

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2014-XXXX
ATTACHMENT B TO ORDER R5-2014-XXXX
MONITORING AND REPORTING PROGRAM

WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
GROWERS WITHIN THE SACRAMENTO RIVER WATERSHED
THAT ARE MEMBERS OF A THIRD-PARTY GROUP

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Appendix MRP-1:	Third-Party Management Plan Requirements
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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 Sacramento River Watershed that are Members of the Third-Party Group, Order R5-2014-XXXX (hereafter referred to as the “Order”). This MRP applies to each third-party issued an NOA by the Executive Officer. The requirements of this MRP are necessary to monitor Member compliance with the provisions of the Order and determine whether state waters receiving discharges from Member parcels are meeting water quality objectives. Additional discussion and rationale for this MRP’s requirements are provided in Attachment A of the Order.

This MRP establishes specific surface and groundwater 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. The Central Valley Water Board or Executive Officer may revise this MRP as it applies to a third-party or all third-parties governed by the Order. The Central Valley Water Board or Executive Officer may rescind this MRP and issue a new MRP as it applies to a third-party or all third-parties governed by the Order.

II. GENERAL PROVISIONS

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

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

Monitoring data collected to meet the requirements of the Order must be collected and analyzed in a manner that assures the quality of the data. The 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 Officer¹.

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.

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

This MRP Order becomes effective on **DATE/TBD**. The Central Valley Water Board Executive Officer may revise this MRP as necessary. Upon the Executive Officer issuing the Notice of Applicability to the third-party, the third-party, on behalf of the individual Members, shall implement the following monitoring and reporting.

III. SURFACE WATER QUALITY MONITORING REQUIREMENTS

The surface water quality monitoring and reporting requirements in the MRP have been developed in consideration of the critical questions identified in the Information Sheet (Attachment A, section VI.A.1). The third-party must collect 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 surface water receiving water limitations of the Order.

A. SURFACE WATER MONITORING SITES

There are three types of monitoring sites described below: 1) Representative sites; 2) Integration sites; and 3) Special Project sites. Representative sites are monitored comprehensively on a recurring basis to track trends in surface water quality and to identify water quality problems. Integration sites are monitored comprehensively, four times every year to assess broad long term trends. Special Project sites are identified and monitored to investigate identified water quality problems. Special project sites may be selected and used for source identifications or evaluations, confirming whether problems identified at Representative sites occur in represented drainages, or evaluating effectiveness of implemented management practices. A Representative or Integration site may also be a Special Project site.

1. Representative Site Monitoring

The third-party shall ensure that Representative monitoring sites are representative of all areas and all types of irrigated agricultural waste discharge within the entire third-party area. Monitoring sites shall be located to characterize water flow, quality, and irrigated agricultural waste discharges within the entire third-party area. At a minimum, assessment monitoring (as described in section III.C.1) within each subwatershed shall be conducted at the designated Representative sites (see Table 1) for two consecutive years, followed by two consecutive years of monitoring consisting only of that required for surface water quality management plans (SQMP) or other Special Project monitoring. Exceptions to this monitoring schedule are allowed if a different approach has been required or approved by the Executive Officer (see section III.C.1). If a water quality objective or Trigger Limit is exceeded only once at a monitored Representative site during the two-year assessment period, the parameter associated with the exceedance must be monitored for a third consecutive year². Appendix MRP-3 provides an itemization of the drainages

² If two exceedances have occurred within the two years the Representative 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.

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without a monitoring site by subwatershed, as well as their accompanying Representative monitoring site(s). Any SQMP actions associated with the Representative site must also take place in the represented drainages.

2. Integration Site Monitoring

Three sites previously monitored by the Sacramento Valley Water Quality Coalition represent very large and diverse drainages, which are most suitable for identifying cumulative effects and long-term trends in water quality, and will be used as “Integration sites” (Table 1). Monitoring at these locations will be used to identify cumulative effects and long-term trends of agricultural drainage in the Sacramento River Watershed. The parameters monitored will be determined following the process described below in section III.C.3. Integration site monitoring will be conducted four times annually on an ongoing basis, twice following separate storm events in the rainy season and twice during irrigation season at times targeted to early and late in the irrigation season.

3. Special Project Sites

In addition to Representative and Integration sites, the third-party may designate additional 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,³ to evaluate sources of identified water quality problems, and to monitor continuing status of identified water quality problems.

In accordance with Water Code section 13267, 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). Representative 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 Representative, Integration and existing Special Project sites are identified in Table 1, below. The monitoring data collected through Representative site monitoring shall be considered representative of conditions in the drainages that are represented (Appendix MRP-3). When action(s) must be taken based on exceedances at the representative sites, such as management practice implementation, the same action(s) shall be taken throughout the irrigated lands being represented by the identified Representative sites.

Table 1. Sacramento Valley Water Quality Coalition Monitoring Sites

Site Identification	Site Code	Type*	Latitude	Longitude
Butte-Yuba-Sutter Subwatershed				
Lower Honcut Creek	LHNCT	REP	39.3092 N	-121.5954 W
Lower Snake River at Nuestro Road	LSNKR	REP	39.1853 N	-121.7036 W
Pine Creek at Highway 32	PNCHY	REP	39.7533 N	-121.9712 W
Butte Slough at Pass Road	BTTSL	SP	39.1873 N	-121.9085 W
Gilsizer Slough at George Washington Rd	GILSL	SP	39.0090 N	-121.6716 W

³ “Water quality problem” is defined in Attachment E.

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Table 1. Sacramento Valley Water Quality Coalition Monitoring Sites

Site Identification	Site Code	Type*	Latitude	Longitude
Wadsworth Canal at South Butte Road	WADCN	SP	39.1534 N	-121.7344 W
Colusa-Glenn Subwatershed				
Freshwater Creek at Gibson Road	FRSHC	REP	39.1748 N	-122.2265 W
Walker Creek near 99W and CR33	WLKCH	REP	39.6242 N	-122.1965 W
Butte Creek at Gridley Road Bridge	BUCGR	SP	39.3619 N	-121.8927 W
Logan Creek at 4 Mile-Excelsior Road	LGNCR	SP	39.3653 N	-122.1161 W
Lurline Creek at 99W	LRLNC	SP	39.2190 N	-122.2461 W
Rough and Ready Pumping Plant (Rd 108)	RARPP	SP	38.8621 N	-121.7927 W
Stone Corral Creek near Maxwell Road	SCCMR	SP	39.2751 N	-122.1043 W
Stony Creek on Hwy 45 near Road 24	STYHY	SP	39.7101 N	-122.0040 W
El Dorado Subwatershed				
North Canyon Creek	NRTCN	REP	38.7604 N	-120.7102 W
Lake Subwatershed				
Middle Creek upstream from Highway 20	MDLCR	REP	39.1764 N	-122.9130 W
McGaugh Slough at Finley Road East	MGSLU	SP	39.0042 N	-122.8623 W
Napa Subwatershed				
Pope Creek us from Lake Berryessa	PCULB	REP	38.6464 N	-122.3642 W
Capell Creek u/s from Lake Berryessa	CCULB	SP	38.4825 N	-122.2410 W
Pit River Subwatershed				
Pit River at Pittville	PRPIT	REP	41.0454 N	-121.3317 W
Pit River at Canby Bridge	PRCAN	SP	41.4017 N	-120.9310 W
Fall River at Fall River Ranch Bridge	FRRRB	SP	41.0351 N	-121.4864 W
Placer-Nevada-South Sutter-North Sacramento Subwatershed				
Coon Creek at Brewer Road	CCBRW	REP	38.9340 N	-121.4518 W
Coon Creek at Striplin Road	CCSTR	SP	38.8661 N	-121.5803 W
Sacramento-Amador Subwatershed				
Cosumnes River at Twin Cities Road	CRTWN	REP	38.2910 N	-121.3804 W
Grand Island Drain near Leary Road	GIDLR	REP	38.2399 N	-121.5649 W
Dry Creek at Alta Mesa Road	DCGLT	SP	38.2480 N	-121.2260 W
Laguna Creek at Alta Mesa Road	LAGAM	SP	38.3110 N	-121.2263 W
Shasta-Tehama Subwatershed				
Anderson Creek at Ash Creek Road	ACACR	REP	40.4180 N	-122.2136 W
Burch Creek west of Rawson Road	BRCRR	SP	39.9254 N	-122.2182 W
Coyote Creek at Tyler Road	COYTR	SP	40.0926 N	-122.1590 W
Solano Subwatershed				
Ulatis Creek at Brown Road	UCBRD	REP	38.3070 N	-121.7940 W
Z Drain	ZDDIX	SP	38.4522 N	-121.6752 W
Upper Feather River Subwatershed Monitoring Sites				
Middle Fk Feather River above Grizzly Ck	MFFGR	REP	39.8160 N	-120.4260 W
Spanish Creek below Greenhorn Creek	SPGRN	SP	39.9735 N	-120.9103 W

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Table 1. Sacramento Valley Water Quality Coalition Monitoring Sites

Site Identification	Site Code	Type*	Latitude	Longitude
Indian Creek below Arlington Bridge	INDAP	SP	40.0846 N	-120.9161 W
Yolo Subwatershed				
Willow Slough Bypass at Pole Line	WLSPL	REP	38.5902 N	-121.7306 W
Cache Creek at Capay Diversion Dam	CCCPY	SP	38.7137 N	-122.0851 W
Tule Canal at I-80	TCHWY	SP	38.5728 N	-121.5827 W
Integration and Trend Sites				
Sacramento Slough Bridge near Karnak	SSKNK	INT	38.7850 N	-121.6533 W
Colusa Basin Drain above Knights Landing	COLDR	INT	38.8121 N	-121.7741 W
Shag Slough at Liberty Island Bridge	SSLIB	INT	38.3068 N	-121.6934 W

* REP = Representative monitoring sites; INT = integration and trend monitoring sites; SP = special project monitoring sites

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, determine effectiveness of existing or newly implemented management practices, determine whether waste discharges from all represented types of irrigated agricultural operations comply with the receiving water limitations of the Order, and track any trends in degradation. Surface water assessment 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 Sacramento River Watershed are causing or contributing to any surface water quality problems.

Assessment monitoring shall occur at accessible Representative sites, when water is present, for general water quality parameters, nutrients, pathogen indicators, water column and sediment toxicity, pesticides, and metals identified in section III.C.3. The third party shall conduct appropriate monitoring when implementing an applicable Total Maximum Daily Load (TMDL). 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).⁴ The third-party shall continue monitoring as described in the Sacramento Valley Water Quality Coalition's December 2009 Monitoring and Reporting Program (R5-2009-0875), and as revised by the Executive Officer, until the Monitoring Plan Update has been approved. If there are no proposed or required changes to the existing Monitoring Program Plan or Monitoring Plan Update, the third-party is required to submit notification that no changes are being instituted and is not required to submit the Monitoring Plan Update. According to the 2009 Monitoring and Reporting Program, 2014 is an assessment monitoring year. Therefore, 2015 will be the second assessment year of the schedule specified in MRP Order R5-2014-XXXX.

⁴ A monitoring year is defined according to water year, which is 1 October through 30 September. December 2013

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a. Reduced Monitoring/Management Practices Verification Option

The third-party may propose to use the reduced monitoring/management practices verification option within a subwatershed (or regions within a subwatershed) that is deemed to have a lower potential for surface water quality impacts from irrigated agricultural discharges. A proposal must be submitted to the Executive Officer and approved prior to implementation of this option.

The Executive Officer may approve the reduced monitoring/management practices verification option if the following conditions are met as documented in the proposal submitted by the third-party:

- There is a low threat of pesticide discharges from irrigated lands causing or contributing to a surface water quality exceedance or trend of degradation.
- The parameters associated with any existing management plans in the subwatershed do not include toxicity, pesticides, copper, or nutrients.
- There is a low intensity of agricultural land use in the subwatershed.

At a minimum, the proposal should include the following elements:

- A description of the low threat of pesticide discharges, evaluated based on information such as the types of pesticides applied and their toxicity to aquatic life and human health; the relative amount of pesticide applied (considered by pounds or acres applied); the crops to which the pesticides are applied; and the timing of application.
- A description of the intensity of agricultural land use based on an evaluation of the types of agricultural crops/operations and the proportion of agricultural land use in the watershed.
- A summary of previous monitoring results that confirms a low threat to surface water quality and potential risks to water quality from irrigated agriculture.
- A description of the management practices that may be employed to prevent impacts to water quality and the extent to which those practices are being implemented, if known.
- A description of the education and outreach strategy that will promote the implementation and maintenance of appropriate management.
- A discussion of the strategy for verifying Member implementation of management practices that are protective of surface water quality. The strategy must provide for field verification of at least 5% of the irrigated acreage annually, on average.

A separate description must be provided for each defined area.

Upon approval of the modified monitoring approach, the third-party shall conduct assessment monitoring at approved Representative sites in the subwatershed area(s) once in every five (5) years. An exceedance of any pesticide, toxicity, copper, or nutrient water quality objective or trigger limit will require monitoring of that constituent for an additional two years. In addition, the third-party must receive Executive Officer approval for the continuation of this option for the subwatershed where the exceedance occurred. Any Special Project monitoring required for management plans or TMDLs for lower priority parameters (i.e., not toxicity, copper, pesticides, or nutrients) must continue. During the same year as assessment monitoring, Farm Evaluation survey information must also be collected from Members and reported as required in the Annual Monitoring Report. In each Annual Monitoring Report, the third-party must report on the implementation of the education and outreach strategy and the management practice verification strategy.

The modified monitoring approach will be in effect for five years from the approval date. The third-party may request that the Executive Officer approve renewal of this option for another five-year period for all or some of the designated areas. The Executive Officer's consideration of approval of renewal will be based on whether the conditions for the original approval are still met. The third-party may include an evaluation of the changes in conditions as a separate report or as part of the AMR submitted following the fourth year of implementation of this option. In its evaluation, the third-party shall include a review of trends in cropping patterns; changes in pesticide use; changes in enrolled Members; and trends in the proportion of agricultural land use in the subwatershed.

b. 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 Representative or Special Project site during non-scheduled years. Parameters of concern may include, but are not limited to, parameters that exceed an adopted water quality objective or water quality trigger (see section VI).

c. Storm Sampling

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. As part of the Monitoring Plan Update, the third-party shall identify storm runoff monitoring criteria that are based on, but not limited to, precipitation levels and knowledge of soils or other factors affecting when storm runoff is expected to occur at monitoring sites.

The third-party shall identify a schedule for conducting monitoring during the storm season (approximately October through March) to ensure the collection of the required storm samples when, and if, storm runoff occurs. Any needed adaptability in the proposed schedule should be described. Completeness and compliance will be assessed based on conducting the total number of required sample events per the approved Monitoring Plan Update.

2. Monitoring Schedule and Frequency

The third-party shall identify the appropriate assessment monitoring periods (e.g., months, seasons) for the 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 Representative and Integration 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. Adequate characterization of the presence of some pollutants may require monitoring more than once per month. 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

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lands to surface waters and to evaluate the effectiveness of implemented management practices. Water quality is evaluated with both field-measured parameters and laboratory analytical data as listed in Table 2 of this MRP.

The pesticides marked as “to be determined” (TBD) in Table 2 shall be identified as part of a process by Water Board staff that includes input from qualified scientists and coordination with the Department of Pesticide Regulation. Based on the evaluation factors identified in this process, the Executive Officer will provide the third-party with a list of pesticides⁵ that may require monitoring in areas where they are applied and have the potential to impair water quality. The third-party shall apply the evaluation factors to the relevant conditions in each sub-watershed and propose the pesticides to be monitored in its Monitoring Plan Update.

Parameters that are part of an adopted TMDL that is in effect and for which irrigated agriculture is a source within the Sacramento 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 Sacramento River Watershed for which irrigated agriculture is a potential or confirmed source include the Clear Lake nutrient TMDL, chlorpyrifos and diazinon TMDLs, and Delta methyl mercury TMDL.

The metals to be monitored at sites within each 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 and metal fractions warrant monitoring for each 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., previously approved Monitoring Plan Update), the third-party is only required to send written notification that there are no changes and is not required to submit a 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.

⁵ Pesticides to be monitored may include environmentally stable degradates of the registered active ingredient. The evaluation factors applied to degradates will be the same as those applied to the registered active ingredient and will include consideration of the commercial availability of analytical methods to detect the degradate. Potential degradates to evaluate will be identified through Central Valley Water Board and third-party consultation with the Department of Pesticide Regulation.

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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
General Physical	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
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	Water or Sediment	TBD

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Table 2. Monitoring Parameters

	Measured Parameter	Matrix	Required
	the Sacramento River Watershed and requested by the Executive Officer.		
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	As needed***
Grain Size	Sediment	x	

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

*** 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.D.4 below).

4. Toxicity Testing Procedures

The purpose of the 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* (water flea) and *Selenastrum capricornutum* (green alga) in the water column during each year of Assessment monitoring. *Pimephales promelas* toxicity shall be monitored during the first year of the assessment monitoring period, and must be monitored in the second year of assessment monitoring at

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sites where significant toxicity with *Pimephales* survival of $\leq 90\%$ of controls is observed in the first year. Testing for *C. dubia* and *P. promelas* shall follow the USEPA acute toxicity testing methods⁶. Testing for *S. capricornutum* shall follow the USEPA short-term chronic toxicity testing methods⁷. 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 TIE⁸ manipulations shall be conducted to determine the general class(es) (e.g., metals, non-polar organics, 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 aliquot of the original ambient sample, as defined in the freshwater toxicity testing manual.

Selenastrum capricornutum Pre-Test Treatment

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

⁶ 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.

⁷ 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.

⁸ 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.

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* (freshwater amphipod also known as Mexican scud) shall be conducted at each monitoring location established by the third-party for water quality assessment 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 shall be designated for all sediment collection and toxicity testing events. Sediment samples shall be collected and analyzed for toxicity twice per year when water is present. Attempts should be made to collect one sample between 15 August and 15 October, and one sample collected between 1 March and 30 April, during each year of Assessment monitoring for the monitoring site. The *H. azteca* sediment toxicity test endpoint is survival. The Executive Officer may request different sediment sample collection timing and frequency under a SQMP. The third-party may submit written requests to modify the monitoring schedule and frequency of sediment toxicity testing for approval by the Executive Officer.

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 statistically 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 pesticide use information 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 choose to follow up with sediment TIE procedures (USEPA 2007) when there is $\geq 50\%$ reduction in test organism mortality as compared to the laboratory control. Sediment TIEs are an optional tool that may be used to determine possible causes of toxicity. When sediment samples are collected for toxicity analysis, additional sample volume sufficient for the required chemical and physical follow-up analyses must be collected.

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). Special project monitoring may include, but is not limited to, specific targeted monitoring or studies to address implementation of a TMDL or implementation of a Management Plan that results from exceedances. 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 or implement a previously approved Special Project Monitoring proposal as directed by the Executive Officer. 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

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commodity and management practice specific field studies for those commodities and irrigated agricultural practices that could be associated with the constituents 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.

Based on previous monitoring results through 2012, the Sacramento Valley Water Quality Coalition has identified locations where Management Plans are currently required. These are identified as SP (special project) sites in Table 1. Appendix MRP-1 describes requirements for all Management Plans.

Special project monitoring constituents, frequency or other elements shall be reviewed with Central Valley Water Board staff at least annually and may be revised over time. Revisions of monitoring sites, constituents, schedule, and other elements for Management Plans that are approved by the Executive Officer will then supersede those in prior Management Plans.

D. SURFACE WATER DATA MANAGEMENT REQUIREMENTS

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

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

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

http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/electronic_data_submission/

Field Data Template (Required)

The third-party shall input all site visit information and field measurement results into the field data template, which is an Excel workbook. Site visit information (Location and Habitat) must be recorded for any site visit conducted to comply with the requirements in this Order, including

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events when a site is dry. The field data template contains three required worksheets (Locations, FieldResults, HabitatResults) and four optional worksheets (Stations, FundingCode, GroupCode and Personnel). An instruction manual for the template is available on the ILRP Electronic Data Submission webpage.

Chemistry Data Template (Required)

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

Toxicity Data Template (Required)

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

Electronic Quality Assurance Program Plan (eQAPP) (Required)

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

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

Field Sheet Template (Optional)

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

CV RDC Field Entry Shell Database (Optional)

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

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Format Quick Guide (Optional Tool)

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

EDD Checklist with example Pivots (Optional Tool)

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

Online Data Checker (Optional Tool)

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

IV. GROUNDWATER QUALITY MONITORING AND MANAGEMENT PRACTICE ASSESSMENT, AND EVALUATION REQUIREMENTS

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

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

1. The Groundwater Quality Assessment Report (GAR) provides the foundational information necessary for design of the Management Practices Evaluation Program and the Groundwater Quality Trend Monitoring Program. The GAR also identifies the high vulnerability groundwater areas where a Groundwater Quality Management Plan must be developed and implemented, as well as data gap areas for further evaluation.
2. The overall goal of the Management Practice Evaluation Program (MPEP) is to determine the effects, if any; irrigated agricultural practices have on first encountered groundwater under different conditions that could affect the discharge of waste from irrigated lands to groundwater (e.g., soil type, depth to groundwater, irrigation practice, crop type, nutrient management practice).
3. The overall objectives of the Groundwater Quality Trend Monitoring Program are to determine current water quality conditions of groundwater relevant to irrigated agriculture and develop long-term groundwater quality information that can be used to evaluate the regional effects of irrigated agricultural practices.

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

A. Groundwater Quality Assessment Report

The purpose of the Groundwater Quality Assessment Report (GAR) is to provide the technical basis informing the scope and level of effort for implementation of the Order's groundwater monitoring and implementation provisions. Three (3) months after 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. The third-party must review and update the GAR to incorporate new information every five (5) years after Executive Officer approval of the GAR.

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

- Provide an assessment of all readily available, applicable and relevant data and information to determine the high and low vulnerability areas where discharges from irrigated lands may result in groundwater quality degradation.
- Establish priorities for implementation of monitoring and studies within high vulnerability or data gap areas.
- Provide a basis for establishing Monitoring Workplans developed to assess groundwater quality trends.
- Provide a basis for establishing Management Practices Evaluation Program (MPEP) Workplans and priorities developed to evaluate the effectiveness of agricultural management practices to protect groundwater quality.
- Provide a basis for establishing groundwater quality management plans in high vulnerability areas and priorities for implementation of those plans.

2. *GAR components.* The GAR shall include, at a minimum, the following data components:

- Detailed land use information with emphasis on land uses associated with irrigated agricultural operations. The information shall identify the largest acreage commodity types in the third-party area, including the most prevalent commodities comprising up to at least 80% of the irrigated agricultural acreage in the third-party area. If the third-party manages the area through sub-watershed groups, the GAR information should be developed for each sub-watershed.
- Information regarding depth to groundwater, provided as a contour map(s), if readily available. Tabulated and/or graphical data from discrete sampling events may be submitted if limited data precludes producing a contour map.
- Groundwater recharge information, if readily available, including identification of 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 from existing monitoring networks (potential constituents of concern include any material applied as part of the agricultural

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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.
 - Describe 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/ 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 (e.g., irrigation method, crop type, nitrogen application and removal rates, extent of implementation, etc.). If the third-party intends to develop a Basin Plan Amendment Workplan (as described in section VIII.L of the Order), the third-party must identify the areas where a high vulnerability designation results from exceedances due to naturally elevated levels of a constituent. 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 considering information, such 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

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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 municipal and domestic supplies where groundwater serves as a significant source of supply.
- Existing field or operational practices identified to be associated with irrigated agriculture waste discharges that are the cause, or a contributing source.
- 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 or other technical references or regional evaluations may also be considered in designating and prioritizing vulnerability areas for groundwater. Such data include, but are not limited to, 1) published scientific studies, 2) hydrogeologic models, 3) data from areas with exceedances of water quality objectives for which irrigated agriculture waste discharges may cause or contribute to the exceedance, 4) those areas that have been identified by the State Water Board as Hydrogeologically Vulnerable Areas, and 5) California Department of Pesticide Regulation groundwater protection areas.

The Executive Officer will review and may approve or require changes to any 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.

B. Management Practice Evaluation Program

The goal of the Management Practice Evaluation Program (MPEP) is to determine the effects, if any, irrigated agricultural practices⁹ have on groundwater quality. A MPEP is required in high vulnerability groundwater areas and must address the constituents of concern described in the GAR. This section provides the goals, objectives, and minimum reporting requirements for the MPEP. As specified in section IV.D of this MRP, the third-party is required to develop a workplan that will describe the methods that will be utilized to achieve the MPEP requirements.

⁹ 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.

1. *Objectives.* The objectives of the MPEP are to:

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

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 high vulnerability areas and commodities, and present a phased approach to implement the MPEP.

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) of the high vulnerability areas (or commodities within these areas) to be examined under the MPEP shall be prepared and submitted to the Executive Officer as detailed in the Management Practices Evaluation Program Workplan section IV.D below.

3. *Report.* Reports of the MPEP must be submitted to the Executive Officer as part of the third-party's Monitoring Report or in a separate report due on the same date as the Annual Monitoring Report. The report shall include all data¹⁰ (including analytical reports) collected by each phase of the MPEP since the previous report was submitted. The report shall also contain a tabulated summary of data collected to date by the MPEP. The report shall summarize the activities conducted under the MPEP, and identify the number and location of installed monitoring wells relative to each other and other types of monitoring devices. Within each report, the 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

¹⁰ The data need not be associated with a specific parcel or Member.

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, engineering and agronomic principles to identify management practices protective of groundwater quality.

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

C. Groundwater Quality Trend Monitoring

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

1. *Objectives.* The objectives of Groundwater Quality Trend Monitoring are (1) to determine current water quality conditions of groundwater relevant to 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 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 monitoring, while still yielding data which can be compared with historical and future data to evaluate long-term groundwater trends. The third-party may also consider using existing monitoring networks such as those used by AB 3030 and SB 1938 plans.

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The third-party shall submit a proposed Trend Groundwater Quality Monitoring Workplan described in section IV.E below to the Central Valley Water Board. The proposed network shall consist of a sufficient number of wells to provide coverage in the 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 based on the findings in the GAR and included in the workplan.

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

Following collection of sufficient data (sufficiency to be determined by the method of analysis proposed by the third-party) 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 in the Trend Groundwater Monitoring Workplan described in section IV.E below.

D. 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 locations situated throughout the high vulnerability groundwater area(s), and encompassing the range of management practices used, the major agricultural commodities, and site conditions under which these commodities are grown. The workplan shall be designed to meet the objectives and minimum requirements described in section IV.B of this MRP.

1. *Workplan approach.* The workplan must include a scientifically sound approach to evaluating the effect of management practices on groundwater quality. The workplan must include a mass balance and conceptual model of the transport, storage, and degradation/chemical transformation mechanisms for the constituents of concern; or an equivalent method approved by the Executive Officer¹¹ must be provided. The proposed approach may include:
 - literature review of identified management practices,
 - root zone studies,
 - groundwater monitoring,
 - modeling,
 - vadose zone sampling, and/or
 - other scientifically sound and technically justifiable methods for meeting the objectives of the Management Practices Evaluation Program.

Sufficient groundwater quality monitoring data should be collected or available to confirm or validate the conclusions regarding the effect of the evaluated practices on groundwater

¹¹ For nitrate, the proposed "equivalent method" may be based on recommendations developed by the California Department of Food and Agriculture's Nitrogen Task Force or the State Water Resource Control Board's Expert Panel on nitrates (see Finding 51).

quality. Any groundwater quality monitoring that is part of the workplan must be of first encountered groundwater. Monitoring of first encountered groundwater more readily allows identification of the area from which water entering a well originates than deeper wells and allows identification of changes in groundwater quality from activities on the surface at the earliest possible time.

2. *Groundwater quality monitoring – constituent selection.* Where groundwater quality monitoring is proposed, the Management Practices Evaluation Workplan must identify:
 - the constituents to be assessed, and
 - the frequency of the data collection (e.g., root zone pore water, vadose zone monitoring, groundwater quality monitoring ; soil sampling) for each constituent, and
 - sampling techniques/methodology.

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

3. *Workplan implementation and analysis.* The proposed Management Practices Evaluation Workplan shall contain sufficient information/justification for the Executive Officer to evaluate the ability of the evaluation program to identify whether existing management practices in combination with site conditions, are protective of groundwater quality. The workplan must explain how data collected at evaluated farms will be used to assess potential impacts to groundwater at represented farms that are not part of the Management Practices Evaluation Program's network. This information is needed to demonstrate whether data collected will enable 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 its high vulnerability areas in its GAR, a single Management Practices Evaluation Workplan may be prepared which includes a timeline describing the priority and schedule for each of the areas/commodities to be investigated and the submittal dates for addendums proposing the details of each area's investigation.
5. *Installation of monitoring wells.* Upon approval of the Management Practices Evaluation Workplan, the 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.

E. Trend Monitoring Workplan

The third-party 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. The Trend Monitoring Workplan shall provide information/details regarding the following topics:

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1. *Workplan approach.* A discussion of the rationale for the number of proposed wells to be monitored and their locations is required in the workplan. The rationale needs to consider: 1) the variety of agricultural commodities produced within the 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 or data gap 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.
2. *Well details.* The Workplan will provide details for wells proposed for trend monitoring, including:
 - i. GPS coordinates;
 - ii. Physical address of the property on which the well is situated (if available);
 - iii. California State well number (if known);
 - iv. Well depth;
 - v. Top and bottom perforation depths;
 - vi. A copy of the water well drillers log, if available;
 - vii. Depth of standing water (static water level), if available (this may be obtained after implementing the program); and
 - viii. Well seal information (type of material, length of seal).
3. *Proposed sampling schedule.* Trend monitoring wells will be sampled, at a minimum, annually at the same time of the year for the indicator parameters identified in Table 3 below.
4. *Workplan implementation and analysis.* The Workplan will describe proposed method(s) to be used to evaluate trends in the groundwater monitoring data over time.

Table 3 Monitored parameters at groundwater Trend Monitoring wells

<p>Annual Monitoring</p> <p>Conductivity (at 25 °C)* (µmhos/cm)</p> <p>pH* in pH units</p> <p>Dissolved oxygen (DO)* (mg/L)</p> <p>Temperature* (°C)</p> <p>Nitrate as nitrogen (mg/L)</p> <p>* field parameters</p>
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Table 3 Monitored parameters at groundwater Trend Monitoring wells

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.

A. QUARTERLY SUBMITTALS OF MONITORING RESULTS

Each quarter the third-party shall submit the previous quarter monitoring results in electronic format. The dates of these submittals shall be as 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

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minimum, those items detailed in the most recent version of the third-party's approved QAPP Guidelines.

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 MONITORING REPORT

The Annual Monitoring Report (AMR) shall be submitted by 1 May every year, with the first report due 1 May 2015. The report shall cover the monitoring periods from the previous hydrologic water

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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;
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 AMR;
8. Location map(s) of sampling sites/monitoring wells, crops and land uses;
9. Tabulated results of all analyses arranged in tabular form so that the required information is readily discernible;
10. Discussion of data relative to water quality objectives/Trigger Limits, and water quality management plan milestones/Basin Plan Amendment Workplan (BPAW) updates, if applicable;
11. Electronic data submittal.
12. Sampling and analytical methods used;
13. Associated laboratory and field quality control samples results;
14. Summary of Quality Assurance Evaluation results (as identified in the most recent version of the third-party's approved QAPP for Precision, Accuracy and Completeness);
15. Specification of the method(s) used to obtain estimated flow at each surface water monitoring site during each monitoring event;
16. Summary of exceedances of water quality objectives/Trigger Limits occurring during the reporting period and surface water related pesticide use information;
17. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented;
18. Evaluation of monitoring data to identify spatial trends and patterns;
19. Summary of Nitrogen Management Plan information submitted to the third-party;
20. Summary of Management Practice information collected as part of Farm Evaluations
21. Summary of Mitigation Monitoring
22. Summary of education and outreach activities;
23. Reduced Monitoring/Management Plan Verification Option Reports
24. Conclusions and recommendations.

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

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Report Component No. 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 No. 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(s) or in an associated key or table included in the report. The source and date of all data layers must be identified on the map(s) or in an associated key or table included in the report. All data layers/shapefiles/geodatabases included in the map shall be submitted with the Monitoring Report. If changes occur to any submitted data, the updated portion shall be submitted in the subsequent AMR.

Report Component No. 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 No. 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. If a Basin Plan Amendment Workplan (BPAW) has been approved by the Executive Officer, updates on progress made toward BPAW goals and milestones, including any adjustments to the time schedule, must be included.

Report Component No. 11 – Electronic Data Submittal

The annual electronic data submittal will include all of the elements listed in section V.A with information from the relevant reporting year.

Report Component No. 14 — Quality Assurance Evaluation (Precision, Accuracy and Completeness)

A summary of precision and accuracy results (both laboratory and field) is required in the report. The required data quality objectives are identified in the 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,

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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 No. 16 — Summary of Exceedances

A summary of the exceedances of water quality objectives or trigger limits that have occurred during the monitoring period is required in the Monitoring Report. For exceedances of pesticide trigger limits, the data must be summarized in tables showing number of samples taken, number of detections, number of exceedances, and range of detection values. These data should be segregated by pesticide and monitoring site. 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 No. 18 — 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. The third-party must specifically determine whether there are any trends in degradation that may threaten applicable beneficial uses. 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 or sampling events are needed or if additional constituents should be monitored. 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 an area 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 No. 19 – Summary of Reported Nitrogen Data

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

The third-party will also provide an aggregate of the data submitted by its Members in an

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electronic format, compatible with ArcGIS, identified to at least the township level¹².

Report Component No. 20 – Summary of Management Practice Information

The third-party will aggregate and summarize information collected from Farm Evaluations.¹³ The summary of management practice data must include a quality assessment of the collected information by township (e.g. missing data, potentially incorrect/inaccurate reporting), and a description of corrective actions to be taken, regarding any deficiencies in the quality of data submitted, if such deficiencies were identified. In addition to summarizing and aggregating the information collected, the third-party will provide the individual data records used to develop this summary in an electronic format, compatible with ArcGIS, identified to at least the township level.¹⁴

Report Component No. 21 – 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 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.

D. 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. The investigation of toxicity exceedances must include all pesticides applied within the area

¹² The Member and their associated parcel need not be identified.

¹³ 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.

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

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.

E. Basin Plan Amendment Workplan

Should the third-party choose to pursue a Basin Plan Amendment as described in Section VIII.L. of the Order, the third-party must prepare a Basin Plan Amendment Workplan (BPAW) that includes the following elements:

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

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

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

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Annual updates on progress made toward BPAW goals and milestones, including any proposed adjustments to the time schedule, must be included in the 15 June Semi-Annual Monitoring Report.

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

VI. 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 Sacramento 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.

VII. WATERSHED/SUBWATERSHED BASED SEDIMENT AND EROSION CONTROL PLANS

Per section VII.C.2. of Order R5-2014-XXXX, the third-party may assist Members to fulfill sediment and erosion control requirements through a Watershed/Subwatershed based Sediment and Erosion Control Plan that includes collective management practices. Any watershed/subwatershed based (or collective) Sediment and Erosion Control Plan shall include, at a minimum, the following: 1) a time schedule for implementation and/or installation of collective management practices to ensure compliance with water quality objectives¹⁵; 2) a description of the funding mechanism for implementation and/or installation of collective management practices; 3) identification of the individuals or parties (e.g., Flood Control District) that will be primarily responsible for implementation and/or installation of collective management practices; 4) a description of the water quality benefits that will occur due to or from implementation of collective management practices; 5) a reporting schedule for submittal of progress reports to the Central Valley Water Board; and, 6) a description of individual sediment and erosion control practices that will also be implemented, or a technical justification as to why individual sediment and erosion control practices would not be applicable to the watershed/subwatershed (or collective) plan.

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

¹⁵ The time schedule for compliance shall be consistent with Provision XII of Order R5-2014-XXX for surface water.

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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. All Trigger Limits must be consistent with applicable Basin Plan policies governing the interpretation of narrative water quality objectives.

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 (see section II of this MRP). 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 Sacramento Valley Water Quality Coalition's existing QAPP was approved by the Executive Officer in 2010. 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 QAPP. Quality control requirements are applicable to all 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 quantitation limits are described in the QAPP Guidelines.

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Table 5 Numeric water quality objectives from the Basin Plan, California Maximum Contaminant Levels (MCL) and the California Toxics Rule.

Constituent / Parameter Chemical Abstracts Service (CAS) Registry Number (Synonym, if any)	Basin Plan Water Quality Objective	Numeric Water Quality Objectives			G = Groundwater IS = Inland Surface Water	Numeric Threshold Protects Designated Beneficial Use(s) in the Water Body						
		Source of Numeric Threshold <i>(footnotes in parentheses are at bottom of table)</i>	Numeric Threshold (a)	Units		Groundwater			Inland Surface Waters			
						MUN- MCL	MUN- Toxicity	AGR	MUN- MCL	MUN- Toxicity	Aquatic Life & Consumption	AGR
Arsenic 7440-38-2	Chemical Constituents	Basin Plan. Sacramento River from Keswick Dam to the I Street Bridge at City of Sacramento; American River from Folsom Dam to the Sacramento River; Folsom Lake; and the Sacramento-San Joaquin Delta.	10	ug/L	IS							
Chlorpyrifos 2921-88-2	Pesticides	Basin Plan. 1-hour average	0.025	µg/L	IS						X	
		Basin Plan. 4-day average	0.015	µg/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)	Salinity	Basin Plan. North Fork of the Feather River; Middle Fork of the Feather River from Little Last Chance Creek to Lake Oroville; Feather River from the Fish Barrier Dam at Oroville to Sacramento River	150	µS/cm	IS							
		Basin Plan. Sacramento River	230 (50 percentile),	µS/cm								
(Electrical conductivity)		California Secondary MCL	900-1600	µS/cm	G & IS	X	X		X	X		
Copper 7440-50-8	Chemical Constituents	California Secondary MCL (total copper)	1,000	µg/L	G & IS	X			X	X		
	Toxicity	California Toxics Rule (USEPA), (g) (dissolved copper)	variable	µg/L	IS						X	
Diazinon 50-29-3	Pesticides	Basin Plan. Delta Waterways, Sacramento River from Shasta Dam to Colusa Basin Drain, Sacramento River from the Colusa Basin Drain to I Street Bridge. Feather River from Fish Barrier Dam to Sacramento River; 1-hour average	0.16	µg/L	IS						X	
		Basin Plan. As above; 4-day average	0.10	µg/L	IS						X	
Dissolved Oxygen, minimum 7782-44-7	Dissolved Oxygen	Basin Plan. Sacramento River from Keswick Dam to Hamilton City, 1 June – 31 August	9.0	mg/L	IS						X	
		Basin Plan. Feather River from Fish Barrier Dam at Oroville to Honcut Creek	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	California Primary MCL (total lead)	15	µg/L	G & IS	X			X			

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Constituent / Parameter Chemical Abstracts Service (CAS) Registry Number (Synonym, if any)	Basin Plan Water Quality Objective	Numeric Water Quality Objectives				G = Groundwater IS = Inland Surface Water	Numeric Threshold Protects Designated Beneficial Use(s) in the Water Body						
		Source of Numeric Threshold <i>(footnotes in parentheses are at bottom of table)</i>	Numeric Threshold (a)	Units	Groundwater			Inland Surface Waters					
					MUN- MCL		MUN- Toxicity	AGR	MUN- MCL	MUN- Toxicity	Aquatic Life & Consumption	AGR	
	Constituents												
7439-92-1	Toxicity	California Toxics Rule (USEPA) (g) (dissolved lead)	variable	µg/L	IS							X	
Nitrate (as nitrogen) 14797-55-8	Chemical Constituents	California Primary MCL	10	mg/L	G & IS	X	X		X	X			
Nitrite (as nitrogen) 14797-65-0	Chemical Constituents	California Primary MCL	1	mg/L	G & IS	X	X		X	X			
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 7782-49-2	Chemical Constituents	California Primary MCL	50	µg/L	G & IS				X				
	Toxicity	National Toxics Rule (USEPA), 4-day mean	5	µg/L	IS	X						X	
Simazine 122-34-9	Chemical Constituents	California Primary MCL	4	µg/L	G & IS	X	X		X	X			
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								
Zinc 7440-66-6	Chemical Constituents	California Secondary MCL (total zinc)	5,000	µg/L	G & IS	X			X				
	Toxicity	California Toxics Rule (USEPA) (g) (dissolved zinc)	variable	µg/L	IS							X	

Footnotes to Table 8:

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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	The numeric thresholds for dissolved metals 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 Fahrenheit (or 2.78°C) above natural receiving water temperature.
i	See Delta Waterways listed in Appendix 42 of the Basin Plan
Beneficial Uses:	
AGR – Agricultural water uses, including irrigation supply and stock watering	
Aquatic Life & Consumption – Aquatic life and consumption of aquatic resources	
MUN-MCL – Municipal or domestic supply (MUN) with default selection of drinking water maximum contaminant limit (MCL) when available	
MUN-Toxicity – Municipal or domestic supply (MUN) with consideration of human toxicity thresholds that are more stringent than drinking water maximum contaminant limits (MCLs)	

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