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September 19, 2022

***Via E-mail***

Karla Nemeth
Director
Department of Water Resources
715 P Street
Sacramento, CA 95814

**Re: CSPA Comments on Revised Delta-Mendota Component and Coordinated GSP**

Dear Director Nemeth:

Thank you for the opportunity to provide comments to the Department of Water Resources (DWR) as it considers whether the revised GSP for the Delta-Mendota Subbasin[1] should be approved following its resubmission in July of this year.[2]

DWR cannot approve this GSP consistent with SGMA and other state law. The GSP fails to identify, let alone mitigate, overdraft of hundreds of thousands of acre feet, as required by SGMA. And despite ongoing overdraft, its sustainable yield calculation would allow significantly greater extractions than have occurred historically or in projections. It fails to adequately identify, characterize, or map groundwater dependent ecosystems or interconnected surface waters. Its sustainable management criteria—the main focus of the revisions—fail to comply with the law. It also improperly designates data gaps in ways that attempt to excuse the member GSAs' many years of inaction on their surface water obligations. The GSP also fails to correct many legal, scientific, and factual issues identified by CSPA, other NGOs, and relevant state and federal agencies in

[1] The Revised GSP consists of six component GSPs coordinated pursuant to Water Code section 10727 and 10727.6. Each component GSP contains a common chapter shared by all six component GSPs. References to the "GSP" or the "Plan" are to the coordinated GSP. References to the component GSPs, such as the SJREC GSP, are to the revised versions unless otherwise specified. Citations to the Common Chapter are in the form (CC-XX) where XX is the page number in the redlined version of the Common Chapter.

[2] This letter attaches as Exhibit A comments on the revised GSP by Greg Kamman, a certified hydrologist. This letter incorporates Mr. Kamman's comments and asserts that the deficiencies identified by him constitute legal deficiencies with the GSP.

earlier comments.[3]

The problems with this plan cannot wait to be resolved by further changes in the 2025 update—they are fundamental to the GSP and require a finding that it is "inadequate."

**Background on DWR's Role**

Beginning in January 2020, DWR reviewed the Delta-Mendota GSP pursuant to Water Code section 10733.4. On January 21, 2022, DWR issued its Determination Letter finding that the Delta-Mendota GSP was "incomplete." It gave the GSAs 180 days, until July 20, 2022, to submit revisions to the coordinated and component GSPs.

DWR found four deficiencies with the GSP in its January 2022 Determination Letter ("Determination Letter"). These were (1) The GSPs do not use the same data and methodologies; (2) The GSPs have not established common definitions of undesirable results in the Subbasin; (3) The GSPs in the Subbasin have not set sustainable management criteria (SMCs) in accordance with the GSP Regulations; and (4) The management areas established in the Plan have not sufficiently addressed the requirements specified in 23 CCR § 354.20. (Determination Letter, Statement of Findings, at pp. 3-4.)

DWR did not address significant deficiencies in the 2020 coordinated and component GSPs, including characterization of interconnected surface waters (ISW) and groundwater dependent ecosystems (GDEs) along with failure to comply with the waste and unreasonable use and public trust doctrines. Yet these issues remain in the component and coordinated GSPs and as they violate SGMA and the SGMA regulations, DWR must find the component and coordinated plans inadequate pursuant to California Code of Regulations, title 23, section 355.2(e)(3)(C).[4]

For the areas where the GSAs amended the GSP in response to DWR's determination, the changes failed to fix some deficiencies and have created new deficiencies. In particular, the SMCs have not been changed to comply with SGMA. And by recalculating the water budget and sustainable yield figures, the GSP now reveals serious issues of overdraft and a sustainable yield figure that will lead to undesirable results.

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[3] CSPA hereby references and incorporates, to the extent relevant, its comment letter filed with DWR on May 15, 2022 (CSPA DWR Comments), available at https://sgma.water.ca.gov/portal/gsp /comments/13 (accessed September 16, 2022.)

[4] Further citations to California Code of Regulations, title 23, section 350 et seq. are to the "SGMA Regulations."

For this final review, the SGMA Regulations require DWR to consider, among other things:

> (1) Whether the assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are reasonable and supported by the best available information and best available science.
>
> (2) Whether the Plan identifies reasonable measures and schedules to eliminate data gaps.
>
> (3) 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.
>
> (4) Whether the interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have been considered.
>
> (5) 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.
>
> (6) Whether the Plan includes a reasonable assessment of overdraft conditions and includes reasonable means to mitigate overdraft, if present.
>
> (7) Whether the Plan will adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of its sustainability goal.
>
> (8) Whether coordination agreements, if required, have been adopted by all relevant parties, and satisfy the requirements of the Act and this Subchapter.
>
> (9) Whether the Agency has the legal authority and financial resources necessary to implement the Plan.
>
> (10) Whether the Agency has adequately responded to comments that raise credible technical or policy issues with the Plan.

(SGMA Regulations § 355.4(b).)

For the reasons stated below, DWR must find that, based on the factors in section 355.4 and the requirements of the SGMA Regulations, the Delta-Mendota GSP is not in compliance with SGMA and not in compliance with the SGMA Regulations' must therefore find the GSP "inadequate."

**The Revised GSP Fails to Identify, Quantify, and Mitigate Ongoing Overdraft**

A GSP is required to identify and mitigate overdraft in the basin. (Wat. Code § 10727.2, subd. (d)(3); SGMA Regulations § 354.18(b)(5).). If Bulletin 118 identifies overdraft conditions—as has occurred in the Delta-Mendota Subbasin—then the GSP must "include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions." (SGMA Regulations § 354.18(b)(5).) And the GSP must "describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft." (SGMA Regulations § 354.44(b)(2).)

DWR is required to evaluate whether the "Plan includes a reasonable assessment of overdraft conditions and includes reasonable means to mitigate overdraft, if present." (SGMA Regulations § 355.4(b)(6).)

The implications of this regulatory scheme are clear: if a GSP does not identify overdraft, then it will fail to specify projects and management actions to address any such overdraft, including a quantification of demand reduction. (See SGMA Regulations § 354.44(b)(2).)

DWR listed the Delta-Mendota Subbasin as "critically overdrafted" in Bulletin 118. Overdraft means "the condition of a groundwater basin or subbasin in which the amount of water withdrawn by **pumping exceeds the amount of water that recharges the basin over a period of years**, during which the water supply conditions approximate average conditions."[5] "Critical Overdraft" occurs when "continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts."[6] In 2019, DWR assessed the Delta-Mendota Subbasin and found that "adverse habitat and streamflow impacts" were

[5] DWR, Bulletin 118-2016 Update (2016), at p. 8, available at https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118 (accessed September 16, 2022), emphasis added ("Bulletin 118-2016 Update").

[6] *Ibid.*

occurring in the basin.[7]

In other words, DWR already found that current management of the Delta-Mendota has resulted in "pumping that exceeds . . . recharge[]" and that such pumping would probably in result in negative environmental, social, and economic impacts, including impacts on habitat and streamflow.

Importantly, a GSA's duty to quantify overdraft attaches based on DWR's analysis in Bulletin 118—not the GSP's analysis. (SGMA Regulations § 354.18(b)(5).) As DWR listed the Delta-Mendota Subbasin as critically overdrafted, the GSP was required to quantify the overdraft pursuant to regulation.

Nonetheless, the GSP fails to quantify, let alone take steps to address or mitigate, the overdraft. The GSP acknowledges "an overall declining trend in groundwater storage can be observed in both the Upper Aquifer and Lower Aquifer. Cumulative change in storage declined more rapidly in the Upper Aquifer compared to the Lower Aquifer, declining by about 624,0000 AF in the Upper Aquifer and 375,000 AF in the Lower Aquifer between WY2003 to 2013." (CC-102.) Graphs on pages CC-102 and CC-103 demonstrate the negative trends in storage. But the water budget does not include "include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions." (SGMA Regulations § 354.18(b)(5).) In other words, the GSP fails to provide the required analysis of overdraft under average conditions.

And the GSP does nothing to mitigate such overdraft. The graphs presenting the GSP's projected water budget with future climate change factors and PMAs purported to be included show shortfalls over the 50-year planning horizon.[8] (CC-160 to CC-161.)[9] Simply adding the numbers in Table CC-15 on pages CC-157 and 158—a calculation not performed in the GSP—confirms this, showing a cumulative decline in storage of about 150,000 AF in the Upper Aquifer and about 600,000 AF in the Lower Aquifer. Hence, even with projects and management actions implemented, the basin will still extract more water than is recharged over the course of the planning horizon, meeting DWR's

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[7] DWR, Sustainable Groundwater Management Act 2019 Basin Prioritization (2020), at pp. 29-31 available at https://water.ca.gov/programs/groundwater-management/basin-prioritization (accessed September 16, 2022); priority points assigned to Delta-Mendota Subbasin available using the map tool at https://gis.water.ca.gov/app/bp-dashboard/final/ (accessed September 16, 2022).

[8] Mr. Kamman's comments demonstrate that it is likely that the tables on pages CC-160 and CC-161 do not actually include climate change factors. (Ex. A at p. 2.)

[9] Note that the graph on page 161 uses two different y-axes, potentially misleading the reader. The cumulative change is read on the right axis and shows both upper and lower aquifer cumulative change in storage below zero at the conclusion of the period.

definition of overdraft.[10]

Thus the GSP fails to both fulfill SGMA's procedural requirement to document and quantify overdraft, and also its substantive requirement to mitigate overdraft. As Mr. Kamman points out, the Common Chapter fails to present projected water budget scenarios with and without PMAs to evaluate whether any mitigation is taking place. (Ex. A at p. 2.) It is worth noting that none of the PMAs include mandatory demand reduction, meaning that more mitigation could occur should the GSAs choose to direct pumpers to extract less water from the aquifers.[11] And the water budget's conclusion that overdraft will occur despite projects and management actions means that the GSP has failed to mitigate overdraft in violation of SGMA. This alone requires that DWR find the Plan inadequate.

**Despite Projecting Continued Overdraft, the Sustainable Yield Calculation Permits Even More Pumping Than Has Historically Occurred**

More egregiously, the sustainable yield calculation allows dramatically *more* pumping than in the historical scenario. Under SGMA, "sustainable yield" "means the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result." (Wat. Code § 10721, def. (w).)

The sustainable yield calculation for the Upper Aquifer is 403,000 AF/year and the Lower Aquifer is 101,000 AF/year. Using the Groundwater Water Budget data presented in the Common Chapter, the average annual pumping from the upper aquifer for the historic period was 377,889 AF. (Table CC-11, at p. CC-150.) The Common Chapter projects future average annual pumping volume from the upper aquifer to be 348,193 AF. (Table CC-15, at pp. CC-157-58.) Thus, the sustainable yield figure allows significantly more pumping in the Upper Aquifer to occur despite the basin's status as critically overdrafted. As discussed below, this violates SGMA.

The story in the Lower Aquifer is similar. While the sustainable yield calculation allows more than 100,000 AF/year of extraction, the historic average extraction is only 43,000 AF/year. Future extractions are projected at 56,702 AF/year. Thus the GSP envisions extractions more than twice historical levels as being "sustainable," even though historic extractions from the Lower Aquifer have resulted in significant subsidence. (E.g. CC-105-106 ["Based on subsidence rates observed over the last decade,

[10] Bulletin 118-2016 Update, at p. 8.

[11] SJREC GSP at p. 119; Northern and Central Delta-Mendota GSP at p. 7-3; Grasslands GSP at pp. 6-1 to 6-9; Fresno County GSP at p. 100; Farmers GSP at p. ES-14 ("FWD has not formally developed any projects or management actions."); Aliso GSP at pp. 6-1 to 6-29.

it is anticipated that without mitigation, subsidence will continue to impact operations of the DMC and California Aqueduct."].) And the SMCs for subsidence permit and additional two feet of subsidence by 2040—a figure that at least one water authority reliant on the Delta-Mendota Canal has criticized as lacking supporting information and potential for mitigation.[12]

*The Sustainable Yield Calculation Fails to Analyze Whether It Will Prevent Undesirable Results*

In addition to permitting far more extraction than has occurred historically, the Sustainable Yield calculation fails to comply with SGMA's requirements for its calculation. As discussed above, the sustainable yield is defined as the "maximum quantity of water. . . that can be withdrawn annually from a groundwater supply without causing an undesirable result." (Wat. Code § 10721, def. (w).)

But the GSP contains no analysis of how the sustainable yield calculation relates to the SMC discussions. There is no cross-check, for example, of how the sustainable yield would relate to the MTs and MOs identified in the SMC section. In fact, the section of the common chapter discussing the SMCs does not use the term "sustainable yield." (CC-168 to CC-233.) Indeed, given the negative trend in groundwater storage over the historic period and the continued declines in groundwater storage over the projected future, it would be extraordinary if undesirable results did not occur in the future (if they are already not occurring). As Carl Sagan wrote, "extraordinary claims require extraordinary evidence."[13] But the Common Chapter provides *no* evidence tying the sustainable yield calculations to the undesirable result analysis in violation of SGMA.

*The Sustainable Yield Calculation Is Unsupported By Evidence*

And the calculation of the sustainable yield figure itself is unclear and based on information not provided in the Plan. Under the SGMA Regulations, "Plan content information must be sufficiently detailed and readily comparable." (SGMA Regulations § 350.4(b).) In addition, Plan "supporting information" must be "sufficiently detailed and the analyses sufficiently thorough and reasonable." (SGMA Regulations § 355.4(b).) "Findings" must be "reasonable and supported by the best available information and best available science." (SGMA Regulations § 355.4(b)(1)(a).)

The Lower Aquifer sustainable yield calculation is based on studies performed by the Westlands Water District GSA on the Westlands Basin. (CC-165.) This study is not provided in the Common Chapter or in the "references" section of the SGMA

[12] Letter from Johnny Amaral, Friant Water Authority, to Paul Gosselin, DWR (September 19, 2022), available at https://sgma.water.ca.gov/portal/gsp/comments/13 (accessed September 19, 2022.)

[13] Sagan, *Boca's Brain* (1979) at p. 62.

Portal.[14] Nor is any data from it included in the GSP. In the revised Common Chapter, the lower aquifer figure is "refined" by "adjusting the value from 250,000 AF to 101,000 AF, based on observed extractions from the Lower Aquifer during WY2015." Again, these "observed extractions" are not provided in the GSP. As a result, the Lower Aquifer sustainable yield calculation is without "supporting information," let alone the "best available information and best available science."[15] This violates SGMA.

**The Revised GSP's Sustainable Management Criteria Are Deficient**

Of the four deficiencies that DWR identified in its Determination Letter, two specifically addressed the coordinated and component GSPs' failure to develop adequate sustainable management criteria (SMC). Deficiency 2 addressed the GSP's failure to establish coordinated SMCs. (Determination Letter, Staff Report at p. 20) And Deficiency 4 addressed the GSP's failure to establish SMCs that conformed to SGMA and its regulations. (Determination Letter, Staff Report at p. 26.)

The sustainable management criteria are at the heart of SGMA. They inform the public, GSAs, and state regulators whether the plan is working to achieve sustainability. If a GSP does not define "undesirable results" in compliance with SGMA, then negative effects traceable to unsustainable groundwater use can—and likely will—occur without triggering management actions. (See generally, Wat. Code §§ 10721, defs. (u-x); 10727.2; SGMA Regulations § 354.26.)

And if minimum thresholds and measurable objectives are not defined and not quantitively tied to undesirable result definitions, then they will not prevent the occurrence of undesirable results. (SGMA Regulations §§ 354.28-354.30.)

In the Delta-Mendota Subbasin, ESA- and CESA-listed salmonids are vulnerable to declining flows, increased temperatures, and declining water quality as a result of groundwater overextraction. But where SGMA requires detailed, quantitative SMCs that will define and protect against undesirable results, the coordinated and component GSPs continue to punt, deferring their responsibilities for years, ignoring available data, and failing to consider how pumping in the basin will affect these species and the ecosystems they rely on.

*Sustainability Goal*

The Common Chapter defines the "sustainability goal" for ISW as:

[14]SGMA Portal, https://sgma.water.ca.gov/portal/gsp/preview/15 (accessed September 17, 2022).

[15] See Ex. A at p. 3.

> Maintain interconnected surface waters comparable to existing conditions (historic low conditions as of Water Year 2016) in order to prevent a trend of increasing interconnected surface water losses from the San Joaquin River. Work with neighboring Subbasins to address increased interconnected surface water losses caused by pumping outside of the Subbasin.

(CC-219.)

There are numerous problems with these definitions. First, the definition of the sustainability goal refers only to the San Joaquin River, excluding other interconnected surface waters. These waters could include Los Banos Creek, Del Puerto Creek, Orestimba Creek, and Little Panoche Creek. (CC-78.) They could also include wetland areas. The Common Chapter acknowledges that certain west-side streams are "lost to infiltration," strongly implying that they are connected to groundwater. (CC-78.) The failure to analyze and set SMCs for such streams violates SGMA's requirement that interconnected surface waters be identified (SGMA Regulations § 354.16(f) and that undesirable results be prevented by 2040 for such waters. (Wat. Code § 10727.2, subd. (b)(1).)

In addition, exclusion of surface waters other than the San Joaquin River is inconsistent with SGMA's requirements for intermittent and ephemeral streams. The SGMA regulations require monitoring capable of determining the "approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable." (SGMA Regulations § 354.34(c)(6)(B).) The inclusion of these streams in the monitoring requirements implies that such streams should be considered ISWs. And the GSP does not contain the required monitoring of intermittent or ephemeral streams.

The failure to identify these and other streams as "interconnected surface waters" also violates the requirement in SGMA Regulations section 354.16(f) that the GSP identify "interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems." The GSP explicitly excludes westside creeks including Del Puerto and Orestimba Creeks by stating, "These creeks lose their flows to the underlying vadose zone (net-losing streams) and therefore do not represent areas of potential GDEs." (CC-119.) This statement is in conflict with SGMA and the regulations, which define ISWs as "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." (SGMA Regulations § 351(o).) There is no exception for "net-losing" streams or ephemeral streams. This statement also conflicts with the SJREC GSP's limitation of the ISW SMC to losing reaches of the San Joaquin River—it is nonsensical for the Common Chapter to exclude losing streams while a component GSP includes *only* losing streams.

It also unclear why the sustainability goal refers to 2016 as "current conditions."

(CC-219.) First, 2016 was six years ago. Second, the GSP declares that 2013 comprises "current conditions." (CC-87.)

*Undesirable Result*

For interconnected surface waters, the Common Chapter defines an "undesirable result" as "Depletions of interconnected surface water as a direct result of groundwater pumping that cause significant and unreasonable impacts on natural resources or downstream beneficial uses and users." (CC-169, 219.)

The GSP lacks a discussion of the causes of the ISW undesirable result. (SGMA Regulations § 354.26(b)(1).) There is no discussion of how and where depletions stemming from pumping affect surface waters and flows.

And there is almost no discussion of the relationship between the SMC definitions and on-the-ground effects of depletions of surface waters. The regulations require a discussion of potential "effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." (SGMA Regulations § 354.26) But the discussion in the GSP is devoid of any such discussion of cause and effect. The closest the GSP comes to such a discussion is to state that:

> Because the SMCs established for Chronic Lowering of Groundwater Levels are designed to maintain groundwater levels above historic low conditions, they are understood to be protective of the Depletion of Interconnected Surface Water Sustainability indicator and local natural resources and downstream beneficial uses and users.

(CC-219.) This discussion fails to identify any actual effects on beneficial uses and users of groundwater, nor on land uses, nor on property interests, nor any other potential effects. This failure is important: during the 2013-2016 drought, fish populations in the San Joaquin River ecosystem suffered greatly. CDFW determined that the San Joaquin basin suffered from higher temperatures and lower flows during the 2012-2016 drought.[16] Steelhead and Chinook salmon populations declined precipitously in the Merced River. Commercial Chinook landings also declined from around 300,000 to just over 50,000

[16] Statewide Drought Response: Stressor Monitoring Summary Report • 2014-2017, at pp. 91-100, available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=168170&inline (accessed September 17, 2022).

between 2013 and 2017.[17] And the National Marine Fisheries Service has concluded that pumping in the subbasin affects water temperatures, potentially leading to "lethal" temperatures for vulnerable species.[18] Mr. Kamman determined that undesirable results were occurring in the years prior to 2016.[19]

But the GSP refuses to investigate or discuss those impacts, instead stating an "understanding," based on no evidence, that maintaining groundwater levels above historic low conditions would be "protective of" the ISW SMC. This "understanding" is based on no evidence and is logically flawed.

In order to comply with SGMA, the GSAs must investigate the effects of 2015-2016 low groundwater levels on the beneficial users of the interconnected surface waters—the species that rely on those waters—and then determine if those effects were significant and unreasonable. The GSAs have not done this and have made no plans to do so.

*Significant and Unreasonable*

The Revised GSP fails to properly define when undesirable results are "significant and unreasonable." The GSP Regulations require that a GSP "describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin." (SGMA Regulations § 354.26(a).) This description must "include" at least:

> 1) The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results based on information described in the basin setting, and other data or models as appropriate.
>
> (2) The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a

[17] (California Natural Resources Agency, Report to the Legislature on the 2012–2016 Drought (2021) at p. 32, available at https://drought.unl.edu/archive/assessments/CNRA-Drought-Report-final-March-2021.pdf (accessed September 18, 2022).

[18] Letter from Cathy Marcinkevage, NOAA Fisheries, to Paul Gosselin, DWR (Sept. 15, 2022), available at https://sgma.water.ca.gov/portal/gsp/comments/13 (accessed September 19, 2022; see also Myrick, C. A., & Cech, J. J., Temperature effects on Chinook salmon and steelhead: a review focusing on California's Central Valley populations. Bay-Delta Modeling Forum (2001) at p. iii, available at http://www.cwemf.org/Pubs/TempReview.pdf , accessed September 19, 2022.

[19] Ex. A at p. 5.

> quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.
>
> (3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.

(SGMA Regulations § 354.26(b).) DWR has summed up the required approach in its Draft Sustainable Management Criteria Best Management Practice: "GSAs must consider and document the conditions at which each of the six sustainability indicators become significant and unreasonable in their basin, including the reasons for justifying each particular threshold selected."[20]

Reaches of the San Joaquin River that flow through the Delta-Mendota Subbasin designated as having the following beneficial uses: warm- and cold-water freshwater habitat, warm- and cold-water migration, and warm- and cold-water spawning, as well as wildlife habitat.[21]

The Common Chapter defines "significant and unreasonable" as:

> Significant and unreasonable impacts on natural resources or downstream beneficial uses and users of groundwater are a reduction in available surface water supplies for natural resource areas, and reductions in downstream water availability as a result of increased streamflow depletions along the San Joaquin River when compared to similar historic water year types.

(CC-219.)

The Common Chapter (and, by implication, each of the component GSPs, all of which adopt the language in the Common Chapter) fails to meet these requirements because, as discussed further above, the GSP fails to discuss either the causes of

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[20] Department of Water Resources, Sustainable Management Criteria Best Management Practice (Draft) (2019) at p. 6, available at 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 (accessed September 18, 2022).

[21] Central Valley Regional Water Quality Control Board, Basin Plan for The Sacramento River Basin and the San Joaquin River Basin (2019) at p. 2-12, available at (https://www.waterboards.ca.gov /centralvalley/water_issues/basin_plans/sacsjr_201902.pdf (accessed September 18, 2022).

significant and unreasonable effects, nor the effects on beneficial uses and users.

Without such a discussion of cause and effect, the definition of "significant and unreasonable" fails to define when reductions in surface flows as a result of groundwater pumping become "significant" or "unreasonable."

Moreover, the definition fails to present any criteria for when reductions in streamflow become significant or unreasonable. (SGMA Regulations § 354.2(b)(2).) Instead, it merely restates the concepts from the undesirable result definitions. This is circular and fails to satisfy the requirements in the regulations.

Despite DWR's carefully crafted regulations detailing what the definition should contain, it fails to contain the required elements. As a result, the definition fails to serve as an effective trigger for management actions. With no detailed, quantitative description or criteria, neither the GSAs, the public, nor DWR will be able to determine if an undesirable result is occurring or will occur.[22]

*Measurable Objective and Minimum Threshold*

The Revised GSP revises its discussion of the measurable objective ("MO") for ISW to read as follows:

> Interconnected Surface Water is an identified data gap in the Subbasin. As an interim measurable objective, use the Chronic Lowering of Groundwater Level Measurable Objective as a proxy for interconnected surface waters (see below).
>
> Maintain seasonal high groundwater levels at an elevation that is at or above the Water Year 2015 seasonal high at representative monitoring sites in a GSP area. The Water Year 2015 seasonal high is a fixed elevation at each site, based on available groundwater level data. . . . To account for future year-to-year variations in hydrology, compliance with the fixed seasonal high threshold will be compared with a 4-year rolling average of annual groundwater level measurements.

(CC-220.)

[22] For instance, the SJREC GSP still states "In the event the SJREC GSA notices impacts to GDE's, an in-depth review to mitigate those impacts will be initiated." (SJREC GSP at p. 46.) But the common SMCs as adopted in the Common Chapter still do not provide any usable framework or criteria to guide the SJREC GSAs in noticing such impacts or determining whether there are significant or unreasonable.

The minimum threshold (MT) also relies on groundwater levels as a proxy for interconnected surface waters:

> Interconnected Surface Water is an identified data gap in the Delta-Mendota Subbasin. As an interim minimum threshold, use the Chronic Lowering of Groundwater Level Minimum Threshold as a proxy for impacts to interconnected surface waters (see below).
>
> The groundwater elevation indicating a chronic lowering of groundwater levels that may lead to undesirable results is an elevation that is lower than the site, based on available groundwater level data prior to the end of Water Year 2016. To account for future year-to-year variations in hydrology, compliance with the fixed historic seasonal low threshold will be compared with a 4-year rolling average of annual groundwater level measurements.

(CC-219-20.)

These are inadequate. SGMA requires a measurable objective to be set for each sustainability criterion "to achieve the sustainability goal in the basin within 20 years of the implementation of the plan." (Wat. Code § 10727.2, subd. (b)(1).) An MO must contain "specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin." (SGMA Regulations § 351, def. (s).) A GSP may only use groundwater elevation as a "proxy" for other sustainability indicators when the GSA can "demonstrate" that such value is a "reasonable proxy" as "supported by adequate evidence." (SGMA Regulations § 354.30(d).)

And the MT for an ISW must be "supported" by:

> (A) The location, quantity, and timing of depletions of interconnected surface water.
>
> (B) A description of the groundwater and surface water model used to quantify surface water depletion. If a numerical groundwater and surface water model is not used to quantify surface water depletion, the Plan shall identify and describe an equally effective method, tool, or analytical model to accomplish the requirements of this Paragraph.

(SGMA Regulations § 354.28(c)(6).) The use of groundwater levels as a proxy does not tell the GSP or the public anything about the "location, quantity, and timing" of depletions of interconnected surface water. And as the GSA has chosen not to use a

"numerical groundwater and surface water model," it has not demonstrated that the use of the groundwater level proxy is "equally effective" to accomplish the "requirements" of SGMA.

Moreover, as discussed in the attached comments by Mr. Kamman, the GSP gives no justification for the selection of the 2015 seasonal high nor the 2016 seasonal low as the MO or MT figures.[23] No justification is given for selecting these years and there is no justification for why a seasonal high figure was chosen for the MO, when undesirable results are more likely to occur during seasonal low conditions.

*Use of Chronic Lowering of Groundwater Levels as a Proxy for ISWs*

The use of the chronic lowering of groundwater level sustainability indicator as a proxy for ISWs has additional problems. The Revised GSP states that, with respect to chronic lowering of groundwater levels, "Significant and unreasonable is quantitatively defined as exceeding the minimum threshold at more than 50 percent of representative monitoring sites by principal aquifer in a GSP area." (CC-197.) There is no evidence tying this 50% figure to flow depletion figures in identified ISWs. Nor is there justification for why 50% was chosen: it is conceivable, in fact likely, that significant and unreasonable effects could occur should half of the wells in a given area drop below 2016 low levels—levels that were catastrophically low due to the historic 2012-2016 drought.[24]

By choosing a 50% figure, and by tying it to a four-year rolling average, the Revised GSP in fact guarantees that the basin will experience effects more severe than in the 2016 scenario because it permits up to 50% of wells to drop below that level, into uncharted and potentially disastrous territory.

The reliance on the chronic lowering of groundwater SMC as a proxy also suffers because, alone among the sustainability indicators in SGMA, chronic lowering of groundwater levels contains an exception:

> 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

[23] Ex. A at p. 5.

[24] Of course, the circular and inadequate definition of "significant and unreasonable" in the GSP prevents evaluation of what such effects are and determination of whether they are occurring at any given time.

> drought are offset by increases in groundwater levels or storage during other periods.

(Wat. Code § 10721, def. (x)(1).)

Importantly, no other sustainability indicator includes this language—no other sustainability indicator permits short-term exceedances so long as impacts are offset later. (Wat. Code § 10721, defs. (x)(2)-(5).) And this is consistent with the impacts from the other undesirable results: for instance, subsidence is often irreversible and cannot be remedied by increased groundwater levels or storage later. (Wat. Code § 10721, def (x)(5).) Depletions of interconnected surface waters likewise do not contain this exception and for good reason: beneficial uses of surface waters, including listed species, can be irreparably harmed by a single year where conditions are incompatible with species survival. (See, e.g., *National Wildlife Federation v. National Marine Fisheries Service* (9th Cir. 2018) 886 F.3d 803, 818 [harm to a member of a listed species is "irreparable because '[o]nce a member of an endangered species has been injured, the task of preserving that species becomes all the more difficult,' " brackets in original].)

It is therefore inappropriate for the coordinated and component GSPs to rely on the chronic lowering of groundwater levels sustainability indicator as a proxy for ISW or any other SMC. Even if water levels recover after a drought, harm to species could be lasting. The GSP must, but does not, analyze short term impacts to ISWs and their beneficial users.

The use of a four-year rolling average for an ISW SMC has a similar problem. (E.g., CC-220.) A four-year rolling average can obscure very dry conditions in one or two very dry years if subsequent years are wet. But species and habitats can take much longer to recover after even one bad year. SGMA is clear that balancing wet and dry years may be appropriate for chronic lowering of groundwater levels, but not for ISWs. DWR should not permit long-term running averages for the ISW SMC.

*Future "Acute" SMCs*

We acknowledge that the GSP intends to set shorter term "acute" SMCs for several sustainability indicators. However, the GSA has not done so yet, in violation of SGMA. And its plans to do so are incomplete. Indeed, the Common Chapter anticipates waiting until Year 10 to develop "minimum thresholds and measurable objectives as a rate or volume of surface water depletions that have adverse impacts on beneficial uses and users and may lead to undesirable results." This is what SGMA required the GSAs to do in 2020. (CC-220 to CC-221.) Waiting until 2030 or after leaves little time for the GSAs to change management strategies if the new SMCs reveal that undesirable results are occurring, which they may well be.

These "acute" SMCs would be developed after adding monitoring wells to

characterize rate and depletions of surface waters. The proposed wells are only in Northern and Central Delta-Mendota Regions and the Grassland Region. (CC-243.) In the Grassland Region, no additional streamflow monitoring is proposed, inconsistent with the approach in the Northern and Central Delta-Mendota GSP.

There is also no discussion of a plan to describe the potential "effects on the beneficial uses and users" as a result of depletions. (SGMA Regulations § 354.26(b)(3); Wat. Code § 10721, def. (x)(6); SGMA Regulations § 354.28(b)(4), (c)(6).) As discussed in more detail below, SMCs for ISWs must not simply describe depletions of surface waters as detailed in the Regulations but must also take the further step of describing how those depletions affect users of that water, including the fish species that rely on it.

California Department of Fish and Wildlife (CDFW) has published Groundwater Planning Considerations that pose three simple questions that GSPs should answer:

> 1. How will groundwater plans document the timing, quantity, and location of ISW [Interconnected Surface Waters] depletions attributable to groundwater extraction and determine whether these depletions will impact fish and wildlife?
>
> 2. How will GSAs determine if fish and wildlife are being adversely impacted by groundwater management impacts on ISW?
>
> 3. If adverse impacts to ISW-dependent fish and wildlife are observed, how will GSAs facilitate appropriate and timely monitoring and management response actions?[25]

Even if the proposed new wells can begin to answer question 1, they cannot address questions 2 and 3. That will require significantly revising the SMCs in the basin, as well as properly identifying the ISWs and GDEs where listed species occur.

And setting SMCs for ISWs requires analysis of impacts on surface flows *as well as* impacts on beneficial uses and users of water. (Wat. Code § 10721, def. (x)(6); SGMA Regulations §§ 354.28(c)(6) [MT for ISWs must be the "the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water"]; 354.34(c)(6) [monitoring program must characterize "factors that may be necessary to identify adverse impacts on beneficial uses of the surface water"].) The revised coordinated and component GSP includes no plan to analyze the effects of any depletions of groundwater on habitat quality and survivability of listed species, despite SGMA's direction to do so.

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[25] CDFW, Fish & Wildlife Groundwater Planning Considerations, at p. 5, available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=170185 (accessed September 16, 2022).

These effects could include not just streamflow, but also temperature and out-of-basin effects. GSAs are required to include "monitoring and management of…changes in surface flow and surface water quality that. . . are caused by groundwater extraction in the basin," when such conditions are present in the basin.[26] (Wat. Code § 10727.2(d)(2).) The San Joaquin River is listed under Clean Water Act section 303(d) as impaired for temperature.[27] Yet the GSPs contain almost no discussion of water temperature or the effects of groundwater management on river temperatures, nor do they contain a plan to do so. And flow depletions due to overdraft—whether increased losses in gaining reaches or decreased gains from gaining reaches—can require larger releases from upstream dams to maintain any flow requirements that may exist or be imposed.

*Failure to Coordinate*

Last, the coordinated and component GSPs still fail to be truly coordinated. DWR determined that the "GSPs have failed to set common definitions of undesirable results in the subbasin." (Determination Letter, Statement of Findings at p. 3.) The SGMA Regulations require that:

> Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results **applicable to the basin**. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring **throughout the basin**.

(SGMA Regulations § 354.24(a), emphasis added.) Section 354.26(b) contains additional requirements for undesirable results descriptions that are also applicable basin-wide.

The revisions to the coordinated and component GSPs purport to unify the definitions of undesirable results and other SMCs. But there are still inconsistencies. For example, the SJREC GSP introduces an important caveat in its discussion of the ISW SMC:

> Significant and unreasonable depletion of interconnected surface water occurs when groundwater extraction from the SJREC GSP

[26] The GSP does not contain a discussion of whether the factors in section 10727.2(d) are applicable to the basin. But as discussed above, high temperatures attributable at least in part to groundwater extraction are potentially lethal to salmon and other species. Temperature impacts are therefore applicable to the basin for the purpose of section 10727.2(d).

[27] State Water Resources Control Board, 2020-2022 California Integrated Report (Clean Water Act Section 303(d) List and 305(b) Report), App. H, available at https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html (accessed September 17, 2022).

> Group decreases streamflow to a significant and unreasonable level for beneficial users in a stretch of the San Joaquin River that was **historically losing (seeping from the river)**.

(SRJEC GSP at p. 115, emphasis added.)[28] This is inconsistent with the language contained in the common chapter, which contains no limitation to losing reaches. Indeed, SGMA and the regulations are clear that such a limitation is unlawful. SGMA does not limit the term "depletions of interconnected surface water" to losing reaches. Instead, the term covers all situations where there are "surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results." (E.g., SGMA Regulations § 354.28(c)(6).) The failure to consider the existence of and SJREC's management's impacts on gaining reaches could result in significant and unreasonable effects on instream flows and the habitats that depend on them by reducing the extent to which these reaches gain surface water from groundwater, and thereby adversely affect beneficial uses of surface water. This is especially true as areas of the SJREC portion of the subbasin contain shallow groundwater adjacent to the San Joaquin River. (E.g., SJREC GSP at 174-179.) Management activities proposed for these areas include continuing "to pump groundwater to lower the water table below the crop root zone." (SJREC GSP at 179.) There is no analysis of how this management technique affects the contribution of this shallow groundwater area to the San Joaquin River flows.

The SJREC GSP's "monitoring zones" also appear to violate DWR's deficiency 4—management areas that fail to comply with the SGMA Regulations. (Determination Staff Report at p. 36.) The SJREC GSP, along with other GSPs, renamed its "management areas" to "monitoring zones". But it still purports to set "different SMC" for such areas without providing sufficient explanations pursuant to the SGMA Regulations (E.g, SJREC GSP pp. 179, 184, 190, 196; see SGMA Regulations § 354.20.) For instance, there is no explanation of the reason for each different SMC, any different MTs or MOs, or any difference in monitoring or analysis appropriate for each area.

**The Revised GSP Improperly Identifies ISWs as a "Data Gap"**

The Common Chapter declares that "Presently, the Depletion of Interconnected Surface Water Sustainability Indicator is identified as a data gap within the Subbasin." (CC-219.)

SGMA does not define a "data gap." But the SGMA Regulations define the term as "a lack of information that significantly affects the understanding of the basin setting or evaluation of the efficacy of Plan implementation, and could limit the ability to assess whether a basin is being sustainably managed." (SGMA Regulations § 351(*l*).) The Regulations further provide that GSAs must identify data gap and must describe steps to

[28] Citations to the SJREC GSP are to the redlined version.

fill those data gaps before the next 5-year update. (SGMA Regulations §§ 354.12 [basin setting]; 354.14(b)(5) [hydrological conceptual model]; 345.38(b)-(d) [monitoring program].) SMCs must be "commensurate with the level of understanding of the basin setting, based on the level of uncertainty and data gaps, as reflected in the Plan." (SGMA Regulations § 350.4(d).) DWR must evaluate the GSP to determine whether it has "reasonable measures and schedules to eliminate data gaps." (SGMA Regulations § 355.4(b)(1).)

But nothing in SGMA or its regulations permits the approach taken by the coordinated and component GSPs here, which is to declare an entire sustainability indicator to be a "data gap." The general discussion of data gaps includes the following:

> Only three shallow groundwater wells exist proximate to the northern end of the San Joaquin River (outside of the area being addressed by the San Joaquin River Restoration Program). Additional nested or clustered monitoring wells are required adjacent to the river on the northern end of the Subbasin to evaluate horizontal and vertical groundwater gradients, and in connection with river stage monitoring, to assess the interconnection between the San Joaquin River and the northeastern end of the Delta-Mendota Subbasin.

(CC-137.)[29] Yet the SMCs section declares the entire ISW SMC to be a "data gap." (CC-219.) This approach is not "reasonable" and is not "supported by the best available information and best available science." (SGMA Regulations § 355.4(b)(1).) It does not bear scrutiny.

First, the designation of the entire basin as having a data gap for ISW ignores the data that does exist. For instance, the GSP acknowledges that nine monitoring sites already exist in the southern part of the subbasin. (CC-220.) But it does not explain why these wells are not being used to describe interactions between pumping and streamflows for the portions of the basin where they exist. Nor does it explain why it has chosen not to use the methodology for characterization of such interaction proposed by CSPA on several previous occasions.[30]

But more fundamentally, the designation of ISW as a blanket data gap allows the GSP to avoid answering the question that SGMA requires answers to. The definition of

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[29] It is unclear whether the additional proposed monitoring wells in the northern portion of the Subbasin will be "nested or clustered" as discussed here.

[30] As the GSAs plan to drill no new monitoring wells south of the Grassland portion, it is unclear why ISWs have been designated a data gap for the entire subbasin when the southern three GSP areas (Aliso, Fresno County, and Farmers) appear to have no plan to gather any further data.

undesirable results, and the definition of what results are significant and unreasonable, is requires inquiry into the causes of those effects and their impacts on beneficial uses, including vulnerable species. (Wat. Code § 10721, def. (x)(6); SGMA Regulations § 354.26.) As DWR's Monitoring BMPs state, the first steps in designing a monitoring protocol are to "state the problem" and "identify the goal."[31]

There is no reason to await construction of six additional wells to begin the work of determining—whatever the data from those wells shows—how, in general, groundwater extractions affect ISWs, GDEs, and species. Analysis of flows, temperatures, and species lifecycles does not depend on the data generated from new wells. And these new wells will not prevent significant and unreasonable effects if the GSAs never investigate what those effects are on beneficial uses and users as required by SGMA.

This approach is unfortunately consistent with the Delta-Mendota GSAs' approach to ISW for years. In the 2020 plans, as pointed out by DWR, no GSP contained acceptable ISW SMCs. (Determination Letter, Staff Report at pp. 34-35.) Designating ISWs as a blanket data gap does not remedy the situation, it simply punts. Again. DWR should not permit these GSAs to continue to avoid answering for their regions' impacts on listed species.

**The Revised GSP Fails to Properly Identify and Characterize GDEs and ISWs**

As discussed in CSPA's previous comment letters, the coordinated and component GSPs fail to adequately characterize, map, and identify GDEs and ISWs. The revisions to the GSP fail to resolve the issues CSPA identified.

As examples, the Northern and Central Delta-Mendota GSP stated, and continued to state, that "Estimates of the timing of gains and/or depletions were unavailable in related literature, and insufficient data were available to estimate the timing of losses and gains in the Northern and Central Delta-Mendota Regions. Such information will be gathered through future monitoring efforts related to this GSP." (Revised Northern and Central Delta-Mendota GSP at 5-175; 2020 Northern and Central Delta-Mendota GSP at 5-175.) CSPA provided a proposed methodology to map location-specific depletions of interconnected surface waters.[32] CSPA provided similar recommendations to other component GSPs in the basin. Yet none of the plans have used CSPA's proposed

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[31] DWR, Monitoring Programs, Protocols, and Sites BMP, at p. 5, available at https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-1-Monitoring-Protocols-Standards-and-Sites_ay_19.pdf (accessed September 18, 2022).

[32] E.g.. Letter from Tom Lippe to Craig Altaire, DWR (May 15, 2020), at p. 17, available at https://sgma.water.ca.gov/portal/gsp/comments/13 (accessed September 16, 2022).

methodology, nor any other methodology, to identify GDEs or ISWs. Nor have they provided a reasoned explanation why they did not.

Moreover, as discussed in CSPA's previous letters, the coordinated and component GSPs still exclude actual and potential GDEs and ISWs despite having two additional years to perform investigations. The SJREC and Northern and Central Delta-Mendota GSPs, for example, continue to exclude managed wetlands in violation of SGMA's definition of ISWs as all surface waters connected by a saturated zone to the aquifer. (SGMA Regulations § 351(o); Revised SJREC GSP at p. 48; Revised Northern and Central Delta-Mendota GSP at pp. 5-176 to 5-177.).) And there are serious issues with the screening out of GDEs when depth to groundwater is greater than 30 feet.[33] And the SJREC GSP has still not field-surveyed its GDE maps to determine whether its maps relate to reality. (SJREC GSP at p. 46.)

**The Revised GSP Improperly Uses Water Year 2013 as Its "Current Conditions"**

The Common Chapter uses water year 2013 to represent "current conditions." (CC-87.) As pointed out in previous comments, this fails to comply with the SGMA Regulations. Section 354.16 states that "Each Plan shall provide a description of current and historical groundwater conditions in the basin, including data from January 1, 2015, to current conditions, based on the best available information. . . ." It is impossible for 2013 to represent "current conditions" when the Regulations require data *starting* in 2015. This is especially egregious as the GSP has failed to update its current conditions for the revisions, despite the fact that 2013 is now almost ten years (and two droughts) ago.

This is particularly problematic as 2013 was one of the driest years on record. This has the potential to bias SMCs. In addition, SMCs for several sustainability indicators are set at the 2015 or 2016 groundwater levels. The full data for these years are not included in the GSP.

**The Revised GSP Fails to Comply with the Public Trust Doctrine and the Waste and Unreasonable Use Doctrine**

CSPA provided lengthy legal comments in 2020 demonstrating that the coordinated and component GSPs have failed to comply with the public trust doctrine and the waste and unreasonable use doctrine.[34] None of the revisions to the coordinated and component GSPs address these concerns. As DWR is also bound to consider and abide by these doctrines, it must find the coordinated and component GSPs inadequate. (*Environmental Law Foundation v. State Water Resources Control Board* (2018) 26

[33] *Ibid*, Ex. 2 at p. 2.

[34] CSPA 2020 Letter, at pp. 10-14.

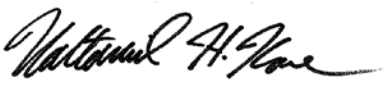
Cal.App.5th 844, 865.)

In particular, DWR must recognize that allowing pumping up to the purported sustainable yield figure in the GSP would be unreasonable. It would permit significant additional pumping beyond levels that DWR has already determined constitute critical overdraft with significant economic, social, and environmental effects.

**DWR Must Find the Delta-Mendota GSP "Inadequate"**

In light of the foregoing deficiencies, DWR must find that the GSP is inadequate. The failures to comply with SGMA are many and—especially with regard to the failure to address overdraft, the inflated sustainable yield figure, and the failure to adopt adequate SMCs—go to the heart of the coordinated and component GSPs' approach to groundwater management. It is highly unlikely that minor revisions in a 2025 update will address these issues. DWR should find the Plan inadequate.

Sincerely,



Nathaniel Kane
Executive Director
Environmental Law Foundation

Attorneys for California Sportfishing
Protection Alliance

# EXHIBIT A

cbec
eco engineering
Hydrology | Hydraulics | Geomorphology | Design | Field Services

August 19, 2022

Mr. Nathaniel Kane, Executive Director
Environmental Law Foundation
1222 Preservation Park Way, Suite 200
Oakland, CA 94612

Subject: Review of Revised Groundwater Sustainability Plans
Delta-Mendota Groundwater Subbasin

Dear Mr. Kane:

I have been retained by your Foundation to review the Revised Groundwater Sustainability Plans (GSP) for the Delta-Mendota (DM) Groundwater Subbasin. As you are aware, I have previously reviewed and reported on the adequacy of the Draft and Final DM subbasin GSPs per my comment letters dated October 11, 2019, and May 14 and 15, 2020, respectively. My current review of the Revised GSPs focused on the Common Chapter[1] with cross-referencing against the Revised GSPs for the Northern and Central and Grassland Delta-Mendota Regions. Based on the findings, it is my opinion that the Revised GSPs remain deficient in several areas. The rationale for this opinion is based on the findings presented below.

**Comments on Chapter 4 - Subbasin Setting**

1. The GSPs uses WY2013 to represent current conditions (pg. CC-87). My 2019 comment that this year falls outside (predates) the range of SGMA defined "current conditions" still applies. The introductory paragraph to SGMA Regulations 354.16 indicates current conditions include "data from January 1, 2015, to current conditions". WY2013 falls outside of this range.

2. The second to last sentence on page CC-92 states there is little variation in seasonal groundwater

[1] The edited version of the Common Chapter was reviewed as presented in Appendix B to the San Joaquin River Exchange Contractors GSP and cited page numbers in the Common Chapter presented herein refer to this version.

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level elevations in the Upper Aquifer during 2013. Based on my review of groundwater level hydrographs for 2013 there appears to be +/- 30' of water level variation in some wells. The GSP does not define "little" and there are certainly significant implications to 60 feet of water level variation with respect to interconnected surface water (ISW) and groundwater dependent ecosystems (GDE).

3. In the second paragraph on pg. CC-140 (Land Surface Water Budget section), item (2) states that groundwater production rates applied to the Projected Land Surface Water Budget would be equivalent to historical extractions for a given year type. This implies there would be no reduction in groundwater production as part of GSP Projects and Management Actions even though water budget results indicate overdraft conditions would continue under future (projected) conditions (as elaborated below). Thus, The GSP has not demonstrated an approach to sustainably manage groundwater in the subbasin.

4. In the last paragraph on pg. CC-140 item (3) (Surface Water Inflow) addresses seepage from surface water to the aquifer. However, there is no discussion of how seepage from the aquifer to the river (gains) are addressed. The GSP states (pg. CC-120) that there are gaining reaches in the lower river especially between the Stanislaus and Merced Rivers, but I found no data or description on how these gains are factored into the Groundwater Water Budget. If seepage from the aquifer to the river is factored into the water budget (i.e., currently a missing outflow variable), it would represent an increase in the total groundwater outflows from storage resulting in higher annual depletions in groundwater storage than those calculated.

5. The last sentence on page 10 of Technical Memorandum #1 in Appendix B to the Common Chapter states the following. "*In summary, the most detailed range for the upper aquifer sustainable yield is calculated using the above formula for both categories of water budgets: projected baseline with climate change factors and projected baseline with climate change factors plus projects and management actions. The 10% factor is applied to the results for both categories. This range aims to demonstrate the Subbasin's upper aquifer sustainable yield without implementing any projects and management actions (low end of range) and how the Subbasin's upper aquifer sustainable yield will be impacted by implementing planned projects and management actions (high end of range)."* However, only the results of the Projected Groundwater Water Budget with climate change (CC) and projects and management actions (PMA) are presented in Section 4.3.3 starting on pg. CC-148 of the Common Chapter. Regardless, based on my review of Section 354.18 (c)(3) of SGMA Regulations, it appears to me that the projected baseline water budget includes the planned projects and management actions without incorporating climate change and that this "baseline" (i.e., without climate change) is used to evaluate for changes by comparison against a water budget that includes projections of climate change. Thus, the projected baseline water budget is not presented in the Common Chapter as required under SGMA.

6. The results of the Historic Water/Groundwater Budget (Table CC-11 on pg. CC 150-151) are graphically depicted in Figures CC-49 (pg. CC-102) and CC-50 (pg. CC-103) for the upper and lower aquifers, respectively. Over the historic period (2003-2013), there is a net decline in groundwater

storage of 624 KAF and 375 KAF in the upper and lower aquifers, respectively. These results illustrate how the DM groundwater subbasin is in overdraft.

Figure CC-64 (pg. CC-162) presents the results of the annual and cumulative change in storage in the upper and lower aquifers for the Groundwater Water Budget including CC and PMA. Even with implementation of PMA, these results indicate the basin will continue to be in overdraft as the at the end of the simulation period, there is a net decline in storage of around 150 KAF in the upper aquifer and decline of 600 KAF in the lower aquifer. This shows that the proposed projects and management actions will not achieve sustainable yield in either aquifer. It is also worth noting that the trend lines plotted on this figure are misleading and there is no description of what they represent or how they were generated. As drawn, the trend lines imply increasing cumulative storage in the Upper Aquifer and no change in cumulative storage in the Lower Aquifer, when water budget results indicate a decline in aquifer cumulative storage in both aquifers.

7. The last sentence on pg. CC-163 states that the sustainable yield for the upper aquifer is 403 KAF/yr. This value was derived using the formula presented in the middle of the same page. The first sentence at the top of the page defines sustainable yield as, "*the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result*." Pursuant to SGMA, the sustainable yield value defines how much groundwater can be safely pumped out of the aquifer without causing undesirable results. Using the Groundwater Water Budget data (Table CC-11, pg. CC-150), the average annual pumping from the upper aquifer for the historic period is 377,889 AF. The average annual pumping volume from the upper aquifer for the Projected Water Budget (Table CC-15, pg. CC-157) is 348,193 AF. In both the Historic and Projected Water Budgets, there is a net (long-term) decline in upper aquifer storage over these periods, indicating the aquifer is not being sustainably managed. It is my opinion that pumping at an average annual rate of 403,000 AF (i.e., sustainable yield estimate), would only lead to worse long-term storage conditions in the upper aquifer as this value is much higher than the average annual pumping rates derived from the Historic and Projected Water Budgets. This will lead to undesirable results in the form of chronic lowering of groundwater levels, significant and unreasonable reduction of groundwater storage, continued land subsidence, and significant depletions of interconnected surface water.

8. Sustainable Yield (Section 4.3.4, starting on pg. CC163)

    a. The Common Chapter reports an annual sustainable yield value of 101,000 AF for the Lower aquifer (last sentence on pg. CC-165). This value was derived based on changes in aquifer storage volumes estimated from land subsidence rates from a study conducted in the Westlands Water District GSA. A technical description of this method is not provided and cannot be verified by review of the Common Chapter. As a practicing hydrogeologist, I have not seen this approach based on subsidence rates used before. It is also dubious how the sustainable yield estimate of 250 KAF derived from land subsidence rates is adjusted to 101 KAF "*based on observed extractions from the Lower aquifer during WY2015*". Again, not only is the land subsidence method neither described nor presented in the Common Chapter for review, a description of how the value is reduced by 60% based on observed extractions from the aquifer in WY2015 is also not presented. It is contradictory that the subsidence-based sustainable yield value can be cut in half based on "observed extractions", yet these same data are not sufficient for use in the Water Budget.

b. The Common Chapter does not present or provide logical rationale for disregarding the sustainable yield estimate for the Lower aquifer from the Projected Water Budget. The stated argument (first sentence of third paragraph on pg. CC-165) that the "*distribution of know Lower aquifer water level data and extraction volume data are not sufficient to allow for an accurate calculation of Lower Aquifer sustainable yield utilizing the same methodology as for the Upper aquifer*" does not convince me that the water budget approach would be less accurate than an estimate derived from a method based on projection of existing subsidence rates.

c. The average annual pumping rates calculated from the Historic and Projected Water Budget tables provide a cross-check to the estimated sustainable yield estimates. The average annual pumping rates from the Lower aquifer for the Historic period was 43,000 AF and 56,702 AF for the Projected (future) period (including projects and management actions). Both values are much lower than the 101,000 AF sustainable yield estimate presented in the Common Chapter. Although not presented in the Common Chapter, I calculated the Lower aquifer sustainable yield estimates from the Historic and Projected Water Budgets tables using the methodology and equation presented on page CC-163. The sustainable yield value for the Historic period is 7,500 AF and 40,702 AF for the Projected future period, which again, includes the project and management actions. I agree with the Common Chapter that more and better data are needed to estimate the sustainable yield for the Lower aquifer, but there is compelling information to indicate it will be much lower than the 101,00 AF estimate presented.

**Comments on Chapter 5 – Sustainable Management Criteria (SMC)**

9. Section 5.4.1 Chronic Lowering of Groundwater Levels (starting on pg. CC-170): The first paragraph of this section states GSAs are committed to maintaining groundwater levels above historic low conditions to avoid undesirable results and prevent further decrease of groundwater levels. This section then goes on to state that SMCs for this indicator were developed using historical records of groundwater levels. It would be very helpful and informative to see the Minimum Threshold (MT) and Measurable Objective (MO) values plotted in relationship to historic groundwater levels. However, these data and analysis are not presented in the Common Chapter or Appendices. Therefore, it isn't possible to evaluate or reproduce the analysis used to develop the SMC.

10. Table CC-16 (starting on pg. CC-197) SMC for Chronic Lowering of Groundwater Levels:

    a. The MT is based on groundwater levels from WY2016. WY2016 is a dry year-type following 3 consecutive critically dry water years (2013-2015) and another dry year (2012) per the San Joaquin River index. Apart from the well hydrographs plotted in Figures CC-42 through CC-44 (pgs. CC-95-97), the Common Chapter does not provide any groundwater level data for the 2012-2016 period. Based on changes in storage estimates for similar dry water year-types presented in the Historic period water budget, I would expect aquifer storage decreased through the 2012-2016 period, reaching a minimum in 2016, which can be demonstrated as follows. Per the footnote on pg. CC-138, the projected water budget (Table CC-15) uses the actual data from water years 2014-2017. Although not analyzing the full 2012-2016 period, projected water budget results indicate a cumulative loss of storage in the upper aquifer of

-925,000 AF and loss of -598,000 AF in the lower aquifer (total groundwater storage loss of -1,523,000 AF) for the 2014-2016 period[2]. It is also my opinion that there is a high probability that there were undesirable impacts associated with low water levels and aquifer storage occurring in the years preceding 2016. Therefore, setting the MT to 2016 water levels is setting the bar too low and there are likely undesirable results that would occur at water levels higher that likely occurred in 2013-2015. Again, this opinion cannot be substantiated or refuted without analysis of water level and water budget data for the 2012-2016 period.

b. There is no discussion or justification for the MO as defined. Why are seasonal high groundwater levels used in lieu of seasonal low levels? Undesirable conditions are more likely be manifested in association with seasonal lows than seasonal highs. Why was the year 2015 selected for establishing the MO? Without technical background and rationale, the evaluation of this MO is not feasible. If the basin is in overdraft during WY2015, setting the MO to this level will perpetuate that undesirable condition.

c. Both compliance with the MT and MO is based on comparing a 4-year rolling average of annual groundwater level measurements to the SMC. However, this approach masks any undesirable results that occur for shorter durations, such as a 1-, 2- or 3-year period.

d. This is the only SMC to mention GDEs (within MT description). However, there is no discussion on how this MT or MO is protective of GDEs, nor is there water budget or water level data presented for 2016 and 2015 (years in which water levels are used to define MT and MO, respectively) for the reader to independently determine their protection of GDEs. Overall, I believe the Common Chapter does not address SMC for GDEs to the degree required under SGMA.

11. Section 5.4.2 Reduction in Groundwater Storage (starting on pg. CC-204): The SMCs for Chronic Lowering of Groundwater are used as the SMCs for Reduction in Groundwater Storage. However, the Common Chapter does not demonstrate that beneficial uses are not impacted when groundwater levels reach the MT and MO levels. It would be logical to extend either the Historic or Current water budget period to include 2015 and 2016 (i.e., years used to establish MT and MO) to demonstrate that the basin is not in overdraft and that these SMC are protective of beneficial uses. How can an MO be established using 2015 water levels without a complete analysis of aquifer storage conditions during that time?

12. Table CC-18 (pg. CC-205) SMC for Reduction of Groundwater Storage: The sustainability goal statement includes providing a 3-year drought buffer. However, there is no discussion how the MO achieves this. If the MO is maintained at 2015 levels (a critically dry year within multi year drought), it is not logical to me that this MO is providing 3-years of drought buffer. If there are undesirable effects occurring in 2015, how can an MO representative of this year by expected to avoid undesirable results.

[2] Per Table CC-15, the annual change in storage in the Upper Aquifer was -428,000, -408,000, and -89,900 AF during water years 20414, 2015, and 2016, respectively. The annual change in storage in the Lower Aquifer was -234,000, -234,000, and -130,000 AF during water years 20414, 2015, and 2016, respectively.

13. Section 5.4.3 Degraded Water Quality (starting on pg. CC-205): The MT is set at 1000 mg/L TDS, which is the California secondary maximum contaminant level (SMCL) upper limit for public health concerns. The MO is simply stated as being a value less than 1000 mg/L. However, the recommended SMCL is 500 mg/L. Why wouldn't the GSP strive to reach the recommended SMCL level?

14. Section 5.4.4 Inelastic Land Subsidence (starting on pg. CC-213): The MT is set at 2-feet of additional inelastic subsidence by 2040, while the MO is stated as no additional subsidence after 2040. This implies that 2-feet of additional subsidence until 2040 is acceptable. Assuming the undesirable results due to subsidence have already started, any further subsidence will continue to damage critical infrastructure (e.g., Delta-Mendota Canal). So how is 2-feet of additional subsidence avoiding an undesirable result?

15. Section 5.4.5 Depletion of Interconnected Surface Water (starting on pg. CC-219): The SMCs for Chronic Lowering of Groundwater are used as the SMCs for Depletion of Interconnected Surface Water. The second to last sentence of the second paragraph in this section states that these SMC are "*understood to be protective of the Depletion of Interconnected Surface Water Sustainability indicator and local natural resources and downstream beneficial uses and users*." However, the Common Chapter does not explain how and why there is this "*understanding*". Justification for how these SMC will be protective needs to be provided – the Common Chapter does not describe when, where and what the undesirable results are or associated groundwater conditions. And again, it is my opinion that the use of MT and MO based on groundwater conditions for dry years (2016 and 2015, respectively) at the end of a multi-year drought would potentially maintain undesirable conditions as discussed above.

Please feel free to contact me with any questions regarding the material and conclusions contained in this letter.

Sincerely,

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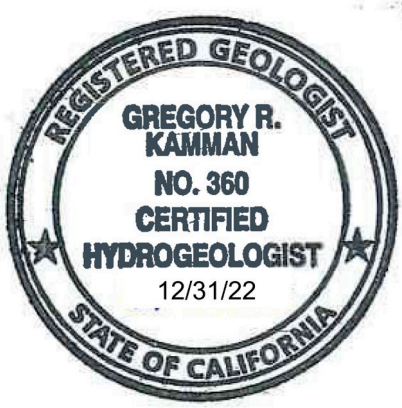


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