State Water Resources Control Board

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MERCED GROUNDWATER SUSTAINABILITY PLAN, GROUNDWATER SUBBASIN NO. 5-022.04

The 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 Merced 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
- Water Budget
- Projects and Management Actions
- Projects Reliant on New or Amended Water Rights
- Engagement

Groundwater Levels and Potential Drinking Water Impacts

1. State Water Board staff appreciates that the groundwater sustainability agencies (GSAs) set groundwater level minimum thresholds (MTs) based on shallow domestic well construction depths. The GSP sets MTs for groundwater levels at the

depth of the shallowest domestic well[1] within a two-mile radius of each Representative Monitoring Site (RMS) well. However, the methodology and approach used may result in a potentially large number of dry domestic wells:

a) There are acknowledged data gaps in the monitoring network along the western edge of the subbasin (p. 4-13); therefore, many domestic wells may not be considered or protected at MTs.

b) The GSP performed three steps before determining the shallowest well within the radius for each RMS. The GSP removed from consideration: (1) shallow wells less than 50 feet deep, (2) inactive wells, and (3) "outliers". Outliers were determined using a statistical analysis of all domestic wells within the two-mile radius for each RMS. However, the identified "outliers" (footnote, p. 3-7) could theoretically represent up to the shallowest 25 percent of wells within the radius (when well depths are very similar). These domestic wells should not be removed from consideration because (1) the GSP does not demonstrate that the number of wells excluded is statistically insignificant and, more importantly, (2) the outliers represent beneficial users mandated for consideration by statute who are, in this case, a potentially large population of domestic well users in the subbasin.[2]

c) State Water Board staff notes some RMSs are assigned MTs below the depth of the RMS well.[3] This could result in MTs being reached or exceeded without the GSAs' knowledge. The GSAs should resolve this issue.

The GSAs should re-evaluate which domestic well depths are used for setting minimum thresholds using a method that considers all beneficial uses and users, clearly estimates how many wells could be dewatered at the selected MT, and evaluate if selected RMS wells are appropriate for monitoring water levels.

Estimates of wells that may be affected at groundwater elevation measurable objectives (MOs) and MTs in Central Valley GSPs are publicly available.[4] These technical resources are available for consideration by the GSAs. State Water Board

[1] Based on active wells in Merced County's electronic well permitting database.
[2] Water Code, §10723.2
[3] E.g.,well IDs 06S12E33D001M, 07S13E30R002M, 06S12E29L002M, 07S14E35E001M, 07S14E30R001M
[4] See reports and analyses by Pauloo, R., Bostic, D., Monaco, A. and Hammond, K., The Water Foundation and EKI; and UC Davis Center for Regional Change

staff conducted its own analysis for the subbasin by comparing the depths of wells[5] in DWR's Online System for Well Completion Reports (OSWCR) database to the MOs and MTs presented in the GSP for the subbasin. Staff also included comparison of MOs and MTs to the known extent and depth of the Corcoran Clay, as delineated by U.S. Geological Survey, as a check on the appropriateness of sustainable management criteria (SMC). This analysis excluded wells that were estimated to have already been dry in 2015.[6] Given uncertainties in the OSWCR data, staff present a range of values based on domestic and public water system well records with location and depth information. The lower bounds represent wells installed after 1991[7] and the upper bounds represent all wells regardless of installation date. The results of this analysis are summarized below.

Above or outside the extent of the Corcoran Clay:

- Of 1,081 to 2,009 domestic wells, 33 to 159 (3% to 8%) may go dry at MOs and 395 to 1,195 (37% to 59%) may go dry at MTs.
- Of 17 to 55 public supply wells, one well (2% to 6%) may go dry at MOs and 4 to 9 (16% to 24%) may go dry at MTs.

SMC appear to be set below the bottom of the Corcoran Clay in some areas in this analysis:

- Of 1,195 to 1,800 domestic wells, MOs are below 12 to 68 wells (1% to 4%) and MTs are below 204 to 566 wells (17 to 31%).
- Of 15 to 40 public supply wells, MOs are below up to 2 wells (0% to 5%) and MTs are below 1 to 11 wells (7% to 28%).

If water levels are allowed to drop below the Corcoran Clay, this would result in the near-surface unconfined aquifer being completely dewatered in this area. Additionally, subsidence could occur due to dewatering of the clays. The GSP should evaluate SMC set below the Corcoran Clay and consider whether the SMC are appropriate.

Note that this analysis assumed groundwater levels declining to MTs at all RMSs, whereas the GSP states an undesirable result would only occur if water levels at

[5] Where available, staff used the bottom of the well screen to represent well depth; otherwise, staff used the bottom of the well.
[6] Detailed methodology available upon request.
[7] See discussion of well retirement age on page 12 of the UC Davis Center for Regional Change's analysis.

more than 25 percent of RMS wells fall below MTs in two consecutive wet, above normal, or below normal years (p. ES-5); accordingly, the GSP's definition of an undesirable result would allow for more wells to fail than described above, particularly in dry and critically dry years.

During the first five years of GSP implementation, the GSAs plan to evaluate establishing mitigation for shallow domestic wells that could be dewatered by declining water levels during the GSP implementation period. To support this evaluation, State Water Board staff strongly recommends that the GSAs conduct an independent analysis of the potential impacts of proposed MOs and MTs and projected groundwater management outcomes on active domestic wells and public water supply wells, update the GSP with this information, including the data upon which conclusions are based, and consider how those effects compare with the GSAs' narrative definition of an undesirable result related to declining groundwater levels. Additionally, the GSAs should estimate and describe the population served by the wells in the subbasin which are not protected at MTs. In order to ensure that all necessary and relevant information is considered in the GSP, the GSAs 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, drawn from the GSAs' evaluation and projections including the analysis described in #1, is that the proposed allowable decline in groundwater levels could constitute a significant and unreasonable depletion of supply, the GSAs should adjust MTs (and amend the analysis described in #1) or otherwise mitigate for impacts to wells. For mitigation, the GSAs could develop and implement a well mitigation plan that would lessen the significance of the impact by replacing or repairing domestic or drinking water system wells impacted by groundwater level declines, supporting expansion of public water system boundaries to private well communities, and supporting 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 could include: (1) providing financial assistance, particularly for low-cost intertie projects 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. The groundwater level MOs for each representative monitoring well were based on modeling the projected future average groundwater levels between 2040 and 2090 under the sustainable yield simulation. In some locations, the modeling results placed the MOs close to or deeper than the MTs, which are based on well depths. In those locations, the GSP chose to set the MOs at least 25 feet above the MTs rather than use the modeled groundwater elevations. The modeling results suggest that, even under proposed sustainable yield management conditions, groundwater levels in a set of wells are at risk of declining near to or below the MTs, resulting in dry domestic wells.

Groundwater Quality

4. The GSP includes monitoring of a many groundwater quality constituents, but only defines SMC for salinity (as total dissolved solids). The GSP states that the "causal nexus between salinity and groundwater management activities has been established" (p. 3-12) but implies this nexus has not been established for other constituents. The GSP states that high salinity groundwater has been shown to migrate both from upwelling of deeper saline brines and across the subbasin due to groundwater pumping. However, groundwater pumping and projects and management actions under the GSAs' authority may also have the potential to influence groundwater concentrations and distributions of widespread contaminants within the subbasin in addition to salinity. Based on their prevalence within the subbasin, GSP implementation should also include SMC for 1,2,3-trichloropropane (1,2,3-TCP), nitrate as nitrogen (nitrate), and arsenic. Staff have attached maps from the State Water Board Groundwater Ambient Monitoring and Assessment (GAMA) Program's database (https://gamagroundwater.waterboards.ca.gov/) showing 1,2,3-TCP, nitrate, and arsenic impacts in subbasin groundwater (Figures 1, 2, and 3 in Appendix).

   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 impact 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 (Water Code, §106.3). Coordination by the GSAs with

agencies that oversee the remediation of existing groundwater contamination is highly recommended, both in setting MTs and developing a plan of implementation.

5. The GSP states that "future increasing trends will be analyzed for evidence of the sources of the trends, such as upward migration of relatively higher salinity water due to overpumping or due to continued agricultural and urban uses. If caused by upward migration, GSAs will respond accordingly due to the causal nexus with groundwater pumping" (p. 3-15). The GSP should outline the process the GSAs would use to decide whether GSP implementation caused or exacerbated an MT exceedance for water quality. In addition, the GSP should provide the data supporting its conclusions, which will allow reviewing regulatory bodies to consider how adequately the GSP addresses undesirable results related to water quality degradation. The GSAs should also coordinate and share the data with other local and regional groundwater monitoring efforts.

6. Please note that historical and recent water quality monitoring information from public water systems can be accessed using the public version of the State Water Board Drinking Water Watch database (https://sdwis.waterboards.ca.gov/PDWW/). The Drinking Water Watch database can be queried by public water system name or system number (see #17 below).

Depletions of Interconnected Surface Water

7. The GSP identifies interconnected stream reaches through numerical modeling but does not adequately characterize the locations, quantity, and timing of interconnected surface water (ISW) depletions. The GSP uses modeling results to make the case that depletions that may occur at the groundwater level MTs are not significant and unreasonable by comparing the additional amount of annual depletions to total annual surface water outflow of the subbasin. This approach misses potential seasonal impacts of stream depletions. While the total annual surface water outflow is dominated by high flows from winter storms or spring and summer snowmelt, depletion impacts to surface water and environmental beneficial users are generally most severe at low flow conditions. 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 recommends the GSAs further evaluate the potential locations, quantity, and timing of stream depletions, perform more detailed analysis of impacts to beneficial users based on the results, improve model accuracy by filling data gaps in the future, and assess what level of depletions would be significant and unreasonable given the analysis.

8. The GSP uses the groundwater elevation MTs developed to manage for decreasing groundwater levels as a proxy to also manage depletions of ISW in the Merced River; however, the GSP does not draw a direct link between the SMC for declining groundwater levels and undesirable results related to depletions of ISW. Instead, the GSP assumes that reservoir operations at Lake McClure would ensure minimum flows for aquatic species, regardless of any increases in stream depletions from declining groundwater levels (p. 3-20, para. 4). This approach overlooks other possible effects of groundwater depletions, including the effects on surface water beneficial users of increased releases from Lake McClure to compensate for additional depletions in maintaining minimum flows. The approach also ignores possible effects on aquatic species if depletions result in warmer water temperatures (due to reduced discharge of lower temperature groundwater) or longer periods of minimum flows each summer/fall. At face value, it appears groundwater level declines allowed by minimum thresholds have implications for interconnected surface water. To illustrate this point, consider shallow representative monitoring well 07S10E06K002M, which is located near the Merced River and has an established MT of -39.8 feet above mean sea level (119.1 feet below ground surface. If the groundwater elevation were to decline to this MT, the nearby sections of the river would be expected to change from connected, gaining, then losing conditions to disconnected conditions. Yet the GSP concludes that depletions at the groundwater level MTs will not be significant and unreasonable, with no consideration of loss of baseflow. Staff recommends that shallow groundwater level MTs for depletions of ISW be supported by considerations of the locations, quantity, and timing of depletions and impacts to beneficial users.

9. The GSP's monitoring plan is insufficient for evaluating the effects of GSP implementation on surface water. Lack of adequate instream flows for fish and wildlife, including anadromous fish, were a primary driver for the State Water Board's Lower San Joaquin River and Southern Delta update to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) in 2018. That update revised water quality objectives to protect fish and wildlife beneficial uses, including in the three major eastside tributaries to the Lower San Joaquin River, the Stanislaus, Tuolumne, and Merced Rivers. In particular, the GSP has few representative monitoring wells (including new planned wells) near the San Joaquin and Merced Rivers (Figures 3-3, 4-5 and 4-6). The San Joaquin River Restoration Program (SJRRP) has multiple shallow groundwater monitoring wells located along the western edges of the subbasin (i.e., SJRRP Reaches 4A, 4B1 and 5), but these wells are not proposed for use in ISW monitoring. The GSP acknowledges that the western edges of the subbasin need more monitoring wells to fill data gaps. Staff recommends the GSAs develop additional ISW monitoring sites in a timely matter, especially along the Merced and

San Joaquin Rivers, and set meaningful SMC for depletions of ISW. The GSAs should engage surface water users, the California Department of Fish and Wildlife, and other interested stakeholders in developing these SMC.

Water Budget

10. The GSP mentioned the State Water Board's Substitute Environmental Document (SED) for the Bay-Delta Plan update[8] but did not describe or acknowledge potential changes to GSP components that could result from its implementation. Compliance with flow requirements along the Merced River may lead to changes in surface water diversions and groundwater pumping. Because the GSP is required to use a 50-year planning horizon, staff recommends the GSAs incorporate strategies in the GSP that anticipate potential changes to the subbasin-wide water budget from Bay-Delta Plan implementation, including revised assumptions regarding surface water and groundwater interactions.

Projects and Management Actions

11. The GSAs propose allocating the sustainable yield of native groundwater to the three GSAs and the GSP states groundwater pumping of native groundwater will be incrementally reduced over time until the allocation objectives are achieved by 2040. As the GSAs take initial steps to implement their basinwide allocation framework (e.g., agreeing upon details of how allocations to each GSA will be established, establishing sustainable allocation trading and crediting rules [p. 6-4]), the GSAs should engage with disadvantaged communities (DACs) and drinking water users to ensure allocations and groundwater trading and crediting rules protect current and future drinking water needs.

12. Agricultural water use in Merced County, which covers the largest portion of the groundwater subbasin, is approximately 94 percent of the total water use.[9] Although urban water use is, overall, a relatively small portion of the total water use, it is important and access to clean, safe, affordable drinking water has been an ongoing challenge for many DAC communities. State Water Board staff appreciates that the GSP includes projects that address undesirable results in DAC areas, including the Planada Groundwater Recharge Basin Pilot Project, El Nido Groundwater Monitoring Wells, Meadowbrook Water System Intertie Feasibility Study, Merced Region Water Use Efficiency Program, and the Study of Potential Water System Intertie Facilities from the Merced Irrigation District (MID) to Le Grand Athlone

[8] Final Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay-Sacramento San Joaquin Delta Estuary, San Joaquin River Flows and Southern Delta Water Quality (July 2018).
[9] 2030 Merced County General Plan Recirculated Draft PEIR, at p. 6-67.

Water District and Chowchilla Water District. If constructed, the intertie projects would provide DACs reliant on groundwater greater resiliency to declining groundwater levels that could occur as part of the GSP implementation or due to drought. The intertie projects could also be an important component of future well mitigation strategies.[10]

13. State Water Board staff appreciates that the GSP includes Project 12, which aims to decrease subsidence by streamlining well permitting for replacement of sub-Corcoran Clay wells in a manner which considers the impacts of shifting production to the shallower, unconfined aquifer. The GSP notes that Merced County will conduct an analysis to evaluate the potential impacts of moving groundwater production wells from below the Corcoran Clay to above the Corcoran Clay (p. 6-23); however, it is unclear from the description if the impact analyses will consider impacts to beneficial users of water, specifically, existing drinking water wells that may be located adjacent to new well sites. Board staff recommends that the project include considerations or recommendations for protecting or mitigating impacts to drinking water wells and other beneficial users in the analysis.

    Additionally, State Water Board staff recommends that GSAs work with county governments to encourage alignment between the GSP and county well permitting programs. As encouraged by the Sustainable Groundwater Management Act (SGMA), GSAs should request counties forward permit requests for new wells, for enlarging of existing wells, or for reactivation of abandoned wells. (Water Code, § 10726.4.) Shifting demand to sites near existing wells may cause groundwater level declines and effects on beneficial users of water in areas of the subbasin not well represented by an RMS. Increased production from these wells may also make it more difficult for the GSAs to avoid undesirable results and achieve sustainability within the implementation period.

14. The feasibility of some supply projects is difficult to assess from the information provided in the GSP. For example, it is noted that some of the project sponsors anticipate water supply sourced from the MID through temporary water purchase and sale agreements. In these project descriptions, a note from the MID indicates that “the Board of Directors for the MID has and shall retain full and absolute discretion regarding whether and when it will enter into temporary water purchase and sale agreement(s), if any” and nothing in the GSP "creates in any party or parties any right to water controlled by the MID whether it be surface water or

[10] Bay-Delta Plan Final SED, Chapter 9, at p. 9-12.

groundwater" (p. 6-9). The GSP should provide information on the availability of MID water to supply those projects.

Projects Reliant on New or Amended Water Rights

15. Implementing some of the projects identified in the GSP may require new or amended water rights. If a project would rely on existing water rights, the GSAs should identify the water right identification numbers and other relevant details. It may be unreasonable for the GSP to assume that projects that currently lack adequate water rights for implementation can obtain either new water rights or modifications to existing water rights within a timeframe that will allow the project to contribute to the GSP achieving sustainability. For the GSP to demonstrate a likelihood of attaining the sustainability goal, the GSP should discuss the timing for obtaining approvals and describe any uncertainties, such as water availability in source streams (e.g., Will less surface water be available with projected Bay-Delta Plan implementation? Is the source on the inventory of fully appropriated streams? Can potential protests be anticipated from downstream water users?).

    a) New surface water right permits: An applicant must gather all information necessary to complete the application; this could be extensive. Once the State Water Board publicly notices an application, other water right holders may protest the project based on potential injury to their water rights. Parties may also protest if the project has the potential to harm public trust resources. The GSAs should contact the Division of Water Rights' Permitting and Licensing Division or consult the Division's Permitting and Licensing Frequently Asked Questions (https://www.waterboards.ca.gov/waterrights/water_issues/programs/applications/faqs.html) to develop an informed timeline for project implementation that includes necessary water right actions.

    b) Amendment of an existing surface water right: The time required to amend an existing water right depends on multiple factors, including but not limited to whether the change is minor, major, or controversial. The GSAs can learn more from the Division of Water Rights' Petitions Frequently Asked Questions (https://www.waterboards.ca.gov/waterrights/water_issues/programs/petitions/faqs.html)

16. Given there is no certainty that a particular water right permit or petition will ultimately be approved, or when, it is important the GSP clarify proposed timelines for projects and management actions and consider how changes in those timelines could impact the subbasin's ability to achieve sustainability by 2040. The GSP should also identify alternative groundwater management strategies to achieve sustainability (e.g., demand reduction), if anticipated water supplies such as

purchases or new or amended water rights are unsuccessful. This would ensure the GSAs can effectively evaluate when they should move towards implementing such contingency projects or management actions if primary projects or management actions are not implemented on projected timelines. To this end, the GSP should also identify well-developed demand management options with clearly defined triggers in the event that proposed supply augmentation volumes are not fully achieved.

Engagement

17. The GSAs should engage with all public water systems which rely on groundwater in the subbasin to ensure the GSP protects drinking water users. To facilitate this, State Water Board staff has attached a list of Public Water Systems with wells in the subbasin as of August, 2021. Please contact the Board's Division of Drinking Water at DDW-SAFER-NAU@waterboards.ca.gov with any questions.

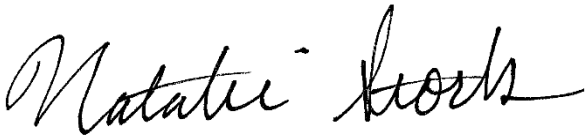
18. The GSP should be more explicit about how the concerns of local beneficial users, particularly disadvantaged communities reliant on groundwater and other stakeholders, were integrated into development of SMC and monitoring networks and selection of RMS and projects and management actions. SGMA requires consideration of the interests of diverse social, cultural, and economic elements of the populations within the subbasin during plan development. Collaborative and inclusive processes can make plans more resilient by increasing buy-in and trust, improving compliance, and enhancing the quality of information on which plans are based. It is important that GSAs send appropriate notices; hold meetings in times, places, and manners that support effective engagement; and acknowledge issues raised. GSAs should consult with individuals or groups when actions may impose direct or indirect costs on those entities. Good governance can build trust and reduce regulatory compliance risks. Consultation, for example, could help a GSA avoid or mitigate an action that might directly or indirectly cause a drinking water system to violate its permit or face new compliance costs due to reduced availability of water or lower water quality.

19. The GSP states that no California Native American Tribes are present in the subbasin; however, the GSP does not describe the GSAs' process for identifying or reaching out to Tribes with potential interests in groundwater management in the subbasin. Without this information, it is difficult to discern whether the GSAs appropriately considered the interests of California Native American Tribes in developing the GSP (Water Code, §10723.2(h)). The GSP should elaborate on the GSAs' tribal engagement effort. If the GSAs have not already done so, the GSAs should consult with the Native American Heritage Commission (NAHC) to obtain

information about Tribes that have current and ancestral ties in the subbasin. To request this information, the GSAs can email the NAHC at nahc@nahc.ca.gov.

If you have any 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,



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Enclosures: Appendix – Select constituents in Merced Subbasin wells

Public water systems with wells in the Merced Subbasin as of August, 2021 (see .xlsx attachment within PDF file)

Appendix – Select constituents in Merced Subbasin wells

Non-detects are green, detections are yellow and orange, and MCL exceedances are red. Figures developed from [State Water Board Groundwater Ambient Monitoring and Assessment (GAMA) Program's database (https://gamagroundwater.waterboards.ca.gov/)](https://gamagroundwater.waterboards.ca.gov/)

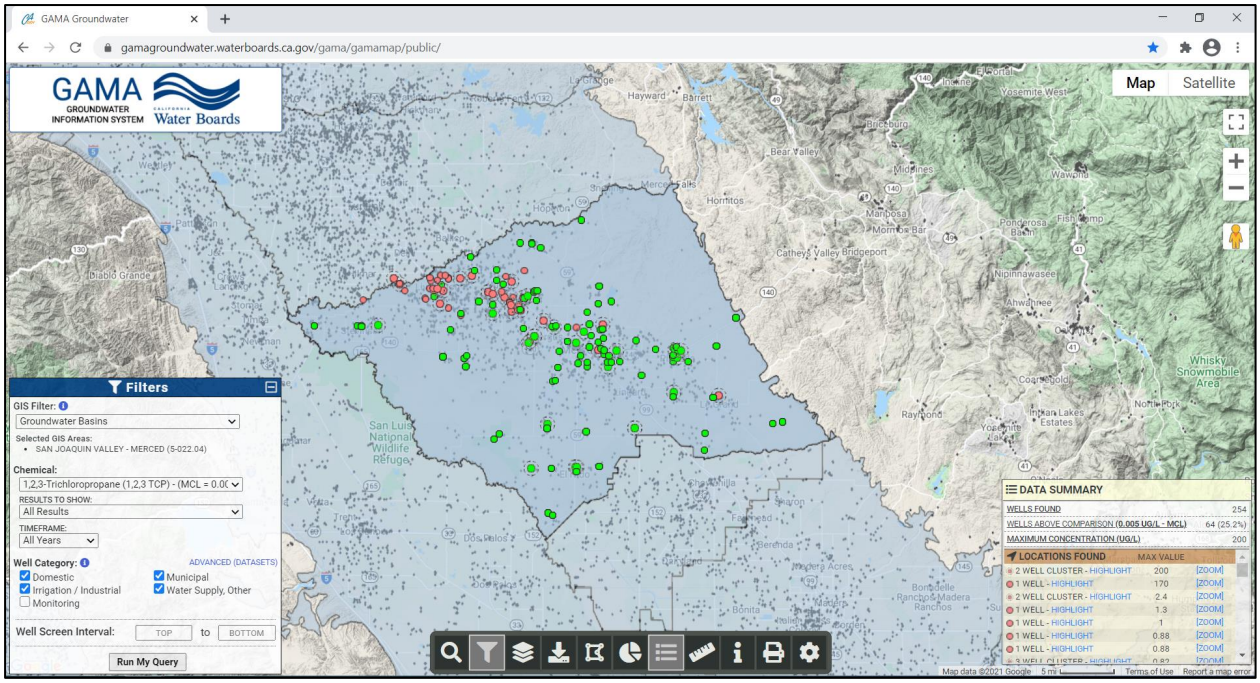

Figure 1. 1,2,3-Trichloropropane in Merced Subbasin wells

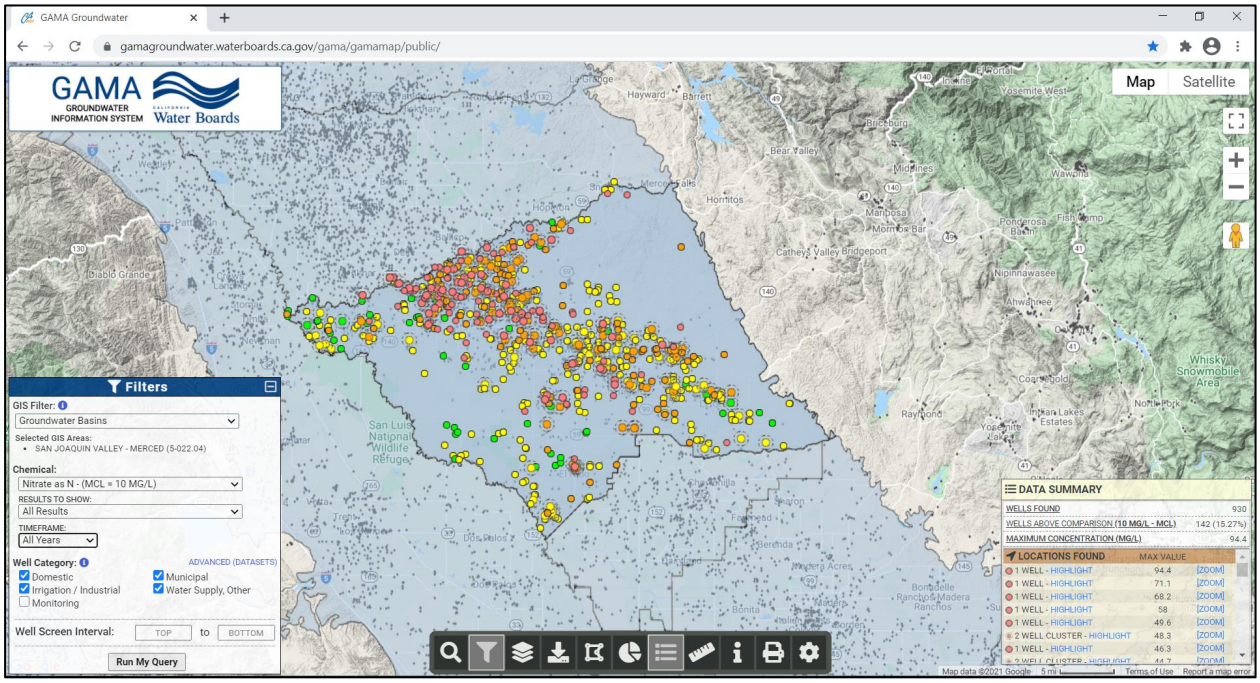

Figure 2. Nitrate as N in Merced Subbasin wells

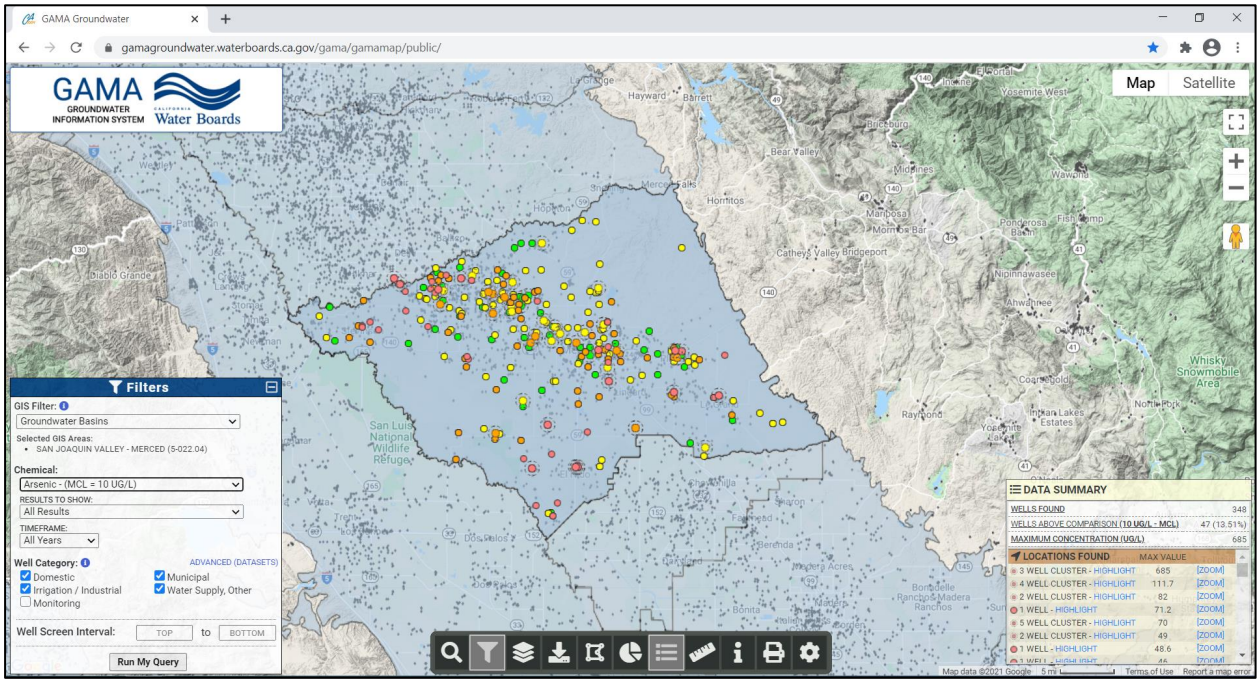

Figure 3. Arsenic in Merced Subbasin wells