# Appendix L

Groundwater Quality Considerations for High and Medium Priority Groundwater Basins letter to the DWR





## State Water Resources Control Board

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# GROUNDWATER QUALITY CONSIDERATIONS FOR HIGH AND MEDIUM PRIORITY GROUNDWATER BASINS

The State Water Resources Control Board (State Water Board) staff is providing this letter 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 (SGMA regulations) (Cal Code Regs., tit. 23, § 350 et seq.) of groundwater sustainability plans (GSPs) submitted by groundwater sustainability agencies (GSAs) in high and medium priority groundwater basins subject to SGMA.

This letter is to inform you that, based on an assessment of more than 24 GSPs, State Water Board staff have identified that many of the GSPs do not comprehensively describe or set appropriate sustainable management criteria (SMC) for groundwater quality.

Water Quality Impacts on Groundwater and Requirements for GSAs under SGMA SGMA is not a remedial statute and does not attempt to resolve all groundwater quality issues but requires that operation of a basin within its sustainable yield, as defined by SGMA, does not cause undesirable results, including water quality degradation. Water Code Section 10727.2 and the SGMA regulations require GSAs to characterize groundwater quality and identify associated undesirable results in the GSPs for their basins. In addition, any projects or management actions adopted by a GSA within their GSP should not cause degradation of water quality that could lead to an undesirable result.

Both groundwater extraction and the implementation of projects to achieve sustainability may cause impacts from migration of contaminant plumes, changes in the concentration

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

of contaminants due to reduction in the volume of water stored in the basin, or change in groundwater conditions (oxic, suboxic, and anoxic) that could lead to the release of harmful naturally occurring constituents. Declining groundwater levels may draw higher concentrations of shallow constituents (e.g., nitrate, which is commonly found in, but not limited to, the shallow portion of the aquifer) into shallow wells, degrading drinking water quality. Additionally, as wells are drilled and screened deeper into an aquifer, well users may encounter groundwater with higher concentrations of constituents such as arsenic, uranium, and total dissolved solids (TDS), which are commonly present in, but not limited to, deeper portions of aquifers.

Natural and anthropogenically sourced constituent mobilization is dependent on local geology and groundwater environmental conditions that can be influenced by groundwater management processes. Groundwater conditions will likely be highly variable spatially and stratigraphically. A GSA should therefore carefully consider how its management of groundwater might further degrade groundwater quality with respect to each known constituent and its mechanism for mobilization in groundwater.

A GSP must characterize historic and current groundwater quality conditions in principal aquifers as part of the hydrogeologic conceptual model (Cal. Code Regs., tit. 23, § 354.14, subd. (b) (4) (D)) and must address groundwater quality that may affect the supply and beneficial uses of groundwater (Cal. Code Regs., tit. 23, § 354.16. subd. (d)). To determine water quality trends and conditions as of January 1, 2015, a GSP will need to evaluate groundwater quality conditions prior to 2015. A GSP, however, is not required to address undesirable results that occurred before and were not corrected by January 1, 2015 (though a GSA may choose to do so) (Wat. Code, § 10727.2, subd. (b) (4)).

## Methodology to Identify Constituents

In order to recommend a suite of constituents that should be considered in GSPs, State Water Board staff developed a methodology to identify key constituents for each basin. The methodology builds on the process we developed to assess groundwater quality in GSPs we previously reviewed. The methodology uses data from the State Water Board's Groundwater Ambient Monitoring and Assessment Program (GAMA) to determine which constituents exceeded screening criteria related to human health, such as Maximum Contaminant Levels (MCLs) or Health-Based Screening Levels (HBSLs). Constituents that are not related to human health or that are generally not impacted by groundwater management activities are excluded by this methodology. The screening criteria uses information taken from four types of wells (domestic, irrigation/industrial, municipal, and water supply) as identified by GAMA. If a constituent exceeded screening criteria in the untreated water of three or more of these types of wells basin-wide, it was included as a constituent that should be considered in the GSP.

State Water Board staff encourage DWR, GSAs, and other interested parties to consider the attached list of constituents derived from this methodology when evaluating or updating GSPs. While it may not be appropriate for a GSP to set minimum thresholds and measurable objectives for all constituents identified for the basin, most or all of the constituents should be discussed in the basin setting (Cal. Code Regs., tit. 23, § 354.14, subd. (b) (4) (D) and § 354.16, subd. (d)), since these constituents are present in the basin at concentrations that can impact beneficial users of groundwater. State Water Board staff also encourage DWR, GSAs, and other interested parties to further explore this list of constituents with the <a href="SGMA Groundwater Quality Visualization Tool">SGMA Groundwater Quality Visualization Tool</a> (<a href="https://www.waterboards.ca.gov/sgma/water-quality-visualization-tool.html">https://www.waterboards.ca.gov/sgma/water-quality-visualization-tool.html</a>). For more guidance for GSAs and other interested parties about the role of water quality in SGMA, please see the State Water Board's <a href="https://www.waterboards.ca.gov/sgma/docs/sgma/sgma wtr qual.pdf">Water Quality FAQ</a> (<a href="https://www.waterboards.ca.gov/sgma/docs/sgma/sgma wtr qual.pdf</a>).

For any questions, please contact the Groundwater Management Program at sgma@waterboards.ca.gov or at (916) 322-6508.

Sincerely,

Natalie Stork

Supervising Engineering Geologist Groundwater Management Program

Matatie Stock

Office of Research, Planning, and Performance

Enclosure: Table: Groundwater Quality Considerations for High and Medium Priority

**Groundwater Basins** 

1-05-5-01   Santa Rosa Plain   Arsenic	Basin Number	Basin/Subbasin	Constituent
1-055.01   Santa Rosa Plalin   Trichloroscheme (TCE)	1-055.01	Santa Rosa Plain	Arsenic
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Basin Number	Basin/Subbasin	Constituent
3-004.06	Paso Robles Area	Nitrate+Nitrite
3-004.06	Paso Robles Area	Total Dissolved Solids
3-004.09	Langley Area	Arsenic
3-004.09	Langley Area	Chromium, Hexavalent (Cr6)
3-004.09	Langley Area	Nitrate as N
3-004.10	Corral De Tierra Area	Arsenic
3-004.10	Corral De Tierra Area	Nitrate+Nitrite
3-004.10	Corral De Tierra Area	Total Dissolved Solids
3-008.01	Los Osos Area	Nitrate as N
3-008.01	Los Osos Area	Nitrate+Nitrite
3-009	San Luis Obispo Valley	Arsenic
3-009	San Luis Obispo Valley	Nitrate as N
3-009	San Luis Obispo Valley	Nitrate+Nitrite
3-009	San Luis Obispo Valley	Perfluorooctanoic acid
3-009	San Luis Obispo Valley	Perfluorooctanoic sulfonate
3-009	San Luis Obispo Valley	Total Dissolved Solids
3-013	Cuyama Valley	Arsenic
3-013	Cuyama Valley	Nitrate as N
3-013	Cuyama Valley	Nitrate+Nitrite
3-013	Cuyama Valley	Total Dissolved Solids
3-014	San Antonio Creek Valley	Arsenic
3-014	San Antonio Creek Valley	Nitrate as N
3-014	San Antonio Creek Valley	Nitrate+Nitrite
3-014	San Antonio Creek Valley	Total Dissolved Solids
3-015	Santa Ynez River Valley	Arsenic
3-015	Santa Ynez River Valley	Chromium, Hexavalent (Cr6)
3-015	Santa Ynez River Valley	Gross Alpha radioactivity
3-015	Santa Ynez River Valley	Nitrate as N
3-015	Santa Ynez River Valley	Nitrate+Nitrite
3-015	Santa Ynez River Valley	Total Dissolved Solids
3-018	Carpinteria	Nitrate+Nitrite
3-018	Carpinteria	Total Dissolved Solids
3-027	Santa Margarita	Arsenic
3-049	Montecito	Nitrate as N
3-049	Montecito	Total Dissolved Solids
4-003.01	Upper Ventura River	Nitrate as N
4-004.02	Oxnard	Gross Alpha radioactivity
4-004.02	Oxnard	Nitrate as N
4-004.02	Oxnard	Selenium
4-004.02	Oxnard	Total Dissolved Solids
4-004.05	Fillmore	Total Dissolved Solids
4-004.06	Piru	Total Dissolved Solids
4-004.07	Santa Clara River Valley East	Perfluorooctanoic acid
4-004.07	Santa Clara River Valley East	Perfluorooctanoic sulfonate
4-004.07	Santa Clara River Valley East	Total Dissolved Solids
4-006	Pleasant Valley	Total Dissolved Solids
4-008	Las Posas Valley	Gross Alpha radioactivity
4-008	Las Posas Valley	Total Dissolved Solids
4-011.01	Santa Monica	Nitrate as N
4-011.01	Santa Monica	Tetrachloroethene (PCE)
4-011.01	Santa Monica	Total Dissolved Solids
4-011.01	Santa Monica	Trichloroethene (TCE)
5-021.50	Red Bluff	Nitrate as N
5-021.50	Red Bluff	Perfluorooctanoic acid
5-021.50	Red Bluff	Perfluorooctanoic sulfonate
5-021.52	Colusa	Arsenic
5-021.52	Colusa	Chromium, Hexavalent (Cr6)
5-021.52	Colusa	Nitrate as N
5-021.52	Colusa	Nitrate+Nitrite

Basin Number	Basin/Subbasin	Constituent
5-021.52	Colusa	Total Dissolved Solids
5-021.54	Antelope	Nitrate as N
5-021.56	Los Molinos	Arsenic
5-021.57	Vina	1,2,3-Trichloropropane (1,2,3 TCP)
5-021.57	Vina	Arsenic
5-021.57	Vina	Di(2-ethylhexyl)phthalate (DEHP)
5-021.57	Vina	Nitrate as N
5-021.57	Vina	Nitrate+Nitrite
5-021.57	Vina	Nitrite as N
5-021.57	Vina	Perfluorooctanoic acid
5-021.57	Vina	Perfluorooctanoic sulfonate
5-021.57	Vina	Tetrachloroethene (PCE)
5-021.61	South Yuba	1,2,3-Trichloropropane (1,2,3 TCP)
5-021.61	South Yuba	Nitrate as N
5-021.62	Sutter	Arsenic
5-021.62	Sutter	Nitrate as N
5-021.62	Sutter	Nitrate+Nitrite
5-021.62	Sutter	Total Dissolved Solids
5-021.64	North American	1,2,3-Trichloropropane (1,2,3 TCP)
5-021.64	North American	Arsenic
5-021.64	North American	Nitrate as N
5-021.64	North American	Nitrite as N
5-021.64 5-021.64	North American  North American	Perfluorooctanoic acid Perfluorooctanoic sulfonate
5-021.64	North American	Tetrachloroethene (PCE)
5-021.64	North American	Total Dissolved Solids
5-021.64	North American	Trichloroethene (TCE)
5-021.65	South American	Arsenic
5-021.65	South American	Nitrate as N
5-021.65	South American	Perfluorooctanoic acid
5-021.65	South American	Perfluorooctanoic sulfonate
5-021.65	South American	Total Dissolved Solids
5-021.66	Solano	Arsenic
5-021.66	Solano	Chromium, Hexavalent (Cr6)
5-021.66	Solano	Nitrate as N
5-021.66	Solano	Nitrate+Nitrite
5-021.67	Yolo	Arsenic
5-021.67	Yolo	Chromium, Hexavalent (Cr6)
5-021.67	Yolo	Nitrate as N
5-021.67	Yolo	Nitrate+Nitrite
5-021.67	Yolo	Nitrite as N
5-021.67	Yolo	Total Dissolved Solids
5-021.69	Wyandotte Creek	Nitrate as N
5-021.69	Wyandotte Creek	Perfluorooctanoic acid
5-021.69	Wyandotte Creek	Perfluorooctanoic sulfonate
5-021.70	Butte	1,2,3-Trichloropropane (1,2,3 TCP)
5-021.70	Butte	Arsenic
5-021.70	Butte	Nitrate as N
5-022.01	Eastern San Joaquin	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.01	Eastern San Joaquin	1,2-Dibromo-3-chloropropane (DBCP)
5-022.01	Eastern San Joaquin	Arsenic  Gross Alpha radioactivity
5-022.01 5-022.01	Eastern San Joaquin Eastern San Joaquin	Gross Alpha radioactivity  Nitrate as N
5-022.01	Eastern San Joaquin Eastern San Joaquin	Nitrate as N Nitrate+Nitrite
5-022.01	Eastern San Joaquin Eastern San Joaquin	Nitrate+Nitrite  Nitrite as N
5-022.01	Eastern San Joaquin	Perfluorooctanoic acid
5-022.01	Eastern San Joaquin	Perfluorooctanoic sulfonate
5-022.01	Eastern San Joaquin	Tetrachloroethene (PCE)
5-022.01	Eastern San Joaquin	Uranium
3 022.01	Lastern san soaquin	Ordinani

Basin Number	Basin/Subbasin	Constituent
5-022.02	Modesto	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.02	Modesto	1,2-Dibromo-3-chloropropane (DBCP)
5-022.02	Modesto	Arsenic
5-022.02	Modesto	Gross Alpha radioactivity
5-022.02	Modesto	Nitrate as N
5-022.02	Modesto	Nitrate+Nitrite
5-022.02	Modesto	Nitrite as N
5-022.02	Modesto	Perfluorooctanoic acid
5-022.02	Modesto	Perfluorooctanoic sulfonate
5-022.02	Modesto	Total Dissolved Solids
5-022.02	Modesto	Uranium
5-022.03	Turlock	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.03	Turlock	Arsenic
5-022.03	Turlock	Gross Alpha radioactivity
5-022.03	Turlock	Nitrate as N
5-022.03	Turlock	Nitrate+Nitrite
5-022.03	Turlock	Nitrite as N
5-022.03	Turlock	Perfluorooctanoic sulfonate
5-022.03	Turlock	Total Dissolved Solids
5-022.03	Turlock	Uranium
5-022.04	Merced	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.04	Merced	Arsenic
5-022.04	Merced	Gross Alpha radioactivity
5-022.04	Merced	Nitrate as N
5-022.04	Merced	Nitrate+Nitrite
5-022.04	Merced	Uranium
5-022.05	Chowchilla	Nitrate as N
5-022.05	Chowchilla	Nitrate+Nitrite
5-022.06	Madera	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.06	Madera	1,2-Dibromo-3-chloropropane (DBCP)
5-022.06	Madera	Arsenic
5-022.06	Madera	Gross Alpha radioactivity
5-022.06	Madera	Nitrate as N
5-022.06	Madera	Nitrate+Nitrite
5-022.07	Delta-Mendota	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.07	Delta-Mendota	Arsenic
5-022.07	Delta-Mendota	Chromium, Hexavalent (Cr6)
5-022.07	Delta-Mendota	Gross Alpha radioactivity
5-022.07	Delta-Mendota	Nitrate as N
5-022.07	Delta-Mendota	Nitrate+Nitrite
5-022.07	Delta-Mendota	Total Dissolved Solids
5-022.08	Kings	1,2 Dibromoethane (EDB)
5-022.08	Kings	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.08	Kings	1,2-Dibromo-3-chloropropane (DBCP)
5-022.08	Kings	Arsenic
5-022.08	Kings	Chromium, Hexavalent (Cr6)
5-022.08	Kings	Gross Alpha radioactivity
5-022.08	Kings	Nitrate as N
5-022.08	Kings	Nitrate+Nitrite
5-022.08	Kings	Nitrite as N
5-022.08	Kings	Perfluorooctanoic acid
5-022.08	Kings	Perfluorooctanoic sulfonate
5-022.08	Kings	Tetral Disselved Solids
5-022.08 5-022.08	Kings	Total Dissolved Solids Trichloroethene (TCE)
5-022.08	Kings	Uranium
5-022.08	Kings Westside	Total Dissolved Solids
5-022.09	Kaweah	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.11	Kaweah	Arsenic

Basin Number	Basin/Subbasin	Constituent
5-022.11	Kaweah	Gross Alpha radioactivity
5-022.11	Kaweah	Nitrate as N
5-022.11	Kaweah	Nitrate+Nitrite
5-022.11	Kaweah	Perfluorooctanoic acid
5-022.11	Kaweah	Perfluorooctanoic sulfonate
5-022.11	Kaweah	Tetrachloroethene (PCE)
5-022.11	Kaweah	Total Dissolved Solids
5-022.11	Kaweah	Uranium
5-022.12	Tulare Lake	Arsenic
5-022.12	Tulare Lake	Gross Alpha radioactivity
5-022.12	Tulare Lake	Nitrate as N
5-022.12	Tulare Lake	Nitrate+Nitrite
5-022.12	Tulare Lake	Total Dissolved Solids
5-022.12	Tulare Lake	Uranium
5-022.13	Tule	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.13	Tule	1,2-Dibromo-3-chloropropane (DBCP)
5-022.13	Tule	Arsenic
5-022.13	Tule	Gross Alpha radioactivity
5-022.13	Tule	Nitrate as N
5-022.13	Tule	Nitrate+Nitrite
5-022.13	Tule	Nitrite as N
5-022.13	Tule	Uranium
5-022.14	Kern County	1,2 Dibromoethane (EDB)
5-022.14	Kern County	1,2,3-Trichloropropane (1,2,3 TCP)
5-022.14	Kern County	1,2-Dibromo-3-chloropropane (DBCP)
5-022.14	Kern County	Arsenic
5-022.14	Kern County	Benzene
5-022.14	Kern County	Gross Alpha radioactivity
5-022.14	Kern County	Nitrate as N
5-022.14	Kern County	Nitrate+Nitrite
5-022.14	Kern County	Nitrite as N
5-022.14	Kern County	Perfluorooctanoic acid
5-022.14	Kern County	Perfluorooctanoic sulfonate
5-022.14	Kern County	Selenium
5-022.14	Kern County	Total Dissolved Solids
5-022.14	Kern County	Uranium
5-022.15	Tracy	Arsenic
5-022.15	Tracy	Chromium, Hexavalent (Cr6)
5-022.15	Tracy	Gross Alpha radioactivity
5-022.15	Tracy	Nitrate as N
5-022.15	Tracy	Nitrate+Nitrite
5-022.15	Tracy	Perfluorooctanoic acid
5-022.15	Tracy	Perfluorooctanoic sulfonate
5-022.15	Tracy	Total Dissolved Solids
5-022.16	Cosumnes	Arsenic
5-022.16	Cosumnes	Nitrate as N
5-022.18	White Wolf	Nitrate as N
5-022.19	East Contra Costa	Arsenic  Gross Alpha radioactivity
5-022.19	East Contra Costa	Gross Alpha radioactivity
5-022.19	East Contra Costa	Nitrate as N
5-022.19 5-022.19	East Contra Costa	Nitrate+Nitrite  Total Dissolved Solids
	East Contra Costa	
6-005.01 6-005.01	Tahoe South Tahoe South	Arsenic  Gross Alpha radioactivity
6-005.01	Tanoe South  Tahoe South	Gross Alpha radioactivity Tetrachloroethene (PCE)
6-005.01	Tanoe South  Tahoe South	Uranium
6-005.01	Indian Wells Valley	
6-054	Indian Wells Valley	Arsenic
7-021.01	Indian Wells Valley Indio	Nitrate as N  Arsenic
7-021.01	IIIUIU	Alsellic

Basin Number	Basin/Subbasin	Constituent
7-021.01	Indio	Chromium, Hexavalent (Cr6)
7-021.01	Indio	Gross Alpha radioactivity
7-021.01	Indio	Nitrate as N
7-021.01	Indio	Total Dissolved Solids
7-021.01	Indio	Uranium
7-021.02	Mission Creek	Chromium, Hexavalent (Cr6)
7-021.02	Mission Creek	Gross Alpha radioactivity
7-021.04	San Gorgonio Pass	Nitrate as N
8-001	Coastal Plain Of Orange County	Arsenic
8-001	Coastal Plain Of Orange County	Gross Alpha radioactivity
8-001	Coastal Plain Of Orange County	Nitrate as N
8-001	Coastal Plain Of Orange County	Perfluorooctanoic acid
8-001	Coastal Plain Of Orange County	Perfluorooctanoic sulfonate
8-001	Coastal Plain Of Orange County	Total Dissolved Solids
8-002.07	Yucaipa	Nitrate as N
8-002.09	Temescal	1,2,3-Trichloropropane (1,2,3 TCP)
8-002.09	Temescal	Gross Alpha radioactivity
8-002.09	Temescal	Nitrate as N
8-002.09	Temescal	Perfluorooctanoic acid
8-002.09	Temescal	Perfluorooctanoic sulfonate
8-002.09	Temescal	Total Dissolved Solids
8-004.01	Elsinore Valley	Arsenic
8-005	San Jacinto	1,2,3-Trichloropropane (1,2,3 TCP)
8-005	San Jacinto	Gross Alpha radioactivity
8-005	San Jacinto	Nitrate as N
8-005	San Jacinto	Perfluorooctanoic acid
8-005	San Jacinto	Perfluorooctanoic sulfonate
8-005	San Jacinto	Total Dissolved Solids
9-007.01	Upper San Luis Rey Valley	Nitrate as N
9-007.01	Upper San Luis Rey Valley	Total Dissolved Solids