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Via Mail and Electronic Mail

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**Subject: Comments on the Merced Subbasin Draft Groundwater Sustainability Plan**

Dear Mr. Eltal:

The California Department of Fish and Wildlife (Department) Central Region is providing comments on the Merced Subbasin Draft Groundwater Sustainability Plan (GSP) prepared by Merced Subbasin Groundwater Sustainability Agency (Merced Subbasin GSA, MSGSA), Turner Island Water District GSA, and Merced Irrigation-Urban GSA pursuant to the Sustainable Groundwater Management Act (SGMA). As trustee agency for the State's fish and wildlife resources, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species (Fish & Game Code §§ 711.7 and 1802).

Development and implementation of GSPs under SGMA represents a new era of California groundwater management. The Department has an interest in the sustainable management of groundwater, as many sensitive ecosystems and species depend on groundwater and interconnected surface waters. SGMA and its implementing regulations afford ecosystems and species specific statutory and regulatory consideration, including the following as pertinent to Groundwater Sustainability Plans:

- Groundwater Sustainability Plans should identify and consider impacts to groundwater dependent ecosystems pursuant to 23 CCR § 354.16(g) and Water Code § 10727.4(l);
- Groundwater Sustainability Agencies should consider all beneficial uses and users of groundwater, including environmental users of groundwater pursuant to Water Code § 10723.2 (e); and Groundwater Sustainability Plans should identify and consider potential effects on all beneficial uses and users of groundwater pursuant to 23 CCR §§ 354.10(a), 354.26(b)(3), 354.28(b)(4), 354.34(b)(2), and 354.34(f)(3);

- Groundwater Sustainability Plans should establish sustainable management criteria that avoid undesirable results within 20 years of the applicable statutory deadline, including depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water pursuant to 23 CCR § 354.22 *et seq.* and Water Code §§ 10721(x)(6) and 10727.2(b) and describe monitoring networks that can identify adverse impacts to beneficial uses of interconnected surface waters pursuant to 23 CCR § 354.34(c)(6)(D); and
- Groundwater Sustainability Plans should account for groundwater extraction for all Water Use Sectors including managed wetlands, managed recharge, and native vegetation pursuant to 23 CCR §§ 351(a) and 354.18(b)(3).

Accordingly, the Department values SGMA groundwater planning that carefully considers and protects groundwater dependent ecosystems and fish and wildlife beneficial uses and users of groundwater and interconnected surface waters.

## COMMENT OVERVIEW

The Department supports ecosystem preservation in compliance with SGMA and its implementing regulations based on Department expertise and best available information and science.

The Department recommends the GSP provide additional information and analysis that considers all environmental beneficial uses and users of groundwater in its sustainability management criteria and better characterize or consider surface water-groundwater connectivity. In addition, the Department is providing additional comments and recommendations below.

## COMMENTS AND RECOMMENDATIONS

The Department comments are as follows:

1. **Comment #1** (Basin Setting, 2.2.7 Groundwater-Dependent Ecosystems, pp 2-110): GDE identification, pursuant to 23 CCR § 354.16 (g), is based on a limited data set to demonstrate exclusion of risk to ecosystems that may depend on groundwater.
  - a. *Issue:* Methods applied to the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset to eliminate potential GDEs are not robust.

- i. Depth to Groundwater: The removal of 'areas with a depth to groundwater greater than 30 feet in Spring 2015' relies on a single-point-in-time baseline hydrology, specifically a point in time that is several years into a historic drought when groundwater levels were trending significantly lower due to reduced surface water availability. Exclusion of potential GDEs based on this singular groundwater elevation measurement is questionable because it does not consider representative climate conditions (i.e. seasons and a range of water type years) and it does not account for GDEs that can survive a finite period of time without groundwater access (Naumburg et al. 2005), but that rely on groundwater table recovery periods for long term survival.
  - ii. Adjacent to Irrigation or Surface Water: The removal of potential GDEs that are 'adjacent to irrigated fields' or 'depending on adjacent losing surface water bodies' does not consider GDE's adaptability and opportunistic nature in accessing water supply.<sup>1</sup> The GSP assumes that these potential GDEs are accessing and primarily dependent on irrigation water or surface water discharges based on proximity to a surface water source, but this assumption is poorly justified and there is no acknowledgement of the potential for shifting reliance between surface and ground water. Additionally, GDEs that are near an *interconnected* surface water bodies may depend on sustained groundwater elevations that stabilize the gradient or rate of loss of surface water; meaning ecosystems near interconnected surface waters may depend on sustainable groundwater elevations. Therefore, it is possible that any of these potential GDEs rely on groundwater during specific seasons or water year types.
- b. *Recommendations*:
- i. Depth to Groundwater: Develop a hydrologically robust baseline from which to remove 'areas with a depth to groundwater greater than 30 feet' that relies on multiple, climatically representative years of groundwater elevation and that accounts for the inter-seasonal and inter-annual variability of GDE water demand.

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<sup>1</sup> The Department assumes that potential GDEs removed under this step overlie shallow groundwater, otherwise they would have already been removed during the step of excluding potential GDEs that overlie a depth to groundwater of 30+ feet.

- ii. Adjacent to Irrigation or Surface Water: Reevaluate potential GDEs previously removed due to proximity to irrigated lands or a losing surface water body. The Department recommends the GSP be more conservative and all-inclusive until there is evidence that the overlying ecosystem has no significant dependence on groundwater across seasons and water year types. The Department advises that these riparian GDE beneficial users of groundwater and surface water are carefully considered in the analysis of undesirable results and minimum thresholds for depletions of interconnected surface waters.
  - iii. Include additional references for evaluation: The Department recognizes that NCCAG (Klausmeyer et al. 2018) provided by Department of Water Resources (DWR) is a good starting reference for GDE's; however, the Department recommends the GSP included additional resources for evaluating GDE locations. The Department recommends consulting other references, including but not limited to: California Department of Fish and Wildlife (CDFW) (2019) VegCAMP, CDFW (2019) CNDDDB, California Native Plant Society (CNPS) (2019A and 2019B), Klausmeyer et al. (2019), Rohde et al. (2018), The Nature Conservancy (TNC) (2014), U.S. Forest Service (USFS) (2019) CalVeg, U.S. Fish and Wildlife Service (USFWS) (2018) NWI, USFWS (2019), and Witham et al. (2014).
2. **Comment #2** (Basin Setting, 2.3.3.3 Projected Water Budget, starting pp 2-117):  
The Department is concerned the projected water budget assumptions risk overestimating water availability by not relying on best available information pursuant to 23 CCR § 354.18(e).
  - a. *Issue*: Key water budget assumptions, which potentially underscores sustainable yield estimates, risk overestimating water availability. Overestimation of water availability could result in the overallocation of both surface and groundwater water resources, potentially impacting environmental beneficial users. It is recommended the three water budget assumptions include additional best available information that improves sustainable yield allocation. Specifically, the Department is concerned that: 1) the first 25 years of the 'Projected Conditions Baseline' assumes static basin conditions and only considers expected population, land use, and water demand/supply projections starting in 2040, discounting the first 25 years of change; 2) the climate change analysis that predicts a net depletion of aquifer storage is not reflected in the projected water budget; and 3) projected surface water deliveries appear to not reflect anticipated regulatory reductions of surface water deliveries such as those codified in

the State Water Resources Control Board Water Quality Control Plan for the Bay Delta: San Joaquin River Flows and Southern Delta Water Quality.

- b. *Recommendation*: The Department recommends amending the water budget and sustainable yield to reflect: 1) a refined understanding of changing water demands over the next 25 years; 2) application of climate change estimates; and 3) adjusted, regulatorily-compliant surface water delivery estimates. These adjustments should improve projected water availability and provide a more realistic sustainable yield.
3. **Comment #3** (Sustainable Management Criteria, starting pp 3-1): Sustainable Management Criteria does not appear to protect against undesirable results for fish and wildlife beneficial uses and users of groundwater and interconnected surface waters.
- a. *Issues*:
    - i. Proxy Metrics: Before addressing the individual sustainability criteria that are applied to both Groundwater Levels and Depletions of Interconnected Surface Water, the Department does not concur with the use of groundwater elevations as a proxy metric for Depletions of Interconnected Surface Water. The GSP does not provide adequate documentation that a “significant correlation exists between groundwater elevations” [23 CCR § 354.36(b)(1)] and Depletions of Interconnected Surface Water. Instead, the GSP seems to use a circular reference to get to the proxy metric by associating the proposed Groundwater Level minimum threshold with the absence of significant and unreasonable surface water depletions and by claiming that “historical depletions of interconnected surface water in the Subbasin are not considered significant and unreasonable” (GSP pp 3-19, 4<sup>th</sup> paragraph under Justification of Groundwater Levels a Proxy). The GSP offers few details to substantiate this claim and does not share specifics on the modeling exercise used to determine the insignificance of surface water depletions. Considering the status of surface water allocations and aquatic ecosystems on the Merced River, the Department believes that any surface water depletions attributable to groundwater pumping are likely significant, particularly when contrasted with the benchmark year of 2015, which was the third documented consecutive critical dry year in a drought cycle.

If a significant correlation is lacking between Groundwater Elevations and Depletions of Interconnected Surface Waters, particularly at the representative monitoring well locations used to track groundwater

elevations, then groundwater elevations used as a proxy for surface water depletions may misinform groundwater management activities and poorly predict instream habitat conditions for fish and wildlife species. Accordingly, the Department does not concur that the subsequent application of Groundwater Level sustainable management criteria to Depletions of Interconnected Surface Water is appropriate, as it is not grounded in a quantifiable and site-specific understanding of surface water-groundwater connectivity pursuant to 23 CCR § 354.28 (c)(6)(A).

- ii. Undesirable Results: Current Groundwater Level undesirable results do not mention impacts to environmental beneficial users (pp 3-3). Additionally, the method used to identify undesirable results for Groundwater Levels (i.e., minimum threshold exceedances in groundwater elevation) does not account for dry or critically dry years and is applied to the identification of undesirable results for the Depletions of Interconnected Surface Water. The measure of 25% of monitoring wells falling below their minimum thresholds for two consecutive (non-dry) years may have little relevance to accurately identifying undesirable results for Depletions of Interconnected Surface Water. Firstly, the GSP does not provide data that a relationship between representative monitoring wells and depletions of surface waters exists. Secondly, the indicators of undesirable results are tolerant of exceeding minimum thresholds and do not take into account dry water years suggesting undesirable results may be well underway and impacting ecosystems, before they are identified. Effectively, the GSP does not connect identification of undesirable results for Depletions of Interconnected Surface Waters to impacts on surface water beneficial users. Finally, the GSP notes that groundwater levels that fall below the minimum threshold during hydrologically dry or critical years are not considered to be an undesirable result (pp 3-4), which results in no groundwater management actions to mitigate impacts in the most challenging of times for water resources management.
- iii. Minimum Thresholds and Measurable Objectives: Minimum thresholds and measurable objectives for Groundwater Levels, and by proxy, for Depletions of Interconnected Surface Waters, are not protective of environmental beneficial uses and users of groundwater. Minimum thresholds allow for a significant decrease of groundwater elevation from 2015 for almost all representative monitoring sites, and measurable objectives are set at projected future average groundwater levels as predicted by the Merced Water Resources Model sustainable yield simulation. These sustainability

criteria suggest that: 1) groundwater elevations at representative wells can continue to decrease for the next 20 years from a benchmark date derived several years into a historic drought in a basin already designated *Critically Overdrafted* without witnessing undesirable results (pp 3-9); and 2) measurable objectives for groundwater levels match average groundwater levels necessary to meet sustainable yield (pp 3-7). The Department is concerned that the decline in terrestrial and aquatic groundwater dependent ecosystem health around the 2015 benchmark has already been demonstrated to have impacts to beneficial uses and further groundwater decline will undoubtedly lead to significant impacts for fish and wildlife beneficial uses and users of groundwater and interconnected surface waters under these sustainability criteria. In addition, groundwater levels above the minimum threshold and below the measurable objective (in the margin of operational flexibility), which are acceptable according to the GSP, will not allow the basin to achieve sustainability in the long run.

b. *Recommendation:*

- i. Proxy Metrics: To justify use of groundwater elevations as a proxy metric for Depletions of Interconnected Surface Water, the Department recommends the GSP specify how groundwater elevations are significantly correlated to surface water depletions; and define an expeditious path to identifying the location, quantity, and timing of surface water depletions caused by groundwater use, pursuant to 23 CCR § 354.28(c)(6)(A), to better inform sustainability criteria for Depletions of Interconnected Surface Water.
- ii. Undesirable Results: The Department recommends a discussion of Groundwater Level undesirable results for environmental beneficial users of groundwater during dry and critical water years and provide measurable undesirable result indicators for Depletions of Interconnected Surface Waters that are relevant to beneficial users of surface water.
- iii. Minimum Thresholds and Measurable Objectives: Reconsider minimum thresholds and measurable objectives, accounting for undesirable results for fish and wildlife beneficial uses and users of groundwater and interconnected surface water.

4. **Comment #4** (Sustainability Criteria, 3.6 Degraded Water Quality, starting pp 3-10): The Department does not concur that GSP abdicates responsibility for some

constituents by incorrectly claiming no nexus between some contaminants and “increasing or decreasing pumping” (GSP pp 3-12).

- a. *Issue:* The GSP states that “GSAs do not have control over the presence of [naturally occurring constituents such as arsenic, uranium, iron, and manganese] in aquifer materials,” (GSP pp 3-12) and therefore, the GSP does not set threshold for these constituents claiming “there is no demonstrated local correlation between fluctuations in groundwater elevations and/or flow direction and concentrations of these constituents at wells.” Conversely, over-pumping of aquifers has the potential for clay layers to compress and release dissolved arsenic, as well as high rates of pumping in deep wells drawdown shallow water, resulting in an increase of dissolved uranium in extracted water (Fendor et al. 2019). Thus, pumping actions can affect the presence, movement, and concentration of naturally occurring constituents in groundwater. The GSP cites arsenic and uranium as the primary naturally occurring constituents of concern (GSP pp 2-76).
  - b. *Recommendation:* Establish a plan to investigate the relationship between groundwater pumping and the presence, movement, and concentration of arsenic and uranium in the Merced Subbasin and develop sustainability criteria accordingly for these constituents by the first 5-year plan update in 2025.
5. **Comment #5** (Monitoring Networks, starting pp 4-1): Shallow groundwater monitoring wells are lacking.
- a. *Issue:* The current monitoring network lacks a representative distribution of shallow groundwater monitoring wells sufficient to monitor impacts to environmental beneficial uses and users of groundwater pursuant to 23 CCR § 354.34(2). Few monitoring wells are near interconnected surface waters or concentrated GDEs; and therefore, there are few data points on shallow groundwater level trends that are important to understanding groundwater management impacts on fish and wildlife beneficial uses and users of groundwater, including GDEs and interconnected surface water habitats.
  - b. *Recommendation:* The Department recommends a plan to install additional shallow groundwater monitoring wells near GDEs and interconnected surface waters, potentially to be paired with streamflow gauges for improved understanding of surface water-groundwater interconnectivity.



6. **Comment #6** (Project and Management Actions, 6.2.2 Merced Subbasin GSA Groundwater Demand Reduction Management Actions, starting pp 6-5): Demand reduction management actions lack specificity critical to timely implementation and sustainability goal achievement.
- a. *Issue:* The Department understands development of sustainable yield allocations within 5 years of implementation will result in the quantification of demand reduction requirements for distinct responsible parties. However, in contrast to supply augmentation project and management actions, demand reduction management actions lack implementation details. This lack of specificity on how demand will be managed may lead to deprioritization or delayed implementation of demand management actions, which can undermine a basin's ability to achieve sustainably goals.
  - b. *Recommendation:* The Department recommends including specific measures for initiating demand reduction on an earlier timeline in the Merced Subbasin to account for groundwater pumping lag impacts, implementation challenges, and scaled ramping-down of groundwater use that is a necessary ingredient in San Joaquin Valley long-term groundwater sustainability.

## CONCLUSION

In conclusion, the Merced Subbasin Draft GSP needs to address all SGMA statutes and regulations, and the Department recommends the GSP seriously consider fish and wildlife beneficial uses and interconnected surface waters. The Department recommends that the MSGSA consider the above comments before the GSP is submitted to the Department of Water Resources (DWR). The Department appreciates the opportunity to provide comments on the Merced Subbasin Draft GSP. If you have any further questions, please contact Dr. Andrew Gordus at [Andy.Gordus@wildlife.ca.gov](mailto:Andy.Gordus@wildlife.ca.gov) or (559) 243-4014 x 239.

Sincerely,



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Enclosures (Literature Cited)

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