

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION**

**ATTACHMENT B TO ORDER NO. R5-2014-XXX
MONITORING AND REPORTING PROGRAM**

**WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
SACRAMENTO VALLEY RICE GROWERS**

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I. Introduction

This Monitoring and Reporting Program (MRP) is issued pursuant to the 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 a third-party representative, the California Rice Commission (CRC), to assist individual rice land operators or owners that are Growers¹ subject to and enrolled under Waste Discharge Requirements General Order for Rice Growers within the Sacramento Valley, Order R5-2014-XXXX (hereafter referred to as the “Order”). The requirements of this MRP are necessary to monitor Grower compliance with the provisions of the Order and determine whether state waters receiving discharges from rice lands 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 surface and ground water monitoring, reporting, and electronic data deliverable requirements for the CRC. Due to the nature of agricultural operations, monitoring requirements for surface waters and groundwater will be periodically reassessed to determine if changes should be made to better represent rice field 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 CRC 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 CRC or Growers governed by the Order. The Central Valley Water Board or Executive Officer may rescind this MRP and issue a new MRP as it applies to the CRC or Growers governed by the Order.

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 for rice 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 CRC must follow sampling and analytical procedures as specified in Attachment C, Order No. R5-2010-0805, Monitoring and Reporting Program for California Rice Commission, Quality Assurance Program Plan Guidelines (QAPP Guidelines) and any revisions thereto approved by the Executive Officer.²

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 CRC.

¹ Grower(s) is defined to mean a producer of rice as defined in California Food and Agriculture Code, section 71032, or a landowner that leases, rents, or otherwise owns land that is used by a producer of rice. For both producers of rice and landowners, the land in question must be located within the Sacramento Valley, which includes the counties of Sacramento, Sutter, Yuba, Butte, Glenn, Colusa, Yolo, Placer, and Tehama.

² The CRC has an approved QAPP that meets the conditions of Attachment C, Order No. R5-2010-0805, and was submitted according to MRP requirements.

Because the CRC is a commodity-specific coalition group, monitoring requirements have been specifically designed for rice discharges. Since monitoring locations will overlap with another coalition group, the CRC is encouraged to work with the other third-party entity to determine the source and identity of contaminants of concern for surface and groundwater that may have a rice lands contribution.

This MRP requires the CRC to collect information from its Growers and allows the CRC to report the information to the board in a format that does not identify individual Growers and their parcels. The CRC must submit parcel specific information collected as specified in the Order (see Section VIII.A. of the WDR).

This MRP Order becomes effective on **DATE**. The Central Valley Water Board Executive Officer may revise this MRP as necessary. Upon the effective date of this MRP, the CRC, on behalf of the individual Growers, shall implement the following monitoring and reporting.

III. Surface Water Monitoring Requirements

A. Surface Water Monitoring Sites

The CRC has established four primary locations (see Table 1) as representative of rice field discharges. Secondary sites, upstream from the primary sites, have been used in the Irrigated Lands Regulatory Program (ILRP) to confirm representativeness of the primary sites. Monitoring of the primary and secondary sites will continue in this MRP.

Table 1. CRC Monitoring Sites

Site Type	Site ID	Site Name	Station Code	Latitude	Longitude
Primary	CBD5	Colusa Basin Drain #5	520XCBDWR	39.1833 N	-122.0500 W
Primary	BS1	Butte Slough at Lower Pass Rd	520XBTTSL	39.1875 N	-121.9000 W
Primary	CBD1	Colusa Basin Drain above Knights Landing	520XCBDKL	38.8125 N	-121.7731 W
Primary	SSB	Sacramento Slough Bridge near Karnak	520XSSLNK	38.7850 N	-121.6533 W
Secondary	F	Lurline Creek; upstream site for CBD5	520CRCLCF	39.2184 N	-122.1511 W
Secondary	G	Cherokee Canal, upstream site for BS1*	520CRCCCG	39.3611 N	-121.8675 W
Secondary	H	Obanion Outfall at DWR PP on Obanion Rd, upstream site for SSB	520CRCOOH	39.0258N	-121.7272 W

B. Types of Surface Water Monitoring

Surface water monitoring must provide sufficient data to describe rice operations' impacts on surface water quality and determine whether existing or newly implemented management practices comply with the receiving water limitations of this Order. Surface water monitoring shall include three types of monitoring conducted on a five year rotation (Table 2). The monitoring types are described below.

1. Assessment monitoring

Assessment monitoring shall include field and general parameters, nutrients (nitrate + nitrite as nitrogen and total ammonia as nitrogen), at least two pesticides identified by CRC after evaluation and assessment as specified in Section III.C., and water column and sediment toxicity testing (Table 3). The Executive Officer may require monitoring of more than two pesticides if the Executive Officer determines that insufficient information is available to assess the potential threat to water quality of a pesticide or that available information suggests there could be a water quality

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threat associated with a pesticide³. The pesticides shall be monitored twice during their peak use month and twice in the following month. Sediment toxicity, sediment TOC and grain size testing shall occur once during the pre-harvest drainage. The monitoring schedule for each pesticide shall be tailored to the peak use and/or time periods when the pesticides (respectively) are likely to be discharged to surface water. Water column toxicity testing with *Ceriodaphnia dubia* and *Pimephales promelas* shall occur during two monthly events when pesticides are monitored. For *Selenastrum capricornutum*, toxicity testing shall start during the month when pesticides are first applied and continue for a total of three months. Assessment monitoring shall begin when most rice fields start pesticides application and end with the harvest drainage.

2. Modified assessment monitoring

Modified assessment monitoring shall include the field and general parameters, nutrients, and two pesticides (Table 3) selected based on results from the prior assessment year. The two selected pesticides shall be monitored twice during their peak use month and twice in the following month. The monitoring schedule for each pesticide shall be tailored to the peak use and/or time periods when the respective pesticides are likely to be discharged to surface water. The monitoring period shall be for at least two months of the growing season⁴.

3. Core monitoring

Core monitoring shall include field parameters and two selected indicator rice pesticides (Table 3). Monitoring of the indicator pesticides shall be based on a pesticide evaluation and assessment as specified in Section III.C. Monitoring shall occur two times during one month of each indicator pesticides' peak use period.⁵

The schedule begins with assessment monitoring, followed by a year of modified assessment monitoring, followed by three years of core monitoring, as shown in Table 2. This cycle is continuous until a revised MRP is adopted by the board or approved by the Executive Officer. All sites, primary and secondary, are included in assessment and modified assessment monitoring. Only primary sites are sampled during core monitoring. The schedule for monitoring for each parameter is discussed in the Section III.D.

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³ For example, a change in use patterns or practices may make it more likely that the pesticide could be above water quality objectives or concentrations of the pesticide in surface waters could be increasing (a trend of degradation).

⁴ Since the selected pesticides are each monitored during the month of peak use/application and the following month, the monitoring period for modified assessment sampling may be more than two months of the growing season.

⁵ Since each indicator pesticide is monitored during the month of peak use/application, the monitoring period for core sampling may be more than one month of the growing season.

Table 2. ILRP Monitoring Type and Schedule

Year	Monitoring Type	Monitored for the Year						
		CBD5	CBD1	BS1	SSB	F	G	H
2015	Assessment	X	X	X	X	X	X	X
2016	Modified assessment	X	X	X	X	X	X	X
2017	Core	X	X	X	X			
2018	Core	X	X	X	X			
2019	Core	X	X	X	X			
2020	Assessment	X	X	X	X	X	X	X
2021	Modified assessment	X	X	X	X	X	X	X

C. Surface Water Monitoring Parameters

Table 3 lists the monitoring types and parameters that must be performed during assessment, modified assessment, and core years. The schedule and frequency for monitoring are discussed in the next section. Monitoring performed under a management plan must be identified when a new surface water quality management plan is submitted (see MRP-1, Management Plan Requirements). The Executive Officer may require a parameter(s) of concern continue to be monitored at a specific site during a year that parameter would normally not be scheduled to be monitored. Parameters of concern may include, but are not limited to, parameters that exceed an applicable water quality objective or water quality trigger (see Section VII).

1. Pesticide monitoring

Pesticides to be monitored are based on an evaluation of the previous years' monitoring results, whether changes in the pesticide usage has occurred (e.g., number of acres applied); and the most recent rice pesticide evaluation (see Section V.C. of this MRP Order). The CRC shall propose the pesticides⁶ to be monitored in their Annual Monitoring Report and provide the rationale for their proposal. The pesticides to be monitored shall be reviewed as part of a rice-specific process by Water Board staff that includes input from qualified scientists and coordination with the Department of Pesticide Regulation. Once the list is approved by the Executive Officer, the CRC shall monitor the list of pesticides in accordance with the terms and conditions of this MRP.

⁶ Pesticides to be monitored may include environmentally stable degradates of the registered active ingredient. The evaluation factors applied to degradates will be the same as those applied to the registered active ingredient and will include consideration of the commercial availability of analytical methods to detect the degradate. Potential degradates to evaluate will be identified through Central Valley Water Board and CRC consultation with the Department of Pesticide Regulation.

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Table 3. CRC Surface Water Monitoring Parameters for each Monitoring Type

Monitoring Type	Assessment	Modified Assessment	Core
Sites	Primary and Secondary	Primary and Secondary	Primary
Field measurements^a Flow pH Electrical conductivity Dissolved oxygen (DO) Temperature	X	X	X
General physical parameters^a Turbidity Total organic carbon (TOC) Total suspended solids (TSS)	X	X	
Nutrients^a Nitrate + nitrite as nitrogen Total ammonia as nitrogen	X	X	
Photo monitoring (digital)	To be taken initially, and as needed to document site changes that could affect monitoring results		
Pesticides Pesticides to be determined after evaluation per III.C.	X	X	X
Water column toxicity <i>Selenastrum capricornutum</i>	X		
<i>Ceriodaphnia dubia</i>	X		
<i>Pimephales promelas</i>	X		
Sediment toxicity Hyalella azteca	X		
Sediment TOC	X		
Grain size	X		
Pesticides in sediment (s) cypermethrin λ- cyhalothrin	As needed		

^a Monitoring to include all parameters listed.

D. Surface Water Monitoring Schedule and Frequency

Monitoring shall be based on the timing and frequency of pesticide application and discharge from rice fields that may contain constituents that affect water quality. The monitoring period for a constituent is based on when the constituent is most likely to be discharged. Each year the monitoring start date shall account for factors such as weather conditions, planting dates, and/or pesticide application based on consultation with county agricultural commissioners, growers, pest control advisors, UC Cooperative Extension, and the Central Valley Water Board staff. The monitoring start date and schedule for a constituent may vary from year to year.

Table 4 shows the monitoring schedule and frequency required for surface water. Pesticides to be monitored, as approved by the Executive Officer based on the pesticide evaluation submitted, are to be monitored during the months when peak application and/or release occur.

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Table 4. Surface Water Monitoring Schedule and Frequency

Monitoring Type	Assessment	Modified Assessment	Core
Sites	Primary and Secondary	Primary and Secondary	Primary
Field measurements Flow pH Electrical conductivity Dissolved oxygen (DO) Temperature	Concurrent with all sampling events	Concurrent with all sampling events	Concurrent with all sampling events
General physical parameter Turbidity Total organic carbon (TOC) Total suspended solids (TSS)	Two monthly sampling events	Two monthly sampling events	N/A
Nutrients Nitrates + nitrites as nitrogen Total ammonia as nitrogen	Two monthly events during growing season	Two monthly events during growing season	N/A
Photo monitoring (digital)	Beginning of the monitoring season and as needed (e.g., changes in site location due to inaccessibility, or to document site conditions)		
Pesticides To be determined from evaluation	Two (2) sampling events during the month of peak application, two (2) sampling events in the month following peak application	Two (2) sampling events during the month of peak application	
Water column toxicity <i>Selenastrum capricornutum</i>	Three monthly sampling events starting with pesticide monitoring	N/A	N/A
<i>Ceriodaphnia dubia</i> <i>Pimephales promelas</i>	Two monthly events starting with pesticide monitoring	N/A	N/A
Sediment toxicity Hyalella azteca Sediment TOC Grain size	One sampling event during pre-harvest drainage	N/A	N/A
Sediment pesticides (s) cypermethrin λ- cyhalothrin	Analyzed only if sediment toxicity observed	N/A	N/A

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E. Toxicity Testing

The purpose of toxicity testing is to evaluate compliance with the Basin Plan narrative toxicity water quality objective; identify the causes of toxicity when and where it is observed (e.g., metals, pesticides, ammonia, etc.); and evaluate any additive toxicity or synergistic effects due to the presence of multiple constituents.

1. Water Column Toxicity Testing

Water column toxicity testing shall include *Ceriodaphnia dubia* (water flea), *Pimephales promelas* (fathead minnow), and *Selenastrum capricornutum* (green algae) according to the schedule in Table 4 and shall follow the USEPA methods for acute (*C. dubia* and *P. promelas*) and chronic (*S. capricornutum*) toxicity testing^{7,8}. Toxicity endpoints are survival for *C. dubia* and *P. promelas*, and growth for *S. capricornutum*.

⁷ USEPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, Office of Water, Washington, D.C. USEPA-321-R-02-012.

Water column toxicity analyses shall be conducted on 100% (undiluted) sample for the initial screening. Adequate sample volume must be collected at each site to allow for the toxicity test and any subsequent analysis (dilution series, Toxicity Identification Evaluation [TIE] or pesticide analyses) required by the toxicity test results.

If within the first 96 hours of the initial toxicity screening the mortality reaches 100%, a multiple dilution test shall be initiated. The dilution series must be initiated within 24 hours of the sample reaching 100% mortality, and must include a minimum of five (5) sample dilutions to quantify the magnitude of the toxic response. For the *P. promelas* test, the laboratory must take the steps to procure test species within one working day, and the multiple dilution tests must be initiated the day fish are available.

For *C. dubia* or *P. promelas*, if a 50% or greater difference in mortality in an ambient sample (compared to the laboratory control) is detected at any time in an acceptable test, a TIE or pesticide analyses shall be initiated within 48 hours of such detection. Before the start of the rice monitoring season, but no later than 1 March, the CRC will select the follow-up action (TIE or pesticide analyses) for a 50% or greater difference in mortality and notify the Central Valley Water Board. If the follow-up action selected is to conduct pesticide analysis, a list of pesticides to be analyzed will be developed by the CRC and approved by Central Valley Water Board staff before the monitoring season.

If a 50% or greater reduction in *S. capricornutum* growth in an ambient sample, as compared to the laboratory control, is detected at the end of an acceptable test, a copper/hardness and pesticide analyses shall be initiated within 48 hours from the end of the test.

The pesticide(s) to be analyzed triggered by the 50% or greater reduction in *S. capricornutum* growth, shall be determined based on the CRC and Central Valley Water Board staff evaluation of the pesticides being used before the sampling date, the degradation rate, hold times, and the physical and chemical properties of the pesticides and degradation products. The CRC shall institute procedures (i.e., immediate notification when trigger reached) that ensures the pesticide analysis is performed within the required hold time for the lab method.

Ceriodaphnia dubia and *Pimephales promelas* Media Renewal

Daily sample water renewals shall occur during all acute toxicity tests to minimize the effects of rapid pesticide losses from test waters. A feeding regime of 2 hours before test initiation and 2 hours before test renewal shall be applied. Test solution renewal must be 100% renewal for *C. dubia* by transferring organisms by pipet into fresh aliquot of the original ambient sample, as defined in the freshwater toxicity testing manual.

Selenastrum capricornutum Pre-Test Treatment

Algae toxicity testing shall not be preceded with treatment of the chelating agent EDTA. The purpose of omitting this agent is to ensure that metals used to control algae in the field are not removed from sample aliquots before analysis or during the initial screening.

2. Sediment Toxicity

Sediment toxicity analyses shall be conducted according to EPA Method 600/R-99/064.⁸ Sampling and analysis for sediment toxicity testing utilizing *Hyalella azteca* (*freshwater amphipod also known as Mexican scud*) shall be conducted at each monitoring location established by the CRC for water quality monitoring, if appropriate sediment (i.e. silt, clay) is present at the site. If

⁸ USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition. Office of Water, Washington, D.C. USEPA-821-R-02-013.

⁹ USEPA, 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, Second Edition, Office of Water, Washington, D.C. EPA 600/R-99/064.

appropriate sediment is not present at the designated water quality monitoring site, an alternative site with appropriate sediment shall be designated for all sediment collection and toxicity testing events. Sediment samples shall be collected and analyzed for toxicity during the pre-harvest drainage. The *H. azteca* sediment toxicity test endpoint is survival. The Executive Officer may request different sediment sample collection timing and frequency under a SQMP.

All sediment samples must be analyzed for total organic carbon (TOC) and grain size. Analysis for TOC is necessary to evaluate the expected magnitude of toxicity to the test species. The sediment collected for grain size analysis shall not be frozen. If the sample is not toxic to the test species, the additional sample volume can be discarded.

Sediment samples that show significant toxicity to *Hyaella azteca* at the end of an acceptable test and that exhibit $\geq 20\%$ reduction in organism survival compared to the control require the two pesticide analyses ([s] cypermethrin and λ - cyhalothrin) of the same sample. Analysis at practical reporting limits of 1 ng/g on a dry weight basis for each pesticide is required to allow comparison to established lethal concentrations of these chemicals to the test species. This follow-up analysis must begin within five business days of when the toxicity criterion described above is exceeded. The CRC may also follow up with sediment TIE when there is $\geq 50\%$ reduction in test organism survival as compared to the laboratory control. Sediment TIEs are an optional tool.

F. Special Project Monitoring

The Central Valley Water Board or Executive Officer may require the California Rice Commission to conduct local or site-specific monitoring where monitoring identifies a water quality problem (Special Project Monitoring). The studies shall be representative of the effects of changes in management practices for the parameters of concern. Once Special Project Monitoring is required, the California Rice Commission must submit a Special Project Monitoring proposal. The proposal must provide the justification for the proposed study design, specifically identifying how the study design will quantify rice operations' contribution to the water quality problem, identify sources, and evaluate management practice effectiveness. When such a study is required, the proposed study must include an evaluation of the feasibility of conducting management practice specific field studies that could be associated with the pollutants of concern. Special Project Monitoring studies will be designed to evaluate the effectiveness of practices used by multiple Growers and will not be required of the California Rice Commission to evaluate compliance of an individual Grower.

G. Surface Water Data Management Requirements

All surface water field and laboratory data (including sediment) must be submitted electronically to the ILRP in the required templates. The CRC shall ensure that the most current version of the templates are being utilized. Required formatting and business rules for field, chemistry and toxicity data are detailed within the respective template instruction manuals (see below). These manuals are maintained in collaboration with the Central Valley Regional Data Center (CV RDC) to ensure comparability with the California Environmental Data Exchange Network (CEDEN). In addition to the use of required templates for field, chemistry, and toxicity data, the CRC shall maintain an electronic version of their approved Quality Assurance Project Plan (eQAPP). Detailed electronic water quality data submittal requirements are provided in Section III.G of this MRP Order. Note that electronic copies (e.g. PDF) of all original field sheets, field measurement instrumentation calibration logs, chain of custody forms and laboratory reports must be included in the electronic data submittal.

Once data have been submitted to the ILRP, the data will undergo a series of reviews for adherence to the required formatting and business rules. The data will also be reviewed for the required quality control elements as detailed within the CRC's eQAPP. The CRC will be notified of any changes made to the dataset to successfully load the data. If significant changes are found to be needed, the dataset will be returned to the CRC for revision. Once the data sets have been reviewed and corrected, if needed, the data will be uploaded by the ILRP into a CV RDC CEDEN comparable database. The dataset will then undergo a final set of reviews to ensure completeness and then be transferred to CEDEN for public access.

A narrative describing each required template is provided below. Links to the required templates, instruction manuals and optional tools are available on the ILRP Electronic Water Quality Monitoring Data Submission Resources webpage:

[http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/electronic_data_submission/
Field Data Template \(Required\)](http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/electronic_data_submission/Field_Data_Template_(Required))

The CRC shall input all site visit information and field measurement results into the field data template, which is an Excel workbook. Site visit information (Location and Habitat) must be recorded for any site visit conducted to comply with the requirements in this Order, including events when a site is dry. The field data template contains three required worksheets (Locations, FieldResults, HabitatResults) and four optional worksheets (Stations, FundingCode, GroupCode and Personnel). An instruction manual for the template is available on the ILRP Electronic Data Submission webpage.

Chemistry Data Template (Required)

The CRC shall input all chemistry analysis and associated quality control information into the chemistry data template, which is an Excel workbook. The chemistry data template contains two required worksheets: Results and LabBatch. An instruction manual for the template is available on the ILRP Electronic Data Submission webpage.

Toxicity Data Template (Required)

The CRC shall input all toxicity analysis and associated quality control information, with the exception of reference toxicity analyses, into the toxicity data template, which is an Excel workbook. The toxicity data template contains three required worksheets: Results, Summary, and ToxBatch. An instruction manual for the template is available on the ILRP Electronic Data Submission webpage.

Electronic Quality Assurance Program Plan (eQAPP) (Required)

The eQAPP is an Excel workbook containing a worksheet of the quality control requirements for each analyte and method as detailed in the most current version of the CRC's approved QAPP. The eQAPP workbook will also include additional worksheets containing references for applicable codes, CEDEN retrieval information, and other project specific information. The ILRP has already provided the CRC an eQAPP associated with their previously approved QAPP. The CRC shall be responsible for updating the Quality Control worksheet to the most current approved QAPP. Each analyte, method, extraction, units, recovery limits, QA sample requirement, etc. are included in this document using the appropriate codes required for the CEDEN comparable database. This information should be used to conduct a quality control review prior to submission. Data that does not meet the project quality assurance acceptance requirements must be flagged accordingly and include applicable comments.

The ILRP and CV RDC have also developed several optional tools to assist the CRC. Links to these tools, unless otherwise noted, are available on the ILRP Electronic Data Submission webpage.

Field Sheet Template (Optional)

An example of a CEDEN comparable field sheet can be found on the ILRP webpage. This field sheet was designed to match the entry user interface within the CEDEN comparable database to allow for easier data entry of all sample collection information.

CV RDC Field Entry Shell Database (Optional)

The CV RDC Field Entry Shell Database is a copy of the CV RDC database infrastructure that provides a user interface for site visit and field measurements data entry only. The shell database may be used by those who prefer to enter field data through a user interface rather than directly into the required Excel template. The database provides an export function that can populate the required CV RDC field data template with the data entered. The populated template is then required to be submitted to the ILRP. The shell database may not be used for entry of chemistry or toxicity data. A

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custom field entry shell database may be obtained by contacting the CV RDC:
<http://mlj-llc.com/contact.html>.

Format Quick Guide (Optional Tool)

The Format Quick Guide is a guidance document developed to aid the CRC with data entry and can be used as a reference tool for commonly used codes necessary for populating the required data entry templates. The ILRP will provide this document, and updates to it, upon request.

EDD Checklist with example Pivots (Optional Tool)

The electronic data deliverable (EDD) checklist provides for a structured method for reviewing data deliverables from data entry staff or laboratories before loading. Example pivot tables are provided to assist with the review of the data. Documentation on how to use the checklist and associated pivot tables is available on the ILRP Electronic Data Submission webpage.

Online Data Checker (Optional Tool)

An online data checker was developed to automate the checking of the datasets against many of the format requirements and business rules associated with CEDEN comparable data. The data checker can be accessed through the ILRP Electronic Data Submission webpage. Please note that data submission will not be accepted through this tool; however, the checker can still be used to check data for formatting and business rule compliance.

IV. 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 CRC must collect sufficient data to describe impacts on groundwater quality from rice operations and to determine whether existing or newly implemented management practices comply with the groundwater receiving water limitations of the Order.

The GAR submitted by the CRC did not identify any impacts on groundwater quality that would require the development of a Management Practices Evaluation Program. However, should such impacts be identified, a Management Practices Evaluation Program, or equivalent, that meets the requirements identified below must be prepared. In addition, although a Rice GAR has been submitted, the GAR requirements will apply to updates to the submitted GAR.

The strategy for evaluating groundwater quality and protection consists of 1) Groundwater 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. A GAR that satisfies the requirements outlined in IV.A below was submitted by CRC to the board in July 2013.
2. The overall goal of the Management Practice Evaluation Program (MPEP) is to determine the effects, if any, rice operation practices have on groundwater under different conditions that could affect the discharge of waste from rice operations to groundwater (e.g., soil type, depth to groundwater, irrigation practice, nutrient management practice). A MPEP, or equivalent evaluation program described in the applicable Groundwater Quality Management Plan (GQMP), is required when a GQMP must be prepared (see Section VIII.F of the Order).

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

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 associated with rice operations are protective of groundwater quality, the Executive Officer may also, pursuant to Water Code section 13267, order Growers to perform additional monitoring or evaluations, where violations of this Order are documented or the rice operation is found to be a significant threat to groundwater quality.

A. Groundwater 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. The CRC submitted a draft Groundwater Assessment Report (GAR) in April 2012 for staff review and comment. The final GAR, dated July 2013, was submitted to the board and satisfies the requirements described in this section. Within 90 days of adoption of the Order, the CRC must submit a workplan to address the Yuba County and fringe areas data gaps and proposed elements to resolve them, identified in their GAR, in Section 7.2.3.

The CRC must review and update the GAR to incorporate new information every five (5) years after board adoption of the Order. The requirements below apply to the updates or addenda to the GAR.

1. *Objectives.* The main objectives of the updates to the GAR are to:

- Provide an assessment of all newly available, applicable and relevant data and information to identify changes to high and low vulnerability areas where discharges from rice operations may result in groundwater quality degradation.
- Establish priorities for implementation of monitoring and studies within high vulnerability areas, if applicable.
- Provide an assessment to determine whether the existing workplan to assess groundwater quality trends are still applicable based on the new data and observations.
- Provide an assessment to determine whether the existing workplans and priorities to evaluate the effectiveness of agricultural management practices to protect groundwater quality are still applicable based on the new data and observations.
- Provide a basis for establishing groundwater quality management plans if high vulnerability areas are identified during the updates analysis and priorities for implementation of those plans.

2. *GAR Update components.* The updated GAR or GAR addenda shall include, at a minimum, consideration of updates to the following data components:

- Detailed land use information with emphasis on land uses associated with rice operations.
- Information regarding depth to groundwater, provided as a contour map(s).
- Groundwater recharge information, including identification of areas contributing recharge to urban and rural communities where groundwater serves as a significant source of supply.
- Soil survey information, including significant areas of high salinity, alkalinity and acidity.
- Shallow groundwater constituent concentrations (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

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of Public Health, local groundwater management plans, etc.). This groundwater data compilation and review shall include readily accessible information relative 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 CRC should assess the possibility of data sharing between the data-collecting entity, the CRC, and the Central Valley Water Board.

- A review of the results obtained from the rice-specific trend monitoring network data sampling,

3. *GAR Update/Addenda data review and analysis.* To develop the above data components, the GAR Update/Addenda shall include review and use, where applicable, of relevant updated and new existing federal, state, county, and local databases and documents. The GAR Update/Addenda shall include an evaluation of the above data components to:

- Determine where new information indicates groundwater quality impacts for which rice operations are a potential contributor or where conditions make groundwater more vulnerable to impacts from rice growing activities.
- Determine the merit and feasibility of incorporating additional existing, relevant 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 (if applicable) to provide a basis for prioritization of workplan activities.
- The updated GAR shall utilize GIS mapping applications, graphics, and tables, as appropriate, to clearly convey pertinent data, support data analysis, and show results.

4. *Groundwater vulnerability designations.* The GAR Update/Addenda shall review and confirm or modify groundwater vulnerability designations 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 vulnerability designations will be made by CRC using a combination of physical properties (soil type, depth to groundwater, known agricultural impacts to beneficial uses, etc.) and management practices. The CRC shall provide the rationale for proposed vulnerability determinations. The Executive Officer will make the final determination regarding vulnerability designations.

5. *Prioritization of high vulnerability groundwater areas.* If high vulnerability areas are identified during the GAR update analysis, the CRC 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 CRC may consider, but not be limited to, the following:

- Identified exceedances of water quality objectives for which different types of rice operation waste discharges are the cause, or a contributing source.
- The proximity of the high vulnerability area to areas contributing recharge to urban and rural communities where groundwater serves as a significant source of supply.
- Existing field or operational practices identified to be associated with rice operation waste discharges that are the cause, or a contributing source.
- 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 includes, but is not limited to, 1) those areas that have been identified by the State Water Board as Hydrogeologically Vulnerable Areas, 2) California Department of Pesticide Regulation groundwater

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protection areas, and 3) areas with exceedances of water quality objectives for which waste discharges from rice operations may cause or contribute to the exceedance.

The Executive Officer will review and may approve or require changes to any CRC proposed high/low vulnerability areas and the proposed priority ranking. The vulnerability areas, or any changes thereto, shall not be effective until CRC receipt of written approval by the Executive Officer.

B. 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.C of this MRP, the CRC is required to develop a workplan that will describe the methods that will be utilized to achieve the trend monitoring requirements.

1. *Objectives.* The objectives of Groundwater Quality Trend Monitoring are (1) to determine current water quality conditions of groundwater relevant to rice operations, 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 rice operations and its practices.
2. *Implementation.* To reach the stated objectives for the Groundwater Quality Trend Monitoring program, the CRC has proposed a groundwater monitoring network (Table 5) that will be monitored for rice lands in the Sacramento Valley. These existing shallow wells are specifically designed to yield data which can be compared with historical and future data to evaluate long-term groundwater trends.

The CRC shall submit a proposed Trend Groundwater Monitoring Workplan described in Section IV.C below to the Central Valley Water Board. The rationale for the distribution of trend monitoring wells shall be included in the workplan.

3. *Reporting.* The results of trend monitoring are to be included in the CRC'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 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 CRC) from each well, the CRC is to evaluate the data for trends. The methods to be used to evaluate trends shall be proposed by the CRC in the Trend Groundwater Monitoring Workplan described in Section IV.C below.

C. Trend Monitoring Workplan

The CRC shall develop a workplan for conducting trend monitoring within its boundaries that meets the objectives and minimum requirements described in Section IV.B of this MRP. The workplan shall be submitted to the Executive Officer for review and approval.

The workplan shall use the existing United States Geological Survey (USGS) shallow rice wells as trend groundwater monitoring wells.^{10,11} Table 5 shows the list of monitoring wells for the groundwater trend monitoring.

All operational USGS shallow rice wells identified in Table 5 shall be monitored for all constituents listed in Table 6 for the first year. Subsequently, monitoring shall occur on a rotating basis, with half of the existing monitoring wells monitored the second year and the remaining half the third year. This rotation of monitoring wells shall continue unless modified by the Executive Officer. After the third year

¹⁰ Milby Dawson, B,J, 2001. *Shallow Ground-Water Quality Beneath Rice Areas in the Sacramento Valley, California, 1997.* USGS Water-Sources Investigations Report 01-4000, National Water-Quality Assessment Program, Water-Resources Investigations Report, 04-4000.

¹¹ If access to any of the USGS wells is not provided, the CRC must propose and provide a technical justification for an alternative trend monitoring site.

of monitoring, the CRC may request a reduction in groundwater monitoring to for approval by the Executive Officer.

The Trend Monitoring Workplan shall provide information/details regarding the following topics:

1. *Workplan approach.* The workplan shall include a discussion of the wells to be monitored during each rotation year. The workplan shall outline the schedule for the monitoring period for the first and subsequent years, as well as any proposed changes to Table 5 regarding the wells to be monitored and their locations.
2. *Well details.* Details for wells identified in Table 5 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.* The proposed sampling schedule shall describe which trend monitoring wells will be sampled and the month(s) of sampling. At a minimum, the schedule must propose annual sampling at the same time of the year for the indicator parameters identified in Table 6 below.
4. *Workplan implementation and analysis.* The proposed method(s) to be used to evaluate trends in the groundwater monitoring data over time.

The Trend Monitoring Workplan must include a proposed timeframe for establishing a trend monitoring site (or sites) in any areas identified in the Groundwater Quality Assessment Report as having data gaps.

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Table 5. Shallow Groundwater Monitoring Network for Rice Lands

USGS Report Well ID ^a	DWR Well ID	Latitude	Longitude	Well depth (fbfs)	Screened interval (fblls)	Sub-basin
2	012N003E18H001M	38.886917 N	121.672744 W	49.9	40.0-44.9	Sutter
3	012N002E09B002M	38.908489 N	121.755067 W	28.9	19.0-24.0	Sutter
6	014N002E10R001M	39.070953 N	121.727539 W	44.0	34.1-39.0	Sutter
8	015N002W16R001M	39.148347 N	122.079272 W	35.1	24.9-29.9	Colusa
9	015N002W03E001M	39.183167 N	122.078083 W	35.1	24.9-29.9	Colusa
10	017N003W35M001M	39.281794 N	122.171897 W	35.1	24.9-29.9	Colusa
11	017N002W14G001M	39.329000 N	122.162997 W	33.1	24.9-29.9	Colusa
12	018N001W27B001M	39.390972 N	121.955308 W	33.5	23.6-28.5	West Butte
15	018N002E09L001M	39.426500 N	121.761656 W	35.1	24.9-29.9	East Butte
16	018N002W12G002M	39.429003 N	122.032369 W	35.1	24.9-29.9	Colusa
17	018N001E08D001M	39.434842 N	121.888378 W	38.4	28.5-33.5	West Butte
18	019N003W25R001M	39.470797 N	122.136864 W	38.4	28.5-33.5	Colusa
19	019N003W25E001M	39.472989 N	122.164283 W	35.1	24.9-29.9	Colusa
20	019N001E20R001M	39.479850 N	121.878736 W	48.6	33.5-43.6	West Butte
21	019N001E22B001M	39.490261 N	121.847603 W	35.1	24.9-29.9	East Butte
22	019N002W23E001M	39.491650 N	122.055839 W	35.4	25.6-30.5	Colusa
24	020N002E35J002M	39.541653 N	121.707744 W	35.1	24.9-29.9	East Butte
25	020N002W32J001M	39.542922 N	122.099117 W	35.1	24.9-29.9	Colusa
26	020N002W25A001M	39.564586 N	122.027594 W	35.1	24.9-29.9	Colusa
28	020N002E08A001M	39.608131 N	121.815794 W	35.1	24.9-29.9	East Butte

^a As identified in Milby Dawson, B,J, 2001. *Shallow Ground-Water Quality Beneath Rice Areas in the Sacramento Valley, California, 1997*. USGS Water-Sources Investigations Report 01-4000, National Water-Quality Assessment Program, Water-Resources Investigations Report, 04-4000.

Table 6. Monitored Parameters at Groundwater Trend Monitoring Wells

	Measured Parameter
Annual Monitoring	
	Conductivity (at 25 °C)* (µmhos/cm) Total dissolved solids (TDS) (mg/L) pH* (pH units) Dissolved oxygen (DO)* (mg/L) Temperature* (°C) Nitrate + nitrite as nitrogen (mg/L) Total ammonia as nitrogen (mg/L)
Sampled initially and once every five years thereafter	
	General minerals (mg/L): <ul style="list-style-type: none"> • Anions (carbonate, bicarbonate, chloride, and sulfate) • Cations (boron, calcium, sodium, magnesium, and potassium)

* Field parameters

D. Management Practices Evaluation Program

The purpose of the Management Practices Evaluation Program (MPEP) is to determine the effects, if any, rice operations may have on groundwater quality where rice lands fall under a Groundwater Quality Management Plan (GQMP). Should a Management Practice Evaluation Program be required, this section provides the goals, objectives, and minimum reporting requirements for the MPEP, or equivalent approach described in the GQMP that addresses the requirements of this section. As specified in section IV.E of this MRP, the CRC 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 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 an estimate of the effect of Growers' 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 Growers' farms (i.e., those not specifically evaluated, but having similar site conditions), need to be improved.
2. *Implementation.* Since management practices evaluation may transcend watershed or CRC 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.

A master schedule describing the rank or priority for the investigation(s) of the high vulnerability 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.E.

3. *Report.* Reports of the MPEP must be submitted to the Executive Officer as part of the CRC's Monitoring Report or in a separate report due on the same date as the Monitoring Report. The report shall include all data¹² (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 CRC 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 CRC 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 Growers and staff of the Central Valley Water Board to identify which practices at monitored

¹² The data need not be associated with a specific parcel or Grower.

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farms are appropriate for farms with the same or similar range of site conditions, and generally where such farms may be located within the area covered by this Order (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). The MPER must include an adequate technical justification for the conclusions that incorporates available data and reasonable interpretations of geologic and engineering 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 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 CRC in conjunction with 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. Where applicable, existing GQMPs shall be updated by the CRC to be consistent with the findings of the Management Practices Evaluation Report.

E. Management Practices Evaluation Workplan

Should a Management Practices Evaluation Program be required, the CRC shall prepare a Management Practices Evaluation Workplan as specified in section VIII.C.2 of the Order. The Management Practices Evaluation Workplan may be included in the applicable Groundwater Quality Management Plan. 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 and site conditions under which rice is grown. The workplan shall be designed to meet the objectives and minimum requirements described in Section IV.D 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 Officer¹³. The proposed approach may include:
 - groundwater monitoring,
 - root zone studies,
 - modeling,
 - vadose zone sampling, or
 - other scientifically sound and technically justifiable methods for meeting the objectives of the Management Practices Evaluation Program.

Sufficient groundwater 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,

¹³ 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.

- the frequency of the data collection (e.g., groundwater quality or 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 identification of management practices that are protective of water quality at Grower farms, including represented farms (i.e., farms for which on-site evaluation of practices is not conducted).
4. *Master workplan –prioritization.* If the CRC chooses to rank or prioritize any high vulnerability areas identified in its updated GAR, a single Management Practices Evaluation Workplan may be prepared which includes a timeline describing the priority and schedule for each of the areas 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 Program Workplan, the CRC 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.

V. Reporting Requirements

A. Annual Monitoring Report

The annual monitoring report (AMR) shall be submitted by **31 December** of every year, covering any monitoring conducted from 1 November of the previous year through 31 October of the current year. The monitoring report shall include the following components:

1. Signed Transmittal Letter;
2. Title page;
3. Table of contents;
4. Executive Summary;
5. Description of the CRC geographical area;
6. Monitoring objectives and design;
7. Sampling site/monitoring well descriptions and rainfall records for the time period covered under the Annual Monitoring Report (AMR);
8. Location map(s) of sampling sites/monitoring wells, crops and land uses;
9. Summary of pesticides used on rice, including pounds of active ingredient applied and acreage, as well as any changes in label requirements,
10. Tabulated results of all analyses arranged in tabular form so that the required information is readily discernible,
11. Discussion of data relative to water quality objectives/trigger limits, and water quality management plan milestones, where applicable;
12. Proposed pesticide monitoring (see Section III.C.1);
13. Electronic data submittal;

14. Electronic groundwater data provided as specified by the Executive Officer;
15. Sampling and analytical methods used;
16. Summary of Quality Assurance Evaluation results (as identified in the most recent version of the CRC's approved QAPP for Precision, Accuracy and Completeness) ;
17. Specification of the method(s) used to obtain estimated flow at each surface water monitoring site during each monitoring event;
18. Required every three years, an evaluation of monitoring data to identify spatial trends and patterns;
19. Electronic or hard copies of photos obtained from all monitoring sites, clearly labeled with site ID and date.
20. Summary of exceedances of water quality objectives/trigger limits occurring during the reporting period and related pesticide use information;
21. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented;
22. Status update on preparation and implementation of all Management Plans and other special projects;
23. Summary of Management Practice Information collected as part of Farm Evaluations;
24. Summary or updates of mitigation monitoring;
25. Summary of education and outreach activities;
26. Summary of nitrogen management plan reporting , if applicable, and
27. Conclusions and recommendations.

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Additional requirements and explanations for the above annual report components are described below:

Report Component (1) -- Signed Transmittal Letter

A transmittal letter shall accompany each report. The transmittal letter shall be signed per the requirements given in Section IX of Order No. R5-2014-XXXX.

Report Component (8) -- Location Maps

Location map(s) showing the sampling sites, crops, and land uses within the CRC's geographic area must be updated yearly and included in each annual report. An accompanying list or table of monitoring site information must include the CEDEN comparable site code and name and Global Positioning System (GPS) coordinates. 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 (to a minimum of five decimal places). The datum must be either WGS 1984 or NAD83, and clearly identified on the map. The source and date of all data layers must be identified on the map(s).

To aid the Central Valley Water Board in determining participants, the CRC shall submit GIS information (e.g., a shapefile) identifying parcels covered by the CRC. The data upon which the GIS information is based must be no greater than one (1) year old. This information shall be updated at least every three years, or whenever rice acreage varies by 20% from the latest submitted GIS information.

Report Component (10) -- Tabulated results

Data shall be reported 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 conditions of this MRP order.

Report Component (11) -- Data Discussion to Illustrate Compliance

For surface water data, electronic submittal of the field and laboratory data in a SWAMP comparable format must be included with the AMR. For groundwater data, monitoring results must be provided electronically as specified by the Executive Officer. Exceptions to the due date for submittal of electronic data may be granted by the Executive Officer if sufficient rationale exists.

Report Component (13) – Electronic Submittal of Monitoring Data

The Surface Water Monitoring Data Report shall include the following for the required reporting period:

1. An Excel workbook containing an export of all data records uploaded and/or entered into the CEDEN comparable database (surface water data). The workbook shall contain, at a minimum, those items detailed in the QAPP Guidelines.
2. The most current version of the CRC's eQAPP.
3. Electronic copies of all field sheets.
4. Electronic copies of photos obtained from all surface water monitoring sites, clearly labeled with the CEDEN comparable station code and date.
5. Electronic copies of all applicable laboratory analytical reports on a CD.
6. For toxicity reports, all laboratory raw data must be included in the analytical report (including data for failed tests), as well as copies of all original bench sheets showing the results of individual replicates, such that all calculations and statistics can be reconstructed. The toxicity analyses data submittals must include individual sample results, negative control summary results, and replicate results. The minimum in-test water quality measurements reported must include the minimum and maximum measured values for specific conductivity, pH, ammonia, temperature, and dissolved oxygen.
7. 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,
 - c. Chain of custody (COCs) 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 be 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 AMR, 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 CEDEN comparable database, this shall also be noted with the submittal.

Report Component (14) – Annual Groundwater Monitoring Results

The CRC shall submit the prior year's groundwater monitoring results as an Excel workbook containing an export of all data records in a format specified by the Executive Officer. 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.

Report Component (16) -- Quality Assurance Evaluation (Precision, Accuracy and Completeness)

A summary of precision and accuracy results (both laboratory and field) is required in the annual monitoring report. The data quality indicators for precision and accuracy are listed in the QAPP with acceptance criteria. The CRC 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 in the annual report. The AMR must also include a discussion of how the failed QA/QC results affect the validity of the reported data and the corrective actions initiated.

In addition to precision and accuracy, the CRC must also calculate and report on completeness that includes the percentage of all quality control results that met acceptance criteria, as well as a determination of project completeness.

Report Component (18) -- Evaluation of Monitoring Data

Starting with the 2017 AMR and every three years thereafter, the CRC shall evaluate its monitoring data in the previous years in order to identify potential trends and patterns in surface and groundwater quality that may be associated with waste discharge from irrigated lands. The CRC must specifically determine whether there are any trends in degradation that may threaten applicable beneficial uses. As part of this evaluation, the CRC shall analyze all readily available monitoring data that meet program quality assurance requirements to determine deficiencies in monitoring for discharges from rice lands and whether additional sampling locations or sampling events are needed or if additional constituents should be monitored. If deficiencies are identified, the CRC must propose a schedule for additional monitoring or source studies.

Wherever possible, the CRC should utilize tables or graphs that illustrate and summarize the data evaluation.

Report Components (20/21) -- Summary of Exceedance Reports

A summary of the exceedances of water quality objectives or triggers that have occurred during the monitoring period is required in the AMR. In the event of exceedances for pesticides or toxicity, an evaluation of pesticide use data related to or potentially related to the exceedances must be included in the annual monitoring report.

Report Components (23) -- Summary of Management Practice Information

As specified in section V.D below, the CRC will aggregate and summarize information collected from Farm Evaluations once every three years. 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, if necessary. In addition to summarizing and aggregating the information collected, the CRC will provide the individual data records used to develop this summary in an electronic format, compatible with ArcGIS, identified to at least the Township (TRS) level.¹⁴

Report Components (24) -- Mitigation Monitoring

As part of the Monitoring Report, the CRC shall report on the CEQA mitigation measures reported by rice growers to meet the provisions of the Order and any mitigation measures the CRC has implemented on behalf of its growers. The CRC is not responsible for submitting information that Growers do not send them directly by the 1 October deadline (see Section VII.D of the Order for Grower 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.

B. Surface Water Exceedance Reports

The CRC shall provide surface water exceedance reports if monitoring results show exceedances of adopted numeric water quality objectives or trigger limits, which are based on interpretations of narrative water quality objectives. For each surface water quality objective exceeded at a monitoring location, the CRC shall submit an Exceedance Report to the Central Valley Water Board. The estimated flow at the monitoring location and photographs of the site must be submitted in addition to the exceedance report but do not need to be submitted more than once. The CRC shall evaluate all of its monitoring data and determine exceedances no later than five (5) business days after receiving the laboratory analytical reports for an event. Upon determining an exceedance, the CRC shall send the

¹⁴ The Grower and their associated parcel need not be identified.

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Exceedance Report by email to the CRC's designated Central Valley Water Board staff contact by the next business day. The Exceedance Report shall describe the exceedance, the follow-up monitoring, and analysis or other actions the CRC may take to address the exceedance. Upon request, the CRC shall also notify the agricultural commissioner of the county in which the exceedance occurred and/or the director of the Department of Pesticide Regulation.

Surface water exceedances of pesticides or toxicity: When any pesticide or toxicity exceedance is identified at a location that is not under an approved management plan for toxicity or pesticides, follow-up actions must include an investigation of pesticide use within the watershed area that is physically associated with the exceedance location. This includes all rice pesticides applied within the area that drains to the monitoring site during the four weeks immediately prior to the exceedance date. The pesticide use information may be acquired from the agricultural commissioner, or from information received from agriculture practitioners or Growers within the same drainage area. Results of the pesticide use investigation must be summarized and discussed in the annual monitoring report.

C. Rice Pesticide Evaluation

In its first AMR following adoption of this Order and every five (5) years thereafter, the CRC shall submit in its AMR an updated evaluation of rice pesticides relative to potential effects on surface water quality. The evaluation shall consider the following factors based on their applicability and whether information is readily available: use information (e.g., pounds applied, acres treated, timing of application, product formulation, method of application, application rate, hold times, requirements associated with drift or discharge to surface waters), physical and chemical properties of the pesticide (e.g., degradation rate, adsorption coefficients) and the pesticide's toxicity to aquatic life and risk to human health (e.g., through review of relevant toxicity studies, benchmarks or criteria established for human health or aquatic life protection), and newly registered or cancelled pesticides that are registered for use on rice fields. As described in Section III.C.1, the Rice Pesticide Evaluation will be reviewed as part of a rice-specific process by Water Board staff that includes input from qualified scientists and coordination with the Department of Pesticide Regulation.

D. Farm Evaluation

The CRC shall develop a form or web-based information system to gather farm evaluation information from Growers. The form or web-based information system must be provided to the Central Valley Water Board by 30 November 2014. Upon receiving approval of the farm Evaluation template from the Executive Officer, the CRC shall make the form or web-based information system available to Growers after 30-days.

Starting 31 July 2015 and every three years thereafter, the CRC shall summarize implemented water quality management practices in rice growing regions gathered from the Farm Evaluation report. The practices shall be summarized at the township level as the proportion or acres of land planted to rice within each township that applies the practice.

VI. Templates

The Order provides that the CRC may develop rice specific templates with approval by the Central Valley Water Board Executive Officer. This section describes the minimum requirements that must be met before approval of those templates.

Before Executive Officer approval of any template, the Central Valley Water Board will post the draft template on its website for a review and comment period. Stakeholder comments will be considered by Central Valley Water Board staff. Based on information provided by the CRC and after consideration of comments provided by other interested stakeholders, the Central Valley Water Board's Executive Officer will either: (1) approve the template; (2) conditionally approve the template or (3) disapprove the template. Review of the template and the associated action by the Executive

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Officer will be based on findings as to whether the template meets applicable requirements and contains all of the information required.

A. Farm Evaluation Template

The CRC is to develop a form or web-based information system to gather farm evaluation information from rice landowners. At a minimum, the following information should be in the Farm Evaluation Report:

- Identification of the acreage of rice grown and whether other crops are grown in rotation with rice.
- Location of the farm.
- Identification of on-farm management practices implemented to achieve the Order's farm management performance standards. Specifically track which management practices recommended in management plans have been implemented at the farm.
- Identification of whether or not water leaves the property, and where water leaves the property as well as identifying drainage ditches where water is discharged.
- Location of in-service wells and abandoned wells (well location information may be provided in a Farm Map that remains on-site and is made available for Central Valley Water Board inspection). Identification of whether wellhead protection and backflow prevention practices have been implemented.
- Acknowledgement by the Grower, if a rice producer but not landowner of the rice land enrolled under this Order, that the landowner has been notified of the provisions in the Order and joint responsibility for complying with the terms and conditions of the Order.

B. Nitrogen Management Plan Template

The Nitrogen Management Plan template must be developed by the CRC in consultation with the Central Valley Water Board, and as appropriate, the California Department of Food and Agriculture (CDFA), the University of California Extension, and the UNANR Publication, Rice Nutrient Management in California. In developing the template, the CRC should consider soil and plant tissue testing, nitrogen application rates, nitrogen application timing, consideration of organic nitrogen fertilizer, consideration of irrigation water nitrogen levels.

In addition to the Nitrogen Management Plan Template, the CRC must provide a template for the Nitrogen Management Plan Summary Report, if any high vulnerability areas associated with rice operations are identified and the constituent of concern is nitrate. The Nitrogen Management Plan Summary Report Template must provide for reporting of the nitrogen consumption ratio for each parcel enrolled by the Grower (this MRP requires reporting of this information to the board by township, Grower/parcel need not be specified). The Nitrogen Management Plan Summary Report must also gather information required in the Annual Monitoring Report and information needed for the GQMP, if applicable.

VII. Water Quality Triggers for Development of Management Plans

This Order requires that Growers 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) contains numeric and narrative water quality objectives applicable to surface water and groundwater within the Order's watershed area. USEPA's 1993 National Toxics Rule (NTR) and 2000 California Toxics Rule (CTR) contain water quality criteria which, when combined with Basin Plan beneficial use designations constitute numeric water quality standards. Table 7 of this MRP lists Basin Plan numeric water quality objectives and

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NTR/CTR criteria for constituents of concern that may be discharged by Growers.¹⁵

Table 7 does not include water quality criteria that may be used to interpret narrative water quality objectives, which shall be considered trigger limits. Trigger limits for pesticides will be developed by the Central Valley Water Board staff through a process involving coordination with the Department of Pesticide Regulation (for pesticides) and stakeholder input. The trigger limits will be designed to implement narrative Basin Plan objectives and to protect applicable beneficial uses. The Executive Officer will make a final determination as to the appropriate trigger limits.

VIII. Quality Assurance Program Plan

The CRC 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 QAPP Guidelines. Chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health (DPH), except where the DPH has not developed a certification program for the material to be analyzed.

The CRC's existing QAPP was submitted to the Executive Officer on 29 April 2010 and approved by the Central Valley Water Board Quality Assurance Officer on 19 April 2011. The existing QAPP is acceptable for use by the CRC. Any necessary modifications to the QAPP for groundwater monitoring shall be submitted with the groundwater trend monitoring workplan. Any proposed modifications to the approved QAPP must receive Executive Officer approval before implementation.

The Central Valley Water Board may conduct an audit of the CRC's contracted laboratories at any time to evaluate compliance with the most current version of the QAPP Guidelines. Quality control requirements are applicable to all of the constituents listed in 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 XX [Month] 2014 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] 2014.

PAMELA C. CREEDON, Executive Officer

¹⁵ Future actions, including but not limited to, establishing or changing maximum contaminant levels, water quality objectives, or applicable implementation provisions could result in changes to, additions to, or the applicability of the numerical water quality objectives identified in Table 7.

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Table 7. Basin Plan Numeric Water Quality Objectives for the Sacramento River Watershed.

Constituent / Parameter (Synonym)	Basin Plan Water Quality Objectives	Source of Numeric Threshold <i>(footnotes in parentheses are at bottom of table)</i>	Numeric Threshold(a)	Units	G=Groundwater IS=Inland SW	Numeric Threshold Protects Designated Beneficial Use(s) in the Water Body:							
						Groundwater			Inland Surface Waters				CAS Number
						MUN- MCL	MUN- Toxicity	AGR	MUN- MCL	MUN- Toxicity	Aquatic Life & Consump	AGR	
Coliform, fecal	Bacteria	Basin Plan (b) (c)	200/100	MPN/mL	IS								--
		Basin Plan (b) (d)	400/100	MPN/mL	IS								
Coliform, total	Bacteria	Basin Plan	2.2/100	MPN/mL	G	X							--
Conductivity at 25°C (Electrical conductivity)	Salinity	Basin Plan, Sacramento River at Knights Landing above Colusa Basin Drain (e)	230	µmhos/cm	IS	X							
		Basin Plan, Sacramento River at Knights Landing above Colusa Basin Drain (f)	235	µmhos/cm	IS								
		Basin Plan, Sacramento River at I Street Bridge (g)	240	µmhos/cm	IS								
		Basin Plan, Sacramento River at I Street Bridge (h)	340	µmhos/cm	IS								
		Basin Plan, North Fork of the Feather river, Middle Fork of the Feather River from Little Last Chance Creek to Lake Oroville, Feather River from the Fish Barrier Dam at Oroville to Sacramento River (i)	150	µmhos/cm	IS								
		California Secondary MCL	900-1600	µmhos/cm	G & IS	X			X				
Copper	Chemical Constituents	California Secondary MCL (total copper)	1,000	µg/L	G & IS	X			X	X			7440-50-8
	Toxicity	California Toxics Rule (USEPA), (j) (dissolved copper)	variable	µg/L	IS								
Dissolved Oxygen, minimum	Dissolved Oxygen	Basin Plan, waters designated WARM	5.0	mg/L	IS						X		
		Basin Plan, waters designated COLD and/or SPWN	7.0	mg/L	IS						X		
		Basin Plan, Sacramento River from Keswick Dam to Hamilton City (1 June to 31 August)	9.0	mg/L	IS						X		
		Basin Plan, Feather River from Fish Barrier Dam at Oroville to Honcut Creek (1 September to 31 May)	8.0	mg/L	IS						X		
Mercury	Chemical Constituents	California Primary MCL	2	µg/L	G & IS	X							
	Toxicity	California Toxics Rule (USEPA) for sources of drinking water	0.05	µg/L	IS				X	X			
		California Toxics Rule (USEPA) for other waters	0.051	µg/L	IS & E						X		X
Nitrate (as nitrogen)	Chemical Constituents	California Primary MCL	10	mg/L	G & IS	X	X		X	X			14797-55-8
Nitrite (as nitrogen)	Chemical Constituents	California Primary MCL	1	mg/L	G & IS	X	X		X	X			14797-65-0
Nitrate +Nitrite (as nitrogen)	Chemical Constituents	California Primary MCL	10	mg/L									

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Table 7. Basin Plan Numeric Water Quality Objectives for the Sacramento River Watershed (continued)

Constituent / Parameter (Synonym)	Basin Plan Water Quality Objectives	Source of Numeric Threshold <i>(footnotes in parentheses are at bottom of table)</i>	Numeric Threshold(a)	Units	G=Groundwater IS=Inland SW	Receiving Water Limitation Protects Designated Beneficial Use(s) in the Water Body:							
						Groundwater			Inland Surface Waters				CAS Number
						MUN- MCL	MUN- Toxicity	AGR	MUN- MCL	MUN- Toxicity	Aquatic Life & Consump	AGR	
pH – minimum	pH	Basin Plan	6.5	units	G & IS	X	X		X	X			
pH -- maximum			8.5	units	G & IS	X	X		X	X		X	
Temperature	Temperature	Basin Plan (k)	variable		IS								
Total Dissolved Solids (TDS)	Chemical Constituents	California Secondary MCL, recommended level	500 – 1,000	mg/L	G & IS	X	X		X	X			
Turbidity	Turbidity	Basin Plan, where natural turbidity is <1 NTU	2	NTU	IS								
		Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU.	variable; 2-6	NTU	IS								
		Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20%.	variable; 6-70	NTU	IS								
		Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.	variable 60-110	NTU	IS								
		Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10%.	variable	NTU	IS								

Footnotes to Table 7

- a Numeric thresholds, as maximum levels unless noted otherwise.
- b Applies to water designated for contact recreation (REC-1)
- c Geometric mean of the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed this number.
- d No more than ten percent of the total number of samples taken during any 30-day period shall exceed this number
- e Based upon previous 10 years of record, this number shall not be exceeded (50 percentile).
- f Based upon previous 10 years of record, this number shall not be exceeded (90 percentile).
- g Based upon previous 10 years of record, this number shall not be exceeded (50 percentile).
- h Based upon previous 10 years of record, this number shall not be exceeded (90 percentile).
- i Shall not exceed this number (90 percentile) in well-mixed waters of the Feather River
- j These numeric thresholds are hardness dependent. As hardness increases, water quality objectives generally increase.
- k The natural receiving water temperature shall not be altered unless it can be demonstrated to the satisfaction of the Water Board that such alteration does not adversely affect beneficial uses. However, at no time shall the temperature of WARM and COLD waters be increased more than 5 degrees F above natural receiving water temperature

Abbreviations

CAS Chemical Abstracts Service Registry Number
 MCL maximum contaminant limit
 MUN municipal and domestic supply

Beneficial Uses

AGR – Agricultural water uses, including irrigation supply and stock watering
 Aquatic Life & Consump -- Aquatic life and consumption of aquatic resources
 MUN-MCL – Municipal or domestic supply well default selection of drinking water MCL when available
 MUN-Toxicity – Municipal or domestic supply well consideration of human toxicity thresholds that are more stringent than drinking water MCLs

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