South of Kern River Executive Committee
Regular Meeting

Thursday, October 10, 2024
9:00 a.m.to 11:00 a.m.
Meeting Information Posted:
www.sokrgsp.com
http://www.aewsd.org * http://www.wrmwsd.com
http://www.tejoncastacwd.com * https://www.arvincsd.com

In Person: Arvin-Edison Water Storage District Headquarters
20401 E. Bear Mountain Blvd. Arvin, CA 93203

Via Remote (**Microsoft Teams**): **https://www.microsoft.com/microsoft-teams/join-a-meeting**
Click here to join the meeting
Meeting Number: **289 619 843 830**
Meeting Password: **ko5K35**
Phone: **1.213.437.9052**
Phone Meeting Number (access code): **276 512 496#**

NOTICE: Members of the public interested in participating by teleconference may do so using the call-in information above or by following this link. Please note that this teleconference option is provided as a courtesy and at the participant's own risk. The Committee cannot guarantee that there will be no loss of connectivity or other technological obstacle to full participation through teleconferencing. By participating in this way, participants confirm that they understand this risk and that the Committee is not obliged to delay any portion of the meeting due to such technological obstacles and thus that teleconference participants may be unable to participate.

1. CALL TO ORDER
2. ROLL CALL
3. PLEDGE OF ALLEGIANCE
4. APPROVAL OF THE AGENDA
5. APPROVAL OF SEPTEMBER 12, 2024 MEETING MINUTES
6. PUBLIC COMMENT
7. REPORT ITEMS
    a. GSP Manager Report *(Muhar)*
        i. Basin Coordination
    b. Technical Consultant Report (*EKI*)
        i. Update on Amended 2024 Plan timeline
        ii. SGMA Monitoring Network performance and sustainable management criteria (SMC) compliance
    c. Finance Report *(Nicholas)*

d. California Aqueduct Subsidence Program (CASP) update (*Nicholas*)

e. Management Area updates *(Muhar, Nicholas, Martin, Barraza)*

8. ACTION ITEMS

   a. Consider endorsement of and recommendation to GSA home boards for funding the Technical Working Group Tasks August 2024 through February 2025 for eight consultants ($642k or $29.2k each at 22 parties)

   b. Consider endorsement of and recommendation to GSA home boards for funding the Point of Contact with Rincon contract amendment through February 2025 ($185k or $8.4k each at 22 parties)

   c. Consider endorsement of and recommendation to GSA home boards for funding the Intera Task Order for Well Mitigation Plan ($78k or $3.9k at 20 parties)

9. CORRESPONDENCE

   a. Letter from Kern County Subbasin Plan Manager/Point of Contact to State Water Resources Control Board (SWRCB) re: Comments – Kern County Subbasin

   b. Letter from State Water Project to SWRCB re: SWP Public Comment on State Water Resources Control Board July 2024 Draft Staff Report, Regarding Assessment of Kern County Subbasin Groundwater Sustainability Plans

10. CLOSED SESSION

    a. Potential Litigation (Government Code §54956.9(d)(2), (e)(1); 1 item).

11. ADJOURNMENT

MINUTES OF THE MEETING OF THE
SOUTH OF KERN RIVER EXECUTIVE COMMITTEE
September 12, 2024

CALL TO ORDER

Director Yurosek called the meeting to order at 9:03 a.m., and determined a quorum was present with attendance by:

Executive Committee Directors
Derek Yurosek – Arvin-Edison Water Storage District (AEWSD; Arvin GSA) (present)
Mark Valpredo – Tejon-Castac Water District (TCWD; Tejon-Castac Water District GSA) (present)
Michael Blaine – Wheeler Ridge-Maricopa Water Storage District (WRMWSD; Wheeler Ridge-Maricopa GSA) (present)
Rafael Gallardo – Arvin Community Services District (ACSD) (absent)

District Staff
Jeevan Muhar – AEWSD (present)
Sheridan Nicholas – WRMWSD (present)
Angelica Martin – TCWD (remote)
Raul Barazza – ACWD (present)

PLEDGE OF ALLEGIANCE

APPROVAL OF THE AGENDA

Director Yurosek moved to approve the agenda as amended. The motion was seconded by Director Valpredo. The motion passed 3-0-0.

APPROVAL OF JULY 11, 2024 MEETING MINUTES

Director Yurosek moved to approve the July 11, 2024 SOKR Executive Committee meeting minutes. Director Valpredo seconded. The motion passed 3-0-0.

PUBLIC COMMENT

There were no public comments.

REPORT ITEMS

GSP Manager Report

Basin Coordination

Mr. Muhar reported a meeting with the State Board Staff and the Basin has been scheduled for September 19th. The Basin concurrently has been working towards finalization of the Amended GSPs, including (1) stakeholder outreach and engagement through an all-day outreach event on October 3rd with three stakeholder workshops, (2)

Subbasin-wide organization through the Basin Coordination Agreement, (3) coordination with the SWRCB staff, and (4) detailed technical response from the Technical Working Group (TWG) to SWRCB staff draft report and staff's August workshop presentation.

Summary of draft SWRCB staff report on 2020 and 2022 Plans

Mr. Muhar presented a summary of the draft SWRCB staff report on the 2020 and 2022 Plans, released for public comment on July 25, 2024. The Directors noted that the staff report focused very little on the Amended 2024 Plan, and expressed support for the GSAs' continued coordination and defense of the Amended 2024 Plan as SGMA-compliant and protective of beneficial uses and users.

SGMA Monitoring Network performance and SMCs compliance

Mr. Muhar reported on August groundwater conditions within the SOKR Plan Area compared to the Minimum Thresholds (MTs) and Measurable Objectives (MOs) in both the SOKR GSP and the draft Amended Kern County Subbasin GSP.

No wells in the SOKR Management Areas exceeded their MTs, therefore no Undesirable Results (URs) occurred.

Finance Report

Mr. Nicholas reported on finances to date. Expenses have been submitted to the Coordination Committee. There are still items to be addressed to finalize expenses incurred in AEWSD, WRMWSD, and the Kern Subbasin Non-Districted Lands.

California Aqueduct Subsidence Program (CASP) update

A letter from CASP was received by Wheeler Ridge-Maricopa GSA notifying of surveys that have occurred along the Aqueduct within the GSA. Arvin GSA also received a letter, however it was much shorter, as the Aqueduct does not go through Arvin GSA but rather lands within Arvin GSA are inside the Aqueduct's identified buffer zone. The letter to Wheeler Ridge-Maricopa GSA showed total subsidence between 2020-2024 and 2023-2024 readings along the mileposts, and specifically discussed Milepost 270, the location at which the greatest extent of subsidence occurred from 2020 to 2023. The Directors requested that EKI contact CASP staff to discuss these letters.

Management Area Updates

Mr. Muhar did not have AEWSD-specific updates to report.

Mr. Nicholas did not have WRMWD-specific updates to report.

Ms. Martin did not have TCWD-specific updates to report.

Mr. Barazza reported on ACSD and AEWSD's additional progress on recharge projects. AEWSD recently purchased 160 acres of land for recharge purposes, and a letter from the State indicating CEQA exemption, giving AEWSD permission to begin expansion of recharge facilities.

ACTION ITEMS

The Directors considered endorsement of and recommendation to their GSA home Boards for funding of the GEI/EKI Task Order for the Subbasin Stakeholder Communications and Engagement Plan (SCEP). EKI reported that work to finalize the Draft SCEP was almost complete. EKI also reported the Subbasin website was active, which includes Amended Plans, updates, and FAQs. Subbasin workshops will occur on October 3rd with in-person events between McFarland and Lamont, and a hybrid Zoom option at the KCWA.

Following discussion, the Directors unanimously endorsed the SCEP Proposal.

CORRESPONDENCE

1. Letter from Kern County Subbasin Plan Manager/Point of Contact to State Water Resources Control Board re: Comments – Kern County Subbasin
2. Letter from Technical Working Group to State Water Resources Control Board re: Comments – Kern County Subbasin Staff Presentation during 26 August 2024 Workshop

CLOSED SESSION

Conference with Legal Counsel pursuant to Government Code §54956.9(d)(2), (e)(1) (potential litigation; 1 item). There was no action to report out of closed session.

Next meeting will be held October 10th.

ADJOURNMENT

Director Yurosek adjourned the South of Kern River Executive Committee meeting at 10:29 a.m.

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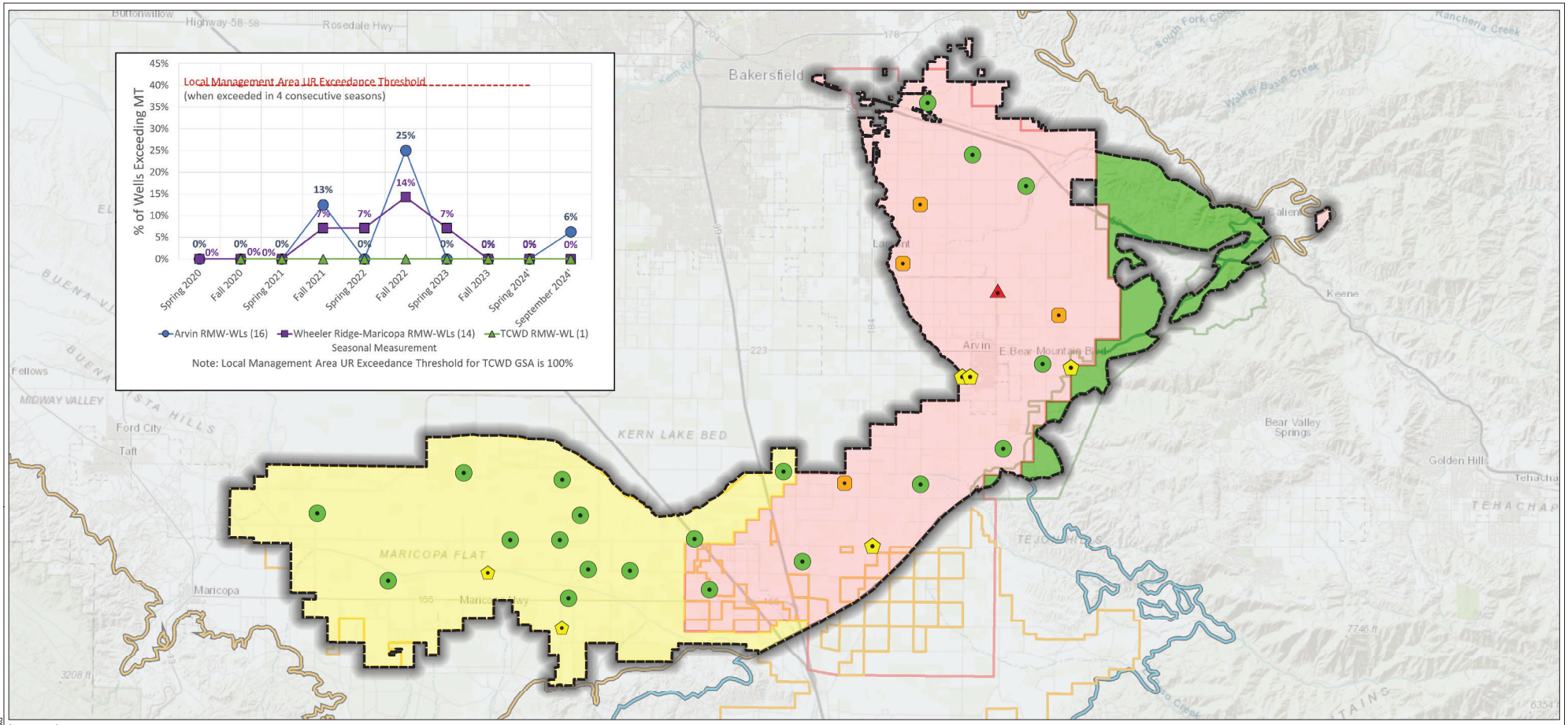
Mark Valpredo, South of Kern River
Executive Committee Secretary



Legend

Representative Monitoring Well and Status as of September 2024

- Water Level Above MO (20 or 65%)
- Water Level Between MO and MT but closer to MO (6 or 19%)
- Water Level Between MO and MT but closer to MT (4 or 13%)
- Water Level Below MT (1 or 3%)
- South of Kern River Plan Area
- Arvin GSA
- Wheeler Ridge-Maricopa GSA
- Tejon-Castac Water District GSA
- WRMWSD Service Area
- AEWSD Service Area
- TCWD Service Area

Groundwater Subbasin

- Kern County (DWR 5-022.14)
- White Wolf (DWR 5-022.18)

Abbreviations

AEWSD	= Arvin-Edison Water Storage District
DWR	= California Department of Water Resources
GSA	= Groundwater Sustainability Agency
MO	= Measurable Objective
MT	= Minimum Threshold
RMW	= Representative Monitoring Well
SGMA	= Sustainable Groundwater Management Act
SMC	= Sustainable Management Criteria
TCWD	= Tejon-Castac Water District
UR	= Undesirable Result
WRMWSD	= Wheeler Ridge-Maricopa Water Storage District

Sources

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 3 October 2024.
2. GSA boundaries obtained from SGMA GSA Map Viewer portal, accessed 6 May 2022.
3. DWR groundwater basins are based on the boundaries defined in California's Groundwater Bulletin 118 - 2019 Update.

Notes

1. All locations are approximate.
2. Status is based on the SMCs in the 2022 South of Kern River Groundwater Sustainability Plan
3. Undesirable Results are deemed to occur if groundwater levels in 40% or more RMWs are below their respective MT for four consecutive bi-annual measurements (Spring and Fall) in any management area.

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September 2024 Water Levels Relative to SMCs

South of Kern River GSP
Kern County, CA
September 2024
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Figure 1

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INTERIM FIGURE - FOR INFORMATIONAL PURPOSES ONLY

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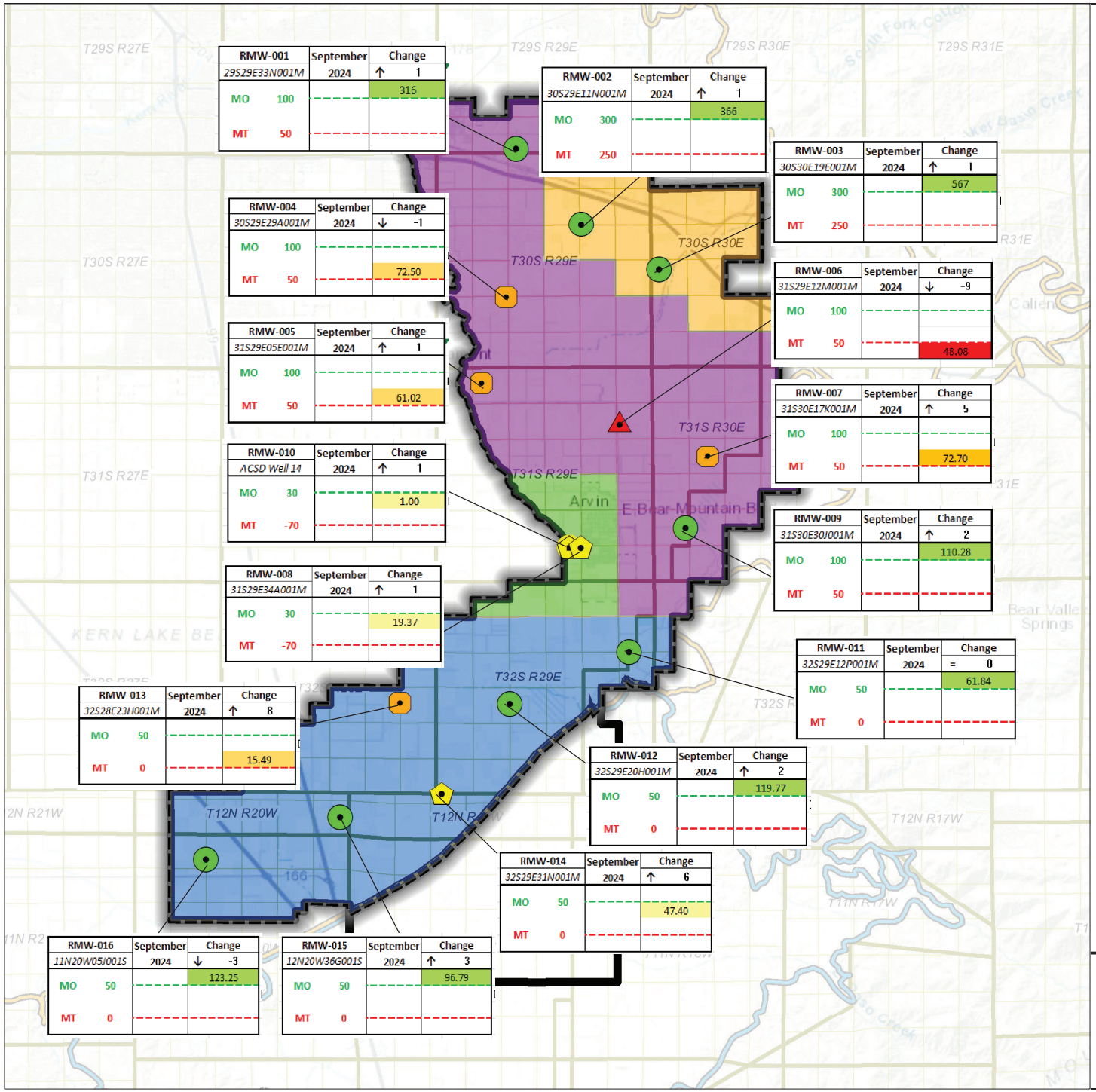

Legend

Representative Monitoring Well and Status as of September 2024

- Water Level Above MO (8 or 50%)
- Water Level Between MO and MT but closer to MO (3 or 19%)
- Water Level Between MO and MT but closer to MT (4 or 25%)
- Water Level Below MT (1 or 6%)

Sustainability Criteria Zones

- ACSD
- Edison
- North Canal
- South Canal
- Arvin GSA
- Arvin-Edison Water Storage District

Groundwater Subbasin

- Kern County (DWR 5-022.14)
- White Wolf (DWR 5-022.18)

Abbreviations

ACSD	=	Arvin Community Services District
DWR	=	California Department of Water Resources
ft msl	=	feet above mean sea level
GSA	=	Groundwater Sustainability Agency
MO	=	Measurable Objective
MT	=	Minimum Threshold
RMW	=	Representative Monitoring Well
SMC	=	Sustainable Management Criteria

Notes

1. All locations are approximate.
2. Groundwater elevations reported in units of ft msl.
3. All water levels collected during September 2024.
4. Arrow direction indicates water level change from previous month.
5. Status is based on the SMCs in the 2022 South of Kern River Groundwater Sustainability Plan.

Sources

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 30 September 2024.

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Groundwater Levels Relative to SMCs
September 2024
Arvin GSA

Arvin-Edison Water Storage District
Kern County, California
September 2024
B60064.10
Figure 3

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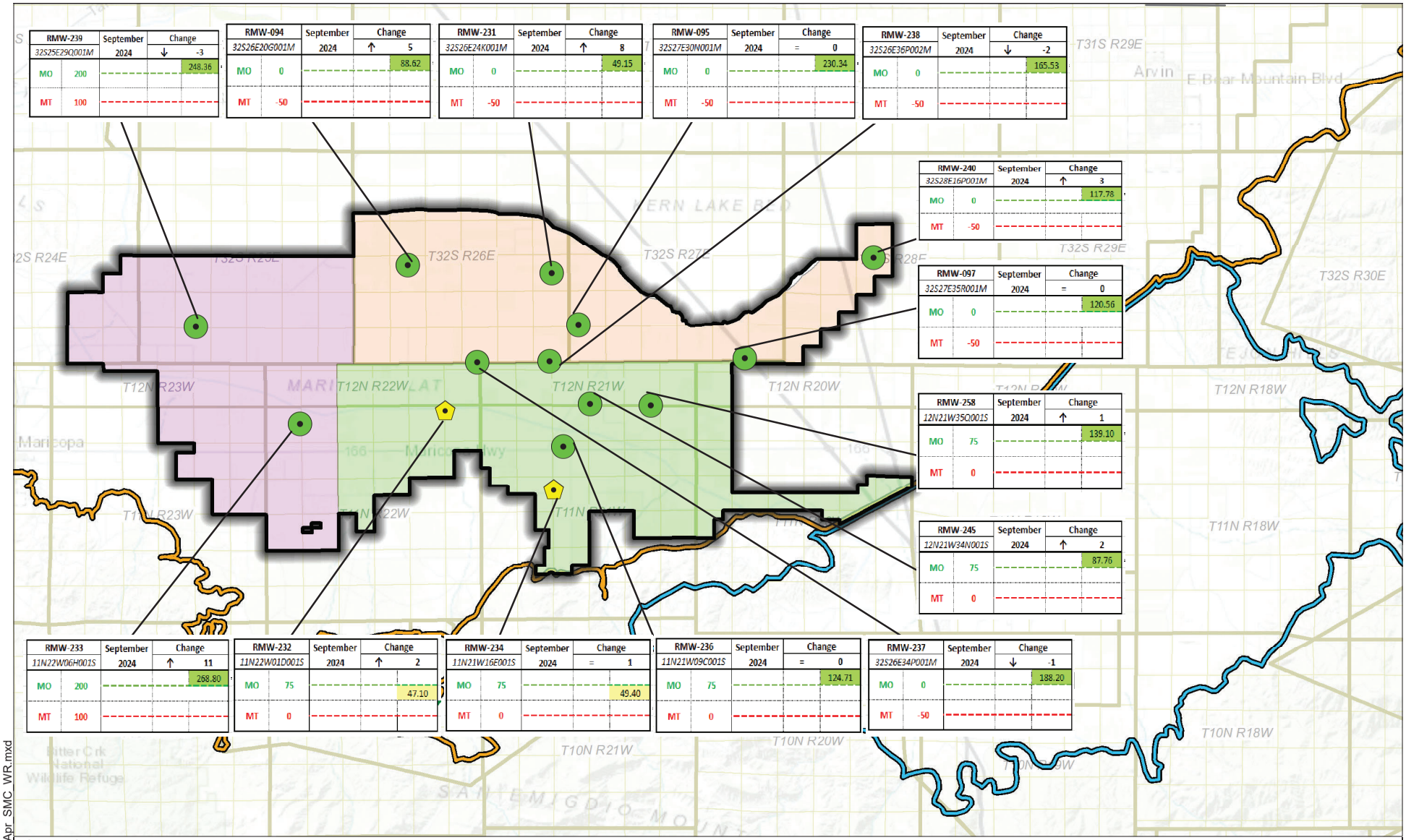
INTERIM FIGURE - FOR INFORMATIONAL PURPOSES ONLY



Legend

Groundwater Subbasin
- Kern County (DWR 5-022.14)
- White Wolf (DWR 5-022.18)

Sustainability Criteria Zones
- Northeast
- Southeast
- West
- Wheeler Ridge-Maricopa GSA

Representative Monitoring Well and Status as of September 2024
- Water Level above MO (12 or 86%)
- Water Level Between MO and MT but closer to MO (2 or 14%)

Notes

1. All locations are approximate.
2. Groundwater elevations reported in units of ft msl.
3. All water levels collected during Septembert 2024.
4. Arrow direction indicates water level change from previous month.
5. Status is based on the SMCs in the 2022 South of Kern River Groundwater Sustainability Plan

Sources

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 3 October 2024.

Abbreviations

DWR	= California Department of Water Resources
ft msl	= feet above mean sea level
GSA	= Groundwater Sustainability Agency
MO	= Measurable Objective
MT	= Minimum Threshold
SMC	= Sustainable Management Criteria

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(Scale in Miles)

Groundwater Levels Relative to SMCs
September 2024
Wheeler Ridge-Maricopa GSA

South of Kern River
Kern County, California
September 2024
C20055.00

Figure 8

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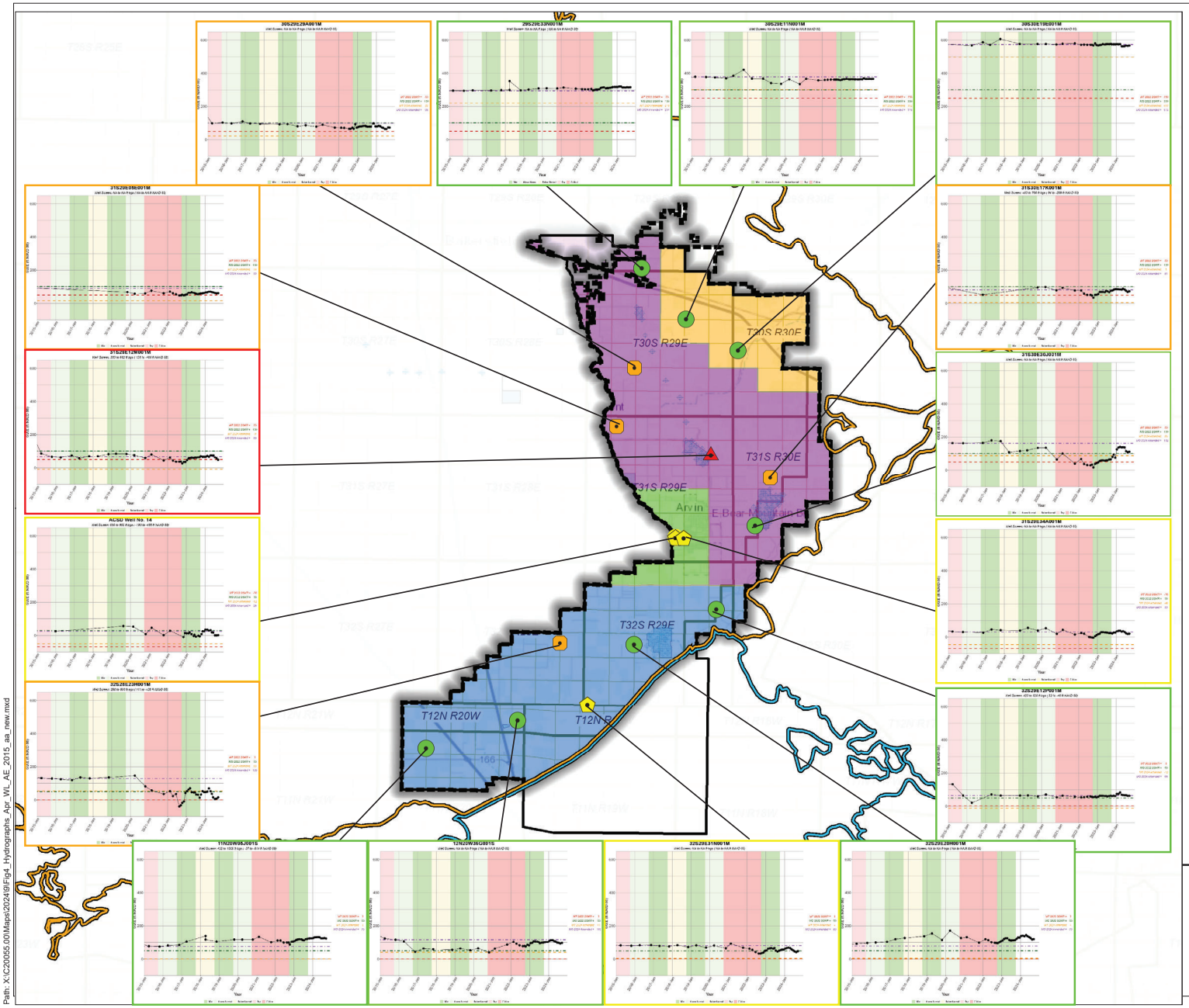

Legend

Representative Monitoring Well and Status as of September 2024

- Water Level Above MO (8 or 50%)
- Water Level Between MO and MT but closer to MO (3 or 19%)
- Water Level Between MO and MT but closer to MT (4 or 25%)
- Water Level Below MT (1 or 6%)
- Arvin-Edison Water Storage District
- Arvin GSA

Sustainability Criteria Zones

- ACSD
- Edison
- North Canal
- South Canal
- District Recovery Well
- AEWSD Spreading Basin

Groundwater Subbasin

- Kern County (DWR 5-022.14)
- White Wolf (DWR 5-022.18)

Abbreviations

AEWSD	= Arvin-Edison Water Storage District
DWR	= California Department of Water Resources
ft msl	= feet above mean sea level
GWE	= groundwater elevation
MO	= measurable objective
MT	= minimum threshold
RMW	= Representative Monitoring Well

Notes

1. All locations are approximate.
2. Groundwater elevations are in feet mean sea level.
3. Status is based on the SMCs in the 2022 South of Kern River Groundwater Sustainability Plan
4. Undesirable Results are deemed to occur if groundwater levels in 40% or more RMWs are below their respective MT forfour consecutive bi-annual measurements (Spring and Fall) in any management area
5. All RMW status based on September 2024 measurements.

Sources

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 30 September 2024.
2. Water level information obtained from AEWSD.

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Hydrographs in Representative Monitoring Wells (Jan 2015 - Septembert 2024)

Arvin-Edison Water Storage District
Kern County, CA
September 2024
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Figure 4

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INTERIM FIGURE - FOR INFORMATIONAL PURPOSES ONLY

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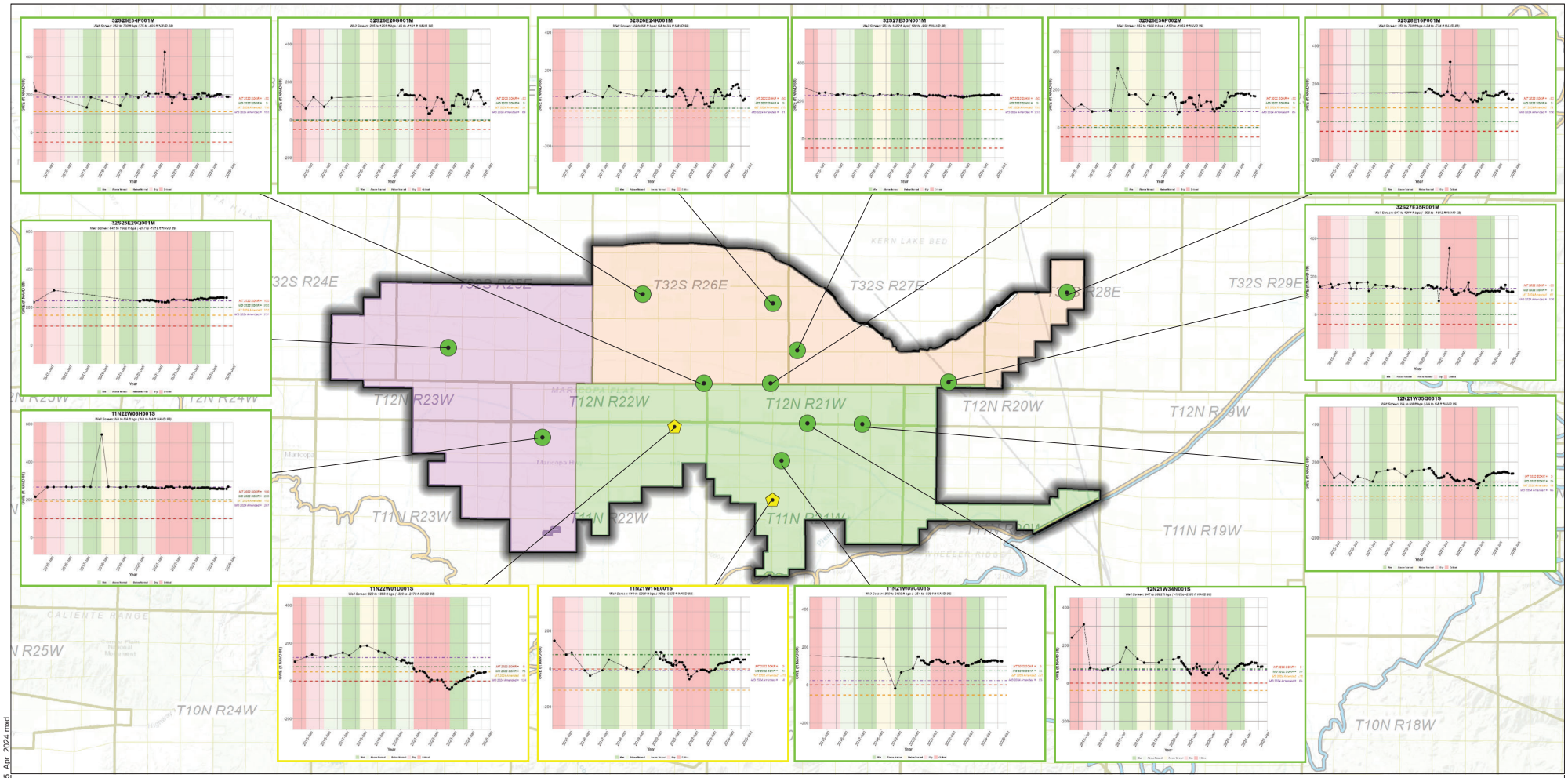

Legend

Representative Monitoring Well and Status as of September 2024

- Water Level above MO (12 or 86%)
- Water Level Between MO and MT but closer to MO (2 or 14%)

Sustainability Criteria Zones

- Northeast
- Southeast
- West
- Wheeler Ridge-Maricopa GSA

Groundwater Subbasin

- Kern County (DWR 5-022.14)
- White Wolf (DWR 5-022.18)

Notes

1. All locations are approximate.
2. Groundwater elevations are in feet mean sea level.
3. Status is based on the SMCs in the 2022 South of Kern River Groundwater Sustainability Plan
4. Undesirable Results are deemed to occur if groundwater levels in 40% or more RMWs are below their respective MT for four consecutive bi-annual measurements (Spring and Fall) in any management area.
5. All RMW status based on September 2024 measurements.

Sources

1. Basemap is ESRI's ArcGIS Online world topographic map, obtained 2 October 2024.
2. Groundwater elevation data provided by WRMWSD.

Abbreviations

DWR	= California Department of Water Resources
ft msl	= feet above mean sea level
GSA	= Groundwater Sustainability Agency
MO	= Measurable Objective
MT	= Minimum Threshold
RMW	= Representative Monitoring Well
SMCs	= Sustainable Management Criteria
WRMWSD	= Wheeler Ridge-Maricopa Water Storage District

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(Scale in Miles)

Hydrographs in Representative Monitoring Wells (January 2015 - September 2024)

Wheeler Ridge-Maricopa Water Storage District
Kern County, CA
September 2024
B70103.01

Figure 10

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INTERIM FIGURE - FOR INFORMATIONAL PURPOSES ONLY

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September 23, 2024

Via electronic mail

California State Water Resources Control Board
Attn: Courtney Tyler, Clerk to the Board
P.O. Box 100
Sacramento, CA 95812-2000
SGMA-Kern@waterboards.ca.gov

Re: Comments – Kern County Subbasin

Dear Chair Esquivel and Members of the Board,

Pursuant to the State Water Resources Control Board's (SWRCB or Board) "Notice of Opportunity to Provide Feedback, Public Staff Workshops, and Public Board Hearing for the Proposed Designation of Kern County Subbasin as a Probationary Basin," the Kern County Subbasin Groundwater Sustainability Agencies (Kern GSAs) provide further comments on the "Kern County Subbasin Probationary Hearing Draft Staff Report" (draft Staff Report), which was published on July 25, 2024. These comments are being provided by the Kern County Subbasin Plan Manager on behalf of all the Kern GSAs, and enclose additional information and analysis prepared by the Kern Technical Working Group (TWG) (*see* Appendix A.1). This submittal supplements the initial comments we filed on August 22, 2024.

As noted in our initial comments, the draft Staff Report is based on the revised 2022 Groundwater Sustainability Plans (GSPs) and includes only two pages of "preliminary review" of the final draft amended Kern County GSP (2024 Plan).[1] Despite Staff's incomplete review of the 2024 Plan, the draft Staff Report recommends the Subbasin be designated as probationary because the Department of Water Resources (DWR) determined the 2022 GSPs were inadequate:

> Despite significant efforts by GSAS in the Kern County Subbasin, *Board staff analysis supports DWR's determination that the Kern County Subbasin 2022 GSPs are inadequate*. Due to poor coordination and inconsistency in goals and implementation, *the current plans* do not achieve sustainability or

[1] The "2024 Plan" is comprised of seven (7) GSPs alongside a coordination agreement. As described in the TWG comments, the GSPs rely on the same data and methodologies for defining sustainable management criteria and undesirable results.

> prevent substantial impacts … The Kern County Subbasin is therefore unlikely to achieve sustainability by 2040, as required by SGMA.[2]

We continue to believe that Staff's analysis and recommendations regarding the 2022 Plans have limited relevance to the Board's decision whether to designate the Subbasin as probationary. The Board cannot reasonably draw or rely upon a conclusion regarding the future sustainability of the Subbasin that does not consider the 2024 Plan.

In response to DWR's inadequate determination, we collectively undertook a rigorous effort, in consultation with Board staff, to amend the 2022 GSPs to remedy the deficiencies identified by DWR. This effort resulted in the 2024 Plan, which is fundamentally different than the 2022 GSPs.[3] It is the 2024 Plan, *not* the 2022 GSPs, that shows how the Kern GSAs will achieve the Subbasin's sustainability goal by 2040.[4]
We disagree with the draft Staff Report's summary claim that the deficiencies DWR identified in the 2022 GSPs apply equally to the 2024 Plan.[5] This is an unreasonable and unfair claim to make based on only "preliminary review" of the 2024 Plan by Board staff and no review by DWR. Before the Board asserts its authority to intervene here, it first must show that the GSAs are unable to manage groundwater sustainably.[6] Again, it cannot make that showing without reviewing the 2024 Plan.

The TWG's supplemental comments describe in more detail how the 2024 Plan relies on the best available science and information, follows the requirements of SGMA and the GSP regulations, and is likely to achieve the Kern Subbasin's sustainability goal.[7] The 2024 Plan was developed by the Kern GSAs to establish a coordinated, sustainable groundwater management program that applies across the entire Subbasin.

As the TWG explains, the 2024 Plan:

> establishes a comprehensive groundwater management program that is coordinated across the Subbasin and is fundamentally different from previous GSP submittals. The [Sustainability Management Criteria (SMCs)], Undesirable Results (URs), monitoring programs, and mitigation plans were

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2 Draft Staff Report, p. 24 (emphasis added).

3 *See* Appendix A.1, p. 1.

4 The Subbasin's work to develop an amended GSP and submit it to Staff several months in advance of the scheduled hearing date is consistent with the Board's guidance. *See* SWRCB, "GSAs and State Intervention under SGMA – FAQs," *available at* https://www.waterboards.ca.gov/sgma/docs/20230621-sgma-gsa-faqs.pdf, p. 2.

5 Draft Staff Report, p. 191.

6 Water Code § 10720.1(h) (describing Legislature's intent to "minimize[e] state intervention to only when necessary to ensure that local agencies manage groundwater in a sustainable manner"); SWRCB, "GSAs and State Intervention under SGMA – FAQs," p. 2 (the Board's "primary goal is to protect a basin's groundwater when GSAs are unable to manage groundwater sustainably").

7 The TWG's supplemental comments are not intended to be exhaustive. They focus on explaining the 2024 Plan rather than providing detailed responses to the draft Staff Report's analysis of the 2022 GSPs. However, we will provide upon Board staff's request, and reserve the right to submit on our own initiative, additional comments to facilitate Staff's review of the 2024 Plan.

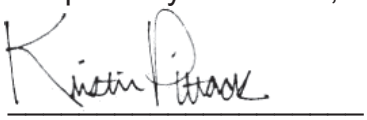
> all developed to be uniformly applicable across the Subbasin and to be protective of all beneficial uses and users of groundwater.… All the GSAs have agreed to implement [projects and management actions (P/MAs)] as necessary to maintain sustainability under 2030 climate change conditions … The resulting portfolio of P/MAs emphasizes demand reduction as the primary action to achieve Subbasin-wide sustainability, with many of the GSAs already implementing P/MAs presented in the Subbasin's portfolio.[8]

The TWG's comments also describe the 2024 Plan's use of revised science- and risk-based methodologies for setting SMCs for all sustainability indicators relevant to the Subbasin, including groundwater levels and land subsidence.[9] The Kern GSAs anticipate that "on-going coordination meetings will allow the TWG and Board staff to walk through any remaining concerns on the details of the proposed SMCs," and will provide additional opportunities for the TWG to "refine our approach to addressing any remaining issues."[10] In short, the same deficiencies that DWR identified in the 2022 GSPs cannot be applied to the 2024 Plan.

Accordingly, we reiterate our prior requests that the Board direct its staff to undertake a complete review of the 2024 Plan, in consultation with the TWG, before Staff finalizes any recommendations to designate the Subbasin as probationary. We further request that Staff issue a revised draft Staff Report that includes its "greater depth" review of the 2024 Plan for public comment prior to finalizing the report.[11] Given that the express purpose of the Staff Report is to inform the Board's decision whether to designate the Subbasin as probationary,[12] the Kern GSAs and other interested stakeholders should have an opportunity to review and respond to Staff's revised findings, and to have their responses considered by Staff *before* the findings are finalized and potentially relied upon by the Board at the hearing.

The Kern GSAs remain appreciative of the Board's consideration and look forward to continued consultation with Board staff. If you have any questions regarding this letter or the 2024 Plan, please contact the Plan Manager, Kristin Pittack, MS, at (760) 223-5062 or kpittack@rinconconsultants.com.

Respectfully submitted,



Kristin Pittack, MS
Kern County Subbasin Plan Manager

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8 Appendix A.1, p. 2.
9 *See* Appendix A.1, pp. 7, 13.
10 Appendix A.1, p. 3.
11 Draft Staff Report, p. 191.
12 *Id.* at 25.

(760) 223-5062
kpittack@rinconconsultants.com

cc:
E. Joaquin Esquivel, Chair, SWRCB
Dorene D'Adamo, Vice Chair, SWRCB
Laurel Firestone, Board Member, SWRCB
Sean Maguire, Board Member, SWRCB
Nichole Morgan, Board Member, SWRCB
Derek Yurosek, Arvin Edison
Michael Blaine, Wheeler Ridge-Maricopa
Mark Valpredo, Tejon-Castac
Rodney Palla, Kern Delta
Bob Smith, City of Bakersfield
Gene Lundquist, KCWA ID4
Brandon Morris, Southern San Joaquin
Randy Bloemhof, Shafter-Wasco/7th Standard
Kevin Andrew, North Kern
John Gaugel, Cawelo
Rob Goff, Westside District Water Authority
Dan Waterhouse, Semitropic
Royce Fast, Pioneer
Kim Brown, Kern Water Bank
Gary Morris, West Kern
Andrew Hart, Kern Tulare
Chad Hathaway, Eastside Water
Gary Unruh, Rosedale
Jeof Wyrick, Henry Miller
Jim Nickel, Olcese
Terry Chicca, Buena Vista

Appendix A.1

Comments on the Kern County Subbasin Probationary Hearing Draft Staff Report

September 23, 2024

Re: Comments on the Kern County Subbasin Probationary Hearing Draft Staff Report
Kern County Subbasin 2024 Groundwater Sustainability Plan
Kern County, CA

The Kern County Subbasin Technical Working Group (TWG) is providing additional comments on the draft Staff Report to further describe and underscore the progress the Subbasin has made since submission of the 2022 Groundwater Sustainability Plans (GSPs), both by completing the 2024 Plan (i.e., the seven coordinated GSPs and Coordination Agreement) to meet the requirements of the Sustainable Groundwater Management Act (SGMA) and by implementing projects and management actions (P/MAs) that are already moving the Kern County Subbasin (Subbasin) toward subbasin-wide sustainability. These comments supplement the initial comments submitted on August 22, 2024, regarding the Draft Staff Report (included herein as **Appendix A.2** and incorporated by reference).

We intend for these comments to facilitate productive discussions with State Water Resources Control Board (SWRCB or Board) staff and to contribute to well-informed, data-driven plan evaluation and decision-making. These comments provide a more detailed explanation of how the 2024 Plan addresses all the deficiencies identified by the California Department of Water Resources (DWR) and additional concerns raised by SWRCB staff. These comments also clarify the best available data relied upon in the 2024 Plan and show where the draft Staff Report's reliance on outdated information and data contained in the revised 2020/2022 GSPs likely contributed to inaccurate interpretations and questioning of the Groundwater Sustainability Agencies' (GSAs) understanding of the Subbasin hydrogeologic conceptual model (HCM), current groundwater conditions, and data and analyses used to develop the Sustainable Management Criteria (SMCs). We look forward to the opportunity to provide a detailed overview of the 2024 Plan to the Board and to collaborative engagement with SWRCB staff to address any remaining concerns.

I. Authority for Basin-Wide Management

A. Board staff are concerned the GSAs lack authority to manage pumping across the entire basin.

1. It is unclear if Kern County Water Agency has jurisdictional authority/coverage under SGMA over areas without member agencies with authorities, and if a public agency can lend authority to private entities under SGMA.

The Kern County Water Agency is a member of the Kern Non-Districted Lands Authority (KNDLA), formerly known as the Kern Groundwater Authority, which is a GSA formed through a joint powers authority agreement, as permitted under SGMA, Water Code § 10723.6(a)(1). A joint powers authority can exercise any of the powers of its members within the combined geographical areas of its member agencies. Kern County Water Agency's enabling act provided

the Agency jurisdiction over all the territory within the boundaries of Kern County and jurisdiction over water matters generally. Since the Kern County Subbasin lies within the county boundaries, the KNDLA has jurisdiction over the non-districted lands.

II. Development of the 2024 Plan

The GSPs submitted in 2020 and 2022 were prepared independently at the GSA level with each GSA working with a separate consultant. These GSPs were then rolled up into a Subbasin Umbrella Plan in the case of the Kern Groundwater Authority (KGA) members, and as stand-alone GSPs for GSAs that had elected to be independent of the KGA. This approach resulted in a collection of independently developed GSPs that were submitted together with a Coordination Agreement to manage the Kern County Subbasin.

The 2024 Plan was developed using a very different approach. The consulting firms who had prepared individual GSPs in 2020 and 2022 were charged to collaboratively develop a revised Subbasin GSP with each consultant applying their particular knowledge and expertise of certain technical areas and specific GSAs to represent the Subbasin with no directive from Subbasin policy makers and managers other than to work together to complete the Plan based on best available data and reliable scientific methods. The Technical Working Group (TWG), composed of approximately 20 technical experts, formed six subcommittees each of which focused on analyzing conditions throughout the Subbasin to develop designated sections of the 2024 Plan.

The broad array of knowledge available to the TWG, together with their highly coordinated and cooperative structure, led to the 2024 Plan, which establishes a comprehensive groundwater management program that is coordinated across the Subbasin and is fundamentally different from previous GSP submittals. The SMCs, Undesirable Results (URs), monitoring programs, and mitigation plans were all developed to be uniformly applicable across the Subbasin and to be protective of all beneficial uses and users of groundwater. The P/MAs were developed by individual GSAs to document each GSA's commitment to undertake specific measures to correct their agreed upon proportions of the Subbasin's deficit. All the GSAs have agreed to implement P/MAs as necessary to maintain sustainability under 2030 climate change conditions, even those that have not been assigned a proportion of the Subbasin's current deficit. The resulting portfolio of P/MAs emphasizes demand reduction as the primary action to achieve Subbasin-wide sustainability, with many of the GSAs already implementing P/MAs presented in the Subbasin's portfolio.

Stakeholders and community members were engaged and will continue to be engaged throughout the 2024 Plan development and implementation process. In addition to direct GSA outreach and regular GSA Board meetings that are open to the public and provide SGMA-related updates, GSA groups held numerous public meetings. These groups include designated representatives of disadvantaged communities (e.g. Arvin Community Services District holds a director position on the South of Kern River GSP Executive Committee and the cities of Delano, McFarland, Shafter, and Wasco have an appointed member on the North Central Kern GSP Steering Committee). Furthermore, as discussed in Section 5.10 of the 2024 Plan, the Subbasin GSAs directly engaged with Kern County Environmental Health Department, Kern County Water Agency, Division of Drinking Water, DWR California Aqueduct Subsidence Program (CASP), Friant Water Authority (FWA), Self-Help Enterprises, Kern Water Collaborative, Water Association of Kern County, and Kern County Farm Bureau. Ongoing engagement strategies

will be outlined in the Stakeholder Communication and Engagement Plan currently under development, and include three stakeholder workshops on October 3, 2024, held in the northern, central (remote option), and southern areas of the Subbasin. Details can be found on www.kerngsp.com.

Six of the GSAs that participated in preparation of the Subbasin GSPs also prepared companion "blue page" GSPs. Each agency submitting a "blue page" GSP is fully supportive of (and fully consistent with) the Subbasin Plan and the HCM, SMCs, monitoring programs, and all other aspects of the Plan. Each "blue page" GSP simply includes a limited number of additional "blue pages," that highlight GSA-specific information that further demonstrates sustainable management. In no instances do the "blue pages" change, retract, or contradict information presented in the Subbasin Plan.

The TWG also acknowledges that while the 2024 Plan more accurately represents conditions in the Subbasin and describes a more comprehensive approach to achieving Subbasin-wide sustainability, some of the historical operations/background information needed to understand groundwater management in the Subbasin needs to be more clearly articulated to support SWRCB staff and public review and understanding. These key issues will be addressed in the final 2024 Plan to further assuage staff concerns. We look forward to continued meetings with Board staff to work through their concerns and to refine our approach to addressing any remaining issues.

III. Response to Deficiencies

As noted above, this comment letter is organized around the deficiencies noted by DWR in their review of the 2022 GSPs. Each of the following sections focuses on how these deficiencies are addressed in the 2024 Plan with these responses also taking into consideration concerns expressed by Board staff during our series of coordination meetings and in the Draft Staff Report.

A. Defining and Avoiding Undesirable Results Related to Coordination in the Subbasin

1. Undesirable results and sustainable management criteria are not coordinated.

The URs and SMCs presented in the 2024 Plan were developed using consistent data and methodologies and applied on a Subbasin-wide scale to be consistent with the requirements of SGMA and to be protective of beneficial uses and users. The URs and SMCs were the subject of many of the coordination meetings with Board staff during the 2023 and 2024 timeframe so that staff would be aware of the high level of Subbasin-wide coordination and agreement that underlies the URs and SMCs. It is anticipated that on-going coordination meetings will allow the TWG and Board staff to walk through any remaining concerns on the details of the proposed SMCs.

The 2024 Plan provides both a qualitative plain language URs definition, and a quantitative URs definition based on number of MT exceedances for each applicable Sustainability Indicator – in a consistent manner across the Subbasin. In the case of Chronic Lowering of Groundwater Levels, the UR definition includes a number of impacted drinking water wells at the Subbasin level, on an individual year and cumulative basis. **Table 1**, which is Table ES-3 in the 2024 Plan, reproduced below, presents a coordinated, Subbasin-wide definition for URs and SMCs for each relevant sustainability indictor.

Table 1. [GSP Table ES-3] Summary of Sustainable Management Criteria

Sustainability Indicator	Undesirable Result	Minimum Threshold	Measurable Objective
Chronic Lowering of Groundwater Levels	One of the following occurs: (1) More than 15 drinking water wells are reported dry in any given year. If 15 drinking water wells were impacted every year, no more than 255 drinking water wells cumulatively would be impacted by 2040, or (2) MTs are exceeded in at least 25% of RMW-WLs over a single year (i.e., two consecutive seasonal measurements)	The lower of: (1) Groundwater level in 2030 if the regional trend is extended from the 2015 low (the MO), or (2) Groundwater level that allows for operational flexibility below the 2015 low, based on an RMW-WL-specific record of groundwater level fluctuations	The 2015 low groundwater elevation.
Reduction of Groundwater Storage	A cumulative reduction in usable groundwater storage of 9.3 million acre-feet (MAF) in the Primary Principal Alluvial Aquifer relative to the baseline (WY 2015) total usable groundwater storage volume.	MTs for Chronic Lowering of Groundwater Levels used as a proxy	MOs for Chronic Lowering of Groundwater Levels used as a proxy
Seawater Intrusion	Groundwater conditions in the Subbasin show that Seawater Intrusion is not present and is not anticipated to be present in the future, and therefore, the Sustainability Indicator is not applicable.		
Degraded Water Quality	MTs for a groundwater quality COC are exceeded in three RMW-WQs in an HCM area based the average of confirmed seasonal samples and can be attributed based on a technical analysis to groundwater management actions (e.g., groundwater level changes).	The greater concentration of: (1) The applicable health-based screening standard, or (2) The maximum pre-2015 baseline concentration at each RMW-WQ. For wells with insufficient pre-2015 data, 2010-2023 data is used to determine maximum baseline concentrations at each RMW-WQ. For wells with insufficient 2010-2023 data, the MT is set as the 90th percentile 2010-2023 baseline concentration in the applicable HCM area.	The greater concentration of: (1) The applicable health-based screening standard, or (2) The median pre-2015 baseline concentration at each RMW-WQ. For wells with insufficient pre-2015 data, 2010-2023 data is used to determine median baseline concentration at each RMW-WQ. For wells with insufficient 2010-2023 data, the MO is set as the 90th percentile 2010-2023 baseline concentration in the applicable HCM area.

Sustainability Indicator	Undesirable Result	Minimum Threshold	Measurable Objective
 **Land Subsidence**	MT extent of subsidence is exceeded at any RMS-LS or as measured using InSAR data published annually by DWR averaged across an HCM area. Note: The GSAs' management authority does not extend to all activities and processes that cause Subbasin subsidence.	MTs are established along critical infrastructure as a rate and extent based on specific impacts to critical infrastructure or as an observed or allowable rate of subsidence, as determined by the Subbasin's risk-based approach. Additionally, MTs are set for the Subbasin as the average historical rate of subsidence in each HCM area from 2015-2023.	50% of the MT rate and MT extent.
 **Interconnected Surface Water**	Groundwater conditions in the Subbasin show that there are a few areas with potential Interconnected Surface Waters. However, data show the connection is likely transient, short-lived, and involves shallow or perched groundwater that is not part of the principal aquifer systems. Therefore, the Sustainability Indicator is not applicable to the Subbasin.		

2. The Coordination Agreement, GSPs, and Management Area Plans lack key details necessary for coordinated implementation.

As well as the 2024 Plan, the Coordination Agreement was significantly updated based on the new process and has been updated to include dispute resolution provisions. Management Area Plans that rely on different SMCs have been eliminated, although a small number of Management Areas are defined in the Subbasin Plan.

3. GSAs in the Subbasin have not demonstrated Basin-wide management.

A high degree of coordination among Subbasin policy representatives, GSA managers, and TWG members is evident in the 2024 Plan and in the recently completed workshops and tours. These efforts demonstrate the collective intent to attain Subbasin-wide sustainability.

The MT Exceedance Policy is triggered for a single MT exceedance, requiring GSA action (Appendix W of the 2024 Plan). In response to the 2023 DWR letter, the GSAs enabled Subbasin-wide notifications for when a reported seasonal groundwater level measurement exceeds the MT. This ensures that the GSAs are held accountable for investigating the MT exceedance and initiating appropriate P/MAs to address, as warranted.

B. Defining and Avoiding Undesirable Results Related to Chronic Lowering of Groundwater Levels

1. Undesirable results and sustainable management criteria are poorly coordinated.

As described in Section 13 of the 2024 Plan, and in response to comment B2, below, the Subbasin GSAs developed the Chronic Lowering of Groundwater Levels UR and SMC definitions in a fully coordinated fashion and consistent with the GSP regulations and the intent of SGMA (i.e., to avoid URs).

2. Redevelop undesirable results and sustainable management criteria using consistent data and methods and adequate detail for implementation across many plans.

As described in Section 13 of the 2024 Plan, the Subbasin GSAs applied a coordinated UR definition and a consistent dataset and SMC methodology across the Subbasin that supports proactive and coordinated implementation and protection of beneficial uses and users.

With respect to the URs, they have been established to be very protective of beneficial users (e.g., the lesser of 25% of the Subbasin-wide Representative Monitoring Network or impacting more than 15 drinking water wells in any given year; Section 13.1.1.4).

Per the GSP regulations (§ 354.28), the SMC methodology development process that was employed for the 2024 Plan directly considered all the beneficial uses and users of groundwater. At the outset of the revision process (i.e., in July 2023), the GSAs determined that it would be significant and unreasonable to have more than 255 drinking water wells go dry by 2040 (or no more than 15 per year). This definition is based on an assessment of the previously impacted wells that were successfully mitigated by the Subbasin Joint Operating Committee that has been in place since 2010, the associated costs for past mitigation efforts, and the economic feasibility of funding a Subbasin-wide Well Mitigation Program (Section 13.1.1.4). We note that 255 wells are equivalent by count to less than 5% of the production wells in the Subbasin. The GSAs then conceptualized more than 11 different potential MT methodologies, including some of the methods that were used in the 2022 GSPs that DWR approved in other subbasins (e.g., White Wolf Subbasin and Kings Subbasin).

The Subbasin's technical experts applied each candidate MT method across the Subbasin at the representative monitoring wells (RMWs) and assessed the well impacts, gradients, and the margin of operational flexibility. Following this rigorous and iterative process, the GSAs selected the MT methodology which contains both trend-dominated and range-dominated calculation criteria, and has been shown (see § 354.28) to: (1) be protective of all beneficial uses and users (Section 13.1.2.4), (2) results in reasonable gradients across the Subbasin and between subbasins (Section 13.1.2.3), (3) is consistent with the SMCs for the other Sustainability Indicators (Section 13.1.2.2), and (4) does not impact adjacent subbasins from achieving their Sustainability Goal (Section 13.1.2.3).

With respect to the SMCs, the GSP regulations (§ 354.28) require that MTs be developed based on "the rate of groundwater elevation decline based on historical trends" and as such the exact values plugged into the formula for each RMW represent the unique conditions in that portion of the Subbasin (as represented by the actual historical water level data at that RMW and the water level trends within the applicable HCM Area). Then a series of transparent, detailed and reproducible analyses were conducted to ensure that the resultant MTs would not create URs in the Subbasin (Section 13.1.2.4) and are protective for all other relevant Sustainability Indicators in the Subbasin (Section 13.1.2.2). This technical approach to SMC development resulted in MTs increasing by an average of 20 feet across the Subbasin relative to the 2022 GSPs.

The 2024 Plan provides a detailed, transparent and science-based justification for the SMC methodology selection. A suite of well impacts analyses (Section 13.1.2.4) demonstrate that, if water levels were to decline to the MTs, on average a total of between 77 and 103 drinking water wells may be impacted by 2040 (the average impacts under modeled projected future basin conditions vs application of a stochastic prediction of well impacts based on 5,000 realizations). This is equivalent to between 1.2% and 2.2% of the drinking water supply within the Subbasin. Again, this level of impact is well within the GSAs' ability to mitigate under the

Well Mitigation Program currently under development (Section 14.2.3, P/MA KSB-5, and Section 16.2.1.1). Additionally, modeled projected future subbasin conditions suggest that, with P/MA implementation, only 13 drinking water wells may be impacted by 2040. This justification was presented to SWRCB staff during the technical meetings held on 1 November 2023 and 3 April 2024, as detailed in Section 1.2.1.5.

Finally, it is important to note that it is the Measurable Objectives (MOs), not the MTs that are the GSA's target for sustainable groundwater management in the Subbasin. The MOs are set at the 2015 low groundwater level and were selected as a means to avoid any further impact to drinking water wells relative to pre-SGMA (i.e., 2015) conditions. As a demonstration of progress towards achieving sustainability in the Subbasin, for RMWs with available data, 44% of the RMWs are already above their MOs and 92% of the RMWs are above their MTs as of Spring 2023. The performance of the Subbasin relative to the SMCs shows the benefits of the P/MAs the GSAs have initiated to date that have improved Subbasin groundwater levels and reduced impacts to beneficial uses and users of groundwater in the Subbasin since 2015.

3. Well mitigation plans lack crucial detail.

The Subbasin is fully committed to the development and implementation of a Subbasin-wide well mitigation plan. As described in the 2024 Plan, the Subbasin and Self-Help Enterprises (SHE) signed on to a Letter of Intent (LOI) for the administration of the Subbasin Well Mitigation Program which is included in the 2024 Plan as Appendix K. The well mitigation plan development is being modeled after the existing Rosedale-Rio Bravo Water Storage District, Kern County Water Agency Pioneer Project and Kern Water Bank Authority Joint Operations Committee (JOC) well mitigation plan that is currently in place within the Subbasin and has been operating for over 10 years. The JOC has successfully mitigated numerous impacted wells and has provided emergency water services during the assessment and mitigation process.

The Subbasin has been actively engaged with SHE to develop this plan which would provide public outreach and engagement as well as educational materials focused on domestic wells, notifications to landowners regarding the mitigation plan, and public workshops explaining the mitigation process. In addition to public outreach and engagement, emergency bottled water, temporary tanks and hauled water, a thorough well site assessment, long-term solutions (which may include pump lowering, well-repair, well replacement and/or service connections to nearby water systems) will be available for all impacted domestic and/or small water system wells as defined by the State of California and an education plan for impacted well owners. The Subbasin is regularly meeting with SHE and is fully committed to finalizing and adopting a subbasin wide well mitigation plan by the end of 2024 and will be implemented in January 2025.

4. Demand management plans (how GSPs will reduce groundwater pumping) lack crucial detail.

As described in the 2024 Plan, demand management within the Subbasin will account for 335,086 AF of reduced annual demand. This level of demand reduction will satisfy 90% of the total overdraft of the Subbasin. Approximately 314,680 AFY of this demand reduction will be implemented by individual GSAs and an additional 20,410 AFY being achieved by demand reduction across the non-districted lands of the Subbasin.

Appendix S of the 2024 Plan provides details of each demand reduction P/MA implemented or planned for implementation by each GSA. Minimum target P/MA goals for each GSA were calculated using a historical checkbook surface water supply and demand analysis for the 2010-2019 period, then applied an adjustment for estimated climate change which resulted in increased minimum target P/MA goal above historical levels. The volume of demand reduction P/MAs by GSA are summarized in **Table 2**, followed by a list of each P/MA implemented or planned for implementation in the Subbasin. A zero "0" demand reduction target implies the GSA is not contributing to the Subbasin's overdraft conditions. It should be noted that some GSAs with a zero-deficit target are implementing demand reduction P/MAs so that their surplus is maintained in the future considering 2030 climate change conditions.

Table 2. Summary of 2024 Kern Subbasin GSP Demand Reduction PMAs.

Subbasin GSA	Demand Reduction (AFY by 2040)
Arvin GSA	12,220
Buena Vista	12,090
Cawelo Water District GSA	6,100
Eastside Water Management Area	2,900
Henry Miller Water District GSA	3,600
Kern River GSA	48,299
Kern-Tulare Water District GSA	5,580
Kern Water Bank	0
North Kern Water Storage District GSA	14,620
Olcese Water District GSA	0
Pioneer GSA	0
Rosedale-Rio Bravo Water Storage District GSA	9,367
Semitropic Water Storage District GSA	162,673
Shafter Wasco Irrigation District GSA	5,007
Shafter Wasco Irrigation District GSA (7th Standard Annex)	12,260
Southern San Joaquin Municipal Utility District GSA	5,269
Tejon-Castac Water District GSA	0
West Kern Water District GSA	191
Westside District Water Authority	0
Wheeler Ridge-Maricopa GSA	14,500
Subbasin White Lands	20,410

Arvin GSA
Demand Reduction Target: 12,220 AFY

As detailed in Appendix S of the 2024 Plan, Arvin GSA will achieve 12,200 AF of annual demand reduction through the implementation of 5 P/MAs, listed below:

- AE-7 Sunset Spreading Works
- AE-10 Expansion of North Canal Spreading Works
- AE-14 General In-Lieu Banking Program
- AE-25 Education of Groundwater Use per Acre
- AE-26 Incentives for Land Conversion

Arvin GSA has begun a Land Repurposing Study and presented initial results to the Arvin Board on potential strategies involving various land use opportunities in its general area (solar, habitat, flood, recharge, community buffers, etc).

Buena Vista GSA
Demand Reduction Target: 12,090 AFY

As detailed in Appendix S of the 2024 Plan, Buena Vista GSA has already achieved 12,090 AF of annual demand reduction through the implementation of 5 P/MAs, listed below:

- BV-2 Palms Recharge Project
- BV-3 Corn Camp recharge Project
- BV-4 Annexation Demand Reduction Project
- BV-5 Daley Ranch Recharge Project
- BV-10 McAllister Ranch Recharge Project

Cawelo GSA
Demand Reduction Target: 6,100 AFY

As detailed in Appendix S of the 2024 Plan, Cawelo Water District GSA will achieve 6,100 AF of annual demand reduction through the implementation of 4 P/MAs, listed below:

- CWD-3 Increase Recharge Capacity
- CWD-9 Voluntary Land Conversion
- CWD-11 Crop Conversion and Irrigation Efficiency
- CWD-12 Agriculture to Urban Land Use Conversion

Eastside Water Management Area
Demand Reduction Target: 2,900 AFY

As detailed in Appendix S of the 2024 Plan, Eastside Water Management Area will achieve 2,900 AF of annual demand reduction through the implementation of 2 P/MAs, listed below:

- EWMA-7 Agricultural Demand Reduction
- EWMA-9 Transferrable Water Credit Program

Henry Miller Water District GSA
Demand Reduction Target: 3,600 AFY

As detailed in Appendix S of the 2024 Plan, Henry Miller Water District GSA has achieved 3,600 AF of annual demand reduction through the implementation of 1 P/MA, listed below:

- HMWD-1 Demand Reduction due to Land Fallowing

The HMWD GSA has demonstrated that reduction in groundwater demand through land fallowing or reduction in crop water use has been implemented to achieve sustainability and will continue to be used to maintain sustainable groundwater conditions in the future under any climate change impacts.

Kern River GSA
Demand Reduction Target: 48,299 AFY

As detailed in Appendix S of the 2024 Plan, Kern River GSA will achieve 48,299 AF of annual demand reduction through the implementation of 2 P/MAs, listed below:

- KRGSA-4 Urban Conservation

- KRGSA-8 Conversion of Agricultural Lands in Urban Use

Kern-Tulare Water District GSA
Demand Reduction Target: 5,580 AFY

As detailed in Appendix S of the 2024 Plan, Kern-Tulare Water District GSA will achieve 5,580 AF of annual demand reduction through the implementation of 1 P/MA, listed below:

- KTWD-8 Modify District Pricing Structure

Kern Water Bank GSA
Demand Reduction Target: 0 AFY

The Kern Water Bank does not have any overlying irrigation demand or consumptive groundwater use.

North Kern Water Storage District GSA
Demand Reduction Target: 14,620 AFY

As detailed in Appendix S of the 2024 Plan, North Kern Water Storage District GSA will achieve 14,620 AF of annual demand reduction through the implementation of 5 P/MAs, listed below:

- NKWSD-3 Landowner Subsurface/Surface Recharge Program
- NKWSD-4 SCADA Automation and Evapotranspiration Measurement Improvements
- NKWSD-10 RRID Groundwater Recharge Project
- NKWSD-15 Conversion of Agricultural Land to Urban Use in RRID
- NKWSD-16 Urban Water Conservation Program

Olcese Water District GSA
Demand Reduction Target: 0 AFY

As detailed in Appendix S of the 2024 Plan, Olcese Water District GSA does not plan on implementing demand reduction programs, as it does have a planning deficit target.

Pioneer GSA
Demand Reduction Target: 0 AFY

The Pioneer GSA does not have any overlying irrigation demand or consumptive groundwater use.

Rosedale-Rio Bravo Water Storage District GSA
Demand Reduction Target: 9,367 AFY

As detailed in Appendix S of the 2024 Plan, Rosedale-Rio Bravo Water Storage District GSA will achieve 9,367 AF of annual demand reduction through the implementation of 5 P/MAs, listed below:

- RRB-1 Stockdale East Water Storage and Recovery Project
- RRB-2 McCaslin Recharge Improvements
- RRB-3 Kern Fan Water Storage Project Phase 1
- RRB-12 White Land Water Budget/Demand Imbalance Reduction
- RRB-13 District Land Water Budget/Water Charge Demand Reduction

Semitropic Water Storage District GSA
Demand Reduction Target: 162,673 AFY

As detailed in Appendix S of the 2024 Plan, Semitropic Water Storage District GSA will achieve 162,637 AF of annual demand reduction through the implementation of 2 P/MAs, listed below:

- SWSD-16 Landowner Water Budgets
- SWSD-17 Tiered Pricing for Groundwater Pumping

Shafter Wasco Irrigation District GSA
Demand Reduction Target: 5,007 AFY

As detailed in Appendix S of the 2024 Plan, Shafter-Wasco Irrigation District GSA will achieve 5,007 AF of annual demand reduction through the implementation of 8 P/MAs, listed below:

- SWID-1 Kimberlina Recharge Project
- SWID-2 Bell Recharge Project and Pump Station
- SWID-3 Farmers Coop and Pipeline
- SWID-6 Southeast Recharge
- SWID-7 Dresser Recharge
- SWID-8 Poplar Recharge
- SWID-9 Jack Recharge
- SWID-17 Ag to Urban Conversion

Shafter Wasco Irrigation District GSA (7th Standard Annex)
Demand Reduction Target: 12,260 AFY

As detailed in Appendix S of the 2024 Plan, Shafter-Wasco Irrigation District GSA 7th Standard Annex will achieve 12,260 AF of annual demand reduction through the implementation of 1 P/MA, listed below:

- 7th Standard Annex-2 ET Limitations/Water Budget

Southern San Joaquin Municipal Utility District GSA
Demand Reduction Target: 5,269 AF

As detailed in Appendix S of the 2024 Plan, Southern San Joaquin Municipal Utility District GSA will achieve 5,269 AF of annual demand reduction through the implementation of 10 P/MAs, listed below:

- SSJMUD-3, Pandol Spreading Grounds
- SSJMUD-4, City of Delano Spreading Grounds
- SSJMUD-5, In-District Spreading Grounds
- SSJMUD-6, Giumarra Spreading Grounds
- SSJMUD-7, Regan Spreading Grounds
- SSJMUD-8, Giumarra Additional Spreading Grounds
- SSJMUD-9, Urban Land Conversions
- SSJMUD-10, Caratan Spreading Grounds
- SSJMUD-11, Caratan Additional Spreading Grounds
- SSJMUD-12, White Land Demand Reduction

Tejon-Castac Water District GSA
Demand Reduction Target: 0 AFY

As detailed in Appendix S of the 2024 Plan, Tejon-Castac Water District GSA does not plan on implementing demand reduction programs, as it does not have a planning deficit target.

Westside District Water Authority GSA
Demand Reduction Target: 0 AFY

As detailed in Appendix S of the 2024 Plan, the Westside District Water Authority GSA does not plan on implementing demand reduction programs, as it does not have a planning deficit target.

West Kern Water District GSA
Demand Reduction Target: 191 AFY

As detailed in Appendix S of the 2024 Plan, West Kern Water District GSA will achieve 191 AF of annual demand reduction through the implementation of 2 P/MAs, listed below:

- WKWD-1 Automatic Meter Reading Project
- WKWD-2 Buena Vista Recreation Area Water Supply Management Coordination

Wheeler Ridge-Maricopa GSA
Demand Reduction Target: 14,500 AFY

As detailed in Appendix S of the 2024 Plan, Wheeler Ridge-Maricopa GSA will achieve 14,500 AF of annual demand reduction through the implementation of 4 P/MAs, listed below:

- WRM-8 Pumping Assessment
- WRM-9 Groundwater Allocation and Market
- WRM-11 Mandatory Pumping Limitation
- WRM-12 Land Retirement

C. Defining and Avoiding Undesirable Results Related to Land Subsidence

1. Undesirable results and sustainable management criteria are poorly coordinated.

The 2024 Plan shows that the Subbasin has a plan to minimize GSA-related subsidence by 2040, which aligns with the intent of SGMA. The Subbasin proposes to stabilize water levels and minimize subsidence over the implementation period (see Section 13.5.3, Figure 13.31), while managing and mitigating for significant and unreasonable impacts experienced during the implementation period (Section 13.5.2.1.1). As per SGMA regulations, the 2024 Plan has established MTs that avoid URs, defined as “significant and unreasonable land subsidence that substantially interferes with surface land uses” (CWC § 10721(x), SGMA Regulations 354.28(b)(1))”.

The 2024 Plan uses a regional, consistent, coordinated, risk-based framework for evaluating and setting subsidence SMCs (Section 13.5). While maintaining a consistent approach and utilizing the best available data/tools, this regional framework also incorporates differences in hydrogeologic conditions, anthropogenic drivers of subsidence, and potential impacts to local/critical infrastructure in different parts of the Subbasin in the final SMC determination (Section 7, Section 8.5).

The 2024 Plan analyzes potential impacts from subsidence to local and critical infrastructure (Section 13.5.2.4) and sets SMCs to avoid significant and unreasonable impacts. To this end, the MTs and MOs are set to minimize subsidence by 2040 and mitigate GSA-related impacts during the implementation period. The Subbasin aims to minimize subsidence by 2040 and limit water level declines in the same period. This is done through a combination of P/MAs having a primary objective of reducing demand for groundwater and a secondary objective of increasing the volume of surface water dedicated to groundwater recharge (Section 14). In areas where

GSA-related subsidence during the implementation period may lead to impacts on critical infrastructure, the 2024 Plan has included P/MAs to mitigate these impacts (Section 14.2.3, Appendix T).

As noted in P/MA KSB 1 – Friant-Kern Canal Capacity Mitigation, all GSAs support the Subbasin Plan's program to mitigate the impacts of subsidence on the Friant-Kern Canal. However, some GSAs have experienced limited subsidence due to their location and the characteristics of groundwater extraction in their area. Therefore, while the Subbasin-wide SMCs described in the Subbasin Plan are both necessary and universally supported, subsidence is unevenly distributed across the Subbasin, and mitigation measures are not needed in GSAs that either have historically insignificant rates of subsidence or who cannot contribute to impacts since their boundaries are significantly distant from the Friant-Kern Canal.

2. GSPs lack crucial detail about how they plan to meet their goals and avoid undesirable results.

As previously noted, the 2024 Plan analyzes potential impacts from subsidence to local and critical infrastructure (Section 13.5.2.4) and sets SMCs to avoid significant and unreasonable impacts. To this end, the MTs and MOs are set to minimize subsidence by 2040 and mitigate GSA-related impacts during the implementation period. The Subbasin aims to minimize subsidence by 2040 and limit water level declines in the same period. This is done through a combination of P/MAs having a primary objective of reducing groundwater demand and a secondary objective of increasing the volume of surface water dedicated to groundwater recharge (Section 14).

D. Degraded Groundwater Quality

1. Undesirable result and sustainable management criteria are poorly coordinated.

The 2024 Plan has a single UR definition and SMC for water quality. Section 13.3 provides the Subbasin-wide definition and describes the approach applied to evaluate groundwater conditions as well as the causes and effects of undesirable results. The SWRCB's SGMA Groundwater Quality Visualization Tool was used to evaluate groundwater conditions and identify which constituents warrant SMCs and routine monitoring. Data trending analyses were conducted for all 13 constituents identified for the Kern Subbasin; the following criteria were used to determine which constituents warrant SMCs: 1) the constituent has an existing health-based standard; 2) at least 5% of wells sampled from 2015 through 2023 exceed its health-based standard; and 3) potential for the constituent to be exacerbated by groundwater management actions. These criteria applied to the seven bolded constituents shown in **Table 3** (Table 13-5 in the 2024 Plan). Criteria used to define undesirable results are based on the SWRCB's tools and methodologies. SMCs were established based on the greater concentration of the applicable health-based screening standard or the maximum pre-2015 baseline concentration at each representative monitoring well.

It should be noted that results presented in **Table 3** are aligned with results in the Draft Staff Report *Table 3-2, Summary of Water Supply Wells*. Additionally, conditions identified as having potential to exacerbate constituents of concern through groundwater management actions are the same list of physical and chemical influences that are referenced in the Draft Staff Report *Section 3.5.6.2 Driving Mechanisms.* Section 8.4 of the 2024 Plan presents the trend analysis chemographs and scatter plots that show the relationship between groundwater elevations and

each constituent of concern. Data interpretations and the characterization of groundwater conditions is based on the collective experience and local knowledge of the consultants and managers.

Table 3. Summary of Trend Analysis Results for Each Constituent of Concern

Constituent of Concern	Existing Health-Based Standard	% of Wells Exceeding Health-Based Standard	Potential to Impact Beneficial Users	SMC Developed
Arsenic	10 ppb	22.4%	High	Yes
Nitrate (as N)	10 ppm	14.9%	Moderate	Yes
Nitrate + Nitrite (as N)	10 ppm	24.9%	Moderate	Yes
Nitrite (as N)	1 ppm	1.8%[1]	Moderate	Yes
Total Dissolved Solids	1,000 ppm	11.7%	Moderate	Yes
1,2,3-Trichloropropane (1,2,3-TCP)	5 ppt	44.5%	Moderate	Yes
Uranium	20 pCi/L	7.2%	Moderate	Yes
1,2 Dibromoethane (EDB)	20 ppt	0.7%	Low	No
1,2,-Dibromo-3-chloropropane (DBCP)	200 ppt	2.0%	Low	No
Benzene	1 ppb	0.5%	Low	No
Gross Alpha	15 pCi/L	5.1%	Low	No
Perfluorooctanoic acid (PFOA)	4 ppt	14.8%	N/A[2]	No
Perfluorooctanoic sulfonate (PFOS)	4 ppt	6.9%	N/A[2]	No
Selenium	50 ppb	0.9%	Low	No

[1] Nitrite is primarily non-detect in the Subbasin. Median concentrations and exceedance locations of total nitrate/nitrite (as N) are similar to the prevalence of nitrate. SMCs were established for individual nitrate species because they contribute to the total nitrate/nitrite (as N).
[2] In April 2024, the USEPA announced the Final MCLs for PFOA and PFOS of 4 ppt. Per the USEPA's final rule, public water systems have three years (by 2027) to complete initial monitoring and five years (by 2029) to implement solutions. Due to limited existing data at a Subbasin scale, SMCs for PFOA and PFOS are not set at this time. Subbasin GSAs will use emerging data from public water systems to conduct an initial assessment of Subbasin conditions. SMCs for PFOA and PFOS will be informed by data collected during Plan implementation and will be evaluated as part of the first Periodic Evaluation.

2. The GPSs are not consistent on how they will monitor groundwater quality. They also do not monitor frequently enough.

As shown in **Table 3**, the 2024 Plan proposes to monitor seven of the 13 constituents of concern identified for the Subbasin. During monitoring well selection, efforts were made to include monitoring wells from existing water quality regulatory programs such as the Irrigated Lands Regulatory Program (ILRP) – which monitors first encounter groundwater – and public supply wells regulated by Division of Drinking Water (DDW).

The groundwater quality monitoring network consists of 51 designated Representative Monitoring Wells (RMWs) that will be used to collect samples for the seven constituents of concern, within two weeks of measuring groundwater levels. In addition to the GSAs monitoring program, the Subbasin will continue to evaluate data and water quality reports from ILRP and public water system programs. This combination of data will help the GSAs comprehensively assess groundwater quality conditions across the Subbasin.

Water quality monitoring sites were chosen based on their inclusion in existing programs, accessibility for sampling, and capability to represent aquifer conditions. All wells will monitor effects from changes in groundwater elevations. Select sites within this network are designated to correlate groundwater quality to other sustainability indicators such as potential effects of subsidence and water banking projects. Additionally, groundwater quality monitoring sites were strategically selected to represent locations with high densities of domestic wells and small community water systems. To correlate groundwater elevations with water quality, sampling schedules will be coordinated with groundwater level measurements. GSAs will sample each WQ RMW for the seven constituents of concern. Sample results will be submitted to the Kern Data Management System (DMS) which shares data with all GSA managers, stakeholders, and the public. Additionally, the 2024 Plan states that an assessment of groundwater conditions, comparing current results against baseline conditions, will be provided in each Annual Report to DWR. Detailed protocols for water quality sampling, including field procedures and laboratory methods, are provided Appendix Z (2024 Plan, Section 15.3.3, pg. 15-37).

3. ***The GSPs do not include plans to help people whose well water is allowed to degrade below drinking water standards. The GSPs do not:1) plan for the additional sampling necessary to understand the extent of degraded water or 2) include the well mitigation planning necessary to restore well water to drinking water standards.***

As detailed in the 2024 Plan, the Subbasin's approach to Degraded Water Quality reflects the fact that SGMA does not require GSPs to address water quality URs that occurred before, and have not been corrected by January 1, 2015 (CWC § 10727.2(b)(4)), and that "...s*ustainable groundwater management" means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results*." (CWC §10721(v)) (emphasis added). Consistent with these regulations, the Subbasin GSAs have defined "water management actions" as GSA actions related to groundwater recharge or extraction within the Subbasin. As such, the URs definition and associated MT methodology appropriately focus on whether water quality conditions have degraded as a result of water management actions since the enactment of SGMA on January 1, 2015 (Section 13.3.1).

In any instance whereby a semi-annual water quality sample exceeds the MT, the Subbasin's MT Exceedance Policy would be triggered, which requires confirmation sampling – consistent with Division of Drinking Water requirements for public water systems – and an investigation of site-specific conditions (2024 Plan Section 13.3.1.4, Section 16.2.1, and Appendix W). Details on the exact investigation are not provided in the 2024 Plan; however, based on comments provided in the SWRCB Draft Staff Report, the Subbasin is preparing a Standard Operating Procedure (SOP) that provides guidelines for conducting an MT Exceedance investigation.

Furthermore, the Subbasin GSAs have partnered with Kern Water Collaborative (KWC), the entity implementing the CV-SALTS Nitrate Control Program and administering the domestic well sampling program and providing replacement drinking water for residents who are impacted by nitrate above the MCL (2024 Draft GSP Appendix F). The partnerships between GSAs, KWC, and Self-Help Enterprises facilitate collaborative and holistic solutions that avoid duplication of efforts in groundwater monitoring, domestic well testing, well mitigation, and the overarching objective to achieve the Human Right to Water throughout the Subbasin.

E. Interconnected Surface Water

1. Undesirable results and sustainable management criteria are poorly coordinated.

The 2024 Plan has a single UR definition and SMC for Depletions of Interconnected Surface Water (ISW). As shown in **Table 1**, which is Table ES-3 in the 2024 Plan, the 2024 Plan presents a coordinated, Subbasin-wide definition for URs and SMCs.

2. The GSP currently does not include plans to avoid significant and unreasonable impacts related to interconnected surface water. If GSAs identify interconnected surface water, using the best available data and correct definition of interconnected surface water, then the lack of plan is a deficiency.

The presence or absence of ISW was systematically evaluated based on the best available data in accordance with the GSP regulations (§ 354.16 (f)) and available DWR Guidance (part 1 of 3). The GSAs relied on ISW mapping provided by DWR in support of SGMA including the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset and ICONS: Interconnected Surface Water in the Central Valley, Figures 8-72 and 8-73 in the 2024 Plan. The identified ISWs in these datasets were reviewed for their active connection to the principal aquifers. As documented in the 2024 Plan, the principal aquifers have limited connection with identified ISWs due to topographic and geologic conditions and do not contribute to Groundwater Dependent Ecosystems (GDEs). Undesirable results from ISWs are identified as “not present and are not likely to occur…” (Cal. Code Regs., tit. 23, §354.26, (d)). However, the continued monitoring of ISWs was included in management actions for several GSAs including Semitropic WSD and Olcese WD District.

The Draft Staff Report Figure 3-12a shows GDEs based on the NCCAG dataset. As stated in the 2024 Plan (Section 8.6), these areas of mapped vegetation are not likely GDEs as there is either deep depth to groundwater below rooting depths, or deep percolation is impeded by clay soils and subsurface clay sediments creating shallow perched groundwater disconnected from the Primary Alluvial Principal Aquifer. Each of the focused areas shown on Figure 3-12a are described in more details below:

- Upper-left focused area near Lost Hills: Kern National Wildlife Refuge and Semitropic Ecological Reserve is solely supplied by surface water and is not connected to the principal aquifer.
- Upper-right focused area near Oildale: Kern River corridor. Vegetation along the Kern River is primarily surface water dependent.
- Lower-right focused area near I-5 and Copus Road: These wetlands and vegetation are likely connected to perched groundwater atop the fine-grained “basin” deposits in that area, where depth to groundwater is generally encountered at less than 20 ft bgs. This perched zone is not used for groundwater production. Water level data collected from monitoring wells screening the Primary Alluvial Principal Aquifer in the area indicate depth to water of approximately 120-200 ft bgs, suggesting that the perched zone is fully disconnected from the underlying Primary Alluvial Principal Aquifer.
- Lower-left focused area near Dustin Acres: The vegetation identified in the eastern portion are likely connected to perched groundwater atop the fine-grained “basin” deposits in that area, where depth to groundwater is generally encountered at less than 20 ft bgs.

DWR is still developing a multi-paper series on ISW and depletions of ISW to provide GSAs with tools to better incorporate quantitative approaches in GSPs. The Kern Subbasin GSAs plans to review and incorporate this guidance when available for inclusion in future periodic evaluations.

We believe the concerns expressed in the Draft Staff Report regarding the damages resulting from depletion of ISWs and the measures needed to mitigate those damages are disproportionate to the actual extent of ISWs in the Subbasin (Figure 8-73 from GSP).

IV. Response to Comments on 2024 Plan

A. Board staff note that the use of regionally averaged declining elevation trends leads to groundwater level MTs that vary dramatically across "hydrological areas" of the subbasin and may have resulted in a skewed (heavily weighted toward areas of more pumping and lower elevation) approach in setting MTs.

As clearly demonstrated in the 2024 Plan, the MTs have been developed consistent with the requirements and intent of SGMA, use consistent data and methodologies, and do not result in significant and unreasonable impacts to beneficial users (see Section 13 of the 2024 Plan).

The above notwithstanding, the TWG has conducted extensive additional technical analysis to evaluate whether the concerns expressed by the Board staff regarding the MTs are warranted and result in significant and unreasonable impacts to beneficial users.

Some of this additional analysis is presented in our companion response letter (**Appendix A.2**). The additional analysis we have conducted in response to this comment will be presented to Board staff in detail during our forthcoming technical consultant meetings and is briefly summarized below.

In response to Board Staff's comment that "groundwater level MTs vary dramatically across hydrologic areas" we conducted an analysis of the spatial variability of measured water levels across the Subbasin in 2015 and 2022 as compared to the spatial variability of the MT values. Specifically, the range in groundwater elevation measured at RMWs located within a 2-mile radius of each RMW was calculated. The histogram in **Figure 1** shows the distribution of the observed range in water levels within the 2-mile radius of each RMW for historical groundwater elevation data (Fall 2015 and Fall 2022) as compared to the observed range in the MT values.

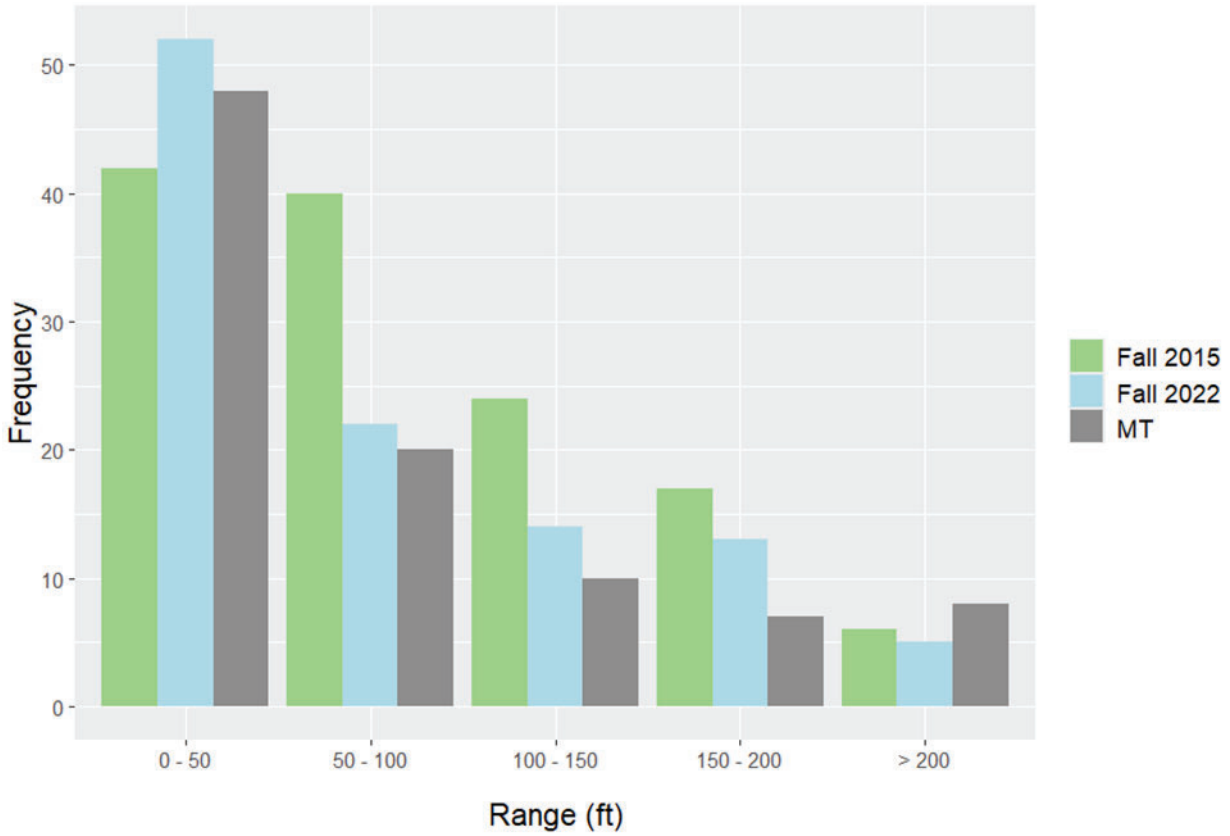

Figure 1. Distribution of Groundwater Elevation Range Within a 2-mile Radius of Each RMW.

The histogram in **Figure 1** shows that the MT values have similar total ranges compared to observed water level data across the Subbasin, reinforcing that the differences in MT values seen in neighboring RMWs accurately reflect local conditions. The observed ranges in MT values are therefore not an inhibitor to sustainable groundwater management, but rather reflect the very real influence of geologic features (faults, synclines, anticlines), topographic changes, and operational variability on water level conditions throughout the Subbasin.

In response to Board Staff's comment that "regionally-averaged declining elevation trends … may have resulted in a skewed (heavily weighted toward areas of more pumping and lower elevation) approach in setting MTs" we have mapped the location of those RMWs that have "outlier trends" (i.e., a historical trend value that is more than mean ± 1 standard deviation). As shown on **Figure 2**, these handful of RMWs are spatially distributed across the Subbasin, are not clustered together, and only potentially impact two of the HCM areas.

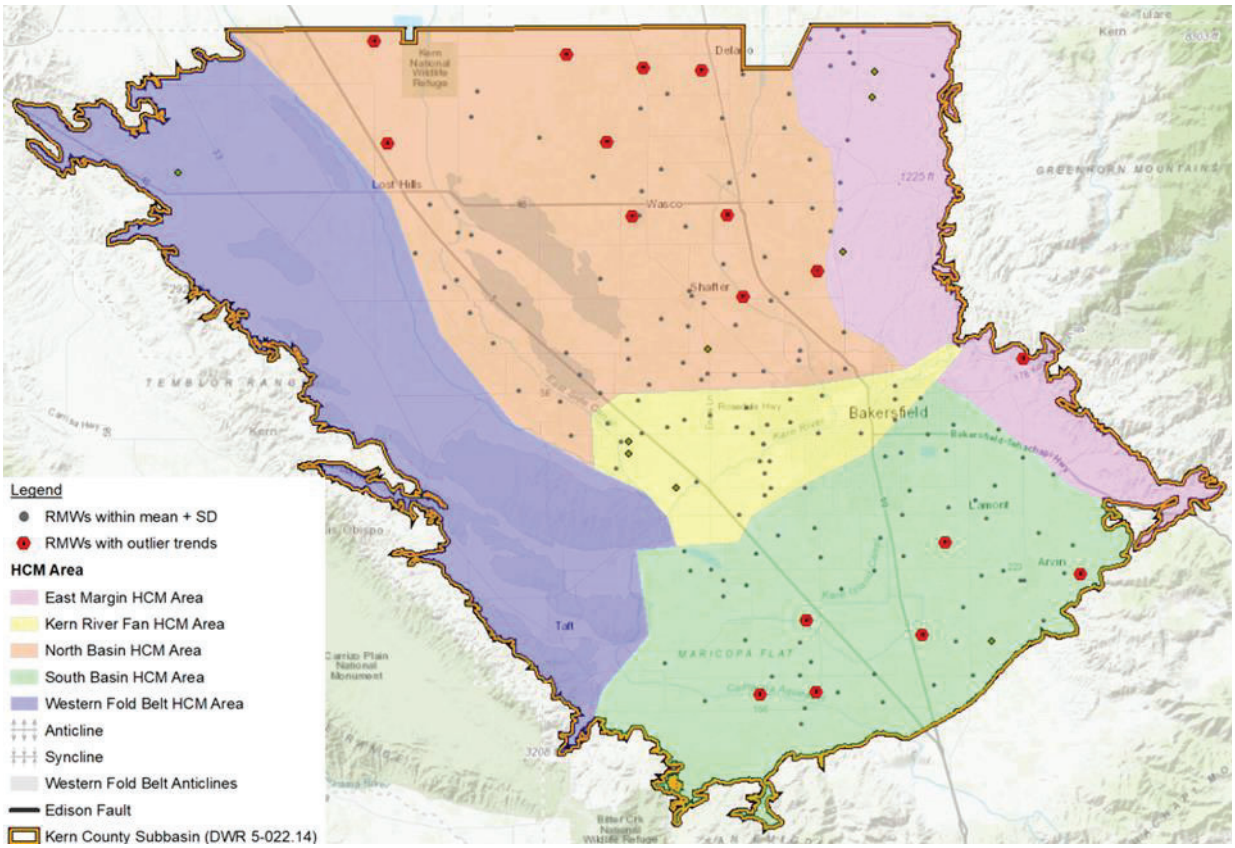

Figure 2. Locations of RMWs with "Outlier Trends" (Mean ± 1 Standard Deviation).

The histogram shown in **Figure 1** shows the distribution of the historical declining trend values at each of the RMWs. As can be seen therein, 92% of the RMWs in the Subbasin have a trend that is within one standard deviation from the mean, meaning that most of the observed trends are similar throughout the Subbasin (and within each HCM area). If we use the median trend value instead of the average (i.e., to eliminate any potential "skew") the trend would change by approximately 1 ft/yr (see **Figure 3**). However, we note that the impact of revising the trend from the mean to median value would only decrease the number of potentially impacted drinking water wells from 103 to 94 under the stochastic well impacts analysis (i.e., an average of nine fewer wells would be impacted under the analysis of 5,000 realizations of up to 25% of RMWs hitting their MTs), and may introduce other issues (i.e., further increasing the range in MT values in near-adjacent RMWs). This analysis shows that revising the MT approach would not significantly change the potential impacts to beneficial uses and users, and therefore that the current MT approach is reasonable and not overly skewed.

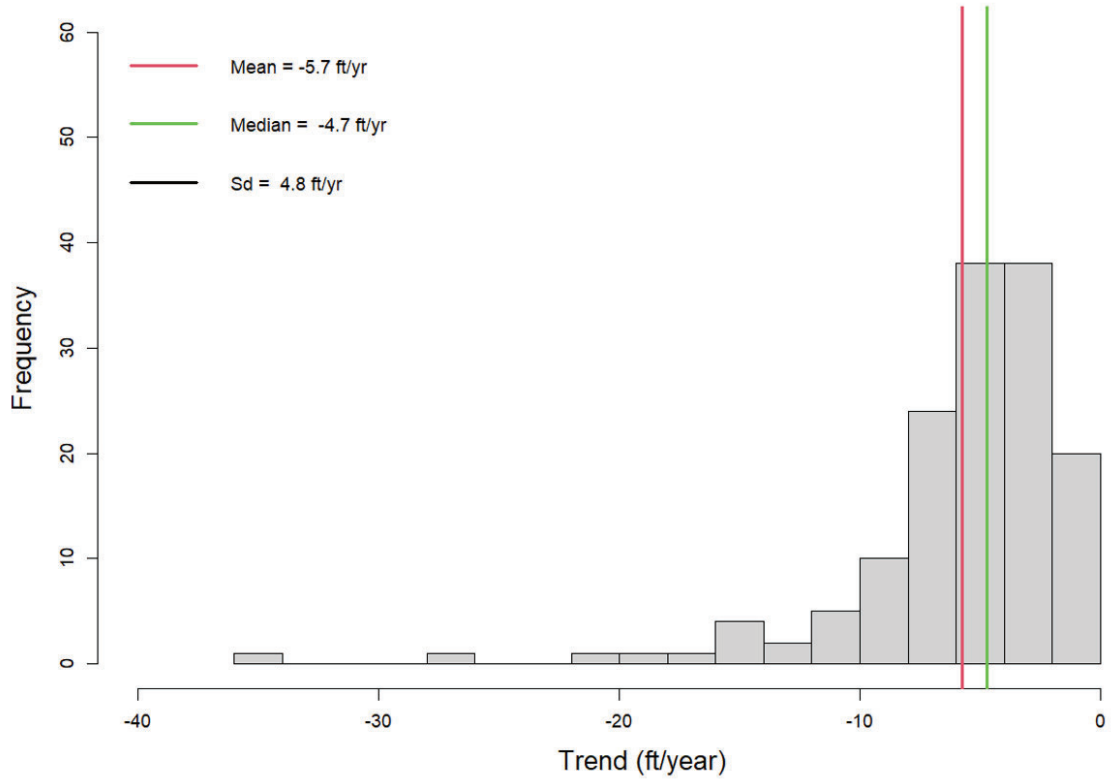

Figure 3. Histogram of Declining Trends in RMWs Used to Inform MT Values.

B. Groundwater level MTs were determined using the lower of project historical trends or historical water level ranges, rather than using threshold focusing on protection of beneficial uses and users.

As described in Section 13 of the 2024 Plan, and in our companion letter included as **Appendix A.2**, the GSAs strictly followed the SMC development procedures laid out in the GSP Regulations that require the identification of beneficial uses and users, a definition of URs, and then selection of an MT methodology that does not result in URs (i.e., significant and unreasonable impacts to beneficial uses and users). Further, we note that the process and methodology selected by the GSAs was consistent with approaches taken in other basins approved by DWR. In developing the URs definition and MT methodology, the GSA's primary focus was on protecting beneficial uses and users, and the use of trends and ranges to determine the MTs is not inconsistent with that intent or the result.

Specifically, after identifying the beneficial uses and users (including through development of a significantly improved well database), the GSAs defined the UR in terms of allowable drinking water well impacts (15 in any given year or less than 255 by 2040). Then the Subbasin's technical experts conceptualized and applied 11 candidate MT methodologies across the Subbasin at the RMWs and assessed the well impacts, thereby focusing on protection of beneficial uses and users. Secondary tests were also conducted to assess gradients within and across the Subbasin and the margin of operational flexibility, as well as consistency with the SMCs for the other applicable Sustainability Indicators. Following this rigorous and iterative process, the GSAs selected the MT methodology which contains both trend-dominated and range-dominated calculation criteria, and has been shown (consistent with § 354.28) to: (1) be

protective of all beneficial uses and users (Section 13.1.2.4), (2) result in reasonable gradients across the Subbasin and between subbasins (Section 13.1.2.3), (3) be consistent with the SMCs for the other Sustainability Indicators (Section 13.1.2.2), and (4) not impact adjacent subbasins from achieving their Sustainability Goal (Section 13.1.2.3).

As part of SMC development, a suite of five separate well impacts analyses were conducted to assess impacts to drinking water users at various combinations of MT exceedances to ensure the protection of beneficial users and users. The most-likely scenarios suggest that a total of 103 drinking water wells may be impacted at the UR definition of 25% of RMWs exceeding their MTs between now and 2040. Potential well impacts are well within the UR definition and the anticipated scope of the well mitigation program being developed and funded by Subbasin GSAs in coordination with Self-Help Enterprises.

Finally, it is important to note that it is the MOs, not the MTs, that are the GSA's target for sustainable groundwater management in the Subbasin. The MOs are set at the 2015 low groundwater level and were selected as a means to avoid any further impact to drinking water wells relative to pre-SGMA (i.e., 2015) conditions. As a demonstration of progress towards achieving sustainability in the Subbasin, for RMWs with available data, 44% of the RMWs are already above their MOs and 92% of the RMWs are above their MTs as of Spring 2023. The performance of the Subbasin relative to the SMCs shows the benefits of the P/MAs the GSAs have initiated to date that have improved Subbasin groundwater levels and reduced impacts to beneficial uses and users of groundwater in the Subbasin since 2015.

C. Plans lack clarity on banking operations and how they impact the ability of the basin to avoid hitting MTs.

The following comment regarding the water banking programs described in Appendix E of the 2024 Plan was made in the draft Staff Report: "*Plans lack clarity on banking operations and how they impact the ability of the basin to avoid hitting MTs. This is especially true given that the GSPs' Appendix E, Kern Fan Water Banking Program, stated that,* "*[t]he Projects cannot cause chronic lowering of groundwater levels or a reduction in storage*" (2024 Draft Main GSP, Appendix E. p. 7) (Groundwater Level deficiency)." (Draft Staff Report, p. 192.)

A response to this comment was provided in the companion letter (**Appendix A.2**, Page A7-9) and is included here by reference. That response included the figure shown below which was developed by DWR during a review of Kern Water Bank (KWB) operations from 1995 through 2014.

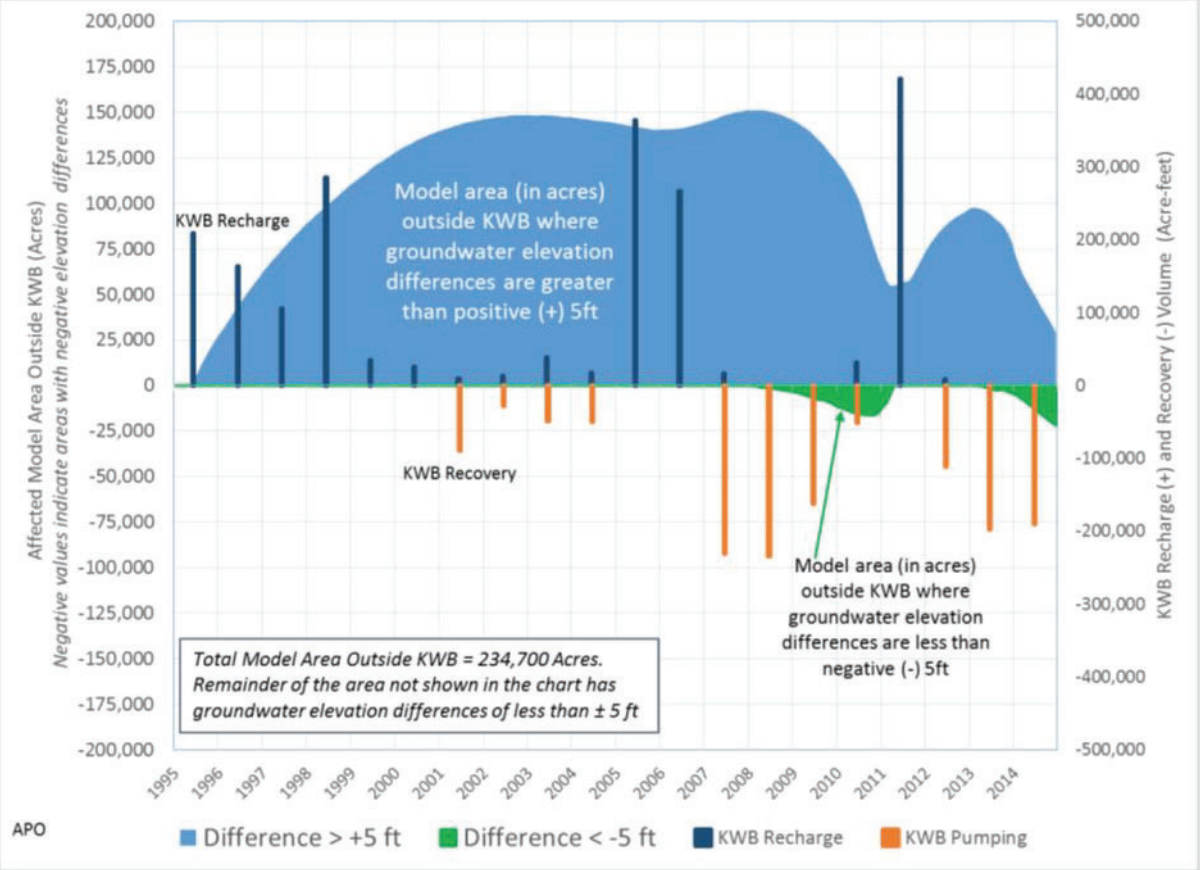

Figure 4. Analysis of Time vs. Affected Area Outside the Kern Water Bank Exceeding 5 feet Up or Down Compared to Without Project Conditions.

Figure 4 illustrates the area in acres outside the KWB where water levels exceeded 5 feet either up or down as compared to the without project condition resulting from KWB operations for the period from 1995 through 2014. As shown, groundwater levels for significant areas outside the KWB were higher than 5 feet throughout the entire period as a result of KWB operations. Groundwater levels were lower than 5 feet for some areas for limited times toward the end of significant droughts when large volumes of banked groundwater were recovered to compensate for limited supplies of surface water. Thus, a lowering of groundwater levels is not indicated for most of the adjoining areas for the 1995-2014 period.

As noted in the companion TWG letter (**Appendix A.2**), following the 1995-2014 period, there were three recovery periods and three significant recharge events. The volumes of water in two of these later recharge events exceeded those from previous recharge events, the recovery volumes were similar to or less than the 2012-2014 recovery period, and groundwater levels responded in a manner similar to those in the 1995-2014 period. Therefore, it would be expected that these later operations would raise groundwater levels in adjoining areas generally to the extent shown in the DWR analysis. In addition, the operations of the other Kern Fan Programs discussed in Appendix E of the 2024 Plan (Pioneer, Berrenda Mesa, and West Kern) are analogous to KWB operations, so it follows that a significant lowering of groundwater levels would not occur as a result of these Kern Fan Programs (see **Figure 5**).

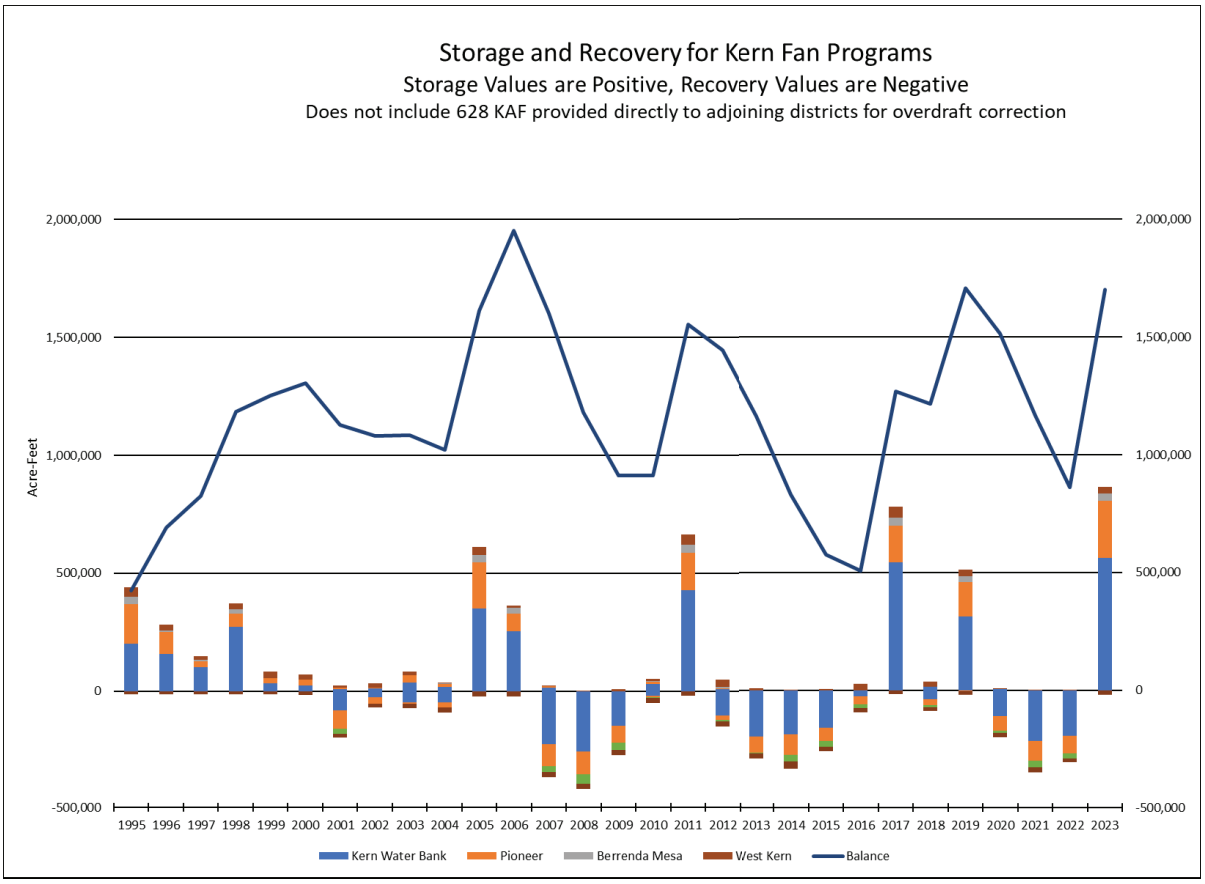

Figure 5. Storage and Recovery for the Kern Fan Projects Described in Appendix E to the 2024 Kern Subbasin GSP.

Figure 5 illustrates the storage and recovery volumes for the Kern Fan Programs. The cumulative volumes, net all losses, exceed 1.7 million acre-feet (MAF) through 2023. This volume does not include an additional 628 thousand acre-feet (TAF) dedicated to overdraft correction in the districts adjoining the Kern Fan Programs. These overdraft correction volumes are used by the adjoining districts to offset consumptive uses. Significantly, even after the 2012-2015 drought, the Kern Fan Programs still had 500 TAF in storage.

With respect to the Kern Fan Banking Programs causing a reduction in groundwater storage, this cannot occur because operational constraints limit the programs to only recovering previously stored surface water. Simply put, the Programs cannot recover the Subbasin's sustainable yield or native groundwater.

The above discussion and analysis cover 29 years of banking operations and clearly demonstrates that the Programs discussed in Appendix E of the 2024 Plan cannot impact the ability of the Subbasin to avoid hitting MTs or result in a reduction of groundwater storage.

With respect to other banking program operations impacting the ability of the Subbasin to avoid hitting MTs, the programs providing water to participants within the Subbasin conserve surplus water supplies and later reduce the need for those entities to pump groundwater within their own jurisdictions thereby helping to maintain groundwater levels above MTs. For those programs storing water for entities outside the Subbasin, those programs have a leave-behind requirement that contributes to groundwater storage and higher groundwater levels. These

other programs are also limited to only recovering previously stored water and cannot cause a reduction in groundwater storage.

The TWG looks forward to working with State Board staff to explain in detail the operations of the Kern Fan Banking Programs and of other Subbasin banking programs and to describe accounting, and mitigation measures that ensure potential impacts are reduced to less-than-significant.

D. The GSAs do not demonstrate a fundamental understanding of the Subbasin's settings. For example, monitoring well networks for groundwater levels and groundwater quality do not differentiate between confined and unconfined aquifers separated by the E-clay (a confining layer), or other clay layers.

The 2024 Plan was developed by the TWG. This group is made up of more than 15 leading groundwater professionals (professional engineers and certified hydrogeologists) from the top consulting firms in the state. Many have led development of successfully approved GSPs, Alterative Plans, and Board-exempted areas/GSPs in other basins. The average professional experience for these professionals is 20 years with direct experience on issues in the Subbasin. They are supported by the managers of each GSA -- the average experience for GSA managers is 21 years. The HCM was developed based on decades of experience and is consistent with the previous work by the USGS, DWR and others in the Subbasin. The GSAs not only understand the Subbasin setting but have actively documented and defined the HCM to improve groundwater management in the Subbasin.

This collective experience of the managers and consultants who have contributed to the 2024 Plan augments the understanding of the Subbasin's complex hydrologic and hydrogeologic setting with an understanding of the Subbasin's intricate water conveyance infrastructure and of the operational cooperation that has evolved among water agencies and between water agencies and the communities they serve. This broad background is central to understanding how the individual GSAs operate within the Subbasin during hydrologic conditions ranging from prolonged droughts to extreme floods.

Familiarity with both the Subbasin setting and of operations within this setting is key to understanding how, during wet years, flood waters are distributed throughout the Subbasin to maximize recharge and how the surface water recharged during flood years creates a reservoir of stored surface water that sustains the Subbasin through droughts. Thus, while it's accurate to present data indicating how reliance on groundwater increases and groundwater levels decline during droughts, as was noted in the draft Staff Report, it's equally accurate to present data illustrating how reliance on groundwater and surface water reverses during wet periods when surface water is adequate to satisfy most demands and to replenish aquifers. Thus, it's vital to examine periods that capture the full range of hydrologic conditions managed by local agencies.

Understanding operations is also valuable in interpreting hydrographs, which are greatly influenced by both hydrogeological and operational factors. For example, operations of banking facilities in the Kern Fan, where the E-clay does not extend, is critical to interpreting the fluctuations in levels observed in multiple completion wells that result from cycles of recharge and recovery. By contrast, in areas along the North-South axis of the Subbasin in areas characterized by a competent E-clay layer, the clay layer is at sufficient depth that drinking water, agricultural and commercial wells extract water only from the zone above the E-clay.

Thus, the distinction between upper and lower aquifers, while apparent, is irrelevant for SGMA compliance as all SMCs apply only to the aquifer above the E-clay.

Another area where operational understanding is important lies in appreciating the nature of various recharge facilities. Just as construction of a recharge basin represents a planned action to capture available surface water for groundwater recharge, so too, a decision to leave an earthen canal unlined is a deliberate act to accomplish the same objective. Although a recharge pond receives water delivered from a conveyance system while an unlined canal combines the functions of conveyance and recharge, in neither instance can the resultant recharge of surface water be considered unplanned. Further, when surface water is available, unlined canals serve as dedicated recharge facilities after the end of the irrigation season and when unlined canals are replaced by pipelines for water distribution, the canals are often retained to preserve their utility as recharge features.

Additionally, it is important to understand the impact of SGMA in encouraging measures to retain surface water within the Subbasin through an array of programs to distribute flood water to locations well-suited for recharge. The cooperation among GSAs and the operational flexibility now available because of the network of conveyance facilities supports implementation of supply augmentation P/MAs which will supplement the Subbasin's present capacity to recharge flood waters.

E. The GSPs state that mitigable subsidence is not considered an undesirable result but do not propose a mitigation plan aside from an external mitigation already being implemented by FWA.

The Friant-Kern Canal (FKC) Mitigation alternative (Section 14.2.3 and Appendix T) is coordinated with the Lower Reach Correction project that Friant Water Authority (FWA) is undertaking (See Appendix J for a Letter of Support from the FWA). However, as detailed in Section 14.2.3 and Appendix T, the cost for mitigating undesirable results will be borne by Subbasin GSAs who include, but are not limited to, several Friant contractors that rely on water supply from the FKC. Moreover, the monitoring and triggers for this mitigation alternative are also managed by the GSAs. Thus, it is not accurate for the SWRCB Draft Staff Report to characterize the mitigation plan as "external mitigation already being implemented by FWA." The GSAs are coordinating closely with the FWA to develop the necessary mitigation measures and the cost-sharing agreement to avoid any future conveyance loss due to GSA-related subsidence along the FKC.

F. Board staff also identified deficiencies in the 2024 Draft GSPs related to degradation of groundwater quality, similar to those observed by Board staff in the 2022 GSPs.

As explained in *Section II. Development of the 2024 Plan*, and in *Section III. D. 1. Degraded Water Quality*, the 2022 Plans and 2024 Plan used vastly different approaches to address degradation of groundwater quality. The 2024 Plan characterized groundwater quality using a combination of data sets available from SWRCB's GAMA and GeoTracker database, DTSC's EnviroStor database, GSAs, and literature review. The methodology used to determine which constituents of concern should be routinely monitored and SMCs established is consistent with SWRCB's Groundwater Quality Considerations for High and Medium Priority Groundwater Basins letter to the DWR, dated November 22, 2022. Further, point-source contamination sites are identified using SWRCB GeoTracker and DTSC EnviroStor databases. Oilfield Injection Wells and Produced Water Pond sites are extracted from GeoTracker. In addition to using

GeoTracker, a literature review of oilfield injection wells studies in the Subbasin are used to understand the extent to which there is contamination from oil and gas developments which could impact groundwater quality. This extensive analysis and literature review resulted in a comprehensive characterization of groundwater conditions and a clear understanding of potential impacts groundwater management and SGMA implementation could have on water quality degradation.

G. GSAs do not define ISWs or propose monitor for ISWs consistent with the requirements of SGMA.

The 2024 Plan presents potential ISWs identified by DWR including the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset and ICONS: Interconnected Surface Water in the Central Valley. The GSAs systematic review each potential ISW to assess if it is "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted," (Cal. Code Regs., tit. 23, § 351. The analysis concluded there are no ISWs in the subbasin. However, some GSAs have adopted management actions to monitor water levels near surface water systems to continue to assess changes in ISWs.

V. Response to other Board priorities

A. Human Right to Water in the Subbasin

The 2024 Plan was developed to protect the Human Right to Water. As described above, the 2024 Plan was developed to be protective of beneficial users; specifically, groundwater level and water quality SMCs were established using an analysis of impacts to drinking water wells then selecting the methodology that minimized impacts within the URs definition. Further, as presented at the SWRCB workshops, the GSAs work closely with the municipalities and community water service districts to ensure local communities, many of which are classified as disadvantaged communities, have reliable and adequate access to water supply for drinking and other domestic uses.

Current and future efforts to engage small community and domestic well owners are occurring through the GSAs partnerships with Self-Help Enterprises, Kern Water Collaborative, Kern County Environmental Health, and local community organizations focused on outreach and education such as the Water Association of Kern County and the Kern County Farm Bureau. Projects and Management Actions developed to support the Human Right to Water goals include the well inventory and well mitigation programs.

B. Public Trust

The 2024 Plan was developed to protect public trust resources. As described above, the GSAs undertook a systematic review of each potential ISW to assess potential groundwater and surface water interconnections. The analysis concluded there are no ISWs in the subbasin; however, the subbasin's portfolio of P/MAs includes management actions to monitor water levels near surface water systems to continue to assess any changes in ISWs.

Appendix A.2

Kern County Subbasin Technical Working Group Companion Letter

August 21, 2024

Via electronic mail

California State Water Resources Control Board
Attn: Courtney Tyler, Clerk to the Board
P.O. Box 100
Sacramento, CA 95812-2000
SGMA-Kern@waterboards.ca.gov

Re: Comments – Kern County Subbasin

Dear Chair Esquivel and Members of the Board,

Pursuant to the State Water Resources Control Board's (SWRCB or Board) "Notice of Opportunity to Provide Feedback, Public Staff Workshops, and Public Board Hearing for the Proposed Designation of Kern County Subbasin as a Probationary Basin," the Kern County Subbasin Groundwater Sustainability Agencies (Kern GSAs) provide initial comments on the "Kern County Subbasin Probationary Hearing Draft Staff Report" (draft Staff Report), which was published on July 25, 2024. These comments are being provided by the Kern County Subbasin Plan Manager on behalf of all the Kern GSAs.

On May 28, 2024, the Kern GSAs submitted a final draft amended Kern County Subbasin Groundwater Sustainability Plan (Amended Subbasin Plan or 2024 Plan) to the Board and its staff for review.[1] We designed the submittal schedule to be responsive to SWRCB Staff's and Board Members' recommendations to submit the plan in advance of any staff report and hearing. In updating the Board on this milestone, we explained that the Amended Subbasin Plan was "the product of many months of collective and collaborative work, undertaken in coordination with SWRCB Staff, to revamp the Revised 2020/2022 Groundwater Sustainability Plans (GSP) to remedy deficiencies previously identified by the Department of Water Resources (DWR)."[2] We also reiterated prior requests that any staff report address the 2024 Plan:

> "As it is intended to be adopted to supersede the Subbasin's Revised 2020/2022 GSPs before January 2025, the Kern GSAs request again that the Board consider, and direct SWRCB Staff to evaluate, the Amended Subbasin Plan as the basis for any staff report or decision whether to hold a probationary hearing for the Subbasin" in 2025.[3]

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1 *See* letter from Kristin Pittack to SWRCB (June 7, 2024), p. 1.
2 *Id.*
3 *See id.* at 3; *see also* letter from Kristin Pittack to SWRCB (Mar. 29, 2024), p. 5.

Notwithstanding the Kern GSAs' requests for evaluation of the 2024 Plan *because that is the Plan that will be adopted and operative on the noticed hearing date*, the draft Staff Report is based almost exclusively on the Revised 2020/2022 GSPs.

The draft Staff Report allocates two pages to the 2024 Plan. In those two pages, SWRCB Staff concludes, based on its preliminary review, that the deficiencies observed in the Revised 2020/2022 GSPs also apply to the 2024 Plan:

> "Because the deficiencies identified after the preliminary review of the 2024 Draft GSPs are consistent with the deficiencies in the 2022 GSPs, GSAs can use the draft staff report as guidance to correct the deficiencies in the 2024 Draft GSPs and address the Board staff recommendation to designate the basin as probationary."[4]

However, the draft Staff Report also indicates this preliminary conclusion is subject to change based on SWRCB Staff's continued review of the 2024 Plan and feedback from interested persons.

To assist with SWRCB Staff's continued review, the Kern GSAs are providing additional explanation and technical analysis regarding the 2024 Plan, which has been prepared by the Kern Technical Working Group (TWG). The TWG's narrative responses to Staff's preliminary review are provided as Attachment A, and a matrix comparing identified deficiencies, SGMA requirements, and potential corrective actions is provided as Attachment B. These responses further explain how the 2024 Plan relies on the best available science and information, follows the requirements of the Sustainable Groundwater Management Act and GSP regulations, and is likely to achieve the Kern Subbasin's sustainability goal.

We request that SWRCB Staff consider the TWG's responses as it continues to review the 2024 Plan in greater depth. To the extent SWRCB Staff disagrees with the TWG's analysis, we request Staff share the data and analysis that are the basis for its disagreement. The TWG notes that the observed deficiencies listed in the draft Staff Report, including foundational issues such as whether the Kern GSAs' have properly characterized the confined versus unconfined aquifer in the Subbasin, were not previously raised by SWRCB Staff during the 10 consultation meetings held from March 2023 to present.[5] Additional information from Staff on these issues would be particularly helpful to the Kern GSAs' efforts to clarify or correct the alleged deficiencies.

We further request that SWRCB Staff issue a *revised* draft Staff Report that incorporates full and complete review of the 2024 Plan prior to issuing a final report. The Kern GSAs and other interested persons should have an opportunity to review and respond to SWRCB Staff's full and complete evaluation of the 2024 Plan prior to any probationary hearing.

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4 Draft Staff Report, p. 191.

5 *See* Attachment A, p. 1.

The Kern GSAs appreciate the Board's consideration and look forward to continued consultation with SWRCB Staff. If you have any questions regarding this letter or the 2024 Plan, please contact the Plan Manager, Kristin Pittack, MS, at (760) 223-5062 or kpittack@rinconconsultants.com.

Respectfully submitted,

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Kristin Pittack, MS
Kern County Subbasin Plan Manager

cc:
E. Joaquin Esquivel, Chair, SWRCB
Dorene D'Adamo, Vice Chair, SWRCB
Laurel Firestone, Board Member, SWRCB
Sean Maguire, Board Member, SWRCB
Nichole Morgan, Board Member, SWRCB
Derek Yurosek, Arvin Edison
Michael Blaine, Wheeler Ridge-Maricopa
Mark Valpredo, Tejon-Castac
Rodney Palla, Kern Delta
Bob Smith, City of Bakersfield
Gene Lundquist, KCWA ID4
Brandon Morris, Southern San Joaquin
Randy Bloemhof, Shafter-Wasco/7th Standard
Kevin Andrew, North Kern
John Gaugel, Cawelo
Rob Goff, Westside District Water Authority
Dan Waterhouse, Semitropic
Royce Fast, Pioneer
Kim Brown, Kern Water Bank
Gary Morris, West Kern
Andrew Hart, Kern Tulare
Chad Hathaway, Eastside Water
Gary Unruh, Rosedale Rio Bravo
Jeof Wyrick, Henry Miller
Jim Nickel, Olcese
Terry Chicca, Buena Vista

Attachment A

Kern County Subbasin Technical Working Group's Comments regarding the Kern County Subbasin Probationary Hearing Draft Staff Report's preliminary review of the Subbasin's 2024 Plan

Introduction

On July 25, 2024, the State Water Resources Control Board (SWRCB) published the "Kern County Subbasin Probationary Hearing Draft Staff Report" (draft Staff Report). The Kern County Subbasin Groundwater Sustainability Agencies (Kern GSAs) tasked the Technical Working Group (TWG) with reviewing and providing initial technical comments regarding the draft Staff Report's preliminary review of the final draft amended Kern County Subbasin Groundwater Sustainability Plan (2024 Plan).

The TWG has reviewed the SWRCB Staff's observed deficiencies regarding the 2024 Plan. In addition to the specific responses provided below, the TWG believes it is important to note at the outset that the deficiencies listed in the draft Staff Report (pp. 191-193) were not raised by SWRCB Staff during the 10 consultation meetings that have occurred since March 2023. In addition, several of the foundational issues raised in the draft Staff Report, like the Subbasin's characterization of the confined versus unconfined aquifer in the Subbasin, were not previously identified by DWR during its review of the 2020/2022 GSPs. The TWG recommends that the Kern GSAs request additional information from SWRCB Staff to better understand the data and analysis it is relying upon as the basis for these newly identified issues.

For ease of reference, the TWG has organized these technical comments to respond to SWRCB Staff's observed deficiencies regarding the 2024 Plan in the order they are presented in the draft Staff Report. Black, italicized text is used for quotes excerpted from the draft Staff Report, and blue text is used for the TWG's responses.

4.1.6 *Preliminary Review of 2024 Draft Groundwater Sustainability Plans*

Staff recognize that coordination among GSAs has substantially improved, but the three fundamental deficiencies identified by DWR's inadequate determination (poor coordination, lowering of groundwater levels, and subsidence) still remain for the 2024 Draft GSPs, in addition to board identified deficiencies (groundwater quality and deletion of ISWs). The draft staff report identifies potential actions that the GSAs can incorporate to address the deficiencies identified in the 2022 GSPs. Board staff have conducted 10 consultation meetings with the Kern County Subbasin GSAs since March 2023 to provide feedback on deficiencies in 2022 GSPs and potential actions for remedying those deficiencies. A significant amount of this feedback forms the basis for the written recommendations of the draft staff report. Because the deficiencies identified after the preliminary review of the 2024 Draft GSPs are consistent with the deficiencies in the 2022 GSPs, GSAs can use the draft staff report

as guidance to correct the deficiencies in the 2024 Draft GSPs and address the Board staff recommendation to designate the basin as probationary. Board staff will continue to review the 2024 Draft GSPs in greater depth and work with the GSAs to provide feedback to resolve remaining deficiencies.

Board staff will incorporate review of the 2024 Draft GSPs into the final staff report. Staff invite interested persons to also review the 2024 Draft GSPs and to provide written comments to the Board on whether and how deficiencies and potential actions identified in the draft staff report remain applicable to the 2024 Draft GSPs.

Below are deficiencies observed by staff during the preliminary review of the 2024 Draft GSPs and the corresponding deficiencies and potential actions in this report:

- *Board staff note that the use of regionally-averaged declining elevation trends leads to groundwater level MTs that vary dramatically across "hydrological areas" of the subbasin and may have resulted in a skewed (heavily weighted toward areas of more pumping and lower elevation) approach in setting MTs. This results in inconsistent management action triggers across plan areas, an issue previously identified by DWR across the 2022 GSP plan areas due to lack of coordination (Consistent with Coordination deficiency 1a).*

The Kern County Subbasin (Subbasin) is by far the largest basin in California, covering 1.8 million acres. For perspective, 40 of the 71 basins with approved GSPs and four of the other inadequate basins could fit within the Subbasin boundaries. The stratigraphy, geology, water sources and use patterns, and type and distribution of beneficial users varies widely across the Subbasin – as do the historical and projected groundwater level trends. The fact that this is not a "one size fits all" Subbasin is something that the 2024 Plan had to directly consider as part of developing a comprehensive management plan and did so through the delineation of five hydrogeologic conceptual model areas ("HCM Areas"). As explained in Sections 5.2 and 6.2.1 of the 2024 Plan, these HCM Areas form a key organizing principal for the Plan, informing the HCM (Section 7), the Groundwater Conditions (Section 8), the Sustainable Management Criteria (Section 13), and the Representative Monitoring Network (Section 15).

The Groundwater Sustainability Plan (GSP) regulations (§ 354.28.) require that Minimum Thresholds (MTs) be developed to "avoid undesirable results" (URs) (i.e., "significant and unreasonable effects… caused by groundwater conditions occurring throughout a subbasin" [§ 354.26]) and that they describe how they "may affect the interests of beneficial uses and users of groundwater or land uses and property interests". Notably, they do not establish a rule that MTs be set above historical lows. In fact, DWR has approved ten GSPs for four subbasins within the southern San Joaquin Valley (SJV) that have MTs below the historical lows (as well as GSPs and Alternatives in other subbasins outside of the southern SJV).

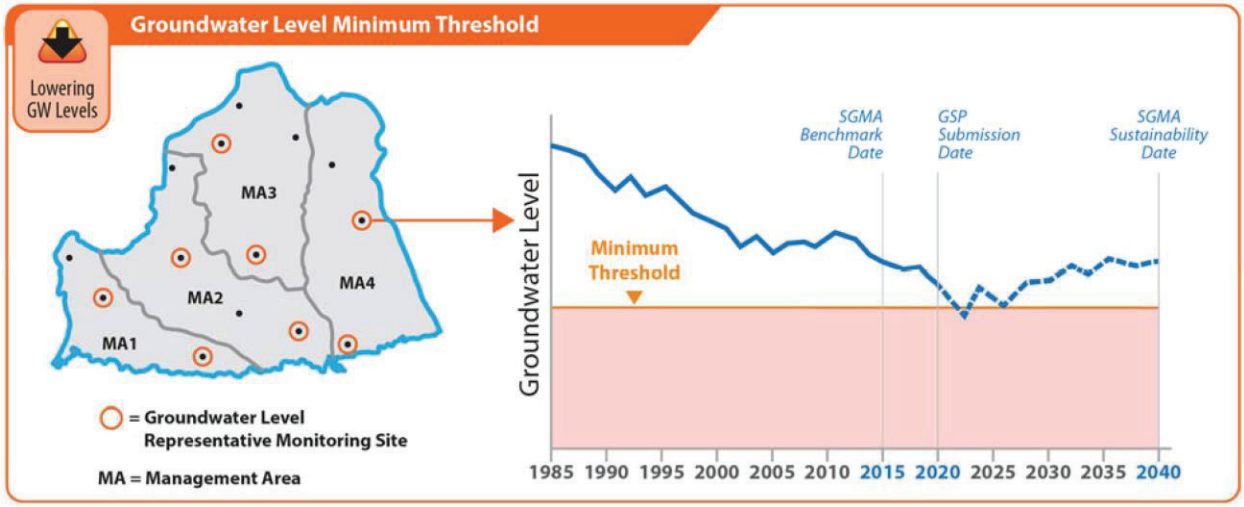
The GSP regulations (§ 354.28) further require that MTs reflect "the rate of groundwater elevation decline based on historical trends" and be "supported by information provided in the basin setting, and other data or models as appropriate". In other words, the regulations expressly require and anticipate the use of trends in the development of a MT methodology and that the trends may differ within a subbasin. The regulations further anticipate that the same methodology may result in different values at different locations in a subbasin based on the local groundwater conditions.

That is why unique MT values are anticipated at each Representative Monitoring Well (RMW) (i.e., an MT "quantif[ies] groundwater conditions for each applicable sustainability indicator at each monitoring site").

The Subbasin's Groundwater Sustainability Agencies (GSAs) developed the MTs in a fully coordinated fashion that is consistent with both the GSP regulations and the intent of SGMA (i.e., to avoid URs). The GSAs applied a consistent dataset and coordinated MT methodology across the Subbasin. The exact values used as inputs in calculating MTs for each RMW represent the unique conditions and characteristic of that portion of the Subbasin (as represented by the actual historical water level data at that RMW and the water level trends within the applicable HCM Area). Then a series of transparent, detailed and reproducible analyses were conducted to ensure that the MTs would not create URs in the Subbasin (Section 13.1.2.4) and are protective for interrelated Sustainability Indicators in the Subbasin (Section 13.1.2.2).

The MTs are therefore not "skewed"; rather the MTs appropriately reflect groundwater conditions at each of the RMWs. For example, there are portions of the Subbasin where groundwater is not pumped in significant quantities, while in other areas water levels fluctuate inter-annually as a result of conjunctive use and other management actions. It is therefore reasonable to expect that a scientifically rigorous MT methodology would reflect and represent those varied conditions in establishing the foundation to support locally-effective groundwater management.

In addition, the MTs do not result in "inconsistent management action triggers across plan areas". Rather, the MTs accurately reflect local conditions and project a realistic glide path towards sustainability at each RMW and each HCM Area, consistent with DWR's guidance in its Sustainable Management Criteria BMP (Figure 3, see excerpt below, which notably shows an MT value that is below 2015 levels).



The SWRCB Draft Staff Report states that the "groundwater level MTs … vary dramatically across 'hydrological areas' of the subbasin". As shown in the contour maps and the three transects Figure 1, Figure 2, and Figure 3 below, the MT (and MO) values in fact do not "vary dramatically" between HCM Areas. They instead appropriately reflect the localized water level conditions across the Subbasin similar to those observed in Fall 2015. Similarly, spatial interpolations of the MTs and MOs at RMWs are similar to the Fall 2015 water level spatial interpolation. It should be noted

that the transects show smooth MT and MO interpolated values, and some of the apparent discrepancy at the RMW points is related to the translation across up to a two-mile distance to the transect lines.

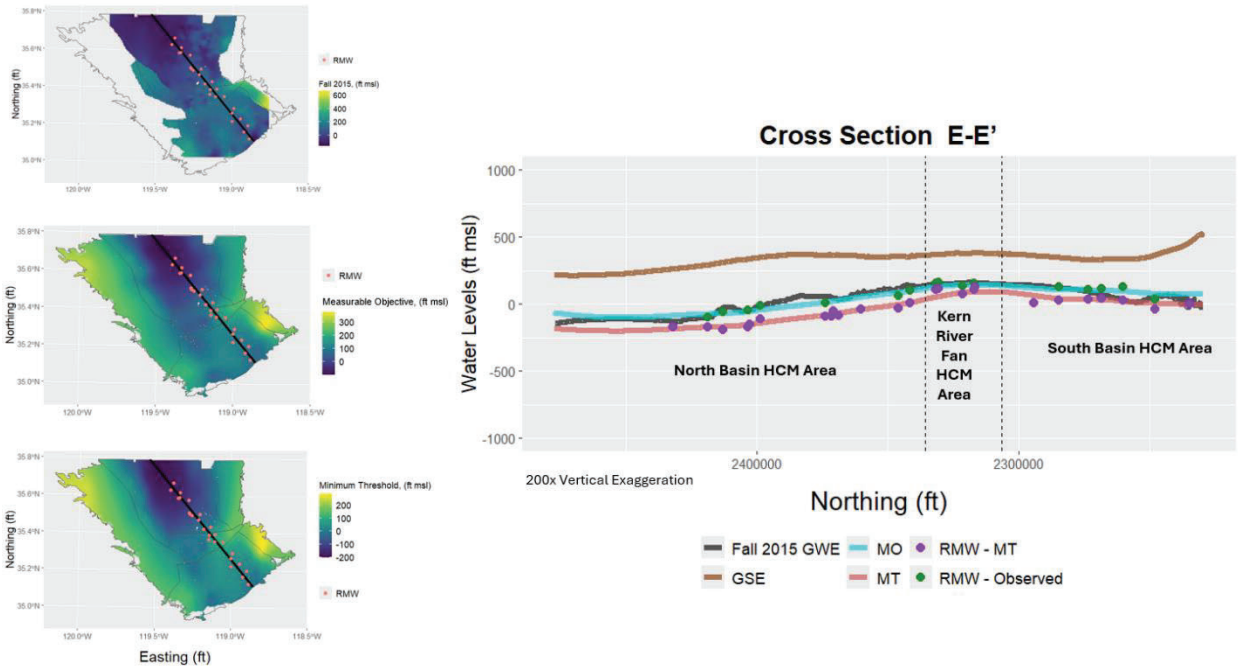


Figure 1. Water level transect along cross section E-E' comparing Fall 2015, MO, and MT groundwater elevations.

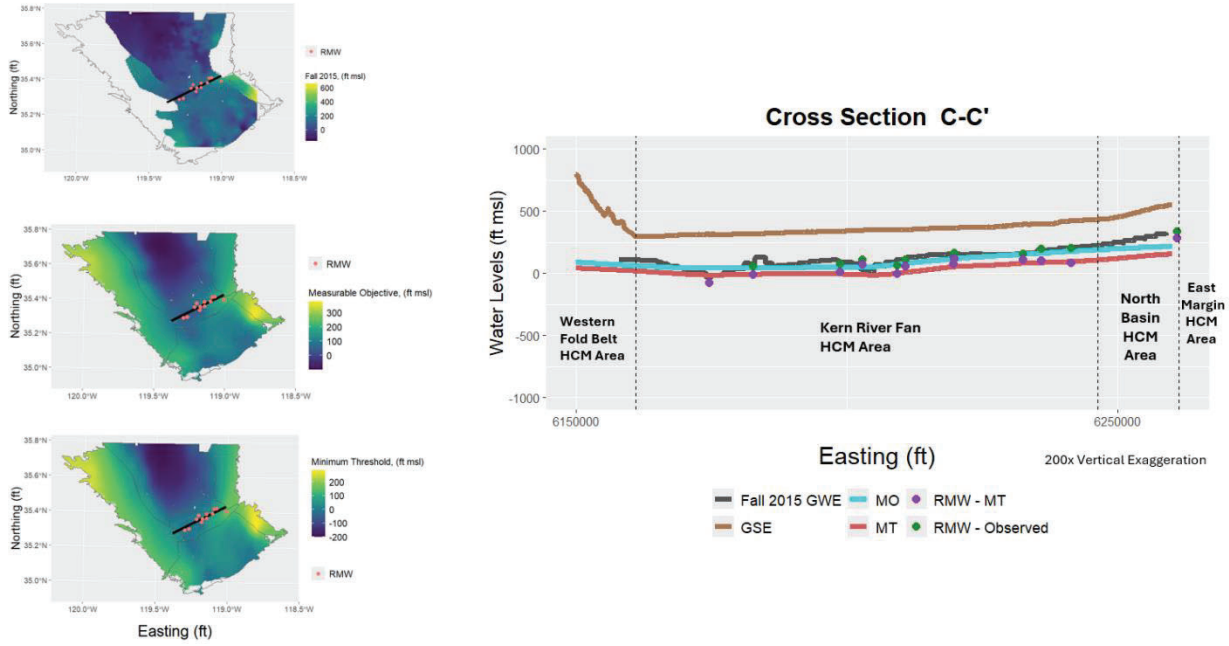


Figure 2. Water level transect along cross section C-C' comparing Fall 2015, MO, and MT groundwater elevations.

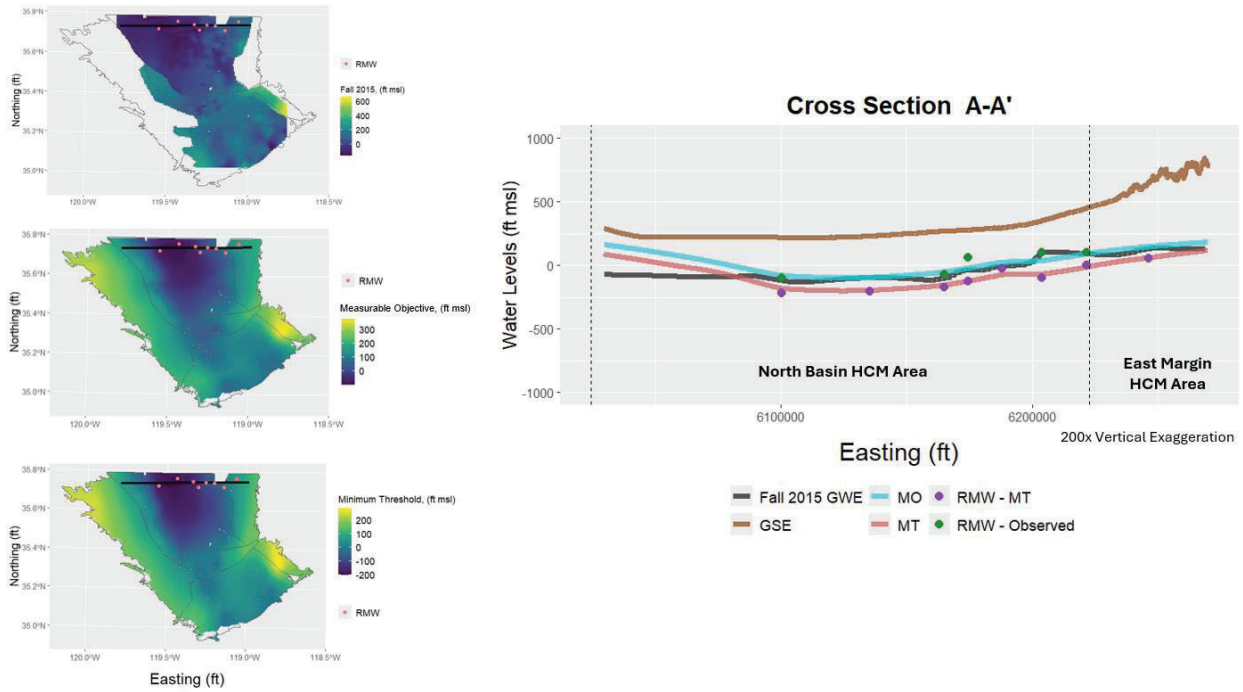


Figure 3. Water level transect along cross section A-A' comparing Fall 2015, MO, and MT groundwater elevations.

Furthermore, the MT Exceedance Policy is triggered for a single MT exceedance, requiring GSA action (Appendix W). In response to the 2023 DWR letter, the GSAs enabled Subbasin-wide notifications for when a reported seasonal groundwater level measurement exceeds the MT. This ensures that the GSAs are held accountable for investigating the MT exceedance and initiating appropriate projects, as warranted.

The SWRCB Draft Staff Report does not acknowledge both the very protective nature of the Subbasin's UR definition in the 2024 Plan (which limits the impacts to no more than 15 drinking water wells being impacted in any given year; Section 13.1.1.4), the MT Exceedance Policy (which requires GSA action in response to any MT exceedance; Section 14.2.3, P/MA KSB-3, Section 16.2.1 and Appendix W), and the planned implementation of a Well Mitigation Program (Section 14.2.3 P/MA KSB-5 and Section 16.2.1.1). Taken together, the GSAs have agreed to a coordinated and comprehensive approach based on best available information and science to: (1) manage groundwater levels sustainably across a large and complex basin, (2) protect beneficial uses, and (3) mitigate impacts caused by ineffective groundwater management.

To the extent SWRCB staff continues to find that the MT methodology is deficient and warrants a recommendation for Subbasin Probation, we request you provide detailed data or analysis demonstrating why the Subbasin's MT approach is deficient in ways that would create significant, unreasonable and unmitigable impacts.

- *Groundwater level MTs were determined using the lowest of projected historical trends or historical water level ranges, rather than using thresholds focusing on protection of beneficial uses and users. This method is consistent with a method called out by DWR's 2022 inadequate determination letter, previously referred to as "trend averages" and "range dominated minus a*

correction" which is now referred to as "trend dominated" and "range dominated" in the 2024 Draft GSPs (2022 DWR Inadequate Letter, pp. 31-32; 2024 Draft Main GSP, ch. 7, pp. 7-10). In many cases this results in MTs that exceed historical lows and are more than one-hundred feet deeper than current groundwater levels with no justification.

Also, staff noted that GSAs lowered numerous MTs, several by more than 50 feet and some by more than 100 feet, compared to MTs set in the 2022 GSPs. These MTs could result in groundwater levels declining well below historic lows without triggering any management actions (Groundwater Level deficiency).

Per the GSP regulations (§ 354.28), the MT methodology development process that was employed for the 2024 Plan directly considered the beneficial users and uses of groundwater. At the outset of the revision process (i.e., in July 2023), the GSAs determined that it would be significant and unreasonable to have more than 255 drinking water wells go dry by 2040 (or no more than 15 per year) based on an assessment of the previously impacted and successfully mitigated wells in the Subbasin since 2010, the associated costs for past mitigation efforts, and the economic feasibility of funding a Subbasin-wide Well Mitigation Program (Section 13.1.1.4). We note that 255 wells are equivalent to less than 5% of the production wells in the Subbasin. The GSAs then conceptualized more than 11 different potential MT methodologies, including some of the methods that were used in the 2022 GSPs that DWR had approved in other basins (e.g., White Wolf Subbasin and Kings Subbasin).

The Subbasin's technical experts applied each candidate MT method across the Subbasin at the RMWs and assessed the well impacts, gradients, and the margin of operational flexibility. Following this rigorous and iterative process, the GSAs selected the MT methodology which contains both trend-dominated and range-dominated calculation criteria, and has been shown (see § 354.28) to: (1) be protective of beneficial uses and users (Section 13.1.2.4), (2) result in reasonable gradients across the Subbasin and between subbasins (Section 13.1.2.3), (3) be consistent with the SMCs for the other Sustainability Indicators (Section 13.1.2.2), and (4) do not impact adjacent subbasins from achieving their Sustainability Goal (Section 13.1.2.3).

The quotation of the 2023 DWR Inadequate Letter included in the SWRCB Draft Staff Report is selective and does not convey the context or full meaning of DWR's comment. In the 2022 and 2023 letters, DWR inventoried the various MT methodologies being used at that time throughout the Subbasin – this cited quotation merely confirms that DWR understood the methodology being employed for a portion of the Subbasin. Based on review of the surrounding text, it is clear that DWR's primary concern was the various and disparate approaches for establishing MTs across the Subbasin in 2022 which resulted in inconsistent settings of groundwater level declines beyond historical lows, not with the MT methodology itself. Furthermore, it is notable that the MT methodology employed in the 2024 Plan is consistent with the MT methodology used in the adjacent White Wolf Subbasin, which was approved by DWR in January 2024 with NO corrective actions related to the water level MT methodology.

Contrary to the SWRCB Draft Staff Report statement that the MTs are presented "with no justification", the 2024 Plan provides a detailed, transparent and science-based justification for the MT methodology selection. A suite of well impacts analyses (Section 13.1.2.4) demonstrate that, if water levels were to decline to the MTs, on

average a total of between 77 and 103 drinking water wells may be impacted by 2040 (the average impacts under modeled projected future basin conditions vs application of a stochastic prediction of well impacts based on 5,000 realizations). This is equivalent to between 1.2% and 2.2% of the drinking water supply within the Subbasin. Again, this level of impact is well within the GSA's ability to mitigate under the Well Mitigation Program currently under development (Section 14.2.3, P/MA KSB-5, and Section 16.2.1.1). Additionally, modeled projected future Subbasin conditions suggest that, with P/MAs implementation, only 13 drinking water wells may be impacted by 2040. This justification was presented to SWRCB staff during the technical meetings held on 1 November 2023 and 3 April 2024, as detailed in Section 1.2.1.5.

With any change in methodology, MT values are expected to change. The 2024 Plan applies consistent data and a coordinated methodology across the Subbasin to establish the groundwater level MTs. In departing from the many methodologies used in the 2022 GSPs, most of the MTs established in those GSPs were modified. On average across the Subbasin, the MTs were raised by 20 feet compared to the 2022 GSPs. Due to the variable conditions found in the Subbasin some MTs changed substantially, including 17 RMWs where the MTs increased by more than 100 feet, while at two RMWs the MTs were lowered by more than 100 feet. Of these two wells one is representative of the lower confined aquifer on the eastern fringe of the Subbasin, an aquifer that is not used by domestic wells (RMW-044). The second is on the southern fringe of the Subbasin more than four miles away from any domestic wells (RMW-234). In the interest of consistent and coordinated basin management, it was therefore determined that the agreed upon consistent MT methodology could be employed at those sites because the well impacts analysis demonstrated that use of this methodology at these locations did not negatively impact beneficial uses and users.

The SWRCB Draft Staff Report appears to object to MTs set below historical lows. However, SGMA does not require MTs to be set at or above historical lows. Instead SGMA and implementing regulations (§ 354.28; § 354.26) require that the MTs be set to avoid "significant and unreasonable impacts". The 2024 Plan clearly demonstrates that the MTs will avoid significant and unreasonable impacts to beneficial uses and users of groundwater. We also note that DWR has approved no fewer than 12 GSPs that have MTs below historical lows, based on findings that those MTs are grounded in best scientific information and comply with SGMA's requirement to avoid URs.

SGMA requires identifying URs and mitigating impacts to beneficial users, which the 2024 Plan and associated Well Mitigation Program does. To the extent that the SWRCB staff continues to find that the MT methodology is deficient and warrants a recommendation for Subbasin probation, we request you provide detailed data or your analysis demonstrating why this approach to MT development and coordinated Subbasin management would create significant and unreasonable and unmitigable impacts.

- *Plans lack clarity on banking operations and how they impact the ability of the basin to avoid hitting MTs. This is especially true given that the GSPs' Appendix E, Kern Fan Water Banking Program, stated that, "[t]he Projects cannot cause chronic lowering of groundwater levels or a reduction in storage" (2024 Draft Main GSP, Appendix E. p. 7) (Groundwater Level deficiency).*

The statement in Appendix E is consistent with the SGMA legislation whereby "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." (California Water Code § 10721(x)).

With respect to the reference to Appendix E, the full statement reads: "*The Projects cannot cause a chronic lowering of groundwater levels or a reduction in groundwater storage* ***because operating rules require that they only recover previously stored surface water from the aquifer after appropriate losses have been applied. If these supplies are exhausted, recovery operations will cease. Importantly, the recovery of stored water in the projects provides much needed water supplies in times of drought to reduce groundwater pumping from overdrafted aquifers elsewhere in the Subbasin. The supplies also help West Kern meet their M&I needs for disadvantaged communities. Nonetheless, the Projects utilize the SMC methodology developed by the Subbasin for these sustainability indicators (see Section 13.1 and 13.2 of the Plan).***

Project operations can cause a temporary lowering of groundwater levels in adjacent areas toward the end of extended droughts. However, as described above, the Projects have developed a well mitigation program that mitigates any such impacts caused by those temporary conditions."

As discussed above, banking projects cannot cause a reduction in groundwater storage because operational constraints limit the projects to only recovering previously stored water.

With respect to banking project operations impacting the ability of the Subbasin to avoid breeching MTs, the projects providing water to participants within the Subbasin conserve surplus water supplies and later reduce the need for those entities to pump groundwater thereby helping to maintain groundwater levels above MTs. For programs storing water for entities outside the Subbasin, those programs have a leave-behind requirement that contributes to groundwater storage and higher groundwater levels.

Regarding the Kern Fan projects discussed in Appendix E, (Kern Water Bank [KWB], Pioneer, Berrenda Mesa, and West Kern), these projects are all stand-alone projects with no overlying beneficial users. The question then becomes, can the operations for these projects contribute to a chronic lowering of groundwater levels in adjoining areas? In fact, these projects cause a chronic raising of groundwater levels in these areas.

DWR conducted an in-depth analysis of KWB operations in a 2016 Environmental Impacts Report (EIR) which included modeling the potential impacts of the KWB project for the 1995-2014 period. An analysis of with project operations and without project operations documented the effects of the project on adjoining areas. These effects are most simply summarized on Figure 3.2-7 which illustrates the area outside the KWB where changes in water levels exceeded 5 feet, either up or down, as a result of project operations. As shown, groundwater levels for significant areas outside the KWB were greater than 5 feet throughout the entire period under the with project operations scenario. Groundwater levels were lower than 5 feet for some areas for limited times toward the end of significant droughts.

Following the 1995-2014 period, there were three recovery periods and three significant recharge events. The volumes of water in these later recharge events exceeded those from previous recharge events, the recovery volumes were similar to or less than the 2012-2014 recovery period, and groundwater levels responded in a manner similar to those in the 1995-2014 period. Therefore, it would be expected that these later operations would raise groundwater levels in adjoining areas to the extent shown in Figure 3.2-7 through 2023. In addition, the operations of the other Kern Fan projects (Pioneer, Berrenda Mesa, and West Kern) are analogous to KWB operations, so it follows that the same chronic raising of groundwater levels has occurred as a result of these projects. Notably, at the end 2023, the volume of water in storage in the four projects approached 2 million acre-feet.

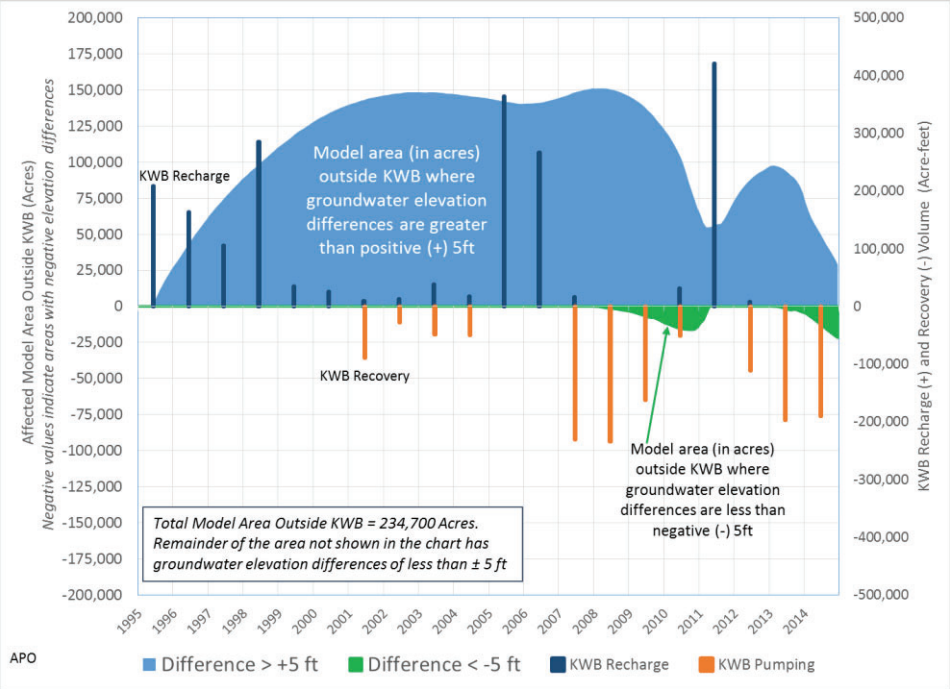


FIGURE 3.2-7. Analysis of Past Operations: Time vs. Affected Area Outside the Kern Water Bank Exceeding ± 5 Feet Differences in Groundwater Elevations ("With Kern Water Bank Operations" Minus "Without Kern Water Bank Operations"), 1995-2014

- *The GSAs do not demonstrate a fundamental understanding of the Subbasin's settings. For example, monitoring well networks for groundwater levels and groundwater quality do not differentiate between confined and unconfined aquifers separated by the E-clay (a confining layer), or other clay layers. Most monitoring wells appear to be screened in the confined aquifer, and therefore may not be protective of all beneficial users when water levels in the unconfined aquifer are lower than that in the confined aquifer. An understanding of groundwater levels and groundwater quality in the unconfined and confined aquifers, as well as subsidence and groundwater quality, is essential for characterizing hydrogeologic conditions throughout the subbasin. Well impact analyses, monitoring plans, or mitigation strategies developed without this knowledge are insufficient and may not be protective of beneficial*

uses and users (Consistent with Groundwater Level and Groundwater Quality deficiencies).

Given the managerial experience and the technical expertise specific to Kern County that were marshalled to produce the 2024 Plan, the GSAs take exception to the SWRCB Draft Staff Report statement that the "GSAs do not demonstrate a fundamental understanding" of the Subbasin because they have not defined a confined and unconfined aquifer. As mentioned above, the Subbasin is significantly larger and more hydrologically and operationally complex than the subbasins to the north where different geologic conditions may have warranted different aquifer designations (see additional discussion below). We note that this was not a deficiency identified by DWR and are interested in understanding the analyses that led to the SWRCB Draft Staff Report's statement.

The groundwater elevation maps of the Primary Alluvial Principal Aquifer presented in Figures 8-2, 8-3 and 8-4 of the 2024 Plan are consistent with well-established representations of the Subbasin published in the Kern County Water Agency (KCWA) Water Supply Reports from 1970 through 2011. KCWA has continued to provide these maps for the Subbasin Annual Reports through WY2023. The maps presented in the 2024 Plan similarly provide a single coordinated, Subbasin-wide representation of groundwater conditions for the hydraulically connected and actively pumped intervals of the Subbasin. Therefore, we consider this approach to be the appropriate mapping and aquifer designation methodology, based on a time-proven approach, that best supports the development of the groundwater level SMCs with respect to managing sustainability within this Subbasin. The implication in the SWRCB Draft Staff Report that this does not accurately represent the Subbasin appears to contradict the decades of groundwater understanding and management that has been implemented by some of the largest and most sophisticated water agencies and managers in the State, including DWR.

For the 2024 Plan, the alluvium was defined as a single principal aquifer rather than subdividing it into upper and lower principal aquifers based on the actual mapping and analysis of the extent and thickness of the E-Clay. Figure 4 illustrates the lack of E-Clay along the Kern River Fan area. Utilizing maps of the E-Clay extent from the USGS and others (Croft 1972, Page 1983, 1986; PGA 1991), it was determined that the E-Clay is absent in over 60% of the Subbasin. In another 30%, the E-Clay is either discontinuous or near the margins, where zones above and below it are hydraulically connected (see Figure 7-24 of the 2024 Plan). Thus, given the limited and discontinuous nature of the E-clay, the aquifer system functions as a single principal aquifer with some local zonation influenced by the E-Clay and other clay layers (see Sections 7.2, 7.3 and 7.4), and was appropriately defined as such.

A distinct separation in groundwater levels due to the E-Clay is observed in an area along the boundary with the Tule and Tulare Lake Subbasins, covering about 10% of the Subbasin. Here, groundwater above the E-clay flows southeastward towards regions where the E-Clay is discontinuous, merging with groundwater below. This area is designated as a conservation easement for the Kern National Wildlife Refuge, which is supported by surface water. Given the lack of groundwater use in this area, it does not qualify as a separate principal aquifer. In contrast, the Tule and Tulare Lake Subbasins define upper and lower principal aquifers due to the E-Clay forming a continuous layer over 60% and 100% of their respective areas. Furthermore, in these

other subbasins, both the upper and lower principal aquifers contribute to agricultural and municipal water supplies.

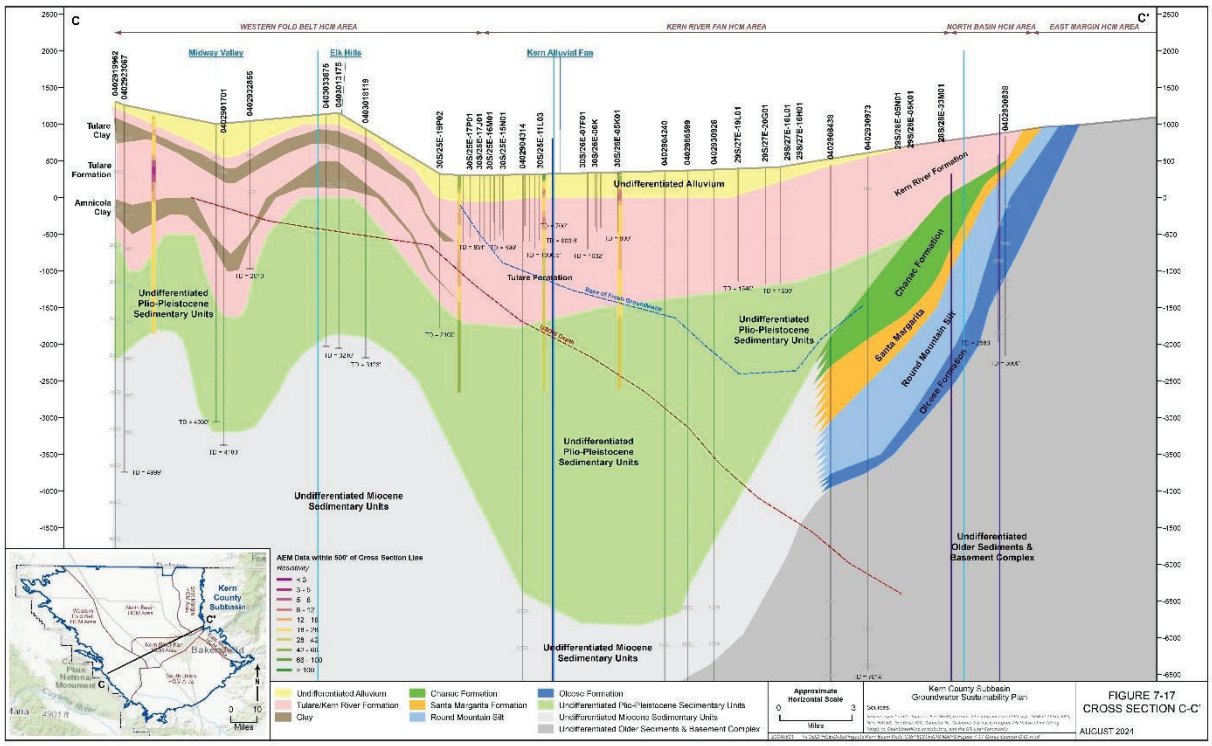


Figure 4. Cross section A-A' comparing showing distribution of clays along the Kern River Fan.

The variability of the E-Clay justifies establishing a single principal aquifer for the alluvial sediments. This is based on a fundamentally sound understanding of the Subbasin-wide hydrogeology. As an example of the hydraulic relationship along the northern fringe of the Subbasin, Figure 5 on the following page shows a series of hydrographs and land subsidence of nearby wells for four areas along Highway 99. The Delano Municipal Airport (Site A) is the furthest northern site within 2 miles of the boundary with the Tule Subbasin and shows examples of zonation among three aquifer zones at variable depth by location. The Highway 99 at Kimberlina Road (Site D) is the farthest southern location and only about 13 miles south of the Delano Airport. At the Delano Municipal Airport site, the groundwater elevations in the shallowest screened zone are higher than the lower zone at times but are nearly the same at other times. This relationship indicates the effects of local zonation as evidenced by increased subsidence at Site A compared to the other three sites that have similar groundwater elevations over the period of record. At the three more southern locations, the difference between the shallower and deeper screened intervals is minimal indicating little to no local zonation in these areas. The smaller magnitude of subsidence observed at the three southern sites compared to Site A is because the E-Clay and lesser clay layers diminish to the south (Figure 4). These wells provide an example of the observed hydraulic response observed in the Subbasin near the Friant-Kern Canal. While localized vertical head differences are present in some areas of the Subbasin, the alluvial aquifer at the Subbasin-scale is

hydraulically connected and can be managed as a single aquifer system.

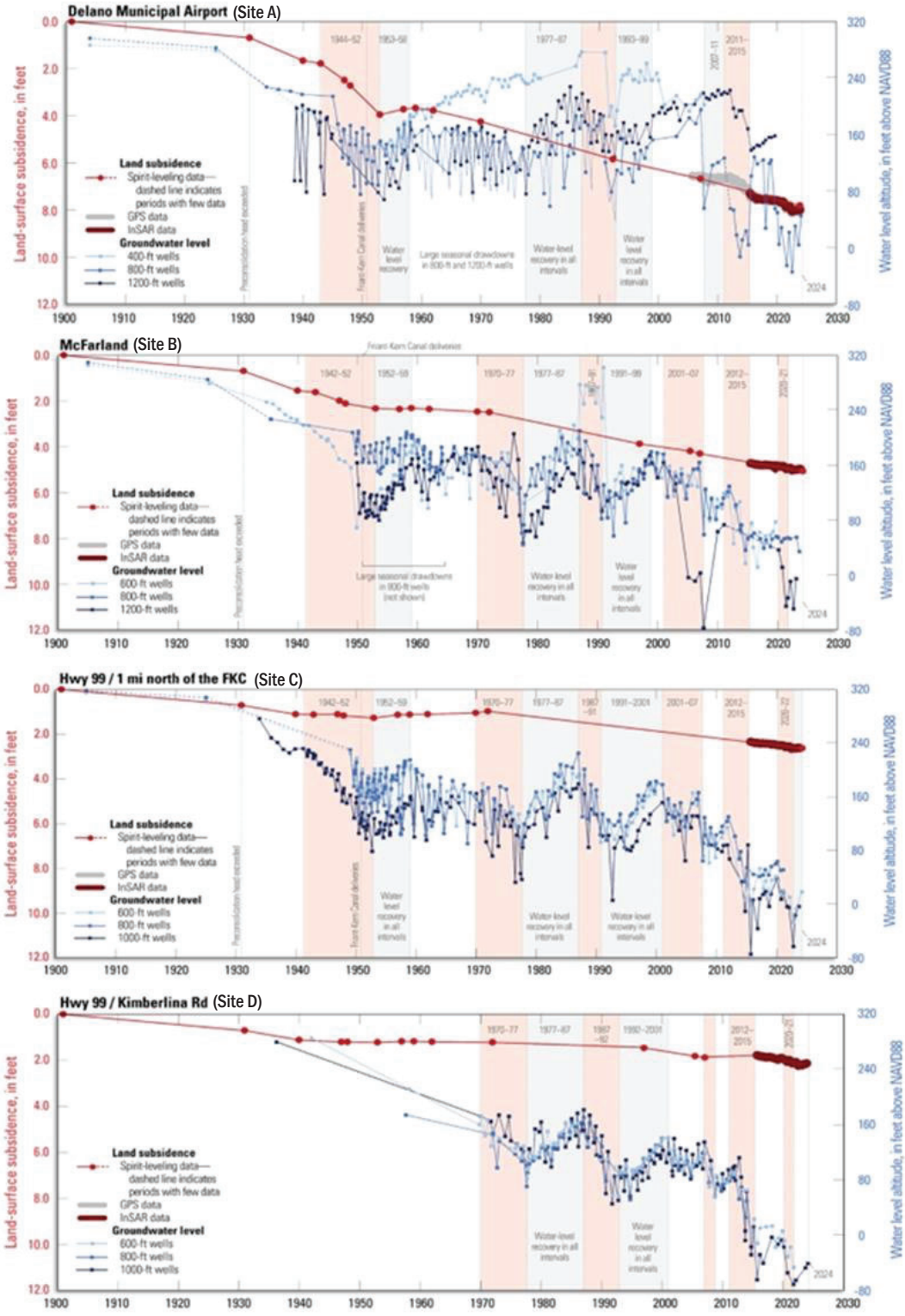


Figure 5. Long-term Groundwater Levels and Land Subsidence (Sites A through D)

Furthermore, the Subbasin did establish the confined Olcese and Santa Margarita

Principal Aquifers in the northeast region of the Subbasin as they represent Miocene sandstone aquifers that are hydraulically separate from the Primary Alluvial Principal Aquifer. The 2024 Plan identifies and includes monitoring for all principal aquifers.

In 2020, the Subbasin recognized that a more comprehensive understanding was needed. With support from a DWR grant, the Kern Subbasin initiated a Basin Study (P/MA KSB-4) in early 2023. The 2024 Plan Basin Setting is the result of in-depth research and model refinement which has provided a comprehensive understanding of the Subbasin. One example is the development of the HCM Areas used in the 2024 Plan. These five areas represent hydrogeologically distinct areas to help organize the HCM discussions to better represent the geological complexity of the Subbasin. In the 2024 Plan, each HCM area is defined in terms of regional hydrology, land use, geology and geologic structure characteristics. The HCM areas are also consistent with the structural regions defined by the USGS (Bartow, 1991) that subdivided the San Joaquin Valley into structural regions based on each regions distinct style of deformation and tectonic history. Figure 6 below shows that relationship of the HCM to the regional hydrology and structural geology.

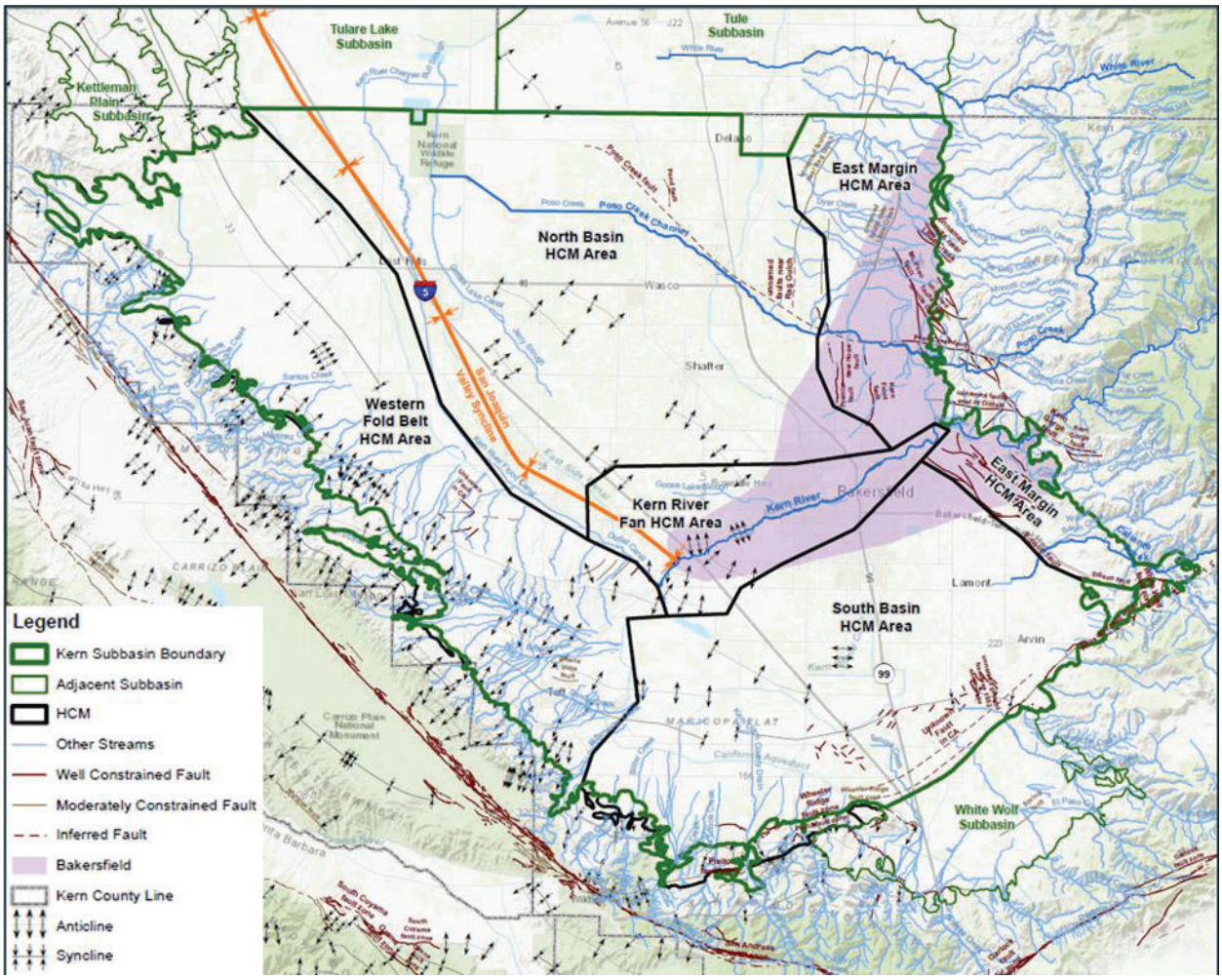


Figure 6. HCM Areas

Again, while we disagree with SWRCB Draft Staff Report's representation of our understanding for the Basin Setting, we acknowledge a data gap in Section 15.5.1 of

the 2024 Plan, where construction data for some monitoring wells is lacking. The monitoring networks were developed to provide an appropriate spatial distribution of monitoring across the Subbasin by principal aquifer following DWR Best Management Practices. While a portion of the representative wells lack construction data, the monitoring networks are representative of groundwater conditions above and below the E-clay and other clay layers and were strategically designed to represent beneficial users throughout the Subbasin. Appendix X (Monitoring Network Data Table) provides a clear description of the aquifer each well represents, the site type (i.e., landowner agricultural supply, public supply, or monitoring) as well as other regulatory programs it's used for (i.e. DDW and ILRP). The Subbasin GSAs are working to rectify the construction details data gap by collecting information for the wells with incomplete data. Completing this data collection effort will further demonstrate that the monitoring networks appropriately represent groundwater conditions and beneficial users throughout the Subbasin.

- *The GSPs state that mitigable subsidence is not considered an undesirable result but do not propose a mitigation plan aside from an external mitigation already being implemented by FWA. The GSPs also propose that subsidence along the CA aqueduct is the result of oil and gas extraction without substantial evidence (2024 Draft Main GSP, ch. 13, p. 75 and 2024 Draft Main GSP, ch. 14, p. 17) (Land Subsidence deficiency).*

As discussed with SWRCB staff, not all subsidence is GSA-related, thus some causes of subsidence are outside the control of the Subbasin. The 2024 Plan shows that the Subbasin has a plan to minimize GSA-related subsidence by 2040, which aligns with the intent of SGMA. The Subbasin proposes to stabilize water levels and minimize subsidence over the implementation period (see Section 13.5.3, Figure 13.31), while managing and mitigating for significant and unreasonable impacts experienced during the implementation period (Section 13.5.2.1.1). As per SGMA regulations, the 2024 Plan has established MTs that avoid URs, defined as "significant and unreasonable land subsidence that substantially interferes with surface land uses" (CWC § 10721(x), SGMA Regulations 354.28(b)(1))".

The 2024 Plan uses a regional, consistent, coordinated, risk-based framework for evaluating and setting subsidence SMCs (Section 13.5). While maintaining a consistent approach and utilizing the best available data/tools, this regional framework also incorporates differences in hydrogeologic conditions, anthropogenic drivers of subsidence, and potential impacts to local/critical infrastructure in different parts of the Subbasin in the final SMC determination (Section 7, Section 8.5).

The 2024 Plan analyzes potential impacts from subsidence to local and critical infrastructure (Section 13.5.2.4) and sets SMCs to avoid significant and unreasonable impacts. To this end, the MTs and MOs are set to minimize subsidence by 2040 and mitigate GSA-related impacts during the implementation period. The Subbasin aims to minimize subsidence by 2040 and limit water level declines in the same period. This is done through a combination of P/MAs having a primary objective of reducing demand for groundwater and a secondary objective of increasing the volume of surface water dedicated to groundwater recharge (Section 14). In areas where subsidence during the implementation period may lead to impacts on local and critical infrastructure, the 2024 Plan has included P/MAs to mitigate these impacts (Section 14.2.3, Appendix T).

The Friant-Kern Canal (FKC) Mitigation alternative (Section 14.2.3 and Appendix T) is coordinated with the Lower Reach Correction project that Friant Water Authority (FWA) is undertaking (See Appendix J for a Letter of Support from the FWA). However, as detailed in Section 14.2.3 and Appendix T, the cost for mitigating undesirable results will be borne by Subbasin GSAs who include several Friant contractors that rely on water supply from the FKC. Moreover, the monitoring and triggers for this mitigation alternative are also managed by the GSAs. Thus, it is not accurate for the SWRCB Draft Staff Report to characterize the mitigation plan as "external mitigation already being implemented by FWA". The GSAs are coordinating closely with the FWA to develop the necessary mitigation measures and the cost-sharing agreement to avoid any future conveyance loss due to GSA-related subsidence along the FKC.

Not all subsidence is GSA-related and thus is outside the control of the Subbasin. For example, data shows there are many places adjacent to the Aqueduct (e.g. Mile Post [MP] 195 - 215) that are caused by non-GSA conditions. The 2024 Plan includes P/MAs (including pumping reductions) to a) stabilize water levels by 2030, b) minimize any GSA-related subsidence by 2040, and c) mitigate potential impacts during the implementation period. The combination of demand reduction and recharge has been demonstrated to keep water levels and subsidence above the minimum thresholds. In addition, the SWRCB Draft Staff Report fails to note that, despite disparate technical evidence indicating GSA-related groundwater extraction is not a contributing factor for Aqueduct subsidence at MP 195 – 215 located adjacent to the Lost Hills Oilfield, the Westside District Water Authority GSA has worked in close consultation with California Aqueduct Subsidence Program (CASP) and local beneficial users to implement two management actions: (1) mandatory groundwater extraction reporting for all wells within close proximity to the CA Aqueduct (i.e., in the CASP Buffer Zone) and (2) a net-zero well drilling moratorium (in the Buffer Zone) that already address the SWRCB Draft Staff Report's potential action LS-2b.

Subbasin GSAs have been working cooperatively with CASP and DWR staff on characterizing and understanding subsidence within the Subbasin for several years. Several studies have been conducted and completed to date. This includes coordination and engagement with DWR SGMA, CASP, California Geologic Energy Management (CalGEM), United States Geological Survey (USGS), and the FWA. These studies have found that there are multiple causes of subsidence in the Subbasin, many of which are not GSA-related. Contrary to the SWRCB Draft Staff Report's comment that "the GSPs also propose that subsidence along the California Aqueduct is the result of oil and gas extraction without substantial evidence", there are multiple studies available in the public domain by various entities including DWR, and westside oil producers that have identified oil extraction and other non-GSA conditions as causes of subsidence at and proximal to the Aqueduct. The 2024 Plan provides a comprehensive description of subsidence drivers in the Subbasin and details the various causes of subsidence, including oil and gas activities and other natural causes of subsidence as supported by InSAR time series and other data. The 2024 Plan presents eight InSAR time series charts representative of different areas-of-interest across the Subbasin, which show distinct patterns associated with various subsidence drivers and can be used to differentiate subsidence as a result of agricultural pumping from oil and gas activities (see Section 8.5.3). Furthermore, this

evidence was previously presented to CASP/DWR and CalGEM on numerous occasions (as documented in Table 2 of Appendix I), and to SWRCB staff during the technical meeting held on 13 December 2023, as detailed in Section 1.2.1.5.

To the extent that the SWRCB staff continues to find that the subsidence approach is deficient and warrants a recommendation for Subbasin probation, we request you provide detailed data of your analysis demonstrating why this approach to MT development and coordinated Subbasin management is inconsistent with SGMA regulations and would create significant and unreasonable and unmitigable impacts.

- *Board staff also identified deficiencies in the 2024 Draft GSPs related to degradation of groundwater quality, similar to those observed by Board staff in the 2022 GSPs. For example, when an exceedance occurs with respect to groundwater quality MTs, GSAs will investigate if it is a result of groundwater management actions using statistical and/or spatial analyses between water levels and water quality (2024 Draft GSP, ch 13, p. 55). However, GSPs lack details of what the investigation would entail or potential mitigation measures if the exceedance is determined to be a result of groundwater management (Groundwater Quality deficiency).*

As detailed in the 2024 Plan, the Subbasin's approach to Degraded Water Quality reflects the fact that SGMA does not require GSPs to address degraded water quality URs that occurred before and have not been corrected by January 1, 2015 (CWC § 10727.2(b)(4)) and that "...*sustainable groundwater management" means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results*." (CWC §10721(v)) (emphasis added). Consistent with these regulations, the Subbasin GSAs have defined "water management actions" as GSA actions related to groundwater recharge or extraction within the Subbasin. As such, the URs definition and associated MT methodology appropriately focus on whether water quality conditions have degraded as a result of water management actions since the enactment of SGMA on January 1, 2015 (Section 13.3.1).

The 2024 Plan establishes water quality MTs based on either the applicable health standard (i.e., MCL) or baseline concentrations. In any instance whereby a semi-annual water quality sample exceeds the MT, the Subbasin's MT Exceedance Policy would be triggered, which requires confirmation sampling and an investigation of site-specific conditions (Section 13.3.1.4, Section 16.2.1, and Appendix W). Details on the exact investigation are not provided in the 2024 Plan because local conditions at the time of a water quality MT exceedance must be taken into account to investigate the cause and possible solutions, and any investigation would be based on historical data (including water level, water quality, and local pumping), documented conditions at the time of sampling including nearby activities, and confirmation sample results. Rather than develop an uninformed process for investigating an MT exceedance, the Subbasin prepared a Standard Operating Procedure (SOP) focused on collecting data necessary to obtain representative data that provides a clear understanding of historical trends and conditions at the time grab samples are collected, which enable the technical team to devise an appropriate protocol when an investigation is needed. This SOP allows the Subbasin technical experts to review water quality data and evaluate the results in a manner consistent with other regulatory programs, which do not require a written protocol for responding to an MCL exceedance. For transparency, all GSAs are alerted

if a well exceeds the water quality MT and the Subbasin will ensure the exceedance is properly investigated.

Furthermore, the Subbasin GSAs have partnered with Kern Water Collaborative (KWC), the entity implementing the CV-SALTS Nitrate Control Program and administering the domestic well sampling program and providing replacement drinking water for residents who are impacted by nitrate above the MCL (Appendix F). The partnerships between GSAs, KWC, and Self-Help Enterprises facilitate collaborative and holistic solutions that avoid duplication of efforts in groundwater monitoring, domestic well testing, well mitigation, and the overarching objective to achieve the Human Right to Water throughout the Subbasin.

To the extent that the SWRCB staff continues to find that the water quality approach is deficient and warrants a recommendation for Subbasin probation, we request you provide detailed data of your analysis demonstrating why this approach to MT development and coordinated Subbasin management is inconsistent with SGMA regulations and would create significant and unreasonable and unmitigable impacts.

- *GSAs do not define ISWs or propose monitor for ISWs consistent with the requirements of SGMA (Cal. Code Regs., tit. 23, § 354) (Interconnected Surface Water deficiency).*

The presence or absence of interconnected surface waters (ISW) was systematically evaluated based on the best available data in accordance with the GSP regulations (§ 354.16 (f)) and available DWR Guidance (part 1 of 3). The GSAs relied on ISW mapping provided by DWR in support of SGMA including the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset and ICONS: Interconnected Surface Water in the Central Valley. The identified ISWs in these datasets were reviewed for their active connection to the principal aquifers. As documented in the 2024 Plan, the principal aquifers have limited connection with identified ISWs and do not contribute to Groundwater Dependent Ecosystems (GDEs). However, the continued monitoring of ISWs was included in management actions for several GSAs including Semitropic WSD and Olcese Water District.

DWR is still developing a multi-paper series on ISW and depletions of ISW to provide GSAs with tools to better incorporate quantitative approaches in GSPs. The Kern Subbasin GSAs plans to review and incorporate this guidance when available for inclusion in future periodic evaluations.

To the extent that the SWRCB staff continues to find that the approach to ISWs is deficient and warrants a recommendation for Subbasin probation, we request you provide detailed data or your analysis demonstrating why our approach and coordinated Subbasin management would create significant and unreasonable and unmitigable impacts.

4.2 *Exclusions from Probationary Status*

The State Water Board must exclude from probation any portions of the basin for which a GSA demonstrates compliance with the sustainability goal (Wat. Code, § 10735.2, subd. (e)). Staff believe no GSAs, or members of GSAs, in the subbasin have demonstrated compliance with the sustainability goal. All GSAs have adopted and are implementing six developed GSPs and 12 Management Area Plans, which DWR has determined to be inadequate. Based on DWR's findings and Board staff's thorough review of each GSP and Management Area Plan, Board staff find that no GSP or Management Area Plan has an adequate sustainability goal. Staff therefore recommend that the State Water Board not exclude any portions of the subbasin from the probationary designation at this time.

Given the information provided above and in the following Table, the TWG maintains that the 2024 Plan corrects all deficiencies identified by DWR and that there is no technical basis for SWRCB Staff's recommendation to designate the entire Subbasin as probationary. The TWG's opinion continues to be that the 2024 Plan is highly coordinated, compliant with the SGMA and GSP regulations, and suitable to supersede the 2022 GSPs. It establishes a comprehensive and transparent program for achieving sustainable groundwater management by 2040. Furthermore, the 2024 Plan provides a revised Sustainability Goal for the Subbasin. We therefore recommend the Kern GSAs' request that SWRCB staff conduct a full and fair review of the 2024 Plan prior to developing a recommendation on the regulatory status of the Kern Subbasin. Based on the TWG representatives' collective work and experience in this Subbasin, a probationary designation based on incomplete review of the 2024 Plan would be a disservice to all stakeholders in the Subbasin and would cause irreparable harm to the many families and communities that are dependent on the agriculture-based economy of Kern County.

Attachment B

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Coordination 1 (CRD)-1: Undesirable results and SMC are not coordinated. • **Deficiency CRD-1a –** Undesirable results are poorly described, unworkably complex, and inconsistently implemented. • **Deficiency CRD-1b** – Sustainable management criteria rely on inconsistent datasets and methodologies.	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In defining undesirable results, GSAs are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6 by including monitoring objectives, a coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). An Agency may create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the	**DWR Inadequate Determination summary:** Ultimately, the fragmented management area approach to groundwater management, particularly in establishing minimum thresholds and measurable objectives, undermines the GSAs ability to clearly define the Subbasin-wide significant and unreasonable effects they hope to avoid. It is, therefore, unclear to Department staff how or whether the sustainable groundwater management approach described in the Plan will achieve the sustainability goals included in the amended Coordination Agreement (2022 Inadequate Determination). **Board issues:** None	**Potential Action CRD-1a –** Develop consistent, clear undesirable results. **Potential Action CRD-1b –** Use consistent data and methods to develop SMC.	**Deficiency CRD-1 is already corrected within the 2024 Plan that was submitted to the SWRCB for review.** **CRD-1a –** The 2024 Plan has consistent and clear definitions of undesirable results (URs) that are Subbasin-wide. Clear plain language definitions of URs are provided, and supplemented with very specific quantitative criteria (based on impacts to beneficial users) that would trigger an UR: • Water levels: Sections 13.1.1 and 13.1.1.4 • Storage: Sections 13.2.1 and 13.2.1.4 • Water quality: Sections 13.3.1 and 13.3.1.4 • Land subsidence: Sections 13.5.1 and 13.5.1.4 Further, as shown in Table ES-3 and Table 11-1, each sustainability indicator has a consistent UR, Minimum Threshold (MT), and Measurable Objective (MO) definition across the Subbasin, all of which are demonstrated to be protective of (and avoid significant and unreasonable impacts to) beneficial uses and users. **CRD-1b –** All of the Sustainable Management Criteria (SMCs) in the 2024 Plan were developed using consistent data and methodologies across the Subbasin. For example, the Subbasin groundwater level SMCs rely on the same method using one compiled dataset of available historical well-specific data, while necessarily reflecting the differing conditions across the largest Subbasin in California that includes highly variable and complex geology and water use patterns and conditions and distribution of beneficial users. The modeling conducted by the Subbasin demonstrates that the SMCs and planned projects and management actions (P/MAs) will support the Subbasin to avoid URs and achieve the Sustainability Goal. Adoption of the Subbasin MT Exceedance Policy further demonstrates that the GSAs have a plan to proactively address any issues and impacts to beneficial users before they become an UR. Implementation of the coordinated 2024 Well

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
	basin" (Cal. Code Regs., tit. 23, § 350.20).			Mitigation Program further demonstrates that the GSAs are committed to address impacts to beneficial users.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency CRD-2: The Coordination Agreement, GSPs, and Management Area Plans lack key details necessary for coordinated implementation. • **Deficiency CRD-2a** – The Coordination Agreement is not sufficient to address disputes. • **Deficiency CRD-2b** – GSAs do not explain how the multiple plans will satisfy SGMA requirements, particularly for Management Areas.	The coordination agreement should be adopted by all relevant parties, explain how the multiple plans will satisfy SGMA requirements, should ensure that the agreement is binding on all parties and sufficient to address any disputes, and satisfies SGMA requirements (Code Regs., tit. 23, § 355.4, subd. (b)(8) and Cal. Code Regs., tit. 23, §357.4). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).	**DWR Inadequate Determination summary:** None **Board issues:** GSP and Coordination agreements do not have a basin wide exceedance policy to properly demonstrate how exceedances are investigated for relevance to SGMA or addressed if driving mechanism is outside of the local management area.	**Potential Action CRD-2a –** The Coordination Agreement should include a basin-wide minimum threshold exceedance plan. **Potential Action CRD-2b –** GSAs should revise plans to demonstrate the necessity and compliance of Management Areas.	Deficiency CRD-2 **not** identified by DWR. **Deficiency CRD-2 is already corrected within the 2024 Plan.** **CRD-2a -** The Subbasin-wide MT Exceedance Policy is included as Appendix W of the Subbasin 2024 Plan. **CRD-2b -** Most Management Areas are no longer relevant. The 2024 Plan relies on GSAs to cover the entirety of the Subbasin. There are two exceptions, with two management areas defined for two GSAs under special circumstances. See Section 10 for details.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency CRD-3 – GSAs in the Subbasin have not demonstrated Basin-wide management.	Any *local agency* –a local public agency with water supply, water management, or land use responsibilities (Wat. Code, § 10721, subd. (n)) – or combination of local agencies overlying a groundwater basin may decide to become a GSA for that basin (Wat. Code, § 10723, subd. (a)). The statute allows some private and non-governmental water entities to *participate* in a GSA, but SGMA does not provide them any additional authorities (Wat. Code, § 10723.6, subd. (b)). Private entities therefore do not have authorities to manage the subbasin, so all areas of a GSA must still be covered by a local agency. GSAs are required to develop "one or more groundwater sustainability plans that will collectively serve as a groundwater sustainability plan for the entire basin" (Water Code § 10735.2, subd. (1)(B)). Portions of high- and medium-priority basins not within the management area of a GSA are considered unmanaged (Water Code § 10724.6, subd. (a)). Groundwater extractors in unmanaged areas must report extractions and pay fees to the State Water Board (Water Code § 10724.6, subd. (b)).	**DWR Inadequate Determination summary:** None **Board issues:** Board staff are concerned that the subbasin may not be able to reach sustainability because it lacks authority to manage pumping across the entire basin. Board staff are unable to properly evaluate basin management due to the complex arrangement of agencies involved and lack of clear detail demonstrating adequate coverage. Board staff note that inadequate coverage could undermine the subbasin's ability to reach sustainability, as pumping could shift to unmanaged areas where no GSA has authority to limit extractions.	**Potential Action CRD-3a –** GSAs should clearly define relationships and responsibilities consistent with SGMA requirements.	Deficiency CRD-3 **not** identified by DWR. **Deficiency CRD-3 is already corrected within the 2024 Plan.** The Subbasin is fully covered by GSAs, as shown in Figure 3-1 of the 2024 Plan. The Kern Non-Districted Land Authority (KNDLA) GSA was established in 2024, with the GSAs participating in the JPA as participating entities. This results in KNDLA GSA having the authority to limit groundwater extraction in unmanaged lands. The "white lands" areas covered by KNDLA GSA have a minimum target P/MA goal of 20,410 AFY (see Table 14-2), which will be addressed primarily through demand management. As discussed in P/MA KSB-6, the KNDLA GSA will establish white lands water budgets necessary to implement a linear demand reduction schedule of 10 percent per year, between 2030-2040. See KSB-6 details in Section 14.2.1 and Appendix D of the 2024 Plan.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Groundwater Level 1 (GL-1) – Groundwater Level undesirable results and SMC are not coordinated. • **Deficiency GL-1a** – Undesirable results are poorly described, unworkably complex, and inconsistently implemented. • **Deficiency GL-1b** – SMC rely on inconsistent datasets and methodologies.	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In defining undesirable results, GSA are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6 by including monitoring objectives, coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).	This is the corresponding subsidence level deficiency for coordination deficiency CRD-1. **DWR Inadequate Determination summary:** The Coordination Agreement requires two conditions to trigger an undesirable result: 1) an MT exceedance must occur in 40% of RMS for four consecutive measurements (at least 2 years) for a management area to contribute to an undesirable result and 2) three adjacent management areas (accounting for at least 15% of basin area) or any management areas accounting for 30% or more of the basin area must be contributing to the undesirable results. DWR found that it "may allow for situations where groundwater conditions could degrade for sustained periods of time for portions of the Subbasin without triggering an undesirable result" (2022 Inadequate Determination, p. 10). DWR also found that the SMC set by each management are, to avoid MA exceedance (40% of MTs for 2 years), were set using various methods and sources and are not easily comparable across plans. **Board issues:** None	**Potential Action GL-1a –** Develop consistent, clear undesirable results. **Potential Action GL-1b –** Use consistent data and methods to develop SMC.	**Deficiency GL-1 is already corrected within the 2024 Plan.** **GL-1a -** See response to CRD-1. As discussed with SWRCB staff, the 2024 Plan completely replaced the prior UR criteria and SMCs. The criteria for triggering URs for groundwater levels are specified based at the Subbasin-level, and have specific quantifiable metrics based on either representative groundwater monitoring or impacts to beneficial users (e.g., well dewatering). The UR criteria are extremely strict and protective of all beneficial users. For example, it would be an UR if more than 15 drinking water wells went dry in a single year across a 1.8 million acre Subbasin that pumps an average of around 1.5 million AFY from approximately 7,200 wells. **GL-1b -** All of the groundwater level SMCs were developed and calculated using the same data and methodologies (i.e., one compiled dataset of available historical well-specific data), while necessarily reflecting the differing conditions across the largest basin in California that includes highly variable and complex geology, water use patterns and conditions, and distribution of beneficial users. The groundwater level SMC values are clearly specified in Table 13-2 and visualized on Figures 13-3, 13-4, 13-12, and 13-13. These table and figures are consistent across all 2024 GSPs.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency GL-2 – The GSPs and Coordination Agreement lack necessary detail about well mitigation.	Although SGMA and the GSP Regulations do not require development of a well impact mitigation plan, the State Water Board considers them to be an important component of SGMA implementation to ensure for availability of water for all beneficial uses and users in the subbasin.	**DWR Inadequate Determination summary:** The 2022 GSPs are not implementing or plan to implement a well mitigation plan. **Board issues:** There is a lack of coordination on well mitigation plans for the subbasin and when present, discussion of well mitigation does not contain sufficient detail and is not yet implemented.	**Potential Action GL-2 –** Establish accessible, comprehensive, and appropriately funded well impact mitigation programs that mitigate impacts to wells affected by lowering of groundwater levels and/or degradation of water quality with clear triggers, eligibility requirements, and funding sources.	**Deficiency GL-2 is already corrected within the 2024 Plan.** As discussed with SWRCB staff on 6 March 2024, a Subbasin-wide Well Mitigation Program is under final development. Subbasin GSAs have signed a letter of intent with Self-Help Enterprises to help develop and administer a well mitigation program, see Appendix K of the 2024 Plan. A well mitigation subcommittee is concluding work on the Subbasin well mitigation program with a target implementation date of January 2025. Water quality mitigation is under development through the Subbasin's memorandum of understanding (MOU) with the Kern Water Collaborative, which is the lead entity responsible for providing nitrate sampling and mitigation to wells owners with nitrate above the MCL (See Appendix F of the 2024 Plan) and a Letter of Intent with Self-Help Enterprises, who offers implementations services (See Appendix K of the 2024 Plan).

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency GL-3 – The GSPs do not describe a feasible path for halting chronic lowering of groundwater levels.	Each GSP is required to include a description of the projects and management actions the GSA has determined will achieve groundwater sustainability in the basin. The description must include project and management actions, a summary of data used to support proposed actions, and a review of the uncertainty associated with the basin setting when developing projects or management actions. The GSP must also describe the criteria that would trigger implementing or stopping a project or management action and the process for determining whether that trigger has occurred (Cal. Code Regs., tit. 23, § 354.44). More fundamentally, for basins in a condition of overdraft, the GSP "shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft" (Cal. Code Regs., tit. 23, § 354.44, subd. (b)(2)) GSPs need to include a description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods (Cal. Code Regs., tit. 23, § 354.44, subd. (b)(9)). In reviewing GSPs, DWR must consider, among other questions, "whether sustainable management criteria and projects and management actions are commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the plan" and "whether the projects and management actions are feasible and likely to prevent undesirable results and ensure that the basin is operated within its sustainable yield" (Cal. Code Regs., tit. 23, § 355.4, subds. (b)(3), (5)).	**DWR Inadequate Determination summary:** The 2022 GSPs do not demonstrate feasibility of projects, but they rely heavily on projects to demonstrate future sustainability. DWR notes in its 2022 Inadequate Determination that the GSPs rely on more than 180 projects and management actions to reach sustainability and that, without these projects and management actions, "extractions would exceed the estimated sustainable yield by 25 to 34 percent" (2022 Inadequate Determination, p. 32). **Board issues:** Demand management actions in the 2022 GSP appear voluntary and therefore unlikely to provide sufficient contingency in case GSAs fail to secure new supplies or overdraft is greater than estimated.	**Potential Action GL-3a –** Evaluate the feasibility of proposed supply augmentation projects. **Potential Action GL-3b –** Develop basin-wide allocations or utilize another demand management structure to help bring the subbasin into balance and meet basin sustainability goals. **Potential Action GL-3c –** Identify key indicator wells in each aquifer, with sufficient spatial coverage to represent beneficial uses and users in each aquifer and identify groundwater levels that will trigger specific demand management.	**Deficiency GL-3 is already corrected within the 2024 Plan or not applicable.** **GL-3a –** The 2024 Plan includes 762,000 AFY of P/MAs by 2040, 80% of which are a result of demand management. Modeling conducted to represent and quantify the benefits of these P/MAs indicates that these P/MAs will be more than enough to achieve the Subbasin's Sustainability Goal, even under climate change. **GL-3b –** Several GSAs have already implemented groundwater allocations within their boundaries to address local deficits (e.g., the Semitropic WSD and Rosedale Rio Bravo WSD GSAs). Noting that in some cases these GSAs are larger than entire groundwater basins. Some other GSAs have a balanced water budget and/or conduct almost no groundwater extraction. These examples show why a basin-wide allocation is not applicable or appropriate in a Subbasin as large and complex as Kern. **GL-3c –** The Subbasin's updated Representative Monitoring Network (RMN) presented in Section 15 of the 2024 Plan coupled with the MT Exceedance Policy (see Appendix W of the 2024 Plan) achieves this objective.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Land Subsidence 1 (LS-1) – Land Subsidence undesirable results and SMC are not coordinated. • **Deficiency LS-1a** – Undesirable results are poorly described, unworkably complex, and inconsistently implemented. • **Deficiency LS-1b** – SMC rely on inconsistent datasets and methodologies.	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In defining undesirable results, GSA are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6 by including monitoring objectives, coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).	This is the corresponding subsidence level deficiency for coordination deficiency CRD-1. **DWR Inadequate Determination summary:** The DWR Inadequate Determination found that GSPs and Management Area plans did not consistently identify critical infrastructure. DWR further notes that, "[s]ome GSPs or management area plans defined Management Area Critical Infrastructure but did not develop sustainable management criteria…" (ibid, p. 38). **Board issues:** Board staff agree and further note that GSPs and Management Areas do not consistently define "significant and unreasonable," as evidenced by evidence in text and additional inconsistent definitions of the quantitative undesirable results.	**Potential Action LS-1a –** Develop consistent, clear undesirable results. **Potential Action LS-1b –** Use consistent data and methods to develop subsidence MTs.	**Deficiency LS-1 is already corrected within the 2024 Plan.** See response to CRD-1. To reiterate, the 2024 Plan submitted to the SWRCB for review completely replaced the prior UR criteria and SMCs. Per the 2024 Plan, the Kern Subbasin is using a regional, consistent, coordinated, risk-based framework for the evaluation of subsidence undesirable results and SMCs. While using best available and consistent subsidence datasets the framework also accounts for differences in sub-regional hydrogeology (Section 7), causes of subsidence (Section 8.5.2), and risk/severity of historical and future magnitude and impacts from subsidence on GSA and Regional infrastructure (Sections 8.5.1, 8.5.3 and 13.5.2.1) in the final SMC determination. See Section 13.5 of the 2024 Plan for additional details on the approach for definition of URs, MTs, MOs, and interim milestones for Land Subsidence in the Kern Subbasin. **LS-1a —** Consistent with the regulatory requirements under SGMA, Section 13.5.1 of the 2024 Plan has clearly defined actionable criteria for responding to URs from land subsidence impacts on beneficial users and regional and GSA-specific infrastructure (Section 13.5.1.1). The URs have specific quantifiable metrics (Section 13.5.1.4) based on representative land subsidence monitoring (utilizing DWR's regional InSAR dataset and other local subsidence data) that consider potential impacts to beneficial users (Section 13.5.1.2) as well as the causes of the undesirable results (Section 13.5.1.3). **LS-1b** –Consistent with the regulatory requirements under SGMA, Section 13.5.2 and 13.5.3 present a regionally coordinated and consistent approach to the development of GSA-related subsidence MTs, MOs, and interim milestones. It is important to note that the Kern Subbasin aims to stabilize water levels by 2030 and minimize subsidence by 2040

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
				(accounting for residual subsidence after water levels stabilize), which is the statutory intent of SGMA. The subsidence SMCs have been developed to avoid significant and unreasonable impacts on infrastructure and, where needed, necessary mitigation measures to address impacts during the implementation period (Section 13.5.2.1.1, 14.2.3, and Appendix T). These SMCs were coordinated with Friant Water Authority (FWA) (see Appendix J for a Letter of Support from the FWA), the California Aqueduct Subsidence Program (CASP), as well as other key stakeholders. Moreover, Sections 13.1.2.2 and 13.5.2.2. of the 2024 Plan demonstrate the consistency between water levels and subsidence SMCs. As demonstrated in these sections, subsidence associated with groundwater level declines to Chronic Lowering of Groundwater Level MTs is not projected to exceed the established Land Subsidence MTs. The approach and metrics for water level and subsidence SMCs were also presented to the SWRCB Staff during several meetings (6/23/2023, 10/4/2023, 11/1/2023, 12/1/2023, 4/3/2024).

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency LS-2 – The GSPs do not provide adequate implementation details.	Each GSP is required to include a description of the projects and management actions the GSA has determined will achieve groundwater sustainability in the basin. The description must include project management actions, summary of data used to support proposed actions, and a review of the uncertainty associated with the basin setting when developing projects or management actions (Cal. Code Regs., tit. 23, § 354.44). In reviewing GSPs, DWR must consider, among other questions, "whether sustainable management criteria and projects and management actions are commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the plan" and "whether the projects and management actions are feasible and likely to prevent undesirable results and ensure that the basin is operated within its sustainable yield" (Cal. Code Regs., tit. 23, § 355.4, subd. (b)(3), (5)).	**DWR Inadequate Determination summary:** None. **Board issues:** The 2022 Coordination Agreement does not provide details about projects and management actions to slow subsidence for both regional and Management Area critical infrastructure. The 2022 Coordination Agreement states that "it is apparent that key data gaps pertaining to the various causes and rates of subsidence in the [Kern County Subbasin] still remain and that further study is needed to better define realistic management objectives for the [Subbasin]." (2022 Amended Coordination Agreement, pdf, p. 356).	**Potential Action LS-2a –** Develop and implement a plan to trigger sufficient management actions when subsidence exceeds defined thresholds, especially near critical infrastructure/facilities. **Potential Action LS-2b –** Reduce pumping and do not allow new wells in areas where subsidence threatens critical infrastructure. **Potential Action LS-2c –** Develop infrastructure mitigation programs with clear triggers, eligibility requirements, metrics, and funding sources.	Deficiency **not** identified by DWR. **Deficiency LS-2 is corrected within the 2024 Plan.** **LS-2a** - Sections 13.5.1.4, 13.5.2.1.1, 14.2.4, and Appendix W of the 2024 Plan detail the MT Exceedance Policy, which includes discussion of measures and actions taken when water level, subsidence, and other MTs are exceeded in the Kern Subbasin. **LS-2b** - The 2024 Plan includes P/MAs (including pumping reductions) to a) stabilize water levels by 2030, b) minimize GSA-related subsidence by 2040, and c) mitigate potential impacts during the implementation period. The combination of demand reduction and recharge has been demonstrated to keep water levels and subsidence above the minimum thresholds. Furthermore, GSAs have already initiated P/MAs to protect Regional Critical Infrastructure. For example, WDWA GSA has a well moratorium P/MA that results in no additional wells within the 2.5-mile CASP Aqueduct Buffer Zone) and that all new replacement wells in the CASP Buffer Zone be metered. Other GSAs with Regional Critical Infrastructure within their jurisdiction continue to assess developing similar P/MAs. **LS-2c** - Section 14.2.3 and Appendix T of the 2024 Plan includes discussion of mitigation along the FKC, which is the only infrastructure currently identified within the Kern Subbasin that may have significant and unreasonable impacts from subsidence due to GSA activities during the implementation period (2015 – 2040). Work on the FKC mitigation program is under development, with collaboration and support of Friant Water Authority (See Appendices J and T of the 2024 Plan). With respect to potential actions **LS-2a – LS-2c**, it is important to note that there are multiple causes of subsidence in the Subbasin and not all subsidence can be attributed to causes in which the GSAs have the authority to control ("GSA-related"). The Subbasin has conducted several studies and

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
				worked cooperatively with DWR, CASP, CALGEM, and the FWA to identify and monitor subsidence causes and rates within the respective buffer zones for the California Aqueduct and Friant-Kern Canal. These drivers of subsidence and the implications of non-GSA related activities on future subsidence and subsidence SMCs were also presented to the SWRCB Staff during the 13 December 2023 technical meeting. These causes of subsidence with references to the historical studies are detailed in Section 8.5.2 of the 2024 Plan. The 2024 Plan lays out the various causes of subsidence in the Kern Subbasin and establishes protective MTs across the Subbasin while establishing P/MAs and mitigation measures to manage GSA-related activities and their potential impact on subsidence. For example, the Subbasin has utilized InSAR time series and other data to refine subsidence data and to help differentiate between GSA and Non-GSA related subsidence between Aqueduct Milepost (MP) 195 and 215, an area of identified subsidence and concentrated non-GSA extraction activity. To help ameliorate subsidence rates in this area of interest the WDWA GSA has proactively implemented a P/MA that requires no net increase in GSA wells in the buffer zone between MP 195 and 215 and that all replacement wells be metered among other measures. The subject P/MAs are described in Section 14.2 of the 2024 Plan.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Groundwater Quality 1 (GWQ-1) – Groundwater Quality undesirable results and SMC are not coordinated. • **Deficiency GWQ-1a –** Undesirable results are poorly described, unworkably complex, and inconsistently implemented. • **Deficiency GWQ-1b –** SMC rely on inconsistent datasets and methodologies.	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In defining undesirable results, GSA are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6 by including monitoring objectives, coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).	This is the corresponding groundwater quality deficiency for coordination deficiency CRD-1. **DWR Inadequate Determination summary:** Not specific to groundwater quality, see CRD - 1. **Board issues:** Board staff agree and elaborate that the fragmented approach for setting SMC would result in localized disproportional impacts in the subbasin without triggering undesirable results. The fragment approach is further exacerbated by lack of coordination between GSAs using inconsistent data and methodologies for monitoring groundwater quality throughout the subbasin.	**Potential Action GWQ-1a –** Develop consistent, clear undesirable results. **Potential Action GWQ-1b –** The GSPs should use consistent data and methods to develop groundwater level MTs.	Deficiency **not** identified by DWR. **Deficiency GWQ-1 is already corrected within the 2024 Plan.** See response to CRD-1. Additionally, the 2024 Plan includes a water quality monitoring program that is coordinated with groundwater level monitoring (refer to Section 15.3 Monitoring Protocols and Appendix Z. Water Quality Sampling SOP). The monitoring network identifies wells that will be used to evaluate the relationship between sustainability indicators (i.e. water quality, subsidence, and groundwater levels) and the monitoring protocols and SOP specify a coordinated approach to data collection.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency GWQ-2 – Groundwater quality monitoring networks are not consistent with SGMA requirements. • **Deficiency GWQ-2a –** The Monitoring Networks are not protective of all beneficial uses and users in the subbasin. • **Deficiency GWQ-2b –** Data collection sampling frequencies are sometimes inadequate. • **Deficiency GWQ-2c –** It is unclear how monitoring networks are monitoring for recharge projects.	The GSP Regulations require GSPs to include a description of the monitoring network objectives for the basin including how the GSA will "monitor impacts to the beneficial uses or users of groundwater" (Cal. Code Regs., tit. 23, § 354.34, subd. (b)(2)). The monitoring network must be "capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, and yield representative information about groundwater conditions as necessary to evaluate [GSP] implementation" (Cal. Code Regs., tit. 23, § 354.34, subd. (a)). Data collected must be of "sufficient quality, frequency, and distribution" to characterize and evaluate groundwater conditions (Cal. Code Regs., tit. 23, § 354.32). GSAs "may designate a subset of monitoring sites as representative of conditions in the basin or an area of the basin...", known as RMSs (Cal. Code Regs., tit. 23, § 354.36). GSAs identify MTs, MOs, and Interim Milestones at these sites. "The designation of [an RMS] shall be supported by adequate evidence demonstrating that the site reflects general conditions in the area" (Cal. Code Regs., tit. 23, § 354.36, subds. (a) & (c)).	**DWR Inadequate Determination summary:** None. **Board issues:** Board staff find that the GSPs monitoring networks are not protective of beneficial uses and users and do not promote the sufficient quality and collection of data, frequency, and distribution to characterize groundwater quality conditions and evaluate changing conditions that occur throughout the implementation of the GSP.	**Potential Action GWQ-2a –** GSAs should add additional wells to monitoring well networks. **Potential Action GWQ-2b –** Revise GSPs and monitoring well networks and exercise coordination with existing regulatory programs to meet the goals of SGMA. **Potential Action GWQ-2c –** GSAs should define RMS that will be used to ensure PMAs do not impact groundwater quality in the Subbasin.	Deficiency **not** identified by DWR. **Deficiency GWQ-2 is already corrected within the 2024 Plan.** **GWQ-2a -** The Subbasin GSAs added water quality RMWs across the Subbasin with consideration (density and distribution) of beneficial users and with sufficient data collection frequency (i.e., seasonal high and seasonal low). **GWQ-2b -** The water quality monitoring network was strategically developed to include representative wells from existing water quality regulatory programs such as the Irrigated Lands Regulatory Program (ILRP) and public supply wells regulated by Division of Drinking Water (DDW). The IRLP wells have been vetted by the Central Valley Regional Board as representing first encountered groundwater quality. Additionally, the monitoring and reporting protocols state that public data from ILRP and DDW programs will be used, in addition to data collected by the GSAs, to evaluate groundwater conditions annually. The Subbasin's annual report to DWR will include a comprehensive summary of all data. **GWQ-2c -** The 2024 Plan also identifies water quality RMWs to represent the relationships between sustainability indicators (i.e. subsidence) and near key recharge facilities (i.e., P/MAs).

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency GWQ-3 – Management actions are not responsive to water quality degradation. • **Deficiency GWQ-3a –** Additional sampling is not triggered when Minimum Thresholds are exceeded. • **Deficiency GWQ-3b –** Well mitigation plans don't address water quality degradation.	Each GSP is required to include a description of the projects and management actions the GSA has determined will achieve groundwater sustainability in the basin. The GSAs must include projects and management actions "that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent" (Cal. Code Regs., tit. 23, § 354.44, subd. (b)(1)). The description must include project and management actions, a summary of data used to support proposed actions, and a review of the uncertainty associated with the basin setting when developing projects or management actions (Cal. Code Regs., tit. 23, § 354.44). In reviewing GSPs, DWR must consider, among other questions, "whether sustainable management criteria and projects and management actions are commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the plan" (Cal. Code Regs., tit. 23, § 355.4, subd. (b)(3)).	**DWR Inadequate Determination summary:** None. **Board issues:** To ensure the human right to water, GSAs should develop mitigation plans for sustainability indicators impacted by basin management. Board staff note that elevated concentrations of arsenic, nitrate, uranium, gross alpha, 1,2,3,-Trichloropropane, and other constituents detected above regulatory thresholds in the Subbasin can severely impact human health (See Table 3-2). Given the potential for these exceedances to occur, GSAs do not propose PMA to mitigate for groundwater quality exceedances as a result of groundwater management activities in the Subbasin.	**Potential Action GWQ-3a –** Plan additional sampling when water quality is degraded. **Potential Action GWQ 3b** is addressed by Groundwater Level Potential Action GL-2.	Deficiency **not** identified by DWR. **Deficiency GWC-3 is already corrected within the 2024 Plan.** The 2024 Plan includes water quality SMCs and semi-annual monitoring for total dissolved solids, arsenic, nitrate and nitrite, uranium, and 1,2,3-TCP. Confirmation sampling is required if an MT exceedance occurs (refer to Section 13.3.1 and Appendix Z. Water Quality Sampling SOP).

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Interconnected Surface Water 1 (ISW-1) – Interconnected Surface Water undesirable results and SMC are not coordinated. • **Deficiency ISW-1a –** Undesirable results are poorly described, unworkably complex, and inconsistently implemented	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In identifying ISWs, GSP Regulations state that ISWs refer to "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted," (Cal. Code Regs., tit. 23, § 351, (o)). The GSP Regulations require GSAs to provide "Identification of interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems, utilizing data available from the Department, as specified in Section 353.2, or the best available information," (Cal. Code Regs., tit. 23, § 354.16, (f)). Where ISWs are identified, GSPs define ISW undesirable results unless they demonstrate that ISWs undesirable results are "not present and are not likely to occur…" (Cal. Code Regs., tit. 23, §354.26, (d)). In defining undesirable results, GSA are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6	**DWR Inadequate Determination summary:** None. **Board issues:** This is the corresponding Interconnected Surface Water level deficiency for CRD-1. Deficiency CRD-1 concerns undesirable results and SMC that are poorly coordinated across the subbasin. And, Despite the fact that GSAs and Management areas claim there is no ISW and therefore no potential undesirable results, the methods used to determine that there are no potential undesirable results are inconsistent. And in some cases, the GSPs do not provide adequate technical justification to demonstrate ISW is not present in the subbasin.	**Potential Action ISW-1a –** Revise GSPs to use best available consistent Data and Methodologies to evaluate for ISW.	Deficiency ISW-1 **not** identified by DWR. **Deficiency ISW-1 is already corrected within the 2024 Plan.** The presence or absence of interconnected surface waters (ISW) was systematically evaluated based on the best available data in accordance with the GSP regulations (§ 354.16 (f)) and available DWR Guidance (part 1 of 3). The GSAs relied on ISW mapping provided by DWR in support of SGMA including the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset and ICONS: Interconnected Surface Water in the Central Valley. The identified ISWs in these datasets were reviewed for their active connection to the principal aquifers. As documented in the 2024 Plan, the principal aquifers have limited connection with identified ISWs and do not contribute to Groundwater Dependent Ecosystems (GDEs). Undesirable results from ISWs are identified as "not present and are not likely to occur…" (Cal. Code Regs., tit. 23, §354.26, (d)). However, the continued monitoring of ISWs was included in management actions for several GSAs including Semitropic WSD and Olcese Water District. DWR is still developing a multi-paper series on ISW and depletions of ISW to provide GSAs with tools to better incorporate quantitative approaches in GSPs. The Kern Subbasin GSAs plans to review and incorporate this guidance when available for inclusion in future periodic evaluations.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
	by including monitoring objectives, coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).			

DEPARTMENT OF WATER RESOURCES
P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

9/20/2024

Ms. Courtney Tyler, Clerk to the Board
STATE WATER RESOURCES CONTROL BOARD
P.O. Box 100
Sacramento, California 95812-2000

Subject: SWP Public Comment on State Water Resources Control Board July 2024 Draft Staff Report, Regarding Assessment of Kern County Subbasin Groundwater Sustainability Plans

Dear Ms. Tyler,

Thank you for your invitation to publicly comment1 on the July 2024 Draft Staff Report (Draft Staff Report or DSR), issued by the State Water Resources Control Board (Board), summarizing the assessment that was performed of the Draft 2024 Kern County Subbasin (KCS) Groundwater Sustainability Plans (2024 Draft GSPs). These 2024 Draft GSPs, along with a Coordination Agreement, were submitted to the Board on May 28, 2024.

Approximately 90 miles of the California Aqueduct (Aqueduct) are located within the borders of the KCS, from Aqueduct Mile Post 189 (Pool 23) in the north, to Aqueduct Mile Post 279 (Pool 36) in the south. The relevant GSAs whose activity may most impact this infrastructure include:

- Kern County Subbasin (KCS) Groundwater Sustainability Agency
- Westside District Water Authority (WDWA) Groundwater Sustainability Agency
- Semitropic Water Storage District (Semitropic) Groundwater Sustainability Agency
- Buena Vista (BV) Groundwater Sustainability Agency
- Henry Miller (HM) Water District Groundwater Sustainability Agency
- West Kern Water District, (WKWD) Groundwater Sustainability Agency

1 The Board's Draft Staff Report informs interested persons that they are invited to review the Draft 2024 KCS GSPs, and to provide written comments to the Board on whether and how deficiencies and potential actions identified in its DSR remain applicable to the Draft 2024 KCS GSPs. (DSR, p. 23, 26, 31, 191)

- Wheeler Ridge Maricopa Water Storage District (WRMWSD) Groundwater Sustainability Agency

- Arvin Groundwater Sustainability Agency

As published previously by the California Department of Water Resources (DWR) State Water Project (SWP) in the *California Aqueduct Subsidence Study* (CASS) (June 2017) and the associated *Supplemental Report* (March 2019), subsidence in this region has significantly reduced the hydraulic conveyance capacity and operational flexibility of the Aqueduct.

One of the primary goals of the SWP is to remediate past and ongoing subsidence-related damage to the Aqueduct, while both addressing the underlying causes and attempting to forestall future harm. In furtherance of that goal, the SWP is providing this letter and its attachment to the Board, which detail our review of the 2024 Draft GSPs and the Board's critique of those GSPs, as reflected in its Draft Staff Report.2 The SWP has also provided individual Public Comment Letters to the five specific GSAs whose proximity to the Aqueduct necessitates that their GSPs include targeted strategies to protect SWP infrastructure.3

We commend the twenty-two Kern Subbasin GSAs who have worked together to develop a basin-wide Coordination Agreement and coordinated amendments to their 2022 GSPs. We acknowledge that the principal GSP amendments, which provide the common text used by the numerous GSAs in their respective draft 2024 GSPs, are contained within the Draft 2024 KCS GSP. Each of the individual 2024 Draft GSPs submitted by (i) WDWA GSA; (ii) Semitropic GSA; (iii) BV GSA; and (iv) HM GSA are identical to the 2024 KCS Draft GSP (as to format, organization, text, figures and appendices). To the extent that unique additional facts, characteristics, or conditions for each of the four other GSAs exist, that unique content is reflected on separate, blue-colored pages inserted into the respective 2024 Draft GSPs, to distinguish them from all other text which is common to the 2024 Draft KCS GSP.

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2 All comments and observations offered by the SWP are provided within the context of its position as owner/operator of the Aqueduct. Such comments and observations do not reflect the opinions or views of DWR's Sustainable Groundwater Management Office (SGMO). Neither do the comments/observations offered by the SWP herein represent a forecast of any position SGMO may ultimately take with respect to any GSP.

3 In addition to KCS GSA, the 4 other GSAs include: (i) WDWA GSA; (ii) Semitropic GSA; (iii) BV GSA; and (iv) HM GSA. WKWD, WRMWSD, and Arvin GSA did not provide standalone GSPs and are covered entirely by the 2024 Draft KCS GSP.

Board Staff conducted a preliminary review of the 2024 Draft GSPs to determine what, if any deficiencies existed, and to provide information and context as the Board considers whether to designate the KCS as a probationary basin consistent with the requirements of the Sustainable Groundwater Management Act (SGMA). (DSR, p. 16-17,67, 191) 4

The SWP, has reviewed all the 2024 Draft GSPs, as well as the Board's DSR. The SWP recognizes that the 2024 Draft GSPs include new and substantial information supportive of the efforts of the GSAs to attempt to meet sustainability goals by 2040 and beyond and address concerns previously raised by SWP, DWR's Sustainable Groundwater Management Office (SGMO), and the Board. As an example of addressing those concerns raised previously, the GSAs have now eliminated the use of groundwater elevation proxy data for measuring subsidence in favor of direct measurements of land surface elevations – a strategy with which the SWP agrees.

Nonetheless, despite these positive steps, the SWP concurs with the assessment by Board Staff that "continued land subsidence" is a deficiency carried over to the 2024 Draft GSPs from the 2022 GSPs submitted by the Kern County Subbasin GSAs. In reaching this conclusion, the DSR built upon the 2023 analysis of DWR's SGMO, in finding that the 2022 GSPs:

> "… **lack a detailed and consistent analysis of the effects** of subsidence in the Subbasin on all beneficial uses and users and infrastructure. Additionally, Board staff also note that GSPs **do not provide key details on how they will prevent damage to infrastructure**.5 State Water Board staff therefore conclude that undesirable results may occur under the 2022 GSPs." (p. DSR, pp. 20, 72, 125)

The DSR concludes that the 2024 Draft GSPs contain deficiencies which are "consistent with the deficiencies in the 2022 GSPs …," noting that:

> "… the 2024 Draft GSPs **still have significant deficiencies** and that Board staff analysis of the 2022 GSPs and identification of potential actions to resolve deficiencies **remain relevant**." (DSR, p.17, 22, 23, 70, 191)

The SWP has correlated the evidence that it cites in support of its comments to the 2024 Draft GSPs, with the deficiencies and criticisms articulated by the Board in the

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4 SWP acknowledges the caveats expressed in the DSR that the review of the 2024 Draft GSPs, conducted by Staff, were "preliminary" in nature, and that a more thorough review of the GSPs will be forthcoming." (DSR, p. 16, 22, 191)

5 Bolding in quoted material represents emphasis added, unless otherwise stated.

DSR.6 The most serious areas of concern include the following:

1. **Deficiency Land Subsidence 1a (LS-1a):**

    a. <u>"GSA" v. "non-GSA" Related Activities.</u>

The DSR defines an LS-1a Deficiency as one where land subsidence undesirable results are not coordinated. Specifically, undesirable results, identified in the 2024 Draft GSPs, were deemed in the DSR to be "poorly described, unworkably complex, and inconsistently implemented." (DSR, p. 85).

The SWP concurs. The underpinning for all Undesirable Result (URs) and Sustainability Management Criteria (SMC) definitions/development in the 2024 Draft GSPs are based upon a methodologically flawed distinction between "<u>GSA-related" and "non-GSA" activities as the causative factors for subsidence</u>. The 2024 Draft GSPs define "GSA-related activities" (e.g., agricultural groundwater pumping) as those for which the GSAs accept responsibility. The 2024 Draft GSPs define purported "non-GSA" activities (e.g., oil & gas extractions) as those for which the GSAs accept no responsibility. Thus, subsidence associated with the "non-GSA" activities is deemed to be "outside of the control" of the GSAs, and as such, will not be the subject of GSA subsidence mitigation efforts. (See Attachment A, pp. 1-2) 7

For example, Board Staff found that:

> "… plain-language undesirable results **are not detailed enough** for consistent implementation across so many different GSPs and Management Area Plans … plain-language undesirable results should clearly describe the effects that a subbasin is trying to avoid. If they do, **the conditions that trigger quantitative undesirable results should be similar across GSAs and Management Areas**." (DSR, p. 141)

The chief example cited in the Draft Staff Report relates to triggers involving oil & gas production activities. Board Staff recognize that in areas where oil & gas operations are occurring, "the activity is likely contributing to subsidence." However, where both oil & gas operations and groundwater extraction activities are occurring, "**then it is probable that both activities are contributing to the overall subsidence** …" (DRS, pp. 64-65)

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6 Evidence below, cited in support of SWP concurrence with Board determinations, have been italicized for easy reference.

7 Specific evidence and details in support of SWP comments are included in Attachment A, at the end of this letter.

The Draft Staff Report criticized the 2022 GSPs (and ultimately the Draft 2024 GSPs) for:

- Failing to identify whether subsidence related undesirable results were caused "… **only by** 'SGMA-related groundwater extractions'", or a combination of SGMA-related and other types of ground water extraction (e.g., oil & gas extraction). (DSR, p.142)

  The SWP concurs. The 2024 Draft GSPs do not explain how the GSAs will determine whether subsidence is caused by: (i) only a GSA-related activity; (ii) only a non-GSA activity; or (iii) a combination of the two. (See Attachment A, p. 3)

- Failing to explain how a determination would be made that:

  > "[p]ermanent loss of freeboard from land subsidence due to other causes including but not limited to oil or gas production … is not within the jurisdiction of a GSA [and] **shall not be considered as a loss of freeboard that contributes to the amount specified for any MO [measurable objectives] or MT [minimum thresholds]**." (DSR, p.142)

  The SWP concurs. As an example, in developing its strategies, the 2024 Draft GSPs point to the credibility of the TRE ALTIMIRA InSAR data provided by DWR, but nonetheless rely upon conflicting InSAR information provided by GSA consultant ECI, without explaining or reconciling those conflicts. (See Attachment A, pp. 5-6)

- Failing to include clear criteria and methodology for evaluating and quantifying the different subsidence causes. (DSR, p.142)

  The SWP concurs. Apart from "non-GSA" activities of oil & gas extraction, the 2024 Draft GSPs identify other "non-GSA" causative factors for subsidence along the Aqueduct, which are deemed to be outside of the GSA's responsibility including: natural processes, the age of the infrastructure, or expansive soil types susceptible to hydro-compaction. The 2024 Draft GSPs do not identify a methodology for quantifying the effects of these factors, nor do any of the studies referenced in the 2024 Draft GSPs cite specific evidence supportive of their inclusion or consideration. (See Attachment A, pp. 4-6)

- Concluding that subsidence along the Aqueduct is the result of oil and gas extraction **without substantial evidence**. (DSR, p.192)

The SWP concurs. When subsidence is a result of a combination of causative factors, there is no quantification or apportionment of the respective contributions of GSA-related and non-GSA activities to the historical or expected future subsidence encountered. (See Attachment A, pp. 3-4)

Without the clarity, which curing of the above deficiencies would have brought, Board Staff concluded that it could not evaluate whether undesirable results and resulting Sustainability Management Criteria (SMCs) are consistent with the goals of SGMA. (DSR, p. 142)

b. Undesirable Result (UR) Definition.

Regarding LS-1a Deficiencies, the Board Staff concluded that GSPs and Management Areas do not consistently define "significant and unreasonable," in that quantitative undesirable result definitions identified for critical infrastructure (like the Aqueduct) are inconsistent. (DSR, p.140)

The SWP concurs. The flawed definition of URs, which were criticized in SWP's September 2022 Public Comment Letters, is essentially unchanged from the 2022 GSPs. In addition to being based upon the suspect "GSA-related"/"non-GSA" activities methodology described above, the 2024 Draft GSPs do not define a process or criteria for determining what constitutes a "significant loss in functionality" or how "mitigation through retrofitting" will be deemed "economically feasible" (short of leaving that up to the widely divergent views and subjective determination of beneficial users). The potential localized economic benefits to the GSAs of allowing subsidence to occur could result in repair costs to the Aqueduct that would be largely paid by the public water agencies that receive water from the SWP (the SWP water contractors). Those SWP water contractors may consider those resulting costs as "significant and unreasonable". Local entities who may have benefited from the continued extraction responsible for the subsidence may welcome the contribution by the SWP water contractors, thereby making a retrofit more economically feasible from their perspective. Thus, the 2024 Draft GSPs do not identify objective, credible criteria for gauging what may be "significant and unreasonable" impacts. (See Attachment A, pp. 7-8)

2. Deficiency Land Subsidence 1b (LS-1b):

The DSR defines an LS-1b Deficiency as one where SMCs are not coordinated, in that they rely on inconsistent datasets and methodologies. (DSR, p. 85). Citing SGMO's 2022 GSP Inadequate Determination Letter, the DSR explains that:

> "… the Subbasin still does not have a Subbasin-wide approach for managing subsidence because of the **differing data and methodologies** …" (DSR, p. 146)

The DSR noted that with respect to subsidence, there were inconsistencies in defining SMCs in the GSPs located adjacent to regional critical infrastructure. Board Staff commented that because regional critical infrastructure MTs are not based on **substantial interference with land surface** uses:

> "… it is unclear how the established interim MTs would not interfere with the operations of regional critical infrastructure. For instance, **it is unclear how the defined interim MTs would … preserve freeboard along the California Aqueduct**…" (DSR, p. 146)

The SWP concurs. Not only is it unclear how the defined Interim Milestones (IMs) would be protective, but similar concerns exist regarding defined Minimum Thresholds (MTs), and Measurable Objectives (MOs). Apart from the dependence of these definitions upon the "GSA-related"/"non-GSA" distinctions noted above, the 2024 Draft GSPs do not consistently analyze rates and cumulative subsidence (in terms of lasting impacts) which were used to establish its SMCs. (See Attachment A, pp. 9-10). Specific examples include the following:

a. *Northern Aqueduct Segments:*

In developing subsidence SMC values for the Aqueduct, the 2024 Draft GSPs distinguish between the "northern" section of the Aqueduct (north of Aqueduct MP 251, where subsidence is assessed to be a result of "non-GSA" activities), and the "southern" section of the Aqueduct (south of Aqueduct MP 251, where subsidence is caused by both "GSA-related" and "non-GSA" activities). For the "northern" reach of the Aqueduct within KCS (Pools 23-30):

- *The MTs established by the 2024 Draft GSPs may be insufficient to prevent overtopping of the Aqueduct's concrete liner.*
- *There is no support for an exceedance criterion of "twice" the average observed rate of subsidence, as opposed to some lesser trigger.*
- *The method for determining "average" subsidence rates is not described, so it is not possible to independently verify the values derived.*
- *Identical MTs, MOs, and IMs were assigned to all Pools 23-30 of the Aqueduct inclusive, even though cumulative subsidence documented by DWR Precise Survey data differs significantly within and among these pools.*
- *Averaging rates of significant subsidence with areas of lesser subsidence minimizes the hazard in the most significantly affected Aqueduct pools.*

- *The MT rate is presented as a "range", rather than as a single value. Thus, it is unclear what specific subsidence rate would trigger an MT exceedance – the lower end of the range or the upper end.*

- *The only Project and Management Action (P/MA) triggered by an SMC exceedance is a "consultation" to confirm causation by "non-GSA" activities. However, the 2024 Draft GSPs do not describe a process nor a timeline to address the exceedance, or for resolving conflicts if an interested party (including SWP) disagrees with the results of the investigation or the conclusions of the GSA. (See Attachment A, pp. 13-14)*

b. *Southern Aqueduct Segments:*

For the "southern" reach of the Aqueduct within the KCS (Pools 31-36), where subsidence is deemed to be caused by both "GSA-related" and "non-GSA" activities, the data used to develop the SMCs contain numerous errors including the following:

- *The 2024 Draft GSPs fail to harmonize the MT/MO "rates" with the MT/MO extents (defined as the cumulative amount of vertical subsidence (in feet) that would occur from 2024-2040 at the MT rate.*

- *IMs are identified which are excessively high within the context of historic subsidence. Also, the IM rate values all progressively increase at each five-year milestone between 2025 to 2040. This is not consistent with the proposed "glide path" toward a subsidence rate of zero in 2040.*

- *MTs listed would allow significant exceedance of the MOs and IMs without triggering a P/MA to mitigate subsidence.*

- *Risks are established in terms of "observed or 'allowable' rates of subsidence." However, the SWP cannot support an unsubstantiated determination by a GSA (or any third-party) regarding what harm is or is not allowable for SWP infrastructure. (See Attachment A, pp. 14-17)*

c. *Hydrologic Conceptual Models (HCMs), Averages, and Means:*

In many cases, proposed MT and MO values for specific HCM areas, are based on "average", "mean", or "maximum" subsidence values within HCM area, derived from analysis of InSAR data. However, the values are reported inconsistently between tables and figures, and the 2024 Draft GSPs provide no explanation for how these values were determined for independent verification. (See Attachment A, pp. 10-11)

d. Risk Matrix:

The 2024 Draft GSPs outline a complex "risk-based" approach for individual GSAs to determine MTs and MOs in a "coordinated" manner. However, they do not state whether average or maximum subsidence values for HCMs are used to categorize subsidence potential. Additionally, this approach does not appear to follow the standard of practice for qualitative risk assessments. Finally, whereas this approach considers subsidence "rate," it fails to consider the "magnitude" of future subsidence as the determining factor for impacts to the Aqueduct. (See Attachment A, pp.11-12)

3. Deficiency Land Subsidence 2 (LS-2): Where the GSPs do not provide adequate implementation details.

The DSR concludes that the 2022 Coordination Agreement does not provide details about projects and management actions (P/M&As) to slow subsidence for both regional and Management Area critical infrastructure. Moreover, no exact management actions are listed in the Coordination Agreement or GSPs to manage subsidence, in the "Areas of Interest" (AOIs) or the "Watch Areas" (WAs) (DSR, pp.148-149)

The SWP concurs, and cites the following examples:

- *The 2024 Draft GSPs do not include clear criteria or an explanation of the methodology that has been or will be used for evaluating and quantifying the subsidence causes. This criticism sidesteps the issue of who may be at fault in causing the subsidence, and instead, focuses on whether meaningful and effective SMCs can be developed without consideration of all factors (including "non-GSA" related activities) contributing to a loss of freeboard for the Aqueduct.*

- *Further, the need for clarity and transparency in determining causation is necessary to ensure efficacy of the P/MAs involving consultation and investigation, which are only triggered by a determination as to causation. Thus, without an established, accepted approach to determining causation, follow-on actions will be ineffective. (See Attachment A, p. 4)*

- *The P/MAs specified in the 2024 Draft GSPs are geared toward eliminating subbasin overdraft. These P/MAs appear to be mostly carryovers of P/MAs identified in earlier versions of GSPs. Unfortunately, they have no specific subsidence thresholds that would trigger their implementation. Further, whereas the proposed water balance P/MAs are anticipated to benefit land subsidence (and other sustainability indicators), they are also not specifically focused on the Aqueduct, and do not have SMC triggers for subsidence.*

- *Finally, the exceedance policy, described in the 2024 Draft GSPs, establishes a timeline that is not protective of infrastructure which is already critically impacted by subsidence. In such areas, monitoring should be performed regardless of whether MTs are exceeded. As for P/MAs (whose efficacy is limited to mere investigation as opposed to subsidence management actions related to extracted volumes), the 2024 Draft GSPs do not justify why an investigation must wait two years, let alone be "potential", rather than mandatory. (See Attachment A, pp. 17)*

4. Board Staff Recommendations.

Board Staff propose the following deficiencies and potential actions to address subsidence:

a. Regarding Deficiencies LS-1a and b (Poor Coordination of Undesirable Results and SMCs).

The DSR recommends that GSAs redevelop undesirable results and sustainable management criteria using consistent data and methods and adequate detail for implementation across all plans. (DSR, p. 20)

The SWP concurs. The apportionment of subsidence causation and how that carries through to management criteria and management actions to avoid undesirable results for the Aqueduct are the primary points of comment on the 2024 Draft GSPs by SWP.

b. Regarding Deficiency LS-2 (Need for More Effective Implementation Plans).

The DSR proposes three actions to address LS-2 deficiencies. They include:

- Develop and implement a plan to trigger sufficient management actions when subsidence exceeds defined thresholds, especially near critical infrastructure/ facilities.

- Reduce pumping and do not allow new wells in areas where subsidence threatens critical infrastructure.

- Develop infrastructure mitigation programs to repair infrastructure damaged by subsidence with clear triggers, eligibility requirements, metrics, and funding sources. (DSR, pp.20 and 149-150)

In its May 2024 letter, the SWP recognized and commended WDWA GSA on their Board Resolutions to adopt P/MAs which are now reflected in the blue pages of the Draft 2024 WDWA GSP. These three P/MAs enhance WDWA subbasin's groundwater management practices and are specifically intended to protect the Aqueduct from further harm through their implementation. They include:

- The Well Drilling Moratorium "Zero-Net" Wells Management Action.
- The Well Registration Management Action.
- The Well Extraction Volume Reporting within Buffer Zone Management Action.

The SWP concurs with the recommendation of the DSR that the other 2024 GSPs (KSC, BV, HM, and Semitropic) develop and adopt similar protective strategies.

In conclusion, the SWP recognizes and appreciates the efforts of the various GSAs involved in the preparation of the 2024 Draft GSPs. We also support the efforts of SGMO and the Board to monitor and review the efforts of the GSAs, to ensure both the fulfilment of the goals established by SGMA, as well as the protection of critical regional infrastructure such as the Aqueduct. We look forward to our continuing collaboration with the Board, SGMO, and the GSAs in bringing the Subbasin into a sustainable status, in accordance with SGMA.

If you have any questions, please contact Jesse Dillon (Manager of the California Aqueduct Subsidence Program) by telephone at (916) 699-8403 or by e-mail at jesse.dillon@water.ca.gov.

Sincerely,

John Yarbrough

John Yarbrough
Deputy Director
State Water Project

cc: Ms. Kristin Pittack, SGMA Plan Manager
Kern County Subbasin Groundwater Sustainability Agency
4589 North Marty Avenue, Suite 102
Fresno, CA 93722
(kpittack@rinconconsultants.com / comments@kerngsp.com)

Mr. Mark Gilkey, General Manager
Westside District Water Authority Groundwater Sustainability Agency
21908 Seventh Standard Road
McKittrick, CA 93251
(mgilkey@westsidewa.org)

Mr. Jason Gianquinto, General Manager
Semitropic Water Storage District Groundwater Sustainability Agency
1101 Central Ave
Wasco, CA 93280
(jgianquinto@semitropic.com)

Mr. Tim Ashlock, Engineer Manager
Buena Vista Water Storage District Groundwater Sustainability Agency
525 North Main Street, PO Box 756
Buttonwillow, CA 93206
(tim@bvh2o.com)

Mr. Greg Hammett, General Manager
West Kern Water District Groundwater Sustainability Agency
800 Kern St.
Taft, CA 93268
(ghammett@wkwd.org)

Mr. Jeof Wyrick, President / Chairman
Henry Miller Water District Groundwater Sustainability Agency
101 W. Walnut Street
Pasadena, CA 91103
(jwyrick@jgboswell.com)

Mr. Sheridan Nicholas, Engineer-Manager
Wheeler Ridge-Maricopa Groundwater Sustainability Agency
12109 HWY 166
Bakersfield, CA 93313
(snicholas@wrmwsd.com)

Mr. Jeevan Muhar, Engineer-Manager
Arvin-Edison Groundwater Sustainability Agency
20401 Bear Mountain Blvd, P.O. Box 175
Arvin, CA 93203
(jmuhar@aewsd.org)

Mr. Paul Gosselin – DWR Deputy Director – Sustainable Water Management,
Post Office Box 942836
Sacramento, CA 94236-0001
(Paul.Gosselin@water.ca.gov)

Mr. You Chen Chao – DWR SWP Risk and Resiliency Officer

(YouChen.Chao@water.ca.gov)

Mr. Anthony Meyers – DWR SWP Principal Operating Officer
(Anthony.Meyers@water.ca.gov)

Mr. Jesse Dillon – DWR SWP CASP Program Manager
(Jesse.Dillon@water.ca.gov)

ATTACHMENT TO PUBLIC COMMENT LETTER

1. **ISSUE 1: THE UNDERPINNING FOR ALL UNDESIRABLE RESULTS (URs) AND SUSTAINABILITY MANAGEMENT CRITERIA (SMC) DEFINITIONS/DEVELOPMENT IN THE DRAFT 2024 GSP ARE BASED UPON A METHODOLOGICALLY FLAWED DISTINCTION BETWEEN "GSA-RELATED" ACTIVITIES (E.G., AGRICULTURAL GROUNDWATER PUMPING) AND "NON-GSA" ACTIVITIES (E.G., OIL & GAS EXTRACTION) AS THE CAUSATIVE FACTORS FOR SUBSIDENCE.**

    a. **"GSA-Related" v. "Non-GSA" Activities.**

The Draft 2024 GSP affirmatively represented that it would "… achieve sustainable groundwater management within the 20-year implementation schedule [by 2040] …" by, among other things, "… avoiding Undesirable Results for … land subsidence …" (p.ES-3; p.12-1)[1] It also noted that: "The SMCs for Land Subsidence have been developed to avoid impacts of subsidence caused by GSA-managed activities through a risk-based approach that considers subsidence potential and vulnerability." (p.ES-13)

However, review of the Draft 2024 GSP reveals that KCS has still not adequately defined URs or SMCs in a manner which will allow the SWP to conclude that its critical infrastructure, the Aqueduct, will be protected from subsidence related harm. This is due, in large part to KCS's distinguishing of "GSA-related" subsidence and "non-GSA" subsidence. The Draft 2024 GSP specifically states:

> "The SMCs for Land Subsidence have been developed in recognition that subsidence in the Subbasin has been caused by several factors, some of which are within the GSAs' authorities to control (**"GSA-related" subsidence - e.g., groundwater pumping for agricultural and urban uses**), and others that are outside of the GSAs' authorities to control **("non-GSA" subsidence – e.g., oil and gas extraction**, natural processes, and expansive soil types susceptible to hydro-compaction). The SMCs for Land Subsidence have been developed **to avoid impacts of subsidence caused by GSA-managed activities** through a risk-based approach that considers subsidence potential and vulnerability." (p.ES-13; p.8-162-163)[2]

Thus, the key distinction between "GSA-related" subsidence (such as that caused by agricultural groundwater pumping), and "non-GSA" subsidence (such as that caused by oil & gas related groundwater pumping), is that non-GSA subsidence, according to

[1] All page references are to the Draft 2024 GSP, unless otherwise stated.

[2] Bolding and/or underlining in quoted material represents emphasis added, unless otherwise stated.

KCS, is outside of its control, and as such, will not be the subject of subsidence mitigation efforts.

Of critical importance to the SWP and the Aqueduct is that the Draft 2024 GSP confirms that URs and SMCs for subsidence were defined and developed in accordance with this "GSA-related" and "non-GSA" convention, noting that:

> "The Subbasin-wide **UR for Land Subsidence** is defined as follows: The point at which the amount of subsidence, **if caused by GSA-related subbasin groundwater extractions**, creates a significant and unreasonable impact …" (p.13-75)
>
> "The SMCs … have been developed to avoid impacts of subsidence caused by **GSA-managed activities** …." (p.ES-13)
>
> "The **MT for Land Subsidence** for the Northern Aqueduct is established based on the **avoidance of a permanent loss of conveyance capacity associated with GSA-related subsidence** …" (p.13-124)

In determining that oil & gas extractions ("non-GSA" activities) are outside of the GSAs' authority to control …," KCS excludes these activities from UR definitions, SMC development, or corrective actions. However, if this strategy is to be deemed credible or effective, KCS must first demonstrate that it has:

- Correctly identified the extent of subsidence impacts attributable to GSA-related and non-GSA subsidence.
- Correctly identified whether subsidence in certain areas is either: (i) attributed solely to one or the other types of activities; or (ii) attributable to some combination of both GSA-related and non-GSA subsidence.
- Accurately apportioned the respective causative impacts of each type of activity, where subsidence is due to both GSA-related and non-GSA related factors.
- Provided sufficient evidence supportive of the above determinations.

Review of the Draft 2024 GSP reveals that KCS has not achieved these necessary goals, as detailed below.[3]

b. Flawed Methodological Approach.

[3] These shortcomings were not just identified by the SWP in its 2022 Public Comment letter but were also identified by the Board in its recent July Draft 2024 Staff Report (DSR) regarding the Assessment of KCS GSPs.

i. One or Multiple Causes.

The Draft 2024 GSP does not identify whether subsidence related undesirable results were caused only by SGMA-related groundwater extractions, or a combination of SGMA-related and other types of ground water extraction (e.g., oil & gas extraction).[4] It waffles between claiming that subsidence is caused by one factor or a combination of factors. For example, it states:

> "Other Non-GSA Causes of Land Subsidence: Six studies have been conducted in the Subbasin utilizing InSAR and other data to assess the causes of subsidence along a portion of the Aqueduct (MP 195 to 215). These studies found **that various factors not under the control of the Subbasin GSAs were primarily responsible for the observed subsidence."** (p.8-165)
>
> "Agricultural and M&I pumping **primarily occur** in the central portion of the Subbasin, as shown in Figure 8-59. Subsidence in other portions of the Subbasin is **primarily driven** by non-GSA causes." (p.13-85)
>
> "The following considerations were used to establish Land Subsidence SMCs for the northern portions of the California Aqueduct, represented by Pools 23 through 30 (MP 184 to 250) … Historical subsidence has occurred **primarily** as a result of non-GSA activities and conditions … the northern portion of the Aqueduct was determined to have a low vulnerability ranking based on its designation as a Regional Critical Infrastructure with **primarily** non-GSA causes of subsidence." (p.13-103)

The use of the term "primarily" leaves the door open for an interpretation that both GSA and non-GSA related factors contribute to subsidence. However, the Draft 2024 GSP does not quantify the impact of the respective causative factors. It also does not include clear criteria and methodology for evaluating and quantifying the different subsidence causes. There is no quantification or apportionment of the respective contributions of GSA-related and non-GSA activities to the historical or expected future subsidence encountered

ii. Outside GSA Jurisdiction.

[4] Prior to the Draft 2024 GSP, distinctions between activities such as agricultural pumping and oil & gas activities were referred to as SGMA-related and non-SGMA-related activities. With the publishing of the Draft 2024 GSP, that nomenclature has been changed to "GSA" and non-GSA" activities.

The Draft 2024 GSP does not explain how a determination would be made that permanent loss of freeboard from land subsidence due to other causes (including but not limited to oil or gas production) is not within the jurisdiction of a GSA. It also does not explain how these other causes shall not be considered as a loss of freeboard that contributes to the amount specified for any MT or MO.

The Draft 2024 GSP does not include clear criteria or an explanation of the methodology that has been or will be used for evaluating and quantifying the subsidence cause. This criticism sidesteps the issue of who may be at fault in causing the subsidence, and instead, focuses on whether meaningful and effective SMCs can be developed without consideration of all factors contributing to a loss of freeboard for the Aqueduct.

Further, the need for clarity and transparency in determining causation is twofold:

- First, as discussed below, Project and Management Actions (P/MAs) involving consultation and investigation are only triggered by a determination as to causation. Thus, without an established, accepted approach to determining causation, follow-on actions will be ineffective.

- Second, a sound causation determination strategy will be necessary to ensure that GSPs and Management Area Plans are coordinated and in furtherance of SGMA goals.

c. Lack of Substantiating Evidence.

The Draft 2024 GSP concludes that subsidence along the northern portion of the Aqueduct is due, at least in part, to factors outside the control of the GSAs. The evidence sited in support of this conclusion comes from “six studies” which are described thusly:

> “Additional causes of subsidence **that are outside of the GSAs’ control**, include oil and gas extraction, natural processes …, expansive soil types susceptible to hydrocompaction, and others …. Recent technical studies commissioned by the GSAs **have been able to differentiate the subsidence signals associated with these other causal factors**.” (p.ES-8)

However, despite numerous references throughout the Draft 2024 GSP to these studies, the Draft 2024 GSP makes assertions **without sufficient evidence**. This is because the evidence cited by KCS is suspect, for the reasons set forth below.

i. Oil & Gas Related Studies.

According to the Draft 2024 GSP, the studies commissioned by the GSAs rely upon InSAR and other data, which indicate that subsidence between MP 195 and 215 is not related to agricultural groundwater pumping (i.e., non-GSA-related). (p.8-150). Per the Draft 2024 GSP, the studies reveal two "key takeaways:"

> "1.) it is possible using InSAR to **discern the difference between subsidence due to seasonal (cyclical) groundwater extraction and subsidence caused by non-seasonal extraction (i.e. long term) activities not under the control of Subbasin GSAs;** and
>
> 2.) a risk-based methodology is best suited to accommodate Subbasin complexities and SGMA objectives pertaining to the monitoring and assessment of subsidence." (pp.8-162-163)

However, a review of the studies and the conclusions purportedly derived therefrom, are misaligned. The Draft 2024 GSP cites the 2023 ECI Study in support of its position. However, internal technical reviews of this Study demonstrate that:

- The 2023 ECI Study time series disagrees with time series developed from data at nearby continuous GPS stations.
- The 2023 ECI Study does not offer any criteria or analysis to parse relative contributions of GSA-related vs. non-GSA activities to the total subsidence signal adjacent to LHOF.
- The distinctive patterns of temporally varying subsidence that the 2023 ECI Study attributes to oil field activities are not present or replicated in time series over the Lost Hills Oil Fields (LHOF) developed from TRE ALTAMIRA InSAR data provided by DWR. The SWP was not able to duplicate the results of the ECI InSAR analysis using the TRE ALTAMIRA InSAR data. Based on comparison of the ECI and TRE ALTAMIRA InSAR data products with cGPS data, it is believed that ECI's initial analytical approach and decisions during processing of the InSAR data may have introduced errors which have led to unreliable results and conclusions in the ECI subsidence maps, profiles and time series.
- This is critical given the key assertion in the Draft 2024 GSP that KCS commits to using TRE ALTAMIRA InSAR data from DWR to:

  > "… prepare various subsidence time series and monitor overall subsidence across the Subbasin and to identify rates and extent of subsidence." (p.15-31)

> This statement suggests that the TRE ALTAMIRA data will be treated as the reference InSAR dataset for monitoring and analyzing future subsidence. But reliance upon the TRE ALTAMIRA data does not support the theory of allegedly distinctive patterns of subsidence (cited by the 2023 ECI Study and KCS as evidence of "non-GSA" causality in and adjacent to LHOF). Thus, in developing its strategy, the Draft 2024 GSP touts the credibility of the TRE ALTIMIRA InSAR data provided by DWR, but nonetheless relies upon conflicting InSAR information provided by its consultant ECI, without explaining or reconciling those conflicts

ii. Other Non-GSA Causative Factors.

As noted above, the Draft 2024 GSP cites several "[a]dditional causes of subsidence **that are outside of the GSAs' control …"** which also include

> "… natural processes (i.e. faulting), expansive soil types susceptible to hydrocompaction, and others (e.g., deficient Aqueduct pre-construction hydro-compaction, age of infrastructure, etc.)." (p.ES-8)

However, none of the referenced reports or studies provide sufficient evidence that subsidence adjacent to LHOF is caused by "expansive soils, deficient Aqueduct pre-construction hydro-compaction … [or] age of the infrastructure." The 2024 Draft GSP does not identify a methodology for quantifying the effects of these factors, nor do any of the studies referenced in the Draft 2024 GSP cite specific evidence supportive of their inclusion or consideration

In the 2022 Public Comment Letter, SWP requested that the GSAs in the Kern County Subbasin provide specific examples or locations of expansive soil types susceptible to hydro-compaction age (lifespan) of critical infrastructure, historical pre-construction geotechnical deficiencies (e.g., lack of hydro-compaction on the Aqueduct) and subsidence caused by natural processes, so that the SWP could evaluate these factors as potential sources of subsidence damage to the Aqueduct. To date, none of the GSAs located in the Subbasin have provided any such examples, while continuing to assert in the Draft 2024 GSP that these "non-GSA-related" processes may be significant contributions to subsidence affecting the Aqueduct in the Subbasin.

2. **ISSUE 2: THE FLAWED DEFINITION OF URs, WHICH WERE CRITISIZED IN THE SEPTEMBER 2022 SWP PUBLIC COMMENT LETTERS, IS ESSENTIALLY UNCHANGED FROM THE 2022 KGA GSP, IN THAT THE DRAFT 2024 GSP DOES NOT IDENTIFY OBJECTIVE, CREDIBLE CRITERIA FOR GAUGING WHAT MAY BE A "SIGNIFICANT AND UNREASONABLE" IMPACT.**

As noted above, the Draft 2024 GSP defines the UR for Land Subsidence as follows:

> "The point at which the amount of subsidence, **if caused by GSA-related** Subbasin groundwater extractions, creates a significant and unreasonable impact (**requiring either retrofitting or replacement to a point that is economically unfeasible to the beneficial users**) to surface land uses or critical infrastructure. A significant loss in functionality that could be mitigated through retrofitting and is considered economically feasible to the beneficial users would not be considered undesirable." (p.13-75)

This definition is problematic from several standpoints. First, as noted in Issue 1 above, it is limited to impacts which result only from "GSA-related activities", without having justified, validated, quantified, or supported the exclusion of non-GSA factors, such as oil & gas extraction activities.

Second, the Draft 2024 GSP defines "significant and unreasonable impact" as that which requires "… either retrofitting or replacement to a point that **is economically unfeasible to the beneficial users**." In other words, if beneficial users are willing to pay for repairs, the impacts warranting those repairs are not deemed to be significant or unreasonable. For several reasons, this is not a criterion the SWP can support. As the SWP noted in its September 30, 2022 Public Comment letter responding to the 2022 GSPs:

> "First, the GSP **does not define a process or criteria** for determining what constitutes a "significant loss in functionality" or how "mitigation through retrofitting" will be deemed "economically feasible" (short of leaving that up to the subjective determination of beneficial users). Neither does this approach take into consideration **the extended duration of such a significant and unreasonable impact**, while the criterion for determining its status is assessed, and mitigation measures can actually be implemented.
>
> Secondly, there is no accounting for the fact that different beneficial users may have **widely divergent views** as to whether retrofitting is "economically feasible." The GSP does not appear to consider which beneficiaries will be paying for the costs to repair subsidence-related damages to the Aqueduct. Thus, the local economic benefits to [the GSA]

> of allowing subsidence to occur could result in repair costs that are largely **paid by the SWP's water users**, a result which may be considered significantly unreasonable by those entities, while others more directly responsible for having caused the subsidence would welcome the contribution, thereby making a retrofit more economically feasible.
>
> Thirdly, subsidence has progressed to the point that retrofitting or replacement is **already financially daunting**. The ongoing rehabilitation of subsidence to the Aqueduct is costly and disproportionately burdensome." (Sep. 30, 2022 SWP Letter, pp.3-4)

Thus, the Draft 2024 GSP does not identify objective, credible criteria for gauging what may be "significant and unreasonable" impacts. In that the definition of URs in the Draft 2024 GSP is essentially unchanged from the 2022 GSP, it is not appropriate for assessing subsidence impacting the Aqueduct.

3. **ISSUE 3: SMCs: THE DRAFT 2024 GSP CONTAINS SERIOUS DEFECTS IN THE DEFINING AND DEVELOPMENT OF APPROPRIATE SMCs, IN THAT RATES AND CUMULATIVE SUBSIDENCE (IN TERMS OF LASTING IMPACTS) USED TO ESTABLISH THOSE SMCS (WHICH INCLUDE MINIMUM THRESHOLDS (MTs), MEASURABLE OBJECTIVES (MOs), OR INTERIM MILESTONES (IMs)) ARE NOT CONSISTENTLY ANALYZED.**

The Draft 2024 GSP establishes specific numeric MTs for each of the areas encompassed within the Subbasin, as well as protocols for when those MTs are exceeded. The SWP does not support either the MTs or the exceedance protocols for the following reasons:

a. GSA v. Non-GSA Factors.

The Draft 2024 GSP bifurcates the Aqueduct into "northern" and "southern" sections.[5] Specific MTs were developed for each of these sections of the Aqueduct. Regarding the Northern Aqueduct, the Draft 2024 GSP states:

> "The MT for Land Subsidence for the Northern Aqueduct is established based on the **avoidance of a permanent loss of conveyance capacity associated with GSA-related subsidence** as limited by remaining concrete liner freeboard for specific Aqueduct pools (Pools 23 to 30) … **However, since data indicates that subsidence within the 5-milewide CASP buffer zone along the northern Aqueduct is influenced by various non-GSA activities and conditions some subsidence and its affects will likely be outside the GSA authority to manage**." (pp.13-124 and 125)

Similar to the comments referenced in Issue 1 above, the SWP does not support the development of MTs which only consider impacts resulting from "GSA-related" activities, without having justified, validated, quantified, or supported the exclusion of non-GSA factors, such as oil & gas extraction activities.

For the most part, the Draft 2024 GSP absolves KCS of any responsibility for addressing non-GSA activities, with the following exception:

> "If **non-GSA causes of subsidence are contributing** to subsidence along critical infrastructure, the GSAs will work collaboratively with the relevant regulatory agency (e.g., DWR's California Aqueduct Subsidence

[5] The Draft 2024 GSP states that the "Northern Aqueduct extends from near the Kern County line southward along the western side of the Subbasin and includes Pools 23 through 30, approximately MP 195 to 251. The Southern Aqueduct, located south of the Kern River, includes Pools 31 to 35 or approximately MP 251 to 278." (p.8-153, Figure 8-53)

> Program [CASP])[6] to provide data from the GSA **demonstrating <u>the lack of GSA activities contributing</u> to subsidence in the area**." (p.13-85)

This is circular logic – if the GSA concludes that non-GSA activities (e.g., oil & gas extractions) are contributing to subsidence, it will provide information showing <u>no</u> GSA activities (e.g., agricultural groundwater extraction) are occurring in the area. But the Draft 2024 GSP has already conceded that both types of activity are ongoing, if only minimally. As noted above, the Draft 2024 GSP states that:

> "Agricultural and M&I pumping **primarily** occur in the central portion of the Subbasin, as shown in Figure 8-59. Subsidence in other portions of the Subbasin is **primarily** driven by non-GSA causes." (p.13-85)

Because of the use of the qualifying term "primarily," the inference is that the GSA is not claiming that subsidence in a particular area is totally caused by either GSA-related or non-GSA causes. Thus, the correlative inference is that some portion of subsidence in any given area is caused by some percentage of each of these factors. However, the Draft 2024 GSP does not identify the proportionate shares each factor contributes to subsidence, or the SMCs developed to measure that subsidence.

b. <u>Criteria for MT Development</u>.

i. **HCMs, Averages, and Means**.

Per the Draft 2024 GSP, the KCS Subbasin has been separated into five Hydrologic Conceptual Model (HCM) areas that are characterized by specific geologic and hydrogeologic attributes that dictate land and water uses in the area. Of particular relevance to the SWP is the HCM area designated as the Western Fold Belt, through which the Aqueduct either runs or is immediately adjacent. It also includes the area of the LHOF. (p.13-94, Figure 13-23).

In developing MTs for these areas, several problems exist:

- First, subsidence in the area around the LHOF has not been included into reported subsidence for Western Fold Belt HCM. For that area, the maximum subsidence reported in the Table 8-27 is 0.43 ft, and maximum subsidence in the North Basin HCM is 0.29 ft. However, maps of InSAR data in the Draft 2024 GSP

[6] The CASP is NOT a regulatory agency. It is a program within the SWP, and has assisted the SWP prepare the remarks included in the Public Comment Letters. As stated in the footnotes to those Public Comment letters, all comments and observations offered by the SWP are provided within the context of its position as owner/operator of the Aqueduct. Such comments and observations do not reflect the opinions or views of DWR's regulatory Sustainable Groundwater Management Office (SGMO). Neither do the comments/observations offered by the SWP herein represent a forecast of any position SGMO may ultimately take with respect to any GSP.

show that 0.5-2.0 ft of subsidence locally occurred in these fields between 2015-2023 (e.g., p.8-151, Figure 8-52). Whereas the apparent exclusion of subsidence data in and around oil fields in Table 8-27 is consistent with statements throughout the Draft 2024 GSP that all subsidence adjacent to the LHOF is entirely due to "non-GSA" pumping of oil, gas, and groundwater (and thus, outside of the control of the GSA) consideration of these factors is totally absent in developing MTs, MOs, and IMs for the Aqueduct.

- Second, the Draft 2024 GSP identifies the "**average**" rate of subsidence from 2015-2023 for each HCM. However, it does not provide any explanation of how "average" subsidence rates for HCMs were derived, including how "non-GSA" subsidence was identified and excluded from the calculations.

- Third, Table 8-27 in the GSP provides elevation change data for each of the HCMs from 2015-2023 "calculated using InSAR" (p.8-150). The table also lists a "**mean**" subsidence magnitude for each HCM. However, as with average rates, it provides no information about the how the mean was calculated from the InSAR data or other statistics that characterize the distribution of elevation change within a given HCM. The analysis used to derive the values in this table is not described in sufficient detail in the GSP to allow the reader to determine whether the numbers are correct and accurate. Thus, it is not possible to independently verify the values in Table 8-27 from information provided in the Draft 2024 GSP.

- Fourth, the "average" subsidence values in Figure 13-23 differ from the "mean" rates for the HCMs reported in Table 8-27. For example, Figure 13-23 shows that the average rate of subsidence for the Western Fold Belt HCM is -0.007 ft/yr, and the average rate of subsidence for the North Basin HCM is -0.053 ft/yr. These average rates differ from the mean subsidence rates listed in Table 8-27 for these HCMs. No statistics are provided to characterize the distribution of rates or show why the average value differs from the mean value.

Thus, the values are reported inconsistently between tables and figures, and the Draft 2024 GSP provides no explanation for how these values were determined for independent verification.

ii. "Risk" Matrix.

The Draft 2024 GSP explains that SMCs were developed using a "risk matrix" that considers both the **subsidence potential** derived and the type of infrastructure that may be affected by subsidence. According to the matrix, SMCs in areas with moderate to high subsidence risk are determined by:

> "…assessing impacts on infrastructure from future subsidence. If the impacts are found to be significant and unreasonable then mitigation and/or P/MA are proposed to avoid URs..." (p.13-102)

Several problems exist with this strategy:

- First, the 2024 Draft GSP identified areas of subsidence in the subbasin attributed to "GSA-related" groundwater use and characterized those areas for their **potential to cause** "significant and unreasonable impacts", based on the magnitude of cumulative subsidence between 2015-2023. (p.13-86). However, the 2024 Draft GSP does not state whether the average or the maximum subsidence values for HCMs are used to categorize subsidence potential.

- Second, the "risk-based approach" described in Section 13.5.2.1 of the Draft 2024 GSP does not follow the standard practice for qualitative risk assessments.[7] The matrix presented in Table 13-8 of the GSP does not correctly define likelihood for assessing risk to the Aqueduct. As shown in the matrix, "subsidence rate" is used to represent "likelihood" along the rows of the matrix. "Consequences" are defined by classes of infrastructure in the columns, with higher consequences associated with damage to infrastructure that affects larger numbers of people and presumably results in larger economic loss. Subsidence rate alone, however, does not characterize the likelihood that the infrastructure will be damaged.

- Third, the magnitude of future subsidence that could produce loss of conveyance capacity, reduced operational flexibility, or wholesale failure varies along the Aqueduct due to multiple factors, including past subsidence that has reduced available freeboard. To assess the likelihood for damage to occur at a given point, the "magnitude" of subsidence required to produce the damage has to be considered along with the subsidence "rate." However, the matrix in Table 13-8 essentially assumes that all infrastructure in the subbasin has equal vulnerability, and thus, the only variable that matters in assessing risk is subsidence rate. This is clearly not correct for the Aqueduct.

iii. Northern and Southern Aqueduct Areas.

[7] In standard risk assessments performed by DWR, the US Army Corps of Engineers, and many other agencies, risk is defined as the product of "likelihood times consequences". The "risk" is the probability that a specified type of damage will occur, e.g., "loss of conveyance capacity", as noted above. In the context of subsidence and the Aqueduct, "risk" would be the probability of subsidence causing damage such as wholesale failure, loss of conveyance capacity, or reduced operational flexibility.

As noted above, the Draft 2024 GSP deems subsidence in the Northern Aqueduct (Pools 23 through 30, approximately MP 189 to 250) to be primarily caused by non-GSA activities (oil & gas extraction, etc.) and subsidence in the Southern Aqueduct (Pools 31 to 35, approximately MP 251 to 278) to be primarily caused by a combination of GSA and non-GSA related activities (agricultural groundwater pumping). The SWP has concerns with how the Draft 2024 GSP establishes MTs for each of these situations.

1. The Northern Aqueduct.

In the Northern Aqueduct area, where non-GSA-related subsidence occurs, and where the subsidence doesn't encroach on or affect regional critical infrastructure, the Draft 2024 GSP defines the Northern Aqueduct MT as follows:

> "The MT for Land Subsidence along the northern portion of the Aqueduct (i.e., within the 5-mile-wide CASP buffer zone) is defined as the **avoidance of a permanent loss of conveyance capacity** attributable to subsidence as **limited by remaining concrete liner freeboard** for a specific Aqueduct pool that exceeds **twice the average observed rate from 2016-2022"** (p.13-103)

This definition is problematic for the following reasons:

- First, according to data from the CASS Supplemental Report (DWR 2019, showing current freeboard of less than 1.0 ft near MP 200 and MP 210), the MT extent values of 0.8-1.6 ft for subsidence between 2024-2040 in Pools 24 and 25 could result in overtopping of the concrete liner.

- Second, the Draft 2024 GSP does not show whether or how an MT based on "twice the average observed rate from 2016-2022" will protect the remaining concrete liner freeboard and prevent "permanent loss of conveyance capacity" in Pools 23-30.

- Third, there is no explanation as to why 2016-2022 was chosen for determining average subsidence rate, when the "historical" period defined and used elsewhere in the document is 2015-2023.

Subsidence rates for SMCs in Pools 23-30 of the Aqueduct are listed in Table 13-9 (p.13-104). Of note is the fact that the Draft 2024 GSP assigned identical MTs, MOs, and IMs to all Pools 23-30 inclusive, even though cumulative subsidence documented by DWR Precise Survey data differs significantly within and among these pools. Taken at face value, the identical MT values imply that an "average" rate was obtained for the entire reach of the Aqueduct between MP 184 and MP 251. This approach and the presentation in Table 13-9 have multiple flaws:

- First, as noted above, the method for determining "average" subsidence rates is not described, so it is not possible to independently verify the values in Table 13-9.

- Second, the MT rate averages areas of significant subsidence in Pools 23-25 (i.e., the "Kern bowl") with a long reach of little to no subsidence in Pools 26-30, thus minimizing future subsidence hazard in the most significantly affected pools. This approach was previously used in the 2022 KGA GSP, and it was criticized in the September 2022 SWP Public Comment letter as not being sufficiently protective of the Aqueduct (Sep. 30, 2022 SWP Letter, pp.6-7).

- Third, the MT rate is presented as a "range", rather than as a single value. Thus, it is unclear what specific subsidence rate would trigger an MT exceedance – the lower end of the range or the upper end.

- Fourth, the proposed remedy for an MT exceedance is:

  > "… an assessment of the cause…conducted in consultation with CASP. If the exceedance is found to be related to a non-GSA cause, the exceedance will be defined as outside of GSA authority to manage, and the relevant regulatory agency would be contacted." (p.13-104)

  Although not explicitly stated, the GSP implies that individual GSAs are responsible for performing the assessment of causality. However, the GSP does not describe a process for resolving conflicts if the SWP disagrees with the results of the investigation or the conclusions of the GSA. Nor does it indicate what will happen if the GSA is found to be a cause.

Such an approach implicitly puts the burden of proof on the SWP to validate claims by GSAs of causality for subsidence that is damaging "regional critical infrastructure" like the Aqueduct. As a practical matter, the Draft 2024 GSP does not provide any reason to expect that the status quo regarding subsidence north of MP 250 will change.

2. <u>The Southern Aqueduct</u>.

The data in Table 13-10, which are the key subsidence metrics for protecting the Southern Aqueduct, contain numerous errors. The proposed MT, MO, and IM for MP 275.5 in Table 13-10 provide representative examples.

- **Disagreement Between MT Extent and MT Rate**: According to the footnote on Table 13-10, the "<u>MT extent</u>" listed above is defined as "the cumulative amount of vertical subsidence (in feet) that would occur from 2024-2040 at the <u>MT rate</u>" (p.13-109). The "MT extent" is shown as 2.86 ft, which according to the definition

on the table implies an MT rate of 0.2 ft/yr. “MT Rate” for MP 275.5 is listed as 1.91 ft/yr, however, which is about an order of magnitude higher than the rate that is consistent with the listed MT Extent. This is obviously an error in the table. A review of the entire table reveals that this type of error occurs throughout and is not limited to the entry for MP 275.5.

- **Disagreement Between MO Extent and MO Rate**: The MO listed for MP 275.5 exhibit similar errors. According to the footnote on Table 13-10, the “MO extent” listed above is defined as “the cumulative amount of vertical subsidence that would occur from 2024-2040 at the MO rate” (p.13-109). The MO Extent for MP 275.5 is 1.43 ft, which implies a MO Rate of 0.1 ft/yr. The MO Rate listed in the table, however, is 0.95 ft/yr. This rate must be an error because a subsidence rate of nearly 1 foot per year is not even remotely compliant with SGMA as a “measurable objective” for mitigating land subsidence.

- **Errors with the IM Values**: Several errors also are present in the IM values listed in Table 13-10. For example, the proposed 2025 IM Rate for MP 275.5 is 0.6 ft/yr.

    - First, this rate is extremely high in the context of historic subsidence of the Pleito bowl. Based on analysis of DWR Precise Survey data, the subsidence rate at nearby MP 275 was about 0.03 ft/yr during the period 1986-2006, and about 0.16 ft/yr during the 2012-2016 drought. Proposing a much higher rate for a future IM than has been observed during the past three decades (including a severe drought) is not consistent with the SGMA goal of eliminating subsidence and protecting infrastructure.

    - Second, if the 0.6 ft/yr IM rate for 2025 is sustained until the 2030 IM milestone, then the potential IM extent in 2030 is 3 ft greater than the 2025 IM extent. An IM Rate that permits 3 ft of subsidence in five years is not protective of the Aqueduct, and it is not consistent with the 0.5 ft differential between the IM extent values for 2025 and 2030 for MP 275.5 in the table.

    - Third, the IM Rate values shown in the table all progressively increase at each five-year milestone between 2025 to 2040. This is not consistent with the proposed “glide path” toward a subsidence rate of zero in 2040.

    - Finally, the IM Extent for 2040 is shown as 1.43 ft. This agrees with the proposed MO extent of 1.43 ft, but it disagrees with both the MT Rate and MT Extent. The MT listed in the table would allow significant exceedance of the MO and IM without triggering a P/MA to mitigate subsidence.

- **"Confusion between "water surface profile" and excess freeboard":** The Draft 2024 GSP notes that Specific MT, MO, and IM values based on relationships shown in Figure 13-28 are listed for individual MPs along the Aqueduct in Table 13-10 of the GSP. However, a fundamental problem with Figure 13-28 is the characterization of the water surface profile, which KCS GSA confuses with eating into excess freeboard. The derived MT, MO, and IM values in Table 13-10 are fatally flawed due to a technical error in Figure 13-28. The blue "design water surface" line should descend in a series of discrete steps across each check structure at the downstream end of the pools. The water surface elevation should decline linearly at a low gradient to the south (right) within each pool and between each check or siphon. The concavities in the profile of the water surface elevation and the increase in gradient between Pools 34 and 35 shown in Figure 13-28 are not physically realistic. For comparison, a technically accurate representation of the progressive southward decrease in water surface elevation along the Aqueduct can be found in Figure 4-2 of DWR (2019 CASS Supplement). Because the "design water surface" line in Figure 13-28 is not correct, the "CASP required 2.5 ft freeboard" line also is not correct, and consequently all MT, MO, and IM values based on this line cannot be correct. Thus, these errors suggest that the Subbasin GSAs do not appreciate the significance of the criteria communicated by SWP, to ensure proper infrastructure operation, and guarantee its ongoing protection.

- **"Allowable" Subsidence**: The Draft 2024 GSP notes that according to the risk matrix in Table 13-8, SMCs for pools 31-35 are set as an "observed or allowable rate of subsidence" (p.13-105). However, the SWP cannot support an unsubstantiated determination by a GSA (or any third-party) regarding what harm is or is not allowable for SWP infrastructure. As the SWP noted in its 2022 Public Comment Letter, the GSAs seem to have "… a fundamental misunderstanding of design freeboard." They erroneously assume they are entitled to use excess freeboard, when in fact, the purpose of the freeboard is to allow the SWP to address operational flexibility, flow capacity, operational irregularities, flood storage, and safety factors. (Sep. 30, 2022 SWP Letter, p. 5)

In summary, as to the SMCs for the Southern Aqueduct, the actual MT, MO, and IM metrics in Table 13-10 to implement this rubric are filled with errors, contradictory, and cannot be used as presented for subsidence management. Although the SMC for Pools 31-35 are intended to protect the ability of the Aqueduct to operate at design capacity, they are based on assumption that GSAs may determine how much existing freeboard above the SWP-required 2.5 ft minimum can be lost to subsidence. This is not responsive to the 2022 SWP comment letter, which criticized the previous KGA (2022) GSP for "erroneously" assuming that GSAs are entitled to freely use excess design freeboard. (Sep. 30, 2022 SWP Letter, pp. 5-6)

c. Exceedance Protocols.

The Draft 2024 GSP describes MT exceedance protocols as follows:

> "Only the exceedance of the MT extent of subsidence triggers a UR. Per the Subbasin's MT exceedance policy (Section 16.2.1), exceedance of the MT subsidence rate **in any one year would trigger monitoring**, and exceedance of the MT rate **over two years would trigger investigation and potential initiation of P/MAs**." (p.13-84) [8]

These protocols are deficient for the following reasons:

- First, in critically impacted portions of the Aqueduct where design freeboard has already been diminished, "monitoring" should be performed regardless of whether MTs are exceeded at all, rather than only if they are exceeded after one year.

- Second, the Draft 2024 GSP offers no rationale for why an "investigation" of an exceedance must wait until year two, rather than after year one, especially in areas where design freeboard has already been diminished.

- Third, the Draft GSP offers no rationale for why initiation of P/MAs would only be "potential," rather than mandatory, or why such an initiation would wait until two consecutive years of exceedance have occurred, as opposed to after the first year of exceedance.

As the SWP noted in its September 30, 2022 Public Comment letter responding to the 2022 GSPs, the strategy outlined by the GSA "… fails to reflect the immediacy needed to address … exceedances in critically impacted portions of the Aqueduct." (Sep. 30, 2022 SWP Letter, p.11)

[8] Regarding P/MAs, those specified in the 2024 Draft GSP are geared toward eliminating subbasin overdraft. These P/MAs appear to be mostly carryovers of P/MAs identified in earlier versions of GSPs. Unfortunately, they have no specific subsidence thresholds that would trigger their implementation. Further, whereas the proposed water balance P/MAs are anticipated to benefit land subsidence (and other sustainability indicators), they are also not specifically focused on the Aqueduct, and do not have SMC triggers for subsidence.