
Central Valley Regional Water Quality Control Board

13 October 2014

Mr. Mike Wackman, Coalition Program Manager
San Joaquin County Resource Conservation District
3422 W. Hammer Lane, Suite A
Stockton, ca 95219

GROUNDWATER QUALITY ASSESSMENT REPORT OUTLINE – SAN JOAQUIN COUNTY AND DELTA WATER QUALITY COALITION

Thank you for the timely submittal of the 23 July 2014 outline for the San Joaquin County and Delta Water Quality Coalition's (Coalition) Groundwater Quality Assessment Report (GAR). The proposed GAR outline was submitted as required by the Waste Discharge Requirements for Growers within the San Joaquin County and Delta area, Order R5-2014-0029 (Waste Discharge Requirements).

Central Valley Water Board staff reviewed the GAR outline, data sources and the preliminary bibliography. The Coalition has identified a number of key information and data sources; it is understood that the list of information sources will evolve during the preparation of the GAR. As noted in the attached memorandum, staff determined that the proposed GAR outline meets the requirements described in Attachment B to the Waste Discharge Requirements, provision IV.A.

The attached memorandum provides Staff's comments on the GAR outline. Staff would like to meet to discuss these comments as well as your progress with the GAR thus far. We look forward to an ongoing productive dialogue during the process of the GAR development and the receipt of the Coalition's Groundwater Quality Assessment Report by 25 April 2015.

If you have any questions or comments regarding the review, or need any further information, please contact Wesley Ouimette at wouimette@waterboards.ca.gov or by phone at 916-464-4667. Wes will contact you shortly to set up a meeting.

Original signed by

Joe Karkoski, Chief
Supervising Water Resources Control Engineer
Irrigated Lands Regulatory Program

Original signed by

Glenn Meeks, P.G.
Senior Engineering Geologist
Irrigated Lands Regulatory Program

Enclosures: Staff Review San Joaquin County and Delta Water Quality Coalition GAR Outline

cc: Clay Rodgers, CVWQCB, Fresno
Steve Deverel, Hydrofocus

Central Valley Regional Water Quality Control Board

TO: Joe Karkoski, Supervising Water Resources Control Engineer
Glenn T Meeks, P.G., Senior Engineering Geologist

FROM: Wesley Ouimette, Engineering Geologist
Irrigated Lands Regulatory Program

DATE: 10 October 2014

SUBJECT: REVIEW OF SAN JOAQUIN COUNTY AND DELTA WATER QUALITY
COALITION GROUNDWATER QUALITY ASSESSMENT REPORT OUTLINE

To meet the conditions of the Waste Discharge Requirements for Growers within the San Joaquin County and Delta area, Order R5-2014-0029 (Order), the San Joaquin County and Delta Water Quality Coalition (Coalition) is required to prepare a Groundwater Quality Assessment Report (GAR). The GAR may be divided into two phases; the first phase addresses groundwater conditions exclusive of the Delta with the second addressing conditions underlying the Delta valley floor areas. Phase one of the GAR is due 25 April 2015 and phase two is due 25 April 2016. However the GAR outline does not indicate a phased approach, but will include both within and outside of the Delta.

The main objectives of the GAR are to:

- Provide an assessment of all readily available, applicable and relevant data and information to determine the high and low vulnerability areas where discharges from irrigated lands may result in groundwater quality degradation, and to identify where data are non-existing or sparse (data gap areas) and need additional study.
- Establish priorities for implementation of monitoring and studies within high vulnerability and data gap areas.
- Provide a basis for establishing monitoring workplans developed to assess groundwater quality trends.
- Provide a basis for establishing management practices evaluation program workplans and priorities developed to evaluate the effectiveness of agricultural management practices to protect groundwater quality; and
- Provide a basis for establishing groundwater quality management plans in high vulnerability areas and priorities for implementation of those plans.

The Order requires that the Coalition provides a proposed outline describing data sources and references that will be considered in developing the GAR. The due date for the submission of the proposed GAR outline was 25 July 2014, and the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) received the Coalition's GAR outline

on time. The submitted outline and accompanying information were reviewed to assess the preliminary list of data sources and references that will be considered in developing the GAR.

Central Valley Water Board staff considered the preliminary data sources and whether the process proposed for data compilation and analysis would provide information needed to address the main objectives and minimum requirements of the GAR (Order sections VIII.D.1.p.30 and Attachment B.IV.A.1, p.13-14). The submitted GAR outline addresses sources of information of all required components and includes review and analyses as described in the Order.

Overall, the proposed GAR outline suggests that the Groundwater Quality Assessment Report will adequately address the five main objectives specified in the Order:

Objective 1. Provide an assessment of all readily available, applicable and relevant data and information to determine the high and low vulnerability areas where discharges from irrigated lands may result in groundwater quality degradation.

The data compilation and proposed analyses described in the outline indicate that the GAR will develop information necessary to determine the high and low vulnerability areas where discharges from irrigated land may result in groundwater quality degradation.

The GAR outline indicates that a statistical analysis will be conducted and the results will be compared to the DPR Groundwater Protection Areas. The statistical analysis will also include variables that are examined as predictors of nitrate concentrations, the resulting regression model, the model's performance at explaining variance in nitrate concentrations, and an assessment of the model with respect to nitrate data in various service area regions. Additional considerations will include the prevalent land use in the determined HVAs, the proximity to drinking water supply recharge sources and proximity to basins under review by CV-SALTS.

Staff however is concerned about how the data will be used for the analysis. In section 4.a.i of the GAR outline it is stated that one of the HydroFocus objectives is "To develop a preliminary delineation of areas of high and low vulnerability based on exceedances of the MCL for groundwater nitrate concentration". Objective 1 of the GAR refers to degradation of groundwater from irrigated lands. Degradation is defined in Attachment E of Order R5-2014-0029 as "any measurable adverse change in water quality". Based on this definition the analysis should be modified to look at any changes in constituent concentrations that are above background or at levels that may cause adverse changes to groundwater quality or where temporal trend analysis indicate an increasing concentration trend. Groundwater constituent concentration trends may be rising or falling and these factors should also be taken into consideration in the analyses. Additionally, although agricultural related constituents other than nitrates (such as EC, TDS, etc.) should also be considered in the analysis.

Objective II. Establish priorities for implementation of monitoring and studies within high vulnerability or data gap areas.

The outline indicates that future uses of the GAR will include establishing priorities for implementation of monitoring and studies within high vulnerability and data gap areas.

Though the priorities for this objective were not outlined, this objective must ensure that within high vulnerability areas, small disadvantaged communities reliant on groundwater will be included amongst the highest priority HVAs.

Objective III. Provide a basis for establishing monitoring work plans developed to assess groundwater quality trends

The outline indicates that future uses of the GAR will include assessing groundwater quality trends. Identification of monitoring wells used for trend monitoring should be listed under this objective.

Objective IV. Provide a basis for establishing management practices evaluation program work plans and priorities developed to evaluate the effectiveness of agricultural management practices to protect groundwater quality

The outline indicates that future uses of the GAR will include evaluating the effectiveness of agricultural management practices to protect groundwater quality.

Objective V. Provide a basis for establishing groundwater quality management plans in high vulnerability areas and priorities for implementation of those plans

The outline indicates that future uses of the GAR will include establishing groundwater quality management plans. However this section of the outline does not specify that this section will review HVAs.

Recommended Considerations

Staff requests that the final GAR be structured in a way that follows the MRP, with clear objective and component sections as presented in the MRP. This organization will help facilitate a faster review of the final GAR.

Additional notes and comments can be found on Table 1. Preliminary Outline for the Groundwater Quality Assessment Report (GAR) - San Joaquin County and Delta Coalition area (attached).

Table 1. Preliminary Outline for the Groundwater Quality Assessment Report (GAR) - San Joaquin County and Delta Coalition area

GAR Component Name (WDR reference)	Cross-Reference Table in GAR outline state item found	Section of GAR Outline	Preliminary List of Potential Data Sources	Central Valley Water Board Staff Comments
Objectives, MRP Section IV.A.1				
Provide an assessment of all readily available, applicable and relevant data and information to determine the high and low vulnerability areas where discharges from irrigated lands may result in groundwater quality degradation WDR R5-2014-0029 D.1.	Throughout	1.4, 4.a.ii	Data Sources listed in "Preliminary List of Potential Data Sources": GAMA, DWR, USGS NWIS, multiple monitoring studies, Dairy Cares Representative Monitoring	1.4) The outline states in this section "Groundwater quality issues determined from data reviewed" 3.a.iii Regression and covariance analysis and preliminary delineation of HVAs 4.a.ii) reiterates requirements and lists: "1) specification of data and information to be reviewed". The "Hydrofocus" objective is to develop preliminary delineation of areas of high and low vulnerability to exceedance of the MCL for groundwater nitrate concentrations. The Order requires HVA's based on degradation, which is lower than the MCL. Degradation is anything over background.
Establish priorities for implementation of monitoring and studies within high vulnerability or data gap areas WDR R5-2014-0029 D.1.	Section 4 (Discussion)	4.a.iii	Specific data sources for this section are not specifically defined	4.a.iii.1 will discuss establishing priorities for implementation of monitoring and studies within high vulnerability or data gap areas.
Provide a basis for establishing monitoring work plans developed to assess groundwater quality trends	Throughout	Sections 1,2,3,4	Specific data sources for this section are not specifically defined	1.a.iii.3.b: will address data analysis 1.a.iii.3.b: will address monitoring options 1.b will address hydrogeologic context Section 2 will discuss data collection and methods Section 3 will discuss results 4.a.iii.2 will assess groundwater quality trends Identification of monitoring wells used for trend monitoring should be listed under this subject.
Provide a basis for establishing management practices evaluation program work plans and priorities developed to evaluate the effectiveness of agricultural management practices to protect groundwater quality	Throughout	Sections 1,2,3,4	Specific data sources for this section are not specifically defined	4.a.iii.3 will discuss evaluation of agricultural management practices to protect groundwater quality The NRCS and County ag commissioner's should be consulted for data for this objective.
Provide a basis for establishing groundwater quality management plans in high vulnerability areas and priorities for implementation of those plans	Throughout	Sections 1,2,3,4	Specific data sources for this section are not specifically defined	4.a.iii.4 will discuss establishing groundwater management plans Groundwater protection in HVA's near disadvantaged communities reliant on groundwater should be a top priority.
GAR Components, MRP Section IV.A.2				
Detailed land use information with emphasis on land use areas associated with irrigated agricultural operations. The information shall identify the largest acreage commodity types in the third party areas, including the most prevalent commodities comprising up to at least 80% of the irrigated agricultural acreage in the third-party area.	Section 3 (Results)	Section 3	USDA Natural Agricultural Statistics Service, DWR Land use survey, FMMP	Section states that a general description of the land use will be discussed, however the MRP is asking for detailed land use information, including what the largest crop types are. This information is not stated anywhere in the outline.
Information regarding depth to groundwater, provided as a contour map(s), if readily available. Tabulated and/or graphical data from discrete sampling events may be submitted if data precludes producing a contour map.	Section 3 (Results)	Section 3	San Joaquin County Database, GAMA, CASGEM, NWIS, Delta Wetlands Project, various monitoring studies.	3.a.ii.1, only states "Depth to groundwater in the non-Delta Region. Does not state how data will be presented (e.g. D.E.M. maps, or contour maps).
Groundwater recharge information, if readily available including identification of areas contributing recharge to urban and rural communities where groundwater serves as a significant source of supply.	Section 3 (Results)	Section 3	USGS CVHM	3.a.ii.5, only states "Net Groundwater Recharge". Subsections state "general range across the Service area" and "relationship of net recharge rates with groundwater nitrate concentrations". It is not apparent that a discussion of recharge areas including those that supply urban and rural communities will occur. Other topics that need to be discussed are groundwater flux from the Sierras into the Valley floors and recharge areas that supply disadvantaged communities.
Soil survey information, including significant areas of high salinity, alkalinity, and acidity.	Section 3 (Results)	Section 3	USDA NRCS	Will separate Delta from non-Delta
Shallow groundwater constituent concentrations from existing monitoring networks (potential constituents of concern include any material applied as part of the agricultural operations, including constituents in irrigation supply water [e.g., pesticides, fertilizers, soil amendments, background trace elements and metals, etc.] that could impact beneficial uses or cause degradation).	Section 3 (Results)	Do not see any mention of this subject	Same as groundwater quality	Do not see any mention of this subject. The Data and methods section (section 2) talks about possible data sources, section 3 does not talk about the results. There is a lot of talk about Nitrates, which are a big concern, but there are other pollutants. What has GAMA or other monitoring programs found? Are those constituents related to Ag? Also section 1.b.4.c states "Constituents not directly affected by agriculture": Boron and Arsenic. Staff does not have the stance that these constituents are not affected by ag.

GAR Component Name (WDR reference)	Cross-Reference Table in GAR outline state item found	Section of GAR Outline	Preliminary List of Potential Data Sources	Central Valley Water Board Staff Comments
Information on existing groundwater data collection and analysis efforts relevant to this Order (e.g. Department of Pesticide Regulation [DPR] United States Geological Survey [USGS] State Water Board Groundwater Ambient Monitoring and Assessment [GAMA], California Department of Public Health, local groundwater management plans, etc.) This groundwater data compilation and review shall include readily accessible information relevant to the Order on existing monitoring networks (or portions thereof) and/or relevant data sets, the third-party should assess the possibility of data sharing between the data-collecting entity, the third-party, and the Central Valley Water Board.	Section 2 (Data and Methods); Section 3 (Results); Section 4 (Discussion)	Section 2 for possible data source.	Gama, DPR, Dairy Cares RMP, SJCPW, DWR, USGS	The data section (section 2) has sections that lists possible data sources for "Data for non-Delta areas" and "Data for Delta areas". Section 3 (results) does talk about agricultural areas with nitrates above MCL levels an comparing DPR's GWPA's to SWB's HVA's
GAR data review and analysis, MRP Section IV.A.3				
Determine where known groundwater quality impacts exist for which irrigated agricultural operations are a potential contributor or where conditions make groundwater more vulnerable to impacts from irrigated agricultural activities.	Section 1 (Introduction); Section 3 (Results); Section 4 (Discussion)	Section 1.b.4	Same as groundwater quality	In section 1 (introduction) the outline provides sections for "Primary constituents of concern related to agriculture to be considered", "Other constituents of concern related to agriculture to be considered", & "Constituents not directly affected by agriculture" 4.a.i. "To develop a preliminary delineation of areas of high and low vulnerability to exceedance of the MCL for groundwater nitrate concentrations". Also need to identify areas where constituents concentrations are below the MCL, but temporal data indicate an increasing trend. Need to include Selenium for Zones 5 and 6 as groundwater contains Selenium in concentrations of up to 22 ug/L based on CDPH well data for the region. Pumping from wells, that have Selenium in excess of the 5ug/l Water Quality Objective, to discharge to land can contribute to increasing concentrations of Selenium in groundwaters.
Determine the merit and feasibility of incorporating existing groundwater data collection efforts, and their corresponding monitoring well systems for obtaining appropriate groundwater quality information to achieve the objectives of and support groundwater monitoring activities under this Order. This shall include specific findings and conclusions and provide the rationale for conclusions.	Section 4 (Discussion)	Section 4		The outline states that there will be a discussion of existing groundwater quality collection efforts under the "Monitoring options for non-Delta areas".
Prepare a ranking of high vulnerability areas to provide a basis for prioritization of work plan activities.	Section 4 (Discussion)	Section 4		Not a specific section, portions of it talked about throughout.
Describe pertinent geologic and hydrogeologic information for the third-party area(s) and utilize GIS mapping applications, graphs, and tables, as appropriate, in order to clearly convey pertinent data, support data analysis, and show results.	Throughout	Throughout		Staff would like to see separate section for this. Use hydraulic conductivity values in discussion.
Groundwater vulnerability designations, MRP Section IV.A.4				
The GAR shall designate high/low vulnerability areas for groundwater in consideration of high and low vulnerability definitions... The vulnerability designations will be made by the third-party using a combination of physical properties (soil type, depth to groundwater, known agricultural impacts to beneficial uses, etc.) and management practices (e.g. irrigation method, crop type, nitrogen application and removal rates, extent of implementation, etc.).	Section 4 (Discussion)	Section 4		Section for delineation of HVA's discusses this topic. Don't see a specific section that talks about soil type for physical properties. Also just see a section about irrigated ag. Operations are a potential contributor, but don't see mention of irrigation methods, crop types, or nitrogen application and removal rates.
Prioritization of high vulnerability groundwater areas, MRP Section IV.A.5				
Identified exceedances of water quality objectives for which irrigated agriculture waste discharges are the cause, or a contributing source.	Section 3 (Results); Section 4 (Discussion)	Section 3, 4		Outline needs to mention other water quality exceedances besides just nitrates.
The proximity of the high vulnerability area to areas contributing recharge to municipal and domestic supplies where groundwater serves as a significant source of supply.	Section 3 (Results)	Section 3	none listed	under additional HVA considerations. Should also discuss areas where disadvantaged communities use the groundwater in HVAs
Existing field or operational practices identified to be associated with irrigated agriculture waste discharges that are the cause, or a contributing source.	Section 3 (Results)	Section 3		under Land Use and Management Practices in section 3.
The largest acreage commodity types comprising up to at least 80% of the irrigated agricultural acreage in the high vulnerability areas and the irrigation and fertilization practices employed by these commodities.	Section 4 (Discussion)	section 4		under Assessment of HVAs derived from regression modeling and additional considerations.
Legacy or ambient conditions of the groundwater	Section 3 (Results)			Staff does not see where this section is.
Groundwater basins currently or proposed to be under review by CV-SALTS	Section 3 (Results)	Section 3		under additional HVA considerations.
Identified constituents of concern, e.g. relative toxicity (as compared to other constituents of concern), mobility	Section 3 (Results)			Staff does not see where this section is.