

Central Valley Regional Water Quality Control Board

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1 November 2017

**CONDITIONAL APPROVAL OF THE KINGS RIVER WATER QUALITY COALITION'S
REVISED COMPREHENSIVE GROUNDWATER QUALITY MANAGEMENT PLAN**

Thank you for your 17 October 2016 submittal of the Kings River Water Quality Coalition's (Coalition) revised Comprehensive Groundwater Quality Management Plan (GQMP). The initial GQMP was submitted in accordance with Waste Discharge Requirements General Order for Growers in the Tulare Lake Basin that are Members of a Third Party Group, Order No. R5-2013-0120 (General Order), and was subsequently revised to address staff comments. Central Valley Water Board staff has reviewed the revised GQMP, and noted areas within the plan that must be addressed to comply with the General Order (see enclosed).

The enclosed staff review memorandum describes GQMP elements in need of revision. Key issues that must be addressed are: 1) the need for Coalition members to implement specific management practices (wellhead protection, proper destruction of abandoned wells, and accounting for nitrate in irrigation water) as a first step to protect groundwater quality; 2) a specific time schedule for compliance with the General Order's groundwater limitations is missing; 3) early communication with growers regarding their relative nitrogen application and removal rates is needed; and 4) the signature and/or stamp of an appropriately registered professional geologist was not provided.

I am conditionally approving the revised GQMP, contingent on the Coalition immediately incorporating the management practices listed above (issue 1) into its grower outreach program, and the subsequent submittal of an updated version of the GQMP which addresses the issues identified in the enclosed staff review memorandum. Please provide the updated plan **by 12 January 2018**. If you have any questions regarding this letter, please contact David Sholes at (559) 445-6279 or by e-mail at david.sholes@waterboards.ca.gov.

Sincerely,



For Pamela C. Creedon
Executive Officer

Enclosure: Central Valley Water Board Staff Review of the Kings River Water Quality Coalition's Revised Groundwater Quality Management Plan

cc: Sue McConnell, Supervising Water Resource Control Engineer, Rancho Cordova

Central Valley Regional Water Quality Control Board

TO: David Sholes, CEG No. 1687 
Senior Engineering Geologist
Irrigated Lands Regulatory Program

FROM: Eric Warren 
Water Resource Control Engineer
Irrigated Lands Regulatory Program

DATE: 1 November 2017

SUBJECT: REVIEW OF THE KINGS RIVER WATER QUALITY COALITION'S REVISED
COMPREHENSIVE GROUNDWATER QUALITY MANAGEMENT PLAN

On 20 November 2014 the Kings River Water Quality Coalition (Coalition) submitted a Comprehensive Groundwater Quality Management Plan (GQMP) as required by section VIII.I. of Waste Discharge Requirements General Order R5-20F13-0120 (General Order). Groundwater Quality Management Plans are a key mechanism under the General Order to help ensure that waste discharges from irrigated lands do not cause or contribute to an exceedance of applicable water quality objectives in the underlying groundwater, unreasonably affect applicable beneficial uses, or cause or contribute to a condition of pollution or nuisance. Regional Water Board staff reviewed the GQMP and on 16 August 2016, the Executive Officer requested that a revised GQMP be submitted by 17 October 2016.

On 17 October 2016 the Coalition submitted a revised Comprehensive Groundwater Quality Management Plan, which has been reviewed by staff. Table 1 (see page 7 of this memorandum) lists the General Order's requirements for the GQMP and identifies where in the document they have been addressed. A summary of: (1) the Coalition's GQMP approach; (2) public comments; and (3) staff comments are discussed below. All references to "GQMP" are in regards to the current revised version, unless otherwise noted.

Summary of the Coalition's GQMP Approach

The Coalition's GQMP focuses on ensuring that appropriate agricultural management practices are implemented by member growers to address constituents of concern (COCs) in groundwater. Nitrate is a primary COC in the GQMP area, but additional issues exist with regard to Total Dissolved Solids (TDS) and pesticides. Specific practices that may reduce deep percolation of nitrate to groundwater (Dzurella et al., 2012) are identified in the GQMP, and will be discussed with member growers at outreach and education events. Management practices protective of groundwater quality and identified as part of the Southern San Joaquin Valley

Management Practices Evaluation Program (SSJV MPEP) will be communicated to growers as they are identified.

The actions that will be taken to meet the objectives of the GQMP include:

- Identification of protective management practices.
- Education of members;
- Implementation of protective management practices; and
- Tracking of management practices

Identification of management practices – According to the GQMP, the SSJV MPEP effort will evaluate and identify the management practices that are protective of groundwater quality. To help facilitate this effort, the Coalition will develop a listing of management practices currently in use and provide a discussion of how the practices have changed over time.

Education of members – The Coalition intends to conduct outreach to Members to communicate the results of research conducted by the University of California Cooperative Extension (UCCE) or other researchers, and also keep growers informed of other relevant monitoring efforts conducted within the region (e.g., ILRP Trend Monitoring Program). As the outreach effort continues, the Coalition anticipates providing analysis of long-term averages and trends to Members and the Regional Board. Outreach materials will be distributed to Members via newsletters, regularly held Coalition meetings, and postings on the Coalition website (www.kingsriverwqc.org). Independent of outreach conducted as part of the Irrigated Lands Regulatory Program, the GQMP anticipates that the results of the Management Practice Evaluation Program studies will be disseminated by the UCCE, and published in peer reviewed professional journals.

Implementation of management practices – Implementation of protective practices, where needed and not already in place, will be encouraged through outreach. Information will be disseminated to landowners and managers within high-vulnerability areas via outreach meetings, targeted mailings, and a grower/advisor webpage which will include a collection of resources focused on minimizing loss of applied nitrogen to groundwater. The webpage will also feature a query-able database of management practices to assist individuals in determining the practices appropriate for their particular operation.

Tracking of management practices – As the GQMP is implemented, the Coalition will evaluate the rate of implementation of protective practices based on reported changes in the Farm Evaluation analysis. This may require updates to the Farm Evaluation Template as new management practices are identified.

Summary of Public Comments

The Kings River Water Quality Coalition's initial GQMP was released for a 30-day public comment period. One joint comment letter was received from Leadership Counsel for Justice and Accountability, Community Water Center, and Clean Water Action (Commenters). The

Commenters noted several items that the GQMP should include, summarized as follows:

- 1) A stakeholder group process to provide input for the proposed nitrate source identification study (isotope study), if developed.
- 2) Requirements for nitrate testing for all member wells, and domestic wells within in HVAs.
- 3) Actions to reduce continued contamination, with specific benchmarks and timelines.
- 4) Actions to assist disadvantaged communities in obtaining safe and affordable drinking water.
- 5) Immediate strategies to protect disadvantaged communities in or near HVAs (e.g., targeted recharge of high-quality water).

Summary of Staff Comments and Recommendations

Central Valley Water Board staff have reviewed the revised GQMP to determine compliance with the General Order and the comments provided on the initial GQMP. Based on staff review, additional information is still needed. Some of the issues contained in the public comment letter are addressed by staff comments and recommendations. Other issues will be addressed as the Groundwater Quality Trend Monitoring Program and the SSJV MPEP are implemented. Staff provided comment on one issue and find seven areas that require additions/revisions.

- Inventory of Existing Management Practices

Section B.1.d. of Appendix MRP-1 requires that the GQMP provide a baseline inventory of identified existing management practices in use within the management plan area that could be affecting the concentrations of nitrate in groundwater and the locations of the various practices. This information was not included in the initial GQMP.

Staff Comment: The Coalition submitted a Farm Evaluation Summary Report (dated 3 January 2017) which contained a baseline inventory of existing management practices and the locations of the practices. The information contained in the Farm Evaluation Summary Report is sufficient to meet the requirements of Section B.1.d. of Appendix MRP-1.

- Management Plan Strategy/Approach

Section I.C.1. of Appendix MRP-1 requires a description of the approach to be utilized by the management plan (e.g., multiple COC's addressed in a scheduled priority fashion, multiple areas covered by the plan with a single area chosen for initial study, or all areas addressed simultaneously [area wide]). The Coalition's management plan strategy was discussed in the body of the GQMP and was also outlined in Appendix A of the document, in a technical memorandum by the Southern San Joaquin Valley Management Practice Evaluation Program (SSJV MPEP) Team entitled *Identification, Extension, and Implementation of Management Practices to Minimize Nitrate Leaching from Crop Root Zones to Satisfy Groundwater Quality Management Plan Requirements*.

The Coalition's management plan strategy will focus on education and outreach programs to promote the implementation of agricultural management practices that are

known to be protective of groundwater quality. The GQMP indicated that nitrate would be a priority with respect to COCs, and indicated that groundwater management plan areas would be prioritized, based on the following criteria:

- Crops that represent the largest land area and economic value;
- Crops and cropping systems with the largest N surplus and/or largest depth of leaching water applied;
- Crops and cropping systems preferentially grown on coarse soils;
- Crops and cropping systems in areas with shallow depth to groundwater;
- Regions of the MPEP area classified as disadvantaged communities

Based on these criteria, the GQMP states that work will initially focus on the eastern basin.

Staff Comment: The listed criteria provide a basis for the prioritization of GQMP activities. However, the areal extent of the “eastern basin” is not clearly defined in the GQMP. A map showing specific delineations of prioritized areas and their respective priority should be provided. Additionally, it is unclear whether the term “Disadvantaged Community” as used in the GQMP also encompasses Disadvantaged Unincorporated Communities. If not already considered, the Coalition’s prioritization criteria need to include source areas for Disadvantaged Unincorporated Communities that rely on groundwater.

- Actions to Achieve Compliance with Receiving Water Limitations

Section I.C.2 of Appendix MRP-1 requires that the GQMP include actions to achieve compliance with the General Order’s receiving water limitations (groundwater limitations). Page 54 of the GQMP includes a sub-section entitled “Compliance with Receiving Water Limitations”. The section provides a short discussion of the proposed use of the Soil and Water Assessment Tool (SWAT) model as part of the Management Practice Evaluation Program, but does not address this specific Order requirement.

Staff Comment: At a minimum, this section should include a discussion of the immediate management practices to be implemented by growers (see item below), specific timelines for implementation, and a description of how use of these and other practices, when evaluated in conjunction with appropriate feedback mechanisms (direct groundwater monitoring, modeling, improved A/R ratios, etc.), can provide a high level of confidence that receiving water limitations are being met.

- Management Practices

Section I.C.4.b of the Appendix MRP-1 requires that the GQMP identify management practices used to control sources of COC’s from irrigated lands. The GQMP provided a list of three management practices that have been proven effective in protecting groundwater. These include: 1) Drip/microsprinkler irrigation; 2) Split applications of fertilizers; and 3) Increased use of foliar fertilizers. It also provided reference to

additional management practices documented to improve nitrogen fertilizer efficiency (Dzurella et al. 2012). The Coalition will continue to support grower efforts to implement management practices through outreach and support in conjunction with the SSJV MPEP; appropriate well maintenance and destruction of abandoned wells will also be promoted in order to protect groundwater quality.

Staff Comment: Specific management practices that growers must implement as a first step to protect groundwater quality include: (1) wellhead protection and proper maintenance of un-used wells; (2) proper destruction of abandoned wells; and (3) accounting for the amount of nitrate in irrigation supply water in order to reduce the amount of excess nitrogen applied. The first two of these three practices have already been identified in Table Nine of the GQMP, along with associated actions, performance metrics, goals, and timelines for completion. The table and outreach materials should be updated to include the practice of accounting for existing nitrate in irrigation supply water.

As additional protective practices are identified through the MPEP process, the Coalition needs to inform growers of their requirement to implement the practices or their equivalent, if applicable to their farming operation and necessary to meet receiving water limitations. Appropriate performance goals and implementation timelines should also be incorporated into the GQMP and communicated through the Coalition's annual Monitoring Report. The timelines must be as short as practicable, and based on appropriate technical or economic justification.

- Organizational Chart

Section I.C.3.c. of Appendix MRP-1 requires that an organizational chart be provided that identifies lines of authority.

Staff Comment: Growers should be included as a responsible party in the organization chart since they are responsible for implementation of practices.

- Time Schedule for Compliance

Section XII. of the General Order requires that the time schedule for compliance with Groundwater Limitation III.B must be as short as practicable, but may not exceed 10 years from the date the GQMP is submitted for approval by the Executive Officer. The GQMP did not include a time schedule for grower compliance.

Staff Comment: The GQMP must include a time schedule for grower compliance with Groundwater Limitation III.B, and provide justification as to why the proposed schedule is as short as practicable. The GQMP should include discussion of the following items to support the schedule: (1) The immediate or near-term management practices that will be implemented and their respective schedules; (2) The implementation schedule for additional management practices that are identified throughout the MPEP process; and (3) A technical or economic justification for the chosen time schedules (e.g., for management practices requiring substantial monetary investment prior to

implementation, the GQMP may justify the proposed implementation schedule by indicating that the schedule will be based on a reasonable timeframe to budget for the required funding necessary to implement the practice, but under no circumstances will the schedule exceed 10 years).

- Outreach Strategy

Table Nine of the GQMP lists the actions, performance metrics, and goals for the Coalition's GQMP. Included in the list is the identification of consistent outliers based on Nitrogen Management Plan summary report data. The table states that outreach will be conducted to growers who are identified as outliers in consecutive years or multiple times in a 3-to-5 year period, beginning in year three.

Staff Comment: Communication to Coalition members regarding their nitrogen use and removal performance is an essential tool in reducing the amount of nitrogen leaching to groundwater, and should not be delayed until the third year of reporting. Within the first year of GQMP implementation, the Coalition should conduct early, targeted outreach to members identified as statistical outliers based on the reported ratio of nitrogen applied to a field (A) to nitrogen removed from a field (A/R ratio). Members should be provided information in a manner that clearly communicates their performance relative to growers within the same crop industry.

- Compliance with Sections 7835 of the California Business and Professions Code

Section 7835 of the California Business and Professions Code states that *"All geologic plans, specifications, reports, or documents shall be prepared by a professional geologist or registered certified specialty geologist, or by a subordinate employee under his or her direction. In addition, they shall be signed by the professional geologist or registered certified specialty geologist or stamped with his or her seal, either of which shall indicate his or her responsibility for them."*

Staff Comment: The GQMP contains information that is consistent with the requirement of the aforementioned section of the California Business and Professions Code, and, therefore, the appropriate signature or stamp needs to be included. However, the GQMP was not signed or stamped by a professional geologist. A signature and license number and/or stamp of a professional geologist should be included in the GQMP.

Table 1. Components of the Groundwater Quality Management Plan

Item No.	Required Component	Location in GQMP
Introduction and Background		
1	Provide a discussion of the constituents of concern (COCs) that are the subject of the GQMP.	Page 8-11
2	Provide a discussion of the water quality objective(s) or trigger(s) requiring preparation of the management plan.	Missing
3	Identification (both narrative and in a map form) of the boundaries (geographic and groundwater basin[s] or portion of a basin) to be covered by the GQMP including how the boundaries were delineated.	Page 12, Figure Two
4	Provide a summary of previous work conducted to identify the occurrence of the COCs (e.g., studies, monitoring conducted) for the GQMP area.	Page 15-16
Physical Setting and Information		
5	Provide land use maps which identify the crops being grown in the GQMP area (these maps may already be presented in the GAR). Map(s) must also be provided in electronic format as ArcGIS shapefiles.	Page 17, Figure Three, Staff able to obtain GIS shapefiles from referenced source
6	Provide soil types and other relevant soils data as described by the NRCS soil survey or other applicable studies. The soil unit descriptions and a map of their aerial extent within the study area must be included.	Requirement satisfied by GAR submittal
7	Identification of the potential irrigated agricultural sources of the COC(s) for which the management plan is being developed. If the potential sources are not known, a source identification study may be designed and implemented.	Page 19-21
8	Provide a list of the designated beneficial uses as identified in the <i>Water Quality Control Plan for the Tulare Lake Basin</i> , Second Edition, revised January 2004 (Basin Plan).	Page 24
9	Provide a baseline inventory of identified existing management practices in use within the management plan area that could be affecting the concentrations of COCs in groundwater and locations of the various practices.	Page 25-28, Farm Evaluation Summary Report
10	Provide a summary, discussion, and compilation of available groundwater quality data for the parameters addressed by the management plan. The GAR developed for the Coalition's area, and groundwater quality data compiled in that document, may serve as a reference for these data.	Page 29-30
Geology and Hydrogeology		
11	Provide regional and area specific geology, including stratigraphy and existing published geologic cross-sections.	Pg. 44- 47, Figure Eight, Appendix C

12	Provide information on groundwater basin(s) and sub-basins contained within the GQMP area, including a discussion of their general water chemistry as known from existing publications, including the GAR (range of EC, concentrations of major cations and anions, nutrients, TDS, pH, dissolved oxygen, and hardness). The discussion should reference and provide figures of existing Piper Diagrams, Stiff Diagrams and/or Durov Diagrams for the GQMP area.	Pg. 29-42, 48-49, Figure Five
13	Provide information regarding known water bearing zones, areas of shallow and/or perched groundwater, as well as areas of discharge and recharge to the basin/sub-basin in the GQMP area (rivers, unlined canals, lakes, and recharge or percolation basins).	Pg. 49, Figure Nine
14	Identification of which water bearing zones within the GQMP area are being utilized for domestic, irrigation, and municipal water production.	Pg. 51
15	Aquifer characteristics such as depth to groundwater, groundwater flow direction, hydraulic gradient, and hydraulic conductivity, as known or estimated based on existing information.	Pg. 51, Figure Nine
16	Identification, where possible, of irrigation water sources (surface water origin and/or groundwater) and their available general water chemistry (range of EC, concentrations of major cations and anions, nutrients, TDS, pH, dissolved oxygen, and hardness).	Pg. 29-42, 48-49, Figure Five
Management Plan Strategy		
17	Provide a description of the approach to be utilized by the management plan (e.g., multiple COC's addressed in a scheduled priority fashion, multiple areas covered by the plan with a single area chosen for initial study, or all areas simultaneously [area wide]). Any prioritization included in the management plan must be consistent with the requirements in section XII of the General Order, Time Schedule for Compliance.	Pg. 52-61 (Needs clarification)
18	Provide a description of actions to be taken in order to achieve compliance with the receiving water limitations of the General Order (section III).	Pg.54-55 (Incomplete)
19	Provide a description of how the Coalition plans to educate Members about the sources of the water quality exceedances in order to promote prevention, protection, and remediation efforts that can maintain and improve water quality.	Pg. 55
20	Provide a description of how the Coalition will identify, validate, and implement management practices to reduce loading of COCs to surface water or groundwater, as applicable, thereby improving water quality.	Pg. 55
21	Identification of key individuals involved in major aspects of the project (e.g., project lead, data manager, sample collection lead, lead for stakeholder involvement, quality assurance manager).	Pg. 55, Table Ten
22	Provide a discussion of each individual's responsibilities.	Table Ten
23	Provide an organizational chart with identified lines of authority.	Table Ten (Needs addition)
24	Identification of the entities or agencies that will be contacted to obtain data and assistance.	Throughout

25	<p>Identification of management practices used to control sources of COCs from irrigated lands that are 1) technically feasible; 2) economically feasible; 3) proven to be effective at protecting water quality, and 4) will comply with sections III.A and B of the General Order. Practices that growers will implement must be discussed, along with an estimate of their effectiveness or any known limitations on the effectiveness of the chosen practice(s). Practices identified may include those that are required by local, state, or federal law. Where an identified constituent of concern is a pesticide that is subject to DPR's Groundwater Protection Program, the GQMP may refer to DPR's regulatory program for that pesticide and any requirements associated with the use of that pesticide provided that the requirement(s) are sufficient to meet water quality objectives.</p>	Pg. 57-58 (Incomplete)
26	<p>Identification of outreach that will be used to disseminate information to participating growers. This discussion shall include: the strategy for informing growers of the water quality problems that need to be addressed, method for disseminating information on relevant management practices to be implemented, and a description of how the effectiveness of the outreach efforts will be evaluated. The third-party may conduct outreach efforts or work with the assistance of the County Agricultural Commissioners, U.C. Cooperative Extension, Natural Resources Conservation Service, Resource Conservation District, California Department of Food and Agriculture, or other appropriate groups or agencies.</p>	Pg. 58-59
27	<p>Provide a specific schedule and milestones for the implementation of management practices and tasks outlined in the management plan. Items to be included in the schedule include: time estimated to identify new management practices as necessary to meet the Order's groundwater receiving water limitations (section III of the Order); a timetable for implementation of identified management practices (e.g., at least 25% of growers identified must implement management practices by year 1; at least 50% by year 2).</p>	Pg. 59, Table Nine (Needs addition)
28	<p>Establish measureable performance goals that are aligned with the elements of the management plan strategy. Performance goals include specific targets that identify the expected progress towards meeting a desired outcome.</p>	Table Nine
Monitoring Methods		
29	<p>The monitoring system must be designed to measure effectiveness at achieving the goals and objectives of the GQMP and capable of determining whether management practice changes made in response to the management plan are effective and can comply with the terms of the General Order.</p>	Pg. 60
30	<p>The third-party's Management Practice Evaluation Program and Groundwater Quality Trend Monitoring shall be evaluated to determine whether additional monitoring is needed in conjunction with the proposed management strategy(ies) to evaluate the effectiveness of the strategy(ies). This may include commodity-based representative monitoring that is conducted to determine the effectiveness of management practices implemented under the GQMP. Refer to section IV of the MRP for groundwater monitoring requirements.</p>	Pg. 60, Pending Final Trend Monitoring Plan
Data Evaluation		
31	<p>Methods to be utilized to perform data analysis (graphical, statistics, modeling, index computation, or some combination thereof).</p>	Pg. 60-61

32	<p>Identify the information necessary to quantify program effectiveness going forward, including the tracking of management practice implementation. The approach for determining the effectiveness of the management practices implemented must be described. Acceptable approaches include field studies of management practices at representative sites and modeling or assessment to associate the degree of management practice implementation to changes in water quality. The process for tracking implementation of management practices must also be described. The process must include a description of how the information will be collected from growers, the type of information being collected, how the information will be verified, and how the information will be reported.</p>	Throughout
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