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## Central Valley Regional Water Quality Control Board

23 January 2018

David De Groot  
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2904 W. Main Street  
Visalia, CA 93291

### COMMENTS ON THE TULE BASIN WATER QUALITY COALITION'S GROUNDWATER TREND MONITORING WORK PLAN

Thank you for submitting your coalition-specific Groundwater Trend Monitoring Work Plan (GQTMP), required by Waste Discharge Requirements General Order R5-2013-0120 (Order). Subsequent to its submission, the Central Valley Regional Water Quality Control Board adopted a revision to the Order allowing the formation of a regional trend monitoring group. The Tule Basin Water Quality Coalition (Tule Coalition), along with ten others, joined together with the Central Valley Groundwater Monitoring Collaborative (CVGMC) and submitted a conceptual work plan for a collaborative trend monitoring effort on 31 October 2017. Following conditional approval of the conceptual work plan, the CVGMC submitted a schedule for completion of the final Technical Workplan by 16 May 2018. Both the CVGMC and Regional Board staff are committed to begin trend monitoring by Fall of 2018.

Staff has reviewed your GQTMP and provided comments in the enclosed memorandum addressing the Tule Coalition's trend monitoring requirements within the framework of the regional collaborative effort. These comments also provide direction for matters that will be addressed collaboratively in the CVGMC Technical Workplan. Several issues, such as coordinating schedules for various aspects of the program remain unresolved. Staff ask specifically that implementation of the several phases proposed by this plan be integrated with similar phases proposed by other coalitions within the CVGMC. The GQTMP appears sufficient to proceed to phase 2, which includes the field verification of candidate wells for the monitoring network. Sampling should begin no later than fall of 2018.

If you have any questions regarding this letter, please contact me at (559) 445-6279 or by email at [david.sholes@waterboards.ca.gov](mailto:david.sholes@waterboards.ca.gov).

A handwritten signature in black ink that reads "David A. Sholes".

DAVID A. SHOLES  
Senior Engineering Geologist  
Irrigated Lands Regulatory Program Unit - Fresno

Enclosure: Central Valley Water Board Staff Review Memorandum of the Coalition's GTMW

cc: Sue McConnell, Central Valley Water Board, Rancho Cordova

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**Central Valley Regional Water Quality Control Board**

**TO:** David Sholes, PG 4321 *DM*  
Senior Engineering Geologist  
Irrigated Lands Regulatory Program

**FROM:** Marcus Ellison *ME*  
Engineering Geologist  
Irrigated Lands Regulatory Program

**DATE:** 23 January 2018

**SUBJECT: REVIEW OF THE TULE BASIN WATER QUALITY COALITION AUTHORITY  
GROUNDWATER QUALITY TREND MONITORING WORK PLAN**

On 6 January 2017, the Central Valley Regional Water Quality Control Board received the Tule Basin Water Quality Coalition's Groundwater Quality Trend Monitoring Work Plan (GQTMP). Section VIII.D.3 of the Waste Discharge Requirements for Growers within the Tulare Lake Basin Area that are Members of the Third-Party Group" (Order R5-2013-0120 or "General Order") requires the development of a QTMP, one year after written approval of the Groundwater Quality Assessment Report (GAR) by the Executive Officer.

After submission of the QTMP, the Central Valley Water Board adopted an amendment to the General Order which allowed multiple coalitions to join together in a regional trend monitoring effort. The Coalition has joined a collaborative group and some trend monitoring requirements discussed below will be addressed in the regional plan. Staff comments provide guidance on issues, whether they are addressed by the Coalition or in a regional plan prepared by the collaborative group.

The overall objectives of groundwater trend monitoring are to determine current groundwater quality conditions relevant to irrigated agriculture and develop long-term groundwater quality information that can be used to evaluate the regional effects of irrigated agricultural practices. The GQTMW describes the Tule Coalition's approach for the trend monitoring objectives.

Table 1 (see page 5 of this memorandum) lists the General Order's requirements for the QTMP and identifies where in the document they have been addressed. A summary of the Tule Coalition's approach and staff recommendations are discussed below.

**Summary of Tule Coalition's QTMP Approach**

The primary purpose of the groundwater trend monitoring network design in the Tule Coalition area is to establish a network of wells that will provide regional representation of long-term groundwater quality trends as they relate to potential influences of nitrate concentrations from irrigated agriculture, and regional changes to agricultural practices.

The QTMP takes into account the different types of agricultural commodities produced within the Tule Coalitions' boundaries, the areas identified in the GAR as contributing significant groundwater recharge and municipal supply, and the conditions identified in the GAR related to the vulnerability prioritization and high vulnerability. Since nearly all the coverage area within the

Tule basin is categorized as highly vulnerable, no distinction is made between high and low vulnerability areas across the entire Coalition.

The Tule Coalition has prepared the GQTMP as a two phase work plan. The initial phase outlines considerations for monitoring areas and wells. The second phase will verify specific wells for the monitoring network and will describe implementation of the groundwater sampling schedule provided in phase 1.

The GQTMP proposes four monitored wells per township, (one well per nine square miles). Additionally, a back-up or secondary well will be identified for each selected well if a primary well is damaged or is no longer in production. Priority will be given to those wells nearest to a community or a public water system within each township and in areas identified in the GAR as contributing significant recharge to urban and rural communities where groundwater serves as a supply source. Wells considered for the groundwater monitoring network will be selected from existing domestic wells in each township, or a shallow agricultural well will be selected if a domestic well does not exist. Wells will also be selected based on construction characteristics (well depth, screened interval, seal presence), historical data, well accessibility, and general well condition.

Groundwater samples will be collected from the monitoring wells annually, usually in July, and analyzed for the following analytes: electrical conductivity (EC), pH, dissolved oxygen (DO), nitrate as nitrogen, and temperature. Depth to groundwater will be measured twice per year, during the spring (February, seasonal high) and in the fall (October, seasonal low). In addition to the annual sampling, the following constituents will be analyzed every five years: total dissolved solids (TDS), major anions (carbonate, bicarbonate, chloride, and sulfate) and major cations (boron, calcium, sodium, magnesium, and potassium).

### **Summary of Staff Recommendations**

Central Valley Water Board staff has reviewed the GQTMP to determine compliance with the General Order. Based on staff review, additional information is needed. This memorandum provides staff comments recommendations for areas of the GQTMP that require additions/revisions. Item numbers presented below are referenced from Table 1.

#### Items 4, 4a, 4b, 4c. Work Plan Approach

Attachment B, Section IV.E.1 of the General Order requires that the Trend Monitoring Work Plan must provide details regarding the rationale for the number of proposed wells to be monitored and their locations. The rationale needs to consider: the variety of agricultural commodities produced within the third party's boundaries, the conditions identified in the GAR related to the vulnerability prioritization within the coalition area, and the areas identified in the GAR that contribute significant recharge to urban and rural communities where groundwater serves as a significant source of supply. Staff provided comments on the work plan approach, relative to the General Order, on the following:

The GQTMP states in part of Section 4.2.1: "The proposed monitoring network of existing wells will provide coverage of one well for each nine square mile area. Typically, within such spacing, the variety of different crops grown is minimal, thus each selected well used in the monitoring program will provide useful information for the crop grown in that area."

*Staff Comment: Staff finds this rationale to be sufficient to satisfy the requirements of the General Order.*

#### Item 5. Well Details

Attachment B, Section IV.E.2 of the General Order states that the Trend Monitoring Work Plan must provide details for wells proposed for trend monitoring.

The GQTMP states in Section 4.2.3.1: "A well completion report for each candidate selected and secondary well will be required. Each candidate well will be identified in tabular form by: GPS Coordinates, address of the property (if available), CA State Well Number, Well depth, casing top and bottom perforation depths, depth of standing water (static water level, if available) and well seal information (type of material and length of seal)."

*Staff Recommendation: Well details must be provided with the CVGMC's Technical Work Plan to be submitted no later than May 16, 2018.*

#### Item 6. Proposed Sampling Schedule

Attachment B, Section IV.E.3 of the General Order states that the Trend Monitoring Work Plan must provide details regarding the proposed sampling schedule. Trend monitoring wells will be sampled, at a minimum, annually, at the same time of the year for the indicated parameters identified in Table 3 (within the General Order, Attachment B).

Section 5.2.1.1 of the GQTMP states: "Field parameters to be measured at an annual frequency include electrical conductivity at 25°C (EC) in  $\mu\text{S}/\text{cm}$ , pH, temperature (in °C), and dissolved oxygen (DO) in mg/L."

*Staff Recommendation: The Central Valley Groundwater Monitoring Collaborative has proposed to begin sampling by fall of 2018. The Coalition's proposal to conduct annual groundwater sampling in July (starting in July 2018) should coincide with the regional effort.*

Section 6.2.2 of the GQTMP states: "The implementation of the GQTMP will monitor groundwater quality and provide current monitoring data that can be utilized as a primary data source for implementation of the Comprehensive Groundwater Quality Management Plan (CGQMP)."

Under section 2.9, Constituents of Concern, of the CGQMP, section 2.9.3 states: "Pesticides are chemicals used to control populations of a variety of pests of vectors. Pesticides are commonly used for residential, commercial, and agriculture applications on vegetation (herbicides), insects (insecticides), and fungi (fungicides). Pesticides are widely utilized in production agriculture, residential homes and gardens, golf courses, commercial landscaping, and weed control in public right of ways. The exact use of the non-naturally occurring chemicals fluctuate based on the practice and the targeted pest. Pesticides may remain in the soil, and leach over time into groundwater. The Department of Pesticide Regulation (DPR), the Groundwater Ambient Monitoring and Assessment (GAMA), and the Tulare County Ag Commissioner's Office provide sources for determination of pesticide application data which will be utilized for the identification of the cause for an exceedance associated with a pesticide."

*Staff Recommendation: The objective of the GTMW is to determine current water quality conditions of groundwater relevant to irrigated agriculture and develop long-term groundwater quality information that can be used to evaluate the effects of irrigated agriculture and its practices. Part of irrigated agriculture practice is the use of pesticide. The GAR findings identified areas where groundwater quality exceeded the maximum contaminant level for nitrates and/or pesticides. Detection of any pesticide in groundwater is an indication of vulnerability, and exceedance of a water quality objective is an issue of public health.*

*Agricultural chemicals not currently being assessed by DPR that have the potential to impact groundwater, such as 1,2,3-TCP and DBCP, should be added to the list of constituents to be sampled in the first year of Trend monitoring (2018). Staff anticipate additional discussions will be needed with the Tule Coalition and the Central Valley Groundwater Monitoring Collaborative regarding the range of ag-related compounds to be tested, the frequency of long term sampling, and the appropriate areas to be monitored.*

Item 7. Work Plan Implementation and Analysis

Attachment B, Section IV.E.4 of the General Order states that the Trend Monitoring Work Plan must provide details regarding the proposed methods to be used to evaluate trends in the groundwater monitoring data over time.

Section 6.1.1 of the GQTMP: “A tabulation consisting of both the field and laboratory analytical results of the constituents monitored for each well. The tabulation will include results from the current year, and statistical analysis of multi-year data including the minimum, maximum, and mean result.”

*Staff Recommendation: If inferential statistical methods are used, then the potential limitation of those methods should also be discussed. Methods may need to be revisited at some future time when sufficient data has been collected to understand the type of statistical analysis required to infer possible trends.*

Attachments:

Table 1. Components of the Groundwater Quality Trend Work Plan

**Table 1. Components of the Groundwater Quality Trend Monitoring Work Plan**

Item No.	Required Component	Location in GTMW
<b>Groundwater Quality Trend Monitoring</b> As required by General Order Attachment B, Section IV.C		
1	Objectives: Identification of objectives for Groundwater Quality Trend Monitoring being:	
1a	1) to determine current water quality conditions of groundwater relevant to irrigated agriculture	2.10.2, 3, 4.1 Table 8 App. A,B Att. J,K,N,O
1b	2) to develop long-term groundwater quality information that can be used to evaluate the regional effects of irrigated agriculture and its practices.	1.1, 4.1, 4.2, 4.2.1, 4.2.2, 4.2.3
2	Implementation: Identification of developed groundwater monitoring network that will:	1.2, 4.1, 4.2, 4.2.1, 4.2.2, 4.2.3
2a	1) be implemented over both high and low vulnerability areas	All of 4.2 Phase 2 App. D - Township Plats 1-31
2b	2) employ wells that consist of shallow wells or existing wells and monitoring networks	All of 4.2 Phase 2
3	Reporting: Results of trend monitoring including map of sampled wells, tabulation of analytical data, time concentration charts, and evaluation of data trends.	1.2, 6.1.1 Att. L, Phase 2 App. D -Township Plats 1-31
<b>Trend Monitoring Work Plan</b> As required by General Order Attachment B, Section IV.E		
4	Work Plan approach: Provide discussion of the rationale for the number of proposed wells to be monitored and their locations. Rational discussion needs to consider:	4.1, 4.2.1, 4.2.2, 4.2.3, 4.2.3.1, 4.2.3.2
4a	1) the variety of agricultural commodities produced with the third-party boundaries	2.8, 4.2.1,4.2.3, 4.2.3.1, 4.2.3.2, Table 6, Att. F
4b	2) the conditions discussed/ identified in the GAR related to the vulnerability prioritization within the third-party area	4.2.1, 4.2.3, 4.2.3.1, 4.2.3.2
4c	3) the areas identified in the GAR as contributing significant recharge to urban and rural communities where groundwater serves as a significant supply source.	4.2.1, 4.2.3, 4.2.3.1, 4.2.3.2 Att. I
5	Well details: Provide details for wells proposed for trend monitoring, including: GPS coordinates, physical address of the property where well is located, California State well number, well depth, top and bottom perforation depths, copy of water well drillers log, depth of standing (static) water level, and well seal information.	4.2.3.1, 4.2.3.2, 4.3.1, 4.4, Fig. 3, App. C Phase 2
6	Proposed sampling schedule: Identify when trend monitoring wells will be sampled. Sampling, at a minimum, should occur annually at the same time of the year for the constituents and indicator parameters lay out in Table 3 of Section IV.E. of the MRP Order R5-2013-0120.	5, 5.2.1.1 Table 9 Phase 2

7	Work plan implementation and analysis: Discussion of proposed method(s) to be used to evaluate trends in the groundwater monitoring data over time.	5 Table 9
<b>Reporting Requirements</b>		
8	Section 6735(a) of the California Business and Professions Code requires that all final civil engineering calculations and reports shall bear the signature and seal or stamp of the licensee and the date of signing and sealing or stamping.	Provided
9	Reporting provisions of the General Order require a certification statement for each person signing a report.	Provided