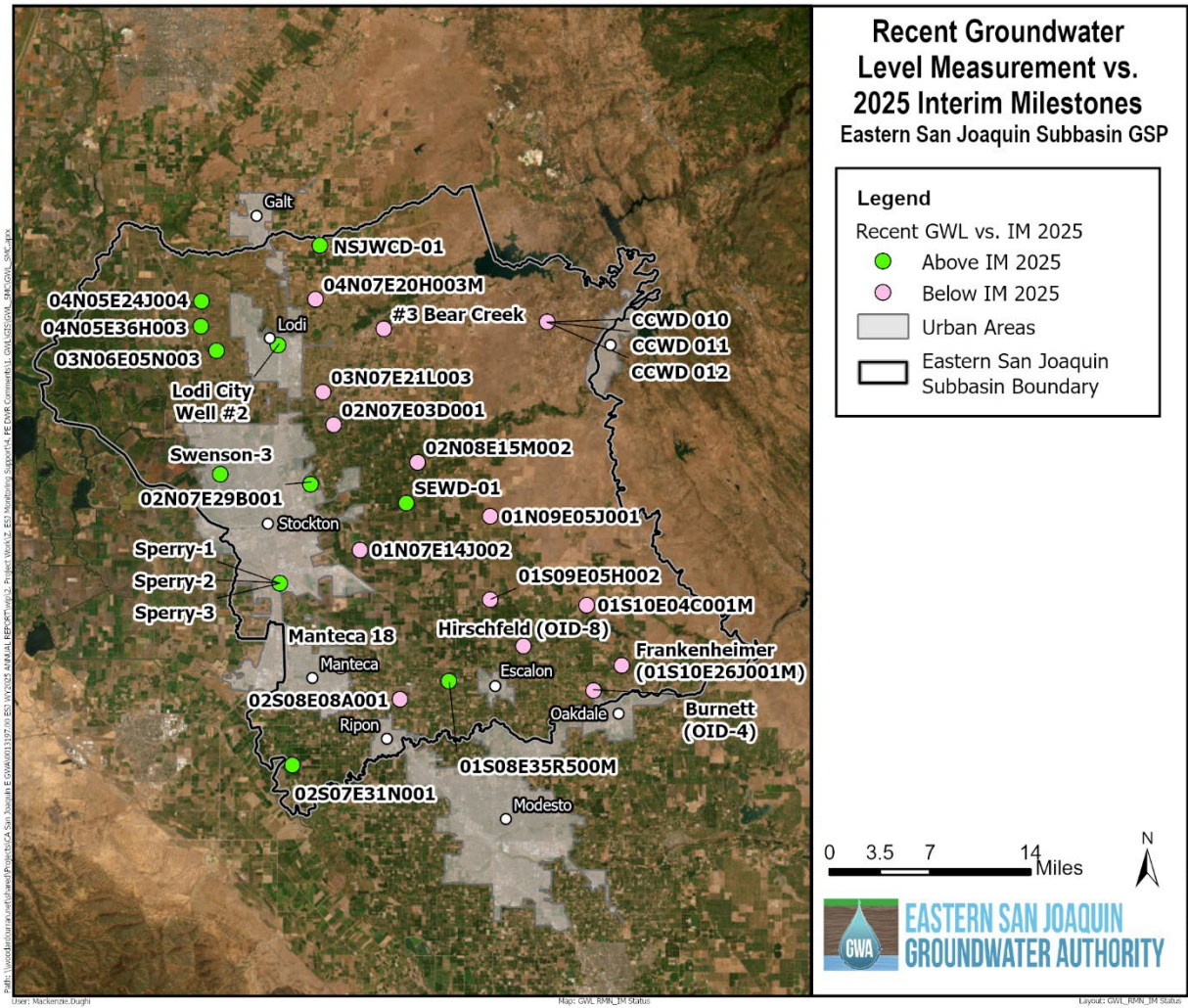
| Well ID            | WY 2025<br>Seasonal Low<br>(or Most<br>Recent<br>Measurement)<br>Date | WY 2025<br>Seasonal Low<br>(or Most<br>Recent<br>Measurement)<br>(ft. msl) | MO<br>(ft.<br>msl) | MT<br>(ft.<br>msl) | IM<br>2025<br>(ft.<br>msl) | IM 2030<br>(ft. msl) | IM<br>2035<br>(ft.<br>msl) | Status vs. IM<br>2025 | Comment                                  |
|--------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------|--------------------|----------------------------|----------------------|----------------------------|-----------------------|------------------------------------------|
| 01S09E05H002       | 03/13/2025                                                            | -26.7                                                                      | -8.6               | -49.8              | -8.7                       | -8.7                 | -8.7                       | Below IM 2025         |                                          |
| 01N07E14J002       | 10/16/2025                                                            | -67.9                                                                      | -49.9              | -93.9              | -49.9                      | -49.9                | -49.9                      | Below IM 2025         | Questionable<br>Measurement <sup>1</sup> |
| Lodi City Well #2  | 10/01/2025                                                            | 1.3                                                                        | 0.6                | -34.4              | 0.6                        | 0.6                  | 0.6                        | Above IM 2025         |                                          |
| Manteca 18         | 06/25/2026                                                            | -2.8                                                                       | 2.8                | -19.0              | 9.1                        | 9.1                  | 6.0                        | Below IM 2025         |                                          |
| Swenson-3          | 10/20/2025                                                            | -10.0                                                                      | -19.3              | -26.6              | -19.3                      | -19.3                | -19.3                      | Above IM 2025         |                                          |
| 01S10E26J001M      | 10/06/2025                                                            | 75.3                                                                       | 81.7               | 43.7               | 81.7                       | 81.7                 | 81.7                       | Below IM 2025         |                                          |
| 02N08E15M002       | 10/13/2016                                                            | -67.4                                                                      | -63.2              | -124.1             | -63.2                      | -63.2                | -63.2                      | Below IM 2025         |                                          |
| #3 Bear Creek      | 03/24/2026                                                            | -55.8                                                                      | -51.8              | -73.8              | -49.3                      | -49.3                | -50.6                      | Below IM 2025         |                                          |
| 04N07E20H003M      | 10/03/2025                                                            | -37.6                                                                      | -35.5              | -80.5              | -35.5                      | -35.5                | -35.5                      | Below IM 2025         |                                          |
| 03N07E21L003       | 03/15/2025                                                            | -51.6                                                                      | -51.5              | -94.0              | -51.5                      | -51.5                | -51.5                      | Below IM 2025         | Questionable<br>Measurement <sup>1</sup> |
| Hirschfeld (OID-8) | 11/05/2025                                                            | 20.5                                                                       | 31.5               | 7.9                | 31.5                       | 31.5                 | 31.5                       | Below IM 2025         |                                          |
| Burnett (OID-4)    | 11/05/2025                                                            | 72.9                                                                       | 79.7               | 60.8               | 79.7                       | 79.7                 | 79.7                       | Below IM 2025         |                                          |
| 02S07E31N001       | 10/17/2025                                                            | 16.4                                                                       | 12.3               | 0.8                | 13.8                       | 13.8                 | 13.1                       | Above IM 2025         |                                          |
| 02S08E08A001       | 06/25/2026                                                            | 14.7                                                                       | 24.0               | 0.6                | 22.2                       | 22.2                 | 23.1                       | Below IM 2025         |                                          |
| 02N07E03D001       | 10/16/2025                                                            | -80.7                                                                      | -61.7              | -113.7             | -61.7                      | -61.7                | -61.7                      | Below IM 2025         |                                          |
| 01N09E05J001       | 10/15/2025                                                            | -34.7                                                                      | -22.6              | -86.8              | -20.2                      | -20.2                | -21.4                      | Below IM 2025         |                                          |
| 02N07E29B001       | 10/16/2025                                                            | -40.8                                                                      | -80.4              | -130.1             | -49.8                      | -49.8                | -65.1                      | Above IM 2025         |                                          |
| 04N05E36H003       | 10/16/2025                                                            | 2.7                                                                        | -5.1               | -31.1              | -5.1                       | -5.1                 | -5.1                       | Above IM 2025         |                                          |
| 03N06E05N003       | 10/16/2025                                                            | -5.1                                                                       | -14.1              | -35.1              | -14.1                      | -14.1                | -14.1                      | Above IM 2025         | Questionable<br>Measurement <sup>1</sup> |

| Well ID               | WY 2025<br>Seasonal Low<br>(or Most<br>Recent<br>Measurement)<br>Date | WY 2025<br>Seasonal Low<br>(or Most<br>Recent<br>Measurement)<br>(ft. msl) | MO<br>(ft.<br>msl) | MT<br>(ft.<br>msl) | IM<br>2025<br>(ft.<br>msl) | IM 2030<br>(ft. msl) | IM<br>2035<br>(ft.<br>msl) | Status vs. IM<br>2025 | Comment |
|-----------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------|--------------------|----------------------------|----------------------|----------------------------|-----------------------|---------|
| 04N05E24J004          | 10/16/2025                                                            | 3.0                                                                        | -6.2               | -31.2              | -6.2                       | -6.2                 | -6.2                       | Above IM 2025         |         |
| 01S10E04C001M         | 10/06/2025                                                            | 52.9                                                                       | 76.4               | 54.7               | 78.0                       | 78.0                 | 77.2                       | Below IM 2025         |         |
| NSJWCD-01E            | 10/22/2025                                                            | -60.6                                                                      | -53.9              | -82.2              | -63.9                      | -63.9                | -58.9                      | Above IM 2025         |         |
| SEWD-01D              | 10/22/2025                                                            | -67.9                                                                      | -57.9              | -89.0              | -69.8                      | -69.8                | -63.8                      | Above IM 2025         |         |
| Sperry-1              | 10/22/2025                                                            | -11.3                                                                      | -19.9              | -32.7              | -19.9                      | -19.9                | -19.9                      | Above IM 2025         |         |
| Sperry-2              | 10/22/2025                                                            | -7.6                                                                       | -15.3              | -29.0              | -15.3                      | -15.3                | -15.3                      | Above IM 2025         |         |
| Sperry-3              | 10/22/2025                                                            | -8.6                                                                       | -13.8              | -30.6              | -13.8                      | -13.8                | -13.8                      | Above IM 2025         |         |
| CCWD 010 <sup>2</sup> | 06/18/2024                                                            | 95.8                                                                       | 92.8               | 67.8               | 92.8                       | 92.8                 | 92.8                       | Above IM 2025         |         |
| CCWD 011              | 06/18/2024                                                            | 88.9                                                                       | 90.4               | 79.0               | 90.4                       | 90.4                 | 90.4                       | Below IM 2025         |         |
| CCWD 012              | 06/18/2024                                                            | 146.5                                                                      | 153.7              | 142.8              | 153.7                      | 153.7                | 153.7                      | Below IM 2025         |         |
| 01S08E35R500M         | 12/16/2025                                                            | 17.7                                                                       | 17.3               | -1.5               | 16.2                       | 16.2                 | 16.8                       | Above IM 2025         |         |

<sup>1</sup>Questionable Measurement: groundwater level measurement flagged as potentially affected by field or well conditions that may reduce measurement reliability.

<sup>2</sup>CCWD 010's MT is based on the 10<sup>th</sup> percentile domestic well depth.





**Figure 8: Status of Most Recent Water Level Measurement in Comparison to 2025 Interim Milestones**

## 9. Conclusion

This TM responds to DWR’s request for additional information regarding groundwater level SMCs as discussed in the ESJ Subbasin 2024 GSP Amendment. The responses clarify the methodology used to establish SMCs for the newly added representative monitoring wells, document the development of new SMCs and IMs, and describe how the RMN and associated impact analyses have been expanded to improve spatial coverage in previously identified data gap areas. The expanded impact analyses demonstrate that the RMN for groundwater levels remains protective of beneficial uses and users. This analysis can continue to be expanded as new wells are added to the RMN and as more refined GDE location information is gathered by the ESJ GSAs. Collectively, the responses provided in this TM address DWR’s comments by maintaining a consistent approach for groundwater level monitoring and SMC development within the Subbasin. **Table 10** summarizes the response to comments included in this TM.

**Table 10: Summary of Responses to DWR’s Comments**

| Additional Information Request Comment # | Summary of Response                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                        | <ul style="list-style-type: none"> <li>• Reviewed recent data at two wells added to RMN in 2024 GSP Amendment</li> <li>• Developed new SMC for new wells</li> <li>• Updated methodology for SMC at new wells</li> <li>• Expanded analysis of impacts to beneficial users/uses at these new well sites</li> <li>• Clarify methods used to establish interim milestones</li> </ul> |
| 2                                        | <ul style="list-style-type: none"> <li>• Clarification provided regarding the use of ESJWRM for SMC development</li> </ul>                                                                                                                                                                                                                                                       |
| 3                                        | <ul style="list-style-type: none"> <li>• Provide explanation regarding potential impacts to other sustainability indicators</li> </ul>                                                                                                                                                                                                                                           |
| 4                                        | <ul style="list-style-type: none"> <li>• Clarified undesirable result definition and analysis updates for an expanded RMN</li> </ul>                                                                                                                                                                                                                                             |
| 5                                        | <ul style="list-style-type: none"> <li>• Added 7 additional wells to the RMN in high density domestic well areas identified by DWR</li> <li>• Developed new SMC for these 7 new wells</li> <li>• Expanded analysis of impacts to beneficial users/uses at these new well sites</li> </ul>                                                                                        |
| 7                                        | <ul style="list-style-type: none"> <li>• Expanded analysis of impacts on GDEs based on 9 new wells added to the RMN</li> </ul>                                                                                                                                                                                                                                                   |
| 8                                        | <ul style="list-style-type: none"> <li>• Clarified how the Subbasin stands regarding Interim Milestones</li> </ul>                                                                                                                                                                                                                                                               |

Note: There was no Comment #6.

## 10. References

Eastern San Joaquin Groundwater Authority. 2024a. *Eastern San Joaquin Groundwater Subbasin – Groundwater Sustainability Plan*.

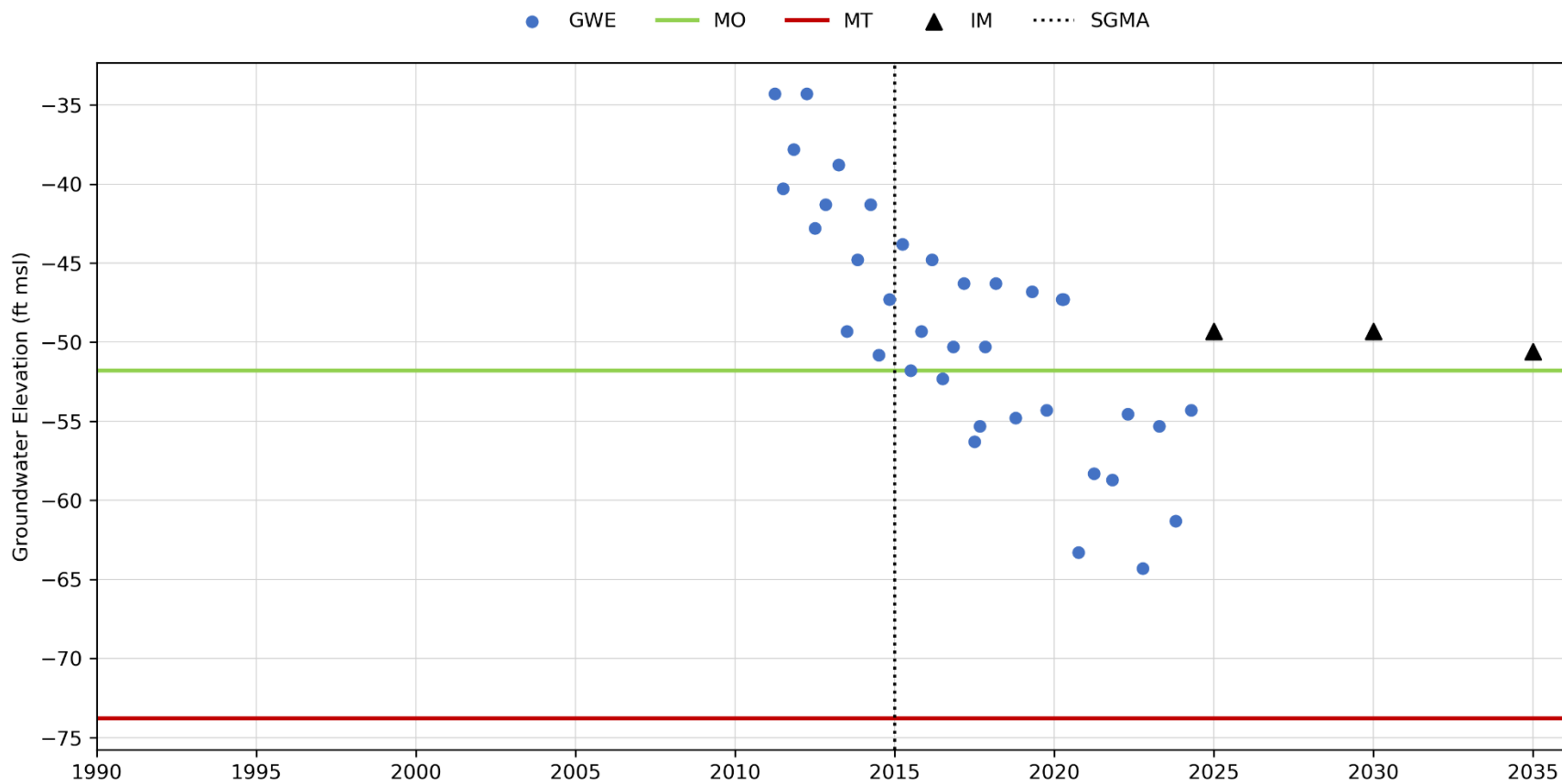
Eastern San Joaquin Groundwater Authority. 2024b. *Eastern San Joaquin Groundwater Subbasin – 2025 Periodic Evaluation*.

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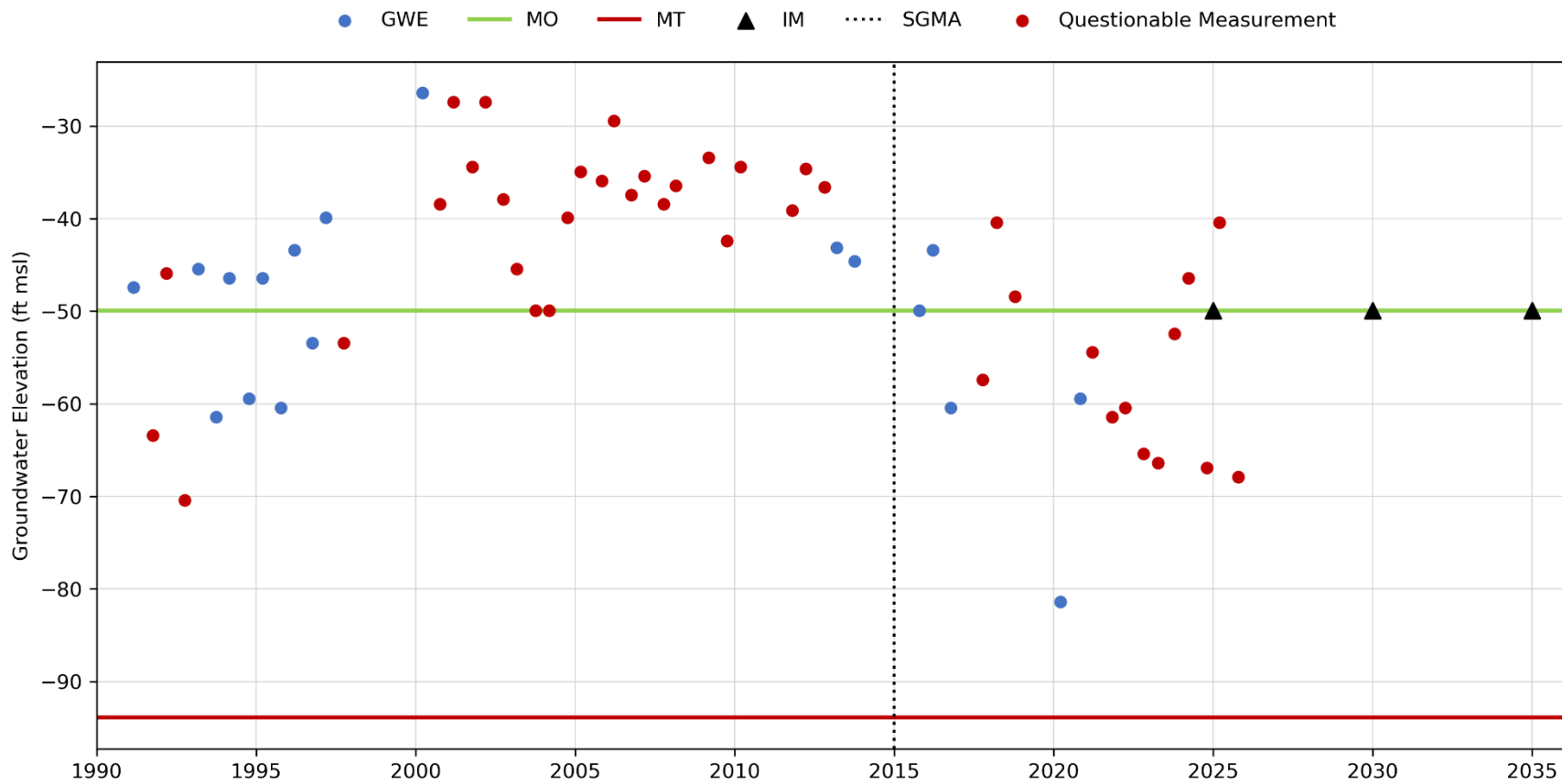
## **APPENDIX A: HYDROGRAPHS WITH INTERIM MILESTONES FOR ALL REPRESENTATIVE MONITORING NETWORK WELLS**



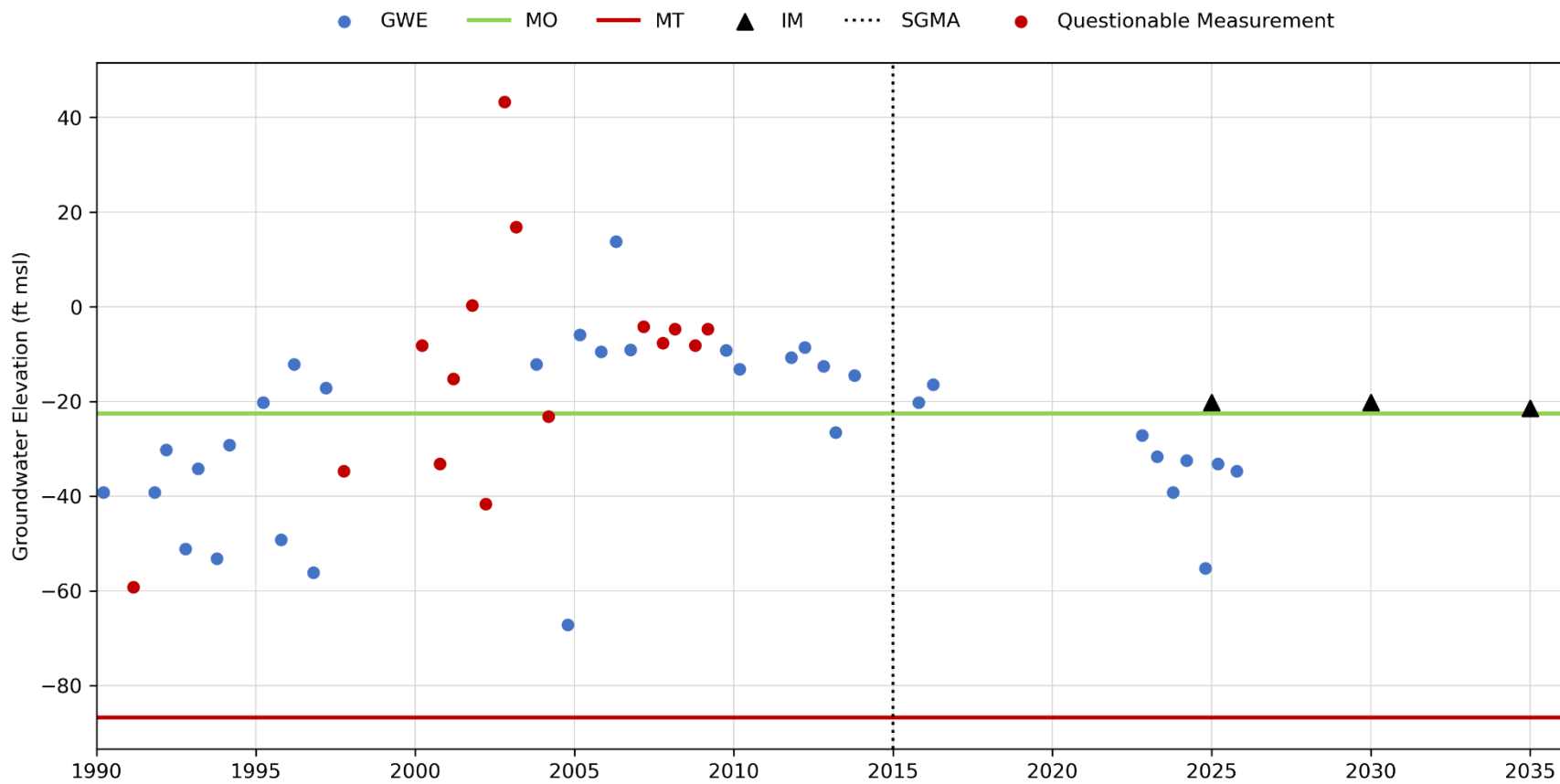
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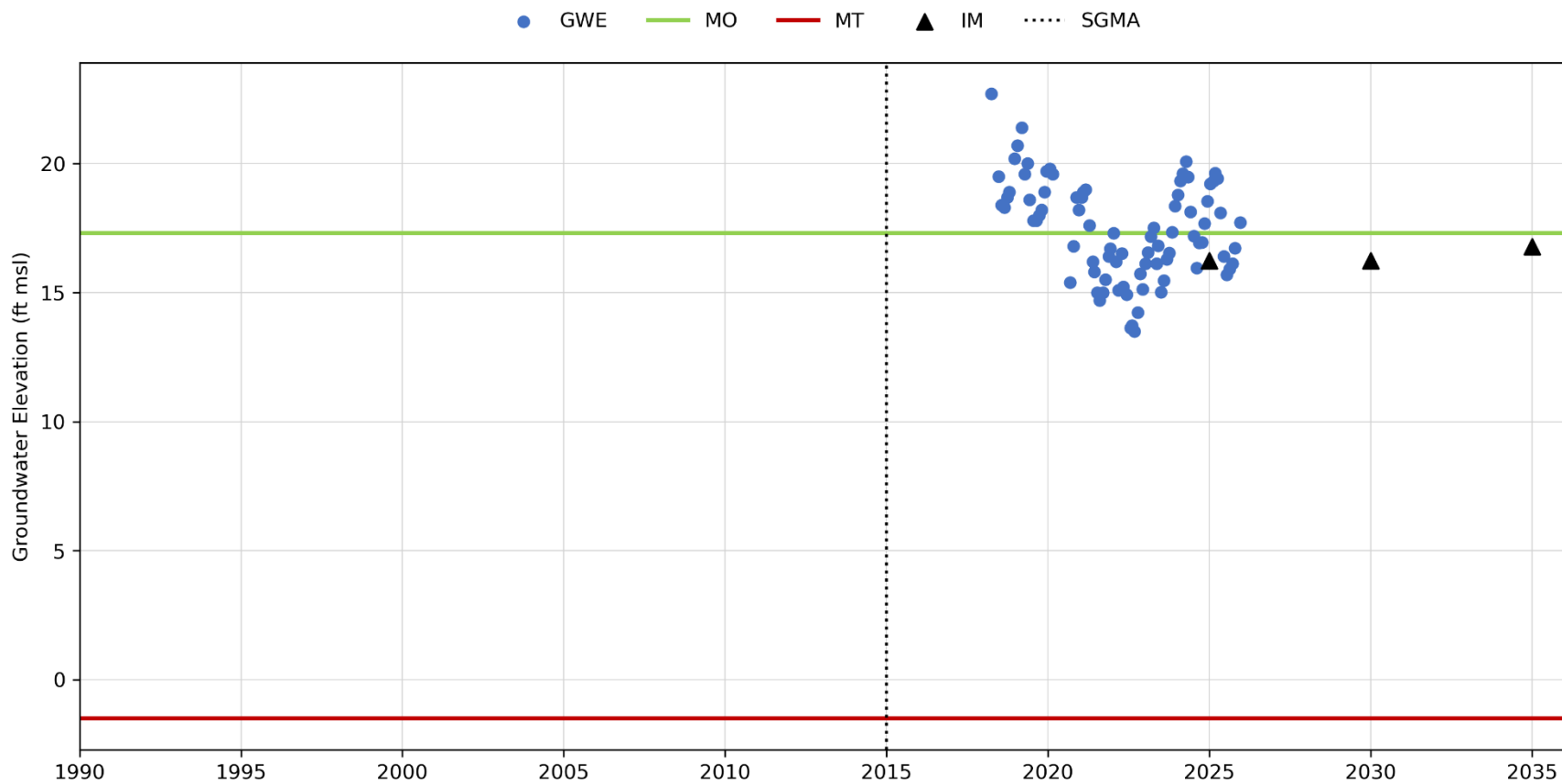
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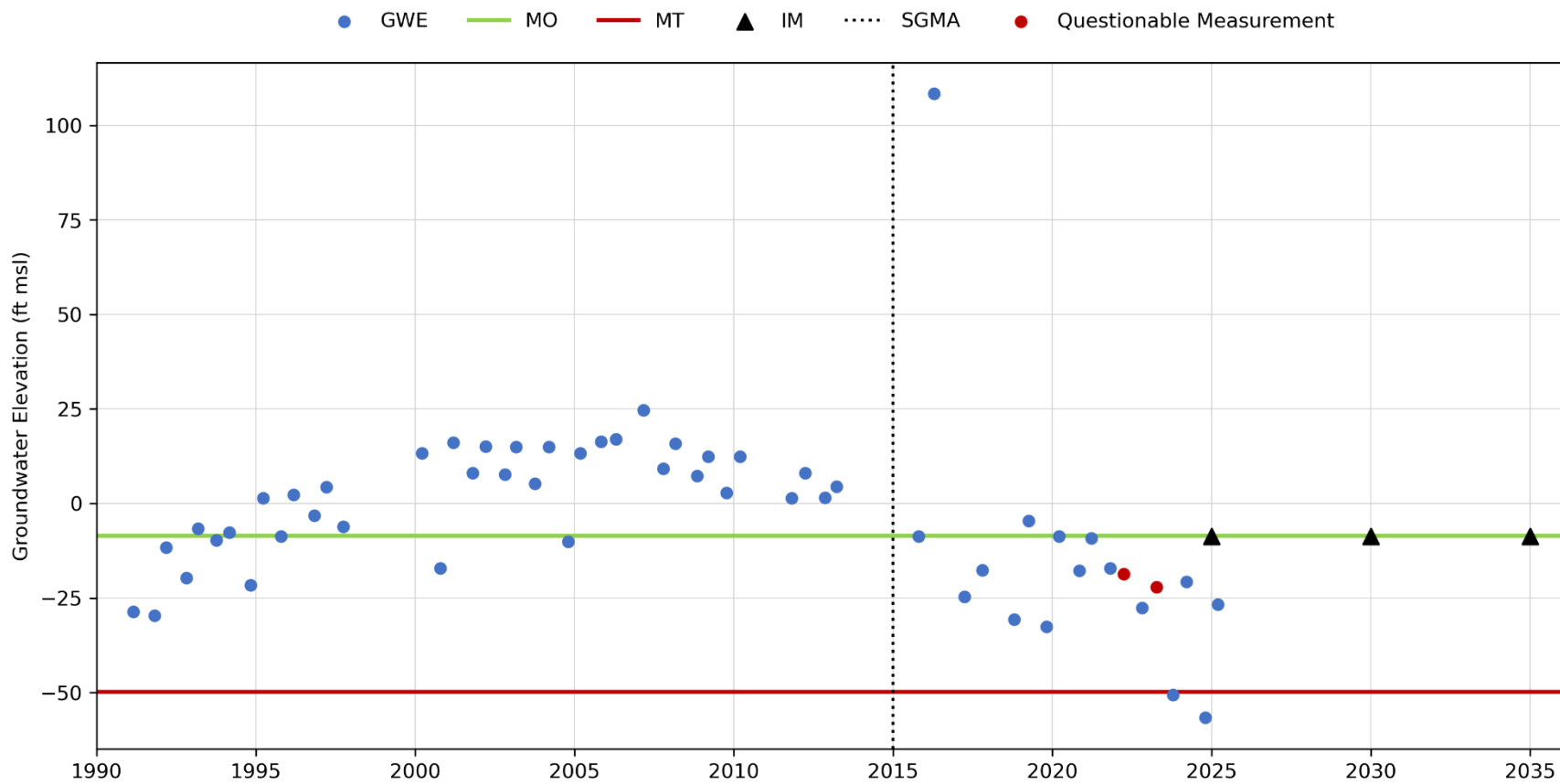
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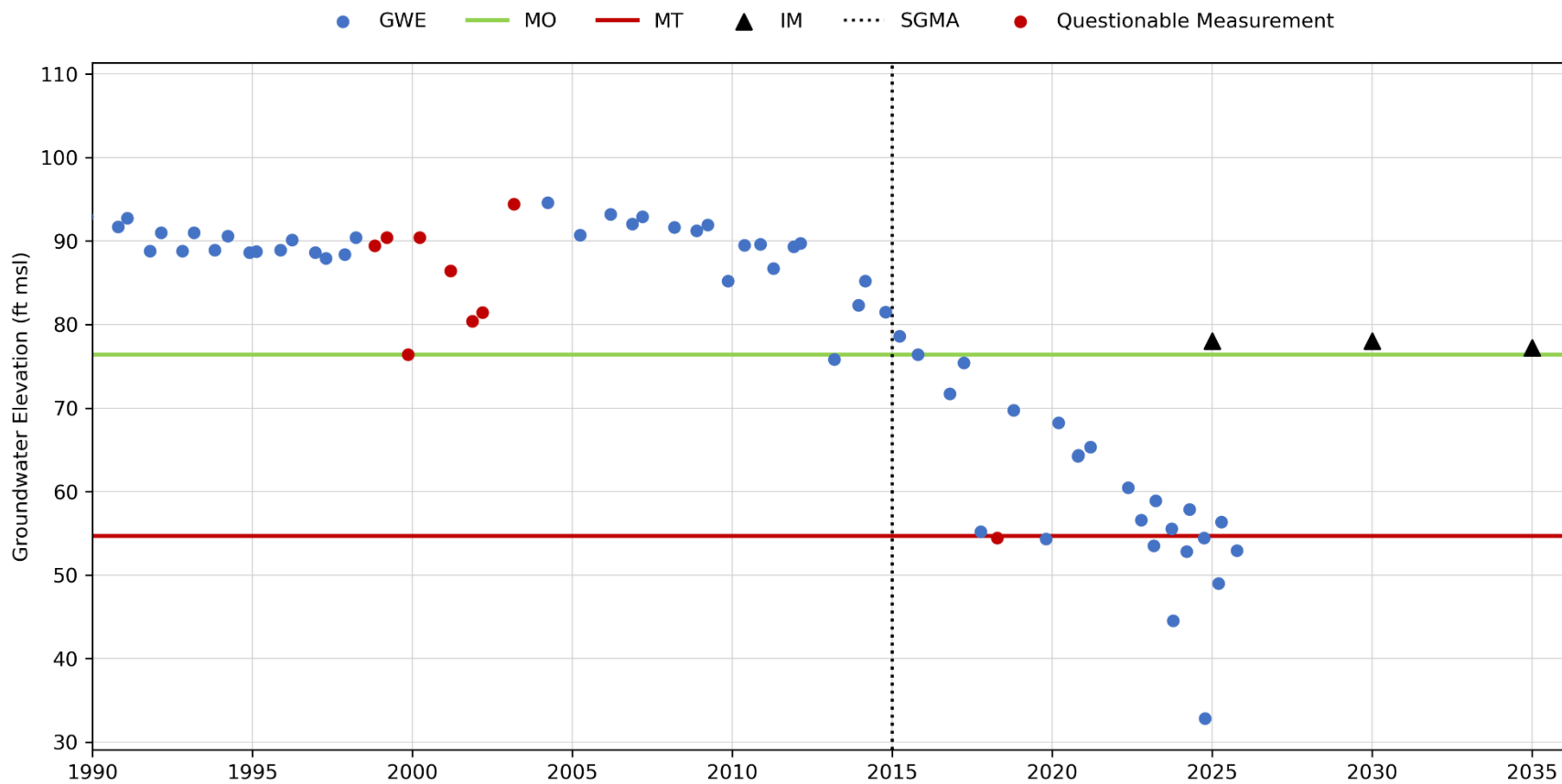
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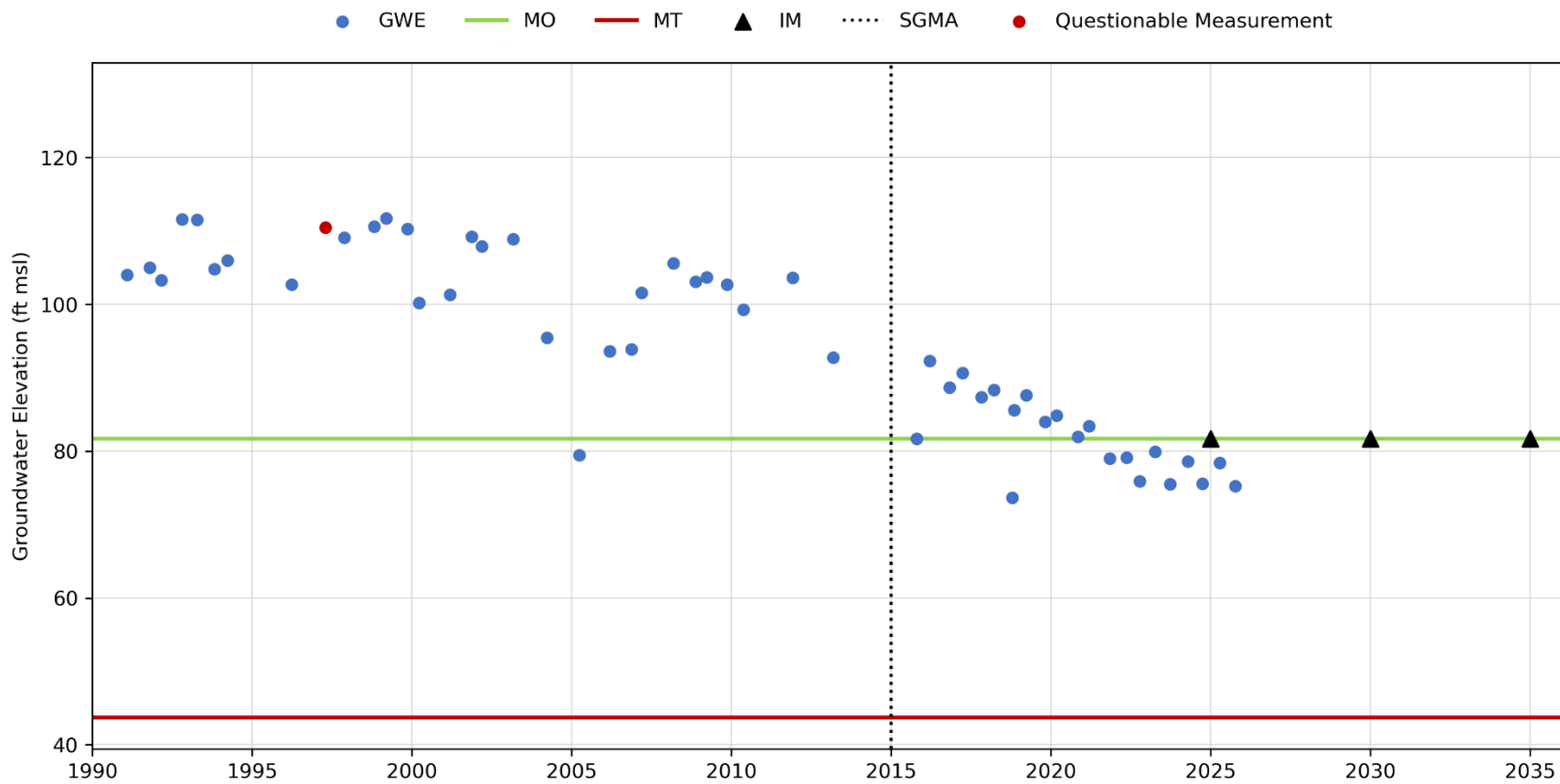


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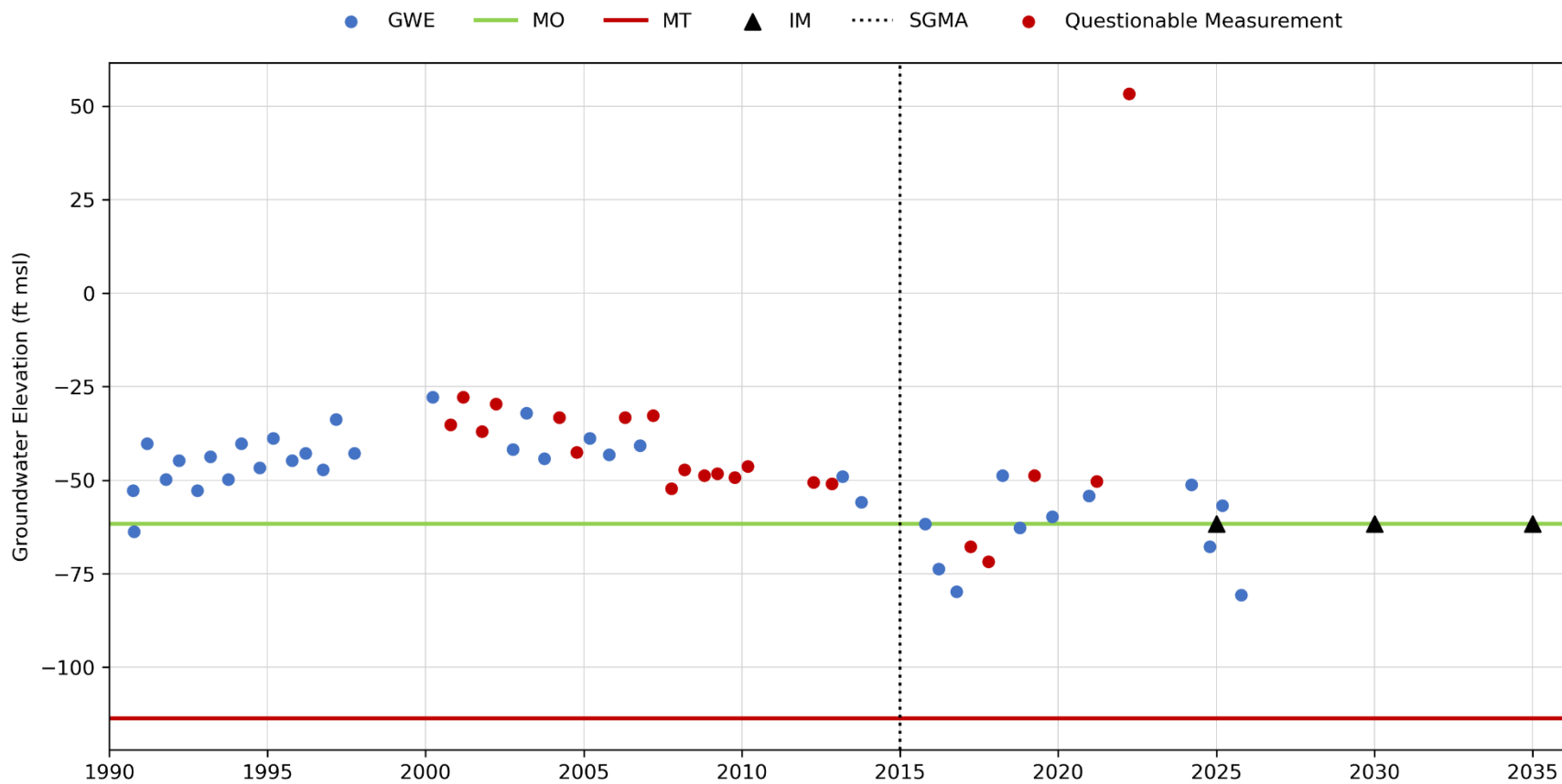




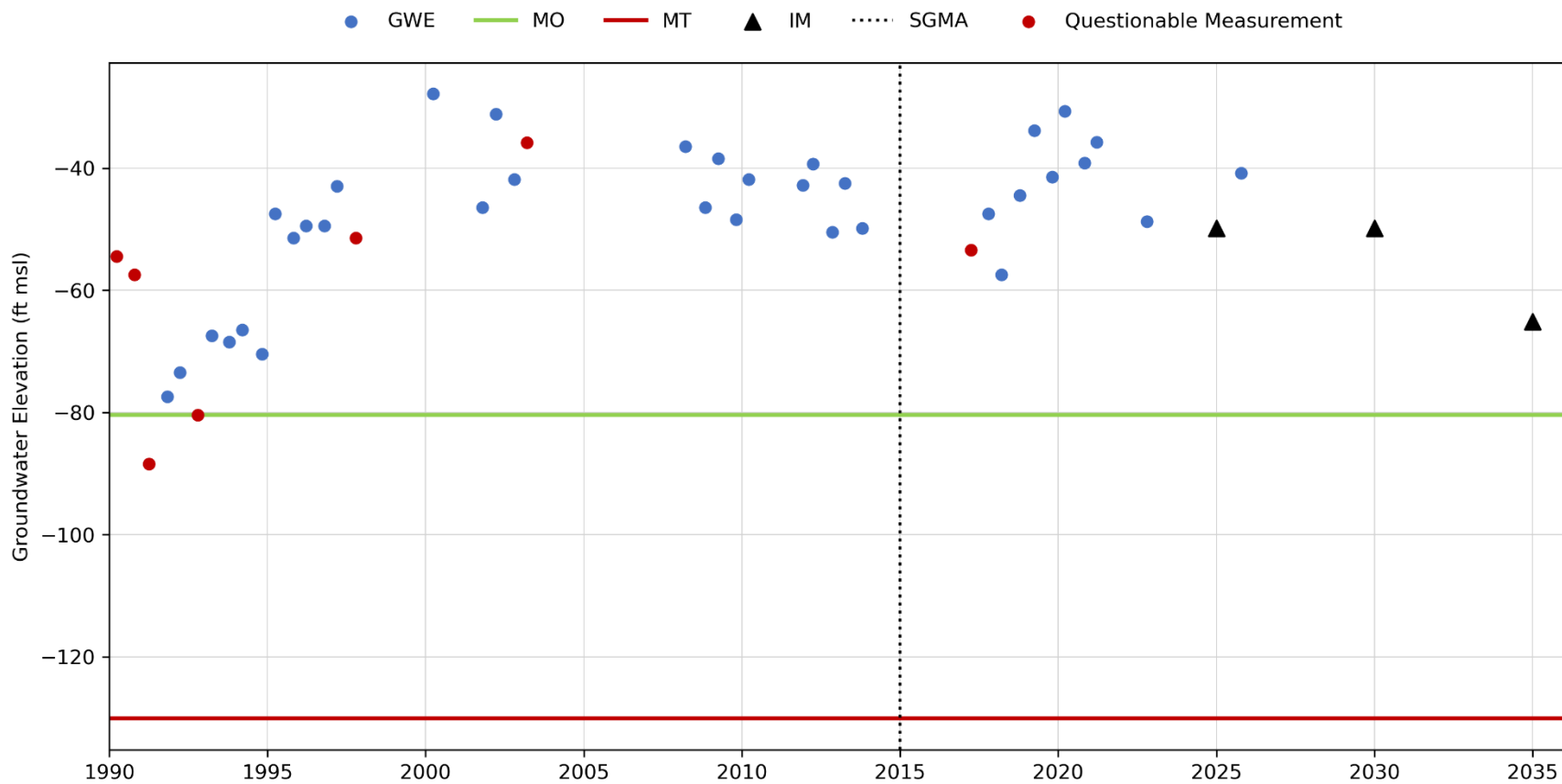
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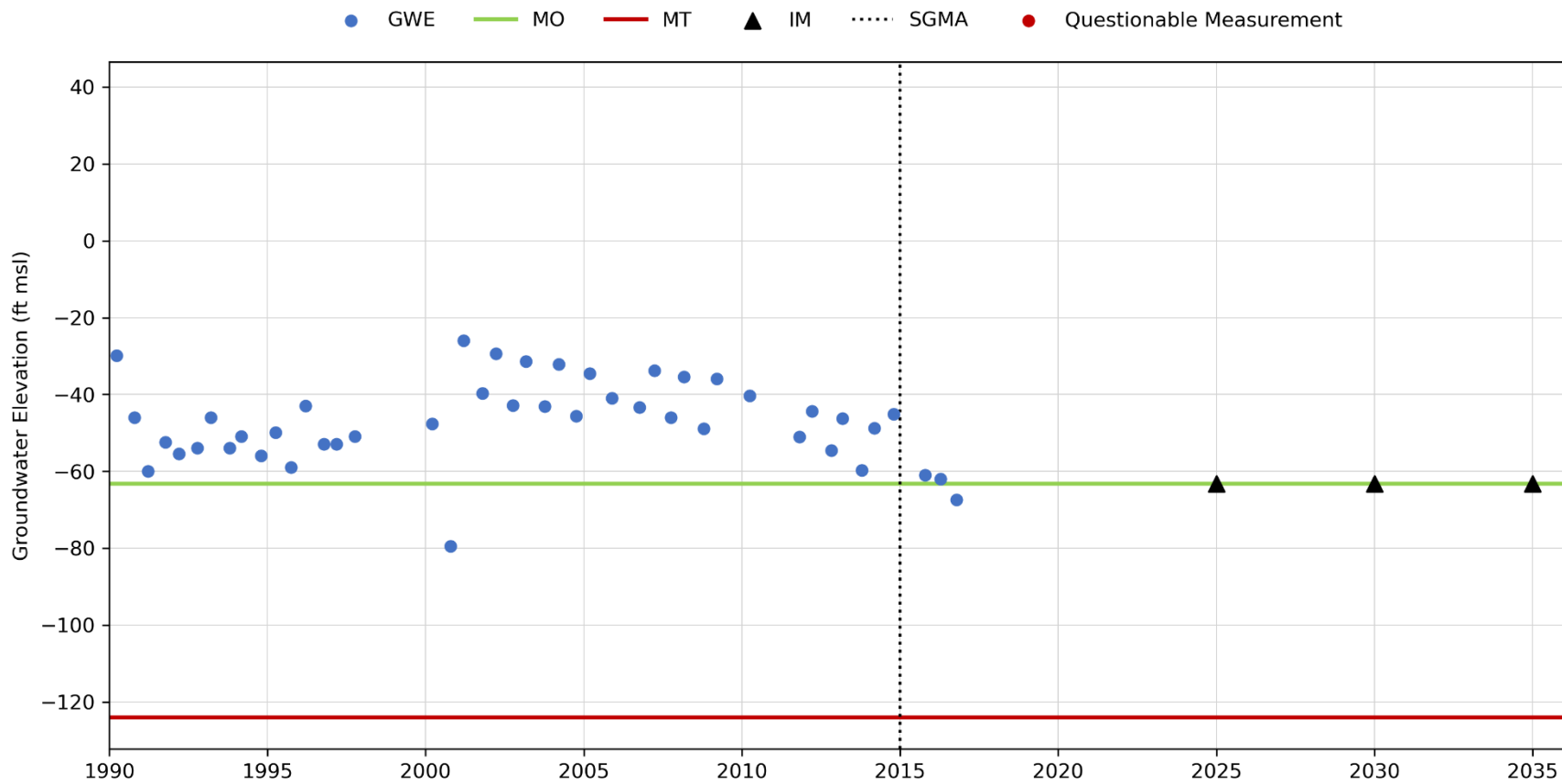
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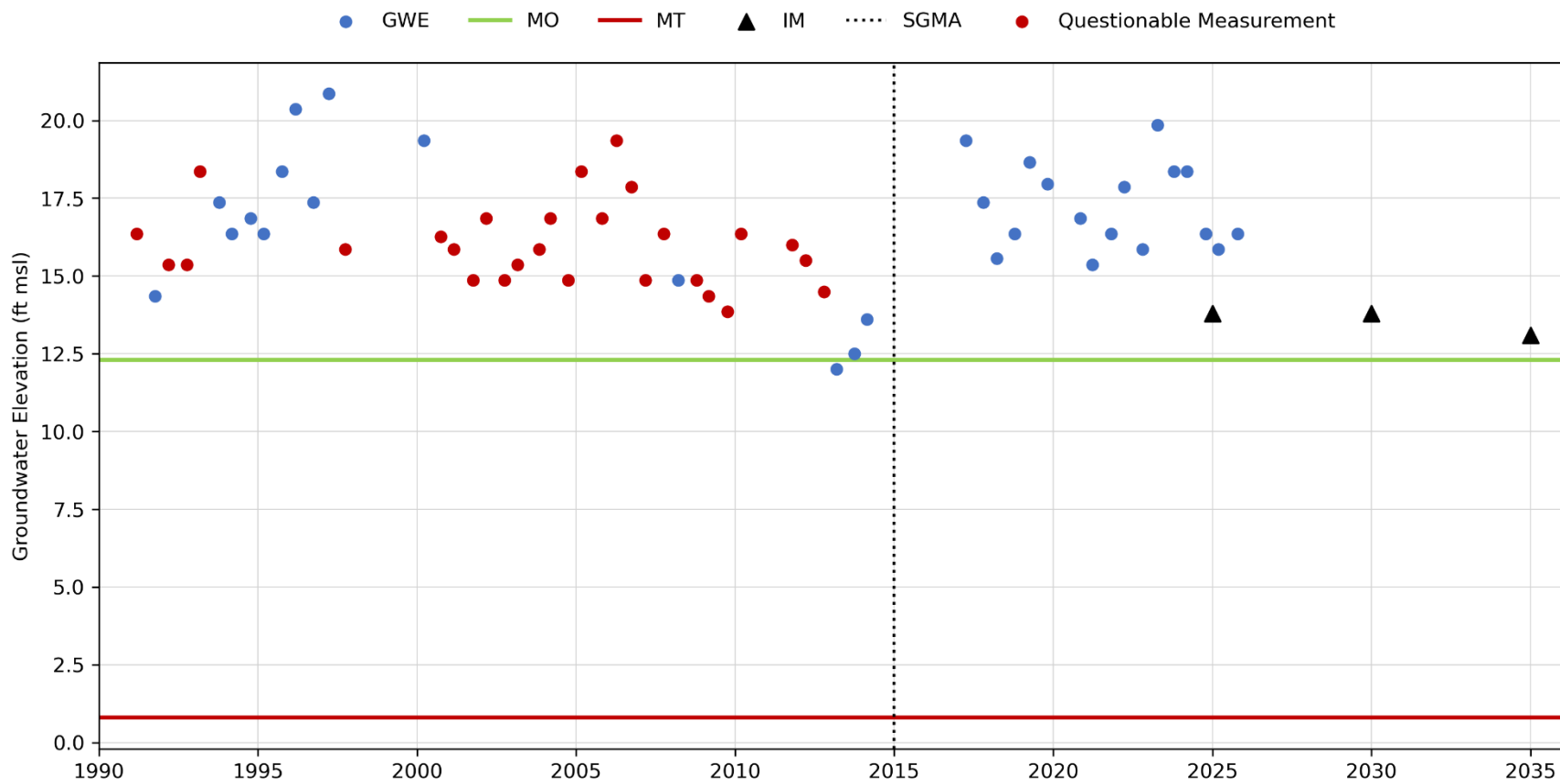
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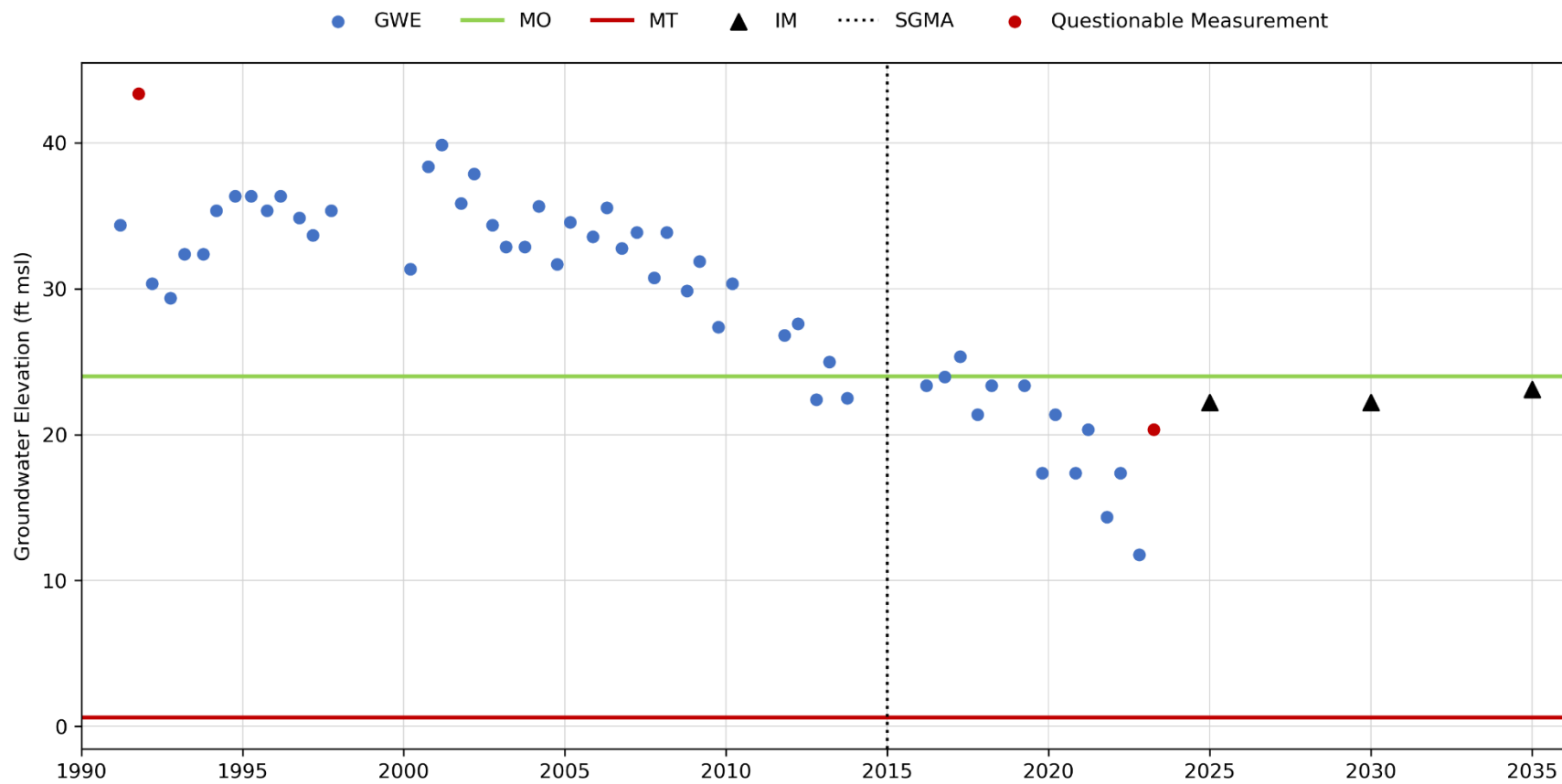
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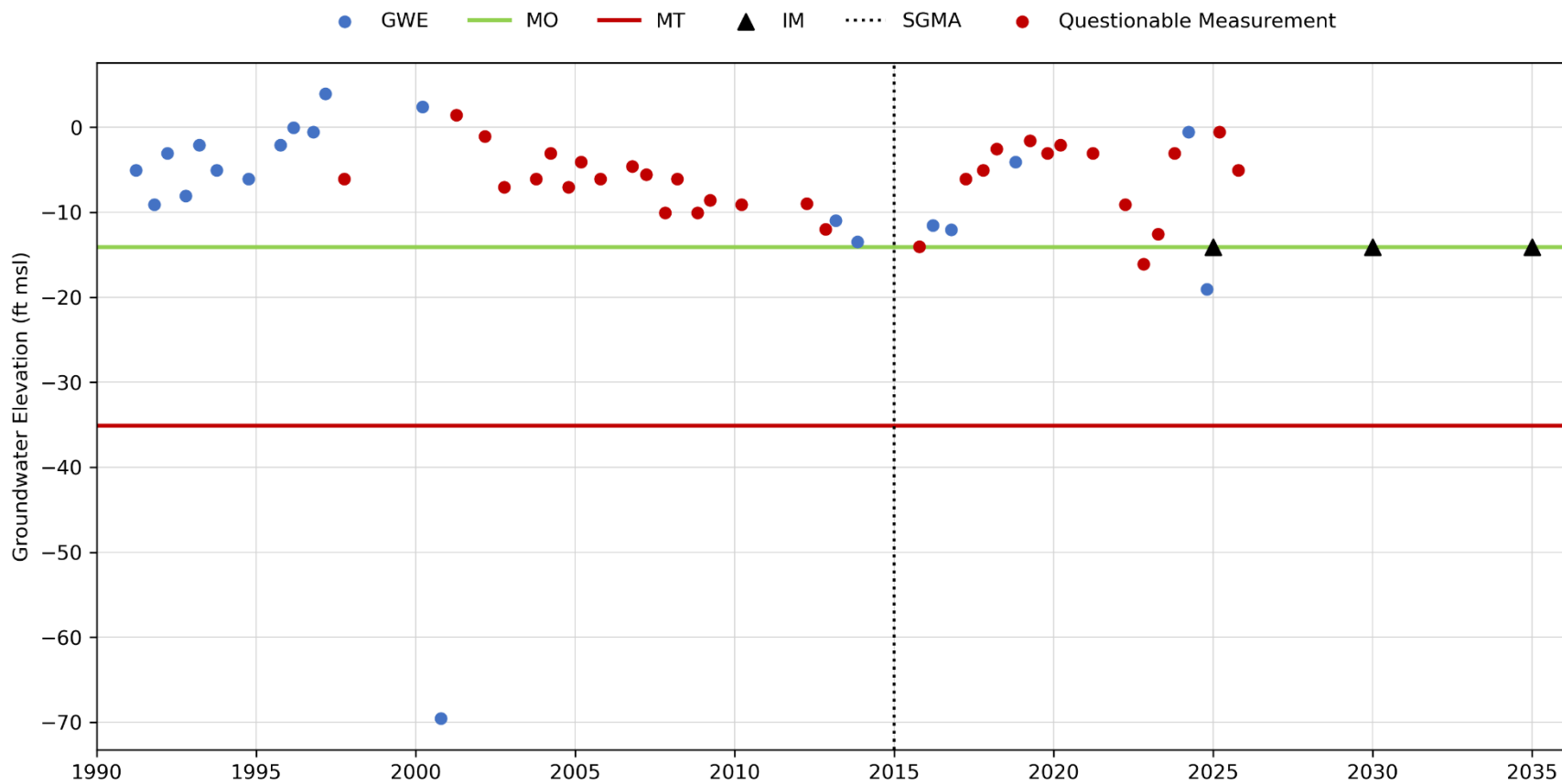
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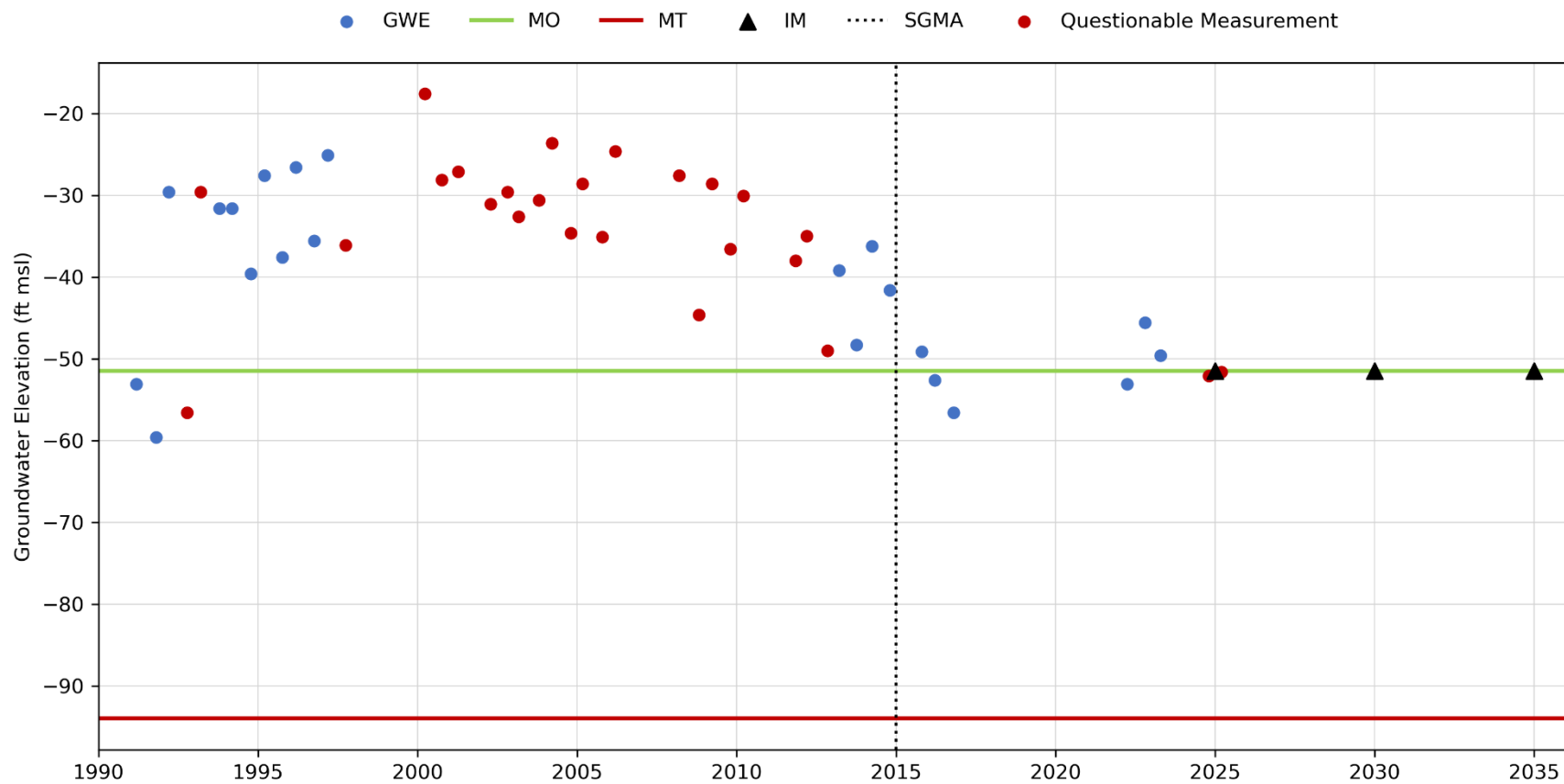


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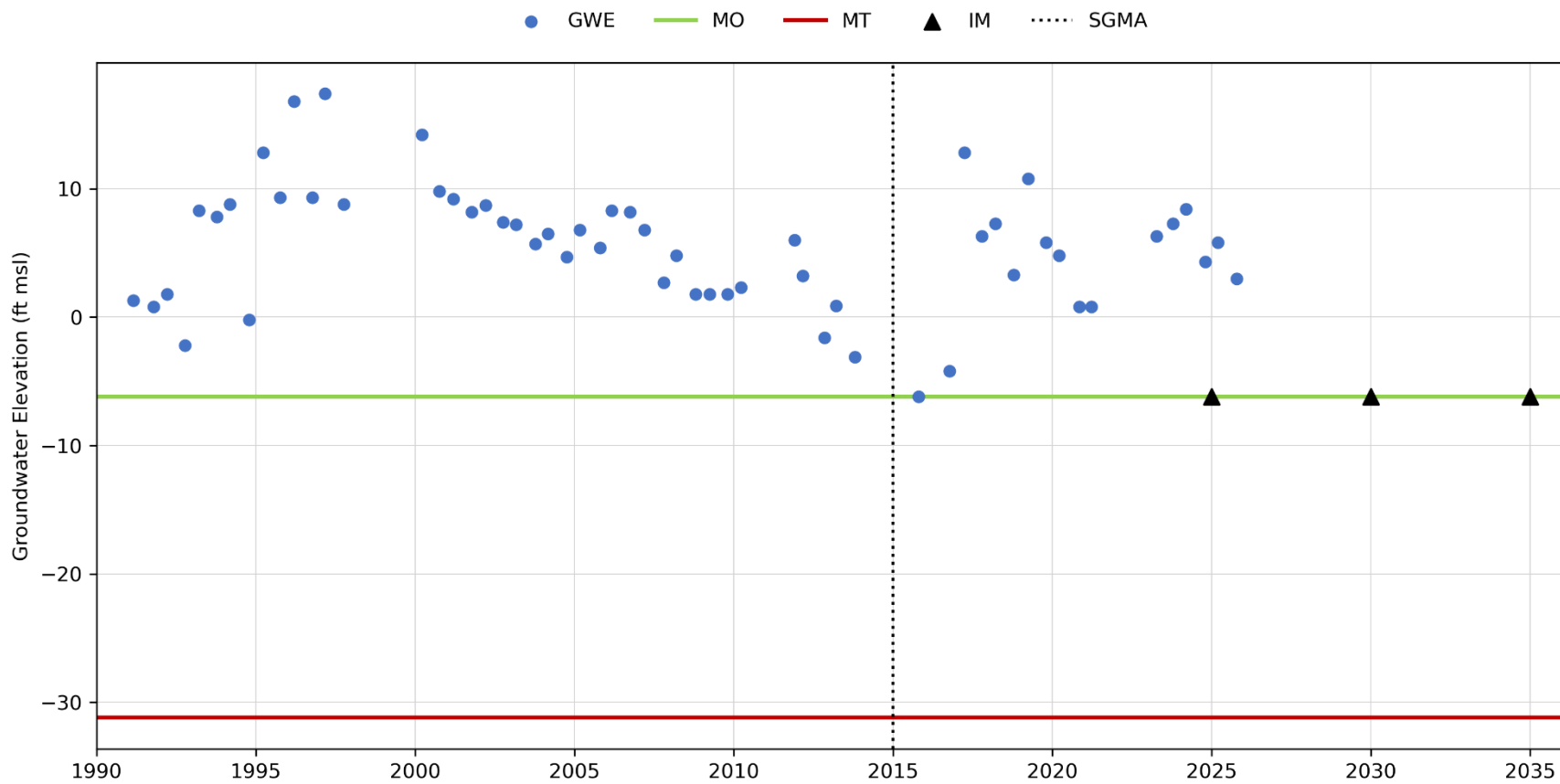




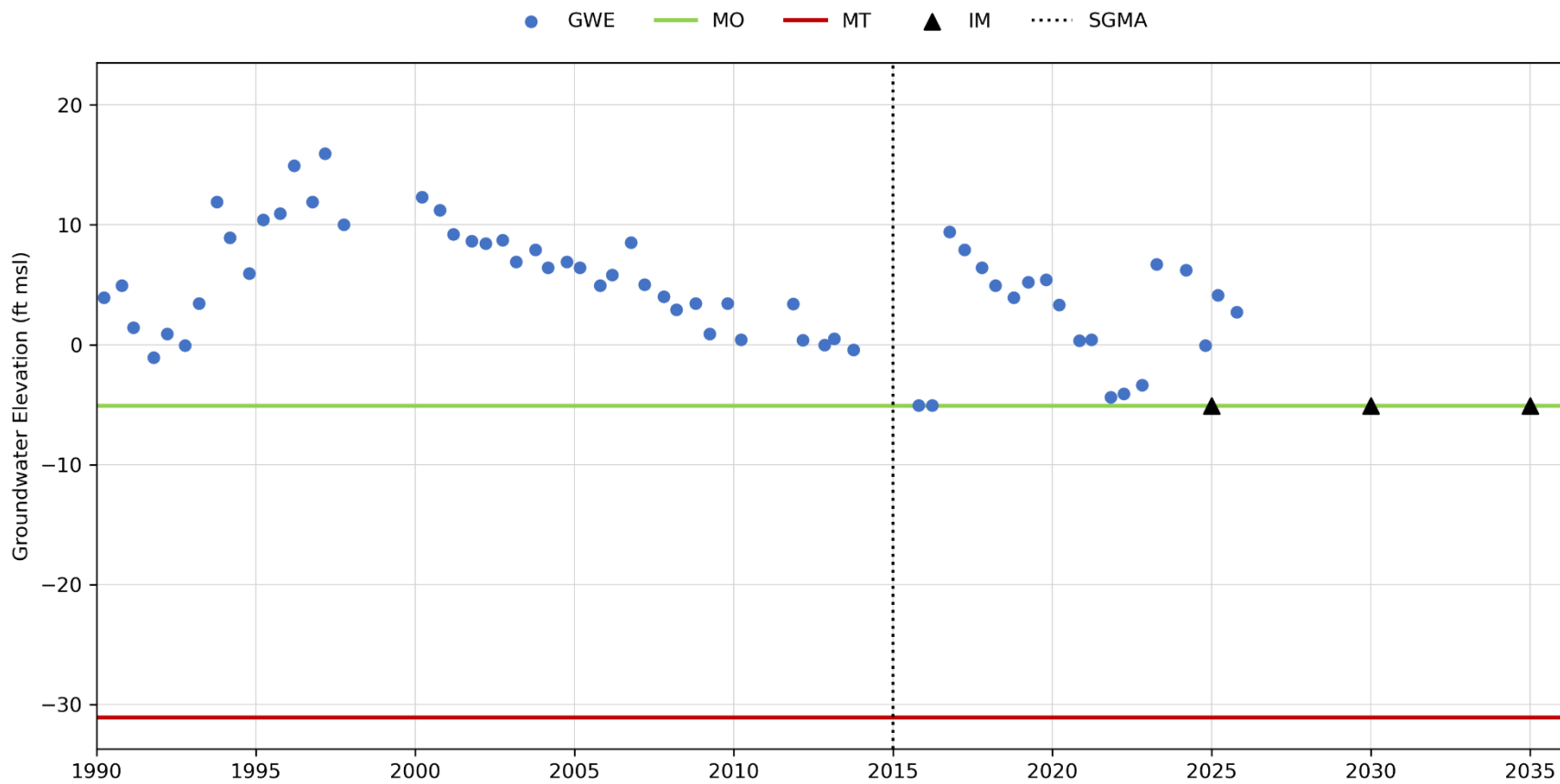
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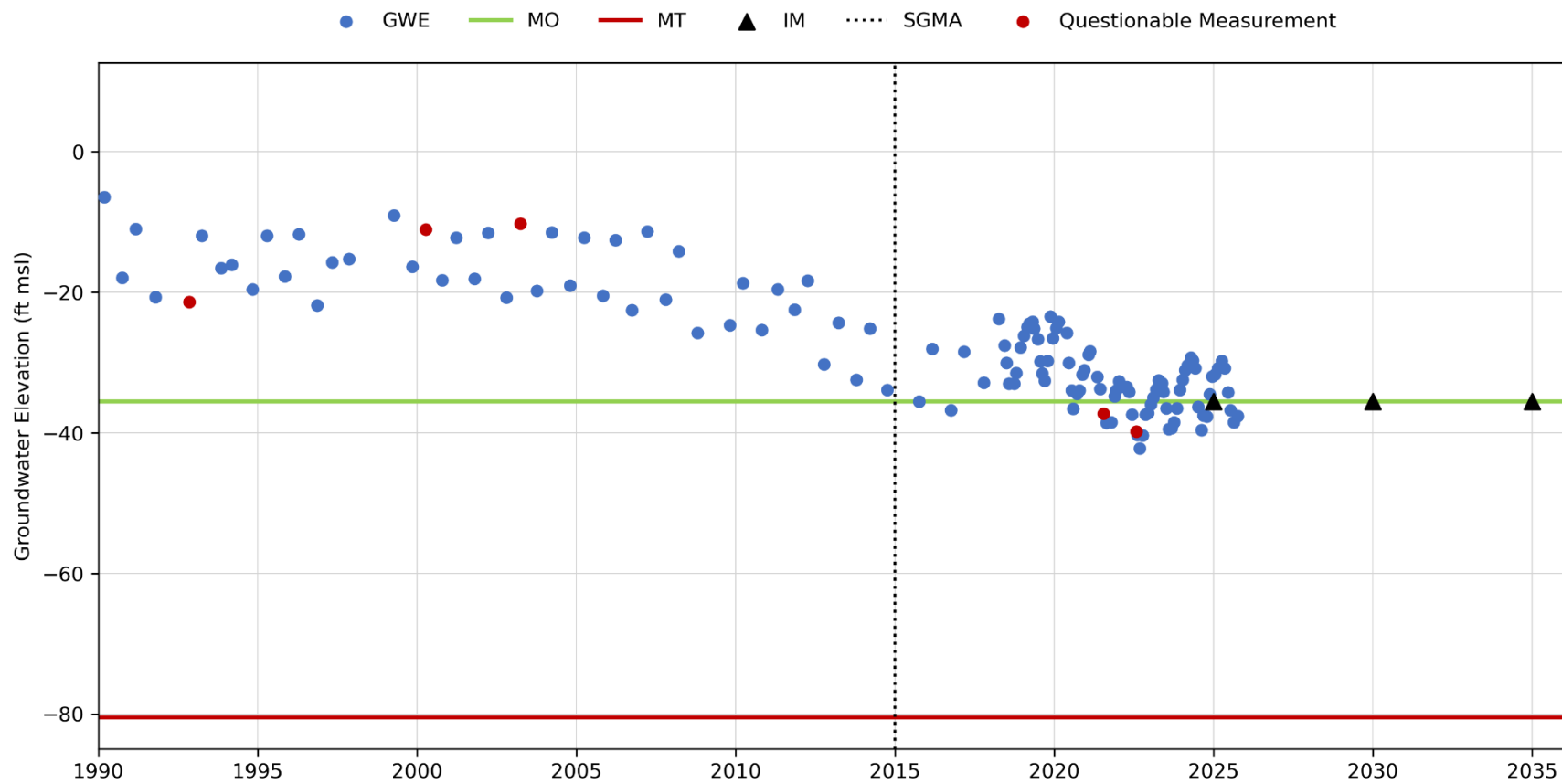
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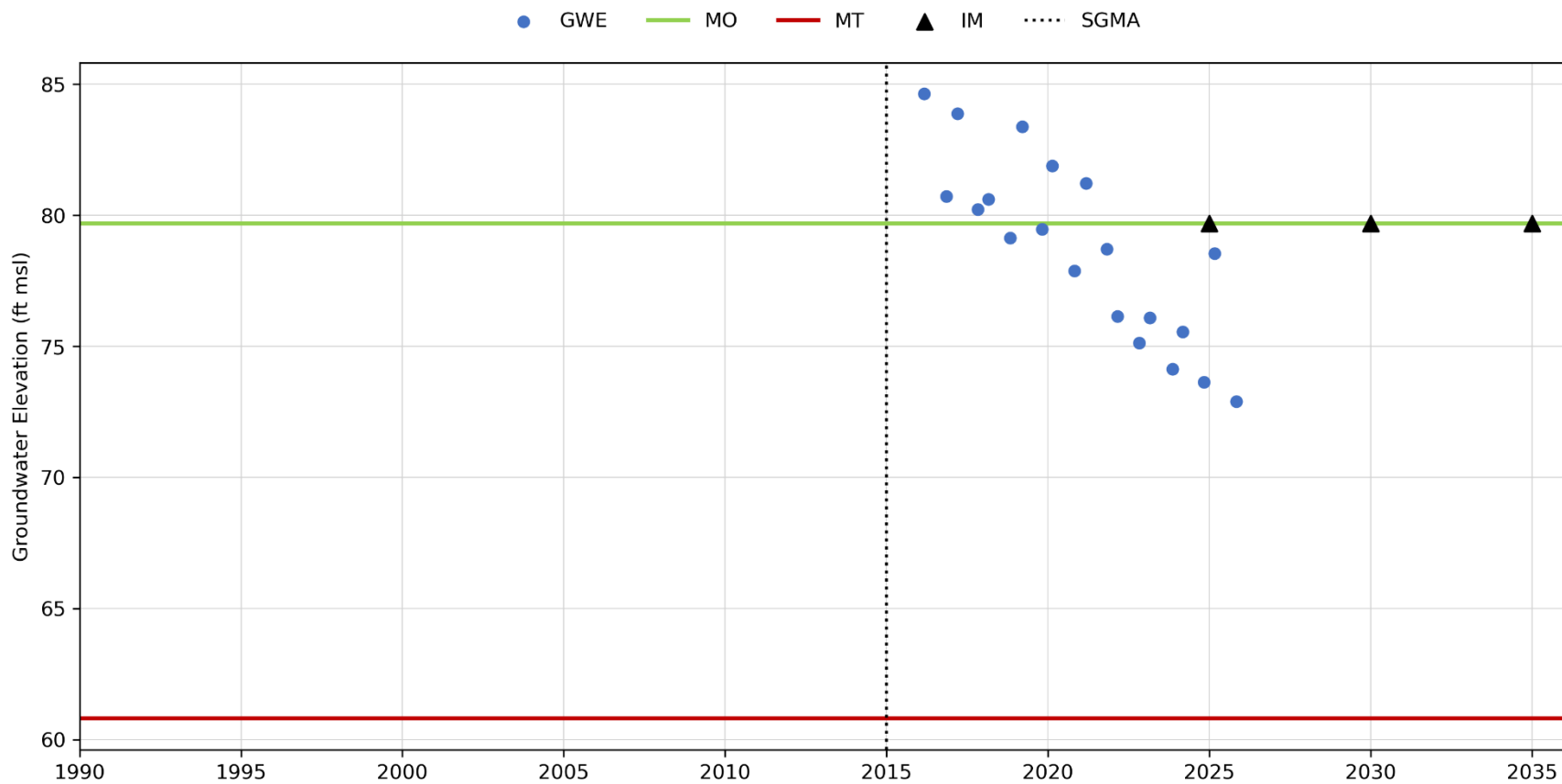
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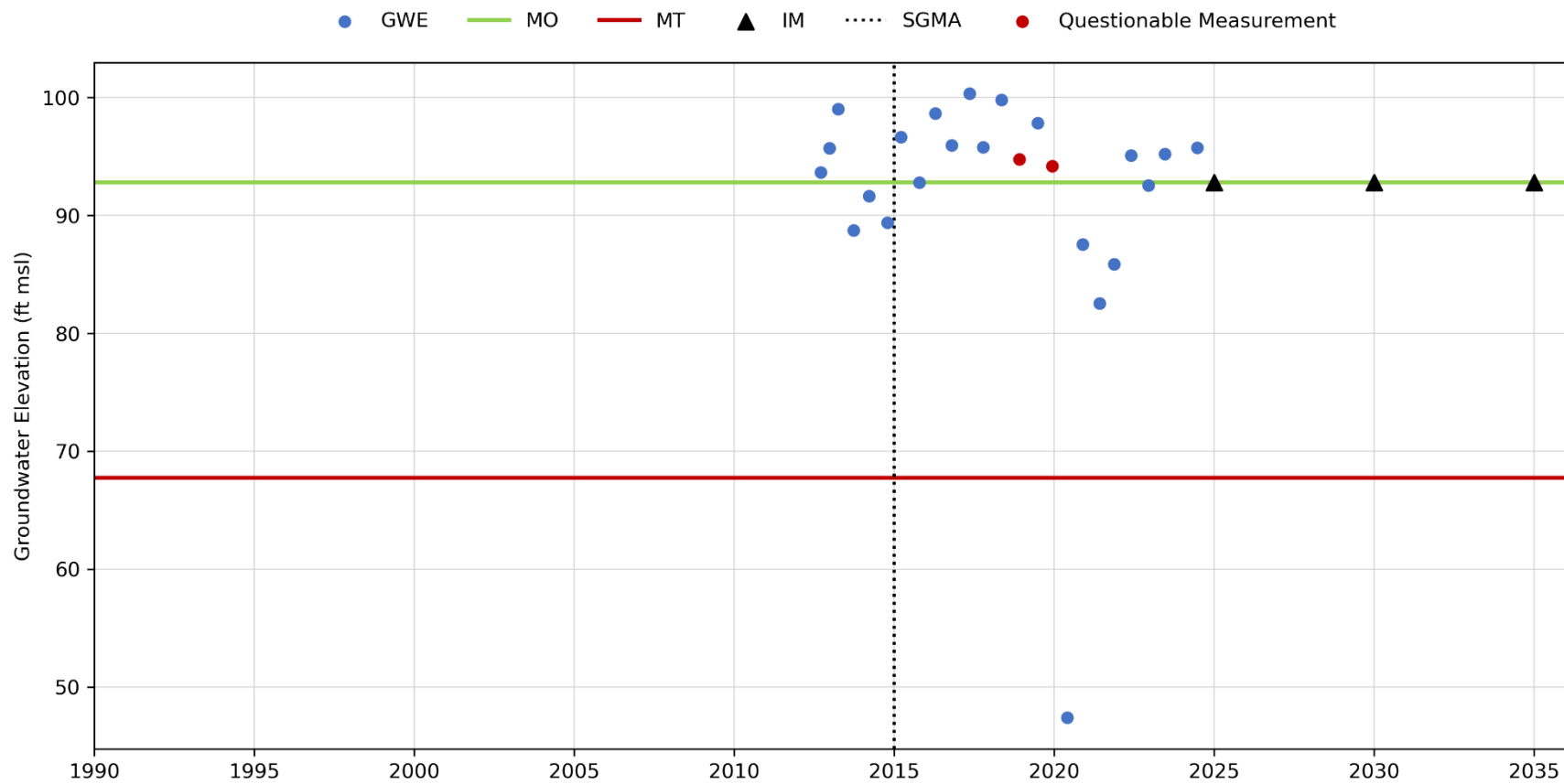
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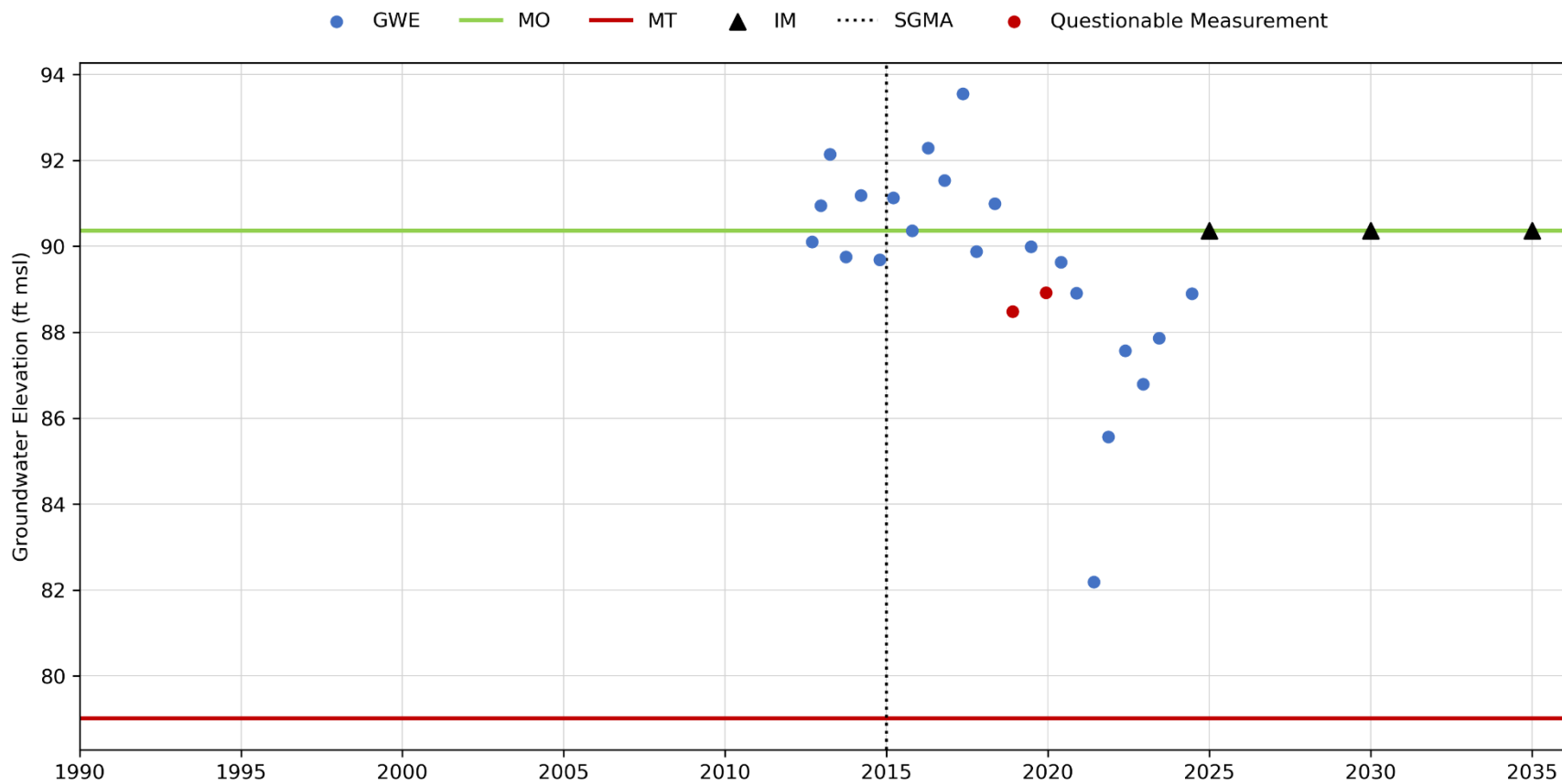
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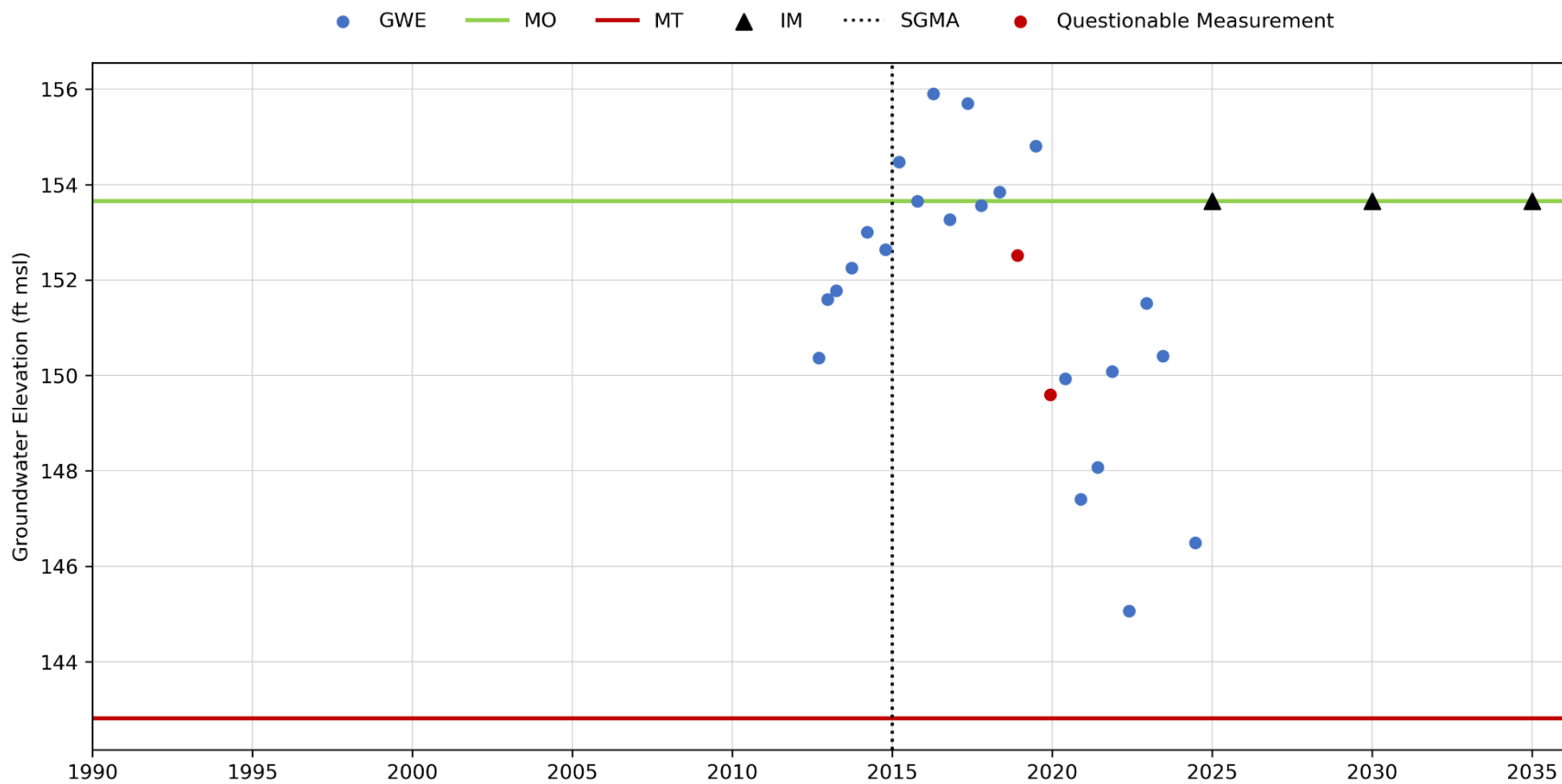
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# CCWD 011

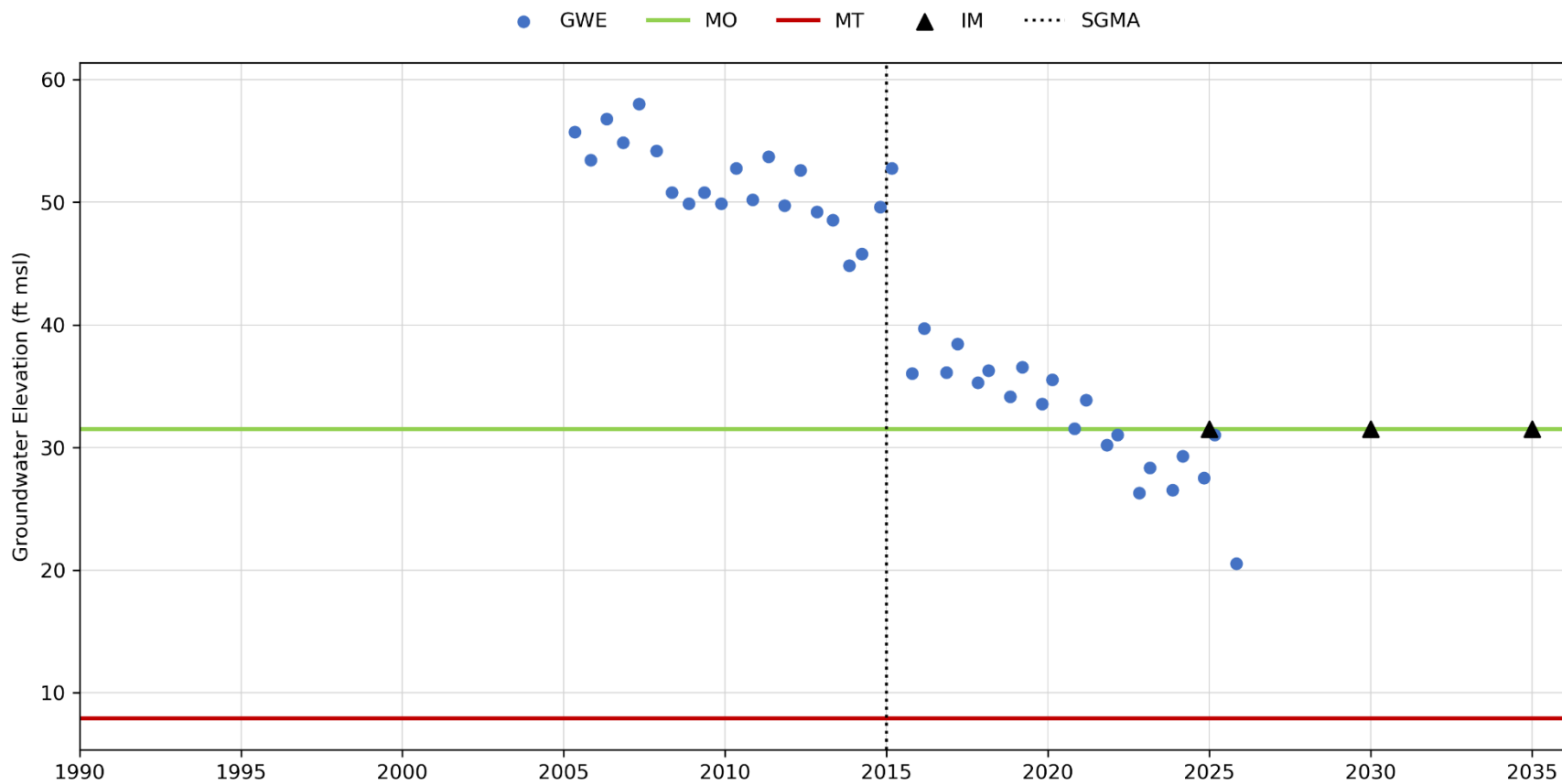


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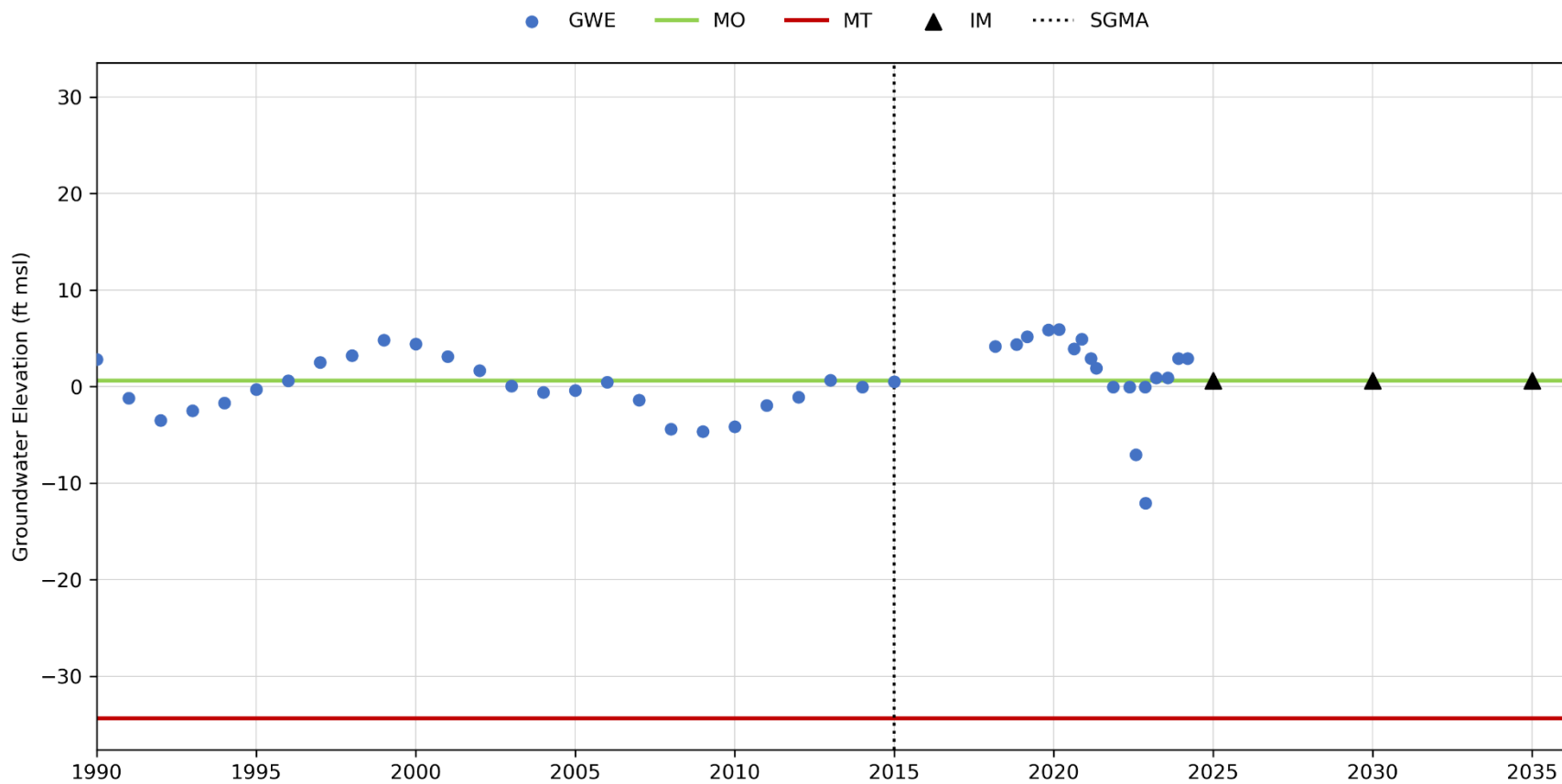




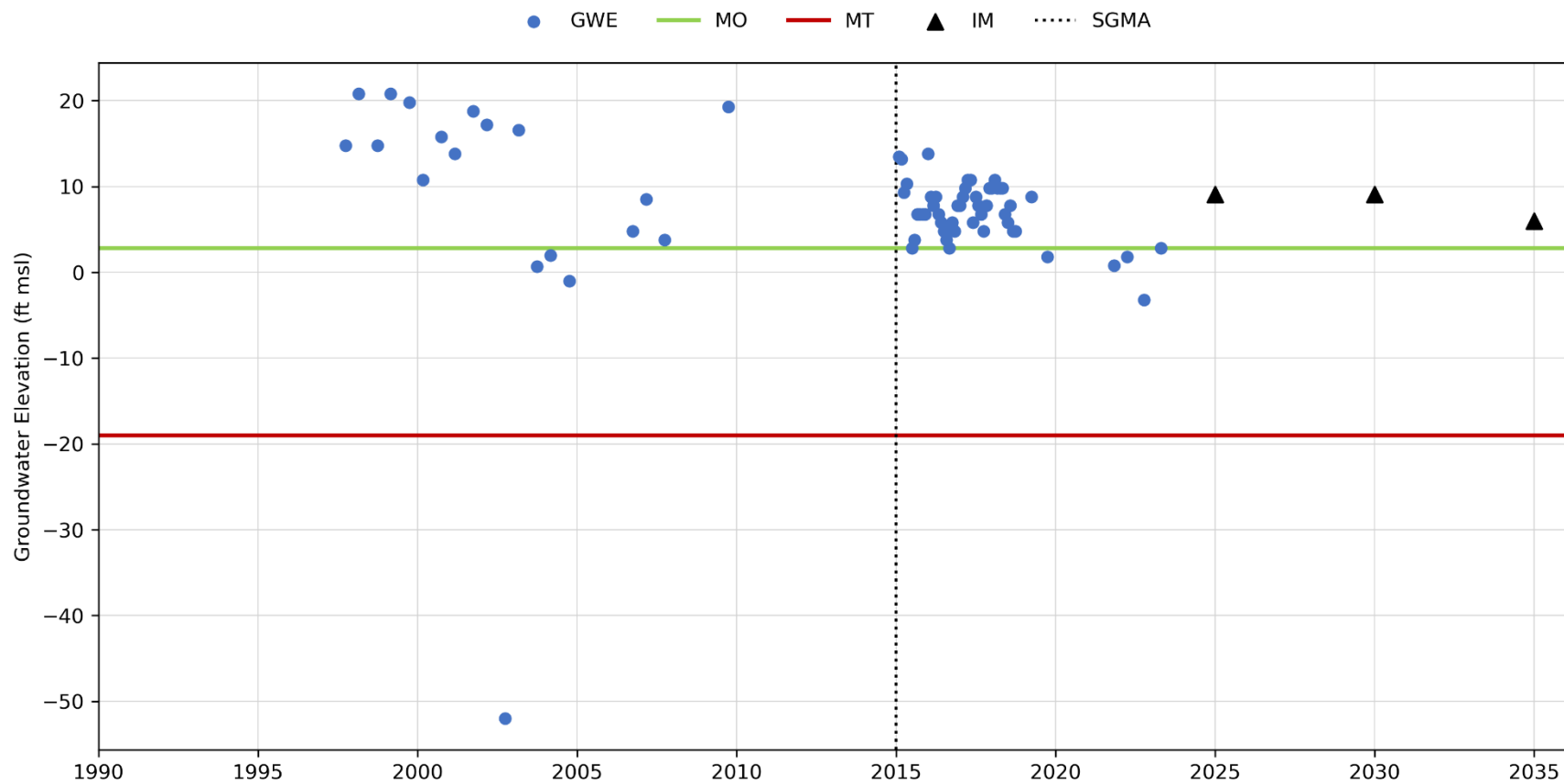
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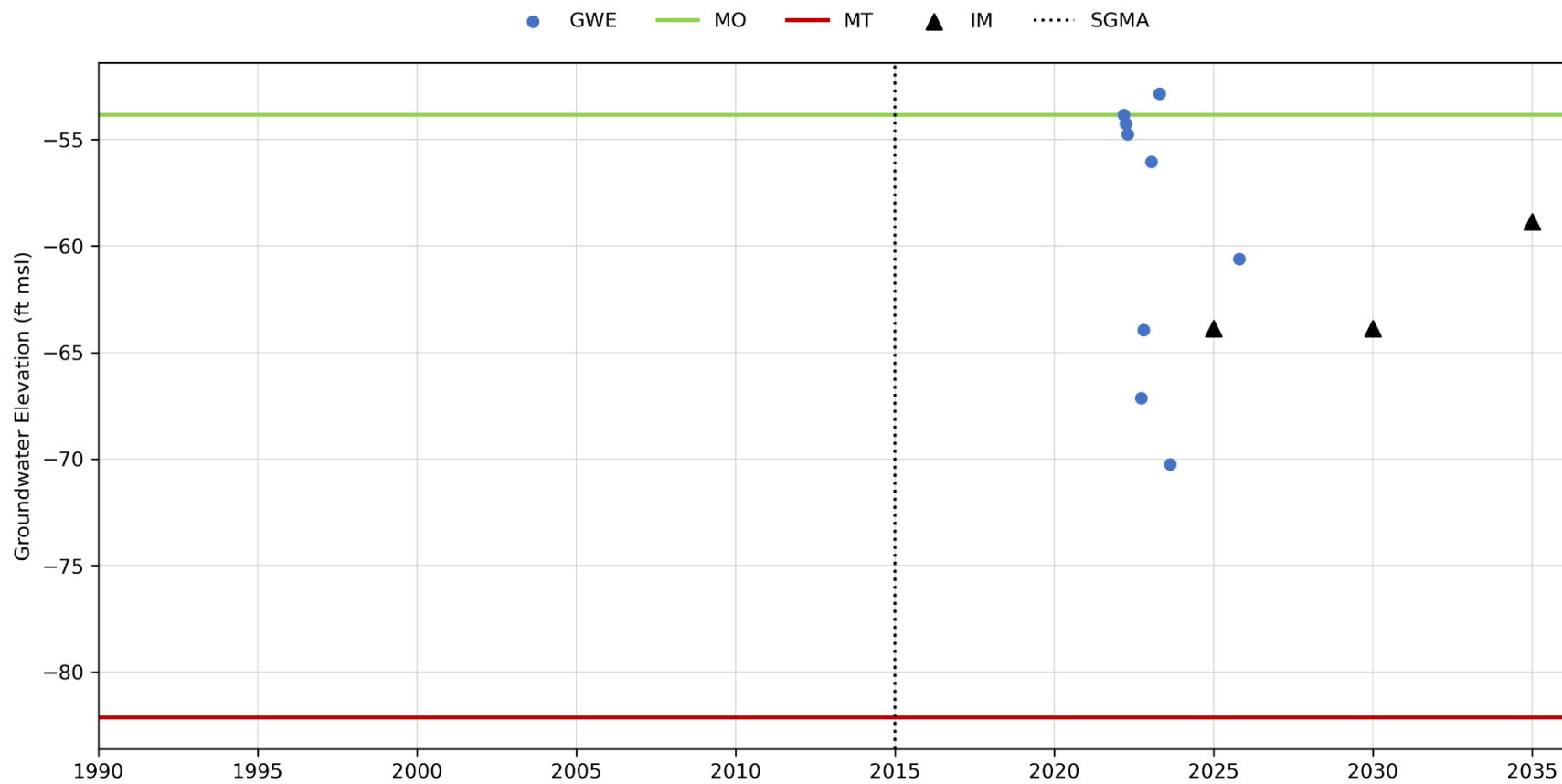
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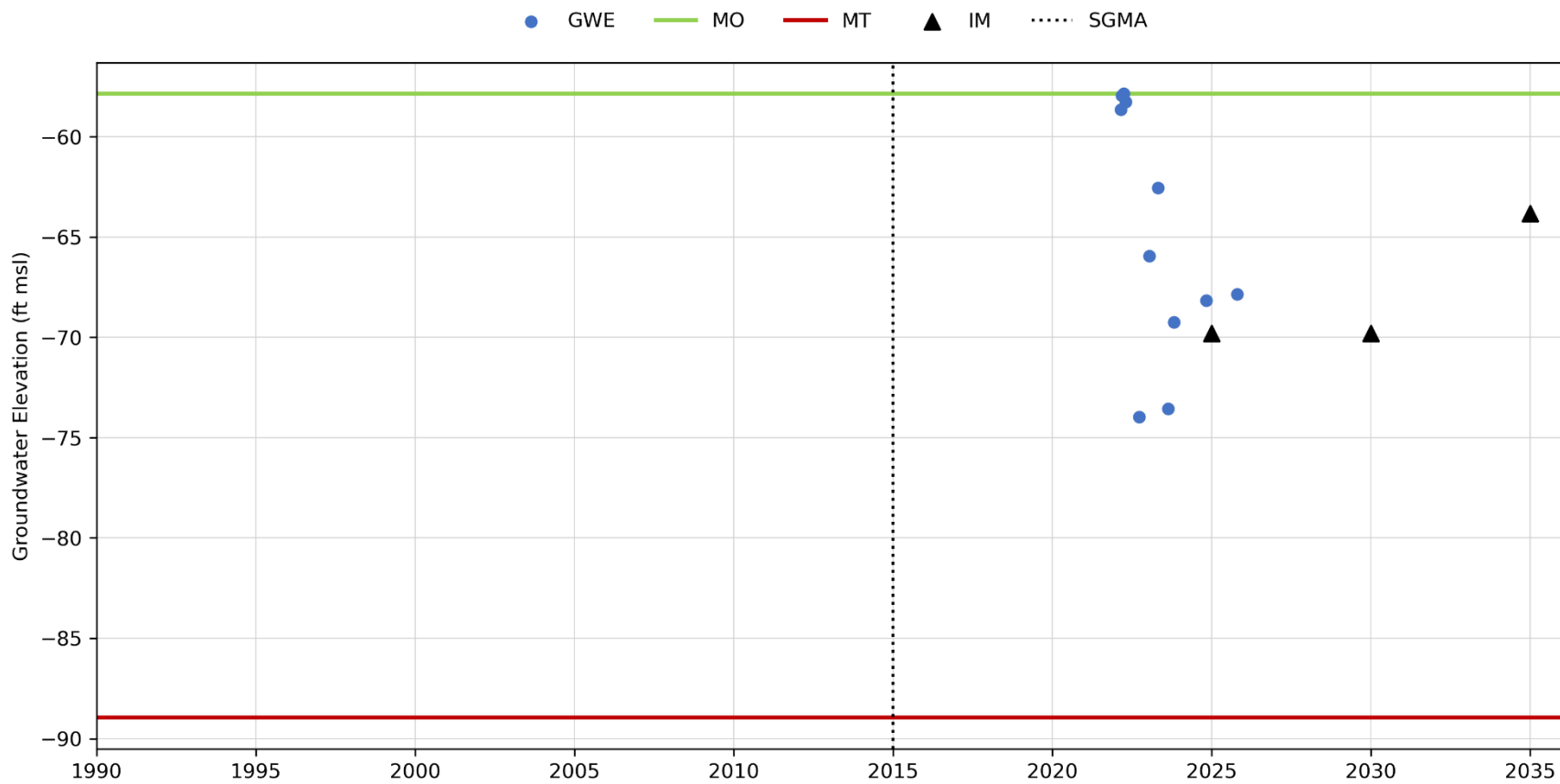
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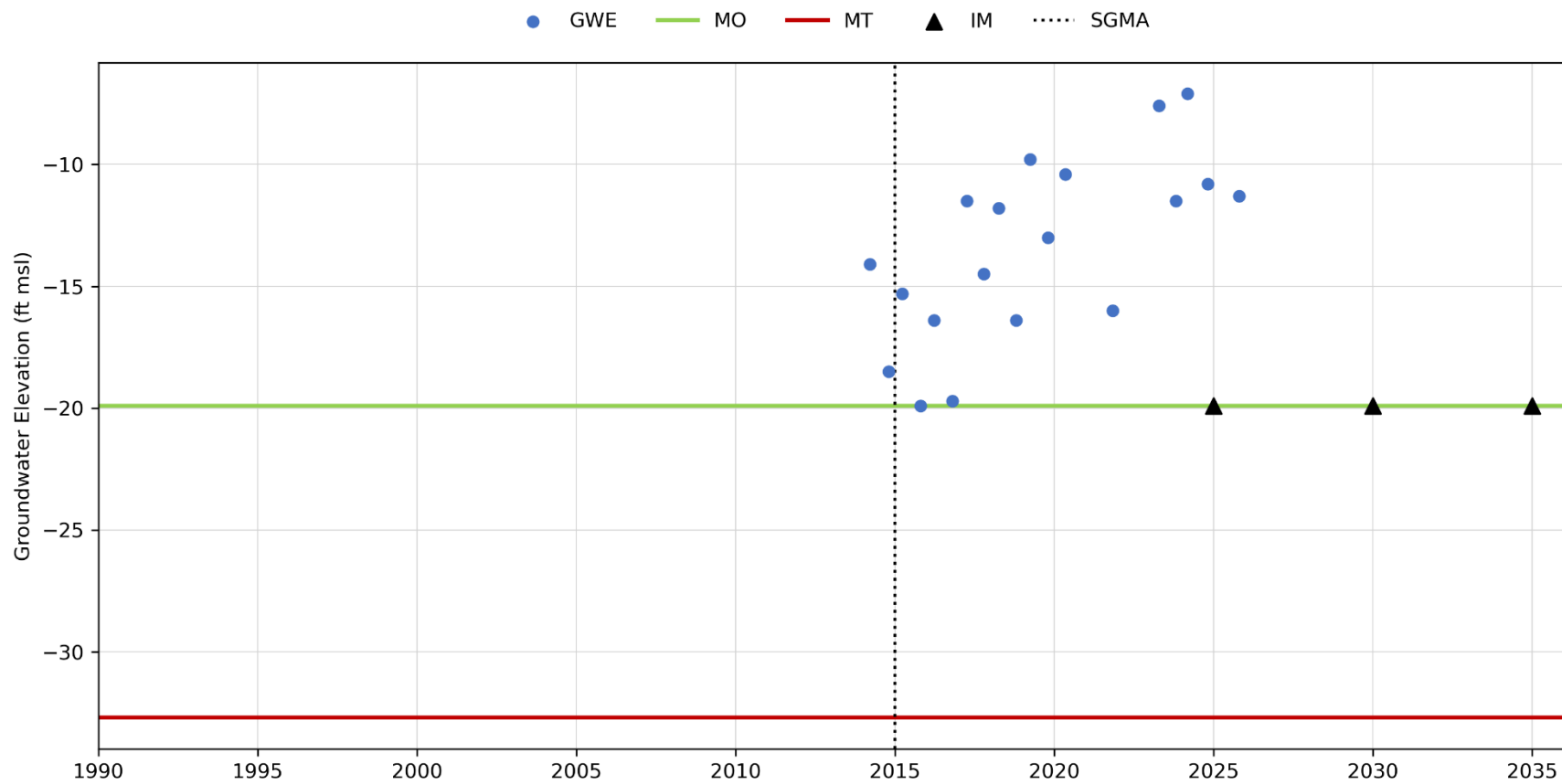
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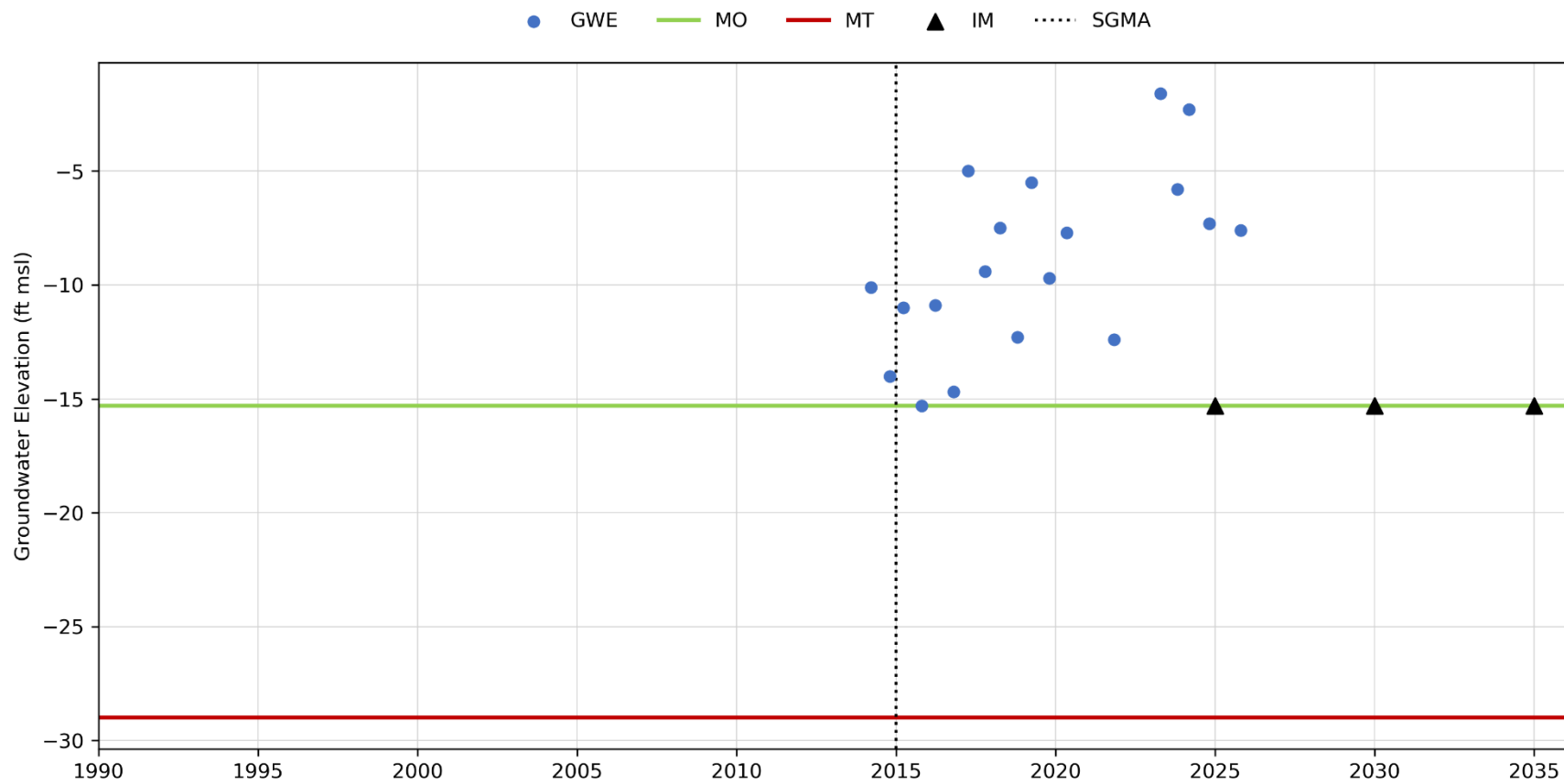
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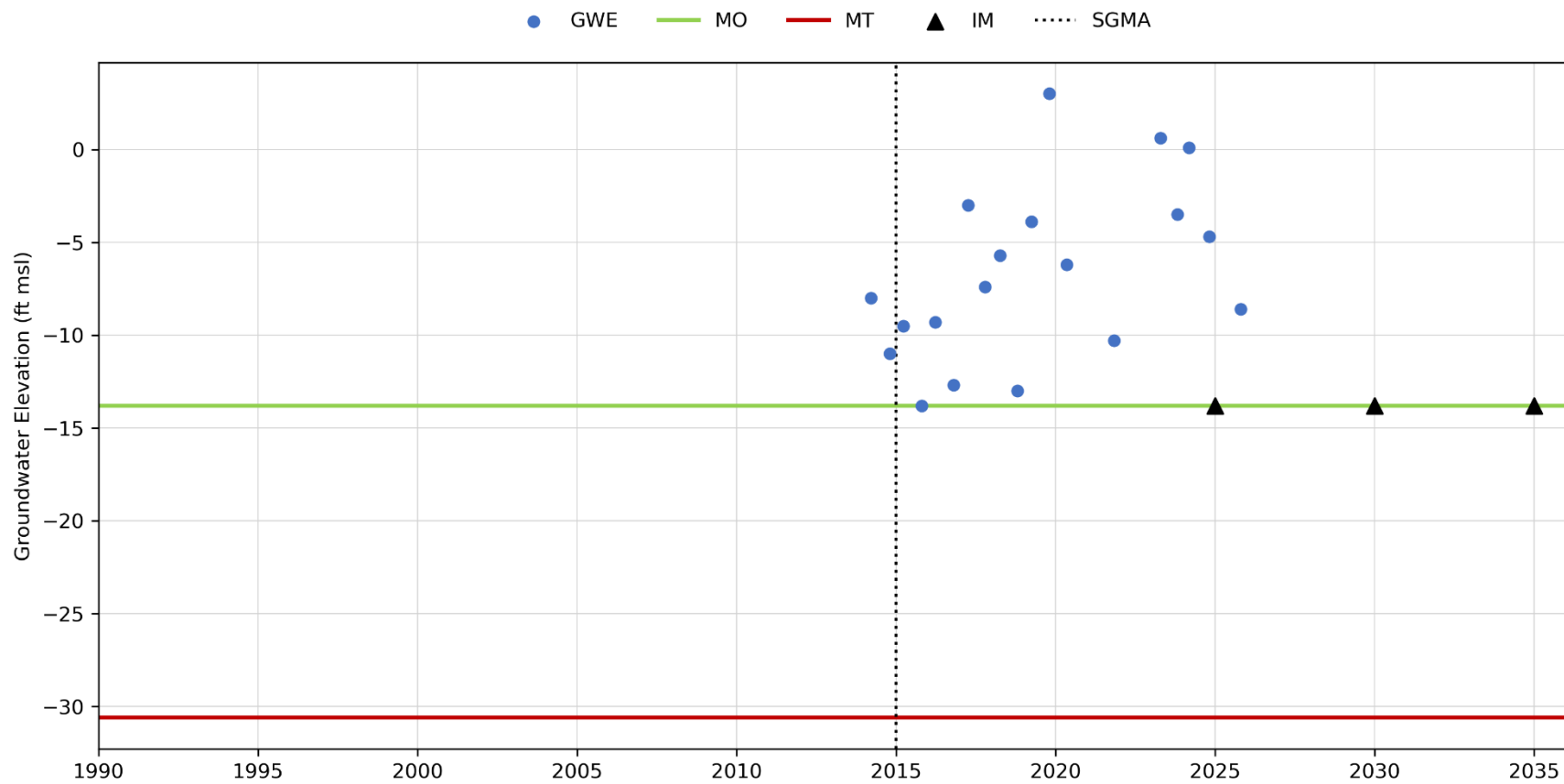
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## Sperry-2

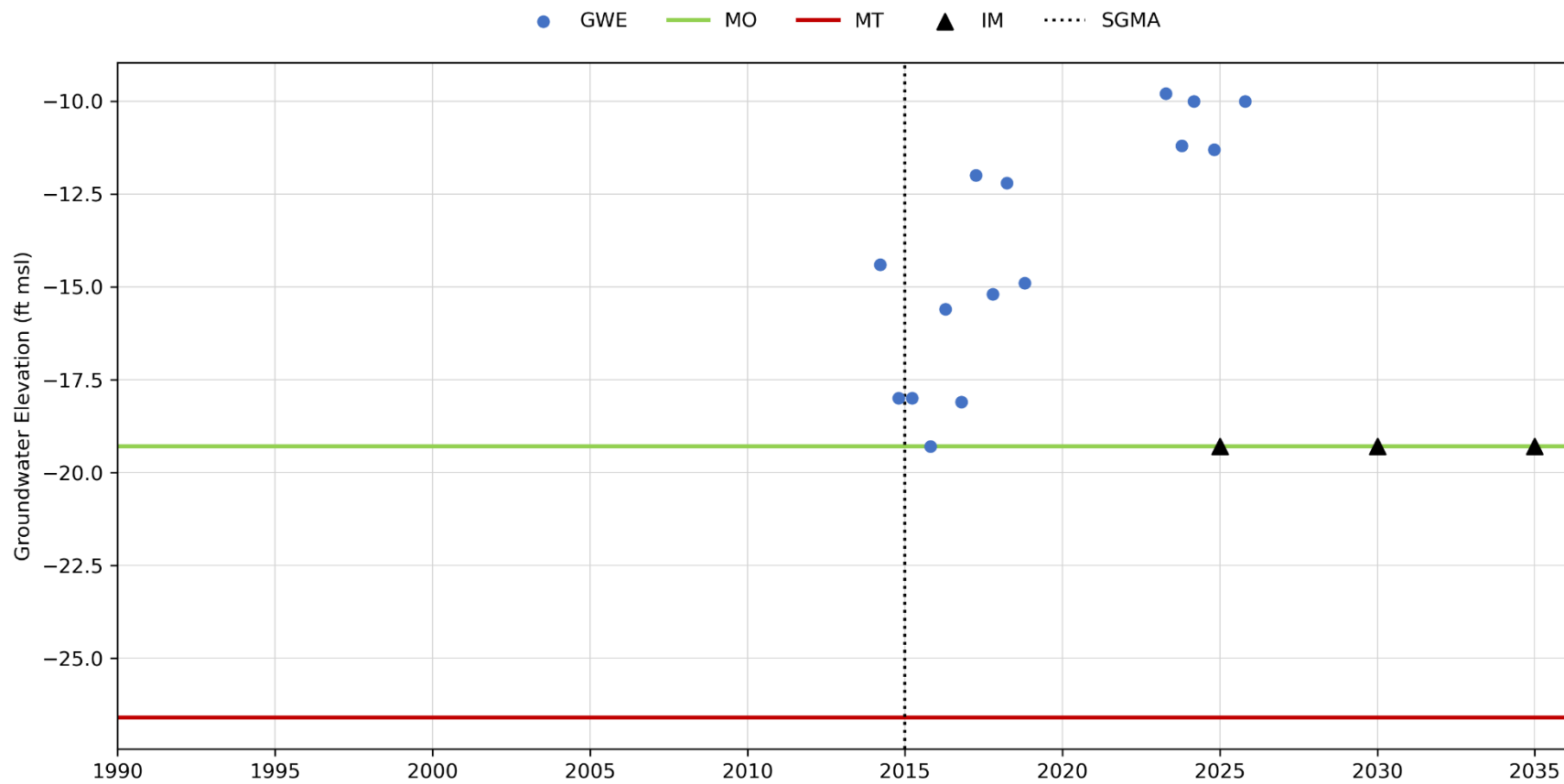


### Sperry-3





### Swenson-3



## TECHNICAL MEMORANDUM

**TO:** Monica Salais, PE (Department of Water Resources)

**CC:** Julia Berry (ESJGWA)

**PREPARED BY:** Woodard & Curran

**REVIEWED BY:** Eastern San Joaquin Groundwater Sustainability Agencies

**DATE:** August 18, 2026

**RE:** DWR Request for Clarification on Monitoring and Reporting

In an April 17, 2026 letter, the California Department of Water Resources (DWR) requested additional information regarding the Eastern San Joaquin (ESJ) Groundwater Subbasin's (Subbasin) 2024 Groundwater Sustainability Plan (GSP) Amendment and 2025 Periodic Evaluation (PE). The letter addresses six topics; this memo addresses Topic 2 which expresses concerns about missed measurements and requests clarification on groundwater level reporting.

During a subsequent meeting between the ESJ Groundwater Authority (GWA), Woodard & Curran, and DWR on May 11, 2026, DWR asked for additional information as stated below.

- 1. Please explain how repeatedly omitted or consistently lagging [representative monitoring network] RMN groundwater level measurements have sufficient temporal frequency (and spatial coverage) to evaluate the effects and effectiveness of Plan implementation,<sup>23</sup> CCR §354.34(b) including if they are ultimately protective of beneficial uses and users of groundwater. If RMN wells are unable to be consistently monitored, the basin should consider utilization of alternate wells.**
- 2. Department staff recognize that the GSAs are addressing inconsistent GW quality monitoring frequency by hiring a dedicated consultant; please explain how the GSAs plan to address inconsistent groundwater level monitoring and whether a similar approach is underway.**
- 3. Please reconcile differences between the representative monitoring network well groundwater level measurements presented in the 2025 Periodic Evaluation, 2024 Amended GSP, and SGMA Portal MNM and clarify which wells have, or are currently, experiencing [minimum threshold] MT exceedances.**

This memorandum has been prepared to address these requests.

## 1. Monitoring and Data Collection

The GWA and Subbasin groundwater sustainability agencies (GSAs) are aware that there have historically been issues with consistently collecting and reporting RMN groundwater level measurements. To address this, the GWA has taken the following actions:

- **Engaged in an exercise to identify missing data in the SGMA Portal.** In the past, there were many individual organizations (GSAs and/or consultants) that were responsible for collecting data from various representative monitoring wells and uploading the data to the ESJ Data Management System (DMS) and SGMA Portal. In many cases, while data were being collected, they were not being appropriately uploaded to either system. This has resulted in the perception of “repeatedly omitted” RMN groundwater level measurements. The GWA has identified data missing from the SGMA Portal and coordinated with the GSAs to determine if that data had been, in fact, collected but not uploaded. The GWA is now in possession of historical data that has been missing from the SGMA Portal and has uploaded this data to the SGMA Portal. See Attachment 1 for a table documenting data that had been missing and has since been identified.
- **Uploaded missing data to SGMA Portal.** The GWA is in the process of scheduling a training session with DWR where the GWA, Condor Earth (the consultant hired by the GWA to assist with monitoring RMN wells), and any interested GSAs will learn how to appropriately upload monitoring data to the SGMA Portal. Prior to and during this training, DWR will assist with uploading the missing data compiled by the GWA.
- **Hired a dedicated consultant to collect groundwater level monitoring data.** As noted by DWR in their comment, the GWA has entered into contract with a consultant, Condor Earth, with the intent of providing more consistent groundwater quality monitoring results. Condor Earth has also been contracted by the GWA to collect groundwater level monitoring data. With this change, the GSAs anticipate reliable monitoring for groundwater quality or groundwater level representative monitoring networks.

These actions not only address historical data gaps in the RMN for groundwater levels but creates a streamlined system moving forward to increase the consistency and reliability of groundwater level monitoring to address “consistently lagging” RMN groundwater level measurements.

The GSP establishes that RMN shall be maintained to ensure continuous and representative coverage of groundwater conditions. In the event that a particular well or wells in the RMN continue to be difficult to monitor (e.g., persistent access issues or it has been damaged or destroyed), the GSAs will select a replacement well in accordance with the criteria established for the RMN, as outlined in Chapter 4 page 4-3 of the GSP.

The success of the enhanced monitoring and data collection process is demonstrated by the Spring 2026 monitoring event. Dedicated staff resources were assigned to investigate the validity of previously reported well inaccessibility and to facilitate data collection at wells that had been deemed inaccessible. As a result of these efforts, Spring 2026 groundwater level data have been uploaded to the SGMA Portal Monitoring Network Module (MNM), with only one remaining missing data point. The missing data are associated with Well 02N8E15M002M, and alternative wells are currently being evaluated to replace this

monitoring location. Groundwater quality and subsidence monitoring data will be uploaded to and stored in the ESJGWA DMS.

## **2. Groundwater Level Measurement Reconciliation**

To address Item 3 noted by DWR, we compared representative monitoring network hydrographs and the underlying groundwater level datasets presented in the 2024 GSP Amendment, 2025 Periodic Evaluation, SGMA Portal monitoring network module (MNM), and the ESJ DMS, with supplemental reference to the Water Data Library (WDL). This comparative review encompassed all 23 groundwater RMN wells and included evaluations of the two examples identified by DWR (02N08E15M002M and Swenson-3). The review indicated differences between data presented in the WDL and the SGMA Portal MNM for certain dates. After we raised this issue with DWR for clarification, DWR identified an error in how the SGMA Portal calculates groundwater surface elevations (as compared to how the WDL does the calculation). DWR resolved this issue in early July 2026. This fix will resolve a number of groundwater level measurement discrepancy issues between the SGMA Portal, and the 2024 GSP Amendment and 2025 Periodic Evaluation.

In addition, we have collected a number of missing groundwater level data entries as noted in Section 1 of this TM. The table attached to this TM indicates in green the data gaps for the groundwater level monitoring that have been filled. Since Spring 2024, 20 data gaps have been filled; these have been uploaded to the SGMA Portal. Moving forward, the ESJGWA will (1) house all groundwater level monitoring data in the SGMA Portal and the ESJ DMS, and (2) house all groundwater quality and subsidence monitoring data in the ESJ DMS.

Following the data review and reconciliation described above, two RMN wells (01S09E05H002M and 01S10E04C001M) were identified as the only groundwater level representative monitoring network wells that have exceeded, or are currently exceeding, their MTs. These exceedances were noted in the appropriate annual reports. No additional RMN wells were identified with historical or current MT exceedances.

Attachment 1 to this memo is a summary data table for all groundwater level RMN wells, as currently updated in the SGMA Portal.

Attachment 2 to this memo is a map of the groundwater level RMN wells.

## **Attachment 1**

**Attachment 1. Groundwater Level Reported Spring 2021 - Spring 2026 Related to the 2024 GSP Amendment RMN**

| Well Location by GSA                                                              | Local Well ID                    | Site Code ID       | 2021        |           | 2022        |           | 2023        |           | 2024        |           | 2025        |           | 2026        |
|-----------------------------------------------------------------------------------|----------------------------------|--------------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|
|                                                                                   |                                  |                    | Spring 2021 | Fall 2021 | Spring 2022 | Fall 2022 | Spring 2023 | Fall 2023 | Spring 2024 | Fall 2024 | Spring 2025 | Fall 2025 | Spring 2026 |
| "Y" indicates data is reported; "N" indicates data is not reported                |                                  |                    |             |           |             |           |             |           |             |           |             |           |             |
| City of Lodi                                                                      | Lodi City Well #2                | 381376N1212740W001 | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| City of Manteca                                                                   | Manteca Well 18                  | 378143N1211910W001 | N           | Y         | Y           | Y         | Y           | N         | N           | N         | N           | N         | Y           |
| Central San Joaquin Water Conservation District                                   | 01N07E14J002                     | 379316N1211665W001 | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| Central San Joaquin Water Conservation District                                   | 01N09E05J001                     | 379661N1210011W001 | N           | N         | N           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| Central San Joaquin Water Conservation District                                   | 01S09E05H002                     | 378824N1210000W001 | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| Stockton East Water District                                                      | 02N07E03D001                     | 380578N1212017W001 | Y           | N         | Y           | N         | N           | N         | Y           | Y         | Y           | Y         | Y           |
| Linden County Water District                                                      | 02N07E29B001                     | 379976N1212308W001 | Y           | N         | N           | Y         | N           | N         | N           | N         | N           | Y         | Y           |
| Linden County Water District                                                      | 02N08E15M002 - Linden School     | 380206N1210943W001 | N           | N         | N           | N         | N           | N         | N           | Y         | Y           | Y         | N           |
| South Delta Water Agency                                                          | 02S07E31N001                     | 377136N1212508W001 | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| South San Joaquin Irrigation District                                             | 02S08E08A001                     | 377810N1211142W001 | Y           | Y         | Y           | Y         | Y           | N         | N           | N         | N           | N         | Y           |
| Woodbridge Irrigation District                                                    | 03N06E05N003                     | 381317N1213524W001 | Y           | N         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| North San Joaquin Water Conservation District                                     | 03N07E21L003                     | 380909N1212153W001 | N           | N         | Y           | Y         | Y           | N         | N           | Y         | Y           | Y         | Y           |
| Woodbridge Irrigation District                                                    | 04N05E24J004                     | 381816N1213723W001 | Y           | N         | N           | N         | Y           | N         | Y           | Y         | Y           | Y         | Y           |
| Woodbridge Irrigation District                                                    | 04N05E36H003                     | 381559N1213727W001 | Y           | Y         | Y           | Y         | Y           | N         | Y           | Y         | Y           | Y         | Y           |
| North San Joaquin Water Conservation District                                     | 04N07E20H003M                    | 381843N1212261W001 | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| City of Stockton                                                                  | Swenson-3<br>02N06E20E003M       | 380067N1213458W003 | N           | N         | N           | N         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| Eastside San Joaquin GSA                                                          | 01S10E04C-M                      | 378846N1208816W001 | Y           | N         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| Eastside San Joaquin GSA                                                          | Frankenheimer<br>(01S10E26J001M) | 378163N1208321W001 | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| Lockeford CSD                                                                     | #3 Bear Creek                    | 38155N1211380W001  | Y           | Y         | Y           | Y         | Y           | Y         | Y           | N         | N           | N         | Y           |
| North San Joaquin Water Conservation District                                     | NSJWCD-01                        | 382347N1212258W004 |             | N         | Y           | Y         | Y           | Y         | N           | Y         | N           | Y         | Y           |
| Oakdale Irrigation District                                                       | Burnett (OID4)                   | 377909N1208675W001 | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| Oakdale Irrigation District                                                       | Hirschfeld (OID8)                | 378352N1209570W001 | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           | Y         | Y           |
| Stockton East Water District                                                      | SEWD-01                          | 379794N1211083W003 |             | N         | Y           | Y         | Y           | Y         | N           | Y         | Y           | Y         | Y           |
| Note: Wells listed are in the SGMA Portal at the time of Technical Memo Submittal |                                  |                    |             |           |             |           |             |           |             |           |             |           |             |

Note: Wells listed are in the SGMA Portal at the time of Technical Memo Submittal

## **Attachment 2**

SACRAMENTO  
COUNTY

AMADOR COUNTY

CALAVERAS  
COUNTY

SAN JOAQUIN  
COUNTY

STANISLAUS  
COUNTY

# Representative Monitoring Network for Groundwater Levels Eastern San Joaquin Subbasin GSP

## Legend

 Representative Monitoring  
Network for Groundwater Wells

 Eastern San Joaquin Subbasin  
Boundary

 1. Central Delta Water Agency

 2. Central San Joaquin Water  
Conservation District

 3. City of Lodi

 4. City of Manteca

 5. City of Stockton

 6. Eastside San Joaquin GSA

 7. Linden County Water District

 8. Lockeford Community  
Service District

 9. North San Joaquin Water  
Conservation District

 10. Oakdale Irrigation District

 11. San Joaquin County

 12. San Joaquin County No. 2

 13. South Delta Water Agency

 14. South San Joaquin  
Irrigation District

 15. Stockton East Water  
District

 16. Woodbridge Irrigation  
District

0 3.5 7 14 Miles



**EASTERN SAN JOAQUIN  
GROUNDWATER AUTHORITY**



## TECHNICAL MEMORANDUM

**TO:** Monica Salais, PE (Department of Water Resources)

**CC:** Julia Berry (ESJGWA)

**PREPARED BY:** Woodard & Curran

**REVIEWED BY:** Eastern San Joaquin Groundwater Sustainability Agencies

**DATE:** August 18, 2026

**RE:** DWR Request for Clarification on Subsidence SMC

In an April 17, 2026 letter, the California Department of Water Resources (DWR) requested additional information regarding the Eastern San Joaquin (ESJ) Groundwater Subbasin's (Subbasin) 2024 Groundwater Sustainability Plan (GSP) Amendment and 2025 Periodic Evaluation (PE). The letter addresses six topics. This memorandum addresses Topic 3, which requests Sustainable Management Criteria (SMC) clarification for land subsidence.

DWR requested clarification "regarding the relationship between subsidence-related adaptive management statements and the SMCs" and that the ESJGWA "provide analysis to justify the rate and extent of potential subsidence impacts on the critical infrastructure." During a subsequent meeting between the ESJ Groundwater Authority (GWA), Woodard & Curran, and DWR on May 11, 2026, DWR elaborated on these two clarification requests:

- 1) *"Clarify the conditions upon which land subsidence becomes "an area of concern" and would then prompt the ESJGWA to take actions to understand the cause(s) of subsidence, consider improved monitoring protocols, and identify next steps. Please also discuss how the described approach relates to the land subsidence sustainable management criteria, including any differences between the described approach and the rates and total extents of land subsidence defined as part of the undesirable result, minimum threshold, interim milestone, and measurable objective."*
- 2) *"Provide analysis to justify the rate and extent of potential subsidence impacts on the critical infrastructure identified in the Subbasin."*

This memorandum addresses these requests.

### 1. Overview of Sustainable Management Criteria in the GSP

The ESJ 2024 GSP Amendment describes the SMC for subsidence in Chapter 3, pages 3-26 to 3-31. The SMC consist of (1) a definition of Undesirable Results, (2) Minimum Thresholds (MTs), (3) Measurable Objectives (MOs), and (4) Interim Milestones (IMs).

#### **a. Undesirable Results**

The undesirable result related to land subsidence is defined in SGMA as:

*Significant and unreasonable land subsidence that substantially interferes with surface land uses.*

An undesirable result for land subsidence in the Eastern San Joaquin Subbasin is experienced if the occurrence of land subsidence substantially interferes with beneficial uses of groundwater and infrastructure within the Subbasin over the planning and implementation horizon of the GSP. Critical infrastructure in the Eastern San Joaquin Subbasin was defined in coordination with the San Joaquin County Department of Public Works and the San Joaquin County Office of Emergency Services as the following infrastructure potentially at risk from land subsidence:

- Major highways, roadways, and bridges
- Canals, pipelines, and levees
- Electrical transmission lines
- Schools
- Fire stations
- Hospitals and other medical facilities
- Law enforcement facilities (police stations, jails, correctional facilities)
- Water and wastewater treatment, distribution, and storage facilities
- Communication facilities (GWA, 2024, p. 3-26)

#### **b. Minimum Thresholds**

The GSP sets the minimum threshold (MT) for land subsidence at:

*"... no more than 0.2 feet/year [2.4 inches/year] in any five-year period between 2020 and 2040, and no more than a total additional 2 feet (24 inches) of land subsidence by 2040"*

This MT is set within the same magnitude of estimated error of the InSAR data (+/- 0.1 feet), which is currently the most comprehensive tool available for measuring subbasin-wide land subsidence consistently each year.

The established MT reflects "the minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results." The 2 feet of additional subsidence by 2040 reflects the total extent of subsidence that may lead to undesirable results, whereas the 0.2 feet/year reflects the rate of subsidence which may result in undesirable results. The 2 feet of additional subsidence is consistent (both by method and magnitude) with the minimum thresholds established by other nearby basins overlying the Corcoran Clay and potential impacts to significant regional infrastructure such as the Delta-Mendota Canal and California Aqueduct (GWA, 2024, p. 3-29).

### c. Measurable Objectives and Interim Milestones

The measurable objective (MO) for subsidence is based on the long-term avoidance of land subsidence: 0 ft/year on a long-term annual average.

Interim milestones (IMs) for subsidence are set in 5-year increments between the MT and MO to provide time for the GSAs to adequately monitor for and, if necessary, address an issue that is technically complex, not well understood, and that has the potential to result in negative socioeconomic impacts. The interim milestones are defined as:

- 2025: -0.1 ft/year
- 2030: -0.05 ft/year
- 2035: -0.05 ft/year
- After 2040: 0 ft/yr (GWA, 2024, p. 3-30)

## 2. Response to Comment #1

*"Clarify the conditions upon which land subsidence becomes "an area of concern" and would then prompt the ESJGWA to take actions to understand the cause(s) of subsidence, consider improved monitoring protocols, and identify next steps. Please also discuss how the described approach relates to the land subsidence sustainable management criteria, including any differences between the described approach and the rates and total extents of land subsidence defined as part of the undesirable result, minimum threshold, interim milestone, and measurable objective."*

### a. Observed Subsidence Rates in the Subbasin

The land subsidence representative monitoring network (RMN) is comprised of both continuous global positioning system (CGPS) monitoring stations (collected and posted by the U.S. Geological Survey (USGS) and UNAVCO's Plate Boundary Observatory Program) and survey benchmarks. DWR's InSAR data are analyzed as part of the annual reporting process in order to assess regional trends and serve as a data comparison tool.

The 2024 GSP Amendment includes direct monitoring data collected through the end of 2023 showing less than one foot of total observed subsidence across the CGPS network between 2015 and 2023, with the highest InSAR-derived average subsidence rate estimated at approximately 0.08 feet per year. The GSP also analyzed how subsidence rates have varied historically with groundwater levels and found that historical groundwater level declines, including periods when groundwater levels fell below a representative monitoring well MT, do not correspond to significant or persistent inelastic subsidence (GWA, 2024).

The Water Year (WY) 2025 Annual Report reported that average vertical displacement rates at CGPS monitoring stations in the RMN ranged from approximately -0.02 ft/year to nearly 0 ft/year. This is well below the MT and, with rounding, at the MO. InSAR data indicate that most areas experienced between approximately 0.01 and 0.1 feet of subsidence during WY 2025. Both data sources indicate the Subbasin is below the 2025 IM of -0.1 ft/year (GWA, 2026).

There are no known historical or active impacts from subsidence in the Subbasin, even under severe drought conditions; therefore, the likelihood of future undesirable results is considered low.

#### **b. Assessing Trends and Adaptive Management to Avoid Undesirable Results**

The 2024 GSP Amendment states that:

*"If land subsidence becomes an area of concern, the ESJGWA will take actions to understand the causes of the subsidence (including localized hydrogeology and groundwater pumping), consider improved monitoring protocols, and identify the next steps for addressing the potential for undesirable results."*

Land subsidence would become "an area of concern" if monitoring at any of the Subbasin's representative monitoring network locations were to record decreasing land surface elevations (increasing subsidence rates) in a magnitude of -0.125 ft/year (1.5 in/year) or greater, calculated as a rolling average over three years. For the purposes of this memorandum, this is referred to as a 'non-regulatory action trigger.'

The action trigger for subsidence is intentionally set lower than the MT subsidence rate and earlier than the 5-year period over which the MT calculated. The trigger is also set higher than the InSAR margin of error (+/- 0.1 foot) to ensure that the rates measured at the representative monitoring network can be compared with more confidence to DWR's InSAR data. Additionally, InSAR data has the most comprehensive coverage within the portion of the Subbasin overlying the Corcoran Clay. This portion of the basin is specifically of concern as dewatering of the Corcoran Clay is a known cause of inelastic land subsidence in the San Joaquin Valley.

In contemplating a possible occurrence of concerning land subsidence, the GSAs would in practice, do the following to identify trends and coordinate to avoid undesirable results as follows:

1. The ESJ GWA and/or GSAs collect subsidence data bi-annually and upload the resulting data to the Subbasin's Data Management System (DMS).
2. The ESJGWA technical consultants would review the collected data as part of the annual report process to identify if there are any trends of decreasing land surface elevations that may be concerning. Land subsidence becomes an area of concern if the rolling average of the land subsidence RMN records decreasing land surface elevations in a magnitude of -0.125 ft/year or greater, as noted above.
3. If the data were to indicate that the non-regulatory action trigger had been met, the GSAs would:
  - Estimate the extent of the area with elevated subsidence rate and evaluate the elasticity of the observed displacement (as opposed to inelastic subsidence).
  - Investigate potential site-specific causes of the observed subsidence as it relates to groundwater basin management activities and subsurface conditions.
4. If this investigation finds a correlation between the subsidence and groundwater basin management activities, then the basin would implement adaptive management strategies. This could include evaluating whether the existing subsidence monitoring network is adequately

characterizing conditions, determining whether additional monitoring (either in terms of location and/or frequency) is warranted, and assessing whether additional groundwater management actions are required and possible to arrest subsidence and/or provide mitigation for potential subsidence impacts caused by groundwater pumping.

### 3. Response to Comment #2

*"Provide analysis to justify the rate and extent of potential subsidence impacts on the critical infrastructure identified in the Subbasin."*

The land subsidence SMCs were established based on an analysis of historical vertical displacement data, consultation with Subbasin GSAs, and information regarding the subsidence tolerance of other regional infrastructure overlying the Corcoran Clay (such as the Delta-Mendota Canal and California Aqueduct) to ensure that SMCs are aligned with known vulnerabilities and impacts to critical infrastructure. Critical infrastructure identified by the GSAs includes major conveyance facilities, canals, pipelines, and major transportation corridors including Interstate 5 and Highway 99. Based on input received from the GSAs, local infrastructure can generally tolerate between 2 and 3 feet of subsidence across the Subbasin before significant impacts are expected. This input was provided through collaborative discussion with the Project Management Committee, comprised of GSA representatives tasked with advising the technical direction of the 2024 GSP Amendment, with consideration of how tolerances to subsidence are different for different types of infrastructure. These values align with the degree of subsidence tolerance for other similar critical infrastructure used in surrounding Subbasins, many of which overlie the Corcoran Clay where inelastic land subsidence is most likely to occur.

Table 1 summarizes the undesirable result, minimum threshold, measurable objective, and monitoring method for land subsidence in each surrounding Subbasin. All surrounding Subbasins have undesirable results linked to critical infrastructure. Minimum thresholds, for those Subbasins that do not use groundwater levels as a proxy, are defined as rates or total subsidence that are similar in magnitude to those defined in the Eastern San Joaquin Subbasin. The measurable objective for Eastern San Joaquin Subbasin is more protective of future subsidence than the Tracy and East Contra Costa Subbasins. Surrounding subbasins evaluate their subbasin conditions relative to their SMC using similar sources of data: DWR's InSAR, CGPS stations, and survey benchmarks.

**TABLE 1: SUSTAINABLE MANAGEMENT CRITERIA IN SURROUNDING SUBBASINS**

| <b>Subbasin</b>                         | <b>Undesirable Result</b>                                                                                                                                                                                                                                                                                                                                                    | <b>Minimum Threshold</b>                                                                                                                                                                                                                                       | <b>Measurable Objective</b>                                                                                                                                                                                       | <b>Monitoring Method</b>      |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Tracy <sup>1</sup>                      | An increase from historic rates of subsidence in the Non-Delta Management Area caused by lowering of groundwater levels that impacts infrastructure                                                                                                                                                                                                                          | -0.03 ft/year; -0.13 ft over 5 years                                                                                                                                                                                                                           | -0.03 ft/year; maintenance of subsidence rates as present at the start of SGMA                                                                                                                                    | InSAR                         |
| East Contra Costa Subbasin <sup>2</sup> | Impacts to infrastructure such as damage to roads and structures, reduced capacity of water conveyances, and increased vulnerability to flooding                                                                                                                                                                                                                             | More than 1 inch (0.08 ft) of land surface elevation change outside the historical elastic range over a 3-year period, measured at UNAVCO station P256                                                                                                         | Maintain land-surface elevation fluctuations within the average seasonal elastic movement of 0.6 inches at UNAVCO station P256; deviations for three or more years may indicate the onset of inelastic subsidence | CGPS                          |
| Modesto <sup>3</sup>                    | Significant and unreasonable inelastic land subsidence, caused by groundwater extraction and associated water level declines, that adversely affects land use or reduces the viability of the use of critical infrastructure. An undesirable result will occur when 33 percent of representative monitoring wells exceed the MT in three consecutive Fall monitoring events. | Minimum thresholds are defined as the historic low groundwater elevation observed or estimated during WY 1991 – WY 2020 at each representative monitoring location, based on available data. <i>(Using Chronic Lowering of Groundwater Levels as a proxy.)</i> | Midpoint between the historical high groundwater elevation and the MT at each representative monitoring location. <i>(Using Chronic Lowering of Groundwater Levels as a proxy)</i>                                | Groundwater levels as a proxy |

<sup>1</sup> Tracy Subbasin GSAs, 2021

<sup>2</sup> East Contra Costa Subbasin Working Group, 2021

<sup>3</sup> STRGBA GSA and County of Tuolumne GSA, 2024

| Subbasin                                             | Undesirable Result                                                                                                                                                                                                                                    | Minimum Threshold                                                                                                                                                                                                                                                            | Measurable Objective                | Monitoring Method          |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------|
| North & Central Delta-Mendota Subbasins <sup>1</sup> | Changes in ground surface elevation that cause damage to critical infrastructure that would cause significant and unreasonable reductions of conveyance capacity, impacts to natural resources, or conditions that threaten public health and safety. | 2 feet of additional inelastic land subsidence attributable to groundwater pumping. Subsidence that exceeds corrective design standards or established triggers for critical infrastructure (Delta-Mendota Canal, California Aqueduct, roads, and bridges) is to be avoided. | No additional subsidence after 2040 | CGPS and survey benchmarks |

The ESJ Subbasin's minimum thresholds, measurable objectives, interim milestones, and undesirable result definition are based on total subsidence and average subsidence rates because these metrics are appropriate for basin-scale sustainability management and protection of large-scale critical infrastructure. There are limitations to these data, as described in detail in Appendix 3-D of the 2024 GSP Amendment; however, the SMC are reflective of the data available to the GSAs in light of minimal subsidence impacts historically and currently observed. For this reason, an adaptive management approach to subsidence is taken in this Subbasin.

#### 4. Summary

The ESJ Subbasin's land subsidence SMC remain tied to the protection of critical infrastructure and prevention of significant and unreasonable impacts. The SMC for land subsidence as contained in the 2024 GSP Amendment are consistent (both by method and magnitude) with the minimum thresholds established by other nearby basins overlying the Corcoran Clay relative to potential impacts to regionally significant infrastructure such as the Delta-Mendota Canal and California Aqueduct.

As noted above, if an average land subsidence rate of -0.125 ft/year (1.5 in/year) or greater as a rolling average over three years is observed in the future, the Subbasin GSAs would evaluate potential site-specific causes of the observed subsidence as it relates to groundwater basin management activities, including assessing what data are available to estimate differential subsidence at specific sites, in order eliminate the observed subsidence and to mitigate future damage to critical infrastructure. The results of any such evaluation would be included as part of the annual reporting process.

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<sup>1</sup> Northern & Central Delta-Mendota, 2022

## 5. References

East Contra Costa Subbasin Working Group. 2021. *East Contra Costa Subbasin Groundwater Sustainability Plan*.

Eastern San Joaquin Groundwater Authority. 2024. *Eastern San Joaquin Groundwater Subbasin – Groundwater Sustainability Plan*.

Eastern San Joaquin Groundwater Authority. 2026. *Eastern San Joaquin Groundwater Subbasin Water Year 2025 Annual Report*.

Northern & Central Delta-Mendota. 2022. *Groundwater Sustainability Plan for the Northern and Central Delta-Mendota Regions*.

Stanislaus and Tuolumne Rivers Groundwater Basin Association (STRGBA) Groundwater Sustainability Agency and County of Tuolumne Groundwater Sustainability Agency. 2024. *Modesto Subbasin Groundwater Sustainability Plan*.

Tracy Subbasin GSAs. 2021. *Tracy Subbasin Groundwater Sustainability Plan*.



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## TECHNICAL MEMORANDUM

**TO:** Monica Salais, PE (Department of Water Resources)

**CC:** Julia Berry (ESJGWA)

**PREPARED BY:** Woodard & Curran

**REVIEWED BY:** Eastern San Joaquin Groundwater Sustainability Agencies

**DATE:** August 18, 2026

**RE:** DWR Request for Clarification on Groundwater Quality SMC

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In an April 17, 2026 letter, the California Department of Water Resources (DWR) requested additional information regarding the Eastern San Joaquin (ESJ) Groundwater Subbasin's (Subbasin) 2025 Amended Groundwater Sustainability Plan (GSP) and 2025 Periodic Evaluation (PE). The letter addresses six topics. This memo addresses Topic 4 which requests Sustainable Management Criteria (SMC) clarification for the groundwater quality parameters of Total Dissolved Solids (TDS) and chloride.

DWR requested "...clarification regarding the relationship between degraded groundwater quality-related adaptive management statements and the SMCs." During a subsequent meeting between the ESJ Groundwater Authority (GWA), Woodard & Curran, and DWR on May 11, 2026, DWR asked for clarification as to **"...the conditions that constitute worsening salinity conditions or deviation from current trends that would then prompt adjustment of chloride and TDS management strategies. Please also discuss how the worsening salinity conditions or deviation from current trends relate to the degraded water quality sustainable management criteria [SMC], including any differences between the described approach and the undesirable results, minimum thresholds, interim milestones and measurable objectives."** This memorandum has been prepared to address these requests.

### 1. SMCs in the GSP

The ESJ 2025 Amended GSP describes the SMC's for groundwater quality in Chapter 3, pages 3-16 to 3-26. The SMCs consist of (1) a definition of Undesirable Results (URs), (2) Minimum Thresholds (MTs), (3) Measurable Objectives (MOs), and (4) Interim Milestones for each applicable constituent.

Below we address these SMCs for TDS and chloride.

### 2. Undesirable Results

The Undesirable Result related to degraded water quality is defined in SGMA as *"Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies"* (Water Code section 10721 (w)(4)). The GSP identifies an Undesirable Result for water quality as a situation where (1) constituent measurements at more than 25 percent of representative monitoring wells

(in the case of the 2025 Amended GSP, this is 3 of 10 wells) exceed the minimum thresholds (MTs) for that constitute for two consecutive years, and (2) where these constituent concentrations are the result of groundwater management activities.

### **3. Minimum Thresholds**

The GSP set the minimum thresholds for TDS and chloride as follows:

- TDS: the greater of 1,000 milligrams per liter (mg/L) or the measured TDS concentration at that well in 2015.
- Chloride: 250 mg/L or the measured chloride concentration at that well in 2015.

These MTs reflect SGMA's guidance that "the plan may, but is not required to, address undesirable results that occurred before, and have not been corrected by, January 1, 2015" (Water Code section 10727.2(b)(4)). Setting the minimum thresholds for TDS and chloride at 2015 concentrations where they were in excess of 1,000 mg/L TDS and/or 250 mg/L chloride beginning January 1, 2015 was done with the goal of preventing further water quality degradation.

As reported in the 2025 Annual Report, all sampled wells in the water quality representative monitoring network reported TDS and chloride concentrations well below the applicable minimum threshold.

### **4. Measurable Objectives and Interim Milestones**

The GSP set measurable objectives for TDS and chloride as follows:

- TDS: 600 mg/L.
- Chloride: equal to the maximum measured chloride concentration as measured during recent historical conditions (between 2015 and 2023).

Interim milestones follow a linear trend between the current condition (defined as the average concentration between 2015 and 2023) and the measurable objective.

As reported in the 2025 Annual Report, none of the sampled wells were above the measurable objective for TDS. Three wells were above their 2025 interim milestone (Well 2, Well 17, Stockton 31). For chloride, three of the sampled wells were above their measurable objective (Well 2, Well 15, Well 17). Five wells were above their 2025 interim milestone (Well 1, Well 2, Well 15, Well 17, Stockton 10R).

### **5. Assessing Trends and Adaptive Management to Avoid Undesirable Results**

The 2025 Amended GSP states that "should an existing groundwater quality impairment or new groundwater quality impact be identified as having a direct impact on groundwater users, the ESJGWA and/or GSAs will coordinate with the appropriate regulatory agency(ies) to communicate the situation to those impacted, and will adaptively work with the regulatory agency(ies) to manage the situation" (2025 Amended GSP p. 3-21). To date, there have been no identified water quality issues in the basin that would result in adaptive management.

In contemplating a possible occurrence of degrading groundwater quality, the GSAs would, in practice, do the following to identify trends and coordinate to avoid undesirable results as follows:

1. The ESJ GWA and/or GSAs collect groundwater quality samples bi-annually and upload the resulting data to the Subbasin's Data Management System (DMS).
2. The ESJ GWA technical consultants would review the water quality data as part of the annual report process to identify if there are any trends of increasing concentrations that may signal worsening conditions or deviations from recent trends. Worsening conditions or deviations from recent trends are indicated when a linear regression of the last 3 fall water quality measurements shows declining water quality and the MT would be reached within the next 5 years if the trend continues.
3. If the data were to indicate that any wells are nearing this non-regulatory trigger (via the linear regression analysis), ESJGWA staff would notify the local agency, department or district responsible for operation of the wells and coordinate with the GSA where the trend is observed to investigate potential causes of the trend. If this investigation finds a correlation with concentration changes and basin management activities, then the basin would implement adaptive management strategies.

Current analysis does not show conditions that constitute worsening salinity conditions or that deviate from current trends (see Attachment A for chemographs).

## **6. Summary**

To date, the GWA has not identified any concentration changes of concern to address for either TDS or chloride. However, the GWA and GSAs have considered a scenario in which this may occur in the future and what the GSAs will do if it does. For example, if increasing concentrations of TDS and/or chloride were observed and linked to a groundwater recharge project, the GSP contemplates that the applicable GSA would pause the project and investigate the cause of the degradation (e.g., poor-quality recharge water, flushing of soil constituents, geochemical reactions, altered groundwater gradients) to determine if modifications to the recharge project are warranted and can be made. As another example, if data indicate a link between increasing concentrations of TDS and/or chloride and declining groundwater levels from pumping, the ESJGWA staff and applicable GSA will determine where this pumping is occurring and formulate a plan to mitigate the water quality impacts by reducing pumping, either temporarily or permanently depending on the situation. In addition, regardless of the type of basin management activity affiliated with an increase in TDS and/or chloride concentrations, the GWA could implement quarterly groundwater quality sampling to collect additional data where the increasing concentration trend is occurring and further assess conditions so as to continue to adaptively manage to prevent further degradation.

The GWA can provide this detailed explanation in its next annual report and in its next GSA amendment if DWR would find it useful.

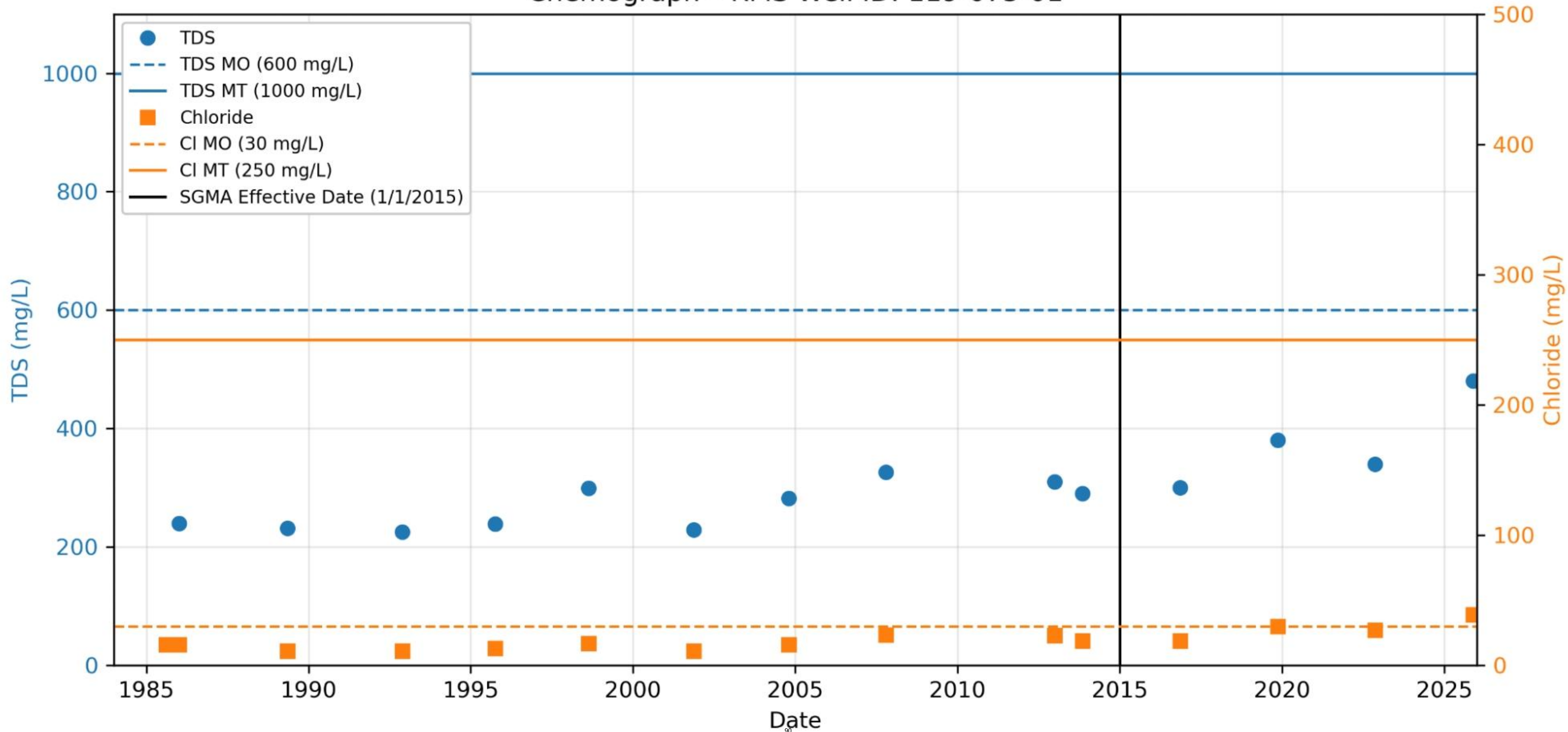
## **7. References**

- 2025 Periodic Evaluation pages 2-4, 4-2 and 5-3;

- June 2022 GSP, Tables 3-5, Table 3-6, page 4-9;
- November 2024 GSP
- Water Year 2025 Annual Report pages 3-29, and 3-9;
- Water Year 2024 Annual Report page 3-11;
- Water Year 2023 Annual Report page 4-30 and Table 8; and 2022 AR

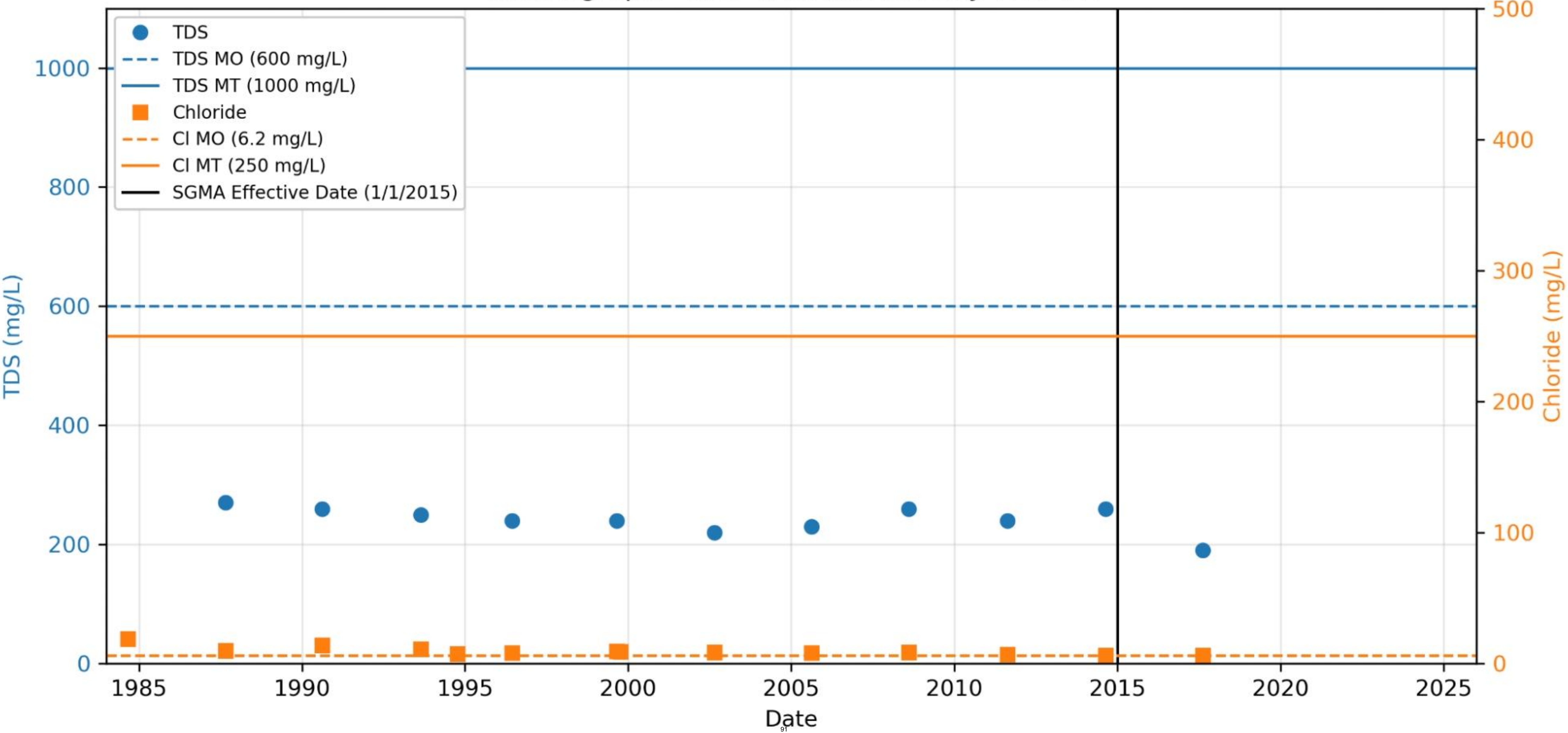
## **Attachment A**

# Chemograph - RMS Well ID: 119-075-01

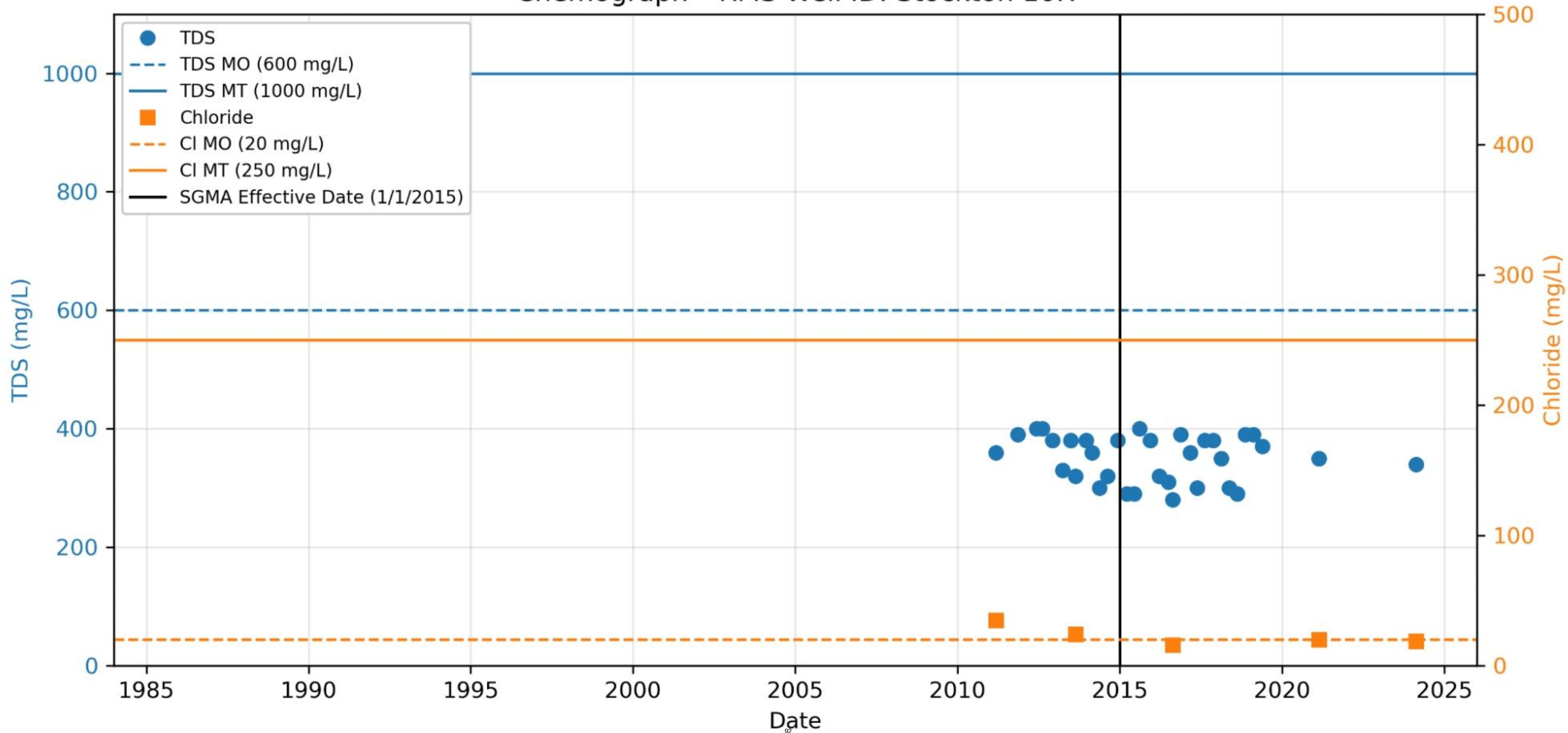




Chemograph - RMS Well ID: Lodi City Well #2

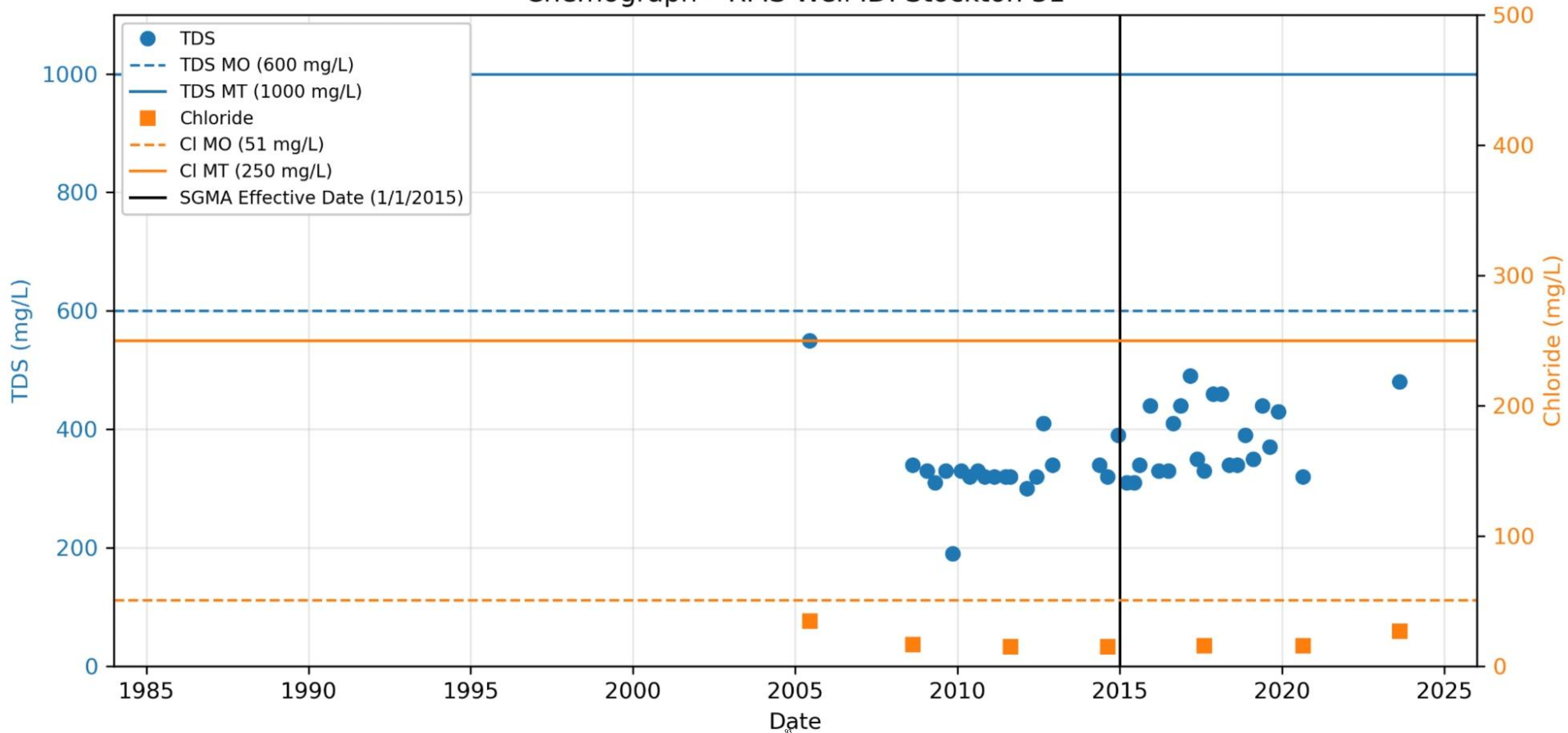


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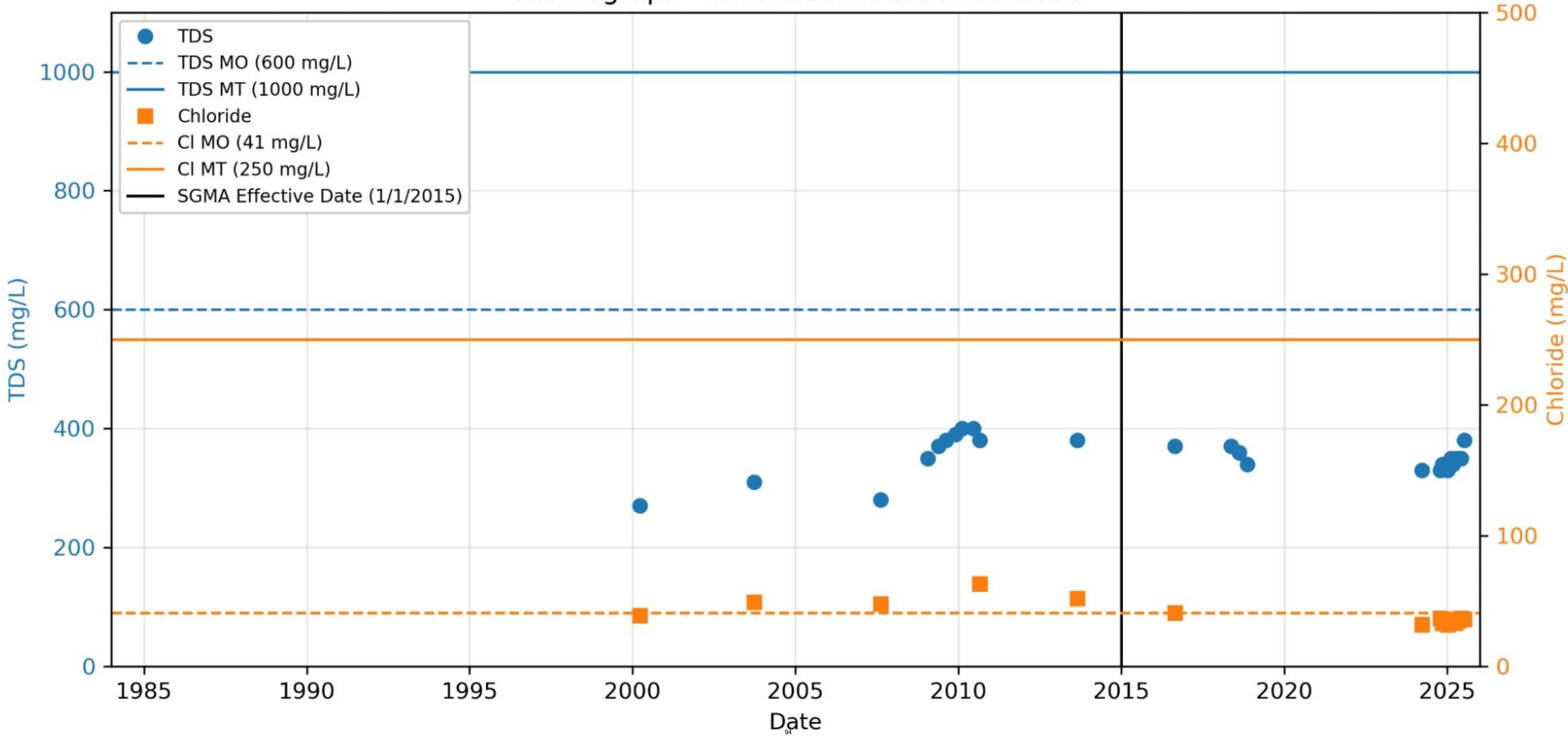




# Chemograph - RMS Well ID: Stockton 31

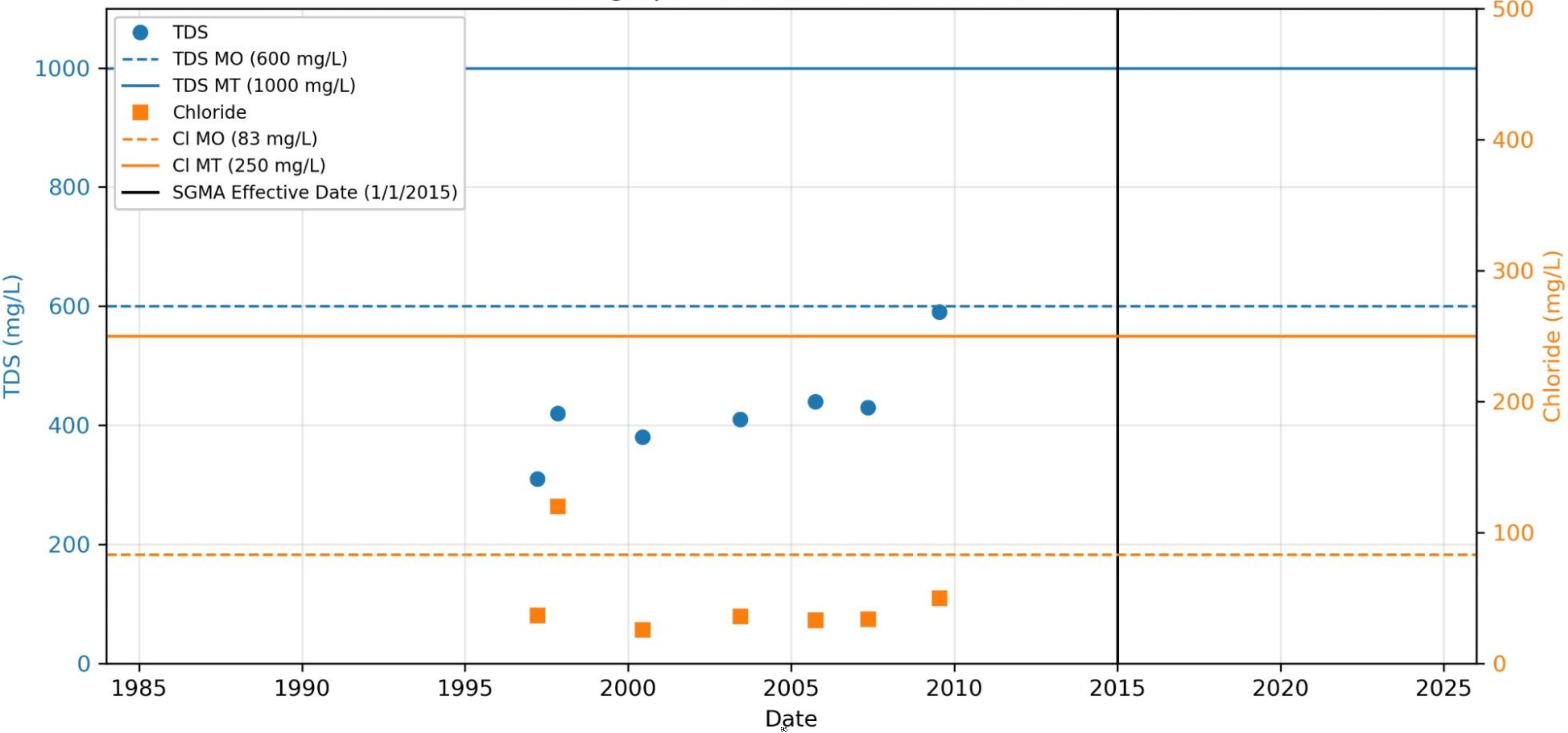


Chemograph - RMS Well ID: Stockton SSS8

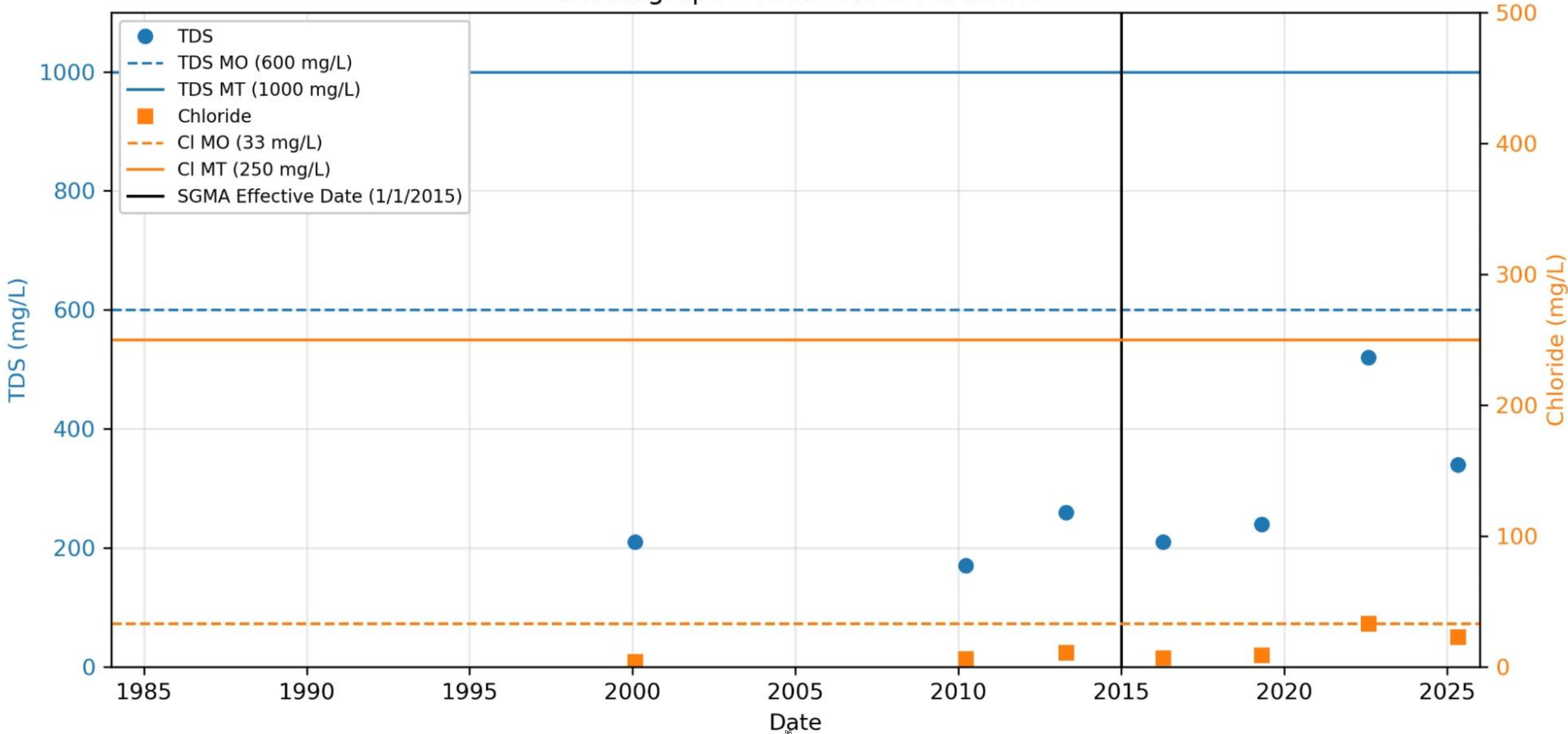




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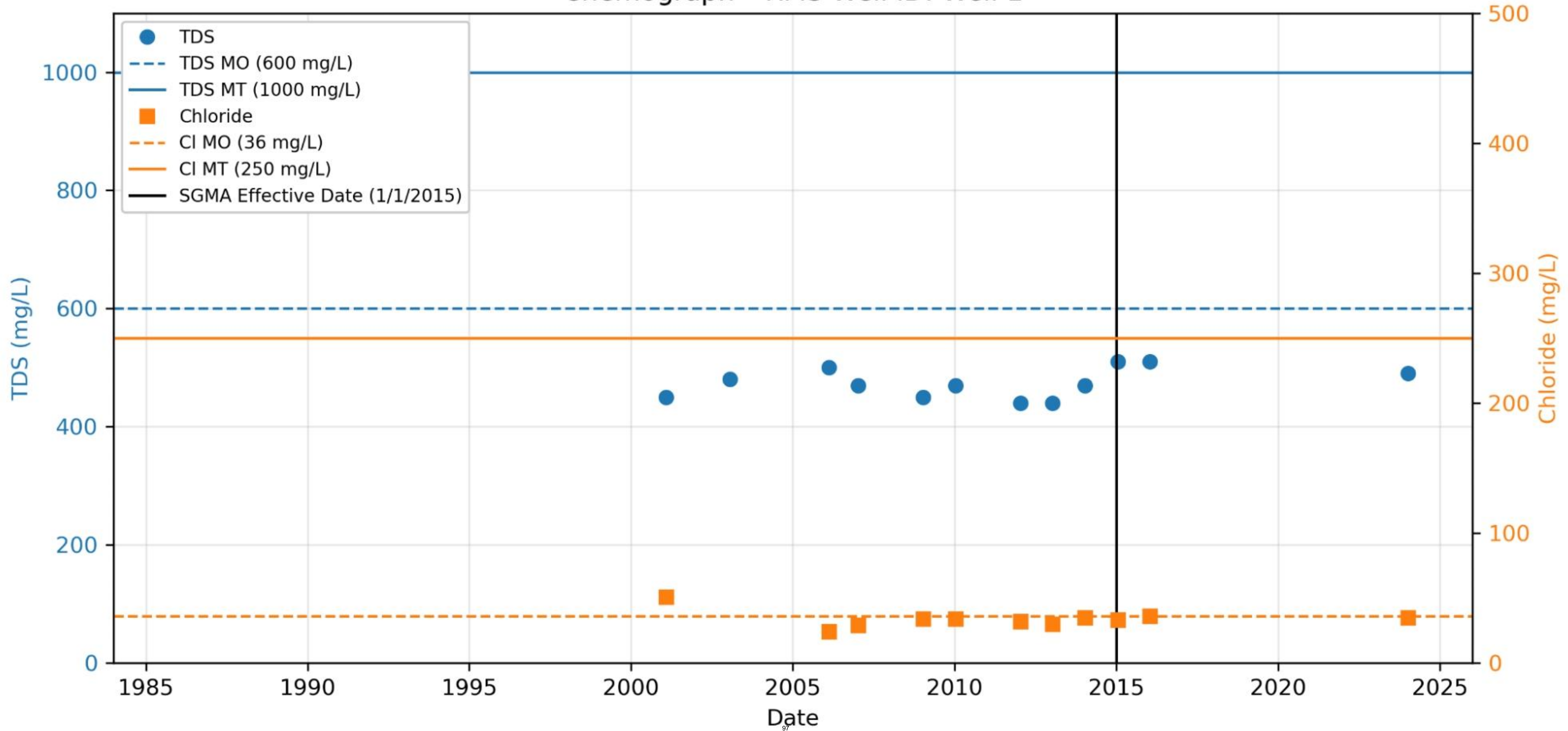


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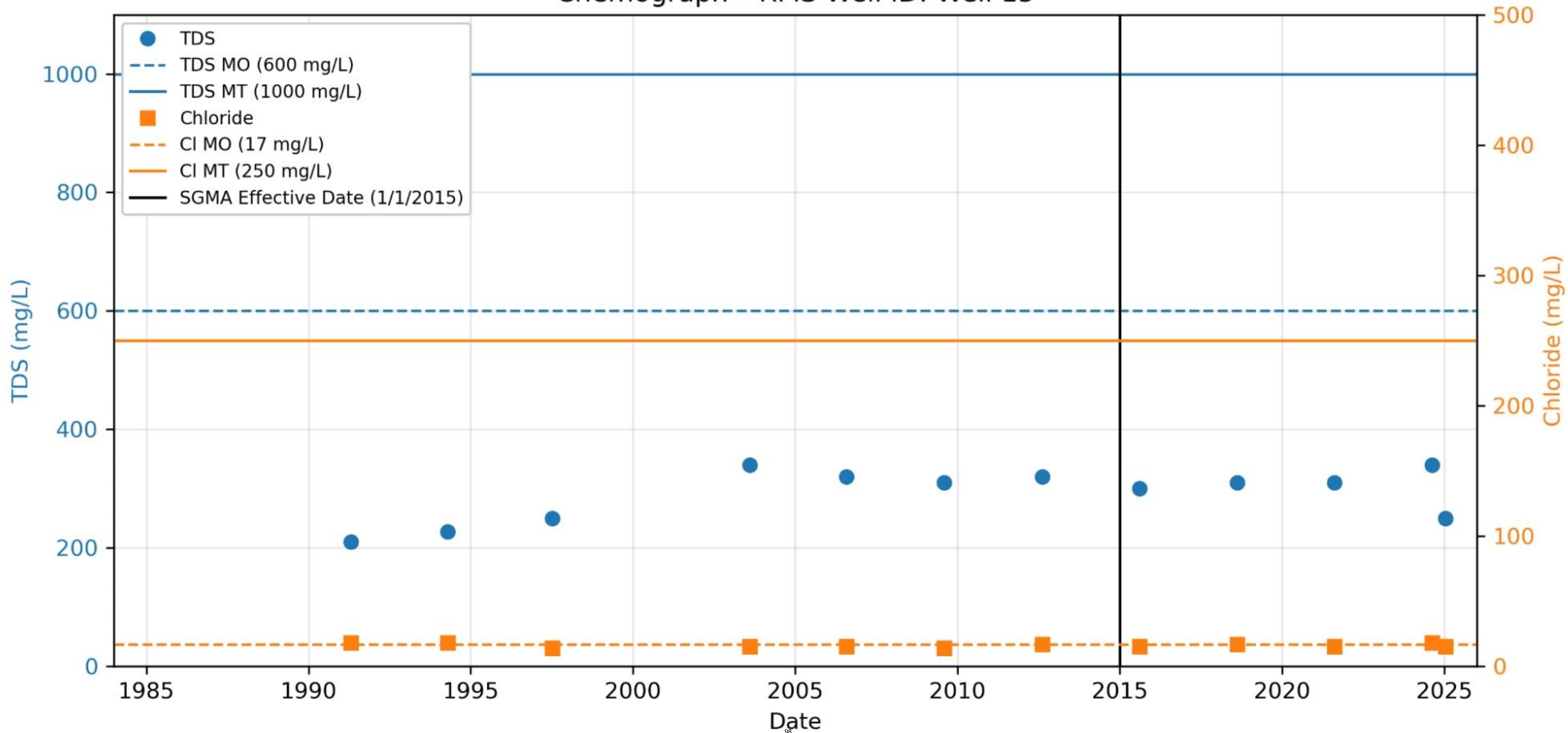




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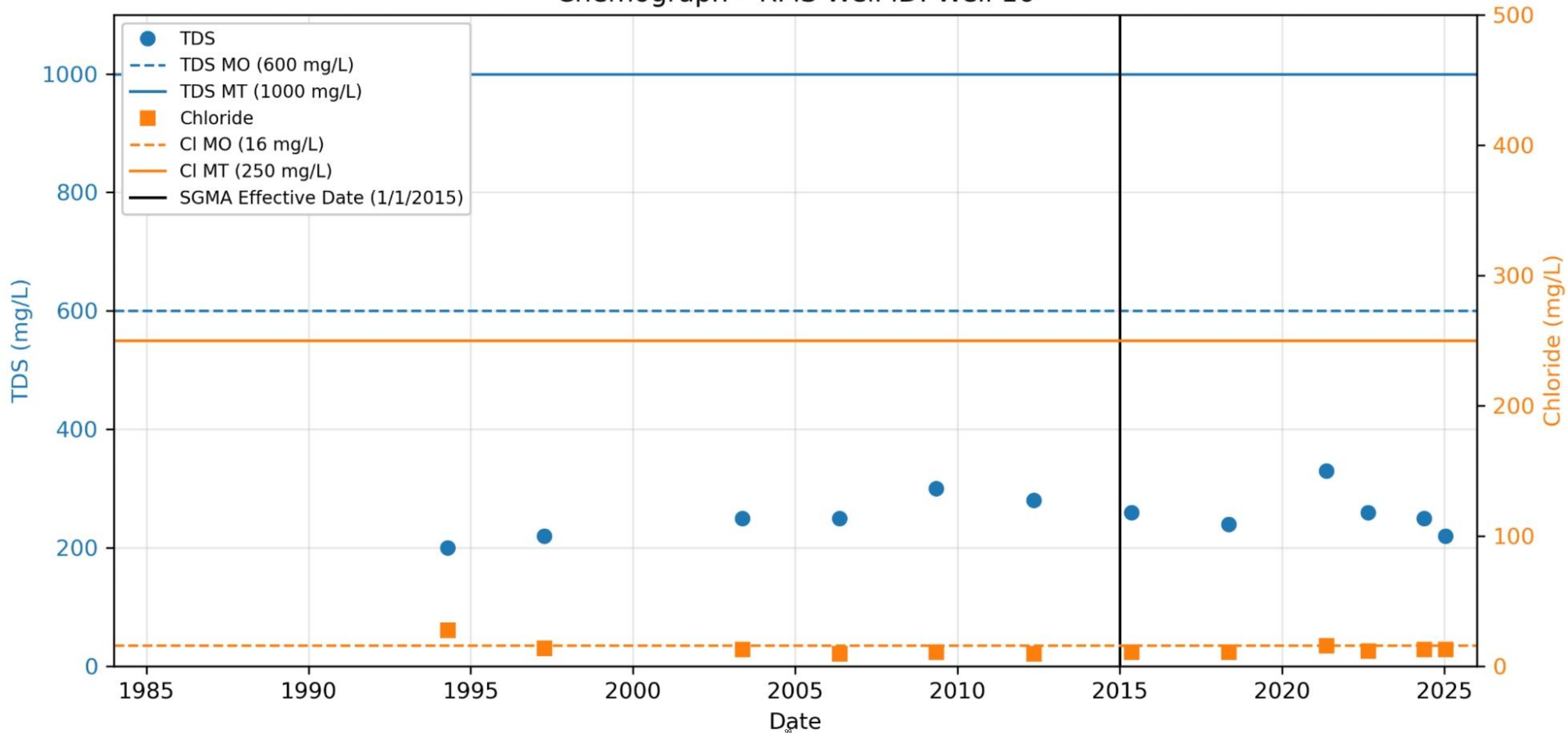


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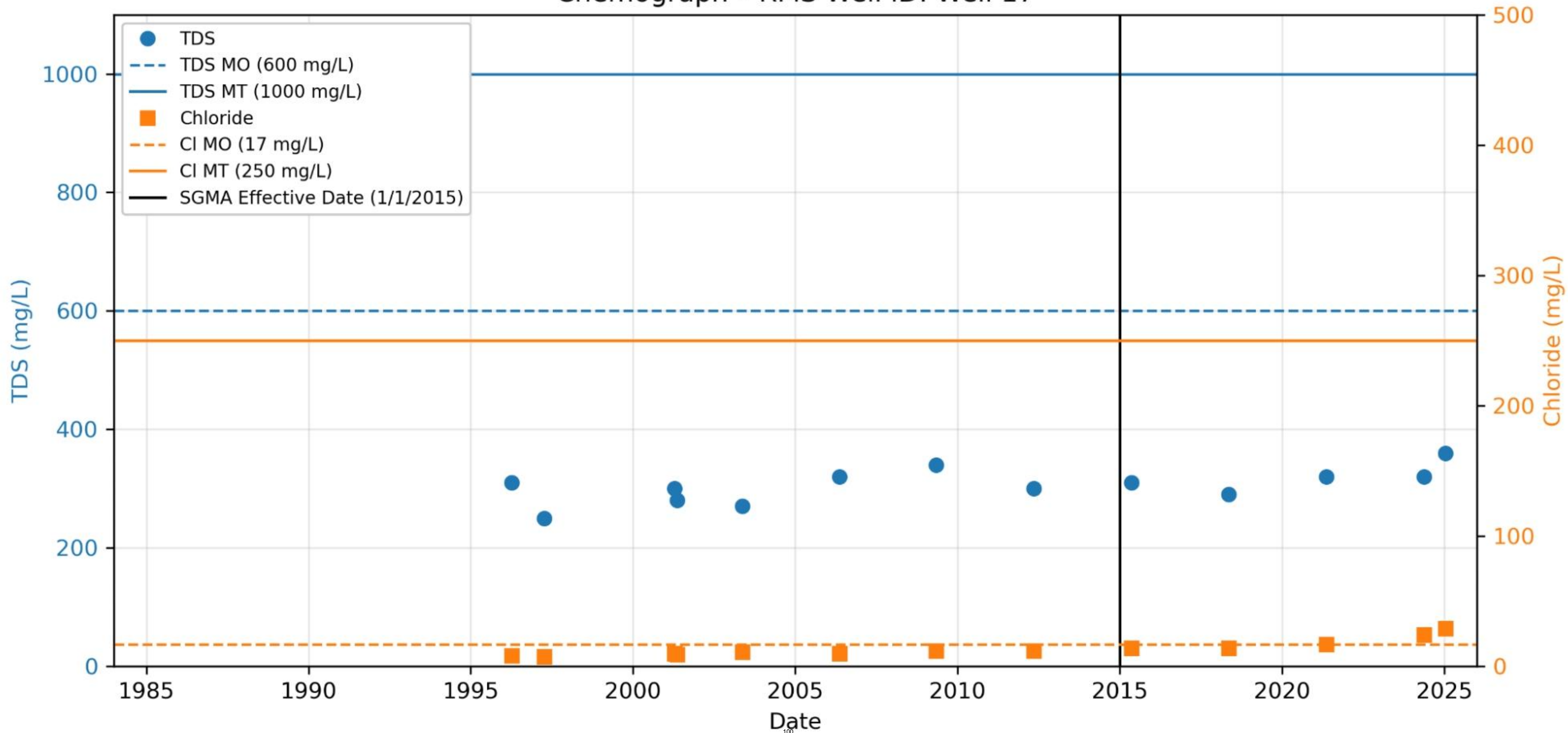




Chemograph - RMS Well ID: Well 16

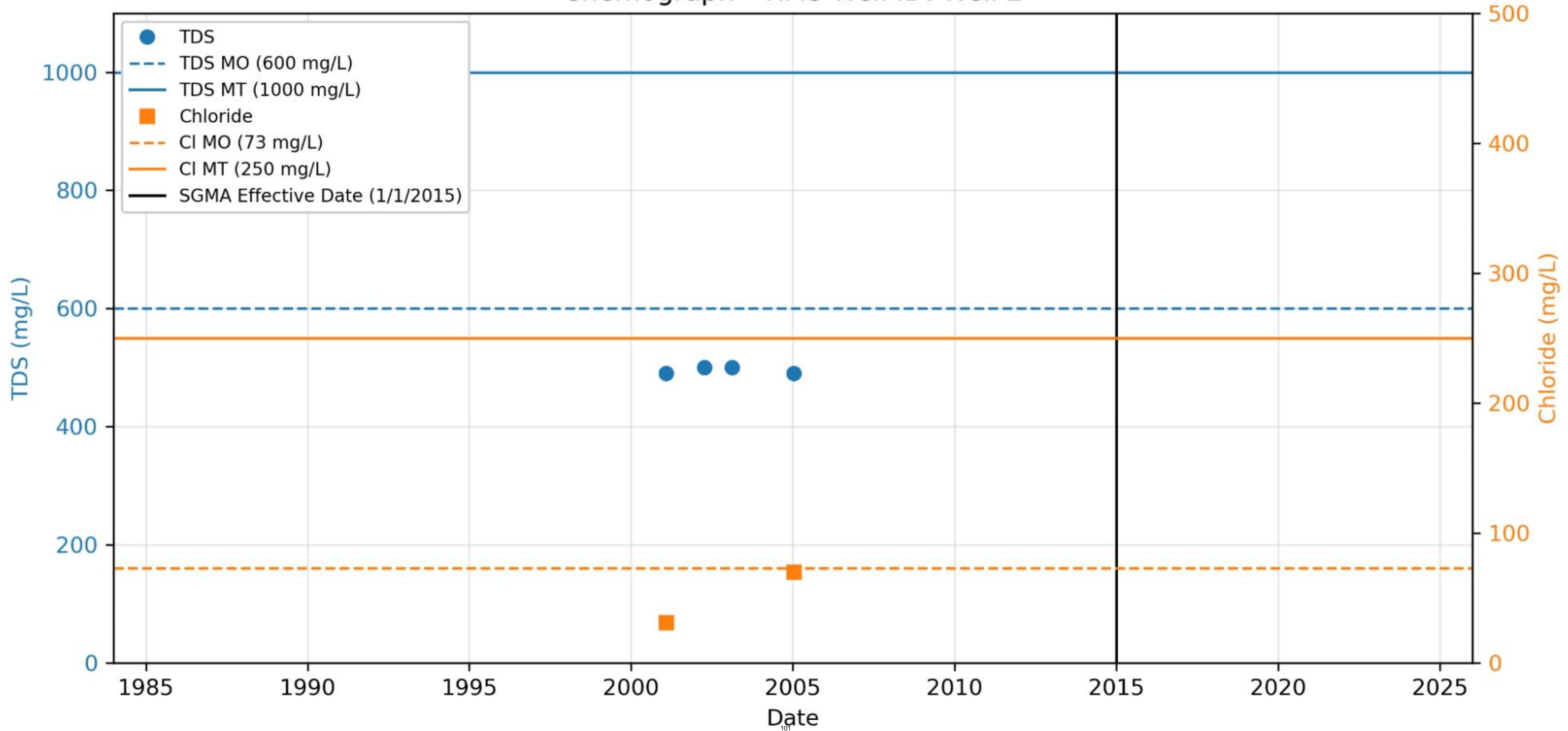


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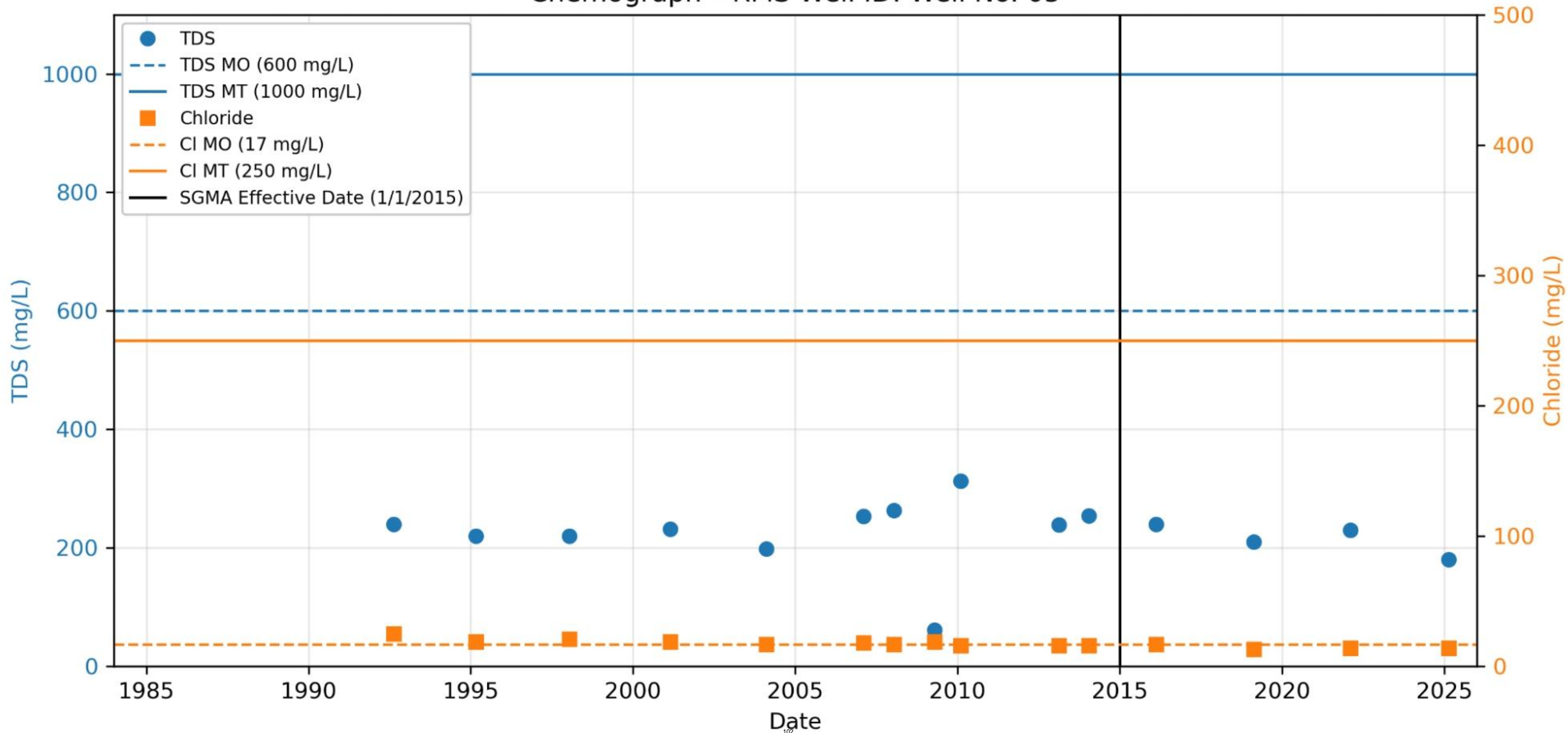




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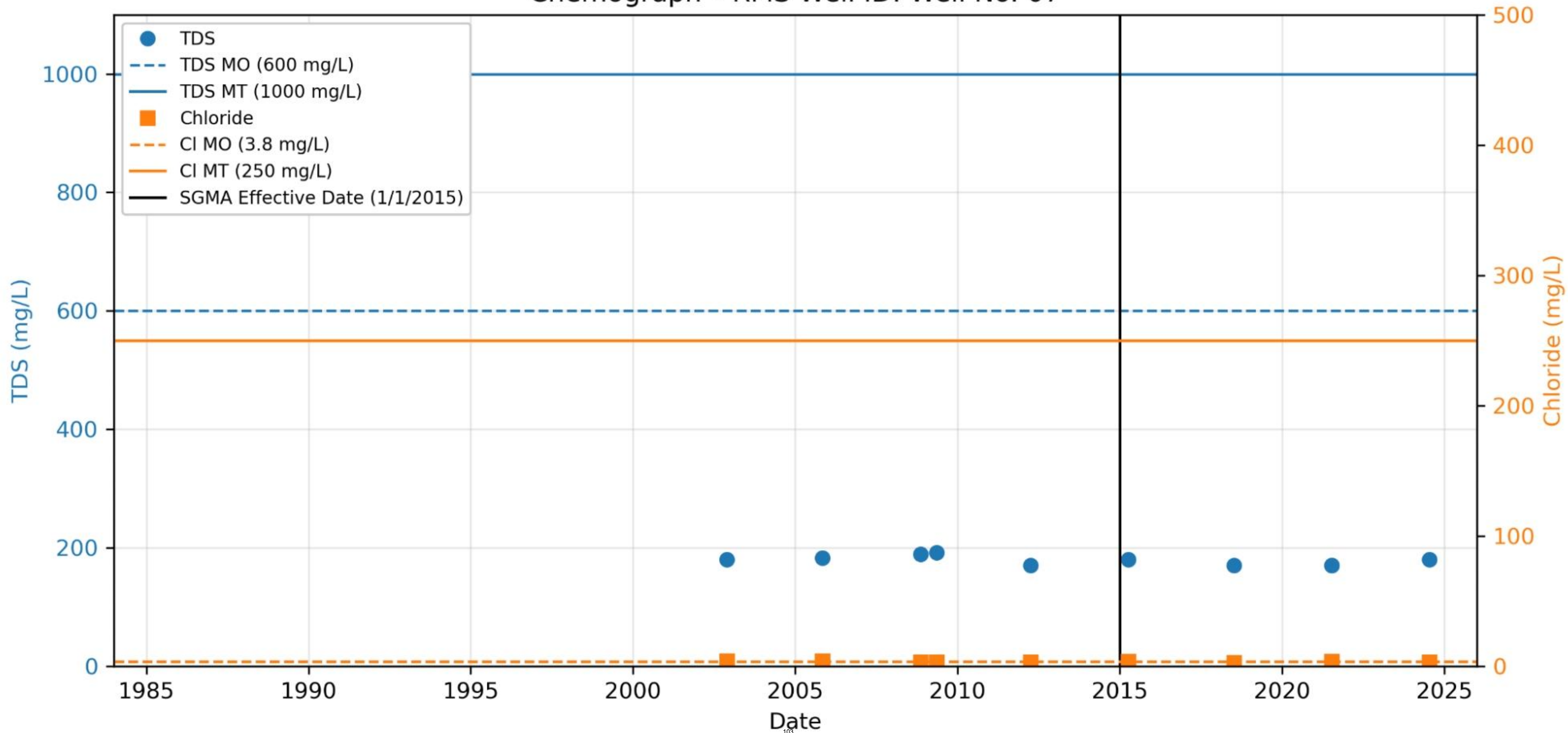


# Chemograph - RMS Well ID: Well No. 05





# Chemograph - RMS Well ID: Well No. 07



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## TECHNICAL MEMORANDUM

**TO:** Monica Salais, PE (Department of Water Resources)

**CC:** Julia Berry (ESJGWA)

**PREPARED BY:** Woodard & Curran

**REVIEWED BY:** Eastern San Joaquin Groundwater Sustainability Agencies

**DATE:** August 27, 2026

**RE:** DWR Request for Clarification on Depletions of Interconnected Surface Water SMC

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In a letter dated April 17, 2026, the California Department of Water Resources (DWR) requested additional information on the Eastern San Joaquin (ESJ) Groundwater Subbasin's (Subbasin) 2024 Groundwater Sustainability Plan (GSP) Amendment and 2024 Periodic Evaluation (PE). Specifically, DWR listed six general areas where they requested additional information and/or clarification; Number 5 in that letter was a request for sustainable management criteria (SMC) information and clarification on the depletions of interconnected surface water (ISW) sustainability indicator.

In the April letter, DWR requested "...additional information and clarification regarding development of SMCs, including the modeling scenarios utilized to support SMC development and ISW definition." During a subsequent meeting on May 11, 2026, between the ESJ Groundwater Authority (ESJGWA), Woodard & Curran, and DWR, DWR expanded on that request in five questions related to the depletions of ISW sustainability indicator. These questions are separated into three thematic groupings for the response in this Technical Memorandum (TM):

- Questions related to current and historical groundwater conditions for depletions of ISW:
  1. Provide an estimate of ISW depletion due to groundwater pumping. If the groundwater sustainability agencies (GSAs) are unable to provide this estimate, please describe any planned modifications to the modeling approach or other approaches being considered to ensure alignment with the GSP Regulations and provide further explanation regarding why ISW depletion due to groundwater pumping could not be quantified, including details of the analysis concluding that the model scenarios provide an inconclusive understanding of ISW depletion due to groundwater pumping.
- Questions related to the ISW monitoring network:
  - 2a. The undesirable result (UR) for the ISW sustainability indicator appears to be still based upon 25 percent of groundwater level representative monitoring network (RMN) wells exceeding minimum thresholds (MTs); please confirm.
  - 2b. Please describe the purpose of the newly-established ISW RMN and the process by which the ISW RMN will be utilized to define undesirable results.
- Questions related to using groundwater levels as a proxy for ISW SMC:
  3. Please provide a robust explanation of the Projected Conditions Baseline (PCBL)-Minimum Threshold modeling scenario, including pumping quantities, timing, and locations.
  4. Please explain how the induction of localized artificial pumping at the set(s) of five wells comprising the UR is representative of Subbasin-wide conditions that would lead to groundwater levels at five or more of the RMN wells lowering to MT levels.

5. If this approach is retained, explain why the use of stream loss as a percentage of streamflow instead of depletion is an appropriate metric to evaluate effects on beneficial uses and users.

This TM has been prepared to address these requests for information and clarification related to the depletions of ISW in the Subbasin. Substantial additional analyses were made relative to the evaluation of the depletions of ISW as the result of recommended corrective actions (RCAs) contained in DWR's July 6, 2023 determination letter, received ahead of preparing the 2024 GSP Amendment and PE. Appendix 3-G in the 2024 GSP Amendment summarizes the additional efforts expended relating to addressing DWR's RCA on the depletions of ISW as part of the 2024 GSP Amendment and PE.

For the purposes of this memorandum, the following definitions are used:

- **Interconnected Surface Water (ISW)** means a surface water feature that is hydraulically connected by a saturated zone to the groundwater system.
- **Stream Gain/Loss**- ISWs may be either gaining or losing, wherein the surface water feature itself is either gaining water from the aquifer system or losing water to the aquifer system.
- **Net Stream Gain**- The net gains and losses experienced by an ISW. A positive value indicates the surface water feature is gaining water from the aquifer system. A negative value indicates the surface water feature is losing water to the aquifer system.
- **Connected/Disconnected Stream**- A connected stream is an ISW by definition and may be either gaining or losing. A disconnected stream is when surface water is not hydraulically connected to groundwater and is a losing stream.
- **Depletions of Interconnected Surface Water**- Reductions in flow or water levels of interconnected surface waters due to groundwater pumping; in other words, groundwater pumping causes changes to flow paths and alters the net stream gain/loss. Depletions cannot be measured directly because they represent the difference between surface water flows with groundwater pumping in place, which can be measured, and surface water flows without groundwater pumping in place, which cannot be easily measured. Therefore, quantifying depletions requires the modeling comparison of stream gains/losses between a With-Pumping and a Without-Pumping scenario.
- **Stream Gain as a Percentage of Streamflow**- Comparing the net stream gain to stream gage data from the same stream to visualize the relative amount of stream-aquifer interaction related to total streamflow.

## 1. Current and Historical Groundwater Conditions for Depletions of ISW

A substantial effort was made during preparation of the 2024 GSP Amendment to quantify the timing, location, and quantity of depletions in the Subbasin using best available science. This section describes the modeling completed in 2024, provides an estimate of ISW depletions based on that modeling, and explains potential future work regarding ISW depletions.

### 1.1 2024 Modeling Completed to Quantify Depletions

Appendix 3-G of the 2024 GSP Amendment does not provide a robust description of the modeling completed because the analysis was viewed as yielding inconclusive depletion results. As described on Pages 3 and 4 of Appendix 3-G: "A good faith effort was conducted to isolate stream depletions in the Eastern San Joaquin (ESJ) Subbasin due solely to groundwater pumping by comparing (1) pumping and no-pumping scenarios and (2) a pumping "pulse" scenario to examine the delayed impact of pumping on stream depletions, both using the integrated Eastern San Joaquin Water Resources Model Version 3.0

(ESJWRM). However, the analyses resulted in an inconclusive understanding of depletions due to pumping since an equilibrium was not reached within the simulation period and depletions were heavily influenced by initial and boundary conditions.” This section describes the extensive modeling undertaken in 2024 to support the 2024 GSP Amendment and Periodic Evaluation.

Modeling described below was completed using best available science between June and August 2024 and was performed as a result of an RCA from DWR based on the 2022 revised GSP, as described in the July 6, 2023 GSP assessment staff report. DWR’s recommended corrective action related to depletions of ISW made several references to guidance to be provided by DWR, listed below:

1. Paper 1: Depletions of ISW: An Introduction, draft released in February 2024 (DWR, 2024a)
2. Paper 2: Techniques for estimating depletions of ISW, draft released in September 2024 (DWR, 2024b)
3. Paper 3: Examples for estimating depletions of ISW, draft released in September 2024 (DWR, 2024c)
4. Guidance: Managing for depletions of ISW, not yet released as of August 2026

The first of four documents related to ISW was released in February 2024 and was referenced and utilized for the update to depletions of ISW SMC for the ESJ Subbasin in the 2024 GSP Amendment. The following two documents were released after the ISW analysis was completed and drafted to allow time for ESJGWA review, public review, revisions and responses to comments, and adoption by each individual GSA ahead of the GSP deadline. The 2024 GSP Amendment’s ISW analysis was not able to utilize DWR’s Papers 2 and 3; however, the modeling completed is consistent with the methods described in those papers. Without the final guidance document (the fourth document) from DWR available, ESJGWA is providing additional clarification on the work completed ahead of the 2024 GSP Amendment and is quantifying depletions based on that analysis. ESJGWA may update the understanding of depletions in the future based on the final guidance document currently pending from DWR.

Eight model simulations were conducted in 2024 as part of the effort to better understand ISW depletions in ESJ Subbasin: seven simulations with varying degrees of pumping reduction intended to approximate a without-pumping condition (discussed in Section 1.1.1), and a pulse-pumping simulation designed to identify the lag between pumping and the resulting stream depletions (discussed in Section 1.1.2).

### **1.1.1 With- and Without-Pumping Scenarios**

The Historical ESJWRM Version 3.0 was used for this analysis. As described in Appendix 2-C of the 2024 GSP Amendment, Historical ESJWRM Version 3.0 covers Water Years (WY) 1995 through 2023, is the most recent updated and calibrated version of the historical model, and is used for the 2024 GSP Amendment’s historical and current conditions water budget. Although historical model calibration treated WY 1995 as a one-year initialization period, the ISW analysis includes WY 1995 because the pumping modifications were applied beginning in that year; the ISW analysis period is therefore the full 29-year simulation (WY 1995 through 2023). The Historical ESJWRM Version 3.0 represents the With-Pumping scenario for the purpose of calculating depletions.

The Subbasin has a complex agricultural irrigation system that combines groundwater pumping and surface water deliveries, so seven alternative pumping-reduction simulations were developed to approximate a without-pumping condition while leaving surface water operations unimpacted. In order to reduce pumping in the model, non-rice irrigated land use was converted to unirrigated land (called native vegetation in the model). This method involved calculating how much surface water and groundwater pumping was delivered to each model element and reducing the non-rice land use proportionally in that element by the amount

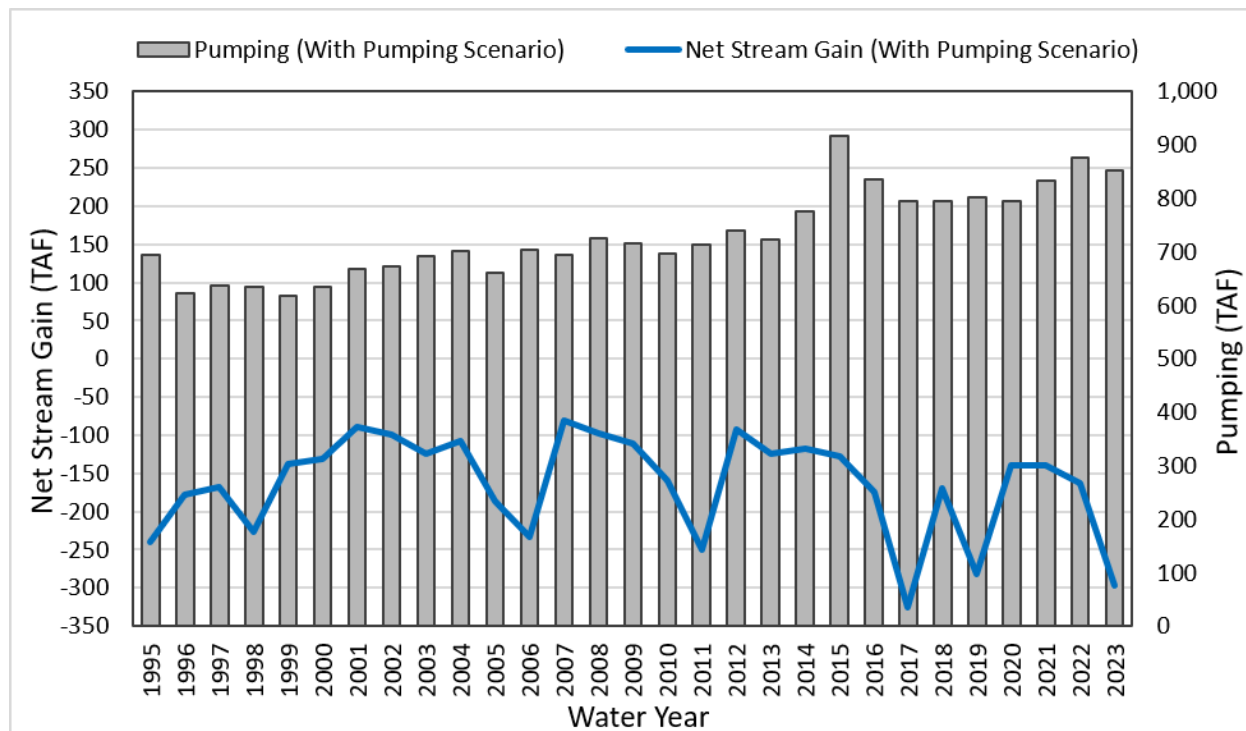
of groundwater delivered. Additionally, urban population was reduced as a mechanism for reducing urban demand (and therefore urban pumping); urban surface water delivery operations were unimpacted. Seven simulations were conducted as part of this effort with varying degrees of pumping reduction intended to approximate a without-pumping condition. For the analyses presented in this TM, one of these seven pumping-reduction simulations was selected as the representative Without-Pumping Scenario because it achieved the largest reduction in irrigation groundwater demand while maintaining a realistic representation of surface water operations.

In the selected Without-Pumping scenario, the reduction in irrigated agricultural acreage ranged from about 231,000 to 294,000 acres across the Subbasin, depending on simulation year. This results in a reduction of between 61 and 76 percent of the total irrigated agricultural acreage in the Subbasin. For groundwater pumping, this translated to a reduction between 93 and 99 percent of the annual agricultural pumping as compared to the With-Pumping scenario; the reduction is not 100 percent due to the targeting of groundwater-pumping dependent model elements while leaving elements predominantly supplied by surface water unconverted and with a small amount of pumping. Land conversion prioritized model elements relying on groundwater pumping, which is why the reduction in agricultural pumping (93–99 percent) is disproportionately larger than the reduction in agricultural acreage (61–76 percent). For urban demand, the population reduction ranged from about 223,000 to 362,000 people, based on the year, and removed 100 percent of the urban groundwater pumping in every year of the scenario. This resulted in a reduction of between 35 and 42 percent of the total urban demand, with the remainder being met by surface water deliveries.

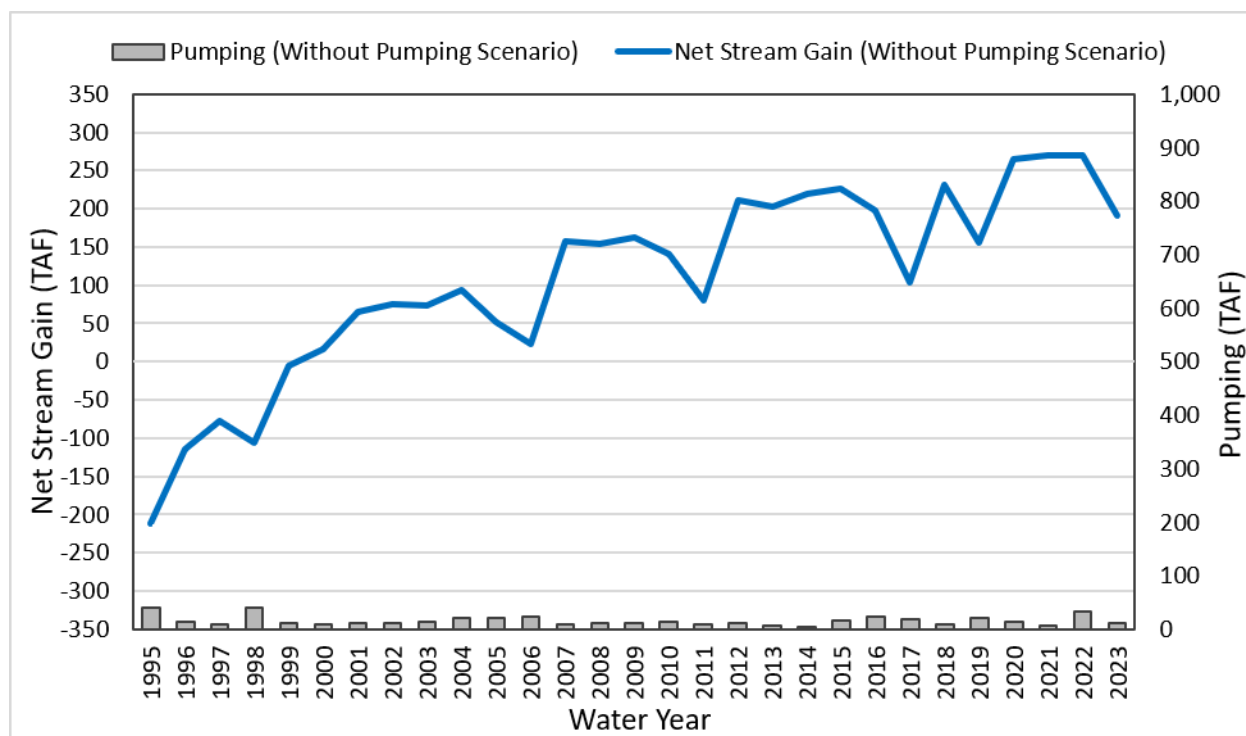
Figure 1 shows the With-Pumping (Historical ESJWRM Version 3.0) groundwater pumping and net stream gain and Figure 2 shows the Without-Pumping scenario's groundwater pumping and net stream gain. Figure 2 visually shows the reduction in groundwater pumping of over 90 percent each year. Figure 3 directly compares the net stream gain between the two scenarios. Both scenarios start with negative net stream gain, indicating that streams are overall losing water to the groundwater system in the Subbasin; however, after five years, the net stream gain in the Without-Pumping scenario switches from negative to positive, indicating that streams are overall gaining water from the aquifer. This response is consistent with interconnected surface water conditions and demonstrates the influence of groundwater pumping on stream-aquifer interactions within the Subbasin. These two scenarios are used in Section 1.2 of this TM to quantify depletions for the Subbasin.



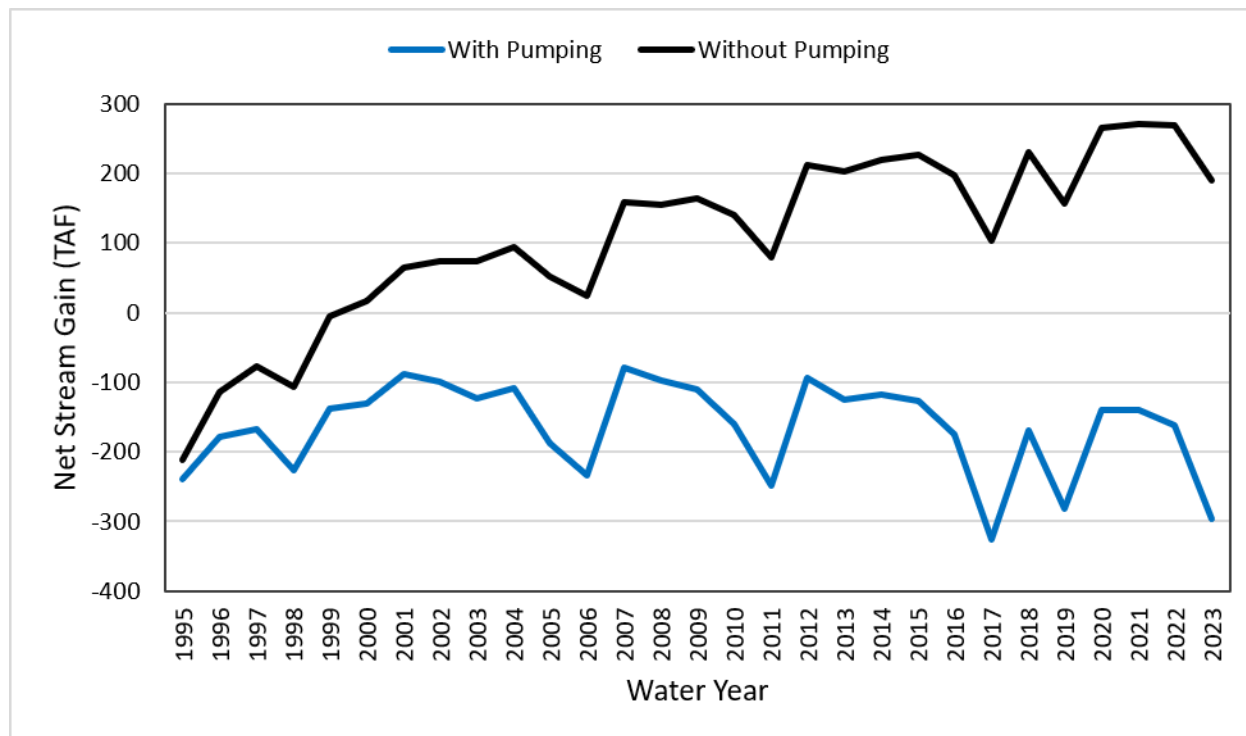
**Figure 1: With-Pumping Model Scenario- Annual Groundwater Pumping and Net Stream Gain**



**Figure 2: Without-Pumping Model Scenario- Annual Groundwater Pumping and Net Stream Gain**



**Figure 3: With- and Without-Pumping Model Scenarios- Net Stream Gain**



### 1.1.2 Pumping Pulse Test Scenario

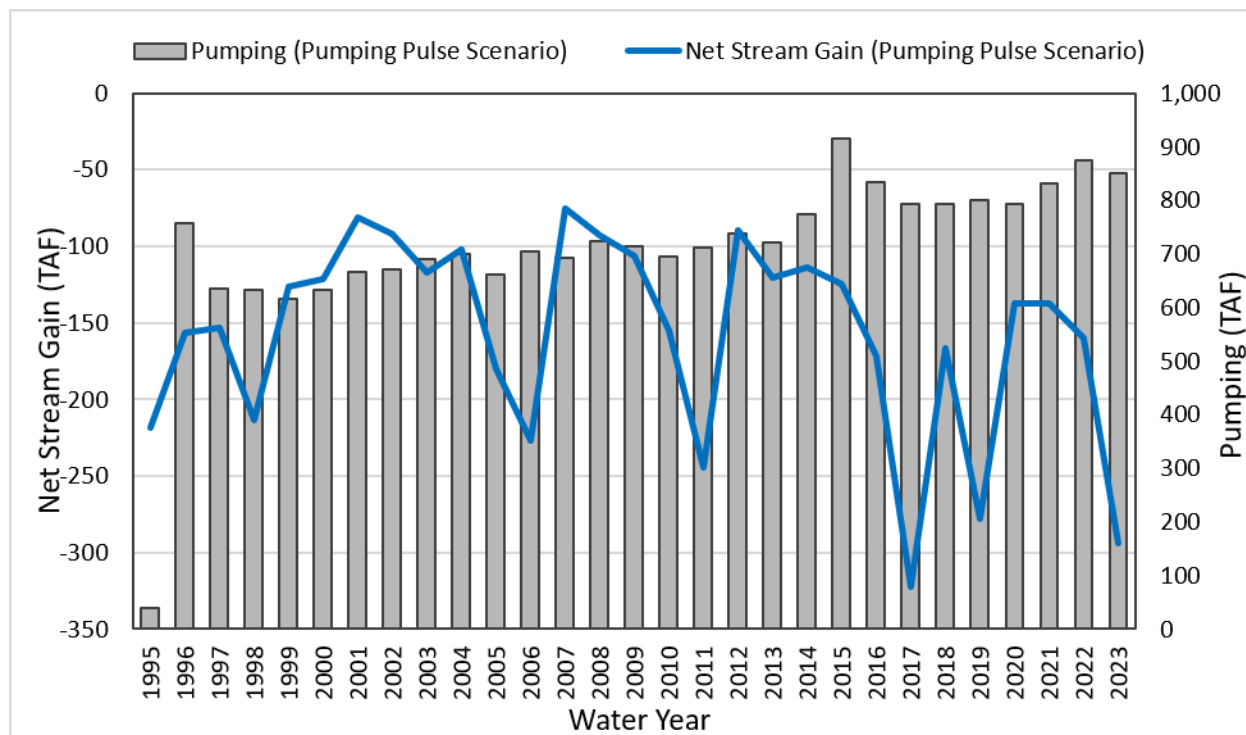
A Pumping Pulse test scenario was completed based on Historical ESJWRM Version 3.0 to analyze depletions following a one-year change in pumping. The Pumping Pulse test was a “what if” experiment run in the model where groundwater pumping was reduced for a single year in the model and then returned to historical levels for the remainder of the simulation. Compared to the Historical ESJWRM Version 3.0 (With-Pumping), this scenario isolates how Subbasin rivers and streams respond to a discrete change in pumping. This complements the Without-Pumping scenario, which shows the total effect of all pumping; the Pumping Pulse test instead shows the timing and persistence of the surface water system’s response to a change in pumping.

To simulate this scenario, a one-year reduction in groundwater pumping was simulated in WY 1995, the first year of the historical simulation; groundwater pumping for the remainder of the simulation follows the same historical patterns in the base Historical ESJWRM Version 3.0. The pumping reduction was similar to the Without-Pumping scenario discussed in Section 1.1.1 in that non-rice irrigated crop acreage was reduced along with urban population. Irrigated crop acreage was reduced by 67 percent in only WY 1995 of the pumping pulse scenario compared to the With-Pumping scenario. Groundwater pumping in that same year was reduced by 94 percent. Figure 4 shows the reduction in groundwater pumping in WY 1995. Figure 5 shows the net stream gain comparison between the With-Pumping (Historical ESJWRM Version 3.0) and the Pumping Pulse scenario. Though visually it appears that net stream gain is very similar between the two scenarios after 2004 (ten years into the simulation), there remain small differences in net stream gain due to the one-year pumping reduction through the remainder of the simulation. The difference between the two lines in Figure 5 is the depletion, shown in Figure 6 as the cumulative depletions compared

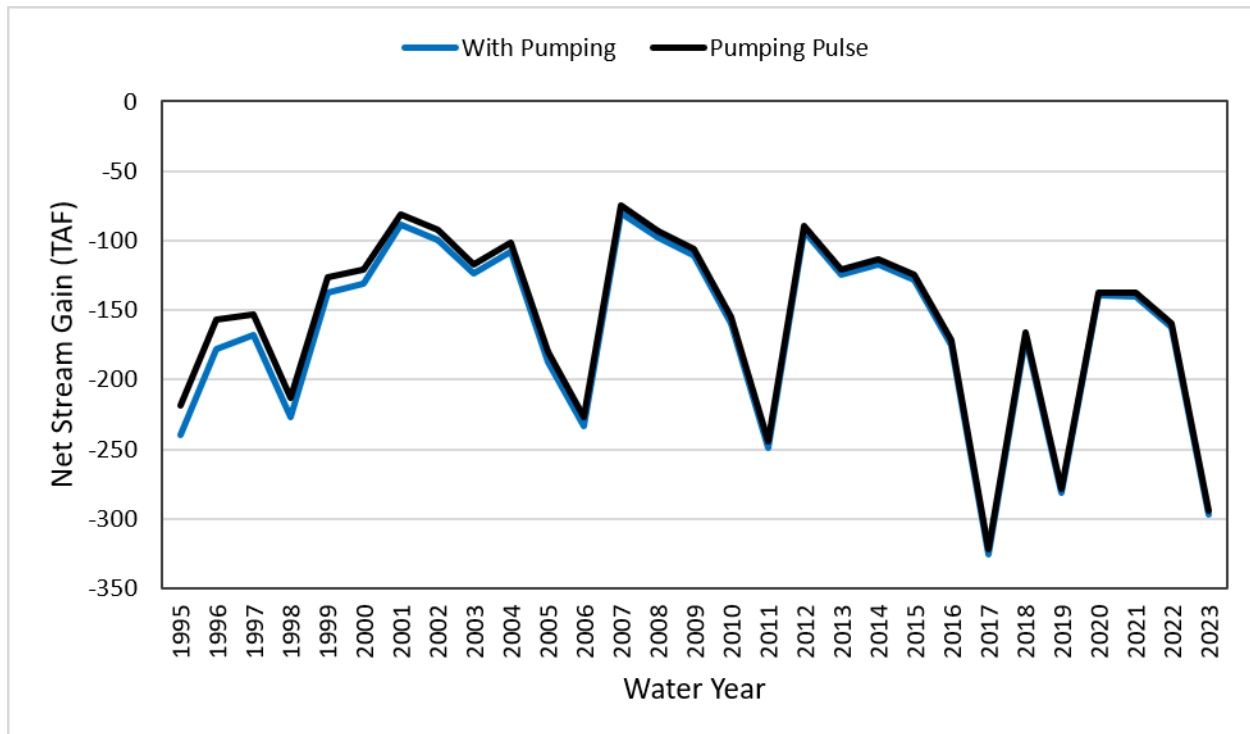
to the cumulative difference in pumping between the Pumping Pulse scenario and the Historical ESJWRM Version 3.0 (With-Pumping scenario).

As shown in Figure 6, the Pumping Pulse scenario results demonstrate the duration of the stream response to a discrete change in pumping. The one-year reduction of 650 thousand acre-feet (TAF) of groundwater pumping in WY 1995 produced a positive stream response of approximately 20 TAF in the first year (about 3 percent of the removed pumping), declining gradually to approximately 2.5 to 4 TAF per year by WY 2023. In other words, a measurable stream response remained for the entire 28-year simulation period following the single-year pulse, with no indication of having fully disappeared by the end of the simulation. Cumulatively, approximately 36 percent of the reduced pumping volume was expressed as a change in Subbasin stream gains and losses within the entire simulation period. The remainder reflects deep percolation of applied groundwater that was not lost to evapotranspiration, changes in subsurface boundary flow with neighboring subbasins, and storage recovery. Expressed relative to the reduction in consumptive use of pumped groundwater, the captured fraction is higher. These results align with the conclusion of the Without-Pumping scenario analysis described in Section 1.1.1 and quantified in Section 1.2: the Subbasin's stream-aquifer system's response to a change in pumping takes longer than the 29-year simulation and only a portion of the total response was captured within the simulation.

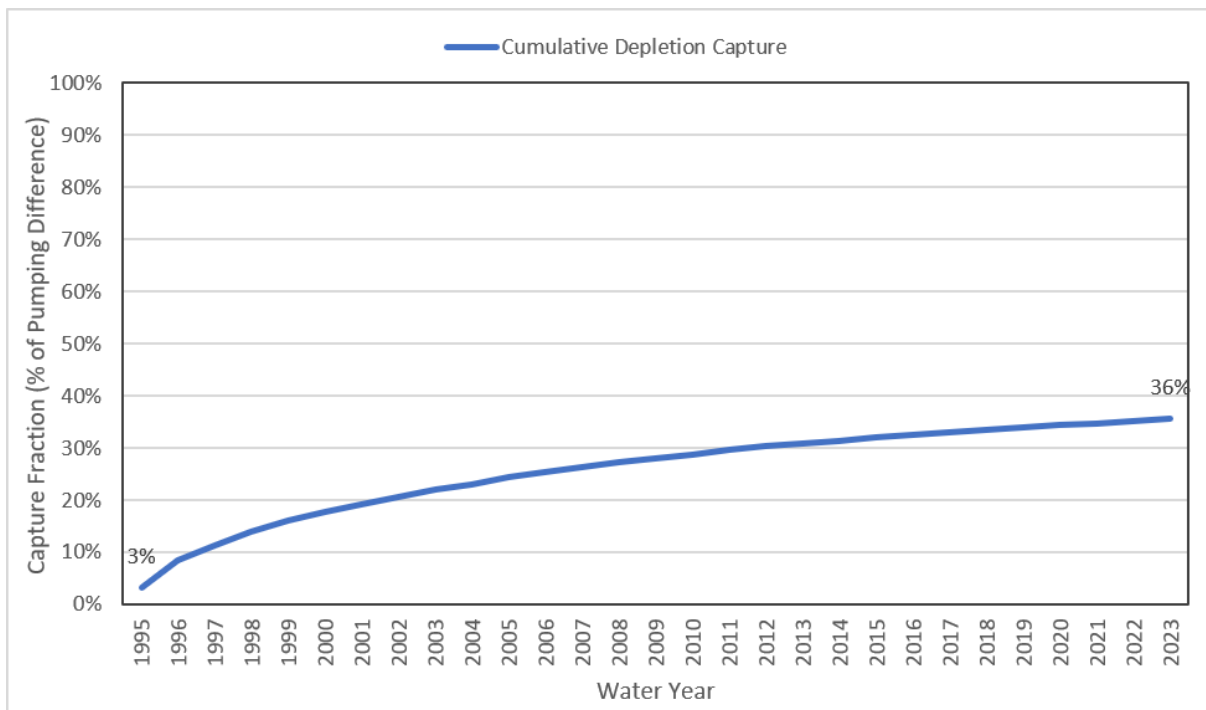
**Figure 4: Pumping Pulse Model Scenario- Annual Groundwater Pumping and Net Stream Gain**



**Figure 5: With-Pumping and Pumping Pulse Model Scenarios- Net Stream Gain**



**Figure 6: With-Pumping and Pumping Pulse Model Scenarios- Cumulative Depletion Capture (Percent of Cumulative Pumping Difference)**



## 1.2 Quantification of Depletions of ISW Quantity, Location, and Timing

Depletions did not converge in either of the scenarios, not in the Without-Pumping scenario, as discussed further below, nor in the Pumping Pulse scenario (as discussed in Section 1.1.2). Convergence, in this context, means that depletions stabilize as a fraction of the reduction in consumptive use of pumped groundwater (i.e., the capture fraction stabilizes), indicating that the simulation period is long enough for the full, or nearly full, depletion response to groundwater pumping to be expressed. It is noted that the capture fraction is not expected to converge to 100 percent, as some depletions occur outside of the Subbasin, represented through changes in boundary flows with neighboring subbasins. As shown in Figure 9, both the annual and cumulative capture fractions (shown relative to pumping difference) increase throughout the simulation period without stabilizing, indicating that the depletion response to pumping was not fully expressed within the 29-year simulation period. Because the results did not stabilize, no depletion quantity was reported in Appendix 3-G as the ESJGWA did not have a sufficient basis to report a defensible depletion quantity based on best available science at the time. This is the basis for the statement in Appendix 3-G that the analysis was inconclusive.

Based on the analysis completed, the 29-year historical simulation period may simply be too short for the stream-aquifer system to reach a new equilibrium following a reduction in groundwater pumping; as discussed in DWR's ISW Paper 2, groundwater systems can take years to decades to fully reflect the effects of a change in pumping, and Subbasins with greater hydrogeologic complexity or more distant stream-aquifer connections are expected to take longer (DWR, 2024b). Extending the simulation period is possible, but extending it backward before WY 1995 is limited by data scarcity, and extending it forward would require projecting beyond the present day, reducing the reliability of a current Subbasin depletion estimate. Along with a truncated simulation period, increasing pumping during the historical simulation is likely also adding to the lack of convergence.

### 1.2.1 Depletion Quantity

Capture fractions presented in this section are expressed relative to the difference in groundwater pumping between the two scenarios. The pumping difference overstates the volume available for capture because a substantial portion of applied groundwater returns to the aquifer as deep percolation and is never consumed. The theoretical maximum stream depletion attributable to pumping is the consumptive use of pumped groundwater. Of that quantity, only the portion expressed within the Subbasin appears as depletion of Subbasin ISW; the remainder is expressed as changes in subsurface flow across the Subbasin boundary and ultimately represents depletions occurring in neighboring subbasins. Capture fractions expressed against the pumping difference remain a useful and internally consistent metric for evaluating whether the stream response has converged over the simulation period.

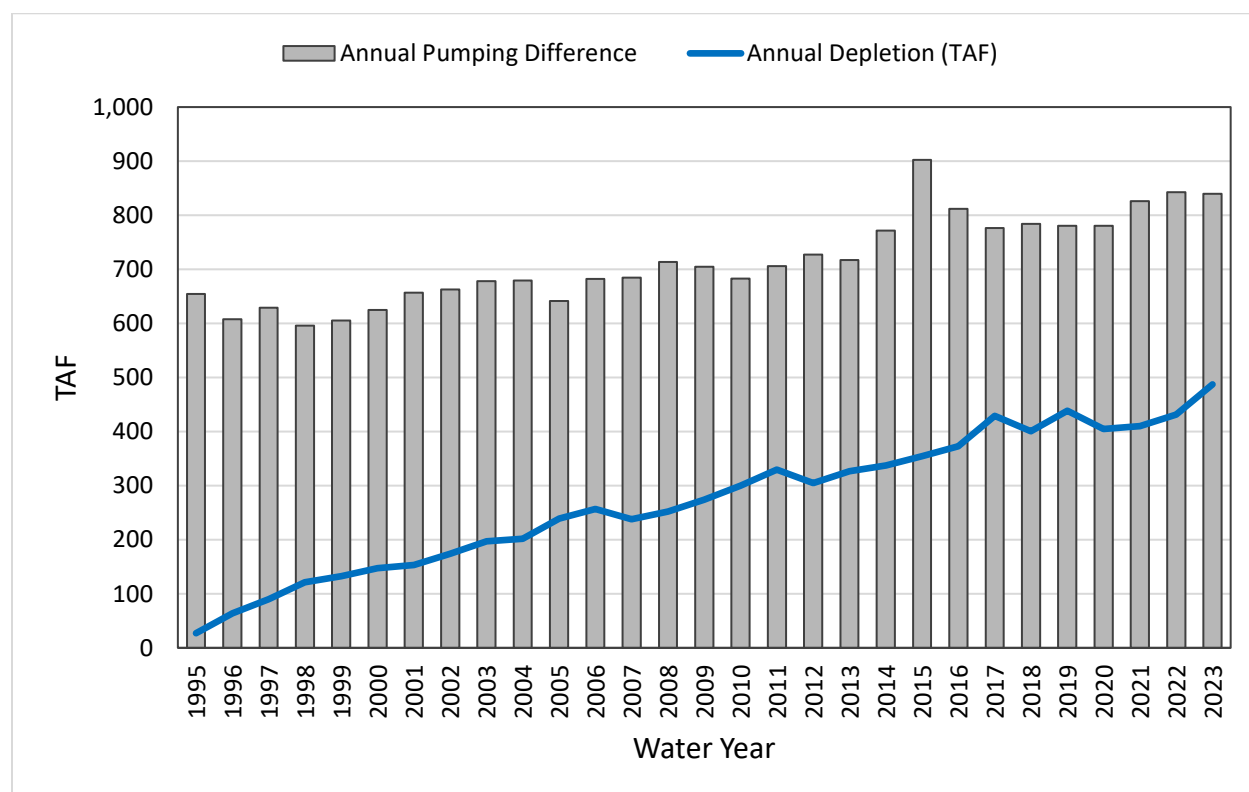
This section attempts to quantify ISW depletion in the Subbasin, while noting that values may underestimate depletions since equilibrium was not reached in the model simulations. Comparing the With-Pumping and Without-Pumping scenarios, groundwater pumping is estimated to have depleted ISW in the Subbasin by a cumulative total of approximately 7,900 TAF over the 29-year simulation period (WY 1995–2023) (Figure 8), an average annual depletion of approximately 270 TAF. Annual depletion grows over the simulation period as the model moves toward equilibrium conditions, averaging approximately 430 TAF per year over the most recent five years (WY 2019–2023) and reaching approximately 490 TAF in the last year of the simulation, WY 2023 (Figure 7). Because the annual depletion series is still increasing at the end of the simulation, these values likely represent a low estimate of the depletion associated with current levels of pumping rather than an equilibrium value.

By WY 2023, annual depletion equals approximately 58 percent of the annual pumping difference (Figure 9). The annual capture fraction continues to increase through the end of the simulation without stabilizing, indicating that the stream response to pumping develops over a period substantially longer than the 29-year simulation. This is consistent with the Pumping Pulse test described in Section 1.1.2, in which a measurable stream response persisted for the full 28-year simulation period following a single-year reduction in pumping, with no indication of having fully dissipated by the end of the simulation.

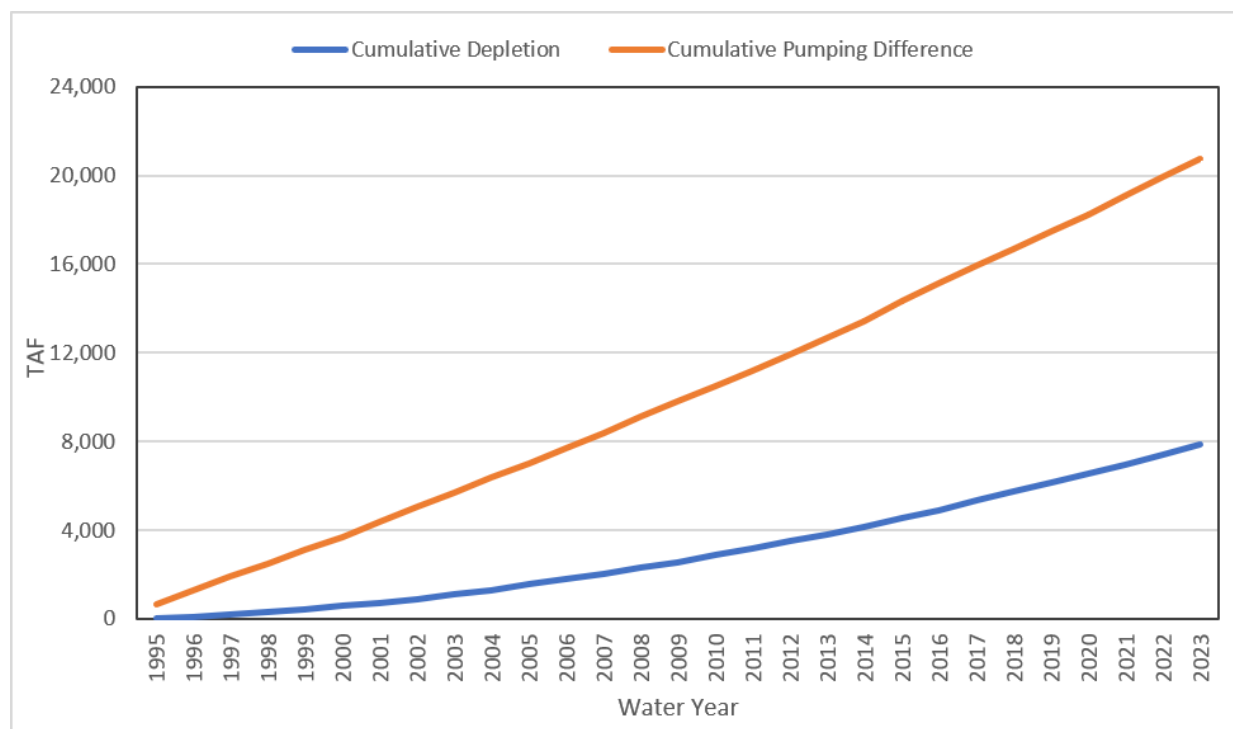
As shown in Figure 10, the cumulative stream depletion accounts for a portion of the cumulative pumping difference, with the remainder accounted for by deep percolation, boundary flow, and storage release. Storage release is initially the largest of these components but decreases over time, while depletion increases and becomes the most prominent annual component of the pumping difference by the end of the simulation (Figure 11). The figures below present the annual and cumulative depletion series and the corresponding capture fractions.

The estimated depletion for the Subbasin based on the scenarios is 430 TAF (average of the last five years). This estimate is considered to be low since the total depletions are likely to be closer to the reduction in consumptive use of pumped groundwater, less the portion of that reduction expressed as changes in subsurface boundary flow with neighboring subbasins. Based on further guidance from DWR, the ESJGWA will consider updating its modeling and related analyses to provide an updated estimate of depletion for the Subbasin.

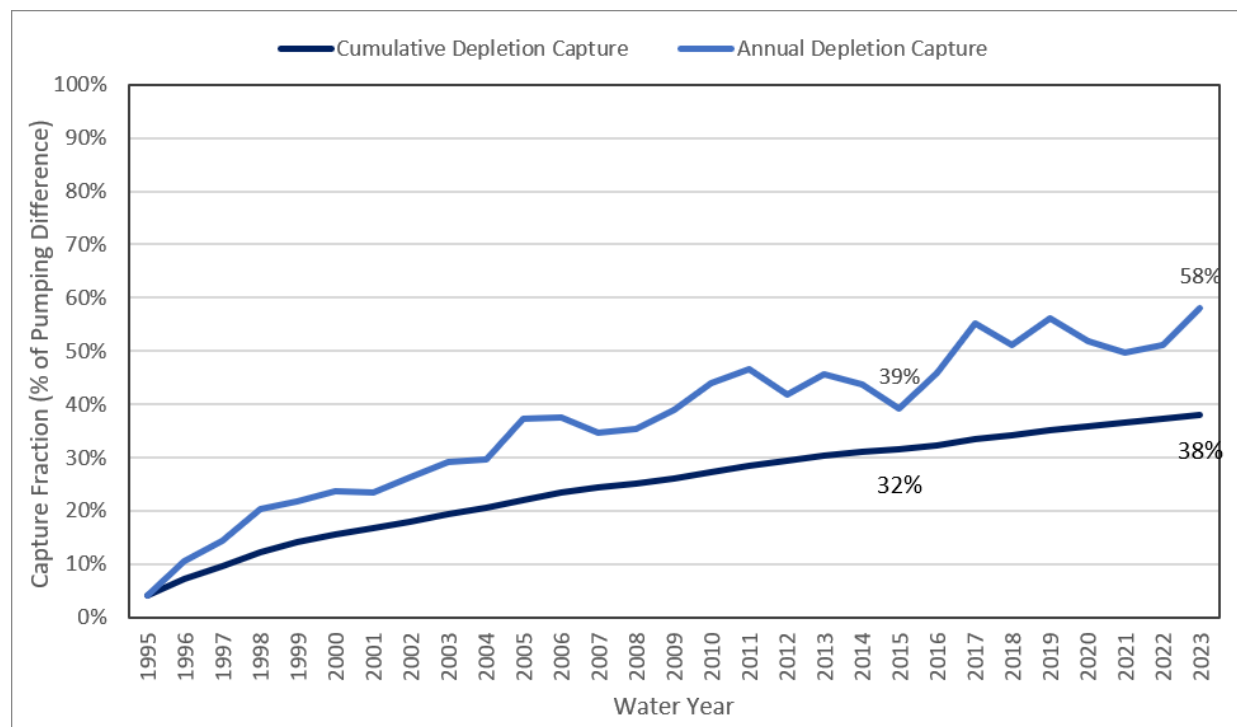
**Figure 7: With- and Without-Pumping Model Scenarios- Annual Depletion and Annual Pumping Difference**



**Figure 8: With- and Without-Pumping Model Scenarios- Cumulative Depletion and Cumulative Pumping Difference**

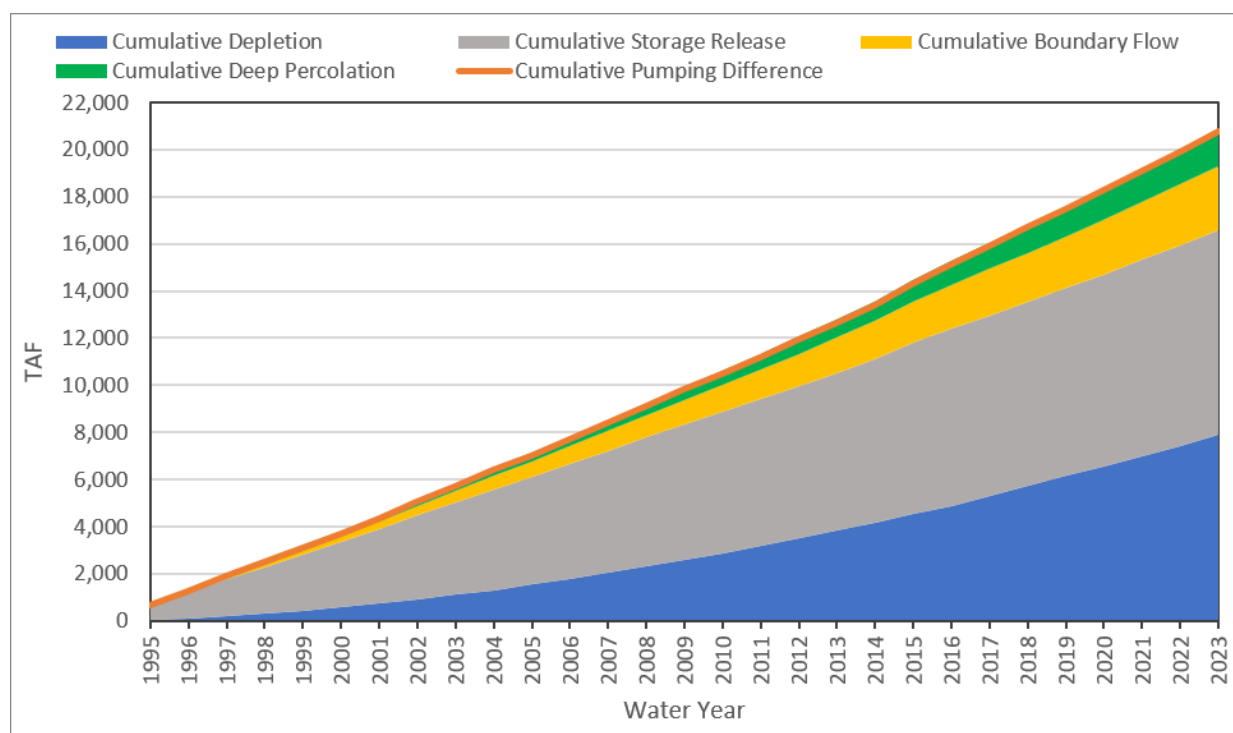


**Figure 9: With- and Without-Pumping Model Scenarios- Annual and Cumulative Depletion Capture (Percent of Annual or Cumulative Pumping Difference)**

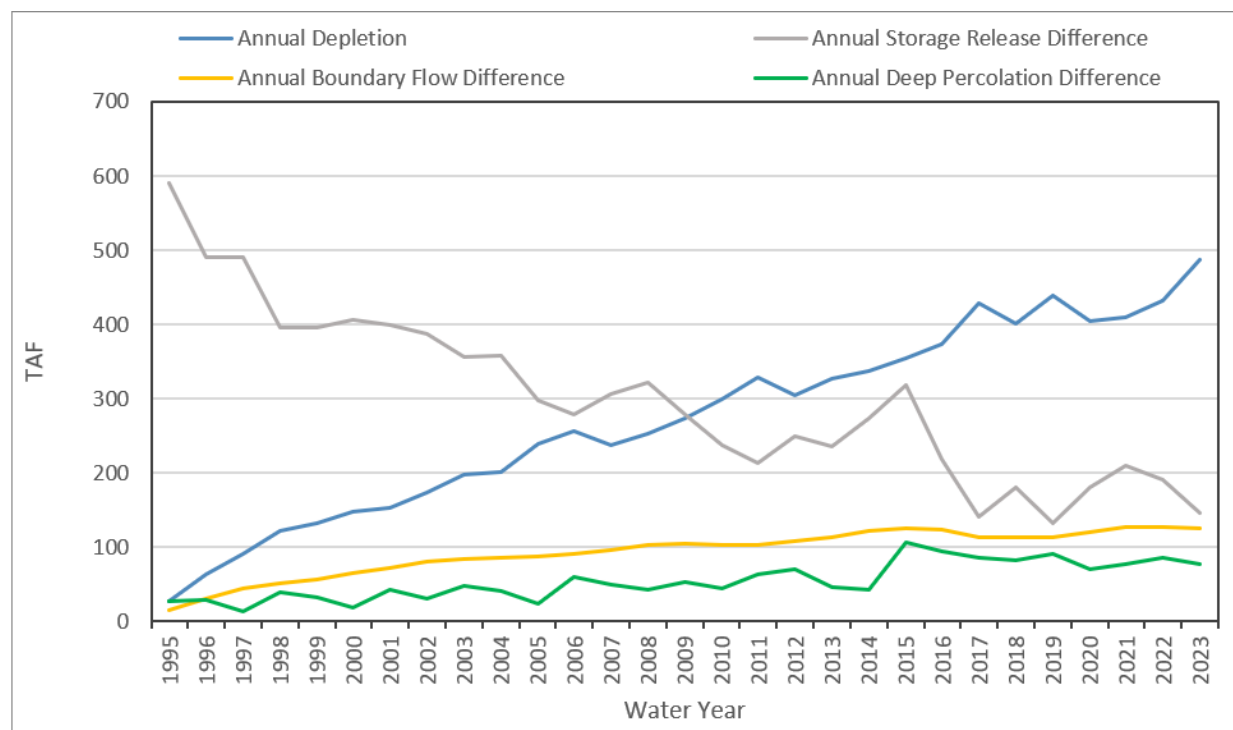




**Figure 10: With- and Without-Pumping Model Scenarios- Components in Cumulative Pumping Difference**



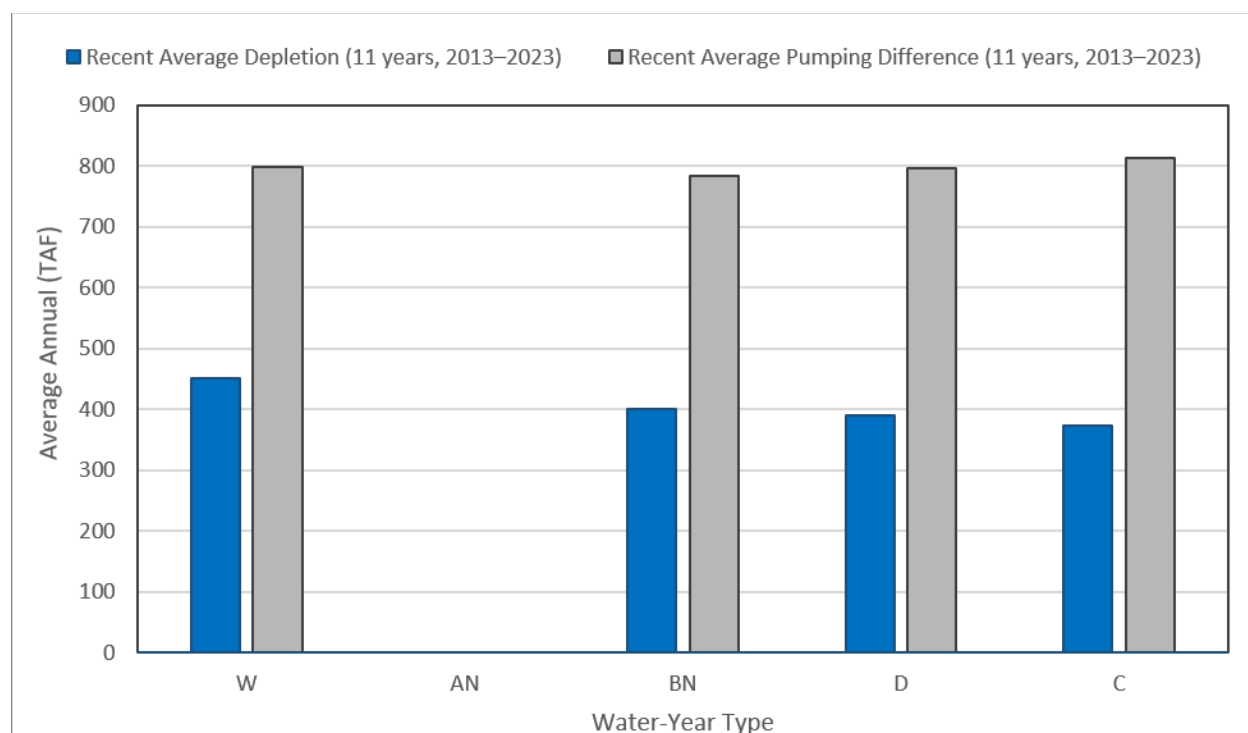
**Figure 11: With- and Without-Pumping Model Scenarios- Annual Components in Pumping Difference**



## 1.2.2 Depletion Timing

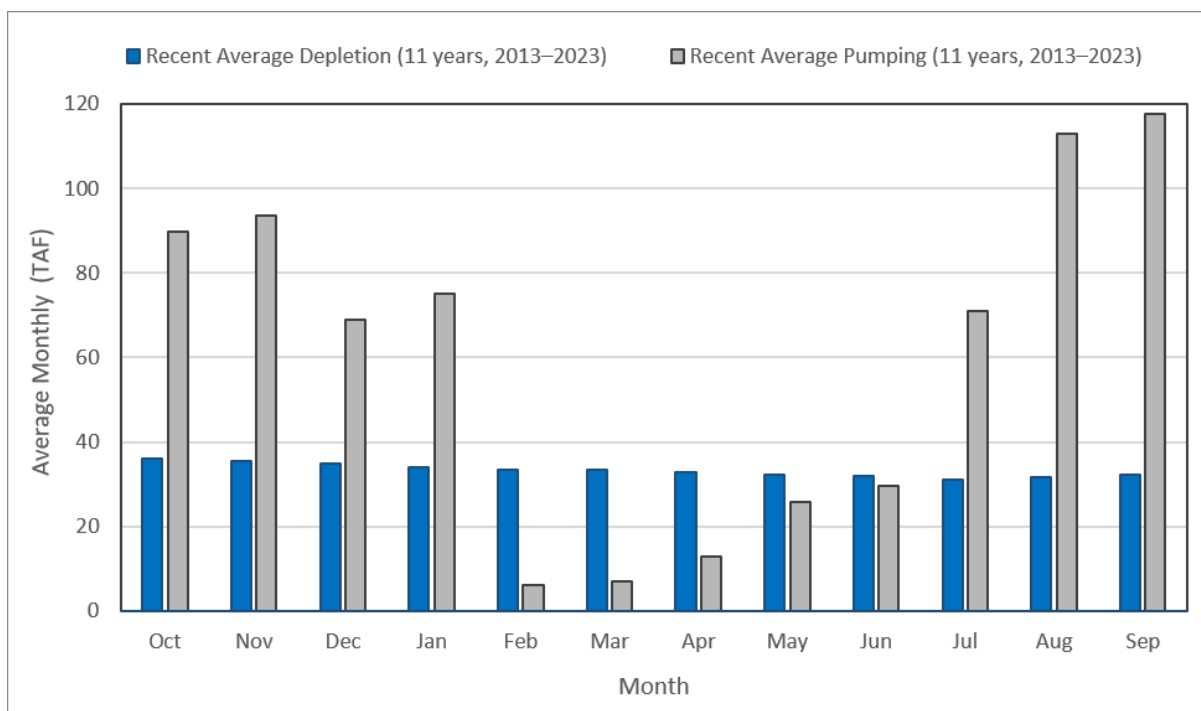
Depletions occur in every water year type and in every month of the simulation. Over the most recent 11 years of the simulation period (WY 2013–2023), average annual depletions are highest in Wet years (approximately 450 TAF per year) and slightly lower for each drier water year type, ending with Critical years (approximately 370 TAF per year). There are no Above Normal years in the recent average period, though the depletions are likely to be between the Wet and Below Normal estimates (Figure 12). On a monthly basis, depletions are relatively uniform across the year, regardless of water year type, with very slightly higher depletions in winter (October, November, December, and January averages range from 34 to almost 36 TAF per year) compared to summer (June, July, and August averages range from 31 to almost 32 TAF per year) (Figure 13). The limited seasonality in the data points to the lagged nature of the stream response demonstrated by the Pumping Pulse test scenario (Section 1.1.2); depletions in any given month or water year reflect pumping over many prior years, not just the pumping occurring in that month.

**Figure 12: With- and Without-Pumping Model Scenarios- Average Depletion and Groundwater Pumping Difference by Water Year Type**



Note: 11-year average period of WY 2013 through 2023 does not contain any Above Normal water years.

**Figure 13: With- and Without-Pumping Model Scenarios- Average Depletion and Groundwater Pumping Difference by Month**



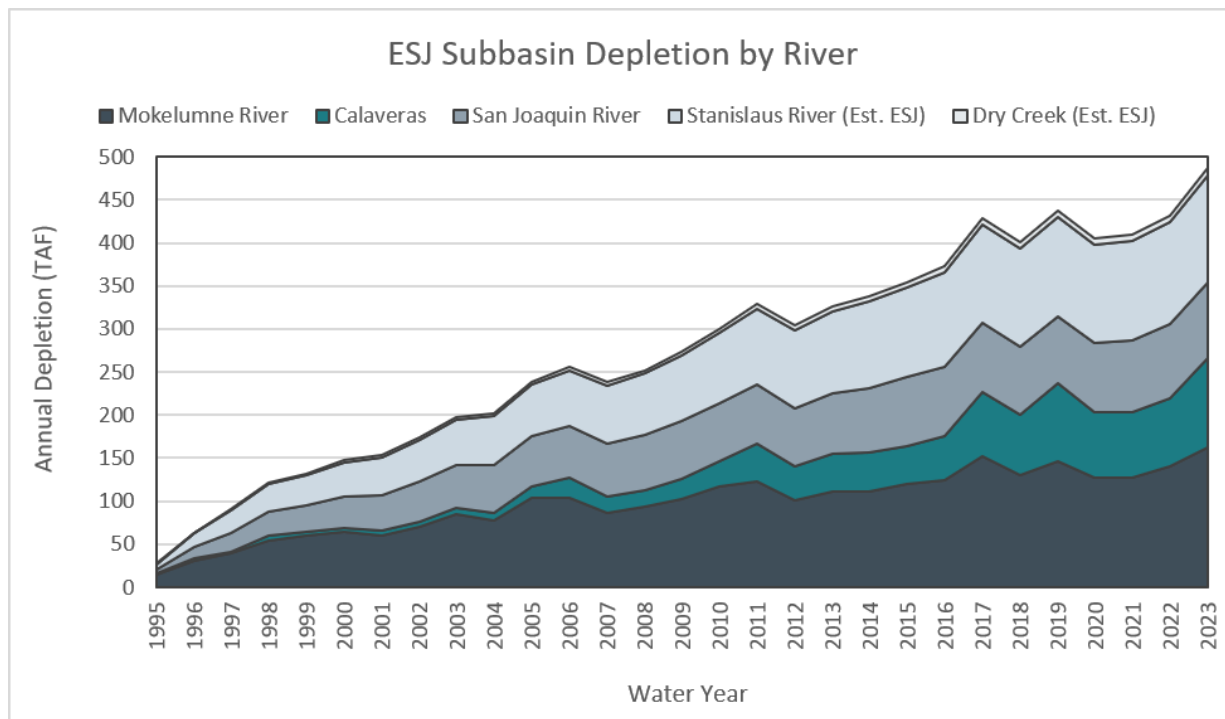
### 1.2.3 Depletion Location

The annual average depletion for each Subbasin stream is shown in Figure 14. Because Dry Creek and the Stanislaus River are represented in ESJWRM as shared between ESJ Subbasin and Cosumnes and Modesto Subbasins, respectively, an estimated 50 percent of the simulated depletions of each are attributed to the ESJ Subbasin. Averaged over the most recent 11 years of the simulation period (WY 2013–2023), depletions within the ESJ Subbasin are approximately distributed as follows (Figure 15):

- Mokelumne River: 33 percent
- Stanislaus River: 28 percent
- San Joaquin River: 20 percent
- Calaveras River: 17 percent
- Dry Creek: 2 percent

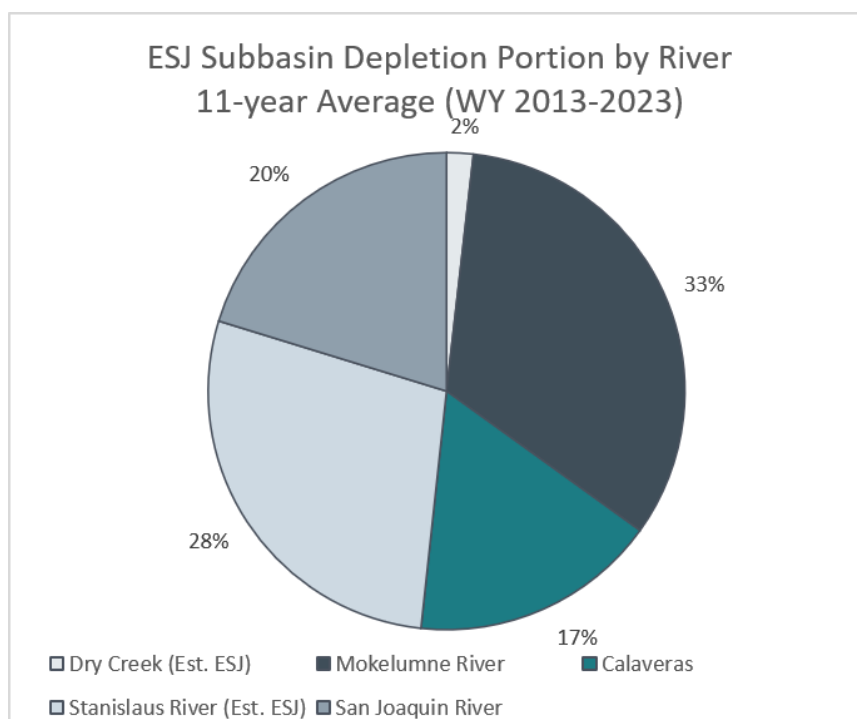
The distribution of depletion among the streams is relatively consistent across water year types and months. Averaged over the most recent 11 years, depletion on Calaveras and Mokelumne Rivers is highest in Wet years as was observed in Section 1.2.2. Conversely, San Joaquin River and Stanislaus River have slightly lower depletion in Wet years compared to each consecutively drier water year type. Dry Creek remains at 2 percent of the Subbasin total regardless of the water year type (Figure 16). On a monthly basis, depletion on each stream is relatively uniform throughout the year, with slightly higher depletion in winter (highest in October, November, December, and January) compared to summer (lowest in June, July, and August) (Figure 17), matching the monthly pattern described in Section 1.2.2. The stability of each stream's share of total depletion across water year types and months further reflects a lagged and dampened stream response where the location of depletion is governed by the long-term distribution of pumping rather than by the hydrologic conditions of any single year or month.

**Figure 14: With- and Without-Pumping Model Scenarios- Depletion by River**

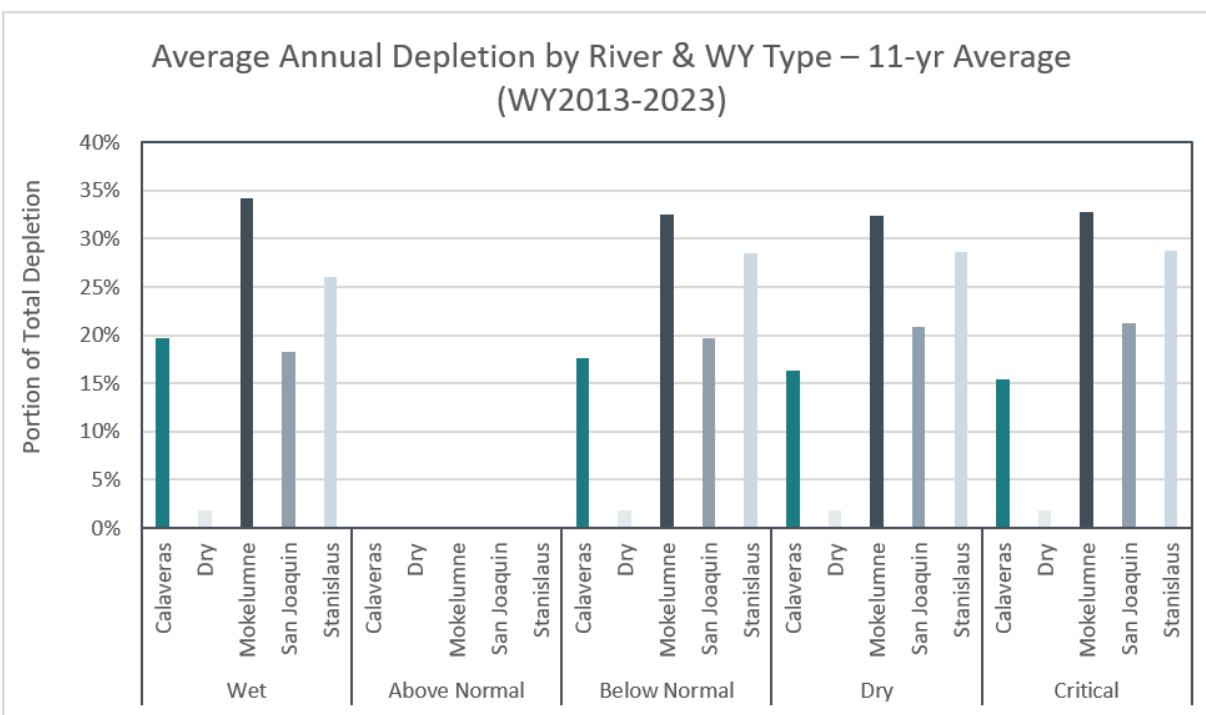


Note: Dry Creek and Stanislaus River are simulated in ESJWRM as shared between ESJ Subbasin and Cosumnes and Modesto Subbasins, respectively, so an estimated 50 percent of the simulated depletions of each are attributed to the ESJ Subbasin.

**Figure 15: With- and Without-Pumping Model Scenarios- 11-Year Average Portion of Depletion by River**

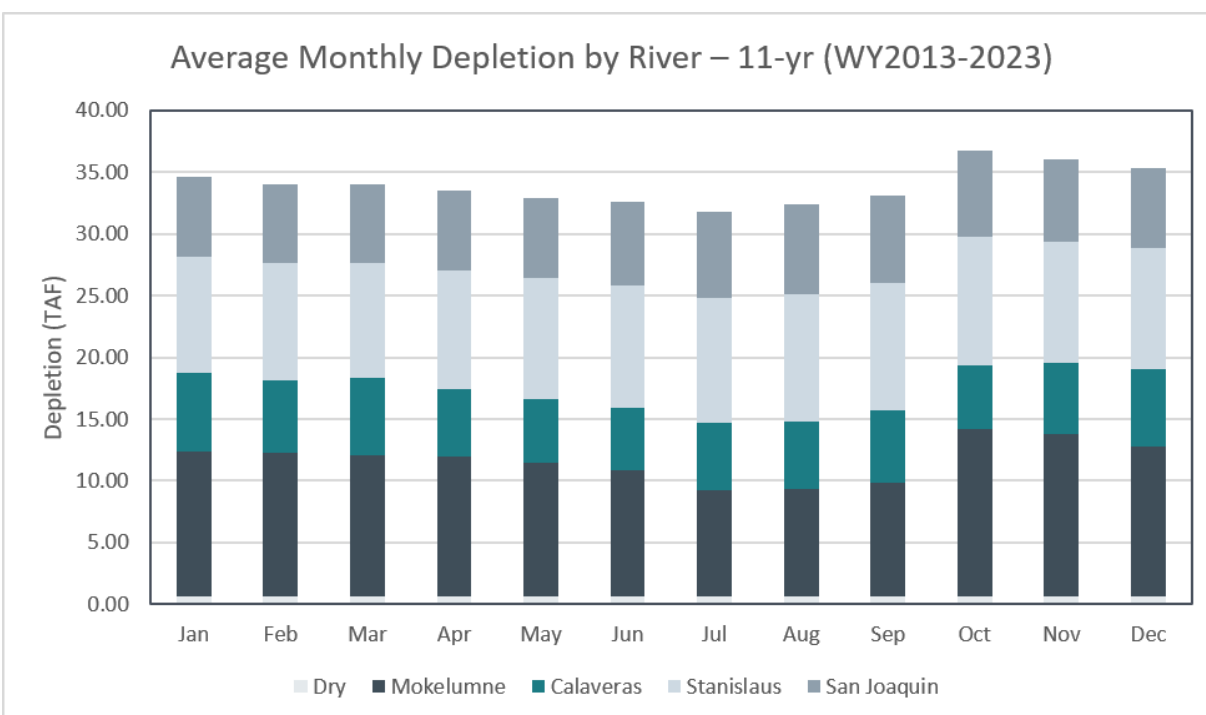


**Figure 16: With- and Without-Pumping Model Scenarios- 11-Year Average Depletion by River by Water Year Type**



Note: 11-year average period of WY 2013 through 2023 does not contain any Above Normal water years.

**Figure 17: With- and Without-Pumping Model Scenarios- 11-Year Average Monthly Depletion by River**



## 2. ISW Monitoring Network

The ISW Representative Monitoring Network (RMN) was established in the 2024 GSP Amendment as part of the update to the understanding of ISW. The groundwater level (GWL) RMN on its own did not include enough shallow wells to characterize near-stream, shallow aquifer dynamics, which is the depth interval most directly relevant to stream-aquifer interaction. For this reason, a separate ISW RMN was established. While established, the RMN is not yet used to actively manage depletions, as six of the wells do not have defined SMCs, as discussed below. Until SMCs are defined, the overall groundwater level sustainability indicator is used as a proxy metric for depletions of interconnected surface water, as explained in Sections 3 and 4.

The ISW RMN was built from two sources:

- Six newly constructed shallow monitoring wells (Well A, Well B, Well C, Well E, Well G, and the Delta Well) were sited specifically to close the shallow well monitoring data gap near interconnected reaches and the Sacramento-San Joaquin River Delta (Delta). Five of the new wells are shallow single-completion wells, and the Delta Well is a dual-completion well with only the shallower of the two completed wells utilized in the ISW RMN. These wells currently only have one data measurement from spring 2026. They will continue to be monitored during the biannual Subbasin-wide monitoring events.
- Six existing GWL RMN wells are located within five miles of connected surface waters, selected for their long-term, high-quality groundwater level records and known well construction. Only one well was included along the Mokelumne River since new ISW wells already cover other segments of that river.

The ISW RMN is discussed further in Appendix 3-G of the 2024 GSP Amendment, which includes Table 4, Figure 22, and Figure 23 with more information on the wells included in the ISW network.

The undesirable result for the ISW sustainability indicator is 25 percent of the ISW RMN (not the GWL RMN) falling below minimum thresholds for two consecutive years. Applied to the full 12-well ISW network, this indicator translates to three wells needing to be below their respective MTs.

At present, the six new, shallow ISW and Delta wells do not yet have a sufficient period of record to establish minimum thresholds. SMCs for these wells will be established once sufficient data are available; data ideally includes at least four years, including a high and a low reading from a Dry or Critical water year. The amount of data, and thus time, required to develop the SMCs will depend on the variability in the data collected and the ability to understand how groundwater levels in each individual well respond in the context of basin-wide conditions. Once SMCs are established for all six new wells, the threshold of 25 percent would apply to the full 12-well network (or three wells). Until SMCs are established at all six new wells, the groundwater level SMC will be used as a proxy, as further detailed in Sections 3 and 4.

## 3. Justification of Use of GWL SMCs for Stream Depletions

The ISW RMN, as identified in the 2024 GSP Amendment, was designed to focus on shallow groundwater levels near interconnected surface waters. Because half of the ISW RMN wells (six of 12) do not yet have sufficient data to establish SMCs, the ISW RMN is not yet used to actively manage depletions. In the interim, the groundwater level sustainability indicator is used as a proxy metric for depletions of ISW. In order to confirm that the GWL SMCs are protective of ISWs, additional analyses were conducted using the ESJWRM, as described below.

The modeling scenario referenced in the 2024 GSP Amendment Appendix 3-G as the “PCBL-Minimum Thresholds” or “PCBL-MT” scenario was, as described in the 2024 GSP Amendment Appendix 3-E (Section 2.3.2), built on the Projected Conditions BaseLine with Climate Change (PCBL-CC) Version 3.0. The omission of “CC” from the scenario name in Appendix 3-G and subsequent documents was inadvertent. For clarity and consistency, this response and future GSP documentation will refer to this scenario as Projected Conditions BaseLine with Climate Change and Minimum Thresholds (PCBL-CC-MT) Version 3.0.

As noted above, the PCBL-CC-MT scenario was utilized to evaluate whether the GWL MTs are protective of depletions of ISW. By simulating the stream-aquifer conditions that would occur when a GWL undesirable result occurs, the scenario was intended to demonstrate that stream depletions occurring when GWL undesirable results occur are not significant and unreasonable, supporting the interim use of GWL SMCs as a proxy for depletions of ISW. Once the guidance document from DWR is available, the ESJGWA will evaluate updates to its ISW SMCs. Section 4 presents additional modeling completed in 2026 that evaluates the same question using a Subbasin-wide pumping increase and provides the primary depletion-based support for the interim use of the groundwater level sustainability indicator as a proxy.

### 3.1 Development of PCBL-CC-MT Version 3.0

The PCBL-CC-MT Version 3.0 scenario was developed as described in Appendix 3-E, Section 2.3.2 of the 2024 GSP Amendment to establish a defensible, model-based linkage between groundwater level MTs and the reduction in groundwater storage sustainability indicator. It was subsequently applied as described in Appendix 3-G to evaluate whether those same GWL MTs are also protective of depletions of ISW.

The undesirable result for the chronic lowering of groundwater levels is defined as 25 percent of the GWL RMN wells dropping to or below their respective minimum thresholds for two consecutive years. Rather than relying on a hypothetical decline in levels, the Subbasin used ESJWRM to simulate an actual GWL undesirable result and then examined the corresponding effect on stream-aquifer interaction so that the GWL SMCs could be evaluated against DWR’s Sustainable Management Criteria standard: “To use the minimum thresholds for chronic lowering of groundwater levels as a proxy for interconnected surface water, the stream depletions which would occur when undesirable results for groundwater levels are reached must not be significant and unreasonable” (DWR, 2017).

Pumping was synthetically induced at five selected GWL RMN wells to artificially lower groundwater levels so that water levels at the GWL RMN wells reached minimum thresholds in the PCBL-CC-MT scenario. The GWL RMN contains 21 wells in the 2024 GSP Amendment, so six wells would need to reach MT groundwater levels for an undesirable result to occur. However, the GWL RMN contained only 20 wells at the time this analysis was completed, so five wells needed to reach MT groundwater levels for an undesirable result to occur. The five wells selected to artificially exceed their MTs were not chosen arbitrarily; many combinations of five-well groupings were tested, varying by:

- Proximity to the Subbasin’s groundwater depression
- Historical GWL SMC performance at each well
- Spatial distribution across the Subbasin

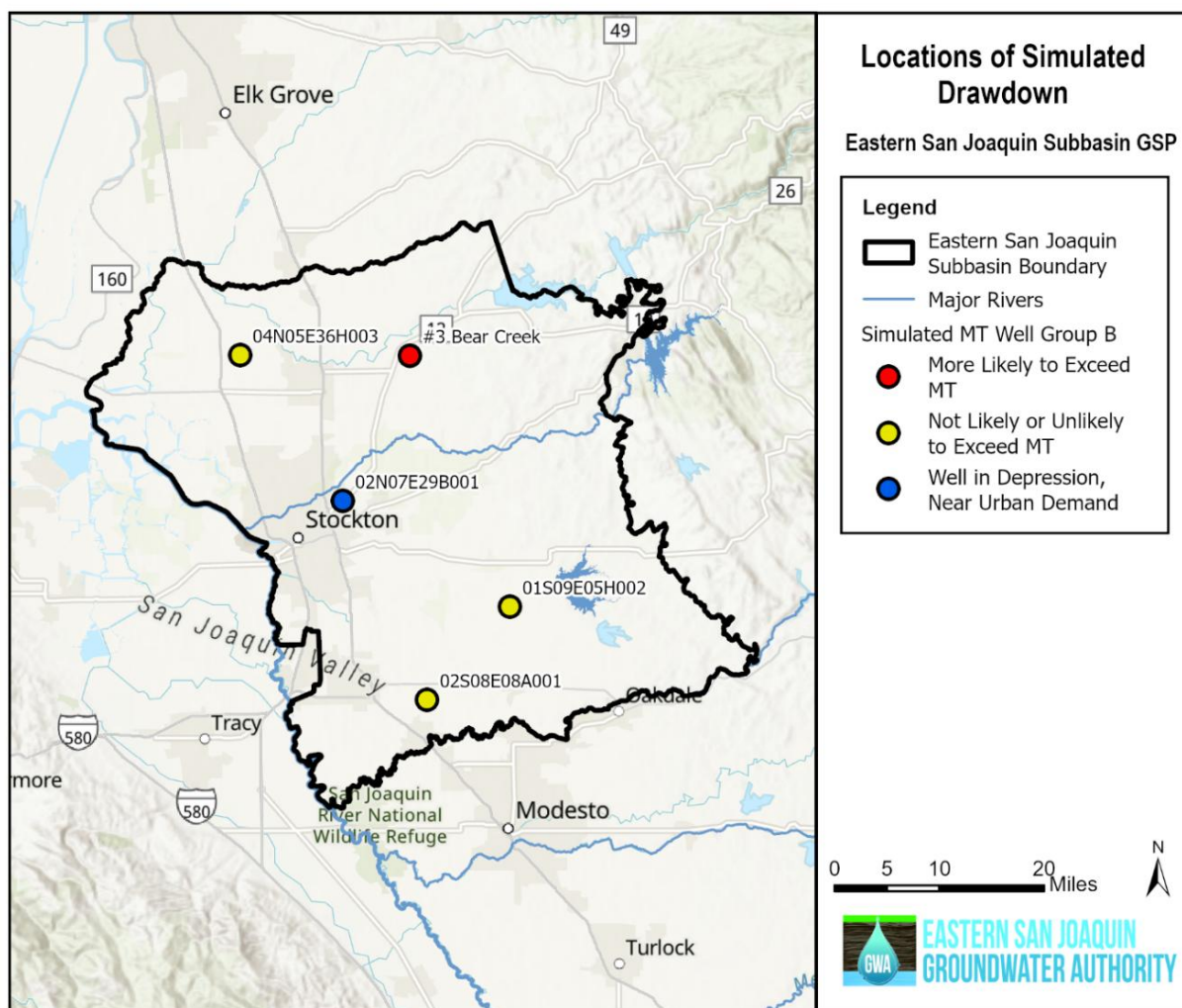
Ultimately, two different pumping groups were selected and pumping rates were adjusted at varying levels at each selected well in the group until a GWL undesirable result was achieved. The well group that was ultimately carried forward into the ISW analysis documented in Appendix 3-G was the most extreme of the iterations tested; it had the highest induced pumping volumes and used wells located closer to interconnected streams. The well group used for the analysis described in Appendix 3-G and for application to ISW is shown in Figure 18 with the colors indicating the categorization of each well as part of the selection



for the PCBL-CC-MT scenario. Note that two of the wells are shared with the ISW RMN and the other three wells are close to the new ISW wells.

The pumping rate used for each well in the simulation was the maximum projected pumping rate in the Subbasin for a single well. Each well pumped between 2,500 and 5,800 acre-feet per year (AFY), varying based on water year type. MT exceedances were observed at six GWL RMN wells across the Subbasin and these wells were not always the five wells where pumping was increased, thus indicating that the impact of the PCBL-CC-MT scenario was more widespread than just where the artificial pumping was applied. The application of the PCBL-CC-MT scenario to depletions of ISW is discussed in the next section.

**Figure 18: Well Group B Locations of Simulated Drawdown**



### 3.2 Application of PCBL-CC-MT Version 3.0 to Depletions of ISW Analysis

Once the PCBL-CC-MT Version 3.0 scenario was finalized, it was then used as described in Appendix 3-G to evaluate stream-aquifer interaction against Water Year 2015 conditions across three dimensions:

- Spatial stream connectivity
- Average annual stream gains and losses
- Seasonal stream gains and losses

The analysis found that the spatial connectivity of streams was unchanged between WY 2015 and PCBL-CC-MT. Though the narrative in Appendix 3-G focused on a comparison with WY 2015, figures included in Attachment 3 of Appendix 3-G demonstrate that the observations made in the text with regards to WY 2015 also hold true to a comparison against model current conditions (average of WY 2020 through 2023) and historical conditions (average over the entire Historical ESJWRM Version 3.0). In other words, streams connected in the historical simulation remain connected under the induced-pumping scenario, and stream losses as a percentage of total stream inflow (calculated by river) were generally equal to or better than historical model conditions. On that basis, it was concluded that the GWL SMCs are protective of ISW and that the scenario does not indicate an undesirable result occurring for ISW.

DWR's comment implies concern that inducing artificial pumping at just five wells of the GWL RMN does not represent realistic, Subbasin-wide future pumping conditions that may lead to GWL undesirable results. While that may be true, there are nearly infinite ways that Subbasin groundwater use could change in the future. The PCBL-CC-MT scenario was never intended to simulate a likely or most-probable future pumping distribution; rather, it was simply designed as a targeted stress test. The scenario was the most efficient way to reproduce the specific regulatory condition that defines a GWL undesirable result (25 percent of GWL RMN wells at MTs for two consecutive years) so that the resulting stream response could be examined. Repeating the analysis multiple times using different sets of wells, as described in Appendix 3-E, demonstrated that the undesirable result condition can be reproduced under differing hydrogeological conditions, so the scenario design does not depend on any single, arbitrary selection of five wells. Concentrating pumping at GWL RMN wells closer to interconnected streams is a conservative design choice and stresses the stream system more directly than a Subbasin-wide pumping increase of the same magnitude would. To address this concern directly, additional modeling was completed in 2026 using a Subbasin-wide pumping increase rather than pumping concentrated at individual wells; that analysis is presented in Section 4.

Additionally, DWR's comment considered whether stream loss as a percentage of streamflow is an appropriate metric for evaluating effects on beneficial uses and users. The percentage-of-streamflow metric was used in the Appendix 3-G analysis because, at the time and as described above in Section 1, the model's simulation length and equilibrium behavior did not support a defensible streamflow depletion value. Percentage of streamflow was a practical proxy that still allowed a comparison against WY 2015 conditions.

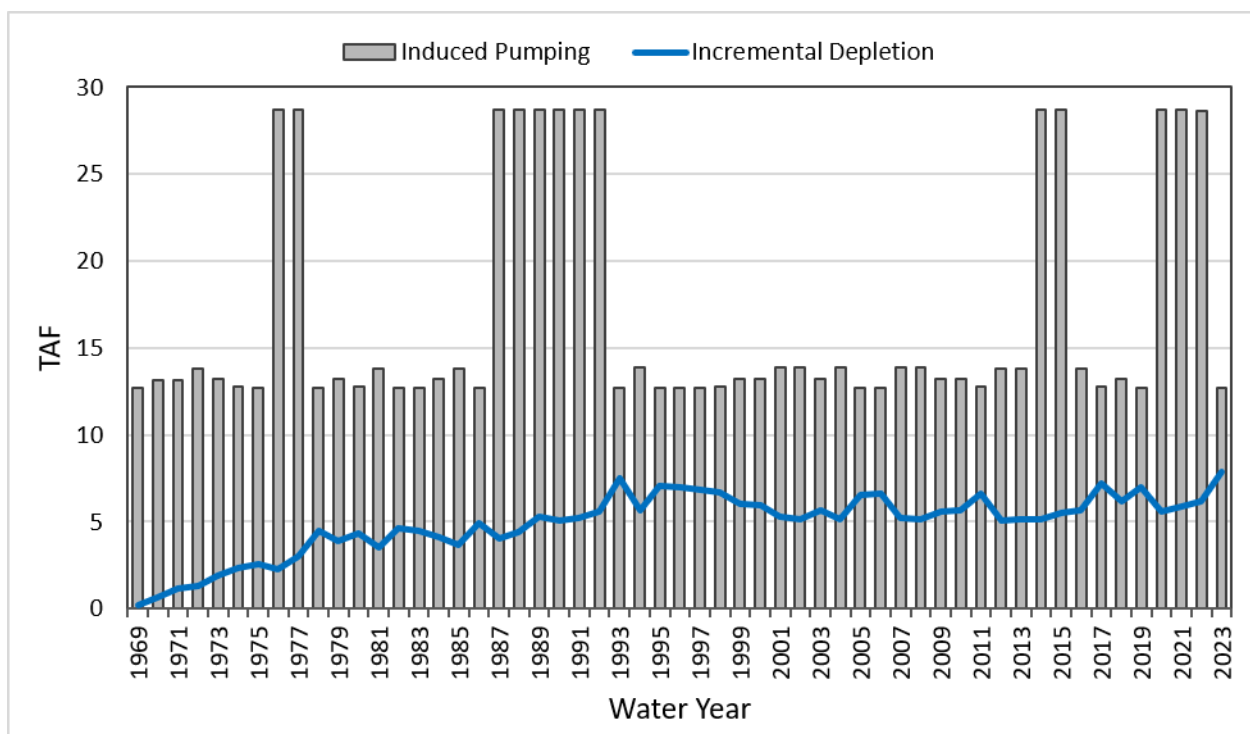
Finally, in order to include a depletion-based metric, the incremental stream depletion caused by the induced pumping in the PCBL-CC-MT was quantified by comparing stream losses between PCBL-CC-MT Version 3.0 and PCBL-CC Version 3.0. Because the two scenarios are identical except for the induced pumping applied at the five selected GWL RMN wells, the difference in simulated stream gains and losses is the depletion caused by the additional pumping that produces the GWL undesirable result. Note that the simulation period here is longer at 55 years, includes climate change, assumes the Subbasin is operating at projection (approximately 2040) demands and supplies, and is based on the real hydrology conditions of WY 1969–2023. Appendix 2-C includes a full description of the PCBL and the PCBL-CC scenarios.

Over the 55-year projected simulation, the induced pumping at the five GWL RMN wells produced an incremental depletion (or depletions beyond those experienced in the PCBL-CC) that increased over approximately the first twenty years and thereafter fluctuated with hydrology around a pseudo-equilibrium of roughly 5 to 7 TAF per year, averaging approximately 6,600 acre-feet per year over the final five simulated years. Over the full simulation, incremental annual capture fractions varied from roughly 20 to 60 percent depending on year type (induced pumping is about 13 TAF per year in most years and approximately 29 TAF per year in the drier year types) (Figure 19, Figure 20, and Figure 21).

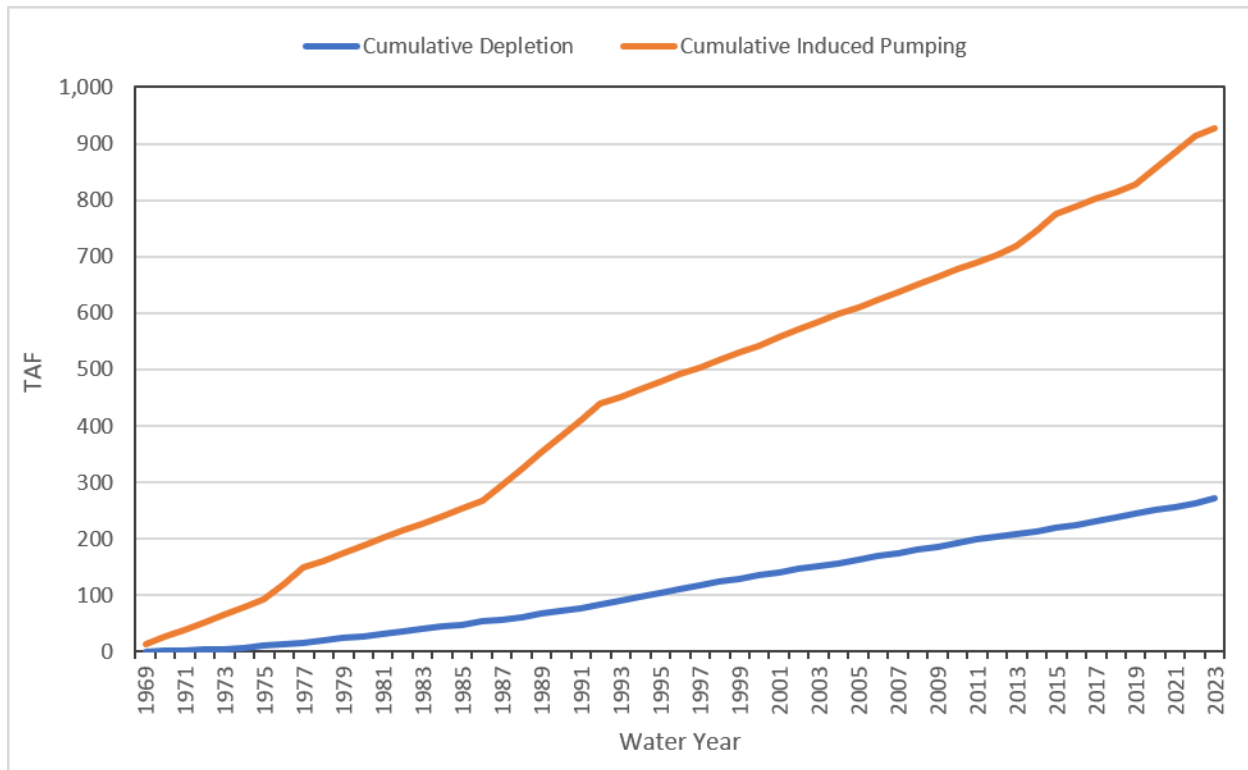
Incremental depletion was concentrated, as expected, in the reaches nearest the pumped wells (the Stanislaus River, the upper Mokelumne River, and the San Joaquin River), confirming that concentrating the induced pumping near interconnected streams stressed the stream system. Incremental depletion in this scenario represents approximately 1.5 percent of the average annual depletion estimated under the With-Pumping and Without-Pumping scenarios in Section 1.2 to represent the current depletion. In contrast to the scenarios described in Section 1, the incremental depletion largely equilibrates within the simulation period.

These results are supplemented by the Subbasin-wide analysis presented in Section 4, which provides the primary depletion-based support for the conclusion that the GWL SMCs are protective of ISW.

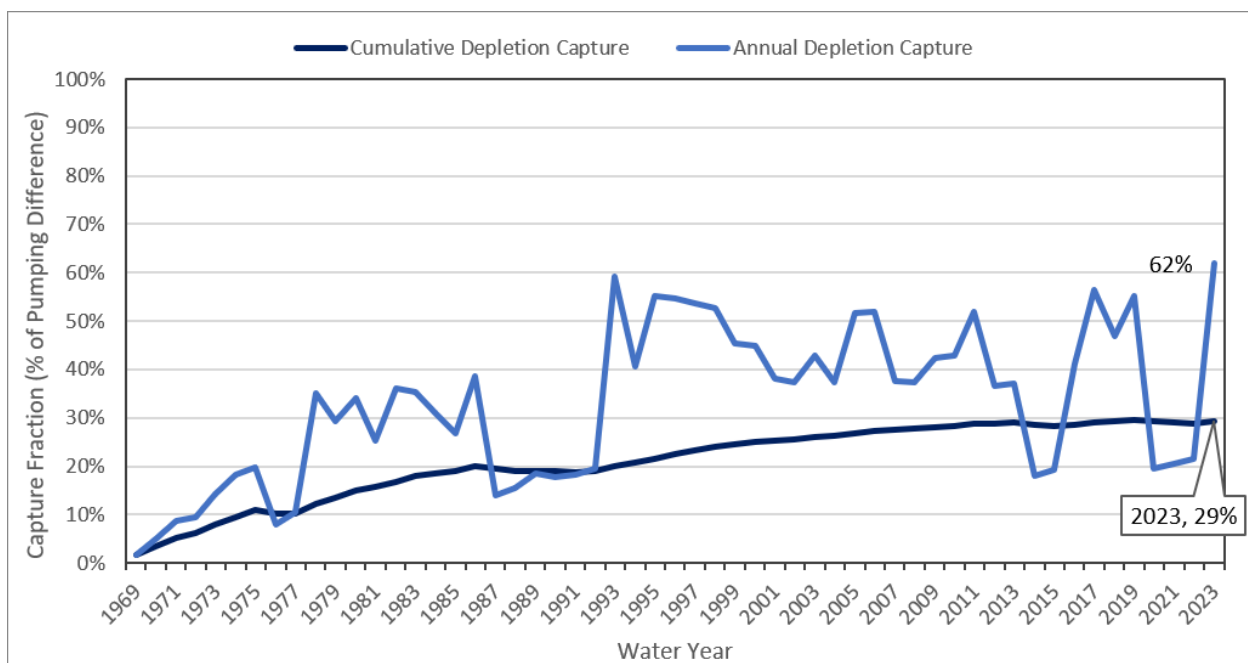
**Figure 19: PCBL-CC-MT and PCBL-CC Scenarios- Annual Incremental Depletion and Annual Induced Pumping**



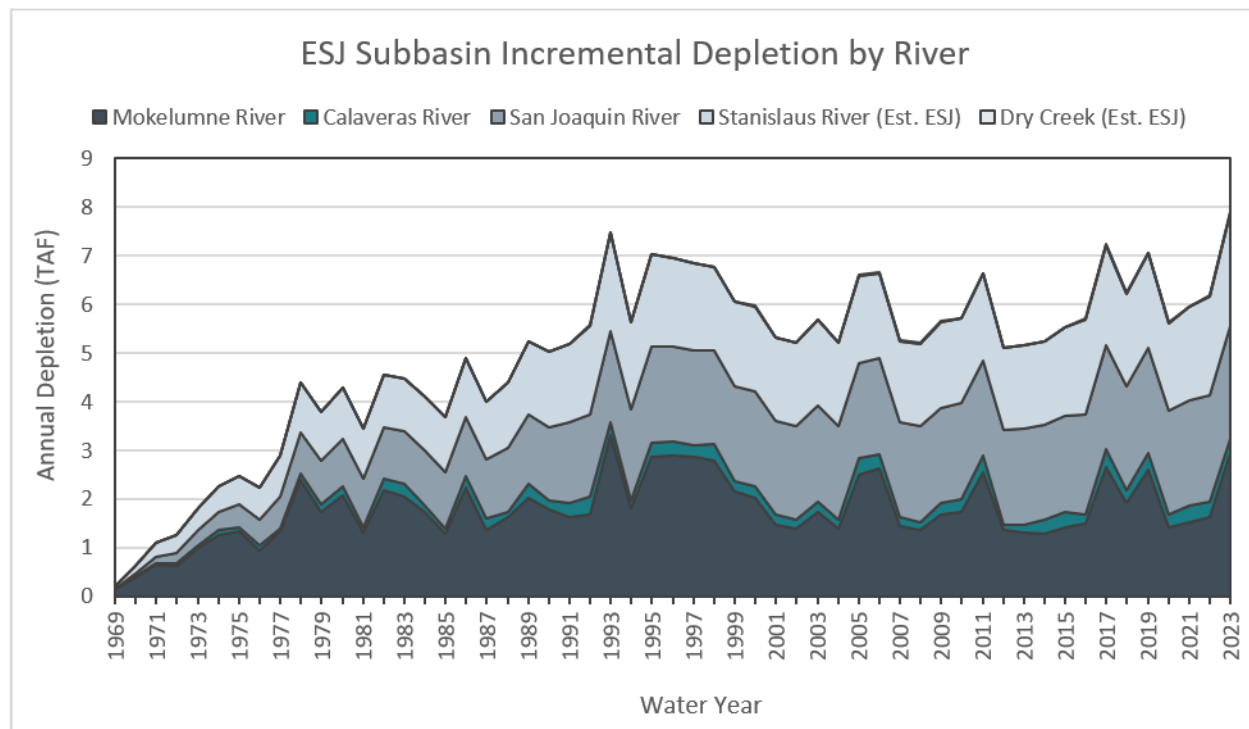
**Figure 20: PCBL-CC-MT and PCBL-CC Scenarios- Cumulative Incremental Depletion and Cumulative Induced Pumping**



**Figure 21: PCBL-CC-MT and PCBL-CC Scenarios- Annual and Cumulative Depletion Capture (Percent of Annual or Cumulative Pumping Difference)**



**Figure 22: PCBL-CC-MT and PCBL-CC Scenarios- Incremental Depletion by River**



#### 4. Additional Analysis to Justify Use of GWL SMCs for Depletions

Additional modeling analysis was completed in 2026 to further justify the use of groundwater levels as a proxy for depletions. As noted in DWR's draft Sustainable Management Criteria Best Management Practice (DWR, 2017), one approach for using groundwater elevations as a proxy metric is to "[d]emonstrate that the minimum thresholds and measurable objectives for chronic declines of groundwater levels are sufficiently protective to ensure significant and unreasonable occurrences of other sustainability indicators will be prevented. In other words, demonstrate that setting a groundwater level minimum threshold satisfies the minimum threshold requirements for not only chronic lowering of groundwater levels but other sustainability indicators at a given site." The 2024 GSP Amendment included model-based analysis showing that the GWL SMCs are protective of ISW, meaning that significant and unreasonable levels of depletions would not be expected to occur without triggering significant and unreasonable conditions related to groundwater levels. Based on DWR feedback that the 2024 GSP Amendment's use of focused pumping at GWL RMN well locations represents the absolute minimum pumping required for a GWL undesirable result, additional modeling was undertaken in 2026 to increase groundwater pumping more broadly across the Subbasin.

The PCBL Version 3.0 was used as the basis of this new analysis, with pumping increased to trigger undesirable results for groundwater levels. In order to increase groundwater pumping and cause a GWL undesirable result (25 percent of the GWL RMN falling below minimum thresholds for two consecutive years), surface water deliveries to the Subbasin were reduced, forcing a larger share of agricultural demand to be met by groundwater pumping. The reduction was applied to agricultural surface water deliveries only, as agricultural use represents the largest groundwater pumping in the Subbasin and is therefore the primary driver of increased pumping due to reduced surface water supply; urban deliveries were held at baseline, an assumption reflecting the more hardened nature of urban demand and with only a small effect on the

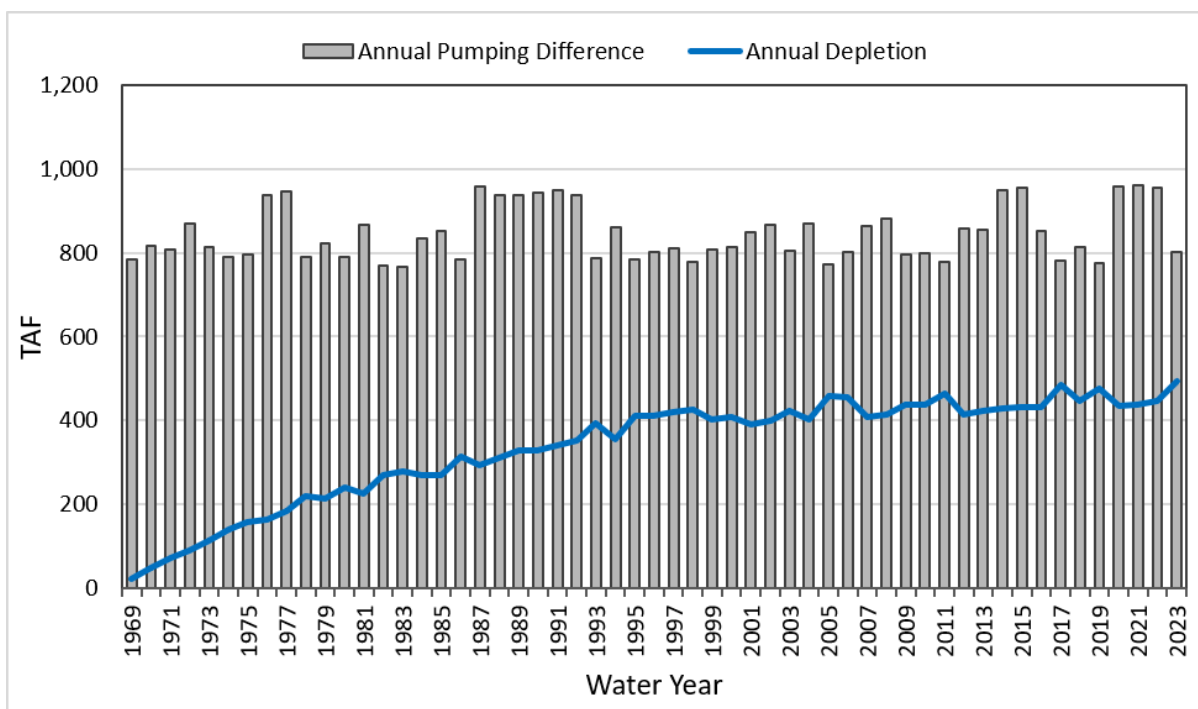
simulated groundwater budget and groundwater levels. In contrast to the PCBL-CC-MT Version 3.0 scenario, which concentrated induced pumping at a select number of GWL RMN wells, this approach increased pumping across most of the Subbasin in response to reduced agricultural surface water availability, potentially producing a more realistic version of what could cause the Subbasin to see a GWL undesirable result. Deliveries were reduced incrementally until a GWL undesirable result occurred. Retaining 85 percent of the Subbasin's agricultural surface water diversions (a 15 percent reduction in agricultural deliveries) produced undesirable results for GWL, with minimum thresholds exceeded at six GWL RMN wells for two consecutive years; this scenario is referred to as PCBL-SW85 Version 3.0. Compared to the PCBL Version 3.0, which only had two wells exceed MTs during the simulation and so did not have a GWL undesirable result, the amount of additional pumping in the Subbasin due to the 15 percent reduction in agricultural surface water is between 41 and 51 TAF per year. This is more than the additional pumping induced in the PCBL-CC-MT scenario (between 13 and 29 TAF per year, depending on water year type).

To quantify the depletions associated with this Subbasin-wide undesirable result, a companion without-pumping scenario was developed, which will be referred to as the PCBL-SW85-NoPump to distinguish from the historical analysis presented above in Section 1. Depletions were quantified by comparing simulated stream gains and losses between PCBL-SW85 and PCBL-SW85-NoPump. Because the two scenarios are identical (both have reduced surface water deliveries) except for the groundwater pumping, the difference in simulated stream gains and losses is the depletion caused by pumping. Over the 55-year simulation, the Subbasin-wide groundwater pumping under PCBL-SW85 produced depletion of approximately 457 TAF per year averaged over the final five simulated years. Similar to the PCBL-CC-MT, depletions increased over approximately the first twenty-five years and thereafter fluctuated with hydrology around a pseudo-equilibrium of roughly 450 TAF per year. Over the full simulation, annual capture fractions (based on total pumping) vary from roughly 35 to 62 percent depending on year type (Figure 23, Figure 24, and Figure 25).

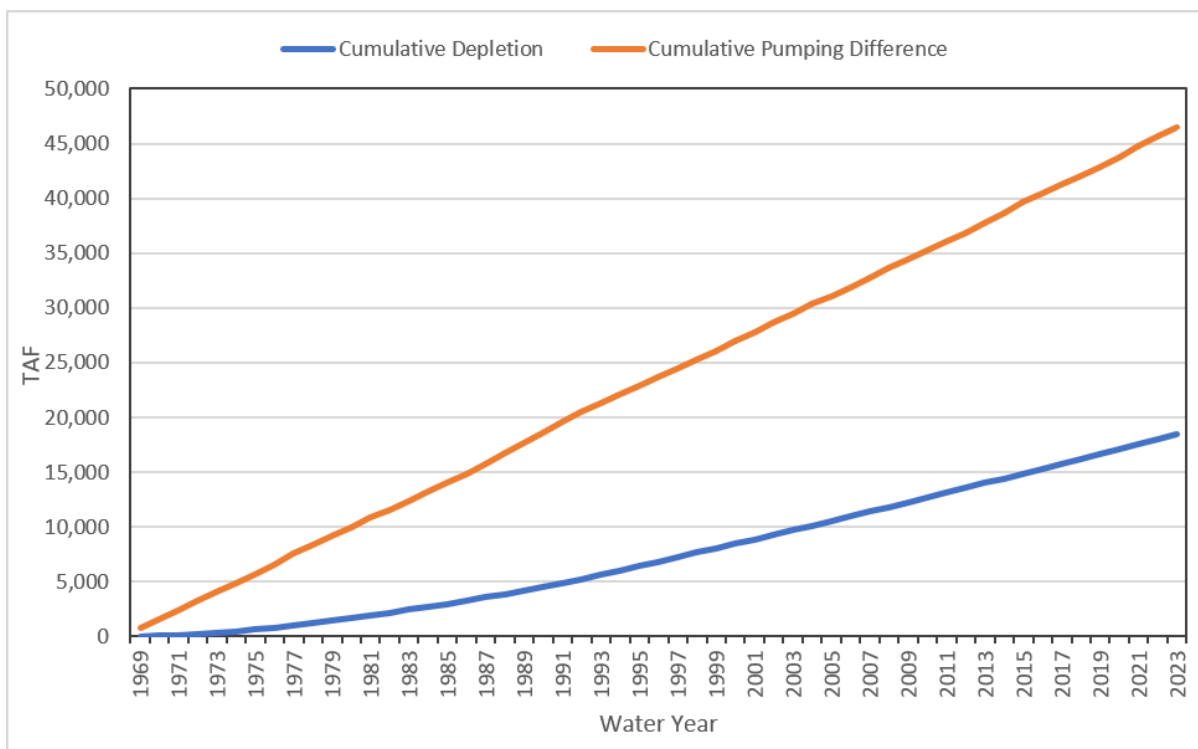
Because this analysis uses the same with- and without-pumping comparison approach applied to the historical analysis in Section 1, the two depletion estimates are comparable. The simulated depletion of approximately 457 TAF per year over the final five simulated years from the PCBL-SW85 scenarios, capturing approximately 40 percent of cumulative pumping, is only modestly larger than the approximately 430 TAF per year and 38 percent cumulative capture estimated in Section 1, indicating that reaching a GWL undesirable result causes a relatively small increase in depletion beyond the depletion already occurring under present-day pumping. Depletions under current and historical conditions are not considered by the GSAs to be significant and unreasonable, nor near significant and unreasonable. With a relatively small increase over current and historical depletions, these results provide a depletion-based confirmation, using a spatially distributed Subbasin-wide pumping increase rather than pumping concentrated at individual GWL RMN wells, that the stream depletion occurring at the point a GWL undesirable result is experienced is not significant and unreasonable. Producing this result required a sustained stress of a 15 percent Subbasin-wide reduction in agricultural surface water deliveries to drive 41 to 51 TAF per year of additional pumping, more than was induced in the PCBL-CC-MT scenario, with minimum thresholds exceeded at six GWL RMN wells. As with the analyses above, the ESJGWA will revisit this analysis, including the selection of depletion metrics, once DWR's final guidance on SMC development for depletions of ISW is released.



**Figure 23: PCBL-SW85 With- and Without-Pumping Model Scenarios- Annual Depletion and Annual Pumping Difference**

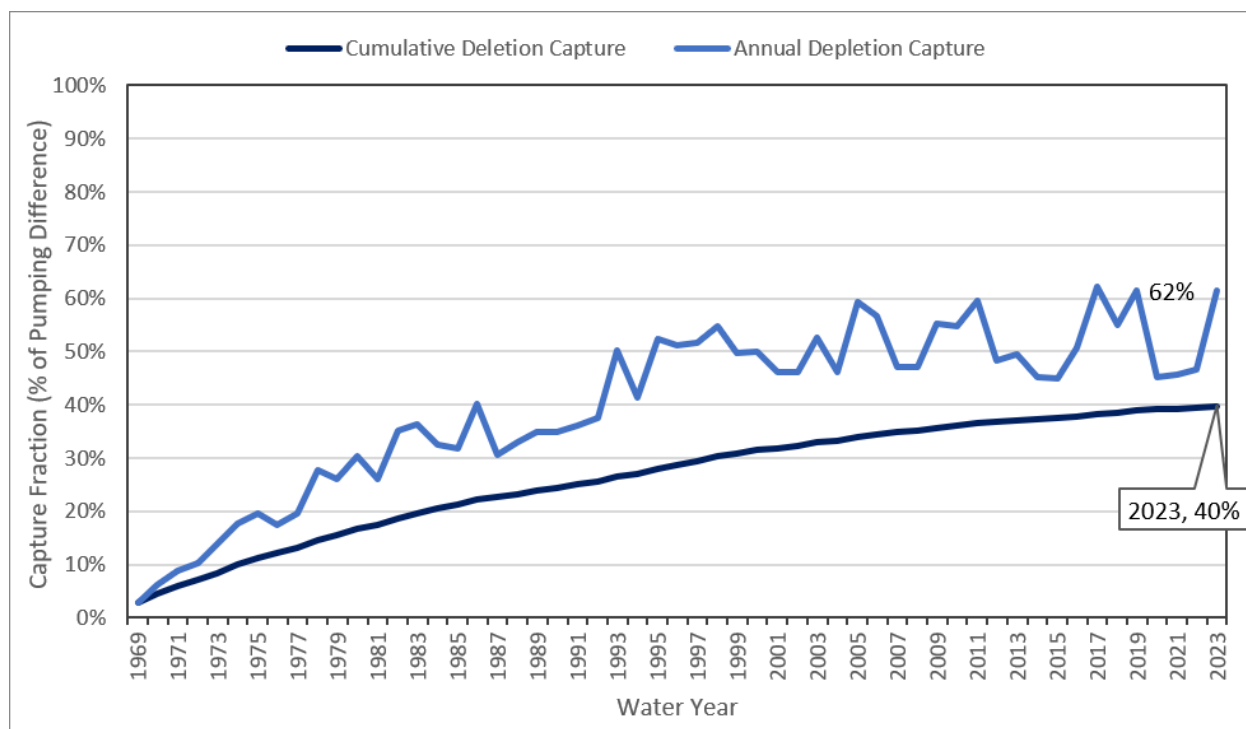


**Figure 24: PCBL-SW85 With- and Without-Pumping Model Scenarios- Cumulative Depletion and Cumulative Pumping Difference**





**Figure 25: PCBL-SW85 With- and Without-Pumping Model Scenarios- Annual and Cumulative Depletion Capture (Percent of Annual or Cumulative Pumping Difference)**



## 5. Summary

DWR's fourth guidance document addressing ISW for SGMA has not yet been released, so the Subbasin did not undertake new modeling for this TM but instead explained the areas of the previous ISW analysis where DWR had questions. Once the guidance is released, the ESJGWA will consider reevaluating analyses related to ISW, including modeling, UR, SMCs, and more. The following summarizes our responses to DWR's specific questions as contained in their April 17, 2026 letter.

1. Provide an estimate of ISW depletion due to groundwater pumping. If the GSAs are unable to provide this estimate, please describe any planned modifications to the modeling approach or other approaches being considered to ensure alignment with the GSP Regulations and provide further explanation regarding why ISW depletion due to groundwater pumping could not be quantified, including details of the analysis concluding that the model scenarios provide an inconclusive understanding of ISW depletion due to groundwater pumping.

*Response: See Section 1 of this TM for the modeling completed using the best available science and the estimate of current ISW depletion due to groundwater pumping. As described in the section, ESJGWA will evaluate updating the modeling given the finalized guidance document from DWR.*

- 2a. The UR for the ISW sustainability indicator appears to be still based upon 25 percent of groundwater level RMN wells exceeding MTs; please confirm.

*Response: In the interim, yes. The ISW RMN will have 12 wells, but currently only six have established MTs. Until SMCs are established at all 12, the groundwater level sustainability indicator serves as the proxy for depletions of ISW, as described in Sections 3 and 4.*

- 2b. Please describe the purpose of the newly-established ISW RMN and the process by which the ISW RMN will be utilized to define undesirable results.

*Response: As discussed in Section 2 of this TM, the ISW RMN was created in response to one of DWR's recommended corrective actions from the 2022 GSP to begin closing the shallow, near-stream data gaps and characterize stream-aquifer interaction. It includes new shallow monitoring wells installed specifically to help the Subbasin improve its understanding of stream-aquifer interaction, along with GWL RMN wells that are within five miles of connected streams.*

3. Please provide a robust explanation of the PCBL-Minimum Threshold modeling scenario, including pumping quantities, timing, and locations.

*Response: As discussed in Section 3 of this TM, the PCBL-CC-MT Version 3.0 scenario used for application to ISW analysis is described in more detail, including the five wells selected for induced pumping and the average pumping induced at each well location in order to cause six wells to exceed MTs during the simulation, potentially indicating a GWL UR.*

4. Please explain how the induction of localized artificial pumping at the set(s) of five wells comprising the UR is representative of Subbasin-wide conditions that would lead to five of the RMN wells lowering to their MTs.

*Response: As discussed in Section 3 of this TM, the PCBL-CC-MT Version 3.0 was a theoretical exercise where Subbasin conditions were stressed by focused pumping at distinct locations. As mentioned in the discussion, the GWL RMN wells that experienced MT exceedances in this scenario did not always correspond to where pumping had been induced, indicating the impact of artificial pumping persists beyond the pumping location. Additional modeling was completed as described in Section 4 to cause a GWL undesirable result through Subbasin-wide increases in pumping.*

5. If this approach is retained, explain why the use of stream loss as a percentage of streamflow instead of depletion is an appropriate metric to evaluate effects on beneficial uses and users.

*Response: As discussed in Section 3 of this TM, stream loss as a percentage of streamflow was used in Appendix 3-G as the best available science because the quantification of depletion was inconclusive at the time. To supplement that metric, the incremental streamflow depletion due to the pumping applied in PCBL-CC-MT Version 3.0 was quantified by comparing against PCBL-CC Version 3.0. The incremental depletion averaged approximately 6,600 acre-feet per year over the final five simulated years, was concentrated in reaches nearest the pumped wells, and was approximately 1.5 percent of the estimated current depletion presented in Section 1. Additional modeling completed in 2026, described in Section 4, quantified depletions under a Subbasin-wide increase in pumping and provides the primary depletion-based support for the conclusion that the GWL minimum thresholds are protective of interconnected surface water.*

## 6. References

California Department of Water Resources (DWR), November 2017. *Best Management Practices for the Sustainable Management of Groundwater: Sustainable Management Criteria*. DRAFT.

DWR, February 2024a. *Depletions of Interconnected Surface Water: An Introduction*. DRAFT.

DWR, September 2024b. *Techniques for Estimating Interconnected Surface Water Depletion Caused by Groundwater Use*. DRAFT.

DWR, September 2024c. *Examples for Estimating Interconnected Surface Water Depletion Caused by Groundwater Use*. DRAFT.



## TECHNICAL MEMORANDUM

**TO:** Monica Salais, PE (Department of Water Resources)

**PREPARED BY:** Julia Berry, Executive Director

**REVIEWED BY:** ESJGWA Groundwater Sustainability Agencies

**Date:** August 26, 2026

**RE:** DWR Request for Clarification on Plan Implementation, Management Actions

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In a letter dated April 17, 2026, the California Department of Water Resources (DWR) requested additional information on the Eastern San Joaquin (ESJ) Groundwater Subbasin's (Subbasin) 2024 Groundwater Sustainability Plan (GSP) Amendment and 2024 Periodic Evaluation (PE). Six areas were identified by DWR, including clarification on implementation of the ESJGWA Groundwater Sustainability Plan (Plan). This Technical Memorandum (TM) addresses Topic 6 which requests clarification of Plan Implementation. Specific responses pertaining to the implementation of the Domestic Well Mitigation Program are included in a separate TM.

In the April letter, DWR requested an update on Plan implementation and Management Actions including the following:

- a) **Demand reduction offset explanation:** Provide additional information pertaining to revision of the groundwater pumping (demand reduction) offset, including justification of underlying assumptions.
- b) **Sustainability Goal:** Clarify and justify discrepancies between projected and realized project and management action benefits in the context of whether the subbasin continues to meet its sustainability goal.
- c) **Management actions:** Justify details pertaining to management actions and their importance for the subbasin to meet its sustainability goal.

This TM provides responses and clarification to DWR's request for additional information in the following sections.

## **1. Groundwater Offset Target**

*"Provide an explanation for why the groundwater offset reduction target was updated, including justification of the underlying assumptions and the selection of a target that does not include climate change."*

### **a. Offset Reduction Target Update<sup>1</sup>**

The offset estimate identified in the GSP is a modeled estimate of the amount of direct or in-lieu groundwater recharge and/or reduction in groundwater pumping required to achieve an approximate net-zero change in groundwater storage over the planning period. It is intended to inform planning and implementation efforts and is not itself a regulatory threshold or management objective. The GSAs manage the Subbasin to measurable objectives and use modeled augmentation/reduction estimates as planning information.

In preparing the 2024 GSP Amendment, the Eastern San Joaquin Water Resources Model (ESJWRM) was updated from Version 2.0 to Version 3.0 using new hydrostratigraphic information, updated monitoring data, and extended datasets through WY2023. As part of this update, the sustainable yield simulation and associated planning scenarios were rerun. These model updates increased the estimated augmentation/reduction needed to achieve an approximate zero change in groundwater storage from 78,000 AFY to 95,000 AFY.

Consistent with SGMA requirements, the GSAs also considered climate change in the projected water budget analyses. When the same scenario was evaluated using climate change assumptions, the model estimated that approximately 166,000 AFY of recharge and/or demand reduction would be necessary to achieve an approximate zero change in groundwater storage.

The GSAs consider the 95,000 AFY and 166,000 AFY results to provide a reasonable planning range for evaluating future management needs. The GSAs reviewed the modeled hydrographs under both modeled scenarios and noted that there was not a material difference in projected groundwater levels remaining above MTs and near MOs between the two scenarios. This is due, in part, to the substantial influence of boundary flows and streamflow interaction in the model.

While the GSAs are initially focusing implementation efforts on the 95,000 AFY scenario, they will continue to evaluate changing hydrologic conditions, updated modeling results, and project effectiveness through adaptive GSP implementation. The climate change modeling scenario includes several conservative assumptions that increase model uncertainty and should not be interpreted as a regulatory commitment to manage the Subbasin to hypothetical future climate conditions. Should future conditions warrant, the GSAs

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<sup>1</sup> DWR's slides use the term "offset reduction target" to refer to the GSP's numerical goal for reduced annual net extraction of groundwater from the subbasin. The term "offset reduction target," however, is not used in the GSP. In the GSP "offset" refers to a replacement for groundwater use. (2024 GSP at ES-1.) For example, a project that provides surface water for use in lieu of pumping groundwater provides an offset. One goal of the GSP is to increase offsets, not reduce offsets. For clarity, therefore, this memorandum does not use the term "offset reduction target" in any other location.

remain prepared to implement additional projects and management actions necessary to avoid undesirable results.

## **2. Feasibility of PMAs to Achieve the Offset Number**

*"Please describe the feasibility of PMAs in Categories A and B of reaching the groundwater offset reduction target and provide details of the planned demand management program to account for deficits between realized project and management action benefits and the demand reduction target considerate of climate change."*

### **a. Feasibility of Category A and B PMAs for Achieving Offset Number**

As previously described, the Model targets a conservative scenario for the amount of increased groundwater recharge or reduction in groundwater pumping that must be implemented to achieve a net-zero change in groundwater storage. ESJWRM model scenarios simulated as part of the 2024 GSP Amendment include two that simulate projects and management actions:

- Projected BaseLine with Projects/Management Actions (PCBL-PMA)
- Projected BaseLine with Climate Change and Projects/Management Actions (PBCL-CC-PMA)

These two scenarios only simulated the implementation of Category A PMAs as these are projects that are already in operation or will be in the near term. The 2024 GSP Amendment (as did prior GSP versions) categorized projects and management actions as either Category A or B based on how likely they are to be online by 2040 and if they already had the necessary water rights and/or agreements to proceed with the project. Category A PMAs are designated as "Category A" because they are highly feasible in that they are planned, designed and slated for funding, under construction and/or in operation. At present, there are 13 Category A projects. Category B PMAs are also feasible but were placed in a separate category as they may be conceptual and/or in the earlier stages of design.

In its April 17, 2026 letter, DWR notes that the Periodic Evaluation documents that Category A project benefits to dates total 5,928 AFY. First, this number is misleading as it assumes benefits are averaged over the last 5 years. However, some of the benefits presented in Table 3-1 in the Periodic Evaluation represent only a single year benefit due to the recent initiation of the project. Therefore, the 5,928 AFY is an underrepresentation of the expected benefits of these projects. .

Second, these numbers represent recharge benefits through September 2024 and do not include additional recharge benefits that have occurred since that time (including recharge during 2 wet years). Some of these were still in the planning and construction process when the annual report was prepared and have only recently become operational.

Finally, 2020, 2021 and 2022 were dry years with limited unallocated water supply available for recharge (either directly or in-lieu). There is updated data for the time period extending through 2026 that shows greater benefits from the Category A PMAs. The GSAs are on track to have Category A PMAs provide an average of 67,000 AFY of direct or in-lieu recharge into the Subbasin, resulting in an average 33,000 AFY



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shortfall after accounting for modeled changes in stream losses and boundary flows (see 2024 GSP Amendment, Appendix 3-E, Technical Memo. No. 4).

In addition, the GSAs are diligently pursuing efforts to fast-track certain Category B PMAs. The Category B PMAs have not been modeled to present an average annual benefit, but the list includes some substantial projects with a total maximum annual recharge benefit of 509,985 AFY (2024 GSP Amendment, page 6-11).

The most notable of these Category B projects is the San Joaquin County Mokelumne River Conjunctive Use Program (called "MICUP"). The MICUP is likely to move up to a Category A PMA in the next annual report due to its recent progress, which includes finalizing an amended water right application on the Mokelumne River and the fact that MICUP partner agencies San Joaquin County, North San Joaquin Water Conservation District, Stockton East Water District and the City of Stockton finalized the project plans and CEQA Draft Environmental Impact Report for MICUP in May of 2026 (the DEIR is currently out for public review). According to the DEIR, the annual maximum MICUP recharge benefit is 158,000 AFY and is expected to generate average annual recharge benefit of 65,000 AFY.

## **b. Provide Details of the Planned Demand Management Program**

The currently modeled Category A PMAs are projected to provide an average annual pumping offset benefit of 33,000 AFY, while MICUP is projected to provide an additional 65,000 AFY of average annual recharge benefit. However, the GSAs have also committed to demand management. As described in 2024 GSP Amendment, Appendix 6-B, Technical Memorandum No. 6, the GSAs are scheduled to reach agreement by the end of 2026 regarding each GSA's responsibility for implementing the required demand management measures. To support those negotiations, the GSAs have retained a consultant to collect updated operational data from each GSA and develop operational budgets using a standardized budgeting methodology. Some GSAs may choose to implement demand management programs earlier. Although responsibility for achieving the Subbasin's Sustainability Goals remains shared among all GSAs, it is anticipated that demand management initiatives/programs will be predominantly assigned specifically to the following three (3) Agricultural/Rural Community GSAs:

- North San Joaquin Water Conservation District (NSJWCD)
- Stockton East Water District (SEWD)
- Central San Joaquin Water Conservation District (CSJWCD)

Additional information for each of the three aforementioned GSAs is provided below:

### **i. NSJWCD GSA:**

NSJWCD's groundwater management efforts focus on: (1) groundwater fees to incentive reduced use of groundwater; (2) converting groundwater users to surface water to accomplish in-lieu recharge; and (3) building direct groundwater recharge facilities.

NSJWCD implemented a groundwater extraction charge in 2021 and has steadily increased it over the last five years. At the same time, approximately 5,000 acres of winegrapes have been removed from the NSJWCD GSA due to market conditions. NSJWCD is currently working on plans for a modified groundwater charge structure and/or groundwater penalty program (to be rolled out in 2027) to incentivize landowners in





making replanting decisions for fields that previously had winegrapes. NSJWCD has also started performing annual ET-based estimates of pumping by parcel and will be formalizing this process for all irrigated parcels in late 2026 for the next water year.

NSJWCD has also completed the following PMAs:

- North System Improvements and Lakso Recharge Basin: Secured long term lease of 80-acre recharge basin that became fully operational in Fall of 2025 and is recharging surface water at a rate of 900 AF per month with 7,000 AFY of recharge anticipated in WY 2026.
- The North Pump Station reconstruction project has completed its planning phase and secured grant funding. It is going through CEQA review and permitting now and will be constructed in 2027. Once operational, this project will add another 5,000 AFY+ capacity to the North System for recharge and irrigation deliveries beginning in 2028.
- Expanded the South Pump Station with a second pump and completed additional replacement of the South Mainline in 2025 to achieve 40 cubic feet per second (cfs) diversion capacity.
- Purchasing 60 acres of land along South System in 2026 and constructing new recharge basins to enable 4,000 AFY of direct recharge on the South System beginning in 2027.
- Expanded irrigation deliveries to approximately 1,500 acres in 2025-26 along the South System, with additional acres adding each year. Many of these new surface water users received State Water Efficiency and Enhancement Program (SWEET) Block Grant to improve on-farm facilities to take surface water in-lieu of groundwater.

Collectively these improvements mean that NSJWCD has gone from a 1,500 AFY average annual surface water user prior to 2025 to a 6,000 AFY average annual surface water user today, with anticipated increase to 15,000 AFY average within the next five years using just the existing NSJWCD water right. These PMA achievements are not captured in the 2024 GSP Amendment nor the Periodic Evaluation because they have come to fruition in 2025-26.

NSJWCD has also partnered with SEWD, the City of Stockton and San Joaquin County to complete the MICUP DEIR and project plans to put up to 148,000 AFY of additional wet season Mokelumne River surface water to use in the Subbasin. An estimated 40% of this new supply would be used in the NSJWCD service area.

Furthermore, NSJWCD is working on a larger groundwater banking program with East Bay Municipal Utility District (EBMUD) that will bring an additional 6-8,000 AFY of EBMUD Mokelumne River water into the NSJWCD area for direct or in-lieu recharge. This is a new supply, like MICUP water, that will increase the total surface water supply in NSJWCD and improve the overall water budget.

NSJWCD's PMA pumping offset with its existing water right projects and MICUP averages 30,000 AFY. This is approximately the groundwater pumping demand management that NSJWCD is likely to have to meet under the agreement currently being negotiated between the GSAs to allocated initial demand management responsibility. However, NSJWCD recognizes that the PMAs may take several years to complete and become fully operational, and that interim demand management in the form of pumping reductions may be needed to avoid undesirable results. That is why NSJWCD has continued to increase its



groundwater extraction charge and is evaluating potentially higher charges and/or penalties in 2027 as part of the schedule of implementation for demand management.

**ii. SEWD GSA:**

Stockton East Water District (SEWD) GSA has concurrently advanced in-lieu recharge projects, managed aquifer recharge (MAR) projects, and planning efforts for regional scale flood-MAR and surface water storage projects. The primary focus, and most immediate impact, on sustaining groundwater levels are the in-lieu recharge projects which constructed surface water diversion facilities to offset historical groundwater use for agricultural irrigation.

- The Lake Grupe In-Lieu Recharge Project converted approximately 600 acres from groundwater irrigation to surface water irrigation. The conversion provided an in-lieu groundwater recharge benefit of 1,680 AF annually.
- Between 2015 and 2020, SEWD facilitated the installation of 10 turnouts, providing surface water to 1,207 acres, and supplying about 3,380 AF of water annually.
- Following submittal of the ESJGWA GSP in 2020, SEWD continued to invest heavily in in-lieu recharge throughout their distribution systems. Since 2020, SEWD has engaged in projects to convert an additional 6,494 irrigated acres to surface water, resulting in an in-lieu recharge benefit of 18,183 AF annually. Many of the projects are complete, while some remain in design or construction; but all projects are funded.
- With regards to direct recharge through MAR basins, SEWD has continued to recharge through facilities constructed in 2003 and advanced three additional MAR projects.
  - The New North Reservoir went online in 2020 and recharged 384 AF that year, and 36,778 AF since that time.
  - In December 2021, SEWD entered into a Borrow Agreement with the San Joaquin Area Flood Control Agency, the CA Department of Water Resources, and the US Army Corps of Engineers (USACE) to provide fill material from SEWD's West Groundwater Recharge Basin site. Excavation of the West Groundwater Recharge Basin began in 2025 and will continue for approximately 15 years, at which time the 94-acre recharge basin will be fully excavated. Upon completion, the basin is estimated to provide recharge capacity of up to 16,000 AF annually.
  - In January 2026, SEWD acquired 96 acres of land near Linden, CA to construct new recharge basins. The property already contains two ponds totaling 3.8 acres that SEWD is currently using for direct recharge, and the remaining acreage is currently under design and planned to be developed into five recharge ponds by 2035. The Project will divert water from the Old Calaveras River (OCR) through a new pipeline, replacing an older pipeline, to serve up to 500 acres of farmland and the supply regulation and recharge reservoirs with surface water. Key components under consideration include one regulating/recharge reservoir, 4 recharge reservoirs, pipelines, grower turnouts to deliver water, and a low lift high flow return water pump station to the OCR for flow regulation.

In addition to the in-lieu and direct recharge projects that are in various stages of design, SEWD has two major planning efforts underway.



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- The Water Supply Enhancement Project includes the installation of multiple distribution pipelines to divert up to 108,000 AF annually of floodwater from the Calaveras River into underground storage. SEWD submitted a water right application to support the diversion and design of the first distribution pipeline is complete. SEWD is currently completing the Environmental Impact Report for the overall project and working to secure \$1.5M in US Bureau of Reclamation grant funding to construct the first pipeline.
- The Farmington Reservoir project was authorized by Congress in the 2024 WRDA, allowing the U.S. Army Corps of Engineers (USACE) to study conversion of the existing flood control dam into a year-round surface water storage facility. SEWD submitted multiple water right applications to support the storage project and received approval in June 2026 to perform a Section 203 study, thereby allowing SEWD, as the local partner, to take lead of the study. Efforts are currently underway to secure funding to conduct the study.

### iii. **CSJWCD GSA:**

Central San Joaquin Water Conservation District was formed in 1958 and has historically relied on imported surface water as its primary tool to reduce groundwater dependency in the subbasin. In December 1993, the District executed a 40-year water supply contract with U.S. Bureau of Reclamation (USBR) for up to 80,000 AFY from New Melones Reservoir (49,000 AF firm yield, plus up to 31,000 AF on an interim basis), specifically to halt the decline of groundwater levels underlying the District through in-lieu recharge. In most years, actual deliveries have been well below the full contract amount, averaging closer to 22,000 AFY recently, but 2026 represents a significant positive development. After a zero allocation had originally been anticipated, USBR issued the District a firm allocation of up to 49,000 AF for the 2026 water year (delivered at a Board-approved rate of \$62.50/AF), one of the larger deliveries in District history. In 2025, the District delivered 37,700 AF of surface water to its boundary, producing an estimated 37,700 AF of effective in-lieu groundwater recharge (a pumping reduction of 29,400 AF plus 8,300 AF of within-District conveyance-loss recharge).

CSJWCD has also completed or is advancing the following PMAs and demand management measures:

- **Pump Testing Program: Quantifying the Economic Case for Conversion:** The District resumed a groundwater pump-testing initiative to evaluate, on a well-by-well basis, the economic benefit of surface water over groundwater pumping. Across fourteen deep-well tests completed to date (2022 and 2025), the District found an average depth to groundwater of 152 feet and average pump efficiency of 54.5%, yielding an average annual cost to pump groundwater of \$104.76/AF (\$116.76/AF including the District's \$12/AF groundwater extraction fee) versus an estimated \$63.98/AF to deliver and use surface water — a net savings of \$52.78/AF, or roughly \$158/acre for a typical tree crop receiving three acre-feet per acre. Staff has concluded the existing dataset is sufficient to support landowner outreach on the comparative cost of groundwater versus surface water and does not anticipate further District-funded testing at this time. The data collected to date will instead be used to communicate the economic case for conversion directly to growers.
- **Mariposa Drain Improvement Project:** This project has been identified as a Category A Project in the ESJGWA GSP (and Item 29 in the WY2025 Annual Report). The District installed monitoring stations along Mariposa Drain in the prior year to improve surface-water flow management, and the FY 2026/2027 Budget includes \$700,000 to advance design from the current ~30% level to the



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60% threshold needed for grant competitiveness. A task order from David's Engineering to begin 60% design work was received and is under execution as of July 2026.

- Avena Drain Improvement Project: This project has also been identified as a Category A Project in the ESJGWA GSP (and as Item 30 in the WY2025 Annual Report). The FY 2026/2027 Budget includes \$100,000 for initial design, expanding surface-water capture and recharge capacity in the southern portion of the District's service area.
- District-Wide Water Balance Data Collection: The District has made significant investment in the data infrastructure needed to develop a comprehensive water resource portfolio to guide future infrastructure investment and now maintains flow monitoring stations at both the inflow and outflow surface-water points of its system allowing staff to quantify surface-water gains, losses, and net delivery across the full conveyance system. This dataset underpins the District's ongoing engineering investigations and prioritization of capital projects.
- Agricultural Water Management Plan and Water Rate Structure Evaluation: Staff are developing an updated Agricultural Water Management Plan and a Water Rate Structure Evaluation, both identified as Tier 1 Needs Assessment priorities supporting surface water supply reliability, financial sustainability, and grant readiness (including the Aggregated Farm Gate Deliveries work needed before submitting grant applications).
- WaterSMART Grant Application: In November 2024, the District applied for a WaterSMART Water and Energy Efficiency Grant to fund variable-speed pumps with remote-control gates at various locations from Little John's Creek to Mariposa Drain, improving delivery efficiency and reducing conveyance losses.
- SWEEP Block Grant Regional Partnership: In April 2026, the Board authorized a cost-share agreement with NSJWCD, SEWD, Woodbridge Irrigation District, and South San Joaquin Irrigation District (District share: \$1,250) to prepare a State Water Efficiency and Enhancement Program (SWEEP) Block Grant Concept Proposal, which would allow the District to offer SWEEP grants directly to customers for on-farm irrigation efficiency upgrades.
- Capital Improvement Program (CIP): Identified as a Category A Project in the GSP, the District offers a landowner incentive, increased to \$300 per acre for up to 10 years, to convert acreage previously irrigated with groundwater to surface water use. First-year implementation saw one CIP application submitted and two pending. The Board has continued refining program requirements (including a 2026 policy addressing projects installed prior to Board approval).
- Groundwater Extraction Charge: Pursuant to Water Code §75500 et seq., the District levies a per-acre-foot groundwater charge on approximately 750 billed accounts, both to fund conservation and recharge activities and to create a financial disincentive to groundwater pumping. In May 2026, the Board adopted Resolution No. 2026-05-02 authorizing collection of delinquent groundwater charges through the San Joaquin County Tax Collector's direct assessment process.
- Public Outreach and Grower Education: The District has identified increased public outreach, grower education, and regional partnership-building as a priority focus area, budgeting \$40,000 for FY 2026/2027 (up from no dedicated funding in FY 2025/2026).

CSJWCD's approach combines increasing surface water supply (2026 firm allocation of 49,000 AF), quantified economic data demonstrating substantial per-acre savings from converting to surface water, improved system-wide data infrastructure to guide investment decisions, targeted capital investment in



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conveyance and recharge infrastructure (Mariposa Drain and Avena Drain projects, together budgeted at \$800,000 in FY 2026/2027), and demand-side tools (the groundwater charge, CIP conversion incentive, and pending SWEEP grant program) to reduce reliance on groundwater pumping consistent with the Subbasin's 95,000 AFY target.

### 3. Clarification on Implementation and Achieving Sustainability Goal

*"Based on the responses to 1 & 2, please provide clarification on whether plan implementation will reach the sustainability goal for the Subbasin and whether future modifications to the GSP will be needed."*

Due to intentional collaboration and input provided during the development of the 2024 GSP Amendment, the GSAs believe the 2024 GSP Amendment, and the project and management actions it contains, will assist the Subbasin in reaching its sustainability goal by 2040. This is supported by the progress of both Category A PMAs and certain Category B PMAs (including MICUP), as well as the fact that the projected hydrographs based on the various model runs do not indicate any significant groundwater level issues near minimum thresholds at the 95,000 AFY offset number and the GSAs are committed to reaching that number.

That said, the GSAs anticipate that future modifications to the GSP may be needed in 2030 after the tasks set forth in Technical Memo. No. 6 regarding demand management program implementation are completed and considering new data collected during the intervening five-year period (including improvements to the ESJWRM model to improve forecasting). At this time, it is anticipated that the PMAs contained in the 2024 GSP Amendment will require updating in 2030 to reflect current data on PMAs in operation or planned and benefits accrued to date. These PMA updates will also be necessary to improve the ESJWRM model, better calibrate the model, and revisit any pumping offset that may be required to ensure the GSAs are on track to achieve sustainability by 2040.

It is worth repeating that in this Subbasin, the modeled change in storage is influenced as much by stream losses and boundary flows (including groundwater conditions in neighboring subbasins) as it is by changes in surface water and groundwater use. Therefore, regular model updates (at least every five years) help refine the model and will be necessary to refine the implementation plan for achieving sustainability in the subbasin.

### 4. Demand Management Plan Details

*"Please clarify and justify description indicating that the demand management program is a "backstop." 2024 GSP, (Appendix 6-B, p. 1764) Given the deficit between necessary groundwater demand offset and expected project and management program benefits (especially, in the near-term), the GSP seems to indicate that the demand management program is more so required to meet the demand reduction offset target. 2024 GSP, (Appendix 6-B, Section 2, p. 1766)"*

The use of the term "backstop" likely does not accurately express the intention of the GSAs in how they use the estimated offset number through the implementation of PMAs and demand management program benefits. Instead of considering demand management as a "backstop" the Subbasin will focus on supply side projects in the immediate future with demand management serving as a necessary tool that may be implemented if projects fall short. Completion of the annual reports and check-in on the status of basin



conditions relative to interim milestones during the periodic evaluations will provide regular feedback as to progress in project implementation and inform the need for demand management.

To summarize the previous described ongoing work, the NSJWCD GSA has (1) imposed a new groundwater charge; (2) increased that charge regularly, and (3) is currently working on additional charge and penalty options to incentive reduced groundwater extraction. This work is happening in parallel with developing PMAs. SEWD GSA has actively increased in-lieu recharge in recent years and has several additional in-lieu and direct recharge projects in various stages of design. Furthermore, SEWD has two major planning efforts underway - the Water Supply Enhancement Project and the Farmington Reservoir project – both of which will increase expand surface and groundwater storage. The CSJWCD GSA continues to rely on imported surface water as its primary tool to reduce groundwater dependency and stabilize declining groundwater levels through in-lieu recharge. Additionally, CSJWCD has (1) developed a Water Rate Structure Evaluation and Groundwater Extraction Charge; (2) outlined capital investments targeted at conveyance and recharge infrastructure to improve surface water management and expand capture and recharge capabilities; and (3) invested in the data infrastructure to improve water management decisions.

The GSAs recognize that their Category A and B PMAs, including MICUP, will take several years to fully develop and that demand management may be a necessary component of the plan to bring the Subbasin into sustainability and ensure that minimum thresholds are met. As previously stated, while it's the responsibility of the GSAs to collectively achieve the Subbasin's sustainability goal, the projects NSJWCD, CSJWCD, and SEWD are currently pushing forward will contribute the majority of the targeted pumping offset opportunities needed.

## **5. Timing of Demand Management Program Implementation**

*"Even with the implementation of Category A projects, the Subbasin is projected to fall short of the demand reduction offset targets by 133,000 AFY (166,000 AFY – 33,000 AFY, considerate of climate change) or 62,000 AFY (95,000 AFY – 33,000 AFY, not considerate of climate change). The demand management program is not planned for implementation until December 31, 2028; given its seeming criticality for the Subbasin to meet its sustainability goal, please describe any interim measures and the anticipated timelines for the "dispute resolution process, creation of a management area, or other action by the other GSAs for legal or equitable remedy" (2024 GSP, Appendix 6-B, p. 1768) should GSAs fail to adopt and implement the program by the respective deadlines."*

### **a. Interim Measures**

As previously discussed, the GSAs are continuing to implement Category A PMAs and anticipate the benefits of MICUP and other Category B PMAs over the next five years. During this period, the Subbasin will manage sustainability through the use of the sustainable management criteria (SMC) described in the 2024 GSP Amendment. Additionally, while the GSAs have committed to a formal demand management program agreement and implementation by the end of 2028, the ongoing work of GSAs within the Subbasin have already started to implement and achieve pumping offsets, as demonstrated through the PMAs described previously for NSJWCD, CSJWCD, and SEWD.

### **b. Dispute Resolution Process**



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At present, we do not have anticipated timeline for creating a dispute resolution process, management areas, or other actions for legal or equitable remedy. Discussions at public board meetings have not indicated that a GSA within the ESJGWA will not implement adopt or implement the demand management program, nor is there any indication of reluctance from any single GSA to complying with such a program. As such, these items are not currently on the list of immediate priorities for the ESJGWA. The focus in the Subbasin over the last year and a half has been on improving reporting and compliance with communication and support from DWR staff and in filling identified data gaps. The language in Appendix 6-B of the 2024 GSP Amendment that reads "or other action over the last year by the other GSAs for legal or equitable remedy" refers to an individual GSA's ability to bring legal action against another party for remedy, absent involvement by the ESJGWA. Provisions are likely to be included in any demand management program and would be developed concurrently therein.





## TECHNICAL MEMORANDUM

**TO:** Monica Salais, PE (Department of Water Resources)

**PREPARED BY:** Julia Berry, Executive Director

**REVIEWED BY:** ESJGWA Groundwater Sustainability Agencies

**Date:** August 25, 2026

**RE:** DWR Request for Clarification on Plan Implementation, Management Actions: Domestic Well Mitigation Program

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In a letter dated April 17, 2026, the California Department of Water Resources (DWR) requested additional information on the Eastern San Joaquin (ESJ) Groundwater Subbasin's (Subbasin) 2024 Groundwater Sustainability Plan (GSP) Amendment and 2024 Periodic Evaluation (PE). Six areas were identified by DWR, including clarification on implementation of the ESJGWA Groundwater Sustainability Plan (Plan).

In the April letter, DWR requested an update on Plan implementation and Management Actions, specifically the Domestic Well Mitigation Program.

### *Background*

The Eastern San Joaquin Groundwater Authority (ESJGWA or Authority) originally adopted its Domestic Well Mitigation Program (Program) in September 2024. At that time, the Authority did not employ dedicated staff and relied on staff support provided by San Joaquin County and the South San Joaquin Irrigation District (SSJID).

Although the Program, as documented in the 2024 GSP Amendment, established a framework for addressing impacts to domestic wells, the promotional materials and application form were not developed nor made available following its adoption. Staffing changes and fluctuations within the two agencies providing support to the Authority (San Joaquin County and SSJID) also made it difficult to maintain consistent responsibility for Program development and ensure sustained implementation and follow-through.

To address these administrative gaps, the Authority hired a dedicated Executive Director. The Executive Director subsequently developed the materials necessary to implement and promote the Program and conducted a comprehensive review to align it with the Authority's current staffing and governance structure. The Program was revised to remove outdated references associated with the former staffing arrangement and standing committees that no longer exist.

The revised Domestic Well Mitigation Program was readopted by the ESJGWA in August 2026. The revisions clarified responsibility for administering the Program, removed obsolete organizational references, and established a more consistent framework for implementation.



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## *Response*

The following responses are provided to answer questions regarding the Program.

### *1. How many wells have been mitigated?*

To date, zero (0) wells have been mitigated.

### *2. How many applications have been declined?*

The program was initially adopted in Fall 2024, though the program was not yet finalized nor was an application developed at the time of adoption. In the last year, one potential applicant approached the ESJGWA and staff directed the applicant to Self-Help Enterprises (SHE) for assistance. As a result, the applicant was able to obtain bottled water and a new well was drilled under the State Water Resources Control Board (SWRCB) well mitigation program. This potential participant was not necessarily declined services by the ESJGWA, but the program was not fully developed, and the applicant was directed to an entity that adequately addressed their needs.

### *3. What outreach has been conducted?*

The Program was amended and readopted in August 2026 to reflect changes to the ESJGWA's governance and staffing structure. After readoption by the ESJGWA Board of Directors, informational brochures and Program applications were distributed to the GSAs. The GSAs, which were asked to make the materials available in their offices and on their websites.

Program information and application materials are also available on the ESJGWA website and through the environmental health offices of the three counties overlying the Subbasin. To date, each GSA has been responsible for conducting outreach within its service area. For example, the North San Joaquin Water Conservation District (NSJWCD) presents information about the Program at its annual landowner meeting, and several other GSAs similarly provide Program information through their regular public outreach activities.

### *4. How the requested evidence is feasible for members of disadvantaged communities*

To date, no concerns have been raised regarding the feasibility of providing the requested evidence, including by members of disadvantaged communities. Accordingly, the Authority is unaware of any barriers or feasibility issues and does not currently have data indicating otherwise. Additionally, the requested evidence is consistent with existing domestic well mitigation programs in other subbasins and provided by other organizations. The Program also notes that assistance in filling out an application can be provided by staff or non-governmental organizations contracted with the Authority.

### *5. Provide clarity surrounding the meaning of "official lab results"*

The "lab reports" referenced in the Program pertain to wells for which a claimant has documented a potential water quality issue resulting from localized groundwater conditions. "Official lab results" include certified laboratory testing conducted at the well owner's direction or through a regional program, such as CV-SALTS, or another similarly recognized testing program.



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6. *Provide clarity regarding the six-month limitation period*

Claims occurring between January 1, 2015, and adoption of the updated program must be filed within six months after adoption. Claims occurring afterward are subject to the limitations process and period stated in the program. The amended program reestablishes the six-month period for claims occurring between January 1, 2015 and August 12, 2026. The six-month period to submit claims for this timeframe will expire on February 12, 2027.

7. *Whether there were documentation issues for historical claims*

No issues have arisen regarding the documentation submitted for historical claims. As of this writing, the ESJGWA Technical Committee is reviewing a historical claim from 2022, and the well owner has provided all required documentation.



# > DWR Comments on Periodic Evaluation & 2024 Amended GSP

September 9, 2026





## ➤ Background

- January 2025: Submitted Periodic Evaluation and 2024 Amended GSP, beginning 2 year “clock” for DWR review
- April 17, 2026: ESJGWA receives letter from DWR identifying 6 areas for additional information to support their review
- May 11, 2026: ESJGWA and W&C meet with DWR to receive presentation with more details about DWR’s request
- October 1, 2026: Response to DWRs request for additional information due

## ➤ Six Topic Areas

1. Groundwater  
Level SMC

2. Monitoring &  
Reporting

3. Land  
Subsidence SMC

4. Groundwater  
Quality: TDS &  
Chloride

5. Interconnected  
Surface Water  
SMC

6. Plan  
Implementation

## ➤ Process for Developing Responses

- Coordinated closely with GSA staff and counsel to review DWR comments & discuss response approach (5 meetings)
- Met with DWR on July 9 and August 6 to clarify DWR requests and present approach to addressing several topic areas
- GSA legal counsel led development of response to Plan Implementation topic area; W&C led development of responses to other 5 areas
  - GSA staff & counsel provided draft TMs





# Development and Implementation of an Annual Net Groundwater Impact Accounting Framework

Proposed Methodology



**Greg Young, P.E.**  
*Senior Principal*



# Agenda

- Review of Timeline and Key Deliverables
- Review of Proposed Methodology
- Effective Precipitation Recommendation
- Approval of Recommendation
- Next Steps



# Overview of Timeline and Deliverables

- Task 1 - Finalize Net Groundwater Impact Methodology (Q3 2026)
- Task 2 - Data Collection and Annual Net Groundwater Impact Calculations (Q3 2026)
- Task 3-Reporting (Q4 2026-Q1 2027)
  - By December 1, 2026: Final report calculating Net Groundwater Impact for Water Years 2024 and 2025
  - By March 1, 2027: Final report calculating Net Groundwater Impact for Water Year 2026
- Task 4-Coordination and Meetings (Q2 2026-Q1 2027)

# Methodology Objective (Review)

- Reasonably estimate annual consumptive use of groundwater pumping to provide a proxy of each GSA's progress toward Subbasin-wide demand management
- Establish a baseline from which to measure progress in a consistent manner to allow for apple-to-apple evaluation of GSA efforts compared to each other
- Maintain simplicity and repeatability
- Use readily available data from GSAs or public sources
- Assure alignment with measured groundwater level changes

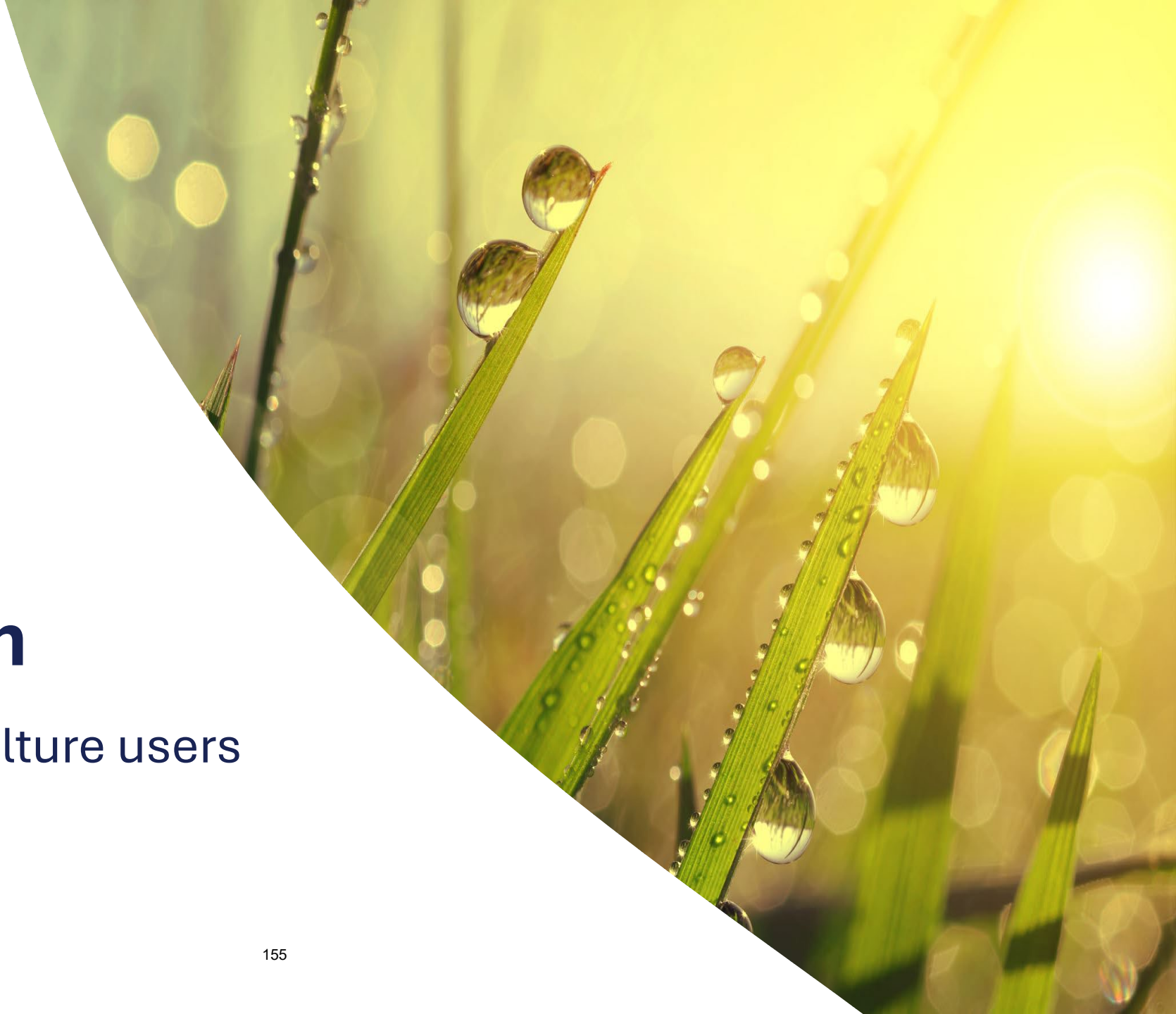
# Methodology by User Group (Review)

- Irrigated agriculture
  - $\text{GW Consumption} = \text{ET} - \text{Eff Precip} - \text{Surface Water}$
  - Convert surface water records to ETAW using general efficiency
- Municipal
  - $\text{GW Consumption} = \text{GW discharge from WWTP} + \text{GW from outdoor use}$
  - Req'd factors (to be estimated based on available data):
    - Ratio of indoor use to outdoor use for year
    - Efficiency of outdoor use
- Rural domestic and self-supplied industry – Agreed to Omit
  - ~~• Generally, very little change since 2015 SGMA baseline and limited overall volumetric impact on basin~~
  - ~~• Industrial use (e.g. wineries) is relatively low compared to overall use~~



# Effective Precipitation

For irrigated agriculture users

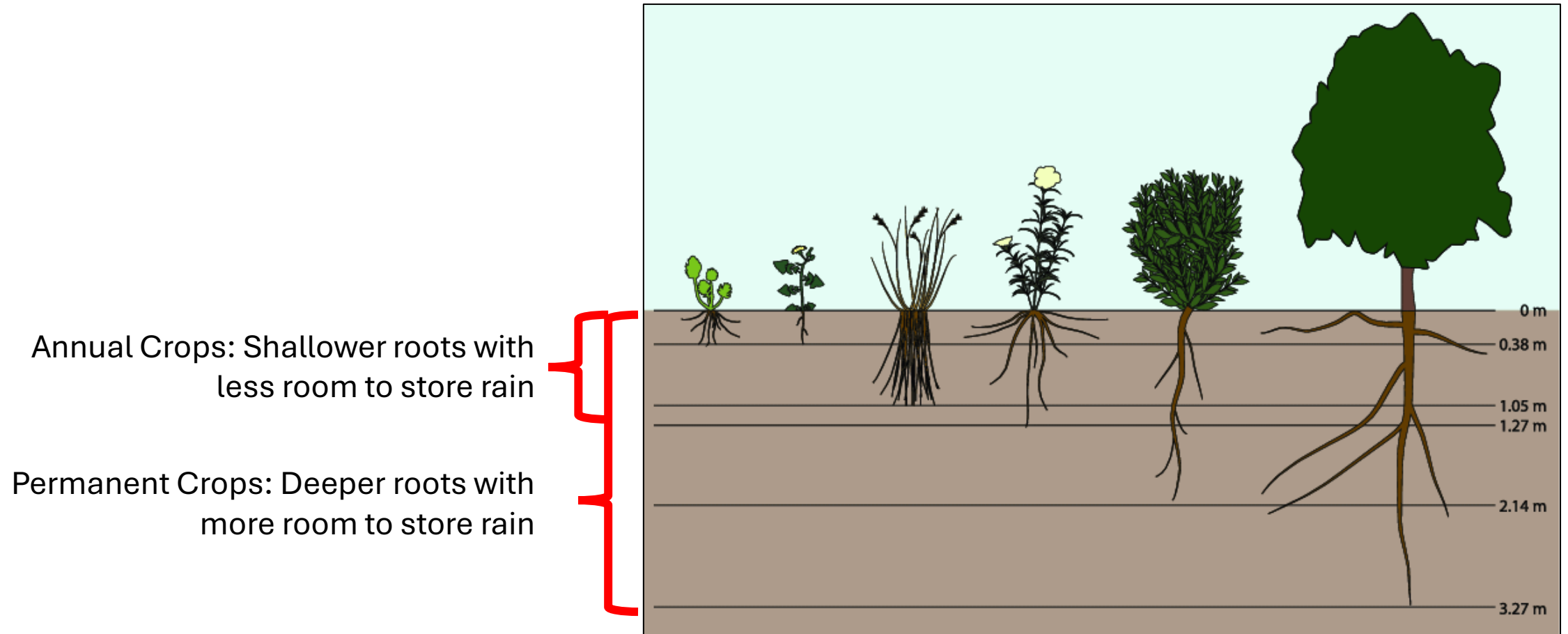


# Effective Precipitation ( $P_{\text{eff}}$ ) (Review)

- Formula:  $GW \text{ Consumption} = ET - P_{\text{eff}} - \text{Surface Water}$
- $P_{\text{eff}}$  benefits crops and meets a portion of ET
  - The benefit can vary by crop type, management practice, time of year and overall quantity
- For this framework:
  - One rainfall value will be used for each year's calculation (with wet/dry season rule)
  - Separate  $P_{\text{eff}}$  values will be used for "permanent" vs "annual" crop
- Objective is to err on the side of "too much" effective precipitation for this framework.



# Concept for Effective Precipitation Rules



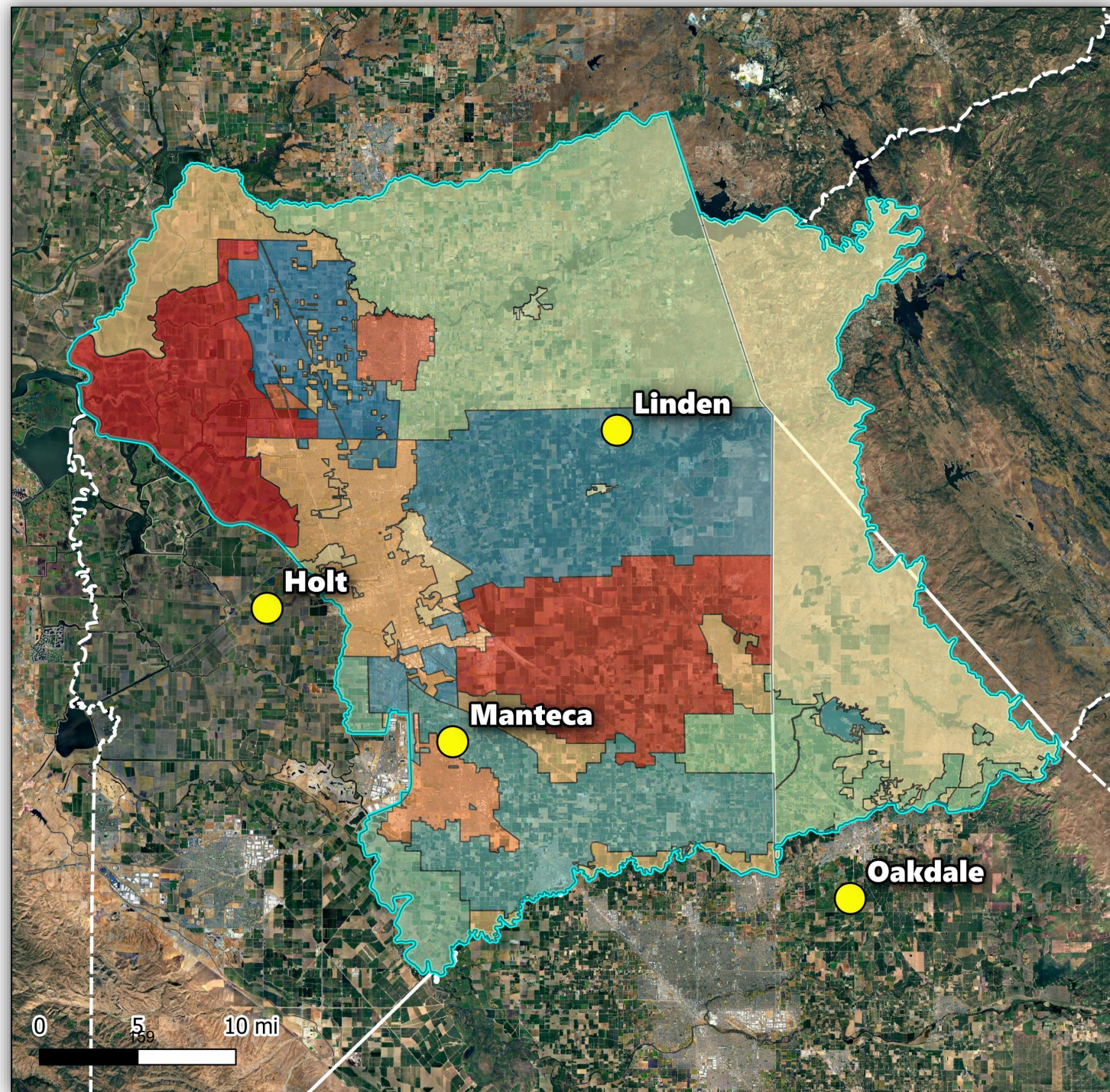
# Concept for Effective Precipitation Rules

| Category        | Wet Season<br>(October – March)                                                                                                                                                                                                                                                                                                                                                                                                                | Dry Season<br>(April – September) |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Permanent Crops | <ul style="list-style-type: none"> <li>Precipitation up to 10 in. <ul style="list-style-type: none"> <li>100%</li> </ul> </li> <li>Precipitation between 10 in. and 16 in. <ul style="list-style-type: none"> <li>75%</li> </ul> </li> <li>Precipitation between 16 in. and 20 in. <ul style="list-style-type: none"> <li>50%</li> </ul> </li> <li>Precipitation above 20 in. <ul style="list-style-type: none"> <li>0%</li> </ul> </li> </ul> | 100%                              |
| Annual Crops    | <ul style="list-style-type: none"> <li>Precipitation up to 8 in. <ul style="list-style-type: none"> <li>100%</li> </ul> </li> <li>Precipitation between 8 in. and 12 in. <ul style="list-style-type: none"> <li>50%</li> </ul> </li> <li>Precipitation above 12 in. <ul style="list-style-type: none"> <li>0%</li> </ul> </li> </ul>                                                                                                           | 100%                              |



# Previously Proposed CIMIS Stations

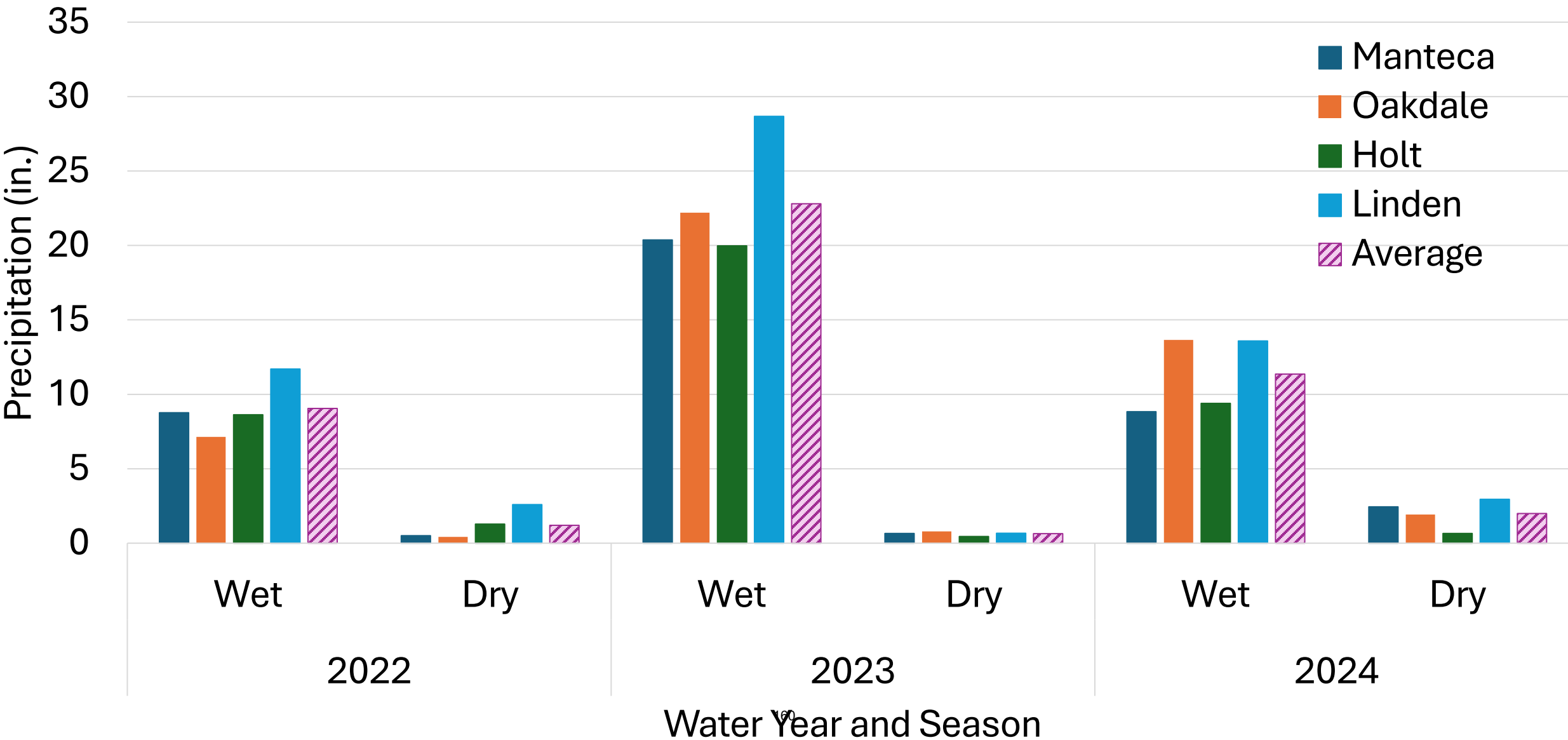
- Manteca
- Oakdale
- Holt
- Linden





# Wet and Dry Season Precipitation at CIMIS Stations

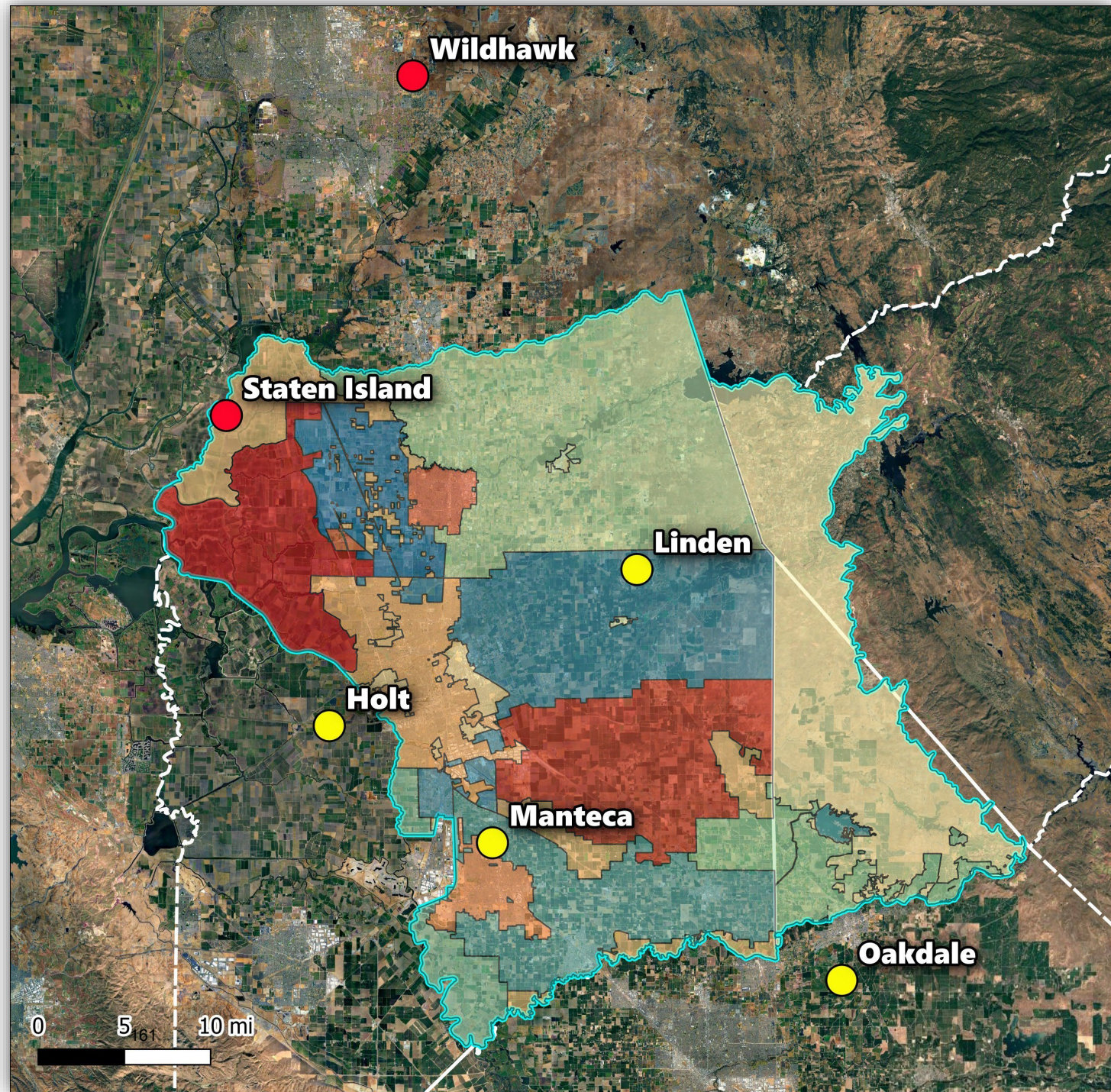
## Water Years 2022, 2023, and 2024





# Updated Proposed CIMIS Stations

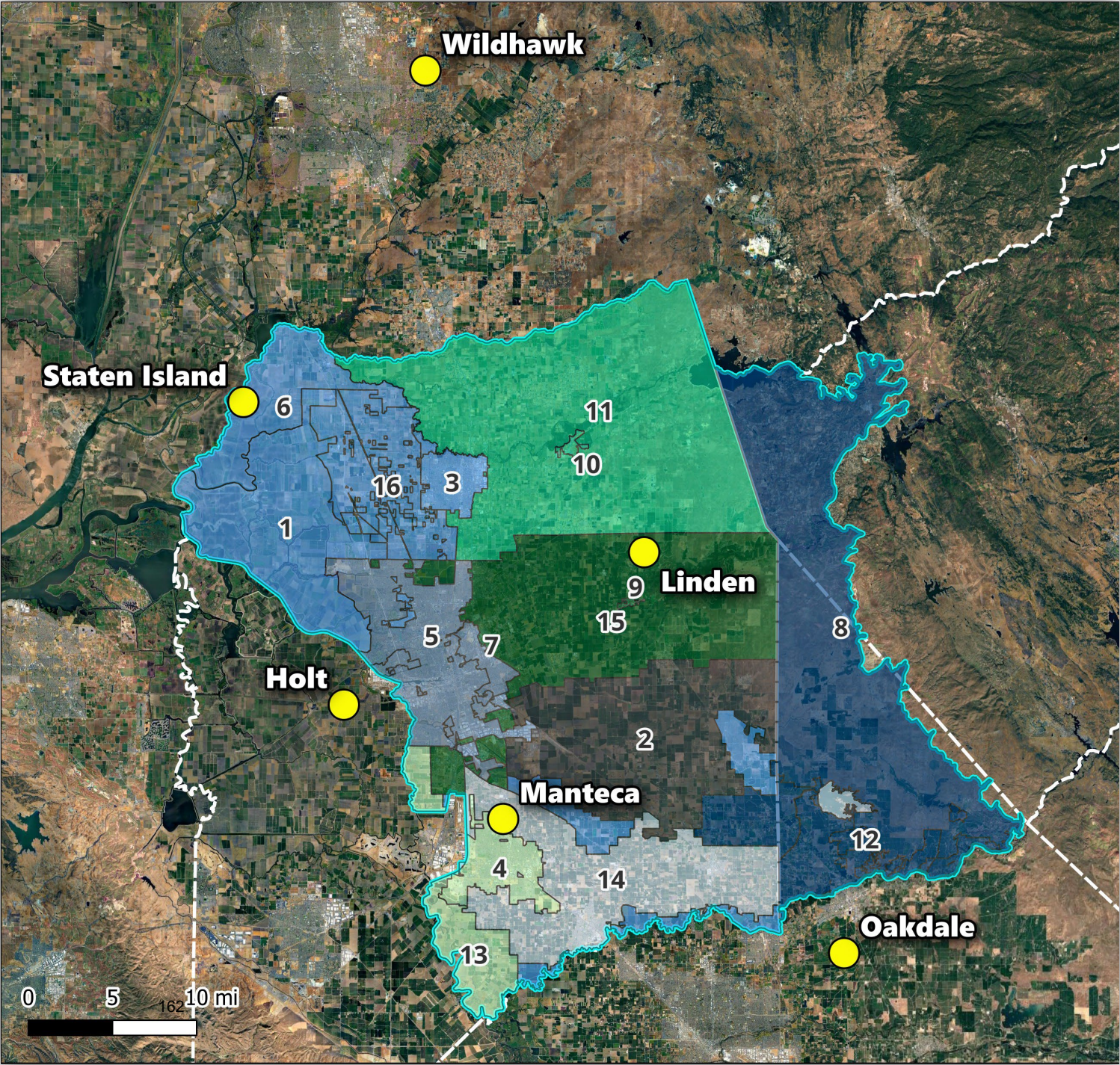
- Manteca
- Oakdale
- Holt
- Linden
- Staten Island
- Wildhawk





# Recommendation

| GSA #       | CIMIS Station Split        |
|-------------|----------------------------|
| 10, 11      | 80/20: Linden/Wildhawk     |
| 1, 3, 6, 16 | 90/10 Staten Island/Linden |
| 9, 15       | 90/10: Linden/Oakdale      |
| 14          | 50/50: Manteca/Oakdale     |
| 2           | 60/40: Linden/Oakdale      |
| 5, 7        | 80/20 Holt/Linden          |
| 4, 13       | 100 Manteca                |
| 8, 12       | 50/50 Linden/Oakdale       |





# Next Steps: Data Collection Approach

Publicly available data will be used wherever possible, with targeted requests to address remaining data gaps.

| User Group              | Anticipated Approach                                                                                                |
|-------------------------|---------------------------------------------------------------------------------------------------------------------|
| Irrigated Agriculture   | Use publicly available ET and precipitation data. GSAs will primarily be asked to provide surface water deliveries. |
| Larger Municipal Users  | Compile available information from sources such as SAFER, Annual Water Supply and Demand Assessments, and UWMPs     |
| Smaller Municipal Users | Request groundwater extraction data when the system does not meet state reporting thresholds                        |

Compile Public Data → GSA Review and Confirmation → Targeted Request for Missing Information

## September 2026 DWR Updates (from DWR's North Central Region Office)

### Grants

#### California Grants Portal

The California State Library, in partnership with the Department of Water Resources and other state grantmaking agencies, has launched the California Grants Portal – your one destination to find all state grant and loan opportunities provided on a first-come or competitive basis. Visit [grants.ca.gov](https://grants.ca.gov) to find funding opportunities for you and your community.

#### **Prop 4, Bond Grant Funds**

Here is a link to sign up for DWR's Prop 4 [email notification list](#).

#### **Sustainable Groundwater Management Grant Program (~\$320 million available)**

- [Draft guidelines are now available](#) for the Small GSA (under 10,000 AFY pumping, \$3.5 million in funding) & Technical Assistance (\$6.5 million available). Public comment period for the Draft guidelines ends September 30, 2026. Comments can be provided by emailing [FinancialAssistance@water.ca.gov](mailto:FinancialAssistance@water.ca.gov). Workshops will be held Sept 1, 11am – noon ([registration link here](#)) and September 22 10am- 11am ([registration link here](#)).
- Draft Guidelines and Proposal Solicitation Package for the full Proposition 4 SGMA Draft grant guidelines are expected to be released for public comment in early fall, concept proposals are expected to open early 2027, with full applications over summer 2027. Workshops to go over the draft guidelines are scheduled for the following dates (registration links are not yet available):
  - Tribal Public Comment Workshop: October 20, 2026 – 2:00 PM to 4:00 PM
  - General Public Comment Workshop: November 5, 2026 – 2:00 PM to 3:30 PM

#### **Watershed Resilience Grant Program (~\$60 million for conservation implementation and ~\$92 million for watershed resilience planning and projects)**

- These funds will be distributed under 2 separate solicitations.
- Conservation Implementation-Capital projects with a water conservation benefit. Projects don't need to be listed in a Watershed Resilience Plan but must be selected by a "collaborative group" (definition forthcoming in the Guidelines). Draft Guidelines/PSP expected in September; concept proposals early 2027, full applications spring 2027.
  - Tribal Public Comment Workshop, October 12, 2026, 10am-12pm, [Register here](#)
  - General Public Comment Workshop, October 22, 2026, 1pm-3pm, [Register here](#)
- Watershed Resilience Planning+ (~\$92 million for projects) – Grantees will work collaboratively across their watershed to develop a Watershed Resilience Plan and then use funding to implement the top-priority project(s) identified by that plan. Draft Guidelines/PSP expected this winter; concept proposals late 2027, followed by full applications.

A joint workshop for the [Sustainable Groundwater Management Grant Program](#) and the [Watershed Resilience Grant Program](#) was held April 30, 2026. The recording and slides for this workshop are available on these webpages.

#### **Multibenefit Land Repurposing Program (\$200 million available through Department of Conservation)**

Upcoming Dates:

- October 2026: Draft Guidelines released for public comment
- October - November 2026: Public comment workshops and tribal roundtables
- Winter 2026: Revised Guidelines released. Response to comments posted
- Winter 2026-'27: Guidelines finalized. Initial application period open

To sign up for notices please either use the [mailing list link](#) or us at [MLRP@conservation.ca.gov](mailto:MLRP@conservation.ca.gov)

## September 2026 DWR Updates (from DWR's North Central Region Office)

### Other DWR Prop 4 grant program information:

- The [Dam Safety and Climate Resilience](#) program has closed public comment on draft Guidelines. Final guidelines will be released later this year.
- The [California Irrigation Management Information System \(CIMIS\) draft Guidelines](#) are now available. The public comment period begins on May 20, 2026, and closed at 5:00 p.m. PDT on July 3, 2026. Final guidelines will be released later this year.
- The public review period for the draft Guidelines of the [Riverine Stewardship](#) has ended. [Final Guidelines can be found here](#).
- The [Brackish Water Desalination Grant Program](#) will held a pre-draft Guideline webinar on June 22nd from 1:00–2:00 PM. Draft proposal solicitation package expected late 2026/early 2027.

### Upcoming conferences, webinars, new reports and data

#### **2026-2027 Recharge Readiness Webinar Series**

DWR, Sustainable Conservation, and the Flood-MAR Network are co-hosting this webinar series to share information about recently completed guidance, projects, and case studies to help recharge project planners and implementers (growers and local agencies, in particular) prepare for the wet season ahead. These webinars will be held twice monthly on the second and fourth Thursday at 11 am Pacific beginning on August 27, 2026. Please see the [accompanying flyer](#) for dates and topics for each meeting. Zoom register link: [tinyurl.com/Recharge26-27](https://tinyurl.com/Recharge26-27)

#### **New: DWR Releases Onboarding Resources for Groundwater Sustainability Agencies**

DWR has developed GSA Onboarding Resources including an Onboarding Checklist and a Handbook Template, to support GSAs as they welcome new board members and staff into their roles under SGMA) These materials are designed to help orient new team members to GSA governance, local GSP implementation, and key SGMA requirements. The resources include two documents. The first is the Onboarding Checklist paired with Section I of the Handbook Template, which highlights GSA- and GSP-specific information. This file is provided as a customizable Word template and is [available here](#). The second document includes Section II of the Handbook Template, presented as a PDF that outlines statewide information and resources; it is [available here](#). A short training video on how to use the template is [available here](#).

#### **DWR Releases Spring 2026 Semi-Annual Groundwater Update**

The Department of Water Resources (DWR) has released the [Spring 2026 Semi-Annual Groundwater Update](#), which provides a look back at California's groundwater conditions during Water Year 2025 and early Water Year 2026. The groundwater update released today includes Water Year 2025 Groundwater Sustainability Plans (GSP) and GSP Alternative annual report data reported across 101 groundwater basins. This information is helping provide an increasingly clearer picture of groundwater conditions, including the amount of change in groundwater storage, groundwater extractions, and managed recharge that occurs each year.

#### **C2VSimFG Web Application Released**

The California Central Valley Groundwater–Surface Water Simulation Model—Fine Grid (C2VSimFG) Web Application is an interactive online tool for exploring outputs from C2VSimFG Version 1.5. It provides users with streamlined access to model results. C2VSimFG simulates groundwater and surface water conditions across the Central Valley and can be used to estimate regional water budgets for Sustainable Groundwater Management Act (SGMA) planning and implementation. Developed for GSAs and other interested parties, the application is designed to support users with little to no modeling experience. Through a user-friendly interface, users can visualize model outputs without running the model, including hydrographs, water budgets, and zonal budget charts generated on demand from the latest model results. To learn more and access the C2VSimFG web application, visit <https://c2vsimfg.water.ca.gov/>. For questions or technical assistance, please contact [c2vsimfgtechsupport@water.ca](mailto:c2vsimfgtechsupport@water.ca)

## September 2026 DWR Updates (from DWR's North Central Region Office)

**Basin Characterization Program Launches Basin Characterization Tools (BCTools)** and Monthly BCX meeting link

DWR's Basin Characterization Program is pleased to announce the release of [Basin Characterization Tools \(BCTools\)](#), a new suite of open-source tools designed to help local agencies, consultants, and researchers better understand California's groundwater basins.

BCTools provides integrated workflows for developing hydrostratigraphic models, creating 3D sediment texture models, and estimating aquifer flow parameters from airborne electromagnetic (AEM) data, lithology and geophysical logs, and aquifer flow measurements. These tools support high-quality, data-driven groundwater analyses and modeling that can advance local and regional groundwater management.

Basin Characterization Exchange (BCX) meeting are held on the 3rd Tuesday of the month from 12:30 - 1:30 pm. Upcoming webinar information can be found on the [BCX Hub](#). To receive updates on upcoming meetings, [join the BCX listserv](#) or email us at [Basin.Characterization@water.ca.gov](mailto:Basin.Characterization@water.ca.gov).

## DWR Releases Final Subsidence BMP and Educational Resource Webpage

DWR has released a [final Best Management Practices document](#), that will serve as a guide for groundwater managers on the basics of subsidence, how to best manage it, and available technical assistance.

DWR has also launched of a [new webpage dedicated to providing educational resources and information about land subsidence](#) in California, particularly as it relates to groundwater use and sustainable groundwater management. The resources available on this page are designed to help the public better understand subsidence and associated potential impacts. The page will be updated with educational materials, data, best management practices, and project information as it is available.

## Preliminary Sac Valley Aquifer Recharge Potential Maps Available

New: [Aquifer Recharge Potential maps](#) and a [process document](#) are now available to download from the [Basin Characterization CNRA Open Data Portal](#). Note– we'll be updating the ARP Process Document later in October.

## DWR Releases Second and Third Paper on Depletions of Interconnected Surface Water

To help GSAs address the depletion of interconnected surface water (ISW) in their Groundwater Sustainability Plans (GSPs), the DWR released the second and third in a series of three draft papers that discuss the technical aspects of ISW and quantification of depletions of ISW caused by groundwater pumping. The first paper (Paper 1), [Depletions of Interconnected Surface Water: An Introduction](#), introduced concepts associated with ISW, including approaches for identifying ISW and defining depletion of ISW from groundwater pumping. The second paper (Paper 2), [Techniques for Estimating Interconnected Surface Water Depletion Caused by Groundwater Use](#), continues the foundational concepts presented in Paper 1 by discussing the data requirements, methods, and general implementation process to consider for ISW depletion analyses. The final paper (Paper 3), [Examples for Estimating Interconnected Surface Water Depletion Caused by Groundwater Use](#), continues and expands upon the topics presented in Paper 2 by providing detailed examples of using numerical models to evaluate depletion of ISW. A pre-recorded webinar that summarizes the contents of the three papers and describes the next steps in the development of the guidance document [can be viewed here](#).

**The DRAFT ISW guidance document is *tentatively* scheduled for fall 2026 for public release.**

## SGMA Updates and Tools

Update Your GSA and GSP Manager Point of Contact Information in DWR's SGMA Portal

If your GSA and/or GSP Plan Manager Point of Contact (POC) is not current, or you are not sure, please visit the SGMA Portal to ensure that your contact information is up-to-date. When logged in, the Portal allows edits to be made to previously submitted contact information. If you have SGMA Portal questions, please email them to [GSPSubmittal@water.ca.gov](mailto:GSPSubmittal@water.ca.gov).

## September 2026 DWR Updates (from DWR's North Central Region Office)

### The CASGEM Online System has moved to the SGMA Portal July of 2026

The Department is completed integration of the [California Statewide Groundwater Elevation Monitoring \(CASGEM\) Program's Online System](#) with the [SGMA Portal's](#) Monitoring Network Module (MNM). This integration will streamline groundwater elevation data management and reporting processes by consolidating data submission into one location – the SGMA Portal's MNM. Our goal is to provide a more unified and efficient user experience for local agencies, stakeholders, and the public.

A [user manual for the CASGEM submodule](#), a [Voluntary Submodule User Manual](#) and a [batch import user manual can be found here](#). If you have questions, please check out the CASGEM webpage ([here](#)) or send your questions [CASGEM@water.ca.gov](mailto:CASGEM@water.ca.gov).

### DWR releases final WY 2023 statewide land use data

**DWR has officially released final data set for 2023 and provisional statewide land use data from Water Year (WY) 2024** for public access and use. The released data follows up on land use mapping conducted in 2018, 2019, 2020, 2021, 2022, and 2023 where more than 14 million acres of land were classified (including agriculture multi-cropping instances and urban categories) using tools such as remote sensing and geographic information systems. The data can now be accessed at the following locations: [CA DWR Land Use Viewer](#) (viewing and downloading); [CNRA Webpage](#) (viewing and downloading); on the [SGMA Data Viewer](#) (viewing) and the [California State Geoportal](#) (viewing and downloading).

### Facilitation Support Service and Translation Services Available to GSA's at No Cost

GSA's developing GSPs are eligible to receive funding for identification and engagement of interested parties, meeting facilitation, interest-based negotiation/consensus building, and public outreach facilitation. [FAQ about FSS is available here](#). More information [can be found here](#). Written translation services available in 8 languages for outreach materials (5,000 word maximum). DWR has [Verbal Interpretation service available to GSA's](#). Real-time interpretive services are available to GSAs for virtual, hybrid, or in-person meetings in support of GSP implementation with the goal of engaging underrepresented communities within basins and encouraging equal access for non-fluent English speakers during the implementation of GSP's. If you are interested in learning more or receiving support from an interpretation team email [sgmps@water.ca.gov](mailto:sgmps@water.ca.gov).

### **Reminders: Drought related tools & guidance**

#### 'Be Well Prepared' Initiative and Website

May 17, 2023, DWR released the [Be Well Prepared initiative](#). DWR is providing tools and resources to help communities that are dependent on groundwater and experiencing climate-driven weather extremes, to prepare for potential impacts to household water supplies. The Be Well Prepared initiative focuses on domestic well owners and residents that use and maintain their well. [The website includes resources and information](#) that every well owner should know and understand about: groundwater conditions, well maintenance, water quality, assistance, and additional articles, videos and resources. A [new flyer](#) from DWR provides the four initial steps for well owners to take if they think their well has gone dry. This flyer is also available in [Spanish](#) and [Hmong](#).

#### SB552: DWR's Water Shortage Vulnerability Scoring and Tool

As part of its technical assistance to support SB 552 implementation, DWR developed the [Water Shortage Vulnerability Scoring and Tool](#) to provide the foundational data and information statewide to counties for their water shortage risk assessment.

#### Dry Well Susceptibility Map

The DWR, in coordination with the State Water Resources Control Board, has developed an interactive mapping tool, called the Dry Well Susceptibility Tool. This tool identifies areas within groundwater basins that may be prone to water supply shortages in drinking water wells. State and local agencies and well owners can use this tool to anticipate where wells may go dry based on historical conditions to inform drought preparedness decision-

## September 2026 DWR Updates (from DWR's North Central Region Office)

making. To use this tool, navigate to [California's Groundwater Live website](#) and click the [Dry Domestic Well Susceptibility tab](#). A fact sheet on this tool, as well as DWR's Dry Well Reporting System, [is available here](#).

### Dry Well Reporting Site

There is a website available to [report private wells going dry](#). Information reported to this site is intended to inform state and local agencies on drought impacts on household water supplies. The data reported on this site (excluding personal identifiable information) can be viewed on the [SGMA data viewer](#) or downloaded on the [CNRA Atlas](#). Individuals or local agencies can report water shortages and [a list of resources are included on the webpage](#). The reporting forms are available in both English and Spanish. Local agencies can now sign up to receive notifications of any dry wells reported in their area. To sign up please email [sgmps@water.ca.gov](mailto:sgmps@water.ca.gov).

### California's Groundwater Live: Up-to-date data on groundwater conditions, well installations and subsidence

The Department of Water Resources (DWR) released the final [California's Groundwater – Update 2020 \(Bulletin-118\)](#), containing information on the condition of the State's groundwater, DWR has also developed a companion web-based application called [California's Groundwater Live](#) (CalGW Live), leveraging the [California Natural Resources Agency Open Data Platform](#) (Open Data) to improve the access and timeliness of statewide groundwater information. The easy-to-use interface will make many of the data sets used in CalGW Update 2020 available in an interactive map format that will be updated regularly for viewing and downloading. For more information, visit the updated [California's Groundwater website](#) Contact: [CalGW@water.ca.gov](mailto:CalGW@water.ca.gov).