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Via email
Board of Directors
Salinas Valley Basin Groundwater Sustainability Agency
P.O. Box 1350
Carmel Valley, CA 93924

Re: 180/400-Foot Aquifer Subbasin GSP Update

Dear Members of the Board:

LandWatch Monterey County (LandWatch) offers the following comments on the draft 180/400-Foot Aquifer Subbasin Groundwater sustainability Plan Update (GSP Update).

LandWatch's comments point to areas in which GSP Update creates roadblocks to management of the subbasin through actions to control extractions.

- First, the decision to abandon the existing extraction-based Minimum Threshold (MT) for storage loss and to adopt an MT based on groundwater levels will frustrate adoption of management actions intended to control extractions because, as staff admit, it is "almost impossible to show a significant correlation between groundwater elevations and 'a total volume that can be extracted.'"[1]

- Second, setting sustainable management criteria based on groundwater levels below sea level prematurely abandons the strategy of restoring and maintaining protective groundwater elevations to control seawater intrusion. This leaves the GSA reliant on the proposed pumping barrier as the sole means to control seawater intrusion, even though this project has not been demonstrated to be feasible either technically or economically.

LandWatch's comments also point out that the SVIHM and SVOM modeling in Chapter 6 is not calibrated with empirical data and presents a water balance that does not in fact balance. In addition, the reports of the modeling output are affirmatively misleading: extractions are stated at the maximum, measured level, but seawater intrusion is stated at the minimum, modeled value, even though the GSP Update admits that this value is not supported. Since the modeling is not even used to determine sustainable yields, it should

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[1] 180/400 GSP Update – Chapter 5 and SMC Discussion, January 2022, pdf page 29, available at https://legistarweb-production.s3.amazonaws.com/uploads/attachment/pdf/1188101/180_400_Update_Ch_5_SMC_discussion_Presentation_20220106.pdf.

be relegated to an appendix and the GSP Update should simply acknowledge that no meaningful modeling is yet available.

Finally, LandWatch objects again that the GSP Update fails to state overdraft conditions clearly by presenting a single measure of overdraft that includes overdraft represented by falling groundwater levels and overdraft represented by seawater intrusion. Instead, the GSP Update repeatedly mischaracterizes overdraft as consisting of only the 800 AFY attributable to falling groundwater levels, ignoring the additional 12,600 AFY overdraft component represented by seawater intrusion. The total overdraft figure, 13,400 AFY, must be clearly stated because the GSP must identify "projects and management actions, including a quantification of demand reductions or other methods, for the mitigation of overdraft." (23 CCR, § 354.44(b)(5).)

LandWatch made these comments in two letters to the 180/400-Foot Aquifer Subbasin Committee dated December 30, 2021 and February 8, 2022 commenting on the draft chapters as they were released to that Committee.[2] As discussed below, the GSP has not been revised to address these comments. In some instances, the response to comments document posted by staff states that the GSP Update will be revised, yet no revisions were in fact made.[3] Since a GSP must demonstrate that the GSA "has adequately responded to comments that raise credible technical or policy issues with the Plan," LandWatch asks that the current GSP draft be revised to address these comments. (23 CCR, § 355.4(b)(10).)

1. **SGMA <u>requires</u> the groundwater storage loss SMCs to be specified in terms of extractions, not groundwater levels. Groundwater levels may be used as a <u>monitoring</u> proxy, but not as a substitute for the storage loss SMCs themselves. Nor is there authority to use seawater intrusion as a substitute for the storage loss SMCs. Furthermore, the GSP does not demonstrate the required significant correlation between groundwater elevations, seawater intrusion, and storage loss because it relies on the SVIHM, which is not correlated with these data.**

We reiterate the comments made in our December 30, 2021 letter regarding sustainable management criteria (SMCs). In summary, we objected that specifying the storage loss minimum threshold (SMC) in terms of changes to groundwater levels and seawater intrusion is inconsistent with 23 CCR Section 354.28(c)(2), which expressly provides that the minimum threshold (MT) must be specified as an extraction limit, i.e., by identifying

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[2] These letters are available at https://svbgsa.org/wp-content/uploads/2022/03/Comment-Letters-for-Update_20220224.pdf.

[3] See 180/400 GSP Update – Comments and Actions, March 2022, available at https://svbgsa.org/wp-content/uploads/2022/03/180_400_Update_Comments-and-Actions.pdf.

"a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results."

Under the 180/400 GSP previously approved by DWR, the minimum threshold (MT) and measurable objective (MO) are based on extractions and are set at the purportedly sustainable yield level of 112,000 AFY. (180/400 GSP, p. 8-26.) An undesirable result would occur if extractions exceeded the MT/MO in an average hydrological year.

The obvious management intent of the mandate in 23 CCR Section 354.28(c)(2) to set the storage loss SMC in terms of an extraction limit is to provide a clear basis for pumping allocations and other management action that would limit pumping. The GSP Update's use of a proxy for the storage loss SMCs instead of basing them on extraction limits can only complicate, and likely frustrate, the implementation of management actions that would limit pumping, e.g., through fallowing, land retirement, or pumping allocations and controls.

And in fact, it remains unclear how the GSA would use storage SMCs based on groundwater levels changes and seawater intrusion data to manage the subbasin or pumping volumes. Staff acknowledge that under the new method it is "almost impossible to show a significant correlation between groundwater elevations and 'a total volume that can be extracted.'"[4] As staff have acknowledged, DWR's regulations "state pumping is the metric to be used."[5] The regulations facilitate basin management by directly connecting allowed extractions to undesirable results. Even if it were allowable to use a proxy for storage loss SMCs, the GSA has failed to explain how the proposed proxy-based SMCs could be used for subbasin management.

The draft GSP Update argues that the substitution of groundwater levels and seawater intrusion metrics for the extraction-based storage loss SMC is permissible because the regulations permit use of groundwater elevations as a monitoring proxy:

> The GSP Regulations § 354.36 (b) states that: "Groundwater elevations may be used as a proxy for monitoring other sustainability indicators if the Agency demonstrates the following: (1) Significant correlation exists between groundwater elevations and the sustainability indicators for which groundwater elevation measurements serve as a proxy."

(Draft GSP Update, p. 8-30, emphasis added.) Section 354.36(b) is part of the regulations governing monitoring, which do not supersede the separate regulations

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[4] 180/400 GSP Update – Chapter 5 and SMC Discussion, January 2022, pdf page 29, available at https://legistarweb-production.s3.amazonaws.com/uploads/attachment/pdf/1188101/180_400_Update_Ch_5_SMC_discussion_Presentation_20220106.pdf.

[5] *Id.*, pdf page 28.

governing sustainable management criteria. Although the GSA may use groundwater elevations to monitor storage loss, nothing in Section 354.36(b) permits the GSA to simply **substitute** a groundwater level SMC for the storage loss SMC, which must be expressed in terms of an extraction limit per Section 354.28(c)(2).

Furthermore, the GSP fails to demonstrate the "significant correlation" between groundwater elevations and storage loss that is required by Section 354.36(b) even to use the groundwater levels as a monitoring proxy. Here is the GSP's discussion of that correlation:

> Figure 8-6 compares the Subbasin's cumulative change in storage, plotted on the black line, with the average annual change in groundwater elevation, plotted on the blue line. The groundwater elevation change data are derived from the groundwater level monitoring network; the cumulative change in groundwater storage is derived from the SVIHM. Although the data come from 2 sources, the data generally show similar patterns between 1980 and 2016. The decrease in storage modeled by the SVIHM from 1983 to 1998 is not exactly reflected in the change in groundwater elevations, because the modeled storage is dependent on the simulated groundwater elevations in the SVIHM. However, from 1998 to 2016, the cumulative change in storage and annual change in groundwater elevations seem to be more closely related as verified on Figure 8-7.
>
> Figure 8-7 shows a scatter plot of cumulative change in storage and annual average change in groundwater elevation. The blue data points show data for the entire model period from 1980 to 2016 and the orange data points show data from 1998 to 2016. Although, the data for the entire model period demonstrate a weak correlation (R2 =0.3748), a more significant positive correlation exists between groundwater elevations and the amount of groundwater in storage between 1998 and 2016 (R2 =0.8334). The correlation for the 1998 to 2016 period is sufficient to show that groundwater elevations are an adequate proxy for groundwater storage. The data presented on Figure 8-6 and Figure 8-7 are used to establish groundwater elevation as proxies for groundwater in storage for the portion of the Subbasin that is not seawater intruded.

(GSP Update, p. 8-30.)

First, the data do not come from the same sources. Groundwater elevations are from the monitoring network but the storage loss is from the SVIHM model.

Second, the SVIHM model itself is not available to the public and the GSP admits that it is not adequately correlated with observed data. As discussed below, the water balance discussion in Chapter 6 demonstrates that the SVIHM model is not calibrated or correlated with extractions and seawater intrusion and does not accurately predict storage loss. Thus, Chapter 6 presents a modeled water balance in Table 6-8 derived from the SVIHM that simply does not balance. The sum of the line items in Table 6-8 add up to indicate a net storage loss of 54,100 AFY, but Table 6-8 purports to identify the bottom line net storage loss as only 800 AFY. As discussed below, the GSP concludes that the 800 AFY storage loss figure is the best available data, but it is not derived from the SVIHM model. It makes no sense to use a storage loss estimate from the SVIHM to assess the significance of the groundwater and storage loss correlation when the GSP admits that the SVIHM does not accurately model storage loss.

Third, the GSP Update admits that "uncertainties exist in groundwater storage estimates from both the SVIHM and the analyses using groundwater level measurements." (GSP Update, p. 6-21.) The GSP reports a wide range of conflicting storage loss estimates based on groundwater levels, and it also admits that its own storage loss estimate based on groundwater levels "is likely underestimated because it does not account for conditions in the Deep Aquifers, due to lack of data." (GSP Update, p. 6-21.) Thus, there can be no confidence in a groundwater based storage loss estimate, even for monitoring purposes.

Fourth, the GSP's discussion of the purported correlation of the groundwater level data and the modeled storage loss estimates shows only a "weak correlation" over the model period and only a "more significant" correlation in the most recent period. (GSP Update, p. 8-30.) The GSP does not explain how a correlation that is merely "more significant" than a weak correlation attains the regulatory mandate of a "significant correlation."

Furthermore, the GSP's rationale for using groundwater levels as a proxy for monitoring storage loss, cites only the first condition in Section 354.36(b), the condition requiring a significant correlation. Section 354.36(b) also requires that the GSA demonstrate that "[m]easurable objectives established for groundwater elevation shall include a reasonable margin of operational flexibility taking into consideration the basin setting to avoid undesirable results for the sustainability indicators for which groundwater elevation measurements serve as a proxy." (23 CCR § 354.36(b)(2).) The GSP simply does not address this requirement. There is nothing in the methodology used to set the measurable objective for groundwater elevation that even addresses storage loss. The methodology was simply to select a conveniently achievable groundwater level without any consideration of storage loss:

> The methodology for establishing measurable objectives is described in detail in Section 8.6.2.1. A year from the relatively recent past was selected for setting measurable objectives to ensure that objectives are achievable. Figure 8-3 shows that there was a slow downward trend in average groundwater elevations through 2003. Since 2003, water elevations have consistently decreased at a more rapid rate. Groundwater elevations from 2003 were selected as representative of the measurable objectives for the 180/400-Foot Aquifer Subbasin.

(GSP Update, p. 8-21; see also p. 8-14 [Section 8.6.2.1 groundwater level SMCs not set with reference to storage loss].) And the GSP's discussion of the relation of the groundwater level SMC to storage loss is completely circular:

> Reduction in groundwater storage. The chronic lowering of groundwater levels minimum thresholds are identical to the groundwater storage minimum thresholds. Thus, the groundwater level minimum thresholds will not result in an undesirable loss of groundwater storage.

(GSP Update, p. 8-18.) The GSA cannot conclude that there can be no undesirable storage loss result simply by equating the storage loss criterion with the groundwater elevation criterion. In sum, the GSP contains no information to show that the groundwater elevation SMCs contain "a reasonable margin of operational flexibility taking into consideration the basin setting to avoid undesirable results for" storage loss. Section 354.36(b)(2) has not been met.

Finally, nothing in the Regulations permits the GSA to use seawater intrusion as a proxy even for monitoring storage loss. Section 354.36(b), cited by the GSP Update as justification for the new storage loss SMCs, permits only the use of <u>groundwater levels</u> as a proxy – and, again, only a proxy for <u>monitoring</u> purposes, not a proxy for the storage loss minimum threshold, which must be expressed as "a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results." (23 CCR, § 354.28(c)(2).)
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2. **The GSA should not set a groundwater level SMC that is based on groundwater levels below sea level because that level will not mitigate seawater intrusion.**

We reiterate the comments made in our December 30, 2021 letter. In summary, we objected that the GSP improperly sets groundwater level-based SMCs below sea level, and therefore at a value that fails to support attainment of the SMC for seawater intrusion. We objected that accepting groundwater levels below sea level effectively abandons the sustainability strategy of restoring and maintaining groundwater levels at a protective elevation to halt seawater intrusion and commits the GSA to implement the unproven and costly pumping barrier approach to controlling seawater intrusion. This commitment is premature in light of the fact that the GSA has not determined either the technical or economic feasibility of the pumping barrier.

SGMA requires that each minimum threshold must avoid *each* undesirable result because it requires that "basin conditions at each minimum threshold will avoid undesirable results for <u>each of</u> the sustainability indicators." (23 CCR § 354.28(b)(2), emphasis added.) For example, the groundwater level minimum threshold must be "supported by" the "[p]otential effects on <u>other</u> sustainability indicators." (23 CCR § 354.28(c)(1)(B), emphasis added.) This means that each minimum threshold, especially the groundwater level minimum threshold, must be coordinated to ensure that <u>all</u> undesirable results are avoided.

The groundwater level SMCs set at levels below sea level fail to support the seawater intrusion SMCs because they fail to establish and maintain protective elevations.

Similarly, the proposed new storage loss SMCs, based on the same groundwater elevations, do not support the seawater intrusion threshold.

The existing 180/400 GSP approved by DWR acknowledges that its extraction-based SMC for storage reduction is based on its estimate of the long term sustainable yield of the subbasin and that, to halt seawater intrusion, "there may be a number of years when pumping might be held below the minimum threshold to achieve necessary rises in groundwater elevation." (180/400 GSP, p. 8-26.) The approved GSP explains that the existing storage reduction SMC set at long-term sustainable yield would not hinder maintenance of the seawater intrusion SMC:

> Pumping at or below the sustainable yield will maintain or raise average groundwater elevations in the Subbasin. Therefore, the minimum threshold for reduction in groundwater storage will not result in a significant or unreasonable increase in seawater intrusion.

(180/400 GSP, p. 8-27.) However, the change to the groundwater storage SMCs that would rely on groundwater elevations as a proxy instead of relying on sustainable yield extractions may result in an SMC that <u>would</u> hinder attainment and maintenance of the seawater intrusion because it permits groundwater levels below sea level. This would further commit the GSA to the proposed capital-intensive pumping barrier project, a project which the GSA has not yet found to be feasible technically or economically.

As LandWatch has objected, the current GSP deferred the identification of the projects or management actions to halt seawater intrusion by equivocating between (1) the "temporary pumping reductions . . . necessary to achieve the higher groundwater elevations that help mitigate seawater intrusion" or (2) a $102 million coastal pumping barrier requiring perpetual pumping with an annual $9.8 million O&M budget to avoid these temporary pumping reductions. (180/400 GSP, pp. 8-26, 9-52 to 9-55, 9-87.) Under the barrier scenario, the GSP claims that sustainability can be attained with groundwater levels below sea level without the temporary pumping reductions needed to restore protective groundwater elevations. (180/400 GSP, response to comment 8-139.)

The GSP Update's abandonment of the existing extraction-based SMCs would effectively require adoption of the pumping barrier project by setting groundwater level based SMCs below sea-level, an approach that precludes the protective elevation approach to attainment of the seawater intrusion SMC. Even if such a change were lawful, the GSA should not adopt it without understanding the technical and economic feasibility of the pumping barrier approach.

3. **Historical and future water budget tables contain inconsistent line items and do not balance due to inclusion of "adjusted" data that is not reconciled with the modeled data. The admittedly inadequate modeling tables, which are not even used to determine sustainable yield, should be moved to an appendix because they are affirmatively misleading**.

As we objected in our February 8, 2022 comments, the modeling of the historic water budget using the SVIHM and the modeling of the future budget using the SVOM, are not calibrated or reconciled with observed data. Thus, for example, the historic budget in Table 6-8 and the future budget in Table 6-13 use "adjusted," i.e., observed, groundwater pumping, which is tens of thousands of acre-feet greater than the modeled value. The GSP Update does not and cannot explain this calibration failure.

As a result, the line items in the historical water budget in Table 6-8 do not balance, i.e., does not add up to the bottom line "net storage gain" figure. The sum of the line items in Table 6-8 indicates a net storage loss of 54,100 AFY, but Table 6-8 purports to identify the bottom line net storage loss as only 800 AFY. Similarly, the sum of the line items for the "adjusted" 2030 future budget in Table 6-13 indicate a storage loss of 46,500 AFY, not the bottom line 800 AFY storage loss that has been simply plugged into the table.

The GSP does not even <u>use</u> the SVIHM or SVOM modeling to determine sustainable yield. Instead, Table 6-9 determines historic sustainable yield solely on the basis of the following observed data and analysis, which is <u>not</u> the output of the SVIHM model:

- GEMS reported pumping values of 114,800 AFY to 136,600 AFY, not the SVIHM's modeled estimate of 94,500 AFY;

- the 800 AFY storage loss estimated by analysis of groundwater elevation changes, not the SVIHM's modeled estimate of 14,800 AFY; and

- the 12,600 AFY seawater intrusion estimated based on the change in the mapped seawater intruded area analyzed in Chapter 5, not the SVIHM's modeled estimate of 2,900 AFY.

Similarly, Table 6-15's estimate of future sustainable yield uses the same data sources and takes nothing from the SVOM model. The comment responses admit that in order "[t]o base the sustainable yield on the best available data, the sustainable yield draws on observed data." In fact, the sustainable yield calculation draws <u>exclusively</u> on observed data and uses <u>none</u> of the modeled data.

The water budget results in Tables 6-8 and 6-13 are affirmatively misleading because they selectively present the modeled results instead of the observed results when the modeled results tend to understate the severity of existing conditions. For example, the higher GEMS pumping data, which tends to suggest that sustainability can be attained a higher pumping levels. Or for example, Tables 6-8 and 6-13 both use the modeled seawater intrusion result of 2,900 AFY instead of the observed seawater intrusion result of 12,550 AFY determined in Chapter 5. (GSP, p. 3-31, Table 5-3 [observed seawater intrusion].) The response to our comments states that Tables 6-8 and 6-13 will be updated to provide the "observed seawater intrusion rate that is considered more accurate," but this was not done. It is fundamentally misleading to use the lower seawater intrusion figure in Tables 6-8 and 6-13 because it is admittedly not "the best available data" and because it directly conflicts with the seawater intrusion data in Tables 6-9 and 6-15, which determine sustainable yield.

Tables 6-8 and 6-13 are internally inconsistent in the sense that they do not add up, i.e., they are not in balance. The comment responses acknowledge that "a water budget conceptually should balance" and they admit that the modeling does not provide "the best available data." The GSP should be revised to acknowledge that meaningful modeling is still not available, to confine its discussion in Chapter 6 to the observed data that are used to determine sustainable yield, and to relegate the discussion of modeling to an appendix.

4. **The water budget fails to provide a clear statement of the magnitude of overdraft, even though the comment responses said this would be clarified.**

As we objected in our February 8, 2022 comments, the GSP fails to provide an unequivocal quantification of overdraft for either historical or future conditions. SGMA requires an express quantification of overdraft, i.e., "a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions." (23 CCR, § 354.18(b)(5).) The purpose of this requirement is to ensure that the GSP actually mitigates that overdraft:

> If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

(23 CCR, § 354.44(b)(2).)

We objected that the GSP repeatedly implied that the overdraft amounts to just the 600 AFY that was estimated to represent the net storage change for the areas south of the seawater intruded areas. We pointed out that this ignores the fact that seawater intrusion must also be included in the determination of overdraft pursuant to Bulletin 118 and 23 CCR Section 354.18(b)(5).

The response to our comments acknowledges that "[c]hange in groundwater storage is the change in storage due to seawater intrusion and change in storage due to groundwater levels outside the seawater-intruded area." The response also states that Chapter 6 "will be revised to more explicitly point out which numbers are the overdraft numbers." This was not done.

Instead, Chapter 6 continues to imply that overdraft consists only of the change in storage due to change in groundwater levels south of the seawater intruded areas, which has been revised from 600 AFY to 800 AFY. For example,

- Table 6-8 lists the nets storage changes as 800 AFY and then notes that "[t]he net storage value is the estimated historical overdraft based on observed groundwater levels, as described in Sections 5.2.2 and 6.3.2." This entirely omits seawater intrusion from the overdraft figure. Seawater intrusion is estimated to be 12,550 AFY, a figure that dwarfs the 800 AFY reported. (GSP, p. 3-31, Table 5-3.)

- Section 6.4.3 states "[a]s described in Section 5.2.2 for the historical water budget, data indicate that the Subbasin has historically been in overdraft (on the order of 800 AF/yr. decline)." Again, seawater intrusion is omitted.

- Section 6.4.4 states "[a]s described for the historical sustainable yield, data indicate that the Subbasin has historically been in overdraft (on the order of 800 AF/yr. decline, not including the Deep Aquifers). This historical decline in storage is used with the adjusted SVOM pumping estimates to provide a likely more reasonable estimate for projected sustainable yield. Therefore, although change in storage projected by the preliminary SVOM is on the order of -11,000 AF/yr., the historical average change in storage in Table 6-15 is set to a decline of 800 AF/yr." Again, seawater intrusion is omitted.

Nowhere does the water budget state clearly that the overdraft consists of both the loss of storage south of the seawater intrusion area plus the seawater intrusion. Nowhere is the magnitude of that overdraft stated as the sum of the 800 AFY loss of storage south of the seawater intruded area plus the 12,550 AFY average seawater intrusion, totaling 13,350 AFY.

Chapter 6 should explicitly and clearly acknowledge an overdraft condition based on the difference between its sustainable yield estimates and groundwater pumping since that is the amount by which pumping exceeds average long term recharge, an approach consistent with the definition of overdraft in Bulletin 118. Based on the sustainable yield data in Table 6-15, the difference between sustainable yield and pumping, i.e., the portion of pumping that represents overdraft, is 13,400 AFY under 2030 conditions. This is an order of magnitude higher than the 800 AFY overdraft reported for the non-seawater intruded area.

Yours sincerely,

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