
Central Valley Regional Water Quality Control Board

1 August 2016

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REVIEW OF THE WESTERN SAN JOAQUIN RIVER WATERSHED COMPREHENSIVE GROUNDWATER QUALITY MANAGEMENT PLAN

Thank you for your 13 November 2015 submittal of the Western San Joaquin River Watershed Comprehensive Groundwater Quality Management Plan (GQMP). The GQMP was submitted in response to Waste Discharge Requirements General Order R5-2014-0002-R2 (Order) and Appendix MRP-1 of Attachment B (Monitoring and Reporting Program) to the Order.

Based on the staff review, the GQMP needs to be revised before approval can be given. The enclosed staff review memorandum notes the areas within the report that must be revised or amended to obtain full approval. A key element that needs to be addressed is the addition of more detailed information regarding the management practices to be implemented prior to the availability of Management Practice Evaluation Program results and schedules for implementation of those practices. Metrics for evaluating achievement of the performance goals identified in the GQMP should also be provided.

In order to receive approval, please revise the GQMP items identified in the staff memorandum and resubmit by **12 September 2016**. If you have any questions regarding this letter, please contact Glenn Meeks at 916-464-4701 or glenn.meeks@waterboards.ca.gov.

Original signed by

Pamela C. Creedon
Executive Officer

Enclosure: Staff Review of the 13 November 2015 Western San Joaquin River Watershed Comprehensive Groundwater Quality Management Plan

Central Valley Regional Water Quality Control Board

TO: Glenn Meeks
Senior Engineering Geologist
IRRIGATED LANDS REGULATORY PROGRAM

FROM: Ashley Peters
Water Resource Control Engineer
IRRIGATED LANDS REGULATORY PROGRAM

DATE: 7 July 2016

SUBJECT: REVIEW OF THE 13 NOVEMBER 2015 WESTERN SAN JOAQUIN RIVER
WATERSHED COMPREHENSIVE GROUNDWATER QUALITY MANAGEMENT
PLAN

On 13 November 2015, the Central Valley Water Board received the Western San Joaquin River Watershed Comprehensive Groundwater Quality Management Plan (GQMP). The GQMP was reviewed to determine compliance with requirements pursuant to section VIII.H of Waste Discharge Requirements General Order R5-2014-0002-R2 (Order) and Appendix MRP-1 of Attachment B (Monitoring and Reporting Program) to the Order.

Staff recommends that the GQMP be revised to meet the terms and conditions of the Order before approval can be considered.

Provision IV.C.9 of the Order requires that the Coalition work cooperatively with the Central Valley Water Board to ensure all Members are taking necessary steps to address exceedances or degradation. Specifically, as a part of the Membership List submittal, the Coalition is required to identify growers who have failed to implement improved water quality management practices within the timeframe specified by the GQMP. This Order requirement needs to be discussed in the GQMP.

Attachment A to the Order describes the objectives of and requirements for the GQMP as summarized below:

Groundwater quality management plans will be required where there are exceedances of water quality objectives, where there is a trend of degradation that threatens a beneficial use, as well as for "high vulnerability groundwater areas". Instead of development of separate GQMPs, the Order allows for the submittal of a comprehensive GQMP along with the Groundwater Assessment Report. GQMPs are the key mechanism under this Order to help ensure that waste discharges from irrigated lands are meeting Groundwater Receiving Water Limitation III.B.

The main elements of GQMPs are to A) investigate potential irrigated agricultural sources of waste discharge to groundwater, B) review physical setting information for the plan area such as geologic factors and existing water quality data, C) considering elements A and B, develop a strategy with schedules and milestones to implement practices to ensure discharge from irrigated lands are meeting Groundwater Receiving Water Limitation III.B, D) develop a monitoring strategy to provide feedback on GQMP progress, E) develop methods to evaluate

data collected under the GQMP, and F) provide reports to the Central Valley Water Board on progress.

Staff comments are provided below. All GQMP components not discussed are complete and do not need to be revised. Table 1 provides descriptions of the required GQMP components from the Order and MRP, and lists the section in the GQMP that addresses each component.

Item 3. Order Requirement: Discussion of the contaminants of concern (COCs) that are the subject of the water quality objectives or triggers requiring preparation of the management plan.

Staff Review: The GQMP identifies nitrate and pesticides as COCs. However, specific pesticides should be identified and the water quality objectives for each COC should be included.

Item 5. Order Requirement: Identification of irrigated agricultural sources of COCs.

Staff Review: Section 2.5.2 discusses natural salinity, but does not discuss irrigated agricultural sources of the COCs addressed by the GQMP. The potential sources of the COCs included in the GQMP should be identified.

Item 7. Order Requirement: Identification of the locations of practices included in a baseline inventory of existing management practices.

Staff Review: The GQMP provides the inventory of existing management practices, but the locations of the various practices are not identified. The locations of the various management practices that are in use (e.g., management practice map) should be identified.

Item 16. Order Requirement: Description of the factors used for prioritizing COCs and locations covered by the GQMP, and an applicable timeline.

Staff Review: No timeline is provided in association with the prioritization provided in the GQMP. It is also unclear what factors were used to establish the priority areas (e.g., well exceedances for specific COCs) and whether the highest concentration areas will be addressed first.

Item 20. Order Requirement: Identification of data manager.

Staff Review: The data manager has not been identified. All of the key individuals involved in the project should be identified.

Item 24. Order Requirement: Identification of management practices for controlling sources of COCs.

Staff Review: Circumstances when individual management practices may not be technically or economically feasible are not identified, so it is unclear if all of the included practices are intended to be used in all areas and if there are limitations to their application. The Coalition should identify management practices that will be used, rather than listing all of the management practices that are available to growers. The Coalition should clarify if all of the included management practices will be utilized and if they will be utilized in all areas or selected based on location specific needs.

Item 25. Order Requirement: Description of how the effectiveness of outreach efforts will be evaluated.

Staff Review: GQMP section 3.4.3.2 does not describe how the effectiveness of outreach efforts will be evaluated. A description of how the effectiveness of outreach efforts will be evaluated should be provided.

Item 26. Order Requirement: Include a specific schedule and milestones for the implementation of management practices and tasks outlined in the management plan.

Staff Review: The requirements for this item have been partially met. The following are the milestones provided in the GQMP (page 52):

- Milestone 1: Additional MPs implemented (emphasis HVAs), especially wellhead protection and nitrogen management. Timeframe: In 2 years of approved GQMP (2018)
 - Milestone 2: Identify schedule for implementing MPs determined by MPEP. Timeframe: In 3 years of MPEP studies (2020)
 - Milestone 3: Identify wells and estimate schedule for proper well destruction (i.e., unusable abandoned wells and/or no planned future well use). Timeframe: In 5 years of approved GQMP (2021)
 - Milestone 4: Evaluate effectiveness of implemented MPs in reducing nitrogen residual below root zone (e.g., via MPs implemented and monitoring results). Timeframe: In 5 years of implementing GQTM (2022)
- a. The dates for milestone completion are not supported with technical or economic justification demonstrating that the proposed schedules are as short as practicable in accordance with Order Section XII.
 - b. Milestone 1 is not specific enough. This milestone should clarify the statement “additional MPs implemented”. In the preceding pages of the GQMP, there are discussions of additional implementation measures for well management and nitrogen management practices. However, no specific practices are identified. The Coalition should clarify what practices Milestone 1 is referring to. An estimate of the percentage of growers (targets for implementation) that will be implementing these additional practices and a prioritized schedule for the implementation of these practices should also be provided.

Item 27. Order Requirement: Establish measurable performance goals. Performance goals include specific targets that identify the expected progress towards meeting a desired outcome.

Staff Review: Additional information detailing how achievement of each performance goal will be measured (e.g., deadline for parcel mapping; outreach to fixed percentage of members) should be included in the GQMP. The Coalition should include metrics for evaluating performance goal achievement. The following is a summary of the performance goals included in the GQMP:

- 1) Identify member parcels in areas requiring a GQMP.
 - a) Map parcels of members in each GQMP zone.
- 2) Review the members’ FE survey (FEs as updated in 2016) to determine number/type of well management practices in place.

- a) Review FEs from member parcels in a GQMP subarea for well management practices.
- b) Identify members with abandoned wells and where disposition and method of well abandonment is not known.
- c) Identify additional practices that can be recommended.
- 3) Review the members' FE survey (FEs as updated in 2016) to determine number/type of irrigation, pesticide and nitrate management practices in place.
 - a) Review FEs for irrigation, pesticide and nitrate management practices.
 - b) Identify additional practices that can be recommended, based on MPEP.
- 4) Continue outreach to inform members of water quality problems and recommend additional practices.
 - a) Provide groundwater monitoring results to members and discuss practices to reduce leaching of COCs.
 - b) Provide MPEP results to members.
 - c) Track meeting attendance for targeted members.
- 5) Improve understanding of effective management practices to reduce potential for leaching of COCs.
 - a) Identify priority crops and data gaps.
 - b) Conduct MPEP studies to fill data gaps.
 - c) Provide resources regarding MPEP study results.
- 6) Evaluate effectiveness of new management practices.
 - a) Evaluate Groundwater Trend monitoring results for COCs.

The Coalition should include specific targets that identify the expected progress towards meeting a desired outcome, meeting GQMP objectives, and should be measurable (e.g., percentage of members that participate in outreach and education [100%]). Performance Goals 3, 4, and 5 rely on information gained through the MPEP. The Coalition should provide additional information about how information gained from the MPEP is expected to be utilized by members and include measurable milestones and schedules.

Finally, the Coalition needs to provide an outreach plan for addressing outliers identified through the nitrogen management plan summary report analysis as an additional performance goal. The plan must include the schedule for providing growers with the A/R information, or A/Y information when A/R is not available. Measurable milestones for the progress of outreach efforts towards minimizing the amount of nitrogen available to leach below the root zone should also be provided.

Item 31. Order Requirement: Description of process for assessing program effectiveness.

Staff Review: The process for assessing program effectiveness is not identified in the GQMP and should be described. The Coalition should also describe the process for tracking implementation of management practices.

Table 1. GQMP Requirements.

Item #	Requirement	Requirement Description	Location in GQMP	Complete
1.	Order VIII.H.2	A GQMP shall be developed by the third-party where: (1) there is a confirmed exceedance (considering applicable averaging periods) of a water quality objective or applicable water quality trigger limit (trigger limits are described in section VII of the MRP) in a groundwater well and irrigated agriculture may cause or contribute to the exceedance; (2) in high vulnerability groundwater areas to be determined as part of the Groundwater Assessment Report process (see MRP section IV); (3) the Basin Plan requires development of a groundwater quality management plan for a constituent or constituents discharged by irrigated agriculture; or (4) the Executive Officer determines that irrigated agriculture may be causing or contributing to a trend of degradation of groundwater that may threaten applicable Basin Plan beneficial uses.	Full document	Yes
2.	Order VIII.H.4	In lieu of submitting separate groundwater quality management plans in the timeframe identified in section VIII.H.1, the third-party may submit a Comprehensive Groundwater Quality Management Plan Within 60 days of the Executive Officers approval of the Groundwater Quality Assessment Report. With the exception of the timeframe identified in section VIII.H.1, all other provisions applicable to groundwater quality management plans in this Order and the associated MRP apply to the Comprehensive Groundwater Quality Management Plan. The Comprehensive Groundwater Quality Management Plan must be updated at the same time as the Management Plan Status Report (see attached MRP, Appendix MRP-1, section I.F) to address any constituents and areas that would have otherwise required submittal of a Groundwater Quality Management Plan.	Full document	Yes
3.	MRP-1 I.A	The introduction portion of the management plan shall include a discussion of the COCs that are the subject of the plan and the water quality objective(s) or trigger(s) requiring preparation of the management plan. The introduction shall also include an identification (both narrative and in map form) of the boundaries (geographic and surface water/ groundwater basin[s] or portion of a basin) to be covered by the management plan including how the boundaries were delineated. For groundwater , previous work conducted to identify the occurrence of the COCs (e.g., studies, monitoring conducted) should be summarized for the GQMP area.	Section 1.2 and 1.3 P. 3-9	Partial

Table 1. GQMP Requirements.

Item #	Requirement	Requirement Description	Location in GQMP	Complete
4.	MRP-1 I.B.1.a	Land use maps which identify the crops being grown in the SQMP watershed or GQMP area. For groundwater, these maps may already be presented in the Groundwater Quality Assessment Report (GAR) and may be referenced and/or updated as appropriate. Map(s) must be in electronic format using standard geographic information system software (ArcGIS shapefiles).	GAR Fig. 4-4	Yes
5.	MRP-1 I.B.1.b	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 study may be designed and implemented to determine the source(s) or to eliminate irrigated lands as a potential source. Requirements for source identification studies are given in section I.G below. In the alternative, instead of conducting a source identification study, the third-party may develop a management plan for the COC(s) that meets the management plan requirements as specified in this appendix.	Section 2.5.2	No
6.	MRP-1 I.B.1.c	A list of the designated beneficial uses as identified in the applicable Basin Plan.	Section 2.4.2.2 P. 24	Yes
7.	MRP-1 I.B.1.d	A baseline inventory of identified existing management practices in use within the management plan area that could be affecting the concentrations of the COCs in surface water and/or groundwater (as applicable) and locations of the various practices.	Tbl. 2-2 P. 27	Partial
8.	MRP-1 I.B.1.e	A summary, discussion, and compilation of available surface water and/or groundwater quality data (as applicable) for the parameters addressed by the management plan. Available data from existing water quality programs may be used, including but not limited to: Surface Water Ambient Monitoring Program (SWAMP), California State Water Resources Control Board (State Water Board) Groundwater Ambient Monitoring Assessment (GAMA) Program, United States Geological Survey (USGS), California Department of Public Health (DPH), California Department of Pesticide Regulation (DPR), California Department of Water Resources (DWR), and local groundwater management programs. The GAR developed for the third-party's geographic area, and groundwater quality data compiled in that document, may serve as a reference for these data.	Section 2.4.2.1 and GAR Tbl. 5-1a, 5-1b, and 5-2	Yes
9.	MRP-1 I.B.3.a	Soil types and other relevant soils data as described by the appropriate Natural Resources Conservation Service (NRCS) soil survey or other	Section 2.3 P. 13-17	Yes

Table 1. GQMP Requirements.

Item #	Requirement	Requirement Description	Location in GQMP	Complete
		applicable studies. The soil unit descriptions and a map of their areal extent within the study area must be included. The GAR developed for the third-party's geographic area, and the soils mapping contained in that document, may satisfy this requirement.		
10.	MRP-1 I.B.3.b.i	Regional and area specific geology, including stratigraphy and existing published geologic cross-sections.	Section 2.3 P. 13-17	Yes
11.	MRP-1 I.B.3.b.ii	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 electrical conductivity [conductivity at 25°C, EC], concentrations of major anions and cations, nutrients, total dissolved solids [TDS], pH, dissolved oxygen and hardness). The discussion should reference and provide figures of existing Piper (tri-linear) diagrams, Stiff diagrams and/or Durov Diagrams for the GQMP area (see definitions in Attachment E of the Order).	Section 2.4.2 P. 18-24	Yes
12.	MRP-1 I.B.3.b.iii	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).	Section 2.3.1 P. 15	Yes
13.	MRP-1 I.B.3.b.iv	Identification of which water-bearing zones within the GQMP area are being utilized for domestic, irrigation, and municipal water production.	Section 2.3.1 P. 15	Yes
14.	MRP-1 I.B.3.b.v	Aquifer characteristics such as depth to groundwater, groundwater flow direction, hydraulic gradient, and hydraulic conductivity, as known or estimated based on existing information (see definitions in Attachment E of the Order).	Section 2.4.1 P. 18	Yes
15.	MRP-1 I.B.3.c	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 anions and cations, nutrients, TDS, pH, dissolved oxygen and hardness).	Section 2.2.1 P. 11 Section 2.4.2 P. 18	Yes
16.	MRP-1 I.C.1	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]). Any prioritization included in the management plan must be consistent with the requirements in section XII of the Order, Time Schedule for Compliance.	Section 3.1 P. 34	Partial

Table 1. GQMP Requirements.

Item #	Requirement	Requirement Description	Location in GQMP	Complete
17.	MRP-1 I.C.2.a	Actions to: Compliance with the Order's receiving water limitations (section III of the Order).	Section 3.2.1 P. 38	Yes
18.	MRP-1 I.C.2.b	Actions 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.	Section 3.2.2 P. 38	Yes
19.	MRP-1 I.C.2.c	Actions to: Identify, validate, and implement management practices to reduce loading of COC's to surface water or groundwater, as applicable, thereby improving water quality.	Section 3.2.3 P. 38-39	Yes
20.	MRP-1 I.C.3.a	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).	Section 3.3 Fig. 3-2 P. 39-40	Partial
21.	MRP-1 I.C.3.b	Discussion of each individual's responsibilities.	Section 3.3 P. 39	Yes
22.	MRP-1 I.C.3.c	An organizational chart with identified lines of authority.	Section 3.3 Fig. 3-2 P. 40	Yes
23.	MRP-1 I.C.4.a	Identify the entities or agencies that will be contacted to obtain data and assistance.	Section 3.4 P. 41	Yes
24.	MRP-1 I.C.4.b	Identify 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 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.	Section 3.4.2 P. 41-48	No
25.	MRP-1 I.C.4.c	Identify 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	Section 3.4.3 P. 49	Partial

Table 1. GQMP Requirements.

Item #	Requirement	Requirement Description	Location in GQMP	Complete
		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.		
26.	MRP-1 I.C.4.d	Include a specific schedule and milestones for the implementation of management practices and tasks outlined in the management plan. The schedule must include the following items: time estimated to identify new management practices as necessary to meet the Order's surface and groundwater receiving water limitations (section III of the Order) and 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). The overall time schedule for compliance must be consistent with the requirements in section XII of the Order, Time Schedule for Compliance.	Section 3.4.4.2 Table 3-6 P. 53	Partial
27.	MRP-1 I.C.4.e	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.	Section 3.4.4 P. 49-52	Partial
28.	MRP-1 I.D.1	The monitoring system must be designed to measure effectiveness at achieving the goals and objectives of the SQMP or 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 Order. Management practice-specific or commodity-specific field studies may be used to approximate the contribution of irrigated lands operations. Where the third-party determines that field studies are appropriate or the Executive Officer requires a technical report under CWC 13267 for a field study, the third-party must identify a reasonable number and variety of field study sites that are representative of the particular management practice being evaluated.	Will be addressed by MPEP	Yes
29.	MRP-1 I.D.3	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	Section 4 P. 54-55	Yes

Table 1. GQMP Requirements.

Item #	Requirement	Requirement Description	Location in GQMP	Complete
		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.		
30.	MRP-1 I.E.1	Methods to be used to evaluate the data generated by SQMP/GQMP monitoring and to evaluate the effectiveness of the implemented management practices must be described. Methods to present data and perform data analysis (graphical, statistics, modeling, index computation, or some combination thereof).	Section 5 P. 56-57	Yes
31.	MRP-1 I.E.2	Information necessary to assess 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.		No