

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

ORDER R5-2012-0116-08
**ATTACHMENT B TO ORDER R5-2012-0116-08
MONITORING AND REPORTING PROGRAM**

WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
GROWERS WITHIN THE EASTERN SAN JOAQUIN RIVER WATERSHED
THAT ARE MEMBERS OF THE THIRD-PARTY GROUP

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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 a third-party representative entity assisting individual irrigated lands operators or owners that are members of the third-party (Members), as well as requirements for individual Members subject to and enrolled under Waste Discharge Requirements General Order for Growers within the Eastern San Joaquin River Watershed that are Members of the Third-Party Group, Order R5-2012-0116-08 (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 Members 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 third-party. Due to the nature of irrigated agricultural operations, monitoring requirements for surface waters and 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 third-party shall not implement any changes to this MRP unless the Central Valley Water Board or the Executive Officer issues a revised MRP.

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 (NSP) 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 third-party must follow sampling and analytical procedures as 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.¹

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 third-party.

This MRP requires the third-party to collect information from its Members and allows the third-party to report the information to the board in a summary format. The third-party 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.

¹ Central Valley Water Board staff will circulate proposed revisions of the QAPP Guidelines for public review and comment prior to Executive Officer consideration for approval.

This MRP Order becomes effective on 7 December 2012. The Central Valley Water Board Executive Officer may revise this MRP as necessary. Upon the effective date of this MRP, the third-party, on behalf of the individual Members, shall implement the following monitoring and reporting.

III. Surface Water Quality Monitoring Requirements

The third-party may elect to participate in an Executive Officer approved Regional Monitoring Program (RMP) [such as the Delta RMP]. If the third-party elects to participate in a RMP, the third-party may submit a proposal to the Executive Officer for approval to reduce some elements of the surface water monitoring requirements described below and instead provide funding and/or in-kind support to an approved RMP. Participation in a Regional Monitoring Program by a third-party shall consist of providing funds and/or in-kind services to the Regional Monitoring Program at least equivalent to discontinued individual monitoring and study efforts. Written approval of the third-party's request, by the Executive Officer, is required prior to discontinuing any monitoring. Approval by the Executive Officer is not required prior to participating in a Regional Monitoring Program.

If the third-party participates in an Executive Officer approved Regional Monitoring Program in lieu of conducting individual surface water monitoring, the third-party shall continue to participate in the Regional Monitoring Program until such time as the third-party informs the Board that participation in the Regional Monitoring Program will cease and the monitoring prior to approved reductions is reinstated. Executive Officer approved reduced monitoring may continue so long as the third-party adequately supports the Regional Monitoring Program. If the Discharger fails to adequately support the Regional Monitoring Program, as defined by the Regional Monitoring Program, the third-party shall reinstate monitoring required prior to approved reductions upon written notice from the Executive Officer.

A. Surface Water Monitoring Sites

There are three different types of monitoring sites described below: 1) Core sites; 2) Represented sites; and 3) Special Project sites. Core sites are monitored comprehensively on an ongoing basis to track trends in surface water quality and to identify water quality problems. Represented sites generally have characteristics similar to, and are, therefore, represented by the Core sites within their common zone.² When a water quality problem is identified at a Core site, the represented sites are evaluated and potentially monitored to determine whether the water quality problem is also occurring at the Represented site (some represented water bodies may not have a monitoring site, e.g. in cases when there is no access). Special Project sites are identified and monitored to investigate identified water quality problems. A Core site or Represented site may also be a Special Project site.

1. Core Site Monitoring

At a minimum, surface water monitoring (as described in section III.C.1) within each zone shall be conducted at one of the designated Core sites (see Table 1) for two consecutive years, followed by two years of monitoring at the second Core monitoring site. Core site monitoring shall alternate continuously between the two Core sites. When a water quality objective or trigger limit at a

² As part of their 25 August 2008 Monitoring and Reporting Program Plan (2008 MRPP), the East San Joaquin Water Quality Coalition (the Coalition) designated six zones within its area based on hydrology, crop types, land use, soil types, and rainfall. The zones identified in the 2008 MRPP are the same zones as those identified in Table 1.

monitored Core site is exceeded, the parameter associated with the exceedance must be monitored for a third consecutive year.³

2. Represented Site Monitoring

When a water quality objective or trigger limit is exceeded at a Core site, the third-party must evaluate the potential for similar risks or threats to water quality associated with that parameter at the sites represented by the Core site (Represented sites). The evaluation must be included in the Monitoring Report (see section V below). If pesticide use information or other factors indicate a risk, monitoring for that parameter must be performed in the appropriate Represented water bodies. The proposed monitoring plan must be included in the Monitoring Plan Update (see section III.C below). Any such monitoring must occur for a minimum of two years during the time period of highest risk of exceedance of water quality objectives for that parameter. When a water quality objective at a monitored Represented site is exceeded, the parameter associated with the exceedance must be monitored for a third consecutive year.⁴

Any watershed area that does not contain a monitoring site due to issues of access or location downstream of urban influence must be represented by the Core sites in that zone. Any applicable surface water quality management plan (SQMP) actions associated with the Core site must take place in these watershed areas (represented drainages without monitoring sites).

3. Special Project Sites

In addition to Core and Represented sites, the third-party may designate Special Project sites as needed in a surface water quality management plan (SQMP) to evaluate commodity or management practice-specific effects on identified water quality problems,⁵ or to evaluate sources of identified water quality problems.

The Executive Officer may require the third-party to conduct local or site-specific monitoring to address a parameter associated with a management plan or TMDL (see section III.C.5. below). Core sites and Represented sites located in areas where management plans are required will also be considered Special Project sites for the parameter(s) subject to the management plan(s).

B. Monitoring Locations

The location of Core and monitored Represented sites are identified in Table 1 below. The third-party may submit written requests (including technical justification) for removal/addition of monitoring sites for approval by the Executive Officer.

Table 1. Third-party Core and Monitored Represented* Sites By Zone

ID	Zone	Site Type	Site Name	Station Code	Latitude	Longitude
B	1	Core	Dry Creek @ Wellsford Rd	535XDCAWR	37.6602	-120.8743
	1	Core	TBD ⁶			

³ If two exceedances have occurred within the two years the Core site is being monitored, a third year of monitoring is not required. However, the parameter would need to be monitored in accordance with the Management Plan for that parameter and site.

⁴ If two exceedances have occurred within the two years the Represented site is being monitored, a third year of monitoring is not required. However, the parameter would need to be monitored in accordance with the Management Plan for that parameter and site.

⁵ "Water quality problem" is defined in Attachment E.

⁶ "To be determined" (TBD) monitoring sites will be established by the third-party and the Water Board.

Table 1. Third-party Core and Monitored Represented* Sites By Zone

ID	Zone	Site Type	Site Name	Station Code	Latitude	Longitude
F	2	Core	Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	37.4422	-121.0024
	2	Core	TBD			
D	3	Core	Highline Canal @ Hwy 99	535XHCHNN	37.4153	-120.7557
	3	Core	TBD			
E	4	Core	Merced River @ Santa Fe	535XMRSFD	37.4271	-120.6721
	4	Core	TBD			
C	5	Core	Duck Slough @ Gurr Rd	535XDSAGR	37.2142	-120.5596
	5	Core	TBD			
A	6	Core	Cottonwood Creek @ Rd 20	545XCCART	36.8686	-120.1818
	6	Core	TBD			
1	6	Represented	Ash Slough @ Ave 21	545XASAAT	37.05450	-120.41580
2	4	Represented	Bear Creek @ Kibby Rd	535XBCAKR	37.31280	-120.41380
3	6	Represented	Berenda Slough along Ave 18 1/2	545XBSAAE	37.01820	-120.32650
4	4	Represented	Black Rascal Creek @ Yosemite Rd	535BRCAYR	37.33210	-120.39470
6	4	Represented	Canal Creek @ West Bellevue Rd	535CCAWBR	37.36075	-120.54941
7	5	Represented	Deadman Creek @ Gurr Rd	535XDCAGR	37.19360	-120.56120
8	5	Represented	Deadman Creek @ Hwy 59	535DMCAHF	37.19810	-120.48690
9	6	Represented	Dry Creek @ Rd 18	545XDCARE	36.98180	-120.21950
11	2	Represented	Hatch Drain @ Tuolumne Rd	535XHDATA	37.51490	-121.01220
12	3	Represented	Highline Canal @ Lombardy Ave	535XHCHNN	37.45560	-120.72070
13	2	Represented	Hilmar Drain @ Central Ave	535XHDACA	37.39060	-120.95820
14	4	Represented	Howard Lateral @ Hwy 140	535XHLAHO	37.30790	-120.78200
15	2	Represented	Lateral 2 1/2 near Keyes Rd	535LTHNKR	37.54780	-121.09274
16	2	Represented	Lateral 5 1/2 @ South Blaker Rd	535LFHASB	37.45823	-120.96726
17	2	Represented	Lateral 6 and 7 @ Central Ave	535LSSACA	37.39779	-120.95971
18	2	Represented	Levee Drain @ Carpenter Rd	535XLDACR	37.47903	-121.03012
19	4	Represented	Livingston Drain @ Robin Ave	535XLDARA	37.31690	-120.74230
20	2	Represented	Lower Stevinson @ Faith Home Rd	535LSAFHR	37.37238	-120.92318
21	4	Represented	McCoy Lateral @ Hwy 140	535XMLAHO	37.30945	-120.78759
22	5	Represented	Miles Creek @ Reilly Rd	535XMCARR	37.25820	-120.47550
35	1	Represented	Mootz Drain Downstream of Langworth Pond	535XMDDL	37.70551	-120.89438
24	3	Represented	Mustang Creek @ East Ave	535XMCAEA	37.49180	-120.68390

Table 1. Third-party Core and Monitored Represented* Sites By Zone

ID	Zone	Site Type	Site Name	Station Code	Latitude	Longitude
26	1	Represented	Rodden Creek @ Rodden Rd	535XRCARD	37.79042	-120.80790
30	2	Represented	Unnamed Drain @ Hogin Rd	535XUDAHR	37.43129	-120.99380
31	4	Represented	Unnamed Drain @ Hwy 140	535XUDAHO	37.31331	-120.89217
33	2	Represented	Westport Drain @ Vivian Rd	535WDAVR	37.53682	-121.04861

*Monitored Represented sites in the table are not an exhaustive list; the Executive Officer may require the third-party to add monitoring sites for represented water bodies as necessary to meet the requirements of the Order.

C. Monitoring Requirements and Schedule

1. Surface Water Monitoring

Surface water monitoring must provide sufficient data to describe irrigated agriculture's impacts on surface water quality and to determine whether existing or newly implemented management practices comply with the receiving water limitations of the Order. Surface water monitoring shall include a comprehensive suite of constituents (also referred to as "parameters") monitored periodically in a manner that allows for an evaluation of the condition of a water body and determination of whether irrigated agriculture operations in the Eastern San Joaquin Watershed are causing or contributing to any surface water quality problems.

Surface water assessment monitoring shall be conducted at Core sites and shall consist of the general water quality parameters, nutrients, pathogen indicators, water column and sediment toxicity, pesticides, and metals identified in section III.C.3. By 1 August of the calendar year in which monitoring begins the third-party shall identify a specific set of monitoring parameters (Monitoring Plan Update) for each site that is scheduled to be monitored (see section III.C.3 below).⁷ The third-party shall continue monitoring as described in the Coalition's 25 August 2008 Monitoring and Reporting Program Plan (2008 MRPP) until the Executive Officer has approved the Monitoring Plan Update. If there are no proposed or required changes to the previous Monitoring Program Plan or Monitoring Plan Update, the third-party is not required to submit the Monitoring Plan Update.

Follow-up sampling: The Central Valley Water Board Executive Officer may request that a parameter(s) of concern continue to be monitored at a specific Core or Represented site during non-scheduled years. Parameters of concern may include, but are not limited to, parameters that exceed an applicable water quality objective or water quality trigger (see section VIII).

Sampling events shall be scheduled to capture at least two storm runoff events per year, except where a different frequency has been required or approved by the Executive Officer. The third-party shall identify storm runoff monitoring criteria that are based on precipitation levels and knowledge of soils or other factors affecting when storm runoff is expected to occur at monitoring sites. The collection of storm runoff samples shall not be contingent upon the timing of other sampling events and could result in monitoring more than once during a month.

⁷ A monitoring year is defined according to water year, which is 1 October through 30 September.

2. Monitoring Schedule and Frequency

The third-party shall identify the appropriate monitoring periods (e.g., months, seasons) for all parameters that require testing (Table 2), including a discussion of the rationale to support the proposed schedule.

For metals, pesticides, and aquatic toxicity, the monitoring periods shall be determined utilizing previous monitoring results, knowledge of agricultural use patterns (if applicable), pesticide use trends, chemical characteristics, and other applicable criteria. All other required parameters shall be monitored according to an approved schedule and frequency during the years in which monitoring is conducted at the Core and Represented sites.

Monitoring must be conducted when the pollutant is most likely to be present. If there is a temporal or seasonal component to the beneficial use, monitoring must also be conducted when beneficial use impacts could occur. The frequency of data collection must be sufficient to allow determination of compliance with the relevant numeric water quality objective(s) or water quality triggers. The third-party may submit written requests for the removal or addition of monitoring sites or parameters, or to modify the monitoring schedule and frequency, for approval by the Executive Officer.

3. Monitoring Parameters

Water quality and flow monitoring shall be used to assess the wastes in discharges from irrigated lands to surface waters and to evaluate the effectiveness of management practice implementation. Water quality is evaluated with both field-measured parameters and laboratory analytical data as listed on Table 2 of this MRP. The pesticides identified as "to be determined" (TBD) on Table 2 shall be identified as part of a process that includes input from qualified scientists and coordination with the Department of Pesticide Regulation. Based on this process, the Executive Officer will provide the third-party with a list of pesticides that require monitoring in areas where they are applied and have the potential to impair water quality.

Parameters that are part of an adopted TMDL that is in effect and for which irrigated agriculture is a source within the Eastern San Joaquin River Watershed shall be monitored in accordance with the adopted Basin Plan provisions or as directed by the Executive Officer. Current adopted TMDLs within the Eastern San Joaquin River Watershed for which irrigated agriculture is a source include the San Joaquin River Deep Water Ship Channel dissolved oxygen; San Joaquin River salt, boron, selenium, diazinon, and chlorpyrifos.

The metals to be monitored at sites within each site subwatershed shall be determined through an evaluation of several factors. The evaluation will provide the basis for including or excluding each metal. Evaluation factors shall include, but not be limited to: documented use of the metal applied to lands for irrigated agricultural purposes in the last three years; prior monitoring results; geological or hydrological conditions; and mobilization or concentration by irrigated agricultural operations. The third-party may also consider other factors such as acute and chronic toxicity thresholds and chemical characteristics of the metals. The third-party shall evaluate the monitoring parameters listed in Table 2 to determine which metals warrant monitoring for each site subwatershed. Documentation of the evaluations must be provided to the Central Valley Water Board as part of the Monitoring Plan Update.

The third-party shall identify in the Monitoring Plan Update all parameters to be monitored and the proposed monitoring periods and frequency at selected sites by 1 August of the year in which monitoring begins (monitoring period begins 1 October). If there are no changes from the previous Executive Officer approved monitoring (i.e., approved MRPP, or previously approved Monitoring

Plan Update), the third-party is not required to submit the Monitoring Plan Update. The Monitoring Plan Update shall be subject to Executive Officer review and approval prior to the initiation of changes in monitoring activities.

Table 2: Monitoring Parameters

	Measured Parameter	Matrix	Required
Field Measurements	Estimated Flow (cfs)	Water	x
	Photo Documentation	Site	x
	Conductivity (at 25 °C) (µs/cm)	Water	x
	Temperature (°C)	Water	x
	pH	Water	x
	Dissolved Oxygen (mg/L)	Water	x
Drinking Water	<i>E. coli</i>	Water	x
	Total Organic Carbon (TOC)	Water	x
Gen Phys	Hardness (as CaCO ₃)	Water	TBD
	Total Suspended Solids (TSS)	Water	x
	Turbidity	Water	x
Metals	Arsenic (total)	Water	TBD
	Boron (total)	Water	TBD
	Cadmium (total and dissolved)**	Water	TBD
	Copper (total and dissolved)**	Water	TBD
	Lead (total and dissolved)**	Water	TBD
	Molybdenum (total)	Water	TBD
	Nickel (total and dissolved)**	Water	TBD
	Selenium (total)	Water	TBD
	Zinc (total and dissolved)**	Water	TBD
Nutrients	Total Ammonia (as N)	Water	x
	Unionized Ammonia (calc value)	Water	x
	Nitrogen, Nitrate+Nitrite	Water	x
	Soluble Orthophosphate	Water	x
Pesticides	Registered pesticides determined according to the process identified in section III.C.3.	Water	TBD

Table 2: Monitoring Parameters

	Measured Parameter	Matrix	Required
303(d)	TMDL constituents required by the Basin Plan		
	303(d) listed constituents to be monitored if irrigated agriculture is identified as a contributing source within the Eastern San Joaquin River Watershed and requested by the Executive Officer.	Water or Sediment	TBD
Water Toxicity	<i>Ceriodaphnia dubia</i>	Water	x
	<i>Pimephales promelas</i>	Water	x
	<i>Selenastrum capricornutum</i>	Water	x
	Toxicity Identification Evaluation	Water	see section III.C.4
Sediment Toxicity			
	<i>Hyalella azteca</i>	Sediment	x
Pesticides & Sediment Parameters	Bifenthrin	Sediment	As needed*
	Cyfluthrin	Sediment	As needed*
	Cypermethrin	Sediment	As needed*
	Deltamethrin	Sediment	As needed*
	Esfenvalerate/Fenvalerate	Sediment	As needed*
	Fenpropathrin	Sediment	As needed*
	Lambda cyhalothrin	Sediment	As needed*
	Permethrin	Sediment	As needed*
	Piperonyl butoxide (PBO)	Sediment	As needed*
	Chlorpyrifos	Sediment	As needed*
	Total Organic Carbon	Sediment	x
	Grain Size	Sediment	x

* For sediment samples measuring significant toxicity and < 80% organism survival compared to the control, the sediment pesticide analysis will be performed. Sediment pesticide analyses may be identified according to an evaluation of PUR data (see sediment toxicity testing requirements in section III.C.4 below).

** Hardness samples shall be collected when sampling for these metals.

4. Toxicity Testing

The purpose of toxicity testing is to: 1) evaluate compliance with the Basin Plan narrative toxicity water quality objective; 2) identify the causes of toxicity when and where it is observed (e.g. metals, pesticides, ammonia, etc.); and 3) evaluate any additive toxicity or synergistic effects due to the presence of multiple constituents.

a. Aquatic Toxicity

Aquatic toxicity testing shall include *Ceriodaphnia dubia*, *Pimephales promelas*, and *Selenastrum capricornutum* in the water column. Testing for *C. dubia* and *P. promelas* shall

follow the USEPA acute toxicity testing methods.⁸ Testing for *S. capricornutum* shall follow the USEPA short-term chronic toxicity testing methods.⁹ Toxicity test endpoints are survival for *C. dubia* and *P. promelas*, and growth for *S. capricornutum*.

Water column toxicity analyses shall be conducted on 100% (undiluted) sample for the initial screening. A sufficient sample volume shall be collected in order to allow the laboratory to conduct a Phase I Toxicity Identification Evaluation (TIE) on the same sample, should toxicity be detected, in an effort to identify the cause of the toxicity.

If a 50% or greater difference in *Ceriodaphnia dubia* or *Pimephales promelas* mortality in an ambient sample, as compared to the laboratory control, is detected at any time in an acceptable test, a TIE shall be initiated within 48 hours of such detection. If a 50% or greater reduction in *Selenastrum capricornutum* growth in an ambient sample, as compared to the laboratory control, is detected at the end of an acceptable test, a TIE shall be initiated within 48 hours of such detection.

At a minimum, Phase I TIE¹⁰ manipulations shall be conducted to determine the general class(es) (e.g., metals, non-polar organics, and polar organics) of the chemical(s) causing toxicity. The laboratory report of TIE results submitted to the Central Valley Water Board must include a detailed description of the specific TIE manipulations that were utilized.

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 in order to quantify the magnitude of the toxic response. For the fathead minnow 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.

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 prior to test initiation and 2 hours prior to test renewal shall be applied. Test solution renewal must be 100% renewal for *Ceriodaphnia dubia* by transferring organisms by pipet into fresh solutions, 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 prior to analysis or during the initial screening.

b. Sediment Toxicity

Sediment toxicity analyses shall be conducted according to EPA Method 600/R-99/064. Sampling and analysis for sediment toxicity testing utilizing *Hyalella azteca* shall be conducted at each monitoring location established by the third-party for water quality monitoring, if appropriate sediment (i.e. silt, clay) is present at the site. If appropriate sediment is not present at the designated water quality monitoring site, an alternative site with appropriate sediment

⁸ 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-821-R-02-012.

⁹ 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.

¹⁰ USEPA. 1991. Methods for Aquatic Toxicity Identification Evaluations. Phase I Toxicity Characterization Procedures. Office of Research and Development, Washington DC. 20460. EPA-600-6-91-003.

shall be designated for all sediment collection and toxicity testing events. Sediment samples shall be collected and analyzed for toxicity twice per year, with one sample collected between 15 August and 15 October, and one sample collected between 1 March and 30 April, during each year of monitoring. 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. Note that 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 *Hyalella azteca* at the end of an acceptable test and that exhibit < 80% organism survival compared to the control will require pesticide analysis of the same sample in an effort to determine the potential cause of toxicity. The third-party may use the previous three years of available PUR data to determine which of the parameters listed in Table 2 require testing in the sediment 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 third-party may also follow up with a sediment TIE when there is $\geq 50\%$ reduction in test organism survival as compared to the laboratory control. Sediment TIEs are an optional tool.

5. Special Project Monitoring

The Central Valley Water Board or Executive Officer may require the third-party 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 third-party 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 irrigated agriculture's 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 commodity and management practice specific field studies for those commodities and irrigated agricultural practices 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 Members and will not be required of the third-party to evaluate compliance of an individual Member.

D. Surface Water Data Management Requirements

All surface water field and laboratory data must be uploaded into the Central Valley Regional Data Center (CV RDC) database and will be exported to the California Environmental Data Exchange Network (CEDEN) once data have been approved as CEDEN comparable. The third-party will input its data into a replica of the CV RDC database following CV RDC and CEDEN business and formatting rules.

The third-party shall utilize the most current version of the database and update associated lookup lists on a routine basis. The third-party shall ensure that the data loaded meet the formatting and business rules as detailed in the most current version of the document "Format and Business Rules for the CV RDC CEDEN Comparable Database."

The Central Valley Water Board has developed several tools to assist the third-party with processing and loading of its data. These tools, whether required or optional, will help the third-party to efficiently conduct data processing and loading and meet data management requirements.

CEDEN Comparable Field Sheets (Required)

The third-party shall use CEDEN comparable field sheets when entering data. An example CEDEN comparable field sheet can be found on the CV RDC 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. Modified versions of the field sheet may be submitted to the Central Valley Water Board Executive Officer for approval.

Format Quick Guide (Optional Tool)

The Format Quick Guide is a guidance document for the formatting of data tailored specifically for the third-party. It contains a column by column guide for filling out the CV RDC data templates with the applicable required codes. The Central Valley Water Board CV RDC will provide this document, and updates to it, upon request based on an approved monitoring plan and associated QAPP.

EDD Checklist (Optional Tool)

The electronic data deliverable (EDD) checklist provides for a structured method for reviewing data deliverables from data entry staff or laboratories prior to loading. An updated checklist will be made available on the CV RDC website.

Online Data Checker (Optional Tool)

An online data checker was developed to automate the checking of the datasets against the current format requirements and business rules associated with CEDEN comparable data. The data checker can be accessed on the CV RDC webpage. Please note that data submission will not be accepted through this tool; however, the checker can still be used to check data for errors.

Electronic Quality Assurance Program Plan (eQAPP) (Required)

The third-party shall use an eQAPP when collecting and analyzing monitoring data. The eQAPP is a spreadsheet document containing the quality control requirements for each analyte and method as detailed in the most current version of the third-party's approved QAPP. Each analyte, method, extraction, units, recovery limits, QA sample requirement, etc. is included in this document using the appropriate codes required for the CEDEN comparable database. The third-party shall use the document to format the reported data and conduct a quality control review prior to loading. Data that do not meet the project quality assurance acceptance requirements must be flagged accordingly and must include brief notes detailing the problem within the provided comments field. Included in this file are also the most recent CEDEN comparable station name and code list as well as the applicable project CEDEN codes for retrieving data from the CEDEN website once data arrive there.

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 third-party must collect 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) Drinking Water Supply Well Monitoring, (2) Groundwater Assessment Report, (3) Management Practices Evaluation Program, and (4) Groundwater Quality Trend Monitoring Program.

1. Drinking Water Supply Well Monitoring is designed to identify human health impacts of nitrate contamination and notifying well users of any well contaminations of nitrate above the Maximum Contaminant Level (MCL) for drinking water wells located on agricultural property.
2. 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.
3. The overall goal of the Management Practice Evaluation Program (MPEP) is to evaluate the effectiveness of management practices in limiting the discharge of waste from irrigated lands to groundwater under different conditions (e.g., soil type, depth to groundwater, irrigation practice, crop type, nutrient management practice).
4. 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.

A. Drinking Water Supply Well Monitoring

After January 1, 2019, Members must initiate sampling of private drinking water supply wells located on their property, as described below. The requirements of this section will not take effect if, prior to January 1, 2019, the State Water Board determines that the legislature has established a comprehensive statewide program that assures that private drinking water wells will be routinely monitored for nitrate contamination and users of those wells will be notified of the results.

The purpose of Drinking Water Supply Well Monitoring is to identify drinking water supply wells that have nitrate concentrations exceeding the MCL and notify any well users of the potential for human health impact.

1. Members must conduct annual drinking water supply well sampling. Members may submit one or more annual drinking water supply well sampling results from one or more of the five prior years in lieu of one or more of the first three rounds of annual monitoring samples, provided sampling and testing for nitrates was completed using EPA approved methods and by an Environmental Laboratory Accreditation Program certified laboratory. If the nitrate concentration is below 8 mg/L nitrate+nitrite as N in three consecutive annual samples, Members may conduct sampling every five years going forward. An alternative sampling schedule based on trending data for the well may be required by the Executive Officer at any time. Sampling may cease if a drinking water well is taken out of service or no longer provides drinking water, including where the well is taken out of service because sufficient replacement water is being supplied. The

- Members must keep any records (e.g. photos, bottled water receipts) establishing that the well is not used for drinking water.
2. Groundwater samples must be collected using proper sampling methods, chain-of-custody, and quality assurance/quality control protocols. Groundwater samples must be collected at or near the well head before the pressure tank and prior to any well head treatment. In cases where this is not possible, the water sample must be collected from a sampling point as close to the pressure tank as possible, or from a cold-water spigot located before any filters or water treatment systems.
 3. Laboratory analyses for groundwater samples must be conducted by an Environmental Laboratory Accreditation Program State certified laboratory according to the U.S. EPA approved methods; unless otherwise noted, all monitoring, sample preservation, and analyses must be performed in accordance with the latest edition of *Test Methods for Evaluating Solid Waste*, SW-846, United States Environmental Protection Agency, and analyzed as specified herein by the above analytical methods and reporting limits indicated. Certified laboratories can be found at the web link: www.waterboards.ca.gov/elap.
 4. All drinking water supply well monitoring data, including any existing data, are to be submitted electronically to the State Water Board's GeoTracker Database by the testing laboratory. The data submitted shall include the APN where the drinking water supply well is located.
 5. If groundwater monitoring determines that water in any well that is used for or may be used for drinking water exceeds 10 mg/L of nitrate+nitrite as N, the Member must provide notice to the users within 10 days of learning of the exceedance and send a copy of the notice to the Central Valley Water Board. If the Member is not the owner of the irrigated lands, the Member may provide notice instead to the owner within 24 hours of learning of the exceedance, and the owner must provide notice to the users within nine days and send a copy of the notice to the Central Valley Water Board.
 6. Notice shall be given to users by providing them a copy of a Drinking Water Notification Template approved by the Executive Officer. The template shall be signed by the Member (or landowner if the member is not the owner) certifying notice has been provided to the users. A copy of the signed template shall be sent to the Central Valley Water Board and retained by the Member or non-Member owner.

B. 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 receiving an NOA from the Central Valley Water Board, the third-party 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.

1. *Objectives.* The main objectives of the GAR are to:
 - Provide an assessment of all 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 associated studies within high vulnerability areas.
 - Provide a basis for establishing workplans to assess groundwater quality trends.
 - Provide a basis for establishing workplans and priorities 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 third-party area, including the most prevalent commodities comprising up to at least 80% of the irrigated agricultural acreage in the third-party area.
 - 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 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 third-party should assess the possibility of data sharing between the data-collecting entity, the third-party, and the Central Valley Water Board.
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.
 - Discuss pertinent geologic and hydrogeologic information for the third-party area(s) 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 or updated periodically during the Monitoring Report process. The third-party 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 third-party using a combination of physical properties (soil type, depth to groundwater, known agricultural impacts to beneficial uses, etc.) and

management practices (irrigation method, crop type, nitrogen application and removal rates, etc.). The third-party 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 third-party 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 third-party 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 urban and rural communities 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.
 - 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 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 protection areas, and 3) areas with exceedances of water quality objectives for which irrigated agriculture waste discharges may cause or contribute to the exceedance.

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

C. Management Practice Evaluation Program

The Management Practice Evaluation Program (MPEP) shall initially focus on the determination of the crop-specific coefficients for conversion of yield to nitrogen removed and then on the determination of acceptable ranges for the multi-year A/R ratio target values by crop. Following the

initial focus, the goal of the MPEP is to evaluate the effectiveness of irrigated agricultural practices¹¹ with regard to groundwater quality. A MPEP may prioritize the condition relevant 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 third-party 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:
 - Determine the crop-specific coefficients for conversion of a measured crop yield to nitrogen removed.
 - Determine acceptable ranges for the multi-year A/R ratios by crop.
 - Identify whether existing site-specific and/or commodity-specific management practices are protective of groundwater quality.
 - Determine if newly implemented management practices are improving or may result in improving groundwater quality.
 - Develop an estimate of the effect of Members' discharges of constituents of concern on groundwater quality.
 - Utilize the results of evaluated management practices to improve the practices implemented on Member farms (not specifically evaluated, but having similar site conditions).

Given the wide range of management practices/commodities that are used within the third-party's boundaries, it is anticipated that the third-party will rank or prioritize its areas and commodities, and present a phased approach to implement the MPEP. The Third Party may base such prioritization on high/low vulnerability distinctions.

2. *Implementation.* Since management practices evaluation may transcend watershed or third-party 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 third-party,
 - 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) 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 third-party'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

¹¹ In evaluating management practices, the third-party is expected to focus on those practices that are most relevant to the Members' groundwater quality protection efforts.

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

summary of data collected to date by the MPEP, including A/R and A-R data. 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 third-party 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 third-party 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 of the third-party 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 third-party 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). 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 third-party 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. Where applicable, existing GQMPs shall be updated by the third-party group to be consistent with the findings of the Management Practices Evaluation Report.

D. 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.F of this MRP, the third-party is required to develop a workplan that will describe the methods that will be utilized to achieve the trend monitoring requirements. This MRP allows developing and implementing a regional Groundwater Quality Trend Monitoring workplan that involves participants in other areas or third-party groups, provided the regional workplan meets the objectives and sampling and reporting requirements described herein. The third-party must submit a copy of the agreement between the parties included in the regional Groundwater Quality Trend Monitoring Group (Trend Monitoring Group). Under this option, the regional workplan may propose a phased approach to develop and implement the workplan elements specified in section IV.F of this MRP.

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 third-party shall develop a groundwater quality monitoring network that will (1) be implemented over both high and low vulnerability areas in the third-party area; and will (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 quality monitoring, while still yielding data which can be compared with historical and future data to evaluate long-term groundwater quality trends. The third-party may also consider using existing monitoring networks such as those used by AB 3030 and SB 1938 plans.

The third-party, either solely or in conjunction with a regional Groundwater Quality Trend Monitoring Group, shall submit a proposed Groundwater Quality Trend Monitoring Workplan described in section IV.F below to the Central Valley Water Board. The proposed network shall consist of a sufficient number of wells to provide coverage in the third-party geographic 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 included in the workplan submitted by the third-party. If the third-party participates in a Trend Monitoring Group, the proposed well network and rationale for distribution of trend monitoring wells is not required in the initial workplan. However, the initial workplan must include a schedule for developing and submitting a proposed well network and rationale for distribution of trend monitoring wells.

3. *Reporting.* The results of trend monitoring are to be included in the third-party's Monitoring Report and shall include a map of the sampled wells, tabulation of the analytical data, and time concentration charts. Groundwater quality monitoring data are to be submitted electronically to the State Water Board's GeoTracker Database and to the Central Valley Water Board.

Following collection of sufficient data (sufficiency to be determined by the method of analysis proposed by the third-party or Trend Monitoring Group) from each well, the third-party is to evaluate the data for trends. The methods to be used to evaluate trends shall be proposed by the third-party or Trend Monitoring Group in the Groundwater Quality Trend Monitoring Workplan described in section IV.F below.

E. Management Practices Evaluation Workplan

The third-party, either solely or in conjunction with a Management Practices Evaluation Group (watershed or commodity based), shall prepare a Management Practices Evaluation Workplan. The workplan shall be submitted to the Executive Officer for review and approval. The workplan must identify a reasonable number of evaluation locations. It must also encompass 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 proposed approach may include:

- groundwater monitoring,
- tracking applied and removed nitrogen,
- modeling,
- vadose zone sampling, or
- other scientifically sound and technically justifiable methods for meeting the objectives of the Management Practices Evaluation Program.

Where available, shallow¹³ groundwater monitoring data should be collected to validate the conclusions regarding the effect on groundwater quality of the evaluated practices. Any shallow groundwater quality monitoring that is part of the workplan must be of first encountered groundwater. Monitoring of shallow first encountered groundwater more readily 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., groundwater quality or vadose zone monitoring; soil sampling) for each constituent.

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 Member farms, including represented farms (i.e., farms for which on-site evaluation of practices is not conducted).
4. *Master workplan –prioritization.* If the third-party chooses to rank or prioritize areas/commodities 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 third-party 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.

¹³ Shallow groundwater in this context refers to groundwater located less than 10 feet below the soil surface, which will exhibit a rapid response to deep percolation (below the root zone) water and nitrate flows.

6. *Groundwater Protection Formula:* By July 1, 2020, the third-party shall amend the workplan to propose a Groundwater Protection Formula (GWP Formula) to the Executive Officer. The purpose of the GWP Formula is to generate a value (the Groundwater Protection Value or GWP Value), expressed as either a nitrogen loading number or a concentration of nitrate in water (e.g. mg/l) as appropriate,¹⁴ reflecting the total applied nitrogen, total removed nitrogen, recharge conditions, and other relevant and scientifically supported variables that influence the potential average concentration of nitrate in water expected to reach groundwater in a given township over a given time period. The Executive Officer shall approve the proposed GWP Formula with any revisions after opportunity for public review and comment. The third-party shall use the GWP Formula to compute GWP Values for each township in high vulnerability areas as part of its GQMP. The GWP Values shall be subject to public review and comment and Executive Officer approval. GWP Values shall be developed and included in the GQMP no later than six months from Executive Officer approval of the GWP Formula.
7. *Groundwater Protection Targets by Township:* The first year following the third-party's inclusion of GWP Values in the GQMP, the third-party shall develop Groundwater Protection Targets (GWP Targets) for each township for which a GWP Values was computed the prior year. The purpose of the GWP Targets is to set a desired target that is intended to achieve compliance with the Receiving Water Limitations for groundwater described in Section III B of the Order within the time schedule for compliance specified in Section XII of the Order. The GWP Targets shall be informed by the GAR, the MPEP, and the trend groundwater monitoring program. The GWP Targets shall be reviewed and subject to approval by the Executive Officer after opportunity for public review and comment. The GWP Targets shall be reviewed and revised as necessary every five years.

F. Groundwater Quality Trend Monitoring Workplan

The third-party, either solely or in conjunction with a regional Groundwater Quality Trend Monitoring Group, shall develop a workplan for conducting trend monitoring within its boundaries that meets the objectives and minimum requirements described in section IV.C of this MRP. The workplan shall be submitted to the Executive Officer for review and approval. If the regional Groundwater Quality Trend Monitoring Group option is selected, the workplan must be submitted to the Executive Officer by 31 October 2017. The regional Groundwater Quality Trend Monitoring Workplan may propose a schedule for a phased approach to develop and implement items 1 through 4 below. In addition, the proposed schedule shall include submittal of a QAPP for the regional Trend Monitoring Workplan. A single third-party Trend Monitoring Workplan shall provide full information/details for items 1 through 4 below upon submittal of the workplan, due one (1) year following approval of the GAR.

1. *Workplan approach.* The Trend Monitoring workplan must include a discussion of the rationale for the number of proposed wells to be monitored and their locations. The rationale needs to consider: (1) the variety of agricultural commodities produced within the third-party's boundaries (particularly those commodities comprising the most irrigated agricultural acreage), (2) the conditions discussed/identified in the GAR related to the vulnerability prioritization within the third-party area, 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.

¹⁴ The appropriate metric is to be determined as part of the workplan development.

2. *Well details.* 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 3 below.

4. *Workplan implementation and analysis.* Proposed method(s) to be used to evaluate trends in the groundwater quality monitoring data over time.

Table 3: Trend Monitoring Constituents

Annual Monitoring Conductivity (at 25 °C)* (µmhos/cm) pH* in pH units Dissolved oxygen (DO)* (mg/L) Temperature* (°C) Nitrate as nitrogen (mg/L)
* field parameters
Trend monitoring wells are also to be sampled initially and once every five years thereafter for the following COCs: Total dissolved solids (TDS) (mg/L) General minerals (mg/L): Anions (carbonate, bicarbonate, chloride, and sulfate) Cations (boron, calcium, sodium, magnesium, and potassium)

V. Third-Party Reporting Requirements

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

The Third-Party shall develop Anonymous Member IDs and Anonymous APN IDs, as defined in Attachment E, for the reporting of data under Section C and D below.

A. Quarterly Submittals of Surface Water Monitoring Results

Each quarter, the third-party shall submit the previous quarter’s surface water monitoring results in an electronic format. The deadlines for these submittals are listed in Table 4 below.

Table 4. Quarterly Surface Water Monitoring Data Reporting Schedule

Due Date	Type	Reporting Period
1 March	Quarterly Monitoring Data Report	1 July through 30 September of previous calendar year
1 June	Quarterly Monitoring Data Report	1 October through 31 December of previous calendar year
1 September	Quarterly Monitoring Data Report	1 January through 31 March of same calendar year
1 December	Quarterly Monitoring Data Report	1 April through 30 June of same calendar year

Exceptions to due dates for submittal of electronic data may be granted by the Executive Officer if good cause is shown. The Quarterly 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 most recent version of the third-party's approved QAPP.
2. The most current version of the third-party'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 quarterly 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 CEDEN comparable database, this shall also be noted with the submittal.

B. Annual Groundwater Monitoring Results

Annually, by 1 May, the third-party 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.

C. Annual Management Practice Implementation Data

By 1 July 2019 and annually thereafter, the third-party shall submit to the Central Valley Water Board management practice implementation data from the prior year's INMP Summary Reports and MPIRs in Excel workbook format. By 1 July 2019, and annually thereafter, the third-party shall also submit management practice implementation data from the most recently submitted Farm Evaluations. 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. The third-party shall maintain an original electronic copy of all Farm Evaluations, INMP Summary Reports, and MPIRs, for ten years as required in Section X of the order.

The following data shall be reported to the Central Valley Water Board for each field:

1. Anonymous Member ID
2. Crop: If the Member has more than one field of a given crop, these may be identified by crop plus a number (e.g. tomato₁, tomato₂).

Data from the INMP Summary Report:

3. Whether Member was notified that Member was an outlier for AR data
4. INMP certification method
5. Irrigation method
6. Irrigation practices
7. Nitrogen management practices

Data from MPIR:

8. Whether the field is in a SQMP area
9. If so, management practices implemented consistent with the SQMP
10. Whether the field is in a GQMP area
11. If so, management practices implemented consistent with the GQMP

Data from Farm Evaluation:

12. Pest management practices
13. Sediment and erosion management practices
14. Whether there are irrigation wells
15. Whether there are abandoned wells

D. Annual Irrigation and Nitrogen Management Plan Summary Report Data

The third-party shall submit certain data from the prior year's Irrigation and Nitrogen Management Plan (INMP) Summary Reports and certain additional calculations in three tables in Excel workbook

format. If any INMP Summary Reports or data are missing, the submittal must include a description of what data are missing and when they will be submitted to the Central Valley Water Board.

The third-party shall submit the Individual Field AR Data by Anonymous Member ID Table beginning 1 July 2019, and annually thereafter.

The third-party shall submit Individual Field AR Data by Anonymous APN ID Table beginning 1 July 2021 and annually thereafter.

The third-party shall submit Township AR Data Table beginning 1 July 2019 and annually thereafter.

The third-party shall maintain all INMP Summary Reports received by the third-party and maintain all electronic database tables created from the INMP Summary Reports for a minimum of 10 years as required by section X of the order.

Concurrently with the data submission, the third-party shall identify the entries in the first two tables below that the third-party considers outliers for AR data, subject to follow up actions, and the standard used to make that determination.

The third-party shall calculate the following values and convert them to per acre values as indicated:

Total Nitrogen Removed

The total nitrogen removed shall be calculated from the total amount of material removed (harvested/sequestered) and multiplied by a crop-specific coefficient, C_N . The third-party shall determine, through literature review, nitrogen removed testing, and research, the most appropriate C_N coefficients for converting crop yield to nitrogen removed. The third-party shall publish C_N coefficients for crops that cover 95% of acreage within the third-party's boundaries in time to calculate Total Nitrogen Removed values based on yield values reported in the INMP Summary Reports due 1 March 2021. By 1 March 2023, the third-party shall publish C_N coefficients for crops that cover 99% of acreage within the third-party's boundaries. For the crops that cover the remaining 1% of acreage within the third-party's boundaries, it is acceptable to use estimated C_N coefficients based on similar crop types. The methods used to establish C_N coefficients must be approved by the Executive Officer. Until C_N coefficients have been established for a particular crop, the member will only report the crop yield in the INMP. Nitrogen Removed includes nitrogen removal via harvest and nitrogen sequestered in permanent wood of perennial crops.

Nitrogen Applied/Nitrogen Removed Ratio (A/R Ratio)

The A/R ratio shall be reported as the ratio of total nitrogen applied to total nitrogen removed (calculated above).

Multi-Year Applied/Nitrogen Removed Ratio (A/R Ratio)

For each field for which three consecutive years of A/R ratio is available, the multi-year A/R ratio shall be reported as the ratio of total nitrogen applied to total nitrogen removed (calculated above) for the three prior consecutive years.

Nitrogen Applied – Nitrogen Removed Difference (A-R Difference)

The A-R difference shall be reported as the numerical difference between total nitrogen applied and total nitrogen removed (calculated above).

The third-party shall review each Members' INMP Summary Reports and independently calculate and report both the A/R ratio and the A-R difference for the current reporting cycle (A/R_{1 year} and A-R_{1 year}). Beginning the third year of reporting, for those locations with data available for three years, the third-party shall calculate and report a three-year running total for both the A/R ratio and the A-R difference (A/R_{3 year} and A-R_{3 year}). The formulas for the A/R ratios and A-R differences are shown in the equations below.

$$A/R_{1\text{ year}} \text{ Ratio} = \frac{\text{Nitrogen Applied during current reporting cycle}}{\text{Nitrogen Removed during current reporting cycle}}$$

$$A/R_{3\text{ year}} \text{ Ratio} = \frac{\text{Sum of Nitrogen Applied during current and two previous reporting cycles}}{\text{Sum of Nitrogen Removed during current and two previous reporting cycles}} = \frac{(A_n + A_{n-1} + A_{n-2})}{(R_n + R_{n-1} + R_{n-2})}$$

$$A-R_{1\text{ year}} \text{ Difference} = \text{Nitrogen Applied (current reporting cycle)} - \text{Nitrogen Removed (current reporting cycle)}$$

$$\begin{aligned} A-R_{3\text{ year}} \text{ Difference} &= [\text{Sum of Nitrogen Applied (current and two previous reporting cycles)}] \\ &\quad - [\text{Sum of Nitrogen Removed (current and two previous reporting cycles)}] \\ &= (A_n + A_{n-1} + A_{n-2}) - (R_n + R_{n-1} + R_{n-2}) \end{aligned}$$

Where n = current reporting cycle

The following data shall be reported to the Central Valley Water Board in three tables:

Individual Field-Level AR Data by Anonymous Member ID Table: One entry is made for each field or management unit reported.

1. Anonymous Member ID: Each Anonymous Member ID may be associated with more than one field.
2. Crop: If the Member has more than one field of a given crop, these may be identified by crop plus a number (e.g. tomato₁, tomato₂).¹⁵
3. Nitrogen applied via fertilizers (lbs/acre)
4. Nitrogen applied via organics and compost (lbs/acre)
5. Nitrogen applied via irrigation water (lbs/acre)
6. Total Nitrogen applied (lbs/acre) [sum of nitrogen from fertilizer (3), organics/compost (4), and irrigation water (5)]
7. Nitrogen removed per acre (lbs/acre)
8. A/R ratio
9. A-R difference (lbs/acre)
10. 3 year A/R ratio if available

¹⁵ We recognize that, if multiple crop types are grown in the same field over the course of a year or over several years, variations on field nomenclature and crop reporting will be necessary. For example, the field could be identified as the same field in an extra column and an extra row could be added for each crop. In addition, the three year A/R target range would likely need to be expressed as a weighted average of the crops grown during the three years.

Individual Field-Level AR Data by Anonymous APN ID Table: An entry for a field or management unit may be repeated if there is more than one Anonymous APN ID associated with the field or management unit.

1. Anonymous APN ID: List on a separate line each Anonymous APN ID assigned to parcels the field overlays completely or partially.
2. Associated groundwater basin or sub-basin
3. Crop: If there is more than one field of a given crop in the APN, these may be identified by crop plus a number (e.g. tomato₁, tomato₂)¹⁶
4. Nitrogen applied via fertilizers (lbs/acre)
5. Nitrogen applied via organics and compost (lbs/acre)
6. Nitrogen applied via irrigation water (lbs/acre)
7. Total Nitrogen applied (lbs/acre) [sum of nitrogen from fertilizer (3), organics/compost (4), and irrigation water (5)]
8. Nitrogen removed per acre (lbs/acre)
9. A/R ratio
10. A-R difference (lbs/acre)
11. 3 year A/R ratio if available

Township-Level Aggregated AR Data Table:

1. Township and range
2. Crop
3. Total acreage: sum for all the acreage for each unique crop within the township (acres)
4. Total nitrogen applied via fertilizer: sum for all acreage for each unique crop (total lbs)
5. Total nitrogen applied via organics and compost: sum for compost for each unique crop (total lbs)
6. Total nitrogen applied via irrigation water: sum for all acreage for each unique crop (total lbs)
7. Total nitrogen applied for each unique crop (total lbs) [sum of nitrogen from fertilizer (3), organics/compost (4), and irrigation water (5)]
8. Total nitrogen removed for each unique crop (total lbs)
9. A/R ratio for each unique crop
10. A-R difference for each unique crop (total lbs)

E. Monitoring Report

The Monitoring Report shall be submitted by 1 May every year, with the first report due 1 May 2014, except for report components 17, 18, and 19 which will be due 1 July of each year. The report shall cover the monitoring periods from the previous hydrologic water year. A hydrologic water year is defined as 1 October through 30 September. The report shall include the following components:

1. Signed transmittal letter;
2. Title page;
3. Table of contents;

¹⁶ We recognize that, if multiple crop types are grown in the same field over the course of a year or over several years, variations on field nomenclature and crop reporting will be necessary. For example, the field could be identified as the same field in an extra column and an extra row could be added for each crop. In addition, the three year A/R target range would likely need to be expressed as a weighted average of the crops grown during the three years.

4. Executive summary;
5. Description of the third-party geographical area;
6. Monitoring objectives and design;
7. Sampling site/monitoring well descriptions and rainfall records for the time period covered under the Monitoring Report;
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, and water quality management plan milestones, where applicable;
11. Sampling and analytical methods used;
12. Summary of Quality Assurance Evaluation results (as identified in the most recent version of the third-party's approved QAPP for Precision, Accuracy and Completeness);
13. Specification of the method(s) used to obtain estimated flow at each surface water monitoring site during each monitoring event;
14. Summary of exceedances of water quality objectives/trigger limits occurring during the reporting period and for surface water related pesticide use information;
15. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented;
16. Evaluation of monitoring data to identify spatial trends and patterns;
17. INMP Summary Report Evaluation;
18. Summary of management practice information collected as part of Farm Evaluations;
19. Summary comparison of township Groundwater Protection Targets and actual value achieved for each township;
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 third-party's geographic area must be updated (based on available sources of information) and included in the 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 (surface water sites and 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. The source and date of all data layers must be identified on the map(s). All data layers/shapefiles/geodatabases included in the map shall be submitted with the Monitoring Report.

Report Component (9) – Tabulated Results

In reporting monitoring data, the third-party 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 third-party'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.

Report Component (12) — 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 most recent version of the third-party's approved QAPP; acceptance criteria for all measurements of precision and accuracy must be identified. The third-party 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.

In addition to precision and accuracy, the third-party 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 QAPP Guidelines. The third-party may ask the laboratory to provide assistance with evaluation of their QA/QC data, provided that the third-party prepares the summary table or narrative description of the results for the Monitoring Report.

Report Component (14) — Summary of Exceedances

A summary of the exceedances of water quality objectives or triggers that have occurred during the monitoring period is required in the Monitoring Report. In the event of exceedances for pesticides or toxicity in surface water, pesticide use data must be included in the Monitoring Report. Pesticide use information may be acquired from the agricultural commissioner. This requirement is described further in the following section on Exceedance Reports.

Report Component (16) — Evaluation of Monitoring Data

The third-party must evaluate its monitoring data in the Monitoring Report in order to identify potential trends and patterns in surface and groundwater quality that may be associated with waste discharge from irrigated lands. As part of this evaluation, the third-party 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 third-party must propose a schedule for additional monitoring or source studies. Upon notification from the Executive Officer, the third-party must monitor any parameter in a watershed that lacks sufficient monitoring data (i.e., a data gap should be filled to assess irrigated agriculture's effects on water quality).

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

Report Component (17) – INMP Summary Report Evaluation

In addition to submitting the INMP Summary Reports Data, as described in Section V.D above, the third-party shall submit an evaluation comparing individual field data collected from the Members' INMP Summary Reports. These comparisons shall include the ratio of Nitrogen Applied to Nitrogen Removed¹⁷ and the difference between Nitrogen Applied and Nitrogen Removed for crops in the Eastern San Joaquin River Watershed. Nitrogen Applied includes nitrogen from any sources, including, but not limited to, organic amendments, synthetic fertilizers, and irrigation water.

The third-party's evaluation of both the $A/R_{1\text{ year}}$ and $A/R_{3\text{ year}}$ ratios must include, at a minimum, a comparison of A/R ratios by crop type. As directed by the Executive Officer, initial further evaluations within each crop type comparing the irrigation method, the soil conditions, and the farming operation size shall be developed. The third-party shall evaluate the corresponding $A-R_{1\text{ year}}$ and $A-R_{3\text{ year}}$ differences by crop type. The third-party shall also evaluate any other A/R ratio or A-R difference comparisons as directed by the Executive Officer. For each comparison, the third-party must identify the mean and the standard deviation as well as develop a histogram plot of the data. A box and whisker plot comparing the A/R ratio and A-R difference for each comparison, or equivalent tabular or graphical presentation of the data approved by the Executive Officer, may also be used. The summary of nitrogen management data must include a quality assessment of the collected information (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. Spreadsheets showing the calculations used for data evaluation must also be submitted to the Executive Officer. The third-party may include any recommendations regarding future A/R ratio target values.

Report Component (18) – Summary of Management Practice Information

The third-party shall aggregate and summarize information collected from Farm Evaluations.¹⁸ 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.

Report Component (19) – GWP Target Summary Comparison

For each township, the third-party shall compare the GWP Target for the township and the actual value achieved in the township based on the A and R reported in the INMP Summary Reports. The third-party shall also provide comparisons of the current year's results to those of the previous years to establish the cumulative trend for each township.

Report Component (20) – Mitigation Monitoring

As part of the Monitoring Report, the third-party shall report on the CEQA mitigation measures reported by Members to meet the provisions of the Order and any mitigation measures the third-party has implemented on behalf of Members. The third-party 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

¹⁷ For some crops the information needed to determine nitrogen removed may not be readily available. This will be determined through N removed research and crop yield will serve as a placeholder until nitrogen removed data is made available.

¹⁸ 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 Progress Report.

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.

F. Surface Water Exceedance Reports

The third-party 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 third-party 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 third-party 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 third-party shall send the Exceedance Report by email to the third-party'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 third-party may take to address the exceedance. Upon request, the third-party 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 location's watershed area. For toxicity exceedances, the investigation must include all 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 Members within the same drainage area. Results of the pesticide use investigation must be summarized and discussed in the Monitoring Report.

VI. Templates – Third Party and Group Options

The Order provides the option for the third-party to develop templates as an alternative to templates provided by the Central Valley Water Board's Executive Officer. This section describes the minimum requirements that must be met prior to approval of those templates.

Prior to 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 third-party 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 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

Should the third-party choose to develop a Farm Evaluation Template per the Third-Party or Group Option outlined in section VIII.C.1 of the Order, the following provisions apply.

The third-party must develop a template or web-based information system to gather Farm Evaluation information from Members for each parcel enrolled. The goal of the template is to

gather information on general site conditions and Member management practices in place to protect water quality. At a minimum, the template must be designed to collect the following information.

- Identification of the crops grown and acreage of each crop.
- Location of the farm.
- The number of drinking water supply wells associated with each enrolled APN.
- Identification of on-farm management practices, with the exception of irrigation methods and irrigation management practices and nitrogen management practices (which are to be reported on the INMP Summary Report) 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. On-farm management practices should include pest management application practices and sediment and erosion control practices.
- Identification of whether or not there is movement of soil during storm events and/or during irrigation drainage events (sediment and erosion risk areas) and a description of where this occurs.
- Identification of whether or not water leaves the property and is conveyed downstream and a description of where this occurs.
- Identification of whether or not one or more of the fields managed by the Member are in an area requiring a SQMP or GQMP.
- Location of in-service wells and abandoned wells. Identification of whether wellhead protection and backflow prevention practices have been implemented.

As part of its submittal for approval, the third-party must identify the entities that participated in the development of any proposed Farm Evaluation Template.

B. Irrigation and Nitrogen Management Plan (INMP) and INMP Summary Report Templates

Should the third-party choose to develop a Nitrogen Management Plan Template per the Third-Party or Group Option outlined in section VIII.C.2 of the Order, the following provisions apply.

The third-party shall develop a template or web-based information system to gather Irrigation and Nitrogen Management Plan and Summary Report information from Members for each parcel enrolled. The goal of the template is to gather information needed to calculate the A/R ratio. At a minimum, the INMP template must be designed to collect the following information:

1. Crop year
2. Owner/Manager name
3. Whether Member was identified as an outlier for AR data in previous year
4. Irrigation management practices implemented
5. Nitrogen management practices implemented to minimize leaching past the root zone
6. Assessor Parcel Number (APN)
7. Field identification number
8. Acreage
9. Residual nitrogen in soil
10. Crop type

11. Crop production units
12. Crop age (permanent crops)
13. Total acreage
14. Irrigation method
15. Crop evapotranspiration (estimated)
16. Anticipated crop irrigation
17. Irrigation water nitrogen concentration
18. Projected yield (if appropriate to crop type)
19. Nitrogen recommended
20. Nitrogen applied in irrigation water
21. Applied fertilizers (products with guaranteed nutrient content)
22. Applied organic soil amendments (compost and manure where nutrient content is not guaranteed)
23. Total nitrogen applied
24. Primary and secondary crop harvest yield
25. Plan certification information

The Irrigation and Nitrogen Management Plan template must be developed by the third-party 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 Natural Resource Conservation Services (NRCS). In developing the template, the third-party should consider, to the extent appropriate, the major criteria established in Code 590 of the NRCS Nutrient Management document, including soil and plant tissue testing, nitrogen application rates, nitrogen application timing, consideration of organic nitrogen fertilizer, consideration of irrigation water nitrogen levels.

INMP Component (1) – Crop Year

The crop year shall be reported for the calendar year in which the crop is harvested.¹⁹

INMP Component (2) – Owner/Manager Name

The owner/manager name shall be reported as the name of the individual completing the INMP form. This may be the individual that owns or manages the farm, or the individual certifying the INMP.

INMP Component (3) – Outlier Status

Whether the Member was notified by the third-party that it was an outlier for AR data the prior year shall be indicated

INMP Component (4) – Irrigation Management Practices Implemented

Irrigation management practices implemented in the prior year shall be reported for each field/management unit

¹⁹ Some crops such as winter cereal grains and some citrus should report information based on the calendar year that the crop is harvested, even if fertilization occurs in the previous calendar year; all nitrogen application information should be provided for the crop harvest year, which may or may not be the same calendar year.

INMP Component (5) – Nitrogen Management Practices Implemented

Nitrogen management practices implemented in the prior year to minimize discharge of nitrogen past the root zone shall be reported for each field/management unit

INMP Component (6) – Assessor Parcel Number (APN)

The Assessor Parcel Number (APN) shall be reported for each field /management unit.

INMP Component (7) – Field Identification Number

The field identification number shall be reported for each field/management unit and corresponding APN.

INMP Component (8) – Acreage

The acreage shall be reported for each field identified by APN and field identification number.

INMP Component (9) – Residual Nitrogen in Soil

The residual nitrogen in soil shall be reported as nitrogen available to the crop during the growing season. This is estimated by analyzing soil samples.

INMP Component (10) – Crop Type

The crop type shall be reported as the name of the harvested crop (i.e. almonds, walnuts, table grapes, wine grapes, raisin grapes, canning tomatoes, fresh market tomatoes, etc.)

INMP Component (11) – Crop Production Units

The crop production units shall be reported as the standard production units for the reported crop (tons, pounds, bushels, bales, etc.).

INMP Component (12) – Crop Age (permanent crops)

The crop age shall be reported for any permanent crop, including orchards and vineyards, and measured in years.

INMP Component (13) – Total Acreage

The total acreage is the sum of the acreage for each field/management unit reported on the INMP.

INMP Component (14) – Irrigation Method

The irrigation method that is used the most for crop irrigation during the growing season (drip, furrow, sprinkler, flood, etc.) shall be the method reported. For example, a grower that uses sprinkler irrigation to germinate a crop from seeds and then converts to drip irrigation for the remainder of the season would report drip irrigation as the irrigation method.

INMP Component (15) – Crop Evapotranspiration

The crop evapotranspiration shall be reported as the total crop-specific evapotranspiration for the reported crop during the applicable growing period. This may be estimated using reference evapotranspiration multiplied by an appropriate crop coefficient. Alternatively, the third-party may provide crop appropriate average evapotranspiration values for use by their members.

INMP Component (16) – Anticipated Crop Irrigation

The anticipated crop irrigation can be estimated using the crop evapotranspiration, subtracting the anticipated rainfall and adjusting accordingly for distribution uniformity and leaching requirement for salinity. A simplified way to adjust for these is to divide by 0.85 such that:

$$\text{Anticipated Crop Irrigation (in)} = \frac{\text{ET}_c - \text{rainfall}}{0.85}$$

INMP Component (17) – Irrigation Water Nitrogen Concentration

The irrigation water nitrogen concentration shall be reported as parts per million (ppm) of all available forms of nitrogen. The concentration is estimated by analyzing an irrigation water sample to determine the available nitrogen content.

INMP Component (18) – Projected Yield

The projected yield should be reported as the projected yield per acre for the field(s)/management unit(s) for the upcoming season. The projected yield expectations will guide nitrogen management decisions.

INMP Component (19) – Nitrogen Recommended

The nitrogen recommended shall be reported as the estimated amount of available nitrogen needed to meet the projected yield. Crop recommendations from CDFA, UCCE, NRCS, commodity groups, or site-specific knowledge based on previous experience are appropriate for estimating the amount of nitrogen needed.

INMP Component (20) – Nitrogen Applied in Irrigation Water

The nitrogen applied in irrigation water shall be reported, in pounds per acre, as the estimated amount of nitrogen applied via irrigation water application. This estimate may be based on the anticipated/actual crop irrigation and the irrigation water nitrogen concentration. This estimate should be reported as nitrogen available throughout the crop season based on the amount of irrigation water applied to the crop. For a crop with an irrigation water nitrate concentration in ppm (or mg/L) and a crop irrigation in inches, the multiplier to determine nitrogen applied in irrigation water is 0.052 lbs-N/acre-inch for nitrate measured as nitrate, and 0.226 lbs-N/acre-inch for nitrate measured as nitrogen (e.g. A crop with 48 inches of applied water with a concentration of 5 ppm nitrate measured as nitrate would apply 5 ppm x 48 inches x 0.052 lbs-N/acre-inch, or 12.5 lbs-N/acre)

INMP Component (21) – Applied Fertilizers

The applied fertilizers are categorized as dry fertilizer, liquid fertilizer, organic fertilizer, foliar fertilizer, and any other type of fertilizer that has a guaranteed nutrient content, and shall be reported as the amount of the nitrogen portion of all applied synthetic fertilizers in pounds per acre.

INMP Component (22) – Applied Organic Soil Amendments (Compost and Manure where nutrient content is not guaranteed)

The applied organic soil amendments include compost and manure and should be reported as the amount of nitrogen available to the plant during the growing period in pounds per acre. Available nitrogen may be measured by testing the applied compost or manure materials or estimated using reference materials that are available for estimating nitrogen content. Caution should be exercised with land application of uncomposted materials, including uncomposted green waste, and other organic amendments containing a high carbon to nitrogen (C:N) ratio due to the potential for significant nitrogen sequestration. This sequestered nitrogen has the potential for bulk rapid release in a very short period of time. If the crop is not prepared to take up this rapid release, there is risk for nitrogen loss to the system.

INMP Component (23) – Total Nitrogen Applied

The total nitrogen applied shall be reported as the sum of the total nitrogen applied in irrigation water, synthetic fertilizers and organic soil amendments.

INMP Component (24) – Primary and Secondary Crop Harvest Yield

The crop harvest yield shall be reported for primary harvest and any secondary crop harvests. The harvest shall be reported in crop production units per acre (i.e. lbs/acre of almonds) and shall include all harvested materials removed from the field, including secondary harvests of rice straw or orchard prunings.

INMP Component (25) – Nitrogen Sequestered in Wood of Perennial Crops

The nitrogen sequestered in wood accounts for the storage of nitrogen in the woody growth of perennial crops such as almonds, peaches, pistachios, etc. The amount of nitrogen sequestered may vary depending on the age of the crop. This sequestered nitrogen shall be included in the nitrogen removed component of the A/R ratio. The third-party shall determine, through testing and research, or the review of existing research, the most appropriate values for annual nitrogen sequestration for those perennial crops that cover 95% of the acreage in perennial crops for use in the INMP Summary Reports due 1 March 2019.

INMP Component (26) – Irrigation and Nitrogen Management Plan Certification Information

The INMP certification information shall include the name of the plan certifier, the date of plan certification, and certification method used. Appropriate certification methods include certification as an INMP specialist,²⁰ self-certification via an approved training program, or self-certification by means of following site-specific recommendations provided by UCANR or NRCS.

The INMP certification shall include the following statement:

The person signing this Irrigation and Nitrogen Management Plan (INMP) certifies, under penalty of law, that the INMP was prepared under his/her direction and supervision, that the information and data reported is to the best of his/her knowledge and belief, true, accurate, and complete, and that he/she is aware that there are penalties for knowingly submitting false information. Where the person signing the INMP is not the Member,* he/she may rely on the information and data provided by the Member and is not required to independently verify the information and data.

The person signing the INMP below further certifies that he/she used sound irrigation and nitrogen management planning practices to develop irrigation and nitrogen application recommendations and that the recommendations are informed by applicable training for meeting the crop's agronomic needs while minimizing nitrogen loss to surface water and groundwater. Where the person signing the INMP is not the Member, he/she is not responsible for any damages, loss, or liability arising from subsequent implementation of the INMP by the Member in a manner that is inconsistent with the INMP's recommendations for nitrogen application. This certification does not create any liability for claims for environmental violations.

Certification:

I, _____, certify this INMP in accordance with the statement above.

²⁰ Described in section VII.D of the Order.

_____ (Signature)

If the certifier is not the Member, the Member additionally agrees as follows:

I, _____, Member, have provided information and data to the certifier above that is, to the best of my knowledge and belief, true, accurate, and complete, that I understand that the certifier may rely on the information and data provided by me and is not required to independently verify the information and data, and that I further understand that the certifier is not responsible for any damages, loss, or liability arising from subsequent implementation of the INMP by me in a manner that is inconsistent with the INMP's recommendations for nitrogen application. I further understand that the certification does not create any liability for claims for environmental violations.

_____ (Signature)

*The Member is the owner or operator of irrigated lands within the Eastern San Joaquin River Watershed that is a member of the third-party group implementing this Order.

In addition to the Irrigation and Nitrogen Management Plan Template, the third-party must provide a template for the Irrigation and Nitrogen Management Plan Summary Report.

Select data from the INMP template will be used to complete the INMP Summary Report. Data collected from the INMP Summary Report will be reported annually to the third-party and the Central Valley Water Board. At a minimum, the INMP Summary Report template must collect the following information:

1. Crop Year
2. Owner/Manager name
3. Assessor Parcel Number (APN)
4. Field identifier
5. Acreage for each field identified
6. Acknowledgement of receipt of outlier notification
7. Crop type
8. Crop age (permanent crops)
9. Irrigation method
10. Irrigation management practices implemented
11. Nitrogen management practices implemented
12. Total Acreage
13. Nitrogen Applied (lbs/acre)
 - a. Irrigation Water
 - b. Synthetic Fertilizers
 - c. Organic Amendments
14. Crop Yield (units specified by third-party)

15. Certification method

As part of its submittal for approval, the third-party must identify the entities that participated in the development of the Irrigation and Nitrogen Management Plan Template.

C. Sediment and Erosion Control Plan Template

Should the third-party choose to develop the Sediment and Erosion Control Plan Template per the Group Option outlined in section VIII.C of the Order, the following provisions apply.

The third-party will create a template to assist Members that must prepare a Sediment and Erosion Control Plan. The goal of the template shall be to assist Members in achieving the farm management performance standards of the Order, which include the requirement to minimize or eliminate the discharge of sediment above background levels. At a minimum, the template must be designed to facilitate Member consideration of the following.

- Identification of locations subject to erosion or locations subject to frequent water flow events that may mobilize sediment (sediment and erosion risk areas). Locations to be evaluated include the fields, roads or stream crossings within the enrolled parcel, and discharge points from the field.
- Identification of practices implemented at sediment and erosion risk areas to minimize or eliminate the discharge of sediment above background levels.

As part of its submittal for approval, the third-party must identify the entities that participated in the development of the Sediment and Erosion Control Plan Template.

VII. Sediment Discharge and Erosion Assessment Report

The third-party shall prepare a Sediment Discharge and Erosion Assessment Report. The report shall be submitted to the Executive Officer for review. The goal of the report is to determine which irrigated agricultural areas within the Eastern San Joaquin River Watershed are subject to erosion and may discharge sediment that may degrade surface waters. The objective of the report is to determine which Member operations are within such areas, and need to develop a Sediment and Erosion Control Plan. The report must be developed to achieve the above goal and objective and must at a minimum, provide a description of the sediment and erosion areas as a series of ArcGIS shapefiles with a discussion of the methodologies utilized to develop the report.

VIII. 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) 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 5 of this MRP lists Basin Plan numeric water quality objectives and NTR/CTR criteria for constituents of concern that may be discharged by Members.

Table 5 does not include water quality criteria that may be used to interpret narrative water quality objectives, which shall be considered trigger limits. Trigger limits 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.

IX. Quality Assurance Project Plan (QAPP)

The third-party 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 East San Joaquin Water Quality Coalition's existing QAPP was approved by the Executive Officer on 25 November 2008. The existing QAPP is acceptable for use by the third-party. Any necessary modifications to the QAPP for groundwater monitoring shall be submitted with the MPEP and groundwater trend monitoring workplans (section IV, MRP). Any proposed modifications to the approved QAPP must receive Executive Officer approval prior to implementation.

The Central Valley Water Board may conduct an audit of the third-party's contracted laboratories at any time in order to evaluate compliance with the most current version of the 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.

Table 5. Basin Plan Numeric Water Quality Objectives for the Eastern San Joaquin River Watershed. * Where more than one objective is applicable, the most stringent shall be applied.

Constituent / Parameter (Synonym)	Basin Plan Water Quality Objective	Source of Numeric Threshold (footnotes in parentheses are at bottom of table)	Numeric Threshold (a)	Units	G= Groundwater IS= Inland Surface Water	Numeric Threshold Protects Designated Beneficial Use(s) in the Water Body:							CAS Number
						Groundwater			Inland Surface Waters				
						MUN- MCL	MUN- Toxicity	AGR	MUN- MCL	MUN- Toxicity	Aquatic Life & Consump	AGR	
Boron, total	Chemical Constituents	Basin Plan. SJR, mouth of Merced R to Vernalis (15 Mar – 15 Sep)	2,000	ug/L	IS							X	7440-42-8
		Basin Plan. SJR, mouth of Merced R to Vernalis (15 Mar – 15 Sep)	800 (b)	ug/L	IS							X	
		Basin Plan. SJR, mouth of Merced R to Vernalis (16 Sep – 14 Mar)	2,600	ug/L	IS							X	
		Basin Plan. SJR, mouth of Merced R to Vernalis (16 Sep – 14 Mar)	1,000 (b)	ug/L	IS							X	
		Basin Plan. SJR, mouth of Merced R to Vernalis (critical year) (c)	1,300 (b)	ug/L	IS							X	
		Basin Plan. SJR from Sack Dam to mouth of Merced River	5,800	ug/L	IS							X	
		Basin Plan. SJR from Sack Dam to mouth of Merced River	2,000 (b)	ug/L	IS							X	
Chlorpyrifos	Pesticides	Basin Plan. SJR from Mendota Dam to Vernalis; 1-hour average	0.025	ug/L	IS						X	2921-88-2	
		Basin Plan. SJR from Mendota Dam to Vernalis; 4-day average	0.015	ug/L	IS						X		
Coliform, fecal	Bacteria	Basin Plan (d) (e)	200/100	MPN/mL	IS				X			--	
		Basin Plan (d) (f)	400/100	MPN/mL	IS				X				
Coliform, total	Bacteria	Basin Plan	2.2/100	MPN/mL	G	X						--	
Conductivity at 25 C (Electrical conductivity)	Salinity	Basin Plan. SJR, Friant Dam to Mendota Pool	150	umhos/cm	IS							--	
		California Secondary MCL	900-1600	umhos/cm	G & IS	X	X		X	X			
Copper	Chemical Constituents	California Secondary MCL (total copper)	1,000	ug/L	G & IS	X			X	X		7440-50-8	
	Toxicity	California Toxics Rule (USEPA), (g) (dissolved copper)	variable	ug/L	IS					X			
Diazinon	Pesticides	Basin Plan. SJR from Mendota Dam to Vernalis; 1-hour average	0.16	ug/L	IS						X	50-29-3	
		Basin Plan. SJR from Mendota Dam to Vernalis; 4-day average	0.10	ug/L	IS						X		
Dissolved Oxygen, minimum	Dissolved Oxygen	Basin Plan. Merced R from Cressy to New Exchequer Dam, all year	8.0	mg/L	IS						X	7782-44-7	
		Basin Plan. Tuolumne R, Waterford to La Grange, 15 Oct – 15 Jun	8.0	mg/L	IS						X		
		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		
Lead	Chemical Constituents	California Primary MCL (total lead)	15	ug/L	G & IS	X			X			7439-92-1	
	Toxicity	California Toxics Rule (USEPA) (g) (dissolved lead)	variable	ug/L	IS					X			

Constituent / Parameter (Synonym)	Basin Plan Water Quality Objective	Source of Numeric Threshold (footnotes in parentheses are at bottom of table)	Numeric Threshold (a)	Units	G= Groundwater IS= Inland Surface Water	Numeric Threshold Protects Designated Beneficial Use(s) in the Water Body:							CAS Number
						Groundwater			Inland Surface Waters				
						MUN- MCL	MUN- Toxicity	AGR	MUN- MCL	MUN- Toxicity	Aquatic Life & Consump	AGR	
Molybdenum, total	Chemical Constituents	Basin Plan. SJR, mouth of Merced R to Vernalis	15	ug/L	IS							X	7439-98-7
		Basin Plan. SJR, mouth of Merced R to Vernalis (monthly mean)	10	ug/L	IS							X	
		Basin Plan. SJR, Sack Dam to mouth of Merced R	50	ug/L	IS							X	
		Basin Plan. SJR, Sack Dam to mouth of Merced R (monthly mean)	19	ug/L	IS							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	G & IS	X	X		X	X			--
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			
Selenium, total	Chemical Constituents	Basin Plan. SJR, mouth of Merced R to Vernalis	12	ug/L									7782-49-2
		Basin Plan. SJR, mouth of Merced R to Vernalis (4-day mean)	5	ug/L									
		Basin Plan. SJR, Sack Dam to mouth of Merced R	20	ug/L									
		Basin Plan. SJR, Sack Dam to mouth of Merced R (4-day mean)	5	ug/L									
	Toxicity	National Toxics Rule (USEPA), 4-day mean	50	ug/L	G & IS	X			X				
			5	ug/L	IS						X		
Simazine	Chemical Constituents	California Primary MCL	4	ug/L	G & IS	X	X		X	X			122-34-9
Temperature	Temperature	Basin Plan (h)	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								

Constituent / Parameter (Synonym)	Basin Plan Water Quality Objective	Source of Numeric Threshold (footnotes in parentheses are at bottom of table)	Numeric Threshold (a)	Units	G= Groundwater IS= Inland Surface Water	Numeric Threshold Protects Designated Beneficial Use(s) in the Water Body:							
						Groundwater			Inland Surface Waters				
						MUN- MCL	MUN- Toxicity	AGR	MUN- MCL	MUN- Toxicity	Aquatic Life & Consump	AGR	CAS Number
Zinc	Chemical Constituents	California Secondary MCL (total zinc)	5,000	ug/L	G & IS	X			X				7440-66-6
Zinc	Toxicity	California Toxics Rule (USEPA) (g) (dissolved zinc)	variable	ug/L	IS						X		

Footnotes to Table 8:

a	Numeric thresholds are maximum levels unless noted otherwise.
b	Monthly mean.
c	See Basin Plan for definition of Critical Year.
d	Applies in waters designated for contact recreation (REC-1).
e	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.
f	No more than ten percent of the total number of samples taken during any 30-day period shall exceed this number.
g	These numeric thresholds are hardness dependent. As hardness increases, water quality objectives generally increase.
h	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
fw	freshwater
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 with default selection of drinking water MCL when available
MUN-Toxicity	Municipal or domestic supply with consideration of human toxicity thresholds that are more stringent than drinking water MCLs

Monitoring and Reporting Program R5-2012-0116-08

Appendix MRP-1

Management Plan Requirements

Surface Water and Groundwater

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MRP - 1: Management Plan Requirements for Surface Water and Groundwater

I. Management Plan Development and Required Components

This appendix describes requirements for the development of water quality management plans under Waste Discharge Requirements General Order for Growers within the Eastern San Joaquin River Watershed that are Members of the Third-Party Group, Order R5-2012-0116-08 (hereafter "Order"). When a management plan has been triggered, the third-party shall ascertain whether or not irrigated agriculture is known to cause or contribute to the "water quality problem" (as defined in Attachment E). If the potential source(s) of the water quality exceedance(s) is unknown, the third-party may propose studies to be conducted to determine the cause, or to eliminate irrigated agriculture as a potential source (see Source Identification Study Requirements in section I.G. below).

When a Surface Water or Groundwater Quality Management Plan (SQMP/GQMP) has been triggered, the management plan shall contain the required elements presented and discussed in the following sections. The third-party may develop one SQMP or GQMP to cover all areas where plans have been triggered rather than developing separate management plans for each management area where plans have been triggered. The third-party would maintain the overarching plan as new information is collected, potentially triggering additional management areas and completion of other management areas.

If multiple constituents of concern (COCs) are to be included in a single management plan, a discussion of the prioritization process and proposed schedule shall be included in the plan. Prioritization schedules must be consistent with requirements described in section XII of the Order, Time Schedule for Compliance.

If a number of management plans are triggered, the third-party shall submit a SQMP/GQMP prioritization list to the Central Valley Water Board Executive Officer. This list may prioritize the order of SQMP/GQMP development based on, for example, 1) the potential to harm public health; 2) the beneficial use affected; and/or 3) the likelihood of meeting water quality objectives by implementing management practices. Prioritization schedules shall be consistent with requirements described in section XII of this Order, Time Schedule for Compliance. The third-party may continue to utilize the surface water quality prioritization process described in the East San Joaquin Water Quality Coalition's Management Plan Strategy,¹ as approved by the Executive Officer. The Executive Officer may approve or require changes be made to the SQMP/GQMP priority list. The third-party shall implement the prioritization schedule approved by the Executive Officer.

A. Introduction and Background Section

The introduction portion of the management plan shall include a discussion of the COCs that are the subject of the plan and the water quality objective(s) or trigger(s) requiring preparation of the management plan. The introduction shall also include an identification (both narrative and in map form) of the boundaries (geographic and surface water/ groundwater basin[s] or portion of a basin) to be covered by the management plan including how the boundaries were delineated.

¹ The East San Joaquin Water Quality Coalition Management Plan, with Addendum, was submitted on 24 November 2008 and approved by the Executive Officer on 25 November 2008. References to this Management Plan include the original 24 November 2008 submittal and subsequent changes and updates approved by the Executive Officer.

For groundwater, previous work conducted to identify the occurrence of the COCs (e.g., studies, monitoring conducted) should be summarized for the GQMP area.

B. Physical Setting and Information

1. General Requirements

The management plan needs to provide a discussion of the physical conditions that affect surface water (for a SQMP) or groundwater (for a GQMP) in the management plan area and the associated existing data. At a minimum, the discussion needs to include the following:

- a. Land use maps which identify the crops being grown in the SQMP watershed or GQMP area. For groundwater, these maps may already be presented in the Groundwater Assessment Report (GAR) and may be referenced and/or updated as appropriate. Map(s) must be in electronic format using standard Arc-geographic information system (ArcGIS shapefiles).
- b. Identification of the potential irrigated agricultural sources of the COC(s) for which the management plan is being developed. If the potential sources are not known, a study may be designed and implemented to determine the source(s) or to eliminate irrigated lands as a potential source. Requirements for source identification studies are given in section I.G below. In the alternative, instead of conducting a source identification study, the third-party may develop a management plan for the COC(s) that meets the management plan requirements as specified in this appendix.
- c. A list of the designated beneficial uses as identified in the applicable Basin Plan.
- d. A baseline inventory of identified existing management practices in use within the management plan area that could be affecting the concentrations of the COCs in surface water and/or groundwater (as applicable) and locations of the various practices.
- e. A summary, discussion, and compilation of available surface water and/or groundwater quality data (as applicable) for the parameters addressed by the management plan. Available data from existing water quality programs may be used, including but not limited to: Surface Water Ambient Monitoring Program (SWAMP), California State Water Resources Control Board (State Water Board) Groundwater Ambient Monitoring Assessment (GAMA) Program, United States Geological Survey (USGS), California Department of Public Health (DPH), California Department of Pesticide Regulation (DPR), California Department of Water Resources (DWR), and local groundwater management programs. The GAR developed for the third-party's geographic area, and groundwater quality data compiled in that document, may serve as a reference for these data.

2. Surface Water – Additional Requirements

The SQMP shall also include a description of the watershed areas and associated COC being addressed by the plan. For a water body that is representative of other water bodies, those areas being represented must also be identified in the SQMP.

3. Groundwater – Additional Requirements

The GQMP shall include:

- a. Soil types and other relevant soils data as described by the appropriate Natural Resources Conservation Service (NRCS) soil survey or other applicable studies. The soil unit descriptions and a map of their areal extent within the study area must be included. The GAR developed for the third-party's geographic area, and the soils mapping contained in that document, may satisfy this requirement.

- b. A description of the geology and hydrogeology for the area covered by the GQMP. The description shall include:
 - i. Regional and area specific geology, including stratigraphy and existing published geologic cross-sections.
 - ii. Groundwater basin(s) and sub-basins contained within the GQMP area, including a discussion of their general water chemistry as known from existing publications, including the GAR (range of electrical conductivity [conductivity at 25 C, EC], concentrations of major anions and cations, nutrients, total dissolved solids [TDS], pH, dissolved oxygen and hardness). The discussion should reference and provide figures of existing Piper (tri-linear) diagrams, Stiff diagrams and/or Durov Diagrams for the GQMP area (see definitions contained in Attachment E of the Order).
 - iii. Known water bearing zones, areas of shallow and/or perched groundwater, as well as areas of discharge and recharge to the basin/sub-basin in the GQMP area (rivers, unlined canals, lakes, and recharge or percolation basins).
 - iv. Identification of which water bearing zones within the GQMP area are being utilized for domestic, irrigation, and municipal water production.
 - v. Aquifer characteristics such as depth to groundwater, groundwater flow direction, hydraulic gradient, and hydraulic conductivity, as known or estimated based on existing information (see definitions contained in Attachment E of the Order).
- c. Identification, where possible, of irrigation water sources (surface water origin and/or groundwater) and their available general water chemistry (range of EC, concentrations of major anions and cations, nutrients, TDS, pH, dissolved oxygen and hardness).

C. Management Plan Strategy

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

1. A description of the approach to be utilized by the management plan (e.g., multiple COC's addressed in a scheduled priority fashion, multiple areas covered by the plan with a single area chosen for initial study, or all areas addressed simultaneously [area wide]). Any prioritization included in the management plan must be consistent with the requirements in section XII of the Order, Time Schedule for Compliance.
2. The plan must include actions to meet the following goals and objectives:
 - a. Compliance with the Order's receiving water limitations (section III of the Order).
 - b. Educate Members about the sources of the water quality exceedances in order to promote prevention, protection, and remediation efforts that can maintain and improve water quality.
 - c. Identify, validate, and implement management practices to reduce loading of COC's to surface water or groundwater, as applicable, thereby improving water quality.
3. Identify the duties and responsibilities of the individuals or groups implementing the management plan. This section should include:
 - a. Identification of key individuals involved in major aspects of the project (e.g., project lead, data manager, sample collection lead, lead for stakeholder involvement, quality assurance manager).
 - b. Discussion of each individual's responsibilities.
 - c. An organizational chart with identified lines of authority.

4. Strategies to implement the management plan tasks.
 - a. Identify the entities or agencies that will be contacted to obtain data and assistance.
 - b. Identify management practices used to control sources of COCs from irrigated lands that are 1) technically feasible; 2) economically feasible; 3) proven to be effective at protecting water quality, and 4) will comply with sections III.A and B of the Order. Practices that growers will implement must be discussed, along with an estimate of their effectiveness or any known limitations on the effectiveness of the chosen practice(s); ineffective practices should also be discussed. Practices identified may include those that are required by local, state, or federal law. Where an identified constituent of concern is a pesticide that is subject to DPR's Groundwater Protection Program, the GQMP may refer to DPR's regulatory program for that pesticide and any requirements associated with the use of that pesticide provided that the requirement(s) are sufficient to meet water quality objectives.
 - c. Identify outreach that will be used to disseminate information to participating growers. This discussion shall include: the strategy for informing growers of the water quality problems that need to be addressed, method for disseminating information on relevant management practices to be implemented, and a description of how the effectiveness of the outreach efforts will be evaluated. The third-party may conduct outreach efforts or work with the assistance of the County Agricultural Commissioners, U.C. Cooperative Extension, Natural Resources Conservation Service, Resource Conservation District, California Department of Food and Agriculture, or other appropriate groups or agencies.
 - d. A specific schedule and milestones for the implementation of management practices and tasks outlined in the management plan. Items to be included in the schedule include: time estimated to identify new management practices as necessary to meet the Order's surface and groundwater receiving water limitations (section III of the Order); a timetable for implementation of identified management practices (e.g., at least 25% of growers identified must implement management practices by year 1; at least 50% by year 2).
 - e. Establish measureable performance goals that are aligned with the elements of the management plan strategy. Performance goals include specific targets that identify the expected progress towards meeting a desired outcome. The performance goals shall include any developed GWP Targets.

D. Monitoring Methods

1. General Requirements

The monitoring system must be designed to measure effectiveness at achieving the goals and objectives of the SQMP or GQMP and capable of determining whether management practice changes made in response to the management plan are effective and can comply with the terms of the Order.

Management practice-specific or commodity-specific field studies may be used to approximate the contribution of irrigated lands operations. Where the third-party determines that field studies are appropriate or the Executive Officer requires a technical report under CWC 13267 for a field study, the third-party must identify a reasonable number and variety of field study sites that are representative of the particular management practice being evaluated.

2. Surface Water – Additional Requirements

The strategy to be used in the development and implementation of the monitoring methods for surface water should address the general requirements and, at a minimum, include the following elements:

- a. The location(s) of the monitoring site and schedule (including frequencies) for monitoring should be chosen to be representative of the COC discharge to the watershed.
- b. Surface water monitoring data must be submitted electronically per the requirements given in section III.D of the MRP.

3. Groundwater – Additional Requirements

The third-party's Management Practice Evaluation Program and Groundwater Quality Trend Monitoring shall be evaluated to determine whether additional monitoring is needed in conjunction with the proposed management strategy(ies) to evaluate the effectiveness of the strategy(ies). This may include commodity-based representative monitoring that is conducted to determine the effectiveness of management practices implemented under the GQMP. Refer to section IV of the MRP for groundwater monitoring requirements.

E. Data Evaluation

Methods to be used to evaluate the data generated by SQMP/GQMP monitoring and to evaluate the effectiveness of the implemented management practices must be described. The discussion should include at a minimum, the following:

1. Methods to be utilized to perform data analysis (graphical, statistics, modeling, index computation, or some combination thereof).
2. Identify the information necessary to quantify program effectiveness going forward, including the tracking of management practice implementation, $A/R_{3\text{ year}}$ ratio results, and GWP Targets where appropriate. The approach for determining the effectiveness of the management practices implemented must be described and when appropriate related to changes in $A/R_{3\text{ year}}$ results. Acceptable approaches include field studies of management practices at representative sites and modeling or assessment to associate the degree of management practice implementation to changes in water quality. The process for tracking implementation of management practices and $A/R_{3\text{ year}}$ ratio results must also be described. The process must include a description of how the information from the Farm Evaluation, Management Practice Implementation Report (MPIR), and INMP Summary Report is collected from growers, how the information will be verified, and how the information will be reported.

F. Records and Reporting

By 1 May of each year, the third-party must prepare a Management Plan Progress Report that summarizes the progress in implementing management plans. The Management Plan Progress Report must summarize the progress for the hydrologic water year.² The Management Plan Progress Report shall include the following components:

- (1) Title page
- (2) Table of contents
- (3) Executive Summary

² A hydrologic water year is defined as 1 October through 30 September.

- (4) Location map(s) and a brief summary of management plans covered by the report
- (5) Updated table that tallies all exceedances for the management plans
- (6) A list of new management plans triggered since the previous report
- (7) Status update on preparation of new management plans
- (8) A summary and assessment of management plan monitoring data collected during the reporting period including a list of management practices recommended
- (9) A summary of management plan grower outreach conducted
- (10) A summary of the degree of implementation of management practices by growers within the management plan area
- (11) Results from evaluation of management practice effectiveness, including the $A/R_{3 \text{ year}}$ ratio when evaluating a GQMP
- (12) An evaluation of progress in meeting performance goals and schedules
- (13) Any recommendations for changes to the management plan

Pursuant to Section VII.G of the Order, the third-party must additionally require submission of a Management Practice Implementation Report (MPIR) by members according to a schedule to be specified by the third-party for each SQMP or GQMP and approved by the Executive Officer.

G. Source Identification Study Requirements

Should the third-party conduct a Source Identification Study to comply with this Order, the third-party must first receive approval from the Executive Officer. Once approved, the third party may proceed with its study.

The minimum components for a source identification study are:

- (1) An evaluation of the types of practices, commodities, and locations that may be a source
- (2) Continued monitoring at the management plan site/area and increased monitoring if appropriate.
- (3) An assessment of the potential pathways through which waste discharges can occur.
- (4) A schedule for conducting the study.

Commodity specific and/or management practice specific field studies (including edge-of field studies) may be required to approximate the contribution of irrigated agriculture. At a minimum, the third-party must evaluate the feasibility of field studies as part of their source identification study proposal. Where field studies are deemed appropriate, the third-party should identify a reasonable number and variety of field study sites that are representative of the particular commodity or management practice being evaluated. If field studies are not proposed, the third-party must demonstrate how the alternative source identification method will produce data or information that will enable the determination of contributions from irrigated agricultural operations to the water quality problem.

If an approved study shows that irrigated lands are not a source, then the third-party can request the Executive Officer to approve completion of the associated management plan. Where irrigated lands are identified as a source, a full SQMP/GQMP shall be prepared and implemented.

II. Approval and Review of the Management Plan

The following discussion describes the review and approval process for draft management plans submitted to the Executive Officer for approval. Any proposed changes to the management plan must be approved by the Executive Officer prior to implementation.

- a. Water quality management plan approval – Prior to Executive Officer approval of any management plan, the Central Valley Water Board will post the draft management plan 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 third-party and after consideration of comments provided by other interested stakeholders, the Central Valley Water Board's Executive Officer will either: (1) approve the management plan; (2) conditionally approve the management plan or (3) disapprove the management plan. Review of the management plan and the associated action by the Executive Officer will be based on findings as to whether the plan meets program requirements and goals and contains all of the information required for a management plan.
- b. Periodic review of water quality management plans – At least once every five years, the Central Valley Water Board intends to review available data to determine whether the approved management plan is resulting in water quality improvements. Central Valley Water Board staff will meet with the third-party and other interested parties to evaluate the sufficiency of management plans. Based on input from all parties, the Executive Officer will determine whether and how the management plan should be updated based on new information and progress in achieving compliance with the Order's surface or groundwater receiving water limitations, as applicable (see section III of the Order). The Executive Officer also may require revision of the management plan based on available information indicating that irrigated agriculture waste discharges are not in compliance with surface or groundwater receiving water limitations (as applicable) of the Order. The Executive Officer may also require revision to the management plan if available information indicates that degradation of surface and/or groundwater calls for the inclusion of additional areas, constituents of concern(s), or improved management practices in the management plan. During this review, the Executive Officer will make one of the findings described below:
 1. Adequate progress – The Executive Officer will make a determination of adequate progress in implementing the plan if water quality improvement milestones and compliance time schedules have been met or the surface/groundwater receiving water limitations of the Order are met.
 2. Inadequate progress – The Executive Officer will make a determination of inadequate progress in implementing the plan if the Order's surface or groundwater receiving water limitations are not being met; and water quality improvement milestones and compliance time schedules in the approved management plan have not been met.

The actions taken by the Executive Officer upon a determination of inadequate progress include, but are not limited to one or more of the following for the area in which inadequate progress has been made:

- Management practice field monitoring studies – The third-party may be required to develop and implement a field monitoring study plan to characterize the commodity-specific discharge of the constituent of concern and evaluate the pollutant reduction efficacy of specific management practices. Based on the study and evaluation, the Executive Officer may require

the SQMP/GQMP to be revised to include additional practices to achieve compliance with the Order's surface and groundwater receiving water limitations.

- Independent, on-site verification of implementation of management practices and evaluation of their adequacy.
- Individual WDRs or waiver of WDRs – The board may revoke the third-party coverage for individual irrigated agricultural operations and require submittal of a report of waste discharge.

III. Management Plan Completion

Management Plans can be completed in one of two ways. The first way a Management Plan can be completed is if an approved source study shows that irrigated agriculture is not causing or contributing to the water quality problem. The second way a Management Plan can be completed is if the improved management practices have resolved the water quality problem.

The goal of all management plans is to identify the source(s) of COCs, track the implementation of effective management practices, and ultimately ensure that irrigated agriculture waste discharges are meeting the surface and groundwater receiving water limitations of the Order. If an approved source study shows that irrigated agriculture is not a source, then the third-party can request the Executive Officer to approve completion of the associated management plan.

A request for approval of completion of a management plan due to improved management practices will require credible evidence that the water quality problem has been resolved. The Executive Officer will evaluate each request on a case-by-case basis. The following key components must be addressed in the request:

- a) Demonstration through evaluation of monitoring data that the water quality problem is no longer occurring (i.e., 3 or more years with no exceedances during the times of the year when previous exceedances occurred) or demonstrated compliance with the Order's surface and groundwater receiving water limitations.
- b) Documentation of third-party education and outreach to applicable Members in the watershed where water quality impairment occurred.
- c) Documentation of Member implementation of management practices that address the water quality exceedances.
- d) Demonstration that the management practices implemented by Members are effective in addressing the water quality problem.

Management plans may be completed for all or some of the constituents that prompted preparation of the management plan. When Executive Officer approval is given for completion of one or more management plan constituents, each constituent shall revert to regular, ongoing monitoring requirements (as described in the MRP). The third-party must also continue tracking on-going implementation of appropriate management practices by growers, which may be done through the Farm Evaluation process.

Requests for management plan completion must summarize and discuss all information and data being used to justify completion. The third-party shall not discontinue any of the associated management plan requirements prior to Executive Officer approval of its completion request.