
State Water Resources Control Board

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KAWEAH GROUNDWATER SUSTAINABILITY PLANS, GROUNDWATER SUBBASIN NO. 5-22.11

The State Water Resources Control Board (State Water Board) staff (staff) is providing these comments in support of the Department of Water Resources' (DWR) review pursuant to the Sustainable Groundwater Management Act (SGMA) (Water Code § 10720 et seq.) and the regulations implementing SGMA (Cal Code Regs., tit. 23, § 350 et seq.) of the East Kaweah, Greater Kaweah, and Mid-Kaweah groundwater sustainability plans (GSPs) and the Coordination Agreement for the Kaweah Subbasin (subbasin).

The comments made here are not exhaustive and staff may have additional comments.

Staff has identified that the GSPs allow for continued groundwater overdraft of the subbasin that will likely result in undesirable results. The GSPs define their sustainable management criteria (SMC) for groundwater levels and water quality in a way that is likely to cause negative impacts to drinking water users of groundwater. In addition, depletions of interconnected surface water are not appropriately addressed in the East Kaweah and Greater Kaweah GSPs. The proposed projects and management actions, as described in the GSPs, do not appear likely to achieve long-term sustainability because they rely heavily on uncertain supplemental water supply sources, without clear triggers for demand management. Moreover, some of the sources of water proposed in the GSPs are "fully appropriated" year-round, meaning those sources have insufficient supply available for new water right applications.

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Our comments on the GSPs focus on the following areas:

- Coordination Agreement
- Groundwater Levels and Potential Drinking Water Impacts
- Groundwater Quality
- Interconnected Surface Water
- Projects and Management Actions

General Comments

The following comments apply to multiple GSPs in the subbasin. Comments regarding individual GSPs begin on page 14.

Coordination Agreement

1. Coordination agreements are required to include the sustainable yield for the basin, supported by a description of the undesirable results for the basin, and an explanation of how the minimum thresholds (MTs) and measurable objectives (MOs) defined by each plan relate to those undesirable results. (Cal. Code Regs., tit. 23, §357.4, subd. (b)(C).) However, the coordination agreement for the Kaweah subbasin does not include a comprehensive description of how the MTs and MOs relate to undesirable results. Without a meaningful quantification of undesirable results, it's not possible to manage the basin to reach sustainability goals. In order to meet these requirements, staff recommends the coordination agreement include a description of how groundwater conditions at MTs may affect beneficial uses and users of water throughout the subbasin, including how wells may be affected and the location and types of affected wells.
2. The coordination agreement describes several water budget components; however, it is unclear how some of the components were developed:
 - a. The Coordination Agreement estimates that mountain-front recharge contributes an average of 52,000 acre-feet per water year (AF/WY) to the subbasin (Coordination Agreement p. 101); however, there is no explanation for this estimate. The GSAs should explain how this recharge value was determined.
 - b. The Coordination Agreement estimates the average total subsurface inflow into the subbasin to be 155,640 AF/WY (Coordination Agreement p. 101). The Coordination Agreement identifies the 52,000 AF/WY average mountain-front recharge inflow but does not explain the source of the remaining 103,640 AF/WY of subsurface inflows. If the source is subsurface inflows from adjacent groundwater subbasins, staff recommends that the GSAs coordinate with neighboring subbasins' GSAs to determine whether subsurface inflow and

outflow volumes are similar when comparing between models and estimates. This information is necessary to understand how management of the subbasins and adjacent subbasins under SGMA will affect the ability of all the basins to achieve sustainability.

Staff recommends that the Kaweah Subbasin GSAs thoroughly explain the water budget assumptions and coordinate with GSAs in the Kings and Tulare Subbasins to characterize subsurface flows for the subbasin water budget.

Groundwater Levels and Potential Drinking Water Impacts

3. The three GSAs set groundwater level MTs by projecting 20 years of “business as usual” pumping and recharge and setting MTs at the groundwater elevations that would result. The GSPs acknowledge that a substantial number of wells would be impacted at the MT levels:
 - a. The Mid-Kaweah GSA and Greater Kaweah GSA conducted an analysis for the entire subbasin, stating:
 - Of 696 domestic wells with well construction information, 429 (62%) could be affected,¹ including 236 (34%) which would go dry.²
 - Of 206 municipal wells with well construction information, 36 (17%) could be affected, including 5 (2%) which would go dry.
 - The Mid-Kaweah GSA and Greater Kaweah GSA justify the impacts to wells at the MT levels, stating “undesirable results will not occur at water levels above these 2040 projections, barring significant and unreasonable impacts on existing wells and freshwater in storage within the Kaweah Subbasin” (MKGSP p. 5-3; GKGSP p. 5-3).
 - b. The East Kaweah GSA conducted a dry well analysis specific to the East Kaweah GSA area and estimated that about one-third of all wells may go dry at the MT groundwater levels, including one-half of domestic wells, one-fourth of agricultural wells, and one-eighth of public supply wells (EKGSP p. 3-21).

The East Kaweah GSP justifies the impacts to well owners, stating that “without SGMA and the proposed incremental mitigation by the EKGSA, the shallow

¹ I.e., groundwater levels would fall below the top of the well screen.

² I.e., groundwater levels would fall below the bottom of the well screen.

wells would have gone dry sooner, requiring communities and landowners to deepen these existing wells” (EKGSP p. 3-21).

Staff disagrees with East Kaweah GSP’s justification; this comparison described by the GSA is not consistent with SGMA. More generally, staff disagrees that the dewatering of over one-third of domestic wells throughout the subbasin represents an insignificant or reasonable depletion of supply and a likelihood that the plan will be implemented in a manner that will achieve sustainable groundwater management as defined under SGMA. (Water Code, § 10721, subd. (v).) The groundwater level MTs are not sufficiently protective of beneficial users of groundwater. Staff recommends that the GSAs revise the sustainable management criteria (SMC) for groundwater levels by determining a reasonable level above which groundwater levels should be stabilized well before the end of the SGMA timeline in 2040. The revised criteria may reflect the actions the GSAs are taking to reduce or mitigate impacts on drinking water wells. 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.

4. All three GSPs include frameworks for potentially mitigating for impacts to wells.³ Implementation of mitigation could impact whether certain groundwater conditions would result in an undesirable result. The GSAs could, for example, commit to further developing and implementing mitigation efforts to lessen the significance of declining groundwater levels by replacing or repairing domestic or drinking water system wells impacted by groundwater level declines. The GSAs could also support 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)

³ I.e., the Drinking Water Wells Protection Program in the East Kaweah GSP (EKGSP p. 5-35), Assistance for Small Water Systems, Domestic Wells in the Mid-Kaweah GSP (MKGSP p. 7-44), and Assistance for Impaired Wells in the Greater Kaweah GSP (GKGSP p. 7-72).

facilitating outreach and introductions between small water systems and owners of domestic wells and larger water systems to assist in developing future partnerships.

5. According to the GSPs, an undesirable result for lowering of groundwater levels would only occur if one-third of representative monitoring site (RMS) wells in the subbasin (Greater Kaweah and Mid-Kaweah GSPs)⁴ or in all three GSA jurisdictions (East Kaweah GSP)⁵ exceed MT levels. The groundwater level MTs were defined per hydrogeologic conditions, using Hydrogeologic Zones in the Greater and Mid-Kaweah GSP areas and using threshold regions in the East Kaweah GSP area.

The GSPs do not explain how maintaining groundwater levels above MTs at two-thirds of RMS wells would avoid significant and unreasonable depletions of supply. This approach could mask localized impacts of declining groundwater levels near RMS wells where groundwater levels drop below MTs. Staff recommends that the GSAs either justify the 'one-third of RMS wells' requirement using the best available data or revise their approach to account for localized impacts to beneficial uses and users, including domestic well owners and public water systems.

Staff also notes that the analyses referenced in #3 appear to assume groundwater levels declining to MTs (and no further) at all monitoring wells. The GSPs, on the other hand, state an undesirable result would only occur if water levels at more than one-third of monitoring wells fall below MTs; accordingly the GSP's definition of an undesirable result could allow for more wells to fail than described above.

6. The Greater and Mid-Kaweah GSAs performed a well impact analysis (described in Appendix 5) to assess how allowing groundwater levels to decline to proposed MTs may impact beneficial users of groundwater. Staff identified a number of issues with the analysis that may result in underestimates of impacts:
 - a. The GSAs assumed a single groundwater elevation for each Hydrogeologic Zone rather than using the individual MTs established for each representative groundwater level monitoring well (MKGSP p. 1447). This approach may

⁴ "With respect to water-level declines, undesirable results occur when one-third of the representative monitoring sites in all three GSA jurisdictions combined exceed their respective minimum threshold water level elevations" (GKGSP p. 3-4; MKGSP p. 89).

⁵ "With respect to groundwater level declines (as well as storage and surface water depletions by proxy), undesirable results occur when one third of the representative monitoring sites in all three GSA jurisdictions exceed their respective minimum threshold water level elevations" (EKGSP p. 166).

underestimate impacts, depending on the proximity of domestic wells to monitoring wells with lower MTs.

- b. The GSAs limited their analysis to wells with well screen interval information. Depending on the quality of well data,⁶ this approach may substantially underestimate the number of total wells which may be affected by groundwater level declines. For example, from a search of DWR's Online System for Well Completion Reports, approximately half of the records for domestic wells in Tulare and Kings counties lack well screen interval information. Nearly all of the records have information on total well depth, however, which could be used as a proxy for well screen depth.

Staff recommends that the Greater and Mid-Kaweah GSAs work with the East Kaweah GSA to update their analysis to assess the impacts of declines to all three GSAs' MTs at the subbasin scale. See #1. Staff also recommends that the Greater and Mid-Kaweah GSPs include this assessment and the rationale of how SMC were determined in the SMC chapter of their GSPs rather than in appendices. Staff recommends Greater Kaweah and Mid-Kaweah GSAs to amend Table 5-3 and Table 5-2 (Summary of Groundwater Level Sustainable Management Criteria for GKGSA/MKGSA), respectively, to include a column that specifies in which Hydrologic Zone each monitoring well is located.

7. Staff recommends that the GSAs expedite the coordination of groundwater level MTs with neighboring subbasins. The East Kaweah GSP states that the Kaweah Subbasin had preliminary meetings with neighboring subbasins to set groundwater level MTs and plans to further coordinate on the topic during GSP implementation (EKGSP p. 3-22).
8. Staff appreciates the East Kaweah GSA's proposal to develop a Drinking Well Observation Program in order to "evaluate conditions of drinking water wells, investigate potential impacts, and distribute information to drinking well users within the EKGSA" (EKGSP p. 56). Staff recommends the GSAs coordinate to expand the program to cover the subbasin and expedite the development and execution of the program to evaluate domestic well vulnerability. Staff suggests the GSAs include vulnerable local public supply wells and representative vulnerable domestic wells in local groundwater level monitoring programs so that mitigation programs can be used and MTs re-evaluated where appropriate to avoid undesirable results before impacts occur.

⁶ The source of well data is not specified in the analysis itself.

Groundwater Quality

9. The GSPs do not demonstrate that the monitoring networks for water quality allow the GSAs to monitor impacts to domestic drinking water wells. The GSAs primarily use public supply wells to represent drinking water wells. Public supply wells are often deeper than domestic wells and are constructed in a way to avoid groundwater containing constituents of concern. As a result, the water quality readings in public supply wells are likely not representative of conditions in shallow domestic wells.

SGMA requires that monitoring networks have sufficient spatial density for each principal aquifer and evaluate the effectiveness of plan implementation, monitor impacts to beneficial uses and users or groundwater, and to determine groundwater quality trends. (Cal. Code Regs., tit. 23, §354.34.)

The GSPs should demonstrate how the groundwater quality monitoring network will be used to monitor impacts to shallow well users; this should include a more robust discussion of how the GSAs will leverage groundwater quality data from other programs (e.g., Irrigated Lands Regulatory Program, CV-SALTS) and the specific data gaps to be filled by new monitoring wells. If further evaluation indicates that groundwater quality at shallow wells is a data gap, the GSAs should develop a plan and timeline for monitoring water quality in the shallow aquifer.

10. The GSAs set MT concentrations at each RMS well based on drinking water quality standards or agricultural water quality goals. The suite of analytes differs between the two groups of RMS wells. The approach for selecting wells for each group differs by GSP:
 - In the Mid-Kaweah GSP and the Greater Kaweah GSP, MTs are set at the drinking water standard (typically Maximum Contaminant Level [MCL]) for wells located within an urban area or near a public water system, which includes schools (MKGSP p. 5-11). MTs are set at ag water quality goals for wells if the majority of the beneficial use (“greater than 50% of the pumping within a determined area”) is agriculture and there are no nearby public water systems (MKGSP pp. 5-10 through 5-11, GKGSP pp. 5-23 through 5-24). Well density and land use maps show the presence of non-urban domestic wells in agricultural water use areas with no public wells (MKGSP Figures 1-4, 1-6, and 1-8, pp. 1-33, 1-35, 1-37). The Mid-Kaweah GSP and Greater Kaweah GSP do not clearly delineate the areas represented by monitoring wells using drinking water standard MTs versus ag water quality goals MTs.

- In the East Kaweah GSP, agricultural production wells in the monitoring network are assigned MTs based on ag water quality goals, and public water system wells are assigned MTs based on drinking water standards.

However, the GSPs don't explain how this approach protects domestic well users in areas with substantial agricultural pumping. The GSPs did not set MTs or MOs for drinking water constituents of concern such as arsenic, nitrate, and 1,2,3-TCP for agricultural RMS wells, so domestic wells users in agricultural areas are at risk (see Appendix, Figures 1- 3). Staff recommends the GSAs explain how the well designation approach considers water quality for domestic well users or otherwise modify the approach.

11. Based on its prevalence within the subbasin, the GSPs should also include SMC for uranium. Staff has attached a map from the [State Water Board Groundwater Ambient Monitoring and Assessment \(GAMA\) Program's database](https://gamagroundwater.waterboards.ca.gov/) (<https://gamagroundwater.waterboards.ca.gov/>) showing uranium impacts in subbasin groundwater (Figure 4 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.

12. The GSPs do not set interim milestones for water quality, nor do the GSPs describe a plan, including specific projects or management actions, to reach MOs, as required. (Cal. Code Regs., tit. 23, §354.30, subd. (e).) SMC based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations will allow informed decision-making and provide transparency when projects and management actions are implemented. (Cal. Code Regs., tit. 23, §354.28, subd. (a),(b)(6),(c)(4).) Milestones should be set consistent with monitoring

plan schedules and account for uncertainty and operating parameters. (Cal. Code Regs., tit. 23, §354.34, subd. (b)(1).)

13. The GSPs' definition of an undesirable result for water quality degradation is not clearly linked to consideration of beneficial users of water, particularly drinking water users.
 - a. The Greater Kaweah and Mid-Kaweah GSAs define the groundwater quality undesirable result as one-third of all Kaweah Subbasin monitoring sites exhibiting an exceedance of any of the MCL or agricultural metrics caused by actions of the GSA (MKGSP p. 5-12, GKGSP p. 5-21). Defining the undesirable result as one-third of all wells exceeding the MT across the six threshold regions could dilute signals of local impacts and, when evaluated, cause water quality degradation in areas of concern to appear less notable.
 - b. The East Kaweah GSP proposes evaluating concentrations based on a 10-year running average, which could allow for groundwater quality in drinking water wells to exceed human health standards, for example, for several years before triggering GSA action. See #27.

Staff recommends the GSAs reconsider MTs for water quality degradation and more clearly tie whichever threshold the GSAs use for groundwater management to beneficial users, especially in areas with known water quality problems that could be exacerbated by groundwater pumping. The GSAs should reach out to beneficial users for input in the development of these SMC.

14. Recently published research by the US Geological Survey (USGS) speaks to how management of groundwater levels may affect groundwater quality at drinking water wells.⁷ USGS scientists found that increased pumping from wells during drought can pull shallow, contaminated groundwater down to depths commonly tapped for public drinking-water supply. Staff recommends the GSAs consider these findings in discussions of how groundwater elevation SMC will guide groundwater management that may affect beneficial users of groundwater.

Not all water quality impacts to groundwater must be addressed in the GSP, but significant and unreasonable water quality degradation that was not present prior to January 1, 2015, and that is due to groundwater management conditions occurring

⁷ [Levy, Zeno F., et al. "Critical aquifer overdraft accelerates degradation of groundwater quality in California's Central Valley during drought." *Geophysical Research Letters* \(2021\): e2021GL094398.](#)

throughout the subbasin must be addressed in the GSP's MTs. 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 established policy of the State that every human being has the right 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.

15. The subbasin GSPs set the MT concentration for total dissolved solids (TDS) at 1,000 milligrams per liter (mg/L) for drinking water RMS wells. The Mid-Kaweah GSP and Greater Kaweah GSP set MO concentrations for TDS at 750 mg/L for drinking water RMS wells. For TDS in drinking water, the secondary maximum contaminant level (SMCL) is 500 mg/L—the recommended maximum contaminant level—and the upper limit SMCL is 1,000mg/L. Staff recommends that the GSPs further discuss consideration of drinking water users in setting the GSPs' water quality SMC.

Interconnected Surface Water

16. The GSP Regulations require monitoring of surface water and groundwater where interconnected surface water (ISW) conditions exist in order to characterize the spatial and temporal exchanges between surface water and groundwater. (Cal. Code Regs., tit. 23, §354.34, subd. (c)(6).) The Coordination Agreement relies on an analysis of groundwater levels in Spring 2015 to identify areas of potential ISW, yet acknowledges that groundwater levels were near the lowest levels on record at that time (Coordination Agreement p. 147). The evaluation of potential ISW should use best available data that reflects a range of hydrogeologic conditions in order to observe potential seasonal impacts of stream depletions. The Eastern Kaweah GSP notes that the most likely stream reaches for ISW in the subbasin are in the East Kaweah GSA and Mid-Kaweah GSA areas in the foothill streams, St. Johns River, and the Kaweah River east of McKay Point (Figure 2-28, EKGSP p. 2-73; Figure 2-29, EKGSP p.2-74).

The East Kaweah GSP acknowledges there is a lack of streamflow data for the smaller streams in the East Kaweah GSA area, including Cottonwood, Yokohl, Lewis, and Frazier creeks. The East Kaweah GSP also acknowledges data gaps in groundwater level monitoring in several areas in the foothills (Figure 4-1, EKGSP p. 4-6). The Greater Kaweah GSP acknowledges a data gap for shallow groundwater,

ISW, and groundwater-dependent ecosystems (GDEs) (GKGSP p. 2-3), and pledges to address the data gap without providing details (GKGSP p. 4-18).

Staff recommends that the East Kaweah GSA and Greater Kaweah GSA update the GSP with a plan to fill data gaps regarding surface water-groundwater interactions including evaluating the potential locations, quantity, and timing of stream depletions. The GSAs should clarify the timeline for installing shallow monitoring wells and for re-evaluating and potentially revising SMC for depletions of ISW.

17. The Greater Kaweah GSP states “No interconnected surface waters have been identified in any Kaweah Subbasin GSAs as described more thoroughly in the basin setting. Thus, criteria were not established” (GKGSP p. 3-10). However, the Coordination Agreement states that the Kaweah River is a gaining stream east of McKay Point (Coordination Agreement p. 32). As noted in #16, the Greater Kaweah GSA should collect additional data on surface water-groundwater interaction in order to determine appropriate SMC for the Greater Kaweah GSA area.
18. The East Kaweah GSP uses groundwater levels as a proxy for ISW, and thus the groundwater level MTs are also used as SMC for depletions of ISW (EKGSP p. 3-17). Yet the East Kaweah GSP does not elaborate on how the proposed groundwater level MTs prevent depletions of ISW that have significant and unreasonable adverse impacts on beneficial users of surface water, as required. (Cal. Code Regs., tit. 23, §354.28, subd. (d).)

Staff recommends that the East Kaweah GSA and Greater Kaweah GSA revise their approach to setting SMC for depletions of ISW. Staff recommends that these GSAs establish SMC based on the volume, rate, and timing of surface water depletions caused by groundwater pumping. (Cal. Code Regs., tit. 23, §354.28, subd. (c)(6).) The GSPs should perform detailed analyses of impacts to beneficial users, including environmental beneficial users, and revise the SMC accordingly.

Projects and Management Actions

19. 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 by 2040. 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?). Below is information on obtaining new surface water rights or modifying existing rights:

- 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. The California Department of Fish and Wildlife, which is the trustee agency for the state's fish and wildlife resources (Fish & G. Code, § 711.7, subd. (a)) or other 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 \(https://www.waterboards.ca.gov/waterrights/water_issues/programs/applications/faqs.html\)](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 \(https://www.waterboards.ca.gov/waterrights/water_issues/programs/petitions/faqs.html\)](https://www.waterboards.ca.gov/waterrights/water_issues/programs/petitions/faqs.html).
20. Given there is no certainty that a particular water right permit or petition will ultimately be approved, or when, it is important the GSPs 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. Alternative groundwater management strategies to achieve sustainability (e.g., demand reduction) may be necessary if anticipated water supplies such as purchases or new or amended water rights are unsuccessful. Clear timelines for recharge projects 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 East Kaweah GSP and Greater Kaweah GSP should include more clearly defined triggers for demand management actions proposed in the GSPs in the event that proposed supply augmentation volumes are not fully achieved. (Cal. Code. Regs, tit. 23, §354.44, subd. (b)(1).)

21. Some of the sources of water proposed in the GSP are “fully appropriated” year-round (e.g., Kings River and Kaweah River), meaning those sources have insufficient supply for new water right applications. For projects reliant on new water rights on fully appropriated streams, the GSP should explain how the fully appropriated designation affects project timelines and feasibility.
22. The GSPs describe well permitting processes in each applicable county, and the East Kaweah GSP describes a possible management action that may involve coordination with the Tulare County well-permitting program. The East Kaweah GSP notes that “the EKGSA, in conjunction with [Tulare County], may work to develop policy and/or procedures to augment the current well requirements set by the State/[Tulare County] and establish new criteria that collaborate with EKGSA and SGMA goals and include the EKGSA in review of all permit paperwork for non-de minimis extractors before [Tulare County] permit issuance” (EKGSP p. 5-33).

However, all of the GSPs lack specific information regarding whether or how the GSAs will evaluate new permits, address possible impacts from new permits, or work with the county to address concerns. Staff recommends that GSAs work with county governments to encourage alignment between the GSPs and county well permitting programs. As encouraged by the 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.

Engagement

23. The GSPs should be more explicit about how the concerns of local beneficial users, particularly disadvantaged communities (DACs)⁸ and small water systems 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 basin 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

⁸ A community with a median household income less than 80 percent of the statewide average. (Pub. Resources Code, § 75005, subd. (g).)

meetings in times, places, and manners that support effective engagement; and integrate interested parties' concerns into subbasin management. In some cases, small water systems may require further efforts for true engagement and inclusion, due to severe limitations in staff, technical, and financial resources. 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.

24. 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 November 2021. Please contact the Board's Division of Drinking Water at DDW-SAFER-NAU@waterboards.ca.gov with any questions.

East Kaweah GSP Comments

Groundwater Levels and Potential Drinking Water Impacts

25. The East Kaweah GSP states, "With respect to groundwater level declines (as well as storage and surface water depletions by proxy), undesirable results occur when one third of the representative monitoring sites in all three GSA jurisdictions exceed their respective minimum threshold water level elevations" (EKGSP p. 166). It is unclear if this definition means that one-third of wells in *each* GSA area must reach the groundwater level MT or if one-third of wells across the *entire* subbasin must decline to the MT before an undesirable result occurs. The definitions in the other two GSPs specify the latter. Staff recommends that the East Kaweah GSA clarify and further explain the definition of the undesirable result for lowering of groundwater levels.
26. The East Kaweah groundwater level MTs would allow for groundwater levels to decline approximately to pre-1950 groundwater levels (i.e., before the Central Valley Project delivered surface water to the region), which the East Kaweah GSP acknowledges is an undesirable result (EKGSP p. 3-21). The MT levels are an average of 49 feet lower than the reported water surface elevations in the threshold regions in 2015 (Table 3-2, EKGSP p. 3-22). About one-third of all wells may go dry at the MT groundwater levels, including 184 domestic wells, 137 agricultural wells, and two public supply wells (EKGSP p. 3-23). The groundwater level MTs are not sufficiently protective of all beneficial users of groundwater unless impacts to drinking water sources are otherwise mitigated. As noted in #3, staff recommends

that the East Kaweah GSA revise their approach to determining what constitutes an undesirable result for the lowering of groundwater levels to additionally account for all beneficial uses and users of water and the significant projected impacts to drinking wells.

Groundwater Quality

27. The East Kaweah GSP states (EKGSP p. 3-30):

The EKGSA minimum threshold for groundwater quality will be based on a 10-year running average for COCs at a monitoring location. Minimum thresholds will breakdown to two categories, as follows:

- For wells with 10-year average COC concentrations less than the recognized standard, no increase in concentration beyond the standard.
- For wells with 10-year average COC concentrations greater than the recognized standard, no increases beyond 20% to the initial average concentration at GSP implementation.

The GSP further states that there is a margin of safety for the MO for groundwater quality, and that actions will be taken when the ten-year average COC concentration reaches 80 percent of the MT or when a “statistically significant rapid rate of degradation” occurs (EKGSP p. 3-32).

This approach is not sufficiently responsive to the short-term impacts of degraded water quality, and the GSP does not explain the scientific basis of the “ten-year average” requirement. It is possible that a monitoring well could have COC concentrations above the recognized standard for several years in a row, yet the ten-year average remains lower than the standard, and thus an undesirable result has not occurred. Staff recommends that the East Kaweah GSA revise the definition of the MTs for degraded water quality to account for short-term impacts of degraded water quality to beneficial users or justify the ten-year average requirement using the best available data and explain how the MT is sufficient to avoid undesirable results.

Projects and Management Actions

28. The East Kaweah GSA prioritizes developing new water supplies and only employs management actions, such as demand management, if necessary (EKGSP p. 5-1). Yet, the GSP acknowledges that the currently proposed projects and management actions will only address 65 percent of overdraft (EKGSP p. 5-3).

- a. The GSP outlines a plan, called the glide path to sustainability, that proposes to address 45 percent of the GSA area's groundwater overdraft (12,600 acre-feet) between 2035 and 2040 (Figure ES-3, EKGSP p. ES-11), the final five years of the SGMA implementation period. In light of the reduced snowpack, increased ambient temperatures and other impacts of climate change, it is unclear how the GSA will be able to manage the as-yet-unaddressed overdraft with the proposed recharge approach, given the limited availability of unappropriated surface water supplies. Staff recommends that the East Kaweah GSA develop a contingency plan with appropriate interim milestones that can be used to resolve the remaining overdraft.
- b. The GSP describes several demand management options, including allocations (GA-1 Development of Groundwater Allocation Per Acre; GA-2 Groundwater Allocation "Ramp-Down" Gradual Decrease; GA-3 Groundwater Allocation "Adaptive Management" Approach), groundwater market/trading, fees, and pumping restrictions (Chapter 5.3 Management Actions, starting p. 5-29). However, the GSP does not describe triggers for developing and implementing these management actions, as required. (Cal. Code. Regs, tit. 23, §354.44, subd. (b)(1).) Management actions should be further developed, including triggers for implementation, in order to ensure successful resolution of the subbasin overdraft. Outreach and engagement with beneficial users will be essential to the comprehensive development of management actions.

Engagement

29. The East Kaweah GSP states that no Tribal lands are present within the East Kaweah GSA area; however, the GSP does not describe the GSA's process for identifying or reaching out to Tribes with potential interests in groundwater management in the basin. Without this information, it is difficult to discern whether the GSA appropriately considered the interests of California Native American Tribes in developing the GSP (Water Code, §10723.2(h)). The GSP should elaborate on the GSA's tribal engagement effort. If the GSA has not already done so, the GSA should consult with the Native American Heritage Commission (NAHC) to obtain information about Tribes that have current and ancestral ties in the basin; the Greater Kaweah GSA submitted a request for the Greater Kaweah GSA area and the NAHC identified several Tribes to contact. To request this information, the GSA can email the NAHC at nahc@nahc.ca.gov.

Greater Kaweah GSP Comments

Engagement

30. While the GSP lists all the beneficial uses and users in section 1.4.1, the GSP does not provide context for the location and extent of communities dependent on groundwater. Staff recommends the GSA provide a more thorough description of the beneficial uses and users of groundwater in the Plan Area, including the land uses and property interests potentially affected by the continued withdrawal of groundwater in the Plan Area. In particular, the GSP should include further description of the DACs and Severely Disadvantaged Communities (SDACs)⁹ and the municipal systems, other Public Water Systems, State Small systems, or domestic wells that serve them, the types of parties representing those interests, and the nature of consultation with those parties. (Cal. Code Regs., tit. 23, §§354.8, subd. (a)(3)(4); 354.10, subd. (a).)

Mid-Kaweah GSP Comments

Groundwater Quality

31. The Mid-Kaweah GSA has extensive groundwater quality monitoring coverage for public drinking water wells. However, it is unclear whether private domestic wells have sufficient coverage under the current and proposed monitoring networks. Staff recommends that Mid-Kaweah GSA clarify if the monitoring network will capture water quality impacts in the shallow portions of the aquifers where domestic wells are located.
32. Staff recommends that Mid-Kaweah GSA increase monitoring in the western portion of the GSA area (Tulare Irrigation District's management area), specifically to monitor water quality in shallower wells. Figure 58 in the Coordination Agreement shows that groundwater quality wells are concentrated in the cities of Tulare and Visalia (Coordination Agreement PDF p. 219). Staff recognizes that Mid-Kaweah GSA has proposed new monitoring wells to fill data gaps, but it appears that the two proposed multi-level piezometers are designated for agricultural monitoring only (Figures 4-6 and 4-7, MKGSP pp. 4-8 through 4-9).

Project and Management Actions

33. The GSP states that the groundwater level MTs will impact "small-system" and domestic wells more than other beneficial users and that the assistance measures

⁹ A community with a median household income less than 60 percent of the statewide average. (Pub. Resources Code, § 75005, subd. (g).)

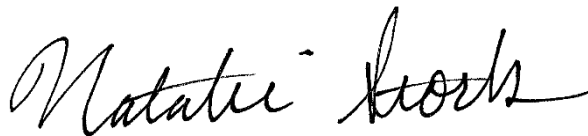
in the management actions section make the MTs acceptable in the Mid-Kaweah GSA area despite large percentages of domestic wells becoming dewatered at the proposed MTs (MKGSP pp. A5-6, A5-8).

Section 7.4 of the GSP describes a small-system and domestic well owner assistance program to mitigate declining groundwater level impacts to stakeholders with shallow wells. Staff recommends Mid-Kaweah GSA include plans to mitigate for water quality degradation in drinking water wells due to groundwater management to protect small-system and domestic well users' access to safe and affordable drinking water. See Comment 13 for more information on the GSAs' responsibility to address water quality impacts under SGMA.

34. Staff recognizes that the Mid-Kaweah GSP has a well characterization management action to address the well construction data gap and recommends that Mid-Kaweah GSA additionally address the gaps in the groundwater level and quality monitoring networks, specifically in domestic and disadvantaged communities. The "Monitoring Network Assessment and Improvement" section from the DWR Reporting chapter (Section 8.2.1, MKGSP pp. 8-5 through 8-6) should be updated as part of this effort.

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,



Natalie Stork
Senior Engineering Geologist
Groundwater Management Program
Office of Research, Planning, and Performance

Enclosures: Appendix – Select constituents in Kaweah Subbasin wells

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

Appendix – Select constituents in Kaweah 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/>).

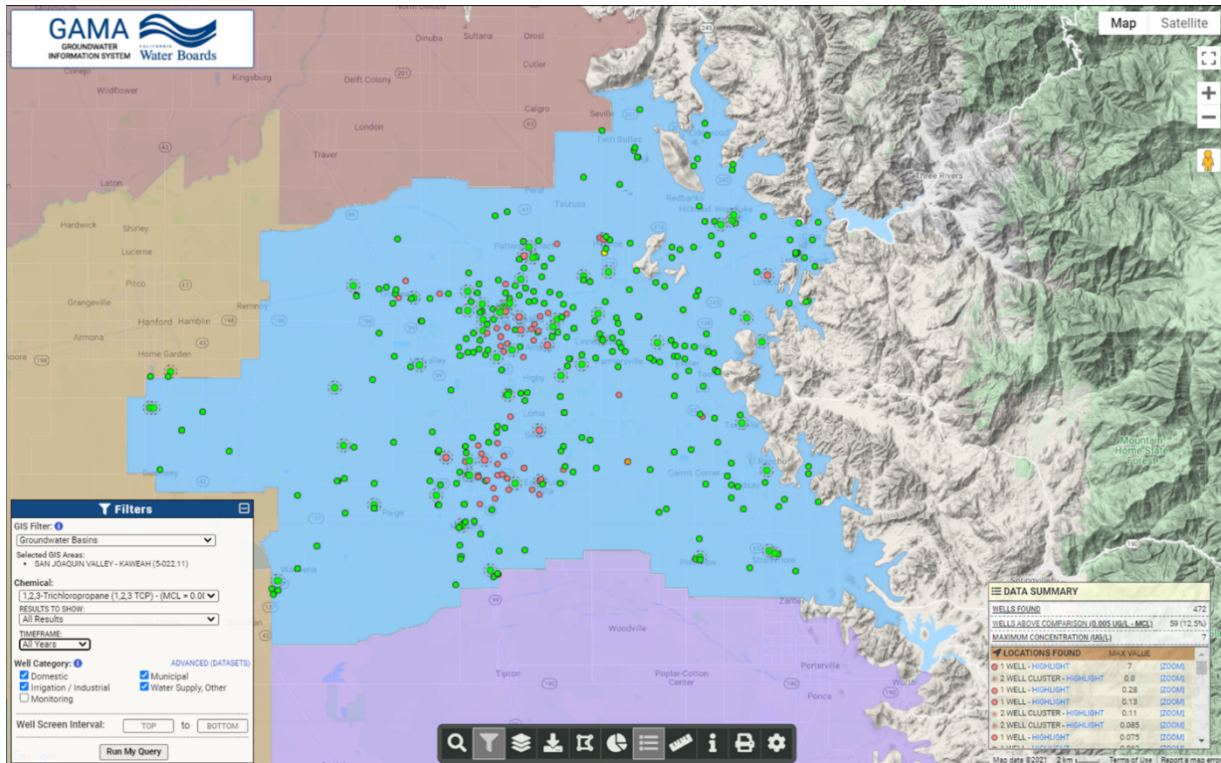


Figure 1. 1,2,3-Trichloropropane in Kaweah Subbasin wells

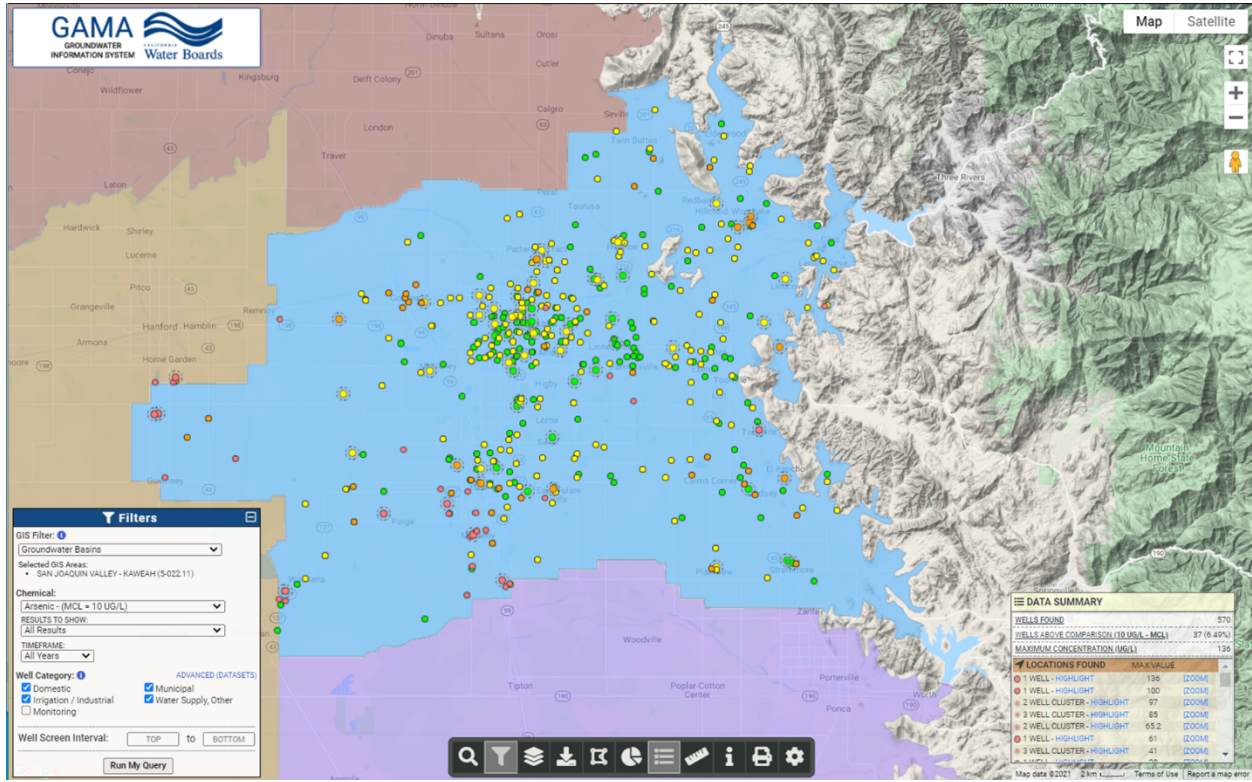


Figure 2. Arsenic in Kaweah Subbasin wells.

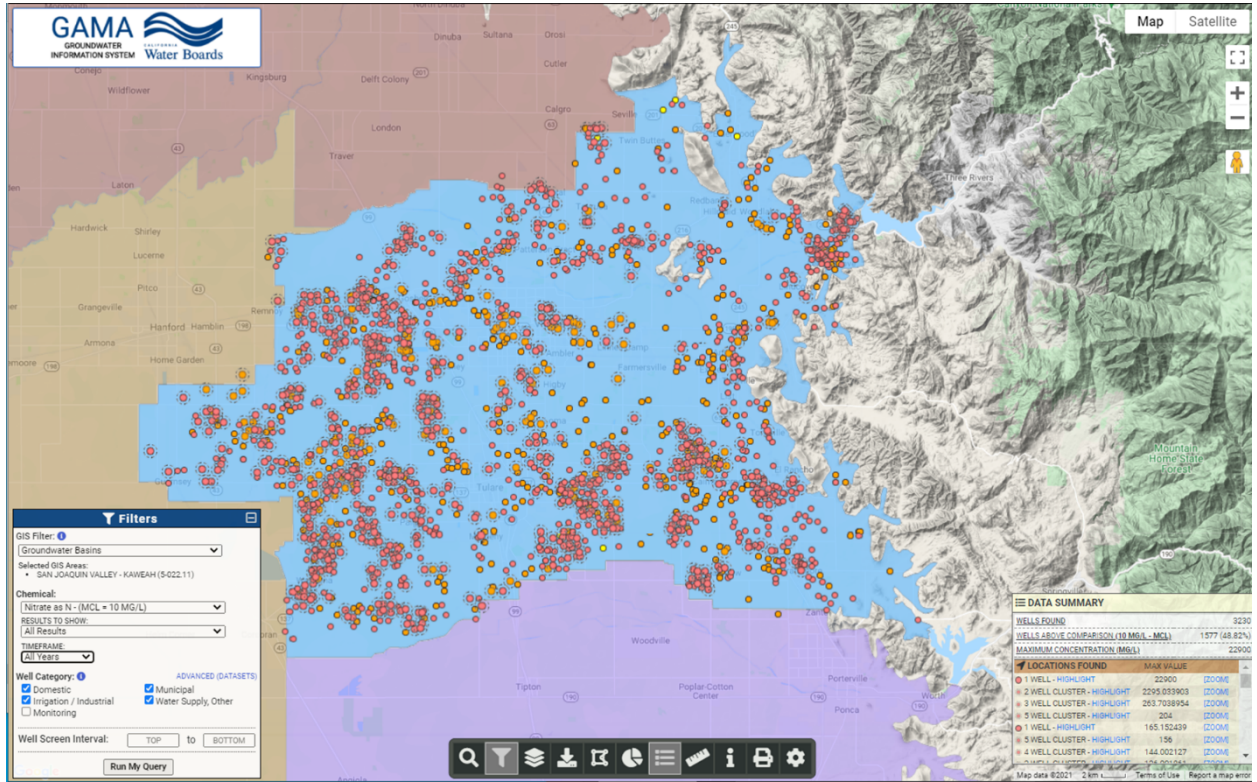


Figure 3. Nitrate in Kaweah Subbasin wells.

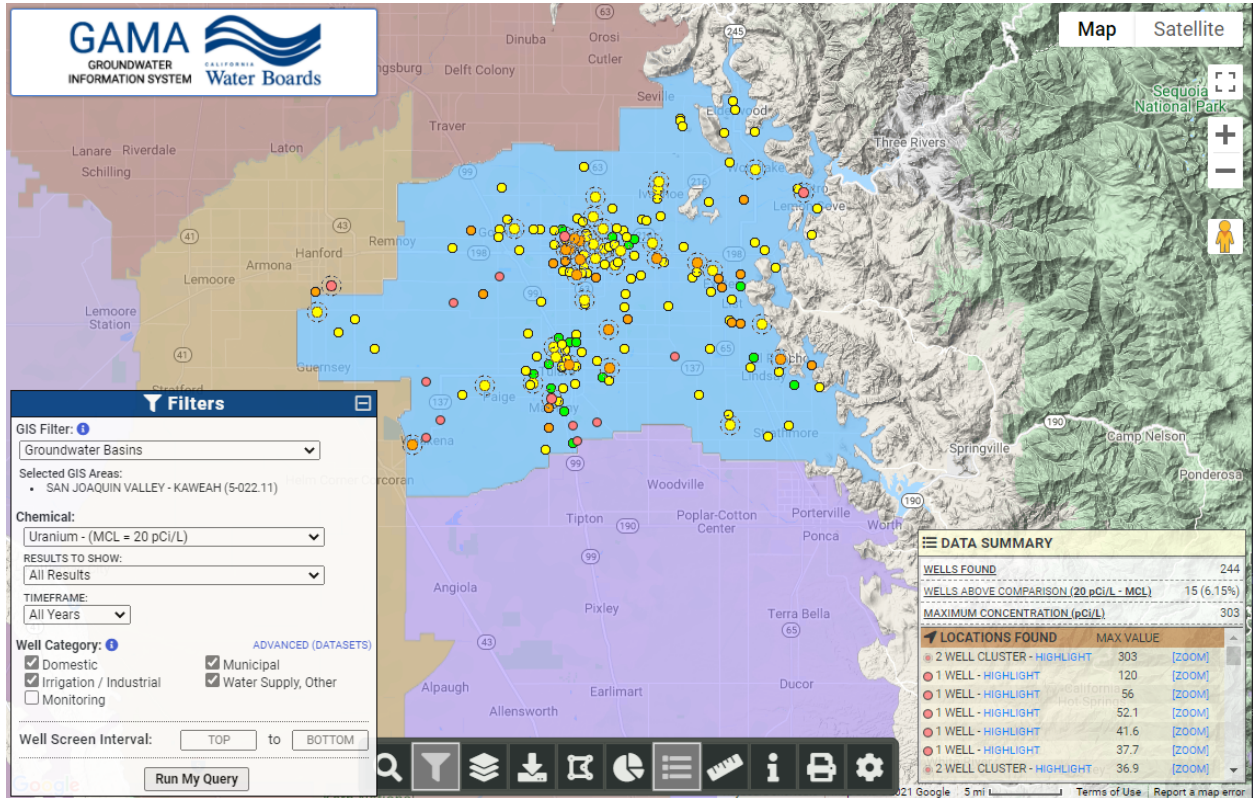


Figure 4. Uranium in Kaweah Subbasin wells.