Meeting of the Delta-Mendota Subbasin Coordination Committee

Monday, June 9, 2025, 1:00 PM

SLDMWA Board Room 842 6th St., Los Banos, CA 93635
The Public May Join the Meeting at the Zoom Link Below:
https://zoom.us/j/93486665792
Meeting ID: 934 8666 5792

Teleconference Locations:
948 Orange Avenue, Patterson, CA 95363
1001 K Street, 6th Floor, Sacramento, CA 95814

June 4, 2025

TO: Delta-Mendota Subbasin Coordination Committee and Interested Parties
FROM: Taylor Blakslee, Hallmark Group
RE: MEETING OF THE DELTA-MENDOTA SUBBASIN COORDINATION COMMITTEE **MONDAY, JUNE 9, 2025 1:00 PM**

NOTICE IS HEREBY GIVEN that a Meeting of the Delta-Mendota Subbasin Coordination Committee has been called for **Monday, June 9, 2025 at 1:00 PM**, on items listed on the attached agenda, which is incorporated by reference and made a part hereof.

Persons with a disability may request disability-related modification or accommodation by contacting Cheri Worthy or Sandi Ginda at the Water Authority Office, 842 6th Street, P.O. Box 2157 Los Banos, CA 93635, via telephone at (209) 826-9696, or via email at cheri.worthy@sldmwa.org or sandi.ginda@sldmwa.org. Requests should be made as far in advance as possible before the meeting date, preferably 3 days in advance of regular meetings or 1 day in advance of special meetings/workshops.

DELTA-MENDOTA SGMA

Meeting of the Delta-Mendota Subbasin Coordination Committee

Monday, June 9, 2025, 1:00 PM

SLDMWA Board Room 842 6th St., Los Banos, CA 93635
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AGENDA

1. Call to Order/Roll Call (Hopkins)

2. Pledge of Allegiance (Hopkins)

3. Committee to Consider Corrections or Additions to the Agenda of Items, as Authorized by Government Code Section 54950 et seq. (Hopkins)

4. Opportunity for Public Comment (Hopkins)

Consent Calendar

5. Committee to Review and Take Action on the Consent Calendar (Hopkins)
   a. Minutes of the May 19, 2025 Meeting
   b. Budget to Actual Report

Action Items

6. Review and Consider Taking Action to Approve and Authorize Entering Into a Proposal with EKI to Update the Model for Annual Report Preparation (Blakslee/Dutton)

Closed Session

7. Conference with Legal Counsel – Anticipated Litigation
   The Committee will meet in closed session to confer with legal counsel on significant exposure to anticipated litigation pursuant to paragraph (2) of subdivision (d) of Government Code Section 54956.9: (1 case)

Open Session

8. Report from Closed Session (Layne)

Report Items

9. Update on June 9, 2025 Meeting with SWRCB (Martin/Hurley/Dutton)

10. Update on Status of Meetings with Adjoining Subbasins Regarding Comment Letters on Periodic Evaluations (Hopkins)

11. Update on FSS Outreach Activities (Beutler)

12. SGMA Round 1 Implementation Grant
    a. Update on Status of Interconnected Surface Water (ISW) Well Construction Project (Hurley)
    b. Update on Status of Subsidence Monitoring Project (Martin)
    c. Update on Status of All Grant Projects (Hopkins)

13. Update on EKI Subsidence CVHM2 Model White Paper In Response to Nelson Subsidence Analysis (Dutton/Mani)

14. GSP Implementation Updates
    a. Update on Status of Spring Water Level and Quality Monitoring and Second Quarter Water Level Monitoring and DMS Upload (Dumas)
    b. Update on Pumping Reduction Plan and GSP Implementation Tracking and Exceedance Reporting (Dutton)
    c. Update on Establishing SMCs for new RMWs (Dutton)
    d. Update on DMS and Potential Improvements (Dumas)
    e. Review of Roles and Responsibilities for Exceedance Reporting (Blakslee)
    f. Report from GSAs with Exceedances (Blakslee/GSAs)

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15. Next Steps (Hopkins)

16. Reports Pursuant to Government Code Section 54954.2(a)(3) (Layne)

17. Next Meeting(s): (Hopkins)
    a. Regular Coordination Committee Meeting: July 14, 2025
    b. JPA Workshop: Early July 2025

18. Adjournment (Hopkins)

DELTA-MENDOTA SGMA

TO: Coordination Committee
Agenda Item No. 5

FROM: Taylor Blakslee, Hallmark Group

DATE: June 9, 2025

SUBJECT: Committee to Review and Take Action on the Consent Calendar

Recommendation
Approve the consent calendar.

Discussion
The below two items are included in the consent calendar for consideration of approval:

a. Minutes of the May 19, 2025 Meeting

b. Budget to Actual Report

Delta-Mendota Subbasin Coordination Committee
Draft Meeting Minutes
Monday, May 19, 2025, 1:00 PM
SLDMWA Board Room 842 6th St., Los Banos, CA 93635

1. Call to Order/Roll Call, Hopkins at 1:01pm

The Delta-Mendota Subbasin Coordination Committee meeting was called to order at 1:00 p.m. and a roll call was made consisting of a quorum as indicated below.

Present	Individual	Role	Affiliation
In-Person	Joe Hopkins	Member (Chair)	Aliso WD
x	Roy Catania	Alternate	Aliso WD
Zoom	Lacey McBride	Alternate	Central DM Region
x	Steve Stadler	Member	Central DM Region
In-Person	Jim Stillwell	Member	Farmers WD
In-Person	Augustine Ramirez	Alternate	Fresno County A&B
X	Buddy Mendes	Member	Fresno County A&B
X	Ken Swanson	Alternate	Grassland WD
In-Person	Ric Ortega	Member	Grassland WD
X	Christy McKinnon	Alternate	Northern DM Region
In-Person	Vince Lucchesi	Member	Northern DM Region
In-Person	Jarrett Martin	Alternate	San Joaquin Exchange Contractors
In-Person	John Wiersma	Member	San Joaquin Exchange Contractors

Others Present In Person:

- Lauren Layne (Baker Manock & Jensen)
- Taylor Blakslee (Hallmark Group)
- Anona Dutton (EKI)
- Patrick McGowan (Panoche Water District)
- Chase Hurley (Water and Land Solutions)
- Chuck Bergson (City of Los Banos)

Other Remote Participants by Zoom:

- Adam Scheuber

- Andrew Francis (LSCE)
- aortiz
- Christy McKinnon (Stanislaus County)
- Ethan Andrews (P&P)
- Gilbert TorresJacinta Cabral
- JamesID-RD1606
- Jason Dean (Westside Ag)
- Jessica Alwan (Hallmark Group)
- Kait Palys (INTERA)
- Kristen Manzano (Hallmark Group)
- Leslie Dumas (Woodard & Curran)
- Lisa Beutler (Stantec)
- Rick Iger (P&P)
- Sam Cunningham (P&P)
- Sarah Gerenday (EKI)
- TerraAg Ventures
- Thomas Cleverdon
- Will Halligan (LSCE)

2. Pledge of Allegiance

Chair Hopkins lead the pledge of allegiance.

3. Committee to Consider Corrections or Additions to the Agenda of Items, as Authorized by Government Code Section 54950 et seq.

There were no corrections or additions to the agenda of items.

4. Opportunity for Public Comment

Chair Hopkins opened the floor for public comment and there was none.

Consent Calendar

5. Committee to Review and Take Action on the Consent Calendar

a. Minutes of the April 14, 2025 Meeting

b. Budget to Actual Report

Committee Member John Wiersma made a motion to approve the consent calendar. The motion was seconded by Committee Member Vince Lucchesi and passed unanimously.

Report Items

6. Committee to Discuss Future Financial and Administrative Structure

Legal Counsel Lauren Layne reported that a joint powers authority formation workshop will be scheduled in June 2025 and directed staff to coordinate this workshop.

7. Committee to Discuss Response to Red Flag Review of the GSP

Committee Member Jarrett Martin reported that a meeting with State Water Resources Control Board (SWRCB) staff is scheduled for June 9, 2025. He noted that attendees will include Committee Members Ric Ortega, Jim Stillwell, and Chase Hurley as well as technical consultants from EKI. He reported there have been no new developments since the last meeting.

8. Committee to Discuss Response to Comment Letters on Adjoining Subbasin Periodic Evaluations/Intervention GSPs

Chair Joe Hopkins provided an update on the need for meetings with adjoining subbasin Groundwater Sustainability Agencies (GSAs) to discuss public comment letters submitted by the Delta-Mendota subbasin on neighboring subbasin Groundwater Sustainability Plan periodic evaluations.

The Coordination Committee agreed that smaller regional ad hoc groups should be formed to ensure timely discussions with each subbasin and developed a draft list of those ad hocs to meet with each subbasin. The group noted that outreach consultant Lisa Beutler will organize these meetings in June and requested EKI develop general talking points to ensure consistency in messaging.

EKI noted that their participation in these meetings was not budgeted for, but the Committee consensus was to include EKI in these meetings due to the importance.

9. Committee to Discuss FSS Outreach

Committee Member John Wiersma provided an update on outreach activities and noted the draft newsletter should be ready in June.

10. Committee to Discuss SGMA Round 1 Implementation Grant

a. ISW Well Construction Management

i. Status of Easements and Construction Bidding

Chase Hurley provided an update on the installation of interconnected surface water (ISW) wells. He noted that the well in Merced County are expected to be finalized by December 2025. He said that the wells in Stanislaus County are navigating additional complications related to easement coordination and securing grant funding. Technical consultant Woodard & Curran's (W&C) Leslie Dumas said the California Department of Water Resources (DWR) has indicated that the grant could cover costs, but an amendment is required to secure the necessary funds.

ii. Construction Status for ISW Sites
Ms. Dumas provided an update on the construction status for interconnected surface water sites.

b. Continuous GPS Subsidence Monitoring Stations Construction Bidding and Contracting
The Committee discussed the available grant funding for the continuous GPS subsidence monitoring stations and tasked Jarrett Martin and Joe Hopkins to work with staff on this project.

11. Committee to Discuss Pumping Reduction Plan Implementation
EKI's Anona Dutton provided an update regarding Pumping Reduction Plan implementation. She also reported that the model needs to be extended to develop the Annual Reports due to DWR and this has not been done for two years. The Committee requested Ms. Dutton come back with a proposal for consideration of approval at the June 9, 2025 meeting. Ms. Dutton also gave a brief status of the exceedance reporting template and planned to provide that for the June 9, 2025 meeting for Committee consideration.

12. Committee to Discuss Scheduling Technical Group Meeting with USBR/USGS to Discuss CVHM2 Model for the San Joaquin Valley
The Committee discussed a draft white paper EKI developed regarding subsidence. Ms. Layne reported that the document is still an internal draft and will be released once it is finalized.

13. Committee to Discuss Spring Water Level and Quality Monitoring Results and Second Quarter Water Level Monitoring
Ms. Dumas reported on the status of spring water level and quality monitoring results, and progress on second-quarter monitoring data collection. She noted that February data in the data management system (DMS) resulted in five groundwater level exceedances. The Committee discussed who is responsible for reporting exceedance and requested a report on this process at the next meeting.

14. Committee to Discuss Potential Updates to the Data Management System
Ms. Dumas presented a list of potential improvements to the DMS. Ms. Dutton requested that an option to report on exceedances be included in the list of potential improvements. The Committee requested Ms. Dumas update the cost estimate for each option to assist the Committee in prioritizing potential DMS improvements.

Committee member Vince Lucchesi left at 3:20 p.m.

15. Next Steps

- Coordinate JPA workshop in June 2025.
- Coordinate meetings with adjoining subbasins regarding comment letters on periodic evaluations.
- Resolve remaining interconnected surface water well installation issues.
- Coordinate purchase of grant-funded subsidence monitoring equipment.
- Present proposal for updating the model for Annual Report development.
- Present the draft subsidence white paper when finalized.
- Distribute the list of exceedances and summarize the reporting process.
- Update the pricing list for potential DMS improvements.

16. Conference with Legal Counsel – Anticipated Litigation

Closed session began at 3:21 p.m. and concluded at 4:09 p.m.

Committee member Jim Stillwell left at 4:03 p.m.

17. Report from Closed Session

No reportable action.

18. Reports Pursuant to Government Code Section 54954.2(a)(3)

There were no reports.

19. Next Meeting: June 9, 2025

Chair Hopkins reported that the next meeting is on June 9, 2025.

20. Adjournment

Chair Hopkins adjourned the meeting at 4:10 p.m.

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY
SGMA ACTIVITIES - COORDINATED COST-SHARE AGREEMENT
MARCH 1, 2025 - FEBRUARY 28, 2026
COORDINATED (FUND 63)
ACTIVITY AGREEMENTS BUDGET TO ACTUAL

Report Period 3/1/25 - 04/30/25

EXPENDITURES	Annual Budget	Paid/ Expense	Amount Remaining	% of Amt Remaining	Expenses Through
Legal:					
Baker Manock & Jensen	$ 70,000	$ 11,313	$ 58,687	84%	4/2/25
Other Professional Services:					
GSP Implementation Contracts					
Coordinated Annual Report Activites					
(Common Chapter, Water Level Contouring)	$ 149,675	$ 57,370	$ 92,305	62%	4/30/25
DMS Hosting, Augmentation and Support	$ 12,000	$ -	$ 12,000	100%	
Staff Augmentation Support	$ 200,000	$ -	$ 200,000	100%	
DAC Outreach and Coordination	$ 20,000	$ -	$ 20,000	100%	
SGMA Implementation Grant Round 1 SPA (A9)	$ 175,015	$ 6,459	$ 168,556	96%	4/30/25
Inadequate Determination Response (EKI)	$ 55,000	$ -	$ 55,000	100%	
Interconnected Surface Water	$ 504,455	$ -	$ 504,455	100%	
Domestic Well Mitigation Funds	$ 100,000	$ -	$ 100,000	100%	
Other:					
Executive Director	$ 750	$ 85	$ 665	89%	4/4/25
General Counsel	$ 1,000	$ -	$ 1,000	100%	
Water Policy Director	$ 20,000	$ 5,019	$ 14,981	75%	3/21/25
In-House Staff	$ 3,000	$ 421	$ 2,579	86%	3/7/25
Conferences & Training	$ 1,000	$ -	$ 1,000	100%	
Travel/Mileage	$ 1,500	$ -	$ 1,500	100%	
Group Meetings	$ 5,000	$ -	$ 5,000	100%	
Telephone	$ 500	$ -	$ 500	100%	
Equipment and Tools	$ 2,000	$ -	$ 2,000	100%	
Total Expenditures	$ 1,320,895	$ 80,666	$ 1,240,229	94%	

DELTA-MENDOTA SGMA

TO: Coordination Committee
Agenda Item No. 6

FROM: Taylor Blakslee, Hallmark Group

DATE: June 9, 2025

SUBJECT: Review and Consider Taking Action to Approve and Authorize Entering Into a Proposal with EKI to Update the Model for Annual Report Preparation

Recommendation

Approve and Authorize Entering Into a Proposal with EKI to Update the Model for Annual Report Preparation.

Discussion

At the May 19, 2025, Coordination Committee meeting EKI's Anona Dutton reported that the model needs to be extended to develop the Annual Reports that are due to the California Department of Water Resources (DWR) and this has not been done for two years. The Committee requested Ms. Dutton come back with a proposal for consideration of approval at the June 9, 2025 meeting and that is provided as Attachment 1 for consideration of Committee approval.

eki environment & water

Corporate Office
2001 Junipero Serra Boulevard, Suite 300
Daly City, CA 94014
(650) 292-9100
ekiconsult.com

5 June 2025

J. Scott Petersen, P.E.
Water Policy Director
San Luis & Delta-Mendota Water Authority
842 6th Street, PO Box 2157
Los Banos, CA 93635

Subject: Proposal to Extend Groundwater Flow Model for Preparation of Annual Report (EKI C0.00041.18)

Dear Mr. Petersen:

Per your request, EKI Environment & Water, Inc. (EKI) is pleased to submit this proposal to the San Luis & Delta-Mendota Water Authority (SLDMWA) to extend the groundwater flow model (Model) developed for the Delta-Mendota Subbasin (Basin) Groundwater Sustainability Plan (GSP) through the end of Water Year (WY) 2025. The extended model will support the development of the upcoming Annual Report. This scope of work aligns with the optional task (CC Task 7) included in EKI's proposal to SLDMWA dated 5 March 2025, which was not selected under the approved contract for technical support services to the Basin Coordination Committee (Task Order 005-F26-AA63-TO001).

SCOPE OF WORK

Task 1 – Model Extension for Preparation of Annual Report

Full compliance with the GSP requires annual updates to the Basin Model to evaluate the depletion of interconnected surface waters (ISW) due to pumping, estimate changes in groundwater storage, and assess the influence of conditions in neighboring areas. Under this task, and as requested, EKI will extend the Model's historical simulation period from WY 2023 through WY 2025. This update will include adjustments to assumptions made for WYs 2022–2023 during GSP development, which were based on limited data availability at the time. Similar assumptions may be necessary for WY 2025, depending on the availability of new data.

EKI will issue a Request for Information (RFI) to Basin GSAs to obtain relevant datasets and will provide updates to the Coordination Committee (CC) through presentations at appropriate milestones. This task does not include calibration or refinement of the Model. To maintain a feasible schedule, the CC must provide formal notice to proceed no later than August 2025.

Deliverables: (1) RFI and as-needed PowerPoint presentations to present results.

Assumptions:

1) Model extension will not include any model calibration or fine tuning or adjustment to conditions in adjacent basins.

2) Model extension will not include refining historical period's representations except for adjustments to assumptions for WYs 2022-2023 (i.e., replacing estimated with reported data as provided by the Basin GSAs).

3) Data and information are provided in a timely manner by the Basin GSAs.

4) CC provides timely notice to EKI to undertake this Task (at least by August 2025).

COMPENSATION

Since the exact level of effort required to complete the above SOWs cannot be determined precisely, EKI proposes to perform the work on a time-and-materials, expense-reimbursement basis in accordance with our current Schedule of Charges (**Attachment A**). The estimated budget for this SOW is $49,000 (Table 1).

Table 1. Estimated Budget

Tasks	Anona Dutton, PG, CHg	Amir Mani, PhD, PE	Associate II, Engineer-Scientist	Engineer-Scientist, Grade 3	Total EKI Labor, including 4% Comm. Charge [1]	Other Direct Costs	Total Budget Requested (Rounded)
	355	319	267	215	($)	($)	($)
Task 1 – Model Extension for Preparation of Annual Report	16	32	60	60	$46,600	$2,000	$49,000
Total	**16**	**32**	**60**	**60**	**$46,600**	**$2,000**	**$49,000**

Notes:
(1) A communications charge of 4% of labor costs covers e-mail access, web conferencing, cellphone calls, messaging and data access, file sharing, local and long distance telephone calls and conferences, facsimile transmittals, standard delivery U.S. postage, and incidental in-house copying.
(2) "Other Direct Costs" includes direct expenses, as listed below, incurred in connection with the work and will be reimbursed at cost plus ten percent (10%) for items such as:
a. Maps, photographs, reproductions, printing, equipment rental, and special supplies related to the work.
b. Consultants, soils engineers, surveyors, drillers, laboratories, and contractors.

SCHEDULE

EKI is prepared to begin work on the above scope of work immediately upon receiving authorization to proceed and will complete its efforts and present the deliverables within six months.

TERMS AND CONDITIONS

All work performed by EKI under this proposal will be pursuant to the Terms and Conditions of our existing Agreement with SLDMWA.

We are happy to discuss the proposed approach and anticipated level of effort for the proposed SOW in more detail with you and look forward to working with you on this important project. Please do not hesitate to contact me if you have any questions or wish to discuss this proposal in greater detail.

Very truly yours,

EKI ENVIRONMENT & WATER, INC.

Anona L. Dutton, PG, CHg
Vice President / Principal-In-Charge

AUTHORIZATION
SAN LUIS & DELTA-MENDOTA WATER AUTHORITY (CLIENT)

By_____

Title_____

Date_____

Attachment

Attachment A EKI 2025 Schedule of Charges

ATTACHMENT A

EKI 2025 Schedule of Charges and Detailed Budget Table

SCHEDULE OF CHARGES FOR EKI ENVIRONMENT & WATER, INC. 1 January 2025

Personnel Classification	Hourly Rate
Officer and Chief Engineer-Scientist	355
Principal Engineer-Scientist	343
Supervising I, Engineer-Scientist	333
Supervising II, Engineer-Scientist	319
Senior I, Engineer-Scientist	306
Senior II, Engineer-Scientist	295
Associate I, Engineer-Scientist	283
Associate II, Engineer-Scientist	267
Engineer-Scientist, Grade 1	248
Engineer-Scientist, Grade 2	234
Engineer-Scientist, Grade 3	215
Engineer-Scientist, Grade 4	193
Engineer-Scientist, Grade 5	170
Engineer-Scientist, Grade 6	148
Project Assistant	139
Technician	133
Senior GIS / Database Analyst	175
CADD Operator / GIS Analyst	152
Senior Administrative Assistant	167
Administrative Assistant	132
Secretary	111

Direct Expenses

Reimbursement for direct expenses, as listed below, incurred in connection with the work will be at cost plus fifteen percent (15%) for items such as:

a. Maps, photographs, reproductions, printing, equipment rental, and special supplies related to the work.
b. Consultants, soils engineers, surveyors, drillers, laboratories, and contractors.
c. Rented vehicles, local public transportation and taxis, travel, and subsistence.
d. Special fees, insurance, permits, and licenses applicable to the work.
e. Outside computer processing, computation, and proprietary programs purchased for the work.

A Communication charge for e-mail access, web conferencing, cellphone calls, messaging and data access, file sharing, local and long distance telephone calls and conferences, facsimile transmittals, standard delivery U.S. postage, and incidental in-house copying will be charged at a rate of 4% of labor charges. Large volume copying of project documents, e.g., bound reports for distribution or project-specific reference files, will be charged as a project expense as described above.

Reimbursement for company-owned automobiles, except trucks and four-wheel drive vehicles, used in connection with the work will be at the rate of sixty cents ($0.60) per mile. The rate for company-owned trucks and four-wheel drive vehicles will be seventy-five cents ($0.75) per mile. There will be an additional charge of thirty dollars ($30.00) per day for vehicles used for field work. Reimbursement for use of personal vehicles will be at the federally allowed rate plus fifteen percent (15%).

CADD and other specialized software computer time will be charged at twenty dollars ($20.00) per hour. In-house material and equipment charges will be in accordance with the current rate schedule or special quotation. Excise taxes, if any, will be added as a direct expense.

Rate for professional staff for legal proceedings or as expert witnesses will be at a rate of one and one-half times the Hourly Rates specified above.

The foregoing Schedule of Charges is incorporated into the Agreement for the Services of EKI Environment & Water, Inc. and may be updated annually.

DELTA-MENDOTA SGMA

TO: Coordination Committee
Agenda Item No. 13

FROM: Anona Dutton/Amir Mani

DATE: June 9, 2025

SUBJECT: Update on EKI Subsidence CVHM2 Model White Paper In Response to Nelson Subsidence Analysis

Recommendation
None; information only.

Discussion
A white paper developed by EKI titled *Technical Review and Comments on "CVHM2: Decision Support Tool for Groundwater and Land Subsidence Management", by Nelson et al. (2025)* is provided as Attachment 1.

TECHNICAL REVIEW AND COMMENTS ON "CVHM2: DECISION SUPPORT TOOL FOR GROUNDWATER AND LAND SUBSIDENCE MANAGEMENT", BY NELSON ET AL. (2025)

Delta-Mendota Subbasin Groundwater Sustainability Agencies' Coordination Committee

June 2025

ABSTRACT

This white paper presents a technical review of the approach and methodology used in Nelson et al. (2025) [1], which explores land subsidence management using the Central Valley Hydrologic Model Version 2 (CVHM2) in the Delta-Mendota Subbasin (Basin), referred to herein as "the study". While the study's objective is to assess the sensitivity of subsidence reduction to different mitigation approaches, its modeling methodology, scenario design, and presentation of conclusions raise serious concerns about its use in policy or regulatory contexts, particularly in its assessment of the Basin's Groundwater Sustainability Plan (GSP) and its application under the requirements of California's Sustainable Groundwater Management Act (SGMA).

The study relies on a large-scale regional model to simulate very localized management outcomes, applies uniform demand reductions that fail to reflect realistic water use and pumping reduction patterns, and provides deterministic results and conclusions without incorporating known biases or uncertainties in the model and modeling approach. Moreover, the study misrepresents the Basin's subsidence sustainable management criteria (SMCs) and Pumping Reduction Plan (PRP), oversimplifies the role of managed aquifer recharge (MAR), and neglects the regional hydrologic interactions with adjacent basins that strongly influence water levels and subsidence within the Basin. Despite these important methodological and interpretive flaws, the study presents its conclusions with a level of prescriptive certainty that risks misleading GSAs and stakeholders.

Given these limitations, this paper recommends that the Nelson et al. (2025) study not be used to guide any operational, regulatory or attributional decision-making until its assumptions, model performance, boundary conditions, and representations of management actions are refined to reflect the complexity and specificity required for local groundwater management planning and subsidence mitigation.

OVERVIEW

In April 2025, an article by Nelson et al. titled "*Central Valley Hydrologic Model Version 2 (CVHM2): Decision Support Tool for Groundwater and Land Subsidence Management*" was published in the Water Journal, applying the CVHM2 to evaluate land subsidence mitigation options in the Basin. The authors extended the CVHM2 simulation period through 2073 to provide a future projection scenario, and tested how subsidence responded to various changes in agricultural demand, MAR, and precipitation as a proxy for future climate variability. The study results emphasize the strong sensitivity of subsidence to demand

[1] Nelson, K., Quinn, N., & Traum, J. (2025). *Central Valley Hydrologic Model Version 2 (CVHM2): Decision Support Tool for Groundwater and Land Subsidence Management*. Water, 17(8), 1120. https://doi.org/10.3390/w17081120

reductions and suggest that significant groundwater pumping reductions would be needed to constrain future subsidence to less than two feet.

While the modeling framework is scientifically valuable, and its overall ranking of sensitivities for studied mitigation approaches aligns with previous scientific studies, its suggested application as currently defined in the study as a decision-support tool for policy or SGMA implementation is problematic. This review identifies key limitations in the study's assumptions and scenario structure that, if unqualified, could lead to significant misinterpretation by groundwater sustainability agencies (GSAs) and the public.

STUDY SUMMARY

Nelson et al. (2025) developed a series of future scenarios using CVHM2 to simulate hydrologic conditions and land subsidence in the Delta-Mendota Subbasin through 2073. The study was designed to examine how subsidence responds to variations in three primary drivers: agricultural water demand, MAR, and climate variability.

To explore these dynamics, the authors ran 27 scenarios that adjusted crop evapotranspiration (ET) demand to represent reductions in agricultural pumping, applied surface recharge to simulate MAR, and scaled historical precipitation to represent wetter or drier future climate conditions. Model inputs were extended through 2073 using a backward-shifted sequence of historical water years. Surface water deliveries and land use conditions were held constant relative to historical operations.

Demand reduction was implemented by scaling down the ET component of crop water use across the Basin area in percentage increments. MAR was represented as additional surface infiltration distributed over broad areas, without differentiation by soil type or targeting areas of the Basin where there is a known hydraulic connection to the lower aquifer. Climate scenarios were created by uniformly scaling precipitation up or down by 50% across the entire subbasin.

The study's findings indicated that reductions in agricultural demand had the greatest effect on mitigating future subsidence, while changes in climate and surface-applied MAR had moderate to limited effectiveness. Injection-based MAR, modeled conceptually beneath the Corcoran Clay, showed theoretical potential to reduce subsidence but was not analyzed for technical or economic feasibility. The authors concluded that substantial demand reductions were necessary to maintain subsidence below two feet by 2073, particularly under dry climate conditions.

TECHNICAL CONCERNS AND CLARIFICATIONS

Technical Concerns with Respect to Overall Use of CVHM2 and Defined Criteria

Application of a Regional Model to Assess Local Impacts

CVHM2 is a regionally calibrated model encompassing the entire Central Valley of California (**Figure 1**) and does not meet industry standards for application for local operation and management. Per its developers, Faunt et al. (2024)[2]: "*CVHM2 was designed to portray general characteristics for examining hydrology at a regional scale; CVHM2 was not designed to reproduce every detail of the Central Valley hydrologic system. For example, the scale of the spatial distribution of deliveries used in the CVHM2 is regional to subregional in scale. If deliveries are used in greater spatial detail, groundwater pumping could be estimated in greater spatial detail... Although CHVM2 does include more detailed accounting units, particularly along the Delta–Mendota Canal, these details are not always easily available through time for the entire Central Valley. Given these limitations, the CVHM2 can be used to represent the longer-term changes and larger spatial trends in groundwater storage and can simulate regional and sub-regional groundwater flow and land subsidence.*"

The scale-appropriate application of CVHM2 and its associated uncertainties are explained thoroughly in the GSP[3]. The Study authors also confirm this fact by stating: *"… the calibration focused on matching general trends in groundwater levels and land subsidence, a more localized focus was also included in locations with a continuous observed record.*" Including a few local stations in the calibration for subsidence without having the same level of calibration in other areas and for other calibration targets does not make the model suitable for targeted application in those few spots. Therefore, using maximum values of subsidence at any location as an indicator, or generating subsidence values at one-third of a mile resolution using a regional model with one-square-mile resolution, without proper discussion and incorporation of uncertainties and inaccuracies, is misleading.

[2]Faunt, C. C., Traum, J. A., Boyce, S. E., Seymour, W. A., Jachens, E. R., Brandt, J. T., Sneed, M., Bond, S., & Marcelli, M. F. (2024). Groundwater Sustainability and Land Subsidence in California's Central Valley. *Water*, *16*(8), 1189. https://doi.org/10.3390/w16081189

[3] As an example, refer to GSP (https://deltamendota.org/final-gsp-documents/) Appendix H, Section 4: "*While USGS-CVHM2 provides a sufficiently good representation of regional conditions for GSP development, it needs further improvement for Basin-wide policy development, estimation of P/MA benefits, and assessing the likelihood of sustainability under the developed sustainable management criteria (SMC). Due to focused calibration based on wells and subsidence locations with long-term data expected to represent historical hydrology, groundwater levels in the Basin in both aquifers are generally overestimated [in USGS-CVHM2] during the historical baseline.*"

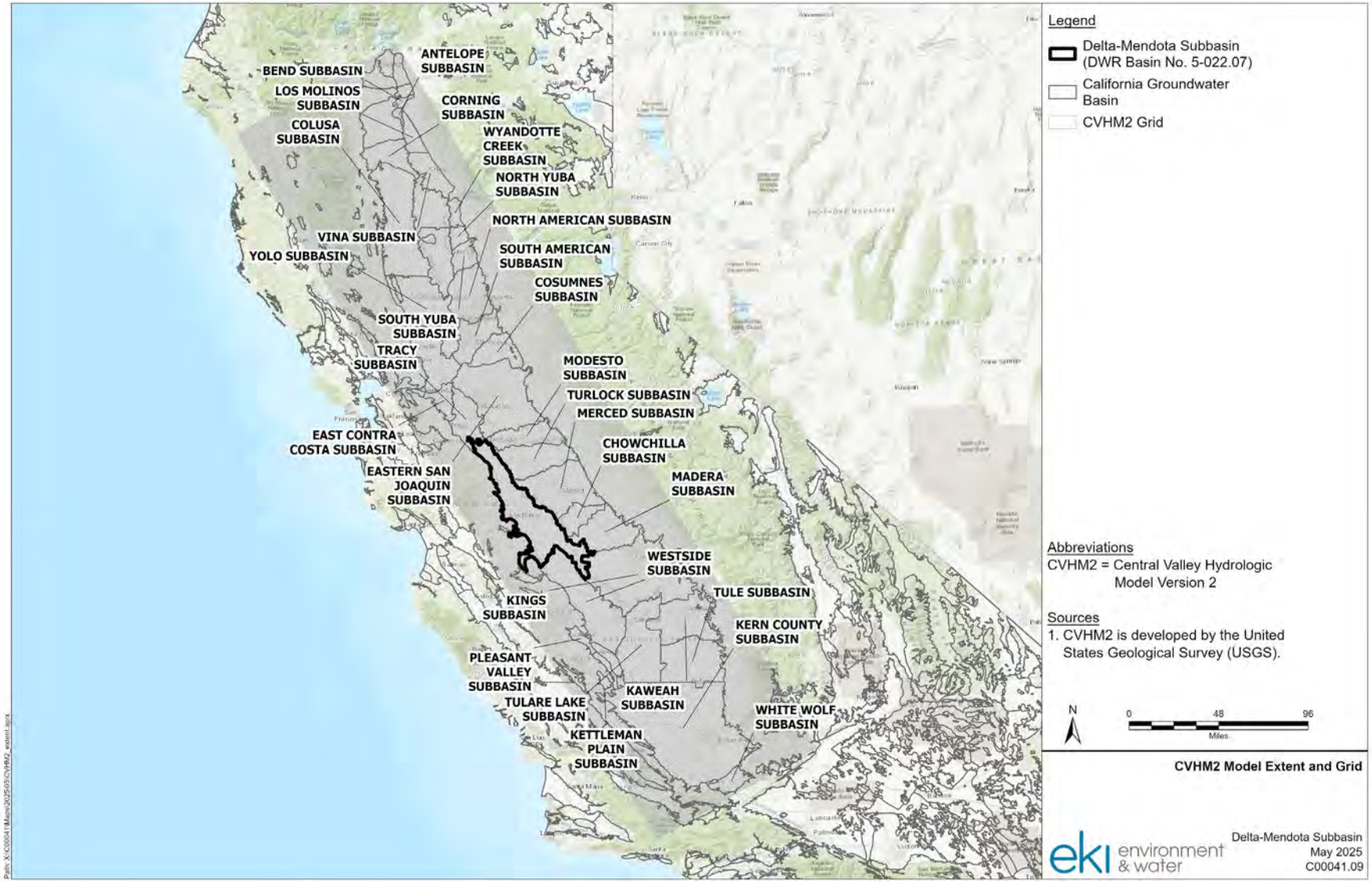

Figure 1. The CVHM2 Model domain includes the entire California Central Valley. The Delta-Mendota Subbasin represents only a small portion of this regional model.

CVHM2 Underestimates Surface Water Deliveries in the Basin

As noted in the GSP[4], CVHM2, as developed by Faunt et al. (2024) and used in this study, underestimates average surface water deliveries in the Basin by more than 200,000 acre-feet per year. This misrepresentation results in inflated estimates of groundwater pumping in certain areas, leading to inaccurate simulation of groundwater levels and subsidence, and overestimating the demand reductions required to mitigate subsidence in those areas under methodologies similar to those used in Nelson et al. (2025).

Criteria Extracted from the Basin GSP Are Misrepresented

The GSP defines the minimum threshold (MT) for subsidence as a cumulative total of two feet between 2020 and 2040. The study, however, incorrectly applies this two-foot threshold through 2073. This misapplication leads to misleading conclusions about the adequacy of current and planned management actions to meet sustainability criteria. While the GSP does target zero subsidence after 2040 as its Measurable Objective (MO), the study's modeling approach, particularly its assumptions of regional conditions outside the Basin and the influence of neighboring basins (as discussed further herein), results in different cumulative subsidence estimates at 2040 and 2073. As highlighted in Tables 2 and 3 of Nelson et al. (2025), the difference between simulated average subsidence for WY 2020-2040 and WY 2020-2073 reaches up to 2 feet in some scenarios. As a result, extending the MT comparison to 2073 under this approach is not appropriate or consistent with the intent of the GSP.

The Basin's Pumping Reduction Plan and Projects Are Misrepresented

The Basin's PRPs include six coordinated components designed to address overdraft and avoid exceedances of MTs for groundwater levels, water quality, and land subsidence. The study simulates only the overdraft mitigation component of the PRPs, overlooking reductions that may be triggered by efforts to avoid groundwater level or subsidence MTs. Under the PRP, if MTs are projected to be exceeded due to Basin management, additional pumping reductions would be implemented. Reductions under these components and overdraft mitigation will be coordinated, focusing pumping reductions on the Lower Aquifer to address any observed local subsidence and groundwater decline. In contrast, it is unclear where and how the overdraft mitigation pumping reduction was applied in the study. The authors also confirm the importance of this source of uncertainty in their study, in the context of its MAR simulation: "*It is also important to note that a recent study notes the importance of focusing on groundwater overdraft reductions in the deeper aquifers where subsidence originates and in localities where subsidence impacts are greatest.*"

It is also worth noting that the GSP sets groundwater level MTs at Fall 2015 levels. Therefore, avoiding MTs in the Lower Aquifer through the PRPs should, in theory, limit subsidence in the Basin to residual subsidence caused prior to 2023 and/or caused by actions outside the Basin and uncontrollable by GSAs. Additionally, the study does not realistically simulate the surface water augmentation projects. In reality, and as planned in the GSP, additional surface water will be delivered to areas dominated by groundwater pumping, specifically Lower Aquifer pumping. This would effectively offset groundwater use and reduce subsidence, similar to demand reduction. In contrast, the study appears to increase surface water supplies uniformly and throughout the Basin, including to areas where no surface water is needed, which may lead to streamflow gains or Upper Aquifer storage increases, outcomes that are unlikely to reduce Lower

[4] Refer to Section 3.3, Appendix H of the GSP.

Aquifer drawdown or subsidence and are less desired compared to targeted Lower Aquifer replenishment and pumping offsets.

CVHM2 Limitations and Uncertainty Are Not Addressed

As thoroughly explained in the GSP, CVHM2 tends to generally overestimate groundwater levels in both aquifers in the Basin and underestimate recent subsidence compared to available InSAR data. Our simulations have shown that these calibration issues can distort future scenarios by shifting subsidence from historical to forecasted periods due to the shift in the occurrence of critical heads. The study does not quantify these biases or include any uncertainty analysis, leading to an unsubstantiated overly deterministic presentation of results.

Overinterpretation of Results and Management Implications

The study's conclusions are framed in a prescriptive way, implying specific management actions are necessary. However, the scenarios do not provide a reliable projection of likely conditions and the GSP's Projects and Management Actions (P/MAs) are not represented realistically. Without clearly disclosing the limitations and assumptions of the model application, the results may mislead readers, especially those unfamiliar with the GSP and the significance and impacts of these underlying modeling mechanics.

Technical Concerns with Respect to Scenario Generation and Application

Subsidence Is a Regional Issue, Not Isolated to In-Basin Pumping

The study treats subsidence as a challenge that can be resolved solely through actions within the Basin, such as demand reduction and recharge. However, subsidence in the Basin is strongly influenced by groundwater gradients and hydrologic conditions in the multiple adjacent basins (**Figure 2**). This has been highlighted repeatedly by the Department of Water Resources (DWR)[5] and is well-documented in the GSP[6], all of which emphasize the regional nature of subsidence and the importance of inter-basin coordination for effective mitigation.

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[5]For most recent reference, refer to latest update provided by DWR Deputy Director Paul Gosselin to the State Water Resources Control Board on 15 April 2025 on DWR's upcoming subsidence guidance document (https://youtu.be/DtTyvzhmX0E?si=BORDjhjvH_OedGby). The DWR Sustainable Management Criteria Best Management Practice also emphasizes the importance of inter-basin coordination and adjacent basins' criteria in setting subsidence sustainable management criteria (https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-6-Sustainable-Management-Criteria-DRAFT_ay_19.pdf).

[6] Refer to Sections 8.3, 9.1, and Appendix H of the GSP (https://deltamendota.org/final-gsp-documents/).

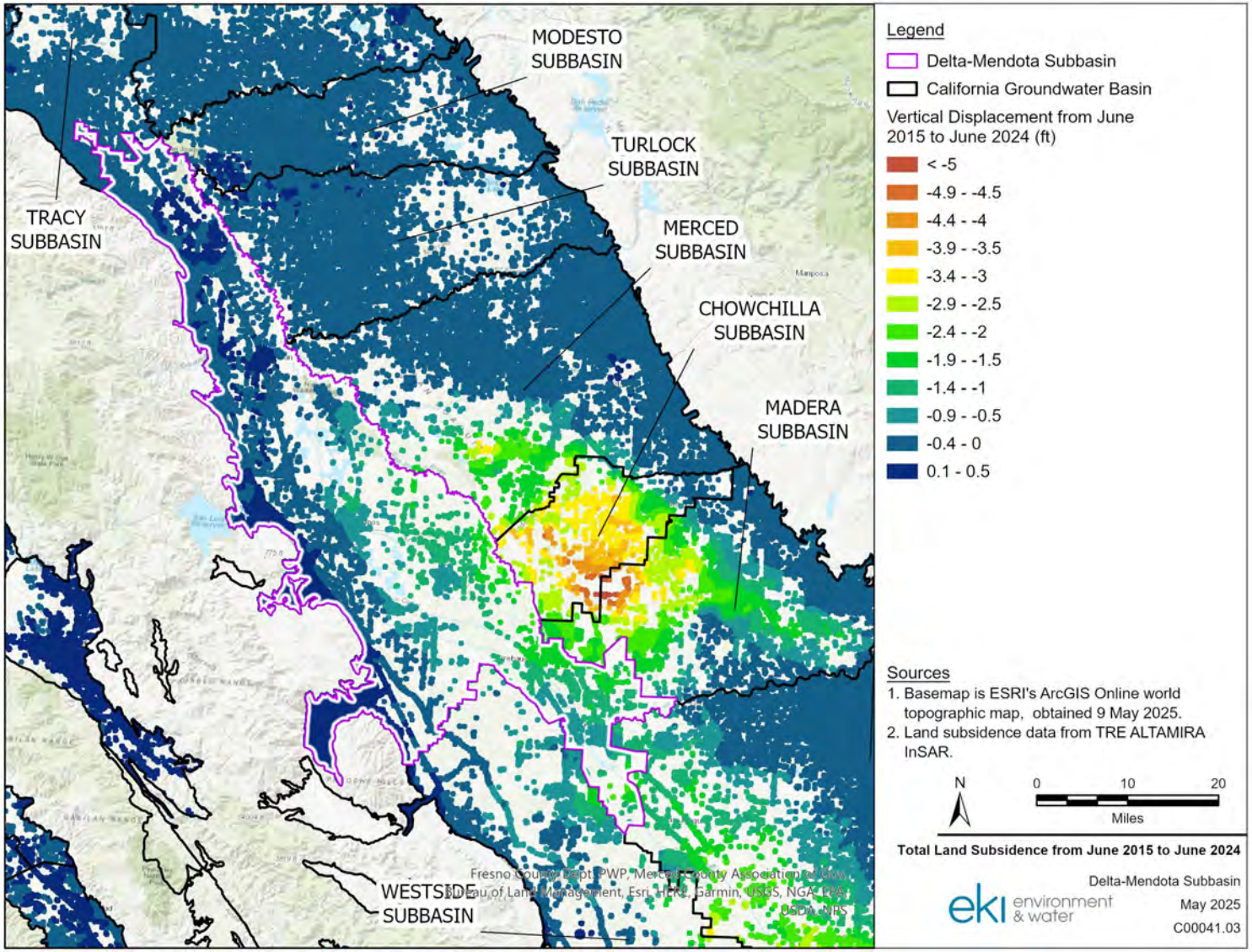

Figure 2. Total land subsidence within and surrounding the Delta-Mendota Subbasin since June 2015, based on InSAR data. Significant subsidence hot spots exist outside of the Basin that are extending into the Basin.

The study does not clearly disclose its assumptions regarding groundwater conditions in neighboring basins throughout the projection period. Based on the scenario descriptions, it appears that all improvements (except for climate scenarios) are modeled only within the Basin, while conditions in adjacent basins are assumed to remain static or continue their historical decline. An example hydrograph from the adjacent Chowchilla Subbasin (**Figure 3**) illustrates the severity of this decline when no assumptions are made regarding SGMA compliance. This imbalance increases simulated groundwater gradients at the Basin boundaries, increases cross-boundary outflows, and exaggerates both the magnitude and rate of projected subsidence. In contrast, the GSP assumes that groundwater levels in surrounding areas will also improve under SGMA compliance, returning to 2015 conditions by 2040 through a linear recovery. This assumption is consistent with the broader intent of SGMA and how sustainability is to be achieved across basins. By ignoring these regional improvements, the study underestimates the impact of Basin-specific mitigation efforts and overestimates the scale of response required within the Basin to address subsidence. Moreover, the study does not present boundary flow results for its scenarios. If shown, these results would likely reveal that a significant share of the recharge and demand reduction benefits simulated in the Basin are generally lost to adjacent basins when compared to the no-action scenario. This further limits the study's ability to accurately assess the effectiveness and efficiency of local mitigation and P/MAs in arresting land subsidence.

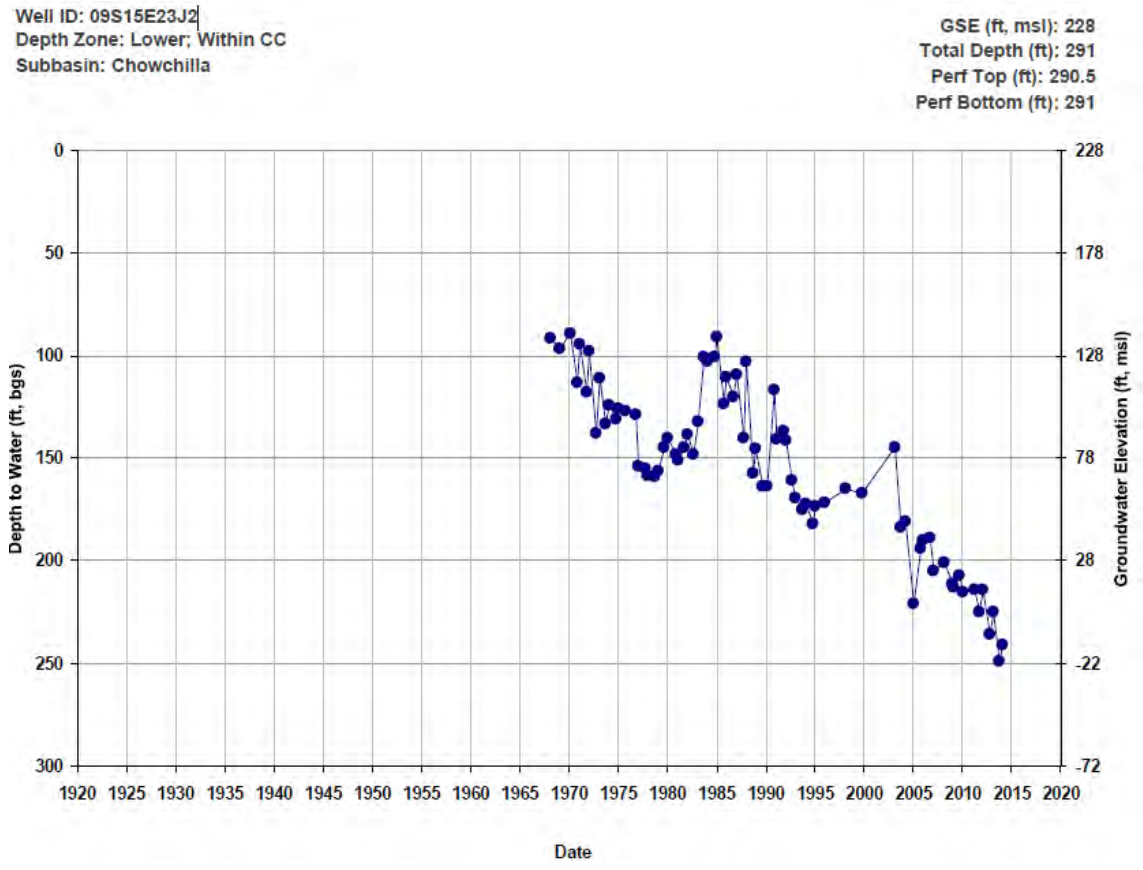

Figure 3. Example lower aquifer groundwater level hydrograph, extracted from Chowchilla Subbasin's revised GSP Appendix 2.E, demonstrating the significant historical decline being replicated outside the Delta-Mendota Subbasin to generate the projected scenarios

Demand Reductions Were Implemented Unrealistically

The study applies uniform percentage reductions in crop demand to simulate pumping management, which ignores current and projected surface water use to meet those demands in certain areas. However, in CVHM2, surface water and precipitation are allocated before groundwater, which means that even small reductions in demand can lead to disproportionately large decreases in groundwater pumping, especially in areas with high surface water availability, such as this Basin. This can mislead readers about what the scenarios actually represent in terms of in-basin groundwater pumping reductions.

This approach also fails to reflect the targeted nature of the GSP's PRP and P/MAs, that are specifically designed to reduce pumping from the Lower Aquifer, where it contributes most to subsidence. For example, to achieve a focused reduction of approximately 20,000 acre-feet per year from Lower Aquifer Pumping near the Delta-Mendota Canal (DMC), the current scenario setup of the study would need to reduce demand Basin wide by a much larger amount. This leads to unnecessary reductions in surface water use and Upper Aquifer pumping, which are not particularly beneficial to subsidence reduction. Yet, those reductions are counted as part of the "required" demand reduction to arrest subsidence. As a result, the scenario design can significantly overstate the level of demand and pumping reductions actually needed in the Basin to achieve the same level of subsidence mitigation. This phenomenon is clear in Table 4 of the paper, as the authors need to reduce twice the required pumping from the Upper Aquifer to achieve the required reduction in the Lower Aquifer under PRP's overdraft mitigation.

MAR Effectiveness Was Narrowly Evaluated

The study simulates MAR as a uniform increase in surface infiltration, without accounting for important factors such as soil type, depth to groundwater, or the presence of confining layers like the Corcoran Clay. In practice, the effectiveness of MAR depends heavily on these local hydrogeologic conditions. Within the Basin, there are areas, particularly near and adjacent to the DMC, where MAR may directly recharge the Lower Aquifer and provide more effective subsidence mitigation than is reflected in the study results. By modeling MAR in such a generalized way, the study may demonstrate an overall relative sensitivity estimation, but it does not support meaningful conclusions about the feasibility or potential benefits of MAR projects as planned under the GSP.

Additionally, simulations conducted during GSP development showed that the effectiveness of recharge projects in the Basin is significantly influenced by groundwater conditions in neighboring basins. As a result, the study's assumptions, particularly the static or worsening conditions in adjacent basins, are likely to underestimate the full benefits of MAR.

Technical Concerns with Respect to Results and Conclusions

Even considering all the uncertainties and limitations described above, the results presented in the study show that average subsidence by 2040 remains under two feet in nearly all scenarios, and there is a large variance in maximum and average subsidence projections. This suggests that a more targeted approach to subsidence mitigation will be needed instead of broad overall demand reductions as applied and suggested in this study.

Despite these results and the several major sources of uncertainty and inaccuracy outline above, the study interprets the subsidence projections in a deterministic manner and implies that very large demand reductions within the Basin are the only effective path to limiting subsidence: "*These results suggest that in the absence of any effective MAR projects, the maximum annual volume of groundwater extraction that is permissible to minimize subsidence to 2 ft or less by 2073 should be on the order of 300,000 AFY or less*

(compared to the nearly 500,000 AFY that would be expected under the GSPs). There are many uncertainties in this analysis—the results presented are model-based approximations. However, these results do strongly suggest that the pumping reductions called for by the GSPs are likely inadequate." Presenting the results without contextualizing these limitations could mislead readers into overestimating both the scale of the problem and the scale of response required within the Basin.