

State Water Resources Control Board

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ANTELOPE GROUNDWATER SUSTAINABILITY PLAN, GROUNDWATER SUBBASIN NO. 5-21.54

State Water Resources Control Board (State Water Board) staff are providing these comments in support of the Department of Water Resources' (DWR) review of the Groundwater Sustainability Plan (GSP) for the Antelope Groundwater Subbasin (subbasin).

Our comments on the GSP focus on the following areas:

- Groundwater Levels and Potential Drinking Water Impacts
- Groundwater Quality
- Depletions of Interconnected Surface Water

Groundwater Levels and Potential Drinking Water Impacts

1. The GSP should better clarify how its minimum thresholds (MTs) for declining groundwater levels relate to undesirable results (Wat. Code, § 10721, subd. (x)), how they were developed, and how they could affect beneficial users of groundwater.
 - a) The GSP does not explain how the MTs represent the “point[s] in the basin that, if exceeded, may cause undesirable results.” (Cal. Code Regs., tit. 23, §354.28, subd. (a).) The GSP explains that “chronic lowering of groundwater elevations in the subbasin cause significant and unreasonable declines if they are sufficient in magnitude to lower the rate of production of pre-existing groundwater wells below that necessary to meet the minimum required to support overlying beneficial use(s) where alternative means of obtaining

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sufficient water resources are not technically or financially feasible.” (GSP p. 3-17.)

The GSP then states that MTs in the Upper Aquifer are set to “Spring groundwater elevation where less than 10 - 20% (on average) of domestic wells could potentially be impacted”¹ and MTs in the Lower Aquifer are set to “Spring groundwater elevations minus 20 to 120 feet” (GSP p. 3-17). According to the GSP, an undesirable result would occur “if 25% or more of the [Representative Monitoring Site] wells are below the minimum threshold for two (2) consecutive annual spring measurements” (GSP p. 3-19).

State Water Board staff recommend the GSA more clearly explain how the MTs were selected to avoid “lower[ing] the rate of production of pre-existing groundwater wells below that necessary to meet the minimum required to support overlying beneficial use(s) where alternative means of obtaining sufficient water resources are not technically or financially feasible,” or adjust the MTs accordingly (see also #1b below).

- b) Moreover, while the GSP states that MTs were selected based on the groundwater levels at which 10 to 20 percent of domestic wells would be affected, the GSP does not describe the data or methodology used to determine the MTs or number of wells impacted. The GSP also does not describe how water levels at or near those specific MTs may impact other beneficial users, such as public water supply wells, or land use and property interests, nor does it describe how these interests or domestic well users were considered in setting the MTs. Inasmuch as groundwater levels tend to be highest in the Spring, the GSP’s discussion of its sustainable management criteria (SMC) should include a description of how groundwater conditions at or near MTs during other times of the year may affect beneficial uses and users of water and whether those effects do or do not constitute an undesirable result.

State Water Board staff recommend that the GSA expand the GSP’s discussion of potential impacts the proposed MOs and MTs and projected groundwater management outcomes may have on active domestic wells and public water supply wells, update the GSP with this information, and consider how those effects compare with the GSP’s definition of an undesirable result related to declining groundwater levels (see #1a). Additionally, the GSP should estimate and describe the population and beneficial uses served by the wells in the

¹ Elsewhere, the GSP clarifies that “impacted” means “potentially run dry.” (GSP p. ES-7.)

subbasin which are not protected at MTs (e.g., known uses of the water pumped by the wells expected to be impacted by the MTs, and any known characteristics/data regarding the populations using those wells). In order to ensure that all necessary and relevant information is considered in the GSP, the GSA should engage domestic well users, public water systems and state small systems, and other stakeholders as part of both the analysis and the discussion of what constitutes an undesirable result.

2. If a reasonable conclusion using the GSP's expanded evaluation and projections including the analysis described in #1b is that the proposed allowable decline in groundwater levels could constitute a significant and unreasonable depletion of supply, the GSP should adjust MTs (and amend the analysis described in #1) or otherwise mitigate for impacts to wells. For mitigation, the GSA could expand and commit to the Well Deepening and Replacement management action described in the GSP (GSP p. 5-59) to lessen the significance of the impact by replacing or repairing domestic or drinking water system wells impacted by groundwater level declines. The GSA could also, in lieu of or in addition to well deepening/replacement, support expansion of public water system boundaries to private well communities or consolidation of smaller drinking water systems dependent on at-risk wells with larger public water systems. This would involve identifying vulnerable areas where consolidation or extension of service is feasible. Consolidation efforts may include: (1) providing financial assistance, particularly for low-cost intertie opportunities for wells or systems that are adjacent to larger systems, (2) working with County planning agencies to ensure that communities served by at-risk wells are annexed into the service areas of larger water systems to limit barriers to future interties, and (3) facilitating outreach and introductions between small water systems and owners of domestic wells and larger water systems to assist in developing future partnerships.
3. Staff suggest inclusion of vulnerable local public supply wells and representative vulnerable domestic wells in local groundwater level monitoring programs so that the GSA can refine mitigation programs and re-evaluate MTs where appropriate to better identify and avoid undesirable results before impacts occur.

Groundwater Quality

4. The GSP notes that total dissolved solids (TDS), nitrate, arsenic, and boron are known groundwater quality issues in the subbasin (GSP p. 2B-56); however, the GSP only describes SMC for TDS and does not explain why the GSA did not set SMC for the other three analytes. The GSA should also develop SMC for nitrate, arsenic, and boron based on their prevalence within the subbasin.

Not all water quality impacts to groundwater must be addressed in the GSP, but significant and unreasonable water quality degradation due to groundwater conditions occurring throughout the subbasin, and that were not present prior to January 1, 2015, must be addressed in the GSP's minimum thresholds. Both groundwater extraction and the implementation of projects to achieve sustainability may cause impacts from migration of contaminant plumes, changes in the concentration of contaminants due to reduction in the volume of water stored in the subbasin, or release of harmful naturally occurring constituents. A GSA should particularly consider whether any groundwater quality constituents in the subbasin may affect the State's policy of protecting the right of every human being to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. (Wat. Code, § 106.3.) Staff recommend that the GSA coordinate with agencies that oversee the remediation of existing groundwater contamination, both in re-evaluating MTs and refining the plan of implementation.

5. The GSP's MT concentrations for degraded water quality are set at 750 milligrams per liter (mg/L) TDS (GSP p. 3-22) and MO concentrations are set at 500 mg/L (GSP p. 3-12). For TDS in drinking water, the secondary maximum contaminant level (SMCL) is 500 mg/L—the recommended maximum contaminant level.² Staff recommend that the GSA explain how drinking water users were considered in setting SMC at these concentrations.
6. The GSP does not describe how groundwater level declines allowed under the GSP could affect the GSA's efforts to avoid undesirable results related to groundwater quality degradation. Recently published research by the US Geological Survey (USGS) speaks to how management of groundwater levels may affect groundwater quality at drinking water wells.³ The USGS found that increased pumping from wells during drought can pull shallow, contaminated groundwater down to depths commonly tapped for public drinking-water supply. Staff recommend the GSA consider these findings in evaluating how groundwater level declines could affect groundwater quality at drinking water wells.

² [California Code of Regulations, Title 22, Secondary Drinking Water Standards \(https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/ddw_secondary_standards.pdf\)](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/ddw_secondary_standards.pdf)

³ [Levy, Zeno F., et al. "Critical aquifer overdraft accelerates degradation of groundwater quality in California's Central Valley during drought." *Geophysical Research Letter* \(2021\): e2021GL094398.](#)

Interconnected Surface Water

7. The GSP does not include a characterization of the locations, quantity, and timing of interconnected surface water (ISW) depletions. The GSP Regulations require identification of ISW systems within the subbasin and monitoring of surface water and groundwater, where ISW conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater (Cal. Code Regs., tit. 23, § 354.34, subd. (c)(6)). Staff recommend the GSA further evaluate the potential locations, quantity, and timing of stream depletions, perform more detailed analysis of impacts to beneficial uses and users based on the results, and assess what level of depletions would be significant and unreasonable given the analysis.
8. The GSP uses the groundwater elevation MTs as a proxy for also managing depletions of ISW in the subbasin; however, the GSP does not demonstrate why the groundwater levels are a reasonable proxy for undesirable results for depletions of ISW. Staff recommend that the GSA explain how MTs set based on groundwater elevations could affect the locations, quantity, and timing of ISW depletions and consequently impact beneficial users of surface water. If a reasonable conclusion from that analysis is that the proposed allowable decline in groundwater levels could result in significant and unreasonable adverse impacts on beneficial uses of ISW, the GSA should develop MTs specific to depletions of ISW.
9. The GSP lacks a detailed discussion of the GSA's plan for filling gaps in the monitoring network for depletions of ISW. The groundwater level monitoring network wells in the upper aquifer also serve as the monitoring network for ISW (GSP p. 3-42). The GSP notes extensive data gaps in the existing ISW monitoring network due to the distance between wells and groundwater-dependent ecosystems (GDE), the lack of shallow monitoring wells, or no correlation between water level data to GDE health indicators (GSP p. 3-49). The GSP states that the GSA will install shallow monitoring wells and stream gages near areas of concern but does not provide locations or descriptions of any proposed monitoring sites (GSP p. 3-49).

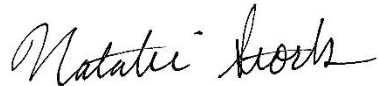
The GSP should include a more detailed description of the GSA's plan and timelines for filling monitoring network gaps; this description should include an explanation of why the proposed monitoring network improvements would be adequate for characterizing the locations, quantity, and timing of ISW depletions and evaluate the effects and effectiveness of GSP implementation.

10. The GSP lists additional studies of GDE and groundwater-surface water interactions as a potential activity in the Projects and Management Actions chapter. (GSP p. 4-63.) The GSP should include an outlined plan and timeline to fill data gaps regarding the location (extent), quantity, and timing of interconnection in the

subbasin. The GSA should reach out to surface water users and the California Department of Fish and Wildlife for input in the development of these SMC.

If you any have questions regarding these comments, please do not hesitate to contact State Water Board Groundwater Management Program staff by email at SGMA@waterboards.ca.gov or by phone at 916-322-6508.

Sincerely,

A handwritten signature in cursive script that reads "Natalie Stork".

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Office of Research, Planning, and Performance