CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ATTACHMENT B TO ORDER R5-2015-XXXX
MONITORING AND REPORTING PROGRAM

WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
GROWERS IN THE GRASSLAND DRAINAGE AREA

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I. Introduction

This Monitoring and Reporting Program (MRP) is issued pursuant to California Water Code (Water Code) section 13267 which authorizes the California Regional Water Quality Control Board, Central Valley Region (hereafter Central Valley Water Board or "board"), to require preparation and submittal of technical and monitoring reports. This MRP includes requirements for the Steering Committee of the Grassland Basin Drainage Management Activity of the San Luis & Delta-Mendota Water Authority (hereafter "Steering Committee" or third-party), a third-party representative entity assisting individual irrigated lands operators or owners (Members), as well as requirements for individual Members subject to and enrolled under Waste Discharge Requirements General Order for Growers in the Grassland Drainage Area (GDA). Order R5-2015-XXXX (hereafter referred to as the "Order"). The requirements of this MRP are necessary to monitor Member compliance with the provisions of the Order and determine whether state waters receiving discharges from Member parcels are meeting water quality objectives. Additional discussion and rationale for this MRP's requirements are provided in Attachment A of the Order.

This MRP establishes specific groundwater monitoring, reporting, and electronic data deliverable requirements for the Steering Committee. Due to the nature of irrigated agricultural operations, monitoring requirements for groundwater will be periodically reassessed to determine if changes should be made to better represent irrigated agriculture discharges to state waters. The monitoring schedule will also be reassessed so that constituents are monitored during application and/or release timeframes when constituents of concern are most likely to affect water quality. The Steering Committee shall not implement any changes to this MRP unless the Central Valley Water Board or the Executive Officer issues a revised MRP. The Central Valley Water Board or Executive Officer may revise this MRP as it applies to the Steering Committee. The Central Valley Water Board or Executive Officer may rescind this MRP and issue a new MRP as it applies to the Steering Committee.

II. General Provisions

This Monitoring and Reporting Program (MRP) conforms to the goals of the Non-point Source (NPS) Program as outlined in The Plan for California's Nonpoint Source Pollution (NPS) Program by:

- tracking, monitoring, assessing and reporting program activities,
- ensuring consistent and accurate reporting of monitoring activities,
- targeting NPS Program activities at the watershed level,
- coordinating with public and private partners, and
- tracking implementation of management practices to improve water quality and protect existing beneficial uses.

Monitoring data collected to meet the requirements of the Order must be collected and analyzed in a manner that assures the quality of the data. The Steering Committee must submit a Quality Assurance Project Plan (QAPP) that follows sampling and analytical procedures for the ILRP.[1]

[1] Specified in Attachment C, Order No. R5-2008-0005, Coalition Group Monitoring Program Quality Assurance Project Plan Guidelines (QAPP Guidelines) and any revisions thereto approved by the Executive Officer.

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To the extent feasible, all technical reports required by this MRP must be submitted electronically in a format specified by the Central Valley Water Board that is reasonably available to the Steering Committee.

This MRP requires the Steering Committee to collect information from its Members and allows the Steering Committee to report the information to the board in a summary format. The Steering Committee must submit specific Member information collected as part of the Order and this MRP when requested by the Executive Officer or as specified in the Order.

This MRP Order becomes effective on XXXX. The Central Valley Water Board Executive Officer may revise this MRP as necessary. Upon approval of the Order, the Steering Committee, on behalf of the individual Members, shall implement the following monitoring and reporting.

III. Groundwater Quality Monitoring and Management Practice Assessment, and Evaluation Requirements

The groundwater quality monitoring, assessment, and evaluation requirements in this MRP have been developed in consideration of the critical questions developed by the Groundwater Monitoring Advisory Workgroup (questions are presented in the Information Sheet, Attachment A). The Steering Committee must collect and analyze sufficient data to describe irrigated agricultural impacts on groundwater quality and to determine whether existing or newly implemented management practices comply with the groundwater receiving water limitations of the Order.

The strategy for evaluating groundwater quality and protection consists of 1) Groundwater Quality Assessment Report, 2) Management Practices Evaluation Program, and 3) Groundwater Quality Trend Monitoring Program

1. The Groundwater Quality Assessment Report (GAR) provides the foundational information necessary for design of the Management Practices Evaluation Program and the Groundwater Quality Trend Monitoring Program. The GAR also identifies the high vulnerability groundwater areas where a Groundwater Quality Management Plan must be developed and implemented, as well as data gap areas for further evaluation.

2. The overall goal of the Management Practice Evaluation Program (MPEP) is to determine the effects, if any, irrigated agricultural practices have on first encountered groundwater under different conditions that could affect the discharge of waste from irrigated lands to groundwater (e.g., soil type, depth to groundwater, irrigation practice, crop type, nutrient management practice).

3. The overall objectives of the Groundwater Quality Trend Monitoring Program are to determine current water quality conditions of groundwater relevant to irrigated agriculture and develop long-term groundwater quality information that can be used to evaluate the regional effects of irrigated agricultural practices.

Each of these elements has its own specific objectives (provided below), and the design of each will differ in accordance with the specific objectives to be reached. While it is anticipated that these programs will provide sufficient groundwater quality and management practice effectiveness data to evaluate whether management practices of irrigated agriculture are protective of groundwater quality, the Executive Officer may also, pursuant to Water Code section 13267, order Members to perform additional monitoring or evaluations, where violations of this Order are documented or the irrigated agricultural operation is found to be a significant threat to groundwater quality.

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A. Groundwater Quality Assessment Report

The purpose of the Groundwater Quality Assessment Report (GAR) is to provide the technical basis informing the scope and level of effort for implementation of the Order's groundwater monitoring and implementation provisions. Three (3) months after the Order approval from the Central Valley Water Board, the Steering Committee will provide a proposed outline of the GAR to the Executive Officer that describes data sources and references that will be considered in developing the GAR. The Steering Committee must review and update the GAR to incorporate new information every five (5) years after Executive Officer approval of the GAR.

1. *Objectives*. 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.
   - Establish priorities for implementation of monitoring and studies within high vulnerability or 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.
   - Provide a basis for establishing groundwater quality management plans in high vulnerability areas and priorities for implementation of those plans.

2. *GAR components*. The GAR shall include, at a minimum, the following data components:
   - Detailed land use information with emphasis on land uses associated with irrigated agricultural operations. The information shall identify the largest acreage commodity types in the Grassland Drainage Area (GDA), including the most prevalent commodities comprising up to at least 80% of the irrigated agricultural acreage in the GDA.
   - 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 limited data precludes producing a contour map.
   - Groundwater recharge information, if readily available, including identification of recharge areas for urban and rural communities where groundwater serves as a significant source of supply. Disadvantaged communities must be identified.
   - Soil survey information, including significant areas of high salinity, alkalinity and acidity.
   - Shallow groundwater constituent concentrations from existing monitoring networks (potential constituents of concern include any material applied as part of the agricultural operation, including constituents in irrigation supply water [e.g., pesticides, fertilizers, soil amendments, etc.] that could impact beneficial uses or cause degradation).
   - 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 well networks, individual well details, and monitored parameters. For existing monitoring networks (or portions thereof) and/or relevant data sets, the Steering Committee should assess the possibility of data sharing between the data-collecting entity, the Steering Committee, and the Central Valley Water Board.

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3. *GAR data review and analysis*. To develop the above data components, the GAR shall include review and use, where applicable, of relevant existing federal, state, county, and local databases and documents. The GAR shall include an evaluation of the above data components to:
   - 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.
   - 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.
   - Prepare a ranking of high vulnerability areas to provide a basis for prioritization of workplan activities, with emphasis on communities reliant on groundwater as a significant source for water supply and higher priority given to disadvantaged communities.
   - Describe pertinent geologic and hydrogeologic information for the GDA and utilize GIS mapping applications, graphics, and tables, as appropriate, in order to clearly convey pertinent data, support data analysis, and show results.

4. *Groundwater vulnerability designations.* The GAR shall designate high/low vulnerability areas for groundwater in consideration of high and low vulnerability definitions provided in Attachment E of the Order. Vulnerability designations may be refined/ updated periodically during the Monitoring Report process. The Steering Committee must review and confirm or modify vulnerability designations every five (5) years after Executive Officer approval of the GAR. The vulnerability designations will be made by the Steering Committee 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.). If the Steering Committee intends to develop a Basin Plan Amendment Workplan (as described in section VIII.L of the Order), the Steering Committee must identify the areas where a high vulnerability designation results from exceedances due to naturally elevated levels of a constituent. The Steering Committee shall provide the rationale for proposed vulnerability determinations. The Executive Officer will make the final determination regarding vulnerability designations.

   If the GAR is not submitted to the board by the required deadline, the Executive Officer will designate default high/low vulnerability groundwater areas using such information as 1) those areas that have been identified by the State Water Board as Hydrogeologically Vulnerable Areas, 2) California Department of Pesticide Regulation groundwater protection areas, and 3) areas with exceedances of water quality objectives for which irrigated agriculture waste discharges may cause or contribute to the exceedance.

5. *Prioritization of high vulnerability groundwater areas*. The Steering Committee may prioritize the areas designated as high vulnerability areas to comply with the requirements of this Order, including conducting monitoring programs and carrying out required studies. When establishing relative priorities for high vulnerability areas, the Steering Committee may consider, but not be limited to, the following:
   - Identified exceedances of water quality objectives for which irrigated agriculture waste discharges are the cause, or a contributing source.
   - 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.
   - Existing field or operational practices identified to be associated with irrigated agriculture waste discharges that are the cause, or a contributing source.

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- 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.
- Legacy or ambient conditions of the groundwater.
- Groundwater basins currently or proposed to be under review by CV-SALTS.
- Identified constituents of concern, e.g., relative toxicity, mobility.

Additional information such as models, studies, and information collected as part of this Order may also be considered in designating and prioritizing vulnerability areas for groundwater. Such data include, but are not limited to, 1) published scientific studies, 2) hydrogeologic models, 3) data from areas with exceedances of water quality objectives for which irrigated agriculture waste discharges may cause or contribute to the exceedance, 4) those areas that have been identified by the State Water Board as Hydrogeologically Vulnerable Areas, and 5) California Department of Pesticide Regulation groundwater protection areas.

The Executive Officer will review and may approve or require changes to any Steering Committee proposed high/low vulnerability areas and the proposed priority ranking. The vulnerability areas, or any changes thereto, shall not be effective until the Steering Committee receives written approval by the Executive Officer. An interested person may seek review by the Central Valley Water Board of the Executive Officer's decision on the designation of high and low vulnerability areas associated with approval of the Groundwater Quality Assessment Report.

B. Management Practice Evaluation Program

The goal of the Management Practice Evaluation Program (MPEP) is to determine the effects, if any, irrigated agricultural practices[2] have on groundwater quality. A MPEP is required in high vulnerability groundwater areas and must address the constituents of concern described in the GAR. This section provides the goals, objectives, and minimum reporting requirements for the MPEP. As specified in section IV.D of this MRP, the Steering Committee is required to develop a workplan that will describe the methods that will be utilized to achieve the MPEP requirements.

1. *Objectives.* The objectives of the MPEP are to:
   - Identify whether existing site-specific and/or commodity-specific management practices are protective of groundwater quality within high vulnerability groundwater areas,
   - Determine if newly implemented management practices are improving or may result in improving groundwater quality.
   - Develop a quantitative estimate of the effect of Members' discharges of constituents of concern on groundwater quality in high vulnerability areas.
   - Utilize the results of evaluated management practices to determine whether practices implemented at represented Member farms (i.e., those not specifically evaluated, but having similar site conditions), are sufficiently protective of groundwater quality or if management practices need to be improved.

   Given the wide range of management practices/commodities that are used within the Grassland Drainage Area boundaries, it is anticipated that the Steering Committee will rank or prioritize its high vulnerability areas and commodities, and present a phased approach to implement the MPEP.

[2] In evaluating management practices, the Steering Committee is expected to focus on those practices that are most relevant to the Members' crop types and groundwater quality protection efforts.

2. *Implementation.* Since management practices evaluation may transcend watershed or the GDA boundaries, this Order allows developing a MPEP on a watershed or regional basis that involves participants in other areas or third-party groups, provided the evaluation studies are conducted in a manner representative of areas to which it will be applied. The MPEP may be conducted in one of the following ways:
   - By the Steering Committee,
   - By watershed or commodity groups within an area with known groundwater impacts or vulnerability, or
   - By watershed or commodity groups that wish to determine the effects of regional or commodity driven management practices.

   A master schedule describing the rank or priority for the investigation(s) of the high vulnerability areas (or commodities within these areas) to be examined under the MPEP shall be prepared and submitted to the Executive Officer as detailed in the Management Practices Evaluation Program Workplan section IV.D below.

3. *Report.* Reports of the MPEP must be submitted to the Executive Officer as part of the Steering Committee's Monitoring Report. The report shall include all data[3] (including analytical reports) collected by each phase of the MPEP since the previous report was submitted. The report shall also contain a tabulated summary of data collected to date by the MPEP. The report shall summarize the activities conducted under the MPEP, and identify the number and location of installed monitoring wells relative to each other and other types of monitoring devices. Within each report, the Steering Committee shall evaluate the data and make a determination whether groundwater is being impacted by activities at farms being monitored by the MPEP.

   Each report shall also include an evaluation of whether the specific phase(s) of the Management Practices Evaluation Program is/are on schedule to provide the data needed to complete the Management Practices Evaluation Report (detailed below) by the required deadline. If the evaluation concludes that information needed to complete the Management Practices Evaluation Report may not be available by the required deadline, the report shall include measures that will be taken to bring the program back on schedule.

4. *Management Practices Evaluation Report*. No later than six (6) years after implementation of each phase of the MPEP, the Steering Committee shall submit a Management Practices Evaluation Report (MPER) identifying management practices that are protective of groundwater quality for the range of conditions found at farms covered by that phase of the study. The identification of management practices for the range of conditions must be of sufficient specificity to allow Members and staff of the Central Valley Water Board to identify which practices at monitored farms are appropriate for farms with the same or similar range of site conditions, and generally where such farms may be located within the Grassland Drainage Area (e.g., the summary report may need to include maps that identify the types of management practices that should be implemented in certain areas based on specified site conditions and/or crop types). The MPER must include an adequate technical justification for the conclusions that incorporates available data and reasonable interpretations of geologic, engineering, and agronomic principles to identify management practices protective of groundwater quality.

   The report shall include an assessment of each management practice to determine which management practices are protective of groundwater quality. If monitoring concludes that management practices currently in use are not protective of groundwater quality based upon

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[3] The data need not be associated with a specific parcel or Member.

information contained in the MPER, and therefore are not confirmed to be sufficient to ensure compliance with the groundwater receiving water limitations of the Order, the Steering Committee in conjunction with commodity groups and/or other experts (e.g., University of California Cooperative Extension, Natural Resources Conservation Service) shall propose and implement new/alternative management practices to be subsequently evaluated. When applicable, existing GQMPs shall be updated by the Steering Committee group to be consistent with the findings of the Management Practices Evaluation Report.

C. Groundwater Quality Trend Monitoring

This section provides the objectives and minimum sampling and reporting requirements for Groundwater Quality Trend Monitoring. As specified in section IV.E of this MRP, the Steering Committee is required to develop a workplan that will describe the methods that will be utilized to meet the trend monitoring requirements and submit a QAPP as specified in the ILRP QAPP Guidelines.

1. *Objectives.* The objectives of Groundwater Quality Trend Monitoring are (1) to determine current water quality conditions of groundwater relevant to irrigated agriculture, and (2) to develop long-term groundwater quality information that can be used to evaluate the regional effects (i.e., not site-specific effects) of irrigated agriculture and its practices.

2. *Implementation.* To reach the stated objectives for the Groundwater Quality Trend Monitoring program, the Steering Committee shall develop a groundwater monitoring network that will (1) be implemented over both high and low vulnerability areas in the Grassland Drainage Area, and (2) employ shallow wells, but not necessarily wells completed in the uppermost zone of first encountered groundwater. The use of existing wells is less costly than installing wells specifically designed for groundwater monitoring, while still yielding data which can be compared with historical and future data to evaluate long-term groundwater trends. The Steering Committee may also consider using existing monitoring networks such as those used by AB 3030 and SB 1938 plans.

   The Steering Committee shall submit a proposed Trend Groundwater Monitoring Workplan described in section IV.E below to the Central Valley Water Board. The proposed network shall consist of a sufficient number of wells to provide coverage in the Grassland Drainage Area so that current water quality conditions of groundwater and composite regional effects of irrigated agriculture can be assessed according to the trend monitoring objectives. The rationale for the distribution of trend monitoring wells shall be based on the findings in the GAR and included in the workplan.

3. *Reporting*. The results of trend monitoring are to be included in the Steering Committee's Monitoring Report and shall include a map of the sampled wells, tabulation of the analytical data, and time concentration charts. Groundwater monitoring data are to be submitted electronically to the State Water Board's GeoTracker Database and to the Central Valley Water Board in a format specified by the Executive Officer.

   Following collection of sufficient data (sufficiency to be determined by the method of analysis proposed by the Steering Committee) from each well, the Steering Committee is to evaluate the data for trends. The methods to be used to evaluate trends shall be proposed by the Steering Committee in the Trend Groundwater Monitoring Workplan described in section IV.E below.

D. Management Practices Evaluation Workplan

The Steering Committee, either solely or in conjunction with a Management Practices Evaluation Group (watershed or commodity based), shall prepare a Management Practices Evaluation

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Workplan. The workplan shall be submitted to the Executive Officer for review and approval. The workplan must identify a reasonable number of locations situated throughout the high vulnerability groundwater area(s), and encompassing the range of management practices used, the major agricultural commodities, and site conditions under which these commodities are grown. The workplan shall be designed to meet the objectives and minimum requirements described in section IV.B of this MRP.

1. *Workplan approach.* The workplan must include a scientifically sound approach to evaluating the effect of management practices on groundwater quality. The workplan must include a mass balance and conceptual model of the transport, storage, and degradation/chemical transformation mechanisms for the constituents of concern, or equivalent method approved by the Executive Officer[4], must be provided. The proposed approach may include:

   - literature review of identified management practices,
   - root zone studies,
   - groundwater monitoring,
   - modeling,
   - vadose zone sampling, and/or
   - other scientifically sound and technically justifiable methods for meeting the objectives of the Management Practices Evaluation Program.

   Sufficient groundwater quality monitoring data should be collected or available to confirm or validate the conclusions regarding the effect of the evaluated practices on groundwater quality. Any groundwater quality monitoring that is part of the workplan must be of first encountered groundwater. Monitoring of first encountered groundwater more readily allows identification of the area from which water entering a well originates than deeper wells and allows identification of changes in groundwater quality from activities on the surface at the earliest possible time.

2. *Groundwater quality monitoring –constituent selection*. Where groundwater quality monitoring is proposed, the Management Practices Evaluation Workplan must identify:

   - the constituents to be assessed, and
   - the frequency of the data collection (e.g. root zone pore water, groundwater quality monitoring, vadose zone monitoring; soil sampling) for each constituent, and
   - sampling techniques/methodology.

   The proposed constituents shall be selected based upon the information collected from the GAR and must be sufficient to determine if the management practices being evaluated are protective of groundwater quality. At a minimum, the baseline constituents for any groundwater quality monitoring must include those parameters required under trend monitoring.

3. *Workplan implementation and analysis.* The proposed Management Practices Evaluation Workplan shall contain sufficient information/justification for the Executive Officer to evaluate the ability of the evaluation program to identify whether existing management practices in combination with site conditions, are protective of groundwater quality. The workplan must explain how data collected at evaluated farms will be used to assess potential impacts to groundwater at represented farms that are not part of the Management Practices Evaluation Program's network. This information is needed to demonstrate whether data collected will allow

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[4] For nitrate, the proposed "equivalent method" may be based on recommendations developed by the California Department of Food and Agriculture's Nitrogen Task Force or the State Water Resource Control Board's Expert Panel on nitrates (see Finding 46).

identification of management practices that are protective of water quality at Member farms, including represented farms (i.e., farms for which on-site evaluation of practices is not conducted).

4. Master workplan –prioritization. If the Steering Committee chooses to rank or prioritize its high vulnerability areas in its GAR, a single Management Practices Evaluation Workplan may be prepared which includes a timeline describing the priority and schedule for each of the areas/commodities to be investigated and the submittal dates for addendums proposing the details of each area's investigation.

5. Installation of monitoring wells. Upon approval of the Management Practices Evaluation Workplan, the Steering Committee shall prepare and submit a Monitoring Well Installation and Sampling Plan (MWISP), if applicable. A description of the MWISP and its required elements/submittals are presented as Appendix MRP-2. The MWISP must be approved by the Executive Officer prior to the installation of the MWISP's associated monitoring wells.

E. Trend Monitoring Workplan

The Steering Committee shall develop a workplan for conducting trend monitoring within its boundaries that meets the objectives and minimum requirements described in section III.C of this MRP. The QAPP for trend monitoring must be submitted for approval as specified in section VI. The workplan shall be submitted to the Executive Officer for review and approval. The Trend Monitoring Workplan shall provide information/details regarding the following topics:

1. *Workplan approach.* A discussion of the rationale for the number of proposed wells to be monitored and their locations is required in the workplan. The rationale needs to consider: 1) the variety of agricultural commodities produced within the GDA boundaries (particularly those commodities comprising the most irrigated agricultural acreage), 2) the conditions discussed/identified in the GAR related to the vulnerability or data gap prioritization within the GDA, and 3) the areas identified in the GAR as contributing significant recharge to urban and rural communities where groundwater serves as a significant source of supply.
2. *Well details.* The Workplan will provide details for wells proposed for trend monitoring, including:
   i. GPS coordinates;
   ii. Physical address of the property on which the well is situated (if available);
   iii. California State well number (if known);
   iv. Well depth;
   v. Top and bottom perforation depths;
   vi. A copy of the water well drillers log, if available;
   vii. Depth of standing water (static water level), if available (this may be obtained after implementing the program); and
   viii. Well seal information (type of material, length of seal).
3. *Proposed sampling schedule.* Trend monitoring wells will be sampled, at a minimum, annually at the same time of the year for the indicator parameters identified in Table 1 below. Staff will also consider the uses of the groundwater in evaluating the constituents to be monitored in groundwater. Groundwater to be used as wetland supply water will be required to be monitored for selenium.
4. *Workplan implementation and analysis.* The Workplan will describe proposed method(s) to be used to evaluate trends in the groundwater monitoring data over time.

Revisions to monitoring parameters and/or schedule must be approved by the Executive Officer. Request for revisions must include adequate monitoring data and documentation to justify the changes.

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Table 1. ~~Monitored Parameters~~Required monitored parameters at groundwater Trend Monitoring wells

	Measured Parameters
Annual Monitoring	
	Conductivity (at 25ºC)* (µS/cm)
	pH* in pH units
	Dissolved oxygen (DO)* (mg/L)
	Temperature* (ºC)
	Nitrate as nitrogen (mg/L)
Sampled initially and once every five years thereafter	
	Total dissolved solids (TDS) (mg/L)
	General minerals (mg/L) • Anions (carbonate, bicarbonate, chloride, and sulfate) • Cations (boron, calcium, sodium, magnesium, and potassium)

* field parameters

IV. Steering Committee Reporting Requirements

Reports and notices shall be submitted in accordance with section IX of the Order, Reporting Provisions.

A. Annual Groundwater Monitoring Results

Annually, 30 April, the Steering Committee shall submit the prior year's groundwater monitoring results as an Excel workbook containing an export of all data records uploaded and/or entered into the State Water Board GeoTracker database. If any data are missing from the report, the submittal must include a description of what data are missing and when they will be submitted to the Central Valley Water Board. If data are not loaded into the GeoTracker database, this shall also be noted with the submittal.

The report shall include the following components:

1. Signed Transmittal Letter;
2. Title page;
3. Table of contents;
4. Executive Summary;
5. Description of the GDA geographical area;
6. Monitoring objectives and design;
7. Sampling site/monitoring well descriptions and rainfall records for the time period covered under the AMR;
8. Location map(s) of sampling sites/monitoring wells, crops and land uses;
9. Tabulated results of all analyses arranged in tabular form so that the required information is readily discernible;
10. Discussion of data relative to water quality objectives/trigger limits, water quality management plan milestones/Basin Plan Amendment Workplan (BPAW), where applicable;
11. Electronic data submittal.
12. Sampling and analytical methods used;
13. Associated laboratory and field quality control samples results;
14. Summary of Quality Assurance Evaluation results and an assessment of precision, accuracy, and completeness;
15. Summary of exceedances of water quality objectives/trigger limits occurring during the reporting period;
16. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented;
17. Evaluation of monitoring data to identify temporal and spatial trends and patterns;

18. Summary of Nitrogen Management Plan information submitted to the Steering Committee;
19. Summary of management practice information collected as part of Farm Evaluations;
20. Summary of mitigation monitoring;
21. Summary of education and outreach activities;
22. Conclusions and recommendations.

Additional requirements and clarifications necessary for the above report components are described below.

Report Component (1) —Signed Transmittal Letter

A transmittal letter shall accompany each report. The transmittal letter shall be submitted and signed in accordance with the requirements of section IX of the Order, Reporting Provisions.

Report Component (8) — Location Maps

Location map(s) showing the sampling sites/monitoring wells, crops, and land uses within the GDA's geographic area must be updated (based on available sources of information) and included in the Annual Monitoring Report. An accompanying GIS shapefile or geodatabase of monitoring site and monitoring well information must include the CEDEN-comparable site code and name (surface water only) and Global Positioning System (GPS) coordinates (wells used for monitoring). The map(s) must contain a level of detail that ensures they are informative and useful. GPS coordinates must be provided as latitude and longitude in the decimal degree coordinate system (at a minimum of five decimal places). The datum must be either WGS 1984 or NAD83, and clearly identified on the map(s) or in an associated key or table included in the report. The source and date of all data layers must be identified on the map(s) or in an associated key or table included in the report. All data layers/shapefiles/geodatabases included in the map shall be submitted with the initial Annual Monitoring Report. If changes occur to any submitted data, the updated portion shall be submitted in the subsequent AMR.

Report Component (9) – Tabulated Results

In reporting monitoring data, the Steering Committee shall arrange the data in tabular form so that the required information is readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with the data collection requirements of the MRP.

Report Component (10) — Data Discussion to Illustrate Compliance

The report shall include a discussion of the Steering Committee's compliance with the data collection requirements of the MRP. If a required component was not met, an explanation for the missing data must be included. Results must also be compared to water quality objectives and trigger limits. If a Basin Plan Amendment Workplan (BPAW) has been approved by the Executive Officer, updates on progress made toward BPAW goals and milestones, including any adjustments to the time schedule, must be included.

Report Component (11) – Electronic Data Submittal

The report shall include an electronic data submittal including the following items:

1. An Excel workbook containing an export of all data records uploaded and/or entered into the GeoTracker database (groundwater data). The workbook shall contain, at a minimum, those items detailed in the most recent version of the Steering Committee's approved QAPP.
2. Electronic copies of all field sheets.
3. Electronic copies of all applicable laboratory analytical reports on a CD.
4. For chemistry data, analytical reports must include, at a minimum, the following:
   a. A lab narrative describing QC failures,
   b. Analytical problems and anomalous occurrences,

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c. Chain of custody and sample receipt documentation,
d. All sample results for contract and subcontract laboratories with units, RLs and MDLs,
e. Sample preparation, extraction and analysis dates, and
f. Results for all QC samples including all field and laboratory blanks, lab control spikes, matrix spikes, field and laboratory duplicates, and surrogate recoveries.

Laboratory raw data such as chromatograms, spectra, summaries of initial and continuing calibrations, sample injection or sequence logs, prep sheets, etc., are not required for submittal, but must by retained by the laboratory in accordance with the requirements of section X of the Order, Record-keeping Requirements.

If any data are missing from the semi-annual report, the submittal must include a description of what data are missing and when they will be submitted to the Central Valley Water Board. If data are not loaded into the GeoTracker database, this shall also be noted with the submittal.

Report Component (14) — Quality Assurance Evaluation (Precision, Accuracy and Completeness)

A summary of precision and accuracy results (both laboratory and field) is required in the report. The required data quality objectives are identified in the QAPP requirements specified for the ILRP; acceptance criteria for all measurements of precision and accuracy must be identified. The Steering Committee must review all QA/QC results to verify that protocols were followed and identify any results that did not meet acceptance criteria. A summary table or narrative description of all QA/QC results that did not meet objectives must be included. Additionally, the report must include a discussion of how the failed QA/QC results affect the validity of the reported data. The corrective actions to be implemented are described in the QAPP Guidelines for the ILRP.

In addition to precision and accuracy, the Steering Committee must also calculate and report completeness. Completeness includes the percentage of all quality control results that meet acceptance criteria, as well as a determination of project completeness. For further explanation of this requirement, refer to the most recent version of the ILRP QAPP Guidelines. The Steering Committee may ask the laboratory to provide assistance with evaluation of their QA/QC data, provided that the Steering Committee prepares the summary table or narrative description of the results for the Monitoring Report.

Report Component (16) — Summary of Exceedances

A summary of the exceedances of water quality objectives or trigger limits that have occurred during the monitoring period is required in the Monitoring Report.

Report Component (18) — Evaluation of Monitoring Data

The Steering Committee must evaluate its monitoring data in the Monitoring Report in order to identify potential trends[5] and patterns in groundwater quality that may be associated with waste discharge from irrigated lands. As part of this evaluation, the Steering Committee must analyze all readily available monitoring data that meet program quality assurance requirements to determine deficiencies in monitoring for discharges from irrigated agricultural lands and whether additional sampling locations are needed. If deficiencies are identified, the Steering Committee must propose a schedule for additional monitoring or source studies. Upon notification from the Executive Officer, the Steering Committee must monitor any parameter in an area that lacks sufficient monitoring data (i.e., a data gap should be filled to assess irrigated agriculture's effects on water quality).

[5] All results (regardless of whether exceedances are observed) must be included to determine whether there are trends in degradation.

The Steering Committee should incorporate pesticide use information, as needed, to assist in its data evaluation. Wherever possible, the Steering Committee should utilize tables or graphs that illustrate and summarize the data evaluation.

Report Component (19) – Summary of Reported Nitrogen Data

The Steering Committee shall aggregate information from Members' Nitrogen Management Plan Summary Reports to characterize the input, uptake, and loss of nitrogen fertilizer applications by specific crops in the Grassland Drainage Area. The Steering Committee's assessment of Nitrogen Management Plan information must include, at a minimum, comparisons of farms with the same crops, similar soil conditions, and similar practices (e.g., irrigation management). At a minimum, the statistical summary of nitrogen consumption ratios by crop or other equivalent reporting units and the estimated nitrogen consumed for the different crop types and soil conditions will describe the range percentiles (10th, 25th, 50th, 75th, 90th) and any outliers. A box and whisker plot or equivalent tabular or graphical presentation of the data approved by the Executive Officer may be used. The nitrogen consumption ratio is the ratio of total nitrogen available for crop uptake (from sources including, but not limited to, fertilizers, manures, composts, nitrates in irrigation supply water and soil) to the estimated crop consumption of nitrogen. The summary of nitrogen management data must include a quality assessment of the collected information by township (e.g. missing data, potentially incorrect/inaccurate reporting), and a description of corrective actions to be taken regarding any deficiencies in the quality of data submitted, if such deficiencies were identified. The Steering Committee will also provide an aggregate of the data submitted by its Members in an electronic format, compatible with ArcGIS, identified to at least the township level.[6]

Report Component (20) – Summary of Management Practice Information

The Steering Committee will aggregate and summarize information collected from Farm Evaluations.[7] The summary of management practice data must include a quality assessment of the collected information by township (e.g. missing data, potentially incorrect/inaccurate reporting), and a description of corrective actions to be taken regarding any deficiencies in the quality of data submitted, if such deficiencies were identified. In addition to summarizing and aggregating the information collected, the Steering Committee will provide the individual data records used to develop this summary in an electronic format, compatible with ArcGIS, identified to at least the township level.[6]

Report Component (21) – Mitigation Monitoring

As part of the Monitoring Report, the Steering Committee shall report on the CEQA mitigation measures reported by Members to meet the provisions of the Order and any mitigation measures the Steering Committee has implemented on behalf of Members. The Steering Committee is not responsible for submitting information that Members do not send them directly by the 1 March deadline (see section VII.E of the Order for individual Discharger mitigation monitoring requirements). The Mitigation Monitoring Report shall include information on the implementation of CEQA mitigation measures (mitigation measures are described in Attachment C of the Order), including the measure implemented, identified potential impact the measure addressed, location of the mitigation measure (township, range, section), and any steps taken to monitor the ongoing success of the measure.

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[6] The Member and their associated parcel need not be identified.

[7] Note that the evaluation of the reported management practices information is discussed in Appendix MRP-1 and will be part of the annual Management Plan Status Report.

B. Basin Plan Amendment Workplan

Should the Steering Committee choose to pursue a Basin Plan Amendment as described in Section VI.B. of the Order, the GBD Steering Committee must prepare a Basin Plan Amendment Workplan (BPAW) that includes the following elements:

1. A technical justification for initiating the basin plan amendment process including maps of the areas proposed for basin plan amendment. The justification must include an assessment of naturally occurring (background) concentrations of the constituent(s), evaluate the potential for irrigated agriculture to further degrade groundwater quality beyond background in the identified areas, and include a preliminary evaluation as to whether controllable water quality factors (as defined in the Basin Plan) are reasonably likely to result in attainment of the applicable use(s);
2. A use attainability study plan to determine whether the beneficial use(s) proposed for de-designation may be attained through the application of current or anticipated technologies, whether groundwater within the proposed basin plan amendment area is currently being used for the beneficial use proposed for de-designation, and whether the groundwater proposed for de-designation meets any of the criteria set forth in the Basin Plan that the board considers in making exceptions to beneficial use designations;
3. A description of how the Steering Committee will coordinate the basin plan amendment process through CV-SALTS, if the amendment is based on elevated salt and/or nitrate concentrations;
4. A proposal for reduced reporting requirements for Members in the areas proposed for basin plan amendment. The Steering Committee may propose that trend monitoring be reduced in those areas. The Steering Committee may also propose that the requirement that the Management Practice Evaluation Program evaluate those areas be suspended. The reduced monitoring and reporting requirements shall be no less stringent than the requirements for low vulnerability areas;
5. A description of the monitoring and reporting required to complete the BPAW must be identified; and
6. A time schedule including workplan goals and milestones for completing BPAW items.

To the extent applicable, the above BPAW workplan elements may be met by existing efforts. However, the Steering Committee must provide the information associated with the applicable element demonstrating that element's requirements are met.

The Executive Officer may approve the BPAW workplan if the Executive Officer determines that the BPAW workplan includes all of the required elements. To approve the workplan, the Executive Officer must conclude that the technical justification provides sufficient evidence indicating that waters within the identified high vulnerability areas would likely qualify for de-designation of a beneficial use or uses under the Basin Plan. Should the Executive Officer approve the BPAW workplan, the Executive Officer will also provide the applicable approved modifications to the monitoring and reporting program.

Annual updates on progress made toward BPAW goals and milestones, including any proposed adjustments to the time schedule, must be included in the 30 April Annual Monitoring Report.

The Executive Officer may reinstate high vulnerability monitoring and reporting requirements if any of the following occur: 1) information gathered during implementation of the BPAW indicates a basin plan amendment is unlikely to be adopted, 2) the basin plan amendment is not likely to be brought before the board within five years of the original proposal date due to insufficient progress in meeting workplan goals and milestones, or 3) the basin plan amendment is not approved by the regional board or state water board.

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V. Water Quality Triggers for Development of Management Plans

This Order requires that Members comply with all adopted water quality objectives and established federal water quality criteria applicable to their discharges. The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan) contain numeric and narrative water quality objectives applicable to groundwater within the Order's watershed area.

VI. Quality Assurance Project Plan (QAPP)

The Steering Committee must develop and/or maintain a QAPP that includes watershed and site-specific information, project organization and responsibilities, and the quality assurance components in the ILRP QAPP Guidelines. Chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the recognized state agency for water quality analyses. Alternate methods[8] may be used for chemical analyses if the laboratory has submitted the required validation package[9] for approval by the Executive Officer.

The QAPP must be submitted for approval by the Central Valley Water Board's Quality Assurance Officer and the Executive Officer prior to initiation of groundwater monitoring and in accordance with the time frame set in the Trend Monitoring Workplan. Any modifications to an approved QAPP must receive Executive Officer approval prior to implementation.

The Central Valley Water Board may conduct an audit of the Steering Committee's contracted laboratories at any time in order to evaluate compliance with the ILRP QAPP Guidelines. Quality control requirements are applicable to all of the constituents listed in the QAPP Guidelines, as well as any additional constituents that are analyzed or measured, as described in the appropriate method. Acceptable methods for laboratory and field procedures as well as quantification limits are described in the QAPP Guidelines.

This MRP Order becomes effective XXX [Month] 2015 and remains in effect unless rescinded or revised by the Central Valley Water Board or the Executive Officer.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region on XX [Month] 2015.

PAMELA C. CREEDON, Executive Officer

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[8] Alternate methods" is defined as laboratory methods not EPA-approved for the constituent analyzed.

[9] USEPA, 1999. *Protocol for EPA Approval of Alternate Test Procedures for Organic and Inorganic Analytes in Wastewater and Drinking Water*. Office of Water, Washington, D.C. EPA 821-B-98-002