PRELIMINARY DRAFT - FOR REVIEW BY THE LONG-TERM IRRIGATED LANDS REGULATORY PROGRAM STAKEHOLDER ADVISORY WORK GROUP

GROUNDWATER QUALITY MANAGEMENT PLANS

The following guidance has been prepared to assist Third-Party Groups in developing a Groundwater Quality Management Plan (GQMP) for a geographical area or areas where a water quality parameter(s) (for which irrigated agricultural could be a source, in whole or part) has exceeded a water quality objective, impairs a beneficial use, or has resulted in a condition of pollution or nuisance (a list of applicable groundwater quality parameters is included in the definitions section of Attachment X).

Dischargers in areas covered by GQMPs are required to implement management practices to achieve best practicable treatment or control (BPTC) for high quality waters (as defined by State Water Resources Control Board's *Statement of Policy with Respect to Maintaining High Quality of Waters in California* [Resolution 68-16]) or best efforts where a water body is not high quality and Resolution 68-16 does not apply for the identified constituent(s) of concern (COC). Monitoring is to be used to assess the effectiveness of management practices and whether BPTC or best efforts standard has been achieved. Additional practices/monitoring may be necessary, in an iterative process, to address water quality concerns.

1. Management Plan Triggers

Two triggers will be used to identify when preparation of a GQMP is required: A) an irrigated agricultural area is known to overlie groundwater that exceeds a water quality objective for which irrigated agriculture is responsible in whole or part, and B) groundwater monitoring identifies exceedances of a water quality objective for which irrigated agriculture is responsible in whole or part. In areas where a local groundwater management plan has been developed, the local plan may be substituted for the development of a GQMP upon approval by the Executive Officer of Central Valley Water Board.

A. Known Problem Areas - Within twelve months (one year) of issuance of Waste Discharge Requirements for Discharges from Irrigated Lands (Order), a GQMP is required to be developed for a geographical area(s) in which a COC (e.g., pesticides, nutrients, salts, and/or pathogens) is known to occur in groundwater at a concentration which exceeds a water quality objective and for which irrigated agriculture could be a source, in whole or part (Tier 3 groundwater areas).

B. Exceedances Identified Through Groundwater Monitoring – A GQMP is required to be developed within six months of groundwater monitoring (regional, site specific, or representative) identifying a verifiable exceedance (initial detection followed by resampling to confirm the initial results) of a water quality objective for which irrigated agriculture could be a source, in whole or part.

2. Management Plan Development and Required Components

When a management plan has been triggered, the Coalition shall ascertain whether or not irrigated agriculture is known to cause or contribute to the water quality problem. If the potential source(s) of the water quality exceedance(s) are unknown, a study shall be

conducted to determine the cause, or eliminate irrigated agriculture as a potential source (see Source Identification Study Requirements in section 2.B.2.b. below).

In areas where irrigated agriculture is known to have caused or contributed to a groundwater quality exceedance(s), a GQMP shall be developed which contains the required elements presented and discussed in the following sections.

A. Introduction and Background Section

The introduction portion of the GQMP shall include a discussion of the COC(s) that are the subject of the plan and an identification of the applicable water quality objective that has been exceeded. Applicable water quality objectives include:

1. Any physical or chemical parameter that exceeds a water quality objective identified in the applicable Water Quality Control Plan (Basin Plan).

2. Any water quality parameter that causes impairment of a beneficial use or pollution of high quality water as defined by State Water Resources Control Board's *Statement of Policy with Respect to Maintaining High Quality of Waters in California* (Resolution 68-16).

The introduction shall also include an identification (both narrative and in 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. Recommended types of delineation include:

1. Indicator kriging (value is above or below a specific water quality objective).

2. Ordinary kriging (interpolates values between locations with data and contours the data).

3. Professional judgment (consideration of land use, knowledge of aquifer, and hydrogeologic factors).

If multiple COCs are to be included in a single GQMP, a discussion of the prioritization process and proposed schedule shall be included in the GQMP.

B. Physical Setting and Information

The GQMP needs to provide a discussion of the physical conditions that affect groundwater in the study area and the associated existing data. At a minimum, the discussion needs to include:

1. Soil types and depths of soil profile as described by the appropriate Natural Resources Conservation Service (NRCS) soil survey or other applicable study. The

soil unit descriptions and a map of their aerial extent within the study area must be included.

2. A description of the geology and hydrogeology for the area covered by the GQMP. The description shall include:

    a. Regional and area specific geology, including stratigraphy and published geologic cross-sections.
    b. Groundwater basin(s) and sub-basins contained within the study area with a discussion of their general water chemistry (range of electrical conductivity [E.C.], concentrations of major anions and cations, nutrients, total dissolved solids [TDS], pH, dissolved oxygen and hardness). The discussion should reference and provide figures of available Piper (tri-linear) diagrams, Stiff diagrams and/or Durov Diagrams (see definitions contained in Attachment X).
    c. Known water bearing zones, areas of shallow and/or perched groundwater (including the areal extent of tile drainage systems and their points of discharge within the study area), as well as areas of discharge and recharge to the basin/sub-basin (rivers, unlined canals, lakes, and recharge or percolation basins).
    d. Identification of which water bearing zones are being utilized for domestic, irrigation, and municipal water production (California Department of Water Resources maps, irrigation district maps, AB 3030 maps, etc).
    e. Aquifer characteristics such as depth to groundwater, groundwater flow direction, hydraulic gradient, and hydraulic conductivity (see definitions contained in Attachment X).

3. A summary, discussion, and compilation of available groundwater quality data for the parameters addressed by the management plan (development of a database). Available data from existing groundwater quality programs may be used, including but not limited to: 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 Regulations (DPR), California Department of Water Resources (DWR), and local groundwater management programs. Data base requirements (format, parameters, and specifications) are described in monitoring and reporting program (MRP) No. R5-2011-XXXX and any subsequent revisions of the MRP approved by the Executive Officer of Central Valley Water Board. All data must be provided in a Geotracker compatible electronic format (Geotracker format is specified in MRP R5-2011-XXXX).

4. Land use maps which identify the crops being grown and the approximate aerial extent of groundwater impact. Map(s) must be in electronic format (computer disk [CD/DVD]) using standard Arc-geographic information system (ArcGIS) format, depict individual parcels, and using the latest publically available land use layer, which is provides as an ArcGIS compatible shapefile.

5. Identification of the potential agricultural sources of the COC(s) for which the management plan is being developed. If the potential sources are not known, a study shall be designed and implemented to determine the source(s) or to eliminate agriculture as a potential source. The source identification study needs to address the types of commodities that are currently grown in the area and have historically been grown in the area, management practices (both current and past), and locations that may have served as a potential source(s). Source identification may need to include more intensive sampling or development of field studies to quantify the relevant waste discharge from irrigated lands. Ensuring (documenting) that all growers are implementing management practices that have been proven to achieve BPTC may negate the need for an intensive source analysis study.

6. Identification of management practices (including irrigation practices) in use within the study area that could be affecting the concentrations of the COCs in groundwater and locations of the various practices (e.g., the management practice currently or previously used in an area for a pesticide that has been detected in groundwater).

7. Identification of irrigation water sources (surface water origin and/or groundwater) and their general water chemistry (range of E.C., concentrations of major anions and cations, nutrients, TDS, pH, dissolved oxygen and hardness).

C. Management Plan Strategy

This section provides a discussion of the strategy to be used in the development and implementation of the GQMP and should at a minimum, include the following elements:

1. A description of the approach to be utilized by the GQMP (e.g., multiple COC's addressed in a scheduled priority fashion, multiple areas covered by the GQMP with a single area chosen for initial study [targeted or phased], or all areas addressed simultaneously [area wide]).

2. The Plan must include actions to meet the following goals and objectives:

    a. Compliance with the water quality objectives that apply to the study area.

    b. Educate the agricultural community about the sources of groundwater quality exceedances in order to promote prevention, protection, and remediation efforts that can maintain and improve water quality.

    c. Identify, validate, and implement best management practices (BMPs) to reduce loading of COC's to groundwater, thereby improving groundwater quality.

d. Prevent increased costs to potable groundwater consumers due to additional treatment requirements to meet drinking water standards.

3. Identify the duties and responsibilities of the individuals or groups developing and implementing the GQMP. This section should include:
   a. Identify 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).
   b. Discussion of each individual's responsibilities.
   c. Provide an organizational chart with identified lines of authority.

4. Develop Strategies to implement the GQMP (tasks)
   a. Identify the potential sources that will be contacted to obtain data and assistance.
   b. Conduct a baseline inventory of water quality management practices from all participating growers within the GQMP area(s).
   c. Identify BMPs used to control sources of COCs from agriculture that are 1) technically feasible; 2) economically feasible; and 3) proven to be effective at protecting groundwater quality. Practices that growers will implement must be discussed, along with an estimate of their effectiveness or any 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.
   d. Identify outreach that will be use to disseminate information to participating growers. This discussion shall including: the strategy for informing growers of the water quality issues that need to be addressed, method for dissimilating relevant management practices to be implemented, and a description of how the effectiveness of the outreach efforts will be evaluated. The Third-Party Group 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.
   e. A specific schedule and milestones for both the GQMP and the implementation of management practices. Items to be included in the schedule include: time required to identify BMPs that are protective water quality objectives; a timetable for implementation of identified BMPs (e.g., at least 25% of growers identified must implement BMPs by Year 1; at least 50% by Year 2). The schedule for achieving compliance with water quality objectives must be consistent with any compliance dates established in the relevant water quality control plan.

D. Monitoring Methods

The monitoring methods to be used to assess current groundwater quality, the continued impact of agricultural operations on groundwater quality, and the long-term trends of water quality within the study area need to be described. The first step in the development of the monitoring program should to be to specify the data requirements necessary for the completion of the goals and objectives of the study. The monitoring methods chosen should be capable of determining the effectiveness of BMPs implemented to address the water quality concern.

The strategy to be used in the development and implementation of the monitoring methods should at a minimum include the following elements:

1. The monitoring system must be designed to achieve the goals and objectives of the GQMP and capable of determining that any management practice changes made in response to the GQMP are effective and can comply with the terms of the Order (i. e., bring exceedances of a water quality objective back into compliance).

2. Identification of the wells to be utilized for the collection of groundwater data, including well construction details. Wells may be permanent monitoring sites, special study monitoring sites, or a combination of both. Well construction must include length of casing, perforated zones, and all annular materials (filter pact, seals, etc.). Each well is to be located on a map along with its latitude and longitude reported in North American Datum (NAD) 83 format with accuracy to within 50 feet.

3. Identification of the sample collection methods to be used, laboratory analysis to be performed (with detection limits specified), specified holding times, and a Surface Water Ambient Monitoring Program (SWAMP) comparable quality assurance/quality control program to be followed.

4. All data must be submitted electronically in a Geotracker compatible format.

3. Data Evaluation

Methods to be used to evaluate the data generated by the monitoring program and to evaluate the effectiveness of the monitoring plan must be described. The discussion should include at a minimum, the following:

1. Methods to be utilized to perform data analysis (graphical, statistics, modeling, index computation, or some combination thereof).

2. 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.

4. Records and Reporting

Annually, a GQMP Progress Report needs to be submitted to the Central Valley Water Board which summarizes the progress in implementing the management plan. At a minimum, the report shall include:

A. Signed transmittal letter with certification statement.
B. Title page
C. Table of contents
D. Executive Summary
E. Location map(s) and a brief summary of management plans covered by the report
F. Updated table that tallies all exceedances for the management plans
G. A list of new management plans triggered since the previous report
H. Status update on preparation of new management plans
I. A summary and assessment of monitoring data collected during the reporting period
J. A summary of grower outreach conducted
K. A summary of the degree of implementation of management practices
L. Results from evaluation of management practice effectiveness
M. A summary of progress in meeting performance goals and schedules
N. Any recommendations for changes to the management plan

5. Approval and Review of the GWMP

The following discussion describes the approval process and opportunity for public input on draft GWMPs submitted to the Water Board's Executive Officer for approval. Any changes to the GWMP must be approved by the Executive Officer prior to their implementation.

A. Water quality management plan approval – Based on information provided by the Third-Party Group and other interested stakeholders, the Central Valley Water Board's Executive Officer will: (a) approve the GQMP; (b) conditionally approve the GQMP or (c) disapprove the GQMP or portions of the GQMP. Review of the GQMP and the associated action by the Executive Officer will be based on findings as to whether the GQMP meets program requirements and goals and contains all of the information required for a GQMP. Failure of a Third-Party Group to submit a GQMP that receives Executive Officer approval may result in

the issuance of 13267 Orders requiring the irrigated agricultural operators and/or property owners in the affected areas to submit the required reports and information.

B. Water quality management plans submitted to the Board's Executive Officer for approval or requests for changes in a previously approved GQMP will be posted on the Water Board's web site for public comment prior to Executive Officer approval or Board action.

C. Periodic review of water quality management plans – At least once every five years, the Central Valley Water Board intends to review available data to determine whether the approved GQMP is resulting in improvements in water quality. The Central Valley Water Board will meet with Third-Party Groups and other interested parties to evaluate the sufficiency of GQMPs. Based on input from all parties, the Board or Executive Officer will determine whether and how the GQMP should be updated based on new information and progress in achieving compliance with water quality objectives. The Board or Executive Officer also may require revision of the GQMP based on available information indicating that exceedances of water quality objectives or degradation of high quality groundwater call for the inclusion of additional areas or constituents of concern(s) in the GQMP.

D. Adequate progress – The Executive Officer or Central Valley Water Board will make a determination of adequate progress in implementing the plan if water quality improvement milestones and compliance time schedules have been met or water quality objectives have been attained.

E. Inadequate progress – The Executive Officer or Central Valley Water Board will make a determination of inadequate progress in implementing the plan if recurring exceedances of objectives or degradation have occurred with no demonstrated improvement in water quality or water quality improvement milestones and if compliance time schedules in the approved management plan have not been met.