California Regional Water Quality Control Board
Central Valley Region
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6 May 2011

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EAST SAN JOAQUIN WATER QUALITY COALITION – MODIFICATION OF THE MONITORING AND REPORTING PROGRAM PLAN AND MONITORING STRATEGY

Thank you for your letter submitted on 11 November 2010 requesting to modify the Monitoring and Reporting Program Plan (MRP Plan) and its monitoring strategy. The Coalition requested the following changes in the MRP Plan monitoring strategy:

(1) Reduce water column sampling for organochlorines;
(2) Reduce water column sampling for the sediment bound chemicals glyphosate and paraquat dichloride;
(3) Reduce water column sampling for metals that are not applied by agriculture including arsenic, cadmium, lead, and molybdenum; and
(4) Omit water column sampling for Total Kjeldahl Nitrogen (TKN) and orthophosphate.

Based on the information provided by the Coalition and Staff recommendations provided in the enclosed memorandum, I approve the Coalition's request for items (1), (2), and (3) with modifications described below. The request for item (4) is not granted at this time because TKN and orthophosphate data are used by Central Valley Water Board Staff working on the San Joaquin River Dissolved Oxygen Control Program to evaluate nutrient discharges to the San Joaquin River. However, all monitoring parameters will be re-evaluated and discussed with the Coalition when their new MRP Order is developed for the Long Term Program. Therefore, any further requests for MRP Plan modifications will be processed and addressed as part of the new Orders.

The following changes in the East San Joaquin Water Quality Coalition MRP Plan, are effective immediately:

(1) Reduce water column sampling for organochlorines
Sampling for organochlorines (OCs) will be performed twice a year: once during a storm event and once during an irrigation event. However, for Group A-OC pesticides the Coalition will need to continue monitoring until June 2011 to complete one full year of data collection. After June 2011, the monitoring frequency for Group A-OC pesticides will be the same as for OCs (twice a year).

The monitoring frequency for OCs, as described above, will be conducted until the Basin Plan TMDL for OC Pesticides is in effect. At that time, the Coalition may need to modify the OCs monitoring strategy to include the Basin Plan requirements in the OC TMDL.

(2) Reduce water column sampling for the sediment bound chemicals glyphosate and paraquat dichloride
Sampling for sediment bound chemicals glyphosate and paraquat dichloride will be performed twice a year: once during a storm event and once during an irrigation event.

(3) Reduce sampling chelating metals that are not applied by agriculture including arsenic, cadmium, lead and molybdenum.
Sampling for arsenic, cadmium, lead and molybdenum will be performed four times a year: once during each storm event (two sampling events) and during high TSS irrigation events (two sampling events).

The approved monitoring strategy for items (1), (2), and (3) is only applicable to assessment monitoring. Constituents under a Management Plan will continue with the originally approved management plan strategy.

The approval of monitoring reductions for OCs, glyphosate, paraquat dichloride, arsenic, cadmium, lead, and molybdenum is subject to change during preparation of a new order for the Coalition. Constituents in items (1), (2), (3), and (4) may be re-evaluated as part of the development of new orders.

Original signed by

Pamela C. Creedon
Executive Officer

Enclosure:
Staff Review of the ESJWQC MRP Plan modification request (memorandum)

cc:
Joe Karkoski, ILRP Program Manager
Susan Fregien, Monitoring and Assessment Unit Senior

Adminsitrative Record
Page 21924

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TO: Susan Fregien
Senior Environmental Scientist
Irrigated Lands Regulatory Program

FROM: Dania Huggins
Water resources Control Engineer
Irrigated Lands Regulatory Program

DATE 6 May 2011

SIGNATURE: Original signed by Dania Huggins

EAST SAN JOAQUIN WATER QUALITY COALITION – MODIFICATION OF THE MONITORING AND REPORTING PROGRAM PLAN AND MONITORING STRATEGY

On 11 November 2010 the Coalition requested the following changes in the MRP Plan monitoring strategy:

(1) Reduce water column sampling for organochlorines (OCs);
(2) Reduce water column sampling for the sediment bound chemicals glyphosate and paraquat dichloride;
(3) Reduce water column sampling for metals that are not applied by agriculture including arsenic, cadmium, lead, and molybdenum; and
(4) Omit water column sampling for Total Kjeldahl Nitrogen (TKN) and orthophosphate.

Staff comments below are based on a review of the information provided by the Coalition in the 11 November 2010 request and during the quarterly management plan meeting held on 8 February 2011.

(1) <u>Reduce water column sampling for organochlorines</u>

Coalition's Proposal and Justification
The Coalition is proposing to reduce sampling for OCs (including Group A) to twice a year: once during a high Total Suspended Solids (TSS) storm event and once during a high TSS irrigation event. Below are the Coalition's definitions for a "high TSS storm event" and a "high TSS irrigation event."

High TSS Storm Event = When the storm event is predicted to bring 0.25 inches or greater of precipitation within a 24-hour period.

High TSS Irrigation Event= After the start of the peak irrigation season during high flows in irrigation canals (June/July/August).

The Coalition justifications for OCs sampling reductions are:

a. OCs bind to sediment and are not used in agriculture.
b. The Coalition can only encourage growers to manage discharges that could potentially mobilize legacy pesticides within surface waters.
c. Minimum number of detections and exceedances in the last four years of monitoring.
d. Reduced monitoring will not affect the ability to assess the agricultural impact to water quality (based on items a, b, and c).

Staff Analysis

The Coalition has completed approximately four years of OCs monitoring (DDD, DDE, DDT, dicofol, dieldrin, endrin, and methoxychlor). Dicofol and endosulfan are the only OCs applied within the Coalition area. The remaining OCs are legacy pesticides. Since 2006 there have only two detections of dicofol in 334 samples one in May 2006 and the second one in August 2007 with a concentration of 0.022 µg/L and 0.053 µg/L, respectively. There have been no detections of endosulfan in 17 samples collected since 2008 to December 2009.

Based on the monitoring results for OCs from 2006 through 2009 Staff created a summary of these results in Tables 1 and 2. The percentage of detections and exceedances has been less than 1% with respect to the total number of tests conducted.

Table 1. Summary of monitoring results for OCs (DDD, DDE, DDT, dicofol, dieldrin, endrin, and methoxychlor)

Year	2006	2007	2008	2009
No. Tests	475	766	815	90
No. Detects	5	7	4	1
No. Exceedances	4	4	2	1

Table 2. Summary of monitoring results for Group A-OC pesticides (aldrin, endosulfan, endrin, hexachlorocyclohexane, chlordane, dieldrin, heptachlor epoxide, and toxaphene)

Year	2008	2009
No. Tests	6	11
No. Detects	3	0
No. Exceedances	3	0

The Coalition has one site under a management plan for DDE (with an exceedance found on February 2007, a second one on June 2007, and a third one on December 2009). The Coalition has stated that many of the management practices that their recommending to reduce runoff of commonly applied pesticides (i.e. chlorpyrifos) will presumably result in the reduction of runoff of other constituents such as OC pesticides (i.e. converting to drip irrigation, spray nozzle calibrations, increased buffer zones).

Staff recommendation

The Coalition provided sufficient information and a reasonable justification for reduced OCs monitoring. For Group A-OC pesticides, the Coalition has not completed a year of monitoring. There are monitoring results for October 2008 through April 2009 and from July 2010 through

Adminsitrative Record
Page 21926

March 2011. Thus, it will be important to have this background information for a complete year cycle (complete irrigation and storm seasons), which will be completed in June 2011.

(2) <u>Reduce water column sampling for the sediment bound chemicals glyphosate and paraquat dichloride</u>

Coalition's Proposal and Justification
The Coalition is proposing to reduce sampling for the sediment bound chemicals glyphosate and paraquat dichloride to twice a year: once during a high TSS storm event and once during a high TSS irrigation event. The following justifications were provided by the Coalition:

a. Since 2006, the Coalition has not had a single exceedance of either glyphosate and paraquat dichloride.
b. Glyphosate and Paraquat have a high Koc (Koc = 24,000 and Koc >100,000, respectively) and therefore bind readily to particulate matter.

Staff Analysis
The Coalition has completed almost four years of monitoring for glyphosate and paraquat dichloride. Glyphosate is widely used in the Central Valley by agriculture: due to its high organic carbon partitioning coefficient, glyphosate was detected in only 14 of 403 samples (3.5%) with the highest concentration detected at 66 µg/L (approximately 1/10 of the WQTL of 700 µg/L) with an average concentration of 14.8 µg/L.

Paraquat was detected in only four of 403 samples (1%) with the highest concentration detected at 1.5 µg/L (approximately half of the WQTL of 3.2 µg/L) and an average concentration of
0.8 µg/L.

Staff recommendation
Given the chemical characteristics of glyphosate and paraquat (e.g. high Koc and short half life) and the monitoring results described above, it is unlikely that glyphosate and paraquat detections will be observed. Therefore, the Coalition's proposed MRP Plan amendment for glyphosate and paraquat is reasonable and appropriate.

(3) <u>Reduce sampling chelating metals that are not applied by agriculture including arsenic, cadmium, lead and molybdenum.</u>

Coalition's Proposal and Justification
The Coalition is proposing to reduced sampling for arsenic, cadmium, lead and molybdenum twice a year: once during a high TSS storm event and once during a high TSS irrigation event. The Coalition provided the following justifications:

a. Based on the PURs analysis, there have been no applications of: arsenic, cadmium, lead, and molybdenum, within the Coalition area.
b. Only two of the metals listed above have been included in products used by agriculture: arsenic and lead with last reported used in 1997 and 1960s, respectively.

Administrative Record
Page 21927

Staff Analysis
The Coalition has completed almost four years of arsenic, cadmium, and lead monitoring (2006 through April 2009, July 2010 through present). Sampling for molybdenum began in October 2008 at six assessment sites. Based on monitoring results for arsenic, cadmium, lead, and molybdenum from 2006 through 2009 Staff created a summary in Table 4 of these results. The percentage of detections has been consistently high ranging from 68 % to 76 % with respect to the total number of tests conducted. The number of exceedances has been consistent from 2006 through 2008 ranging from 8 % to 9 %. A decrease in exceedances was observed in 2009 to 2% (Table 3). However, there is insufficient information to determine the reason (s) for this reduction. Additionally, in 2009 the Coalition was following a different monitoring strategy according to the 15 September 2008 approved MRP Plan.

Table 3. Summary of monitoring results for arsenic, cadmium, lead, and molybdenum

Year	2006	2007	2008	2009
No. Tests	210	351	513	134
No. Detects	142 (68%)	268 (76%)	360 (70%)	96 (72%)
No. Exceedances	18 (9%)	31 (9%)	40 (8%)	3 (2%)

The Coalition has three management plans for arsenic and 11 for lead. The Coalition has explained in previous discussions that the source identification of these metals is challenging since the source vary from: (1) naturally present because of underlying geological materials, (2) legacy pesticides, (3) agricultural use or practices, and (4) a combination of the above.

Staff recommendation
Given the challenges described above and the limited information on the potential sources, given the challenges described above, sampling reduction of these metals will be appropriate at this time. However, staff would like to discuss potential strategies to help determine if the cause of exceedances is due to whole or in part by irrigated agriculture land use. Staff introduced this item to the Coalition during the 3 May 2011 quarterly meeting. Further discussions need to occur to determine potential strategies.

(4) <u>Omit water column sampling for Total Kjeldahl Nitrogen (TKN) and Othophosphate</u>

Coalition's Proposal and Justification
The Coalition is requesting to omit water column sampling for TKN and soluble orthophosphate. The Coalition's justifications for omission are:

a. The results do not aid in understanding sources of water quality issues nor are there any standards by which to compare the results to evaluate water quality.
b. Total phosphorous (P) could be used to calculate the variability in orthophosphate.

Staff Analysis
Based on the information presented and the monitoring results available (Table 4), Staff has determine that TKN can be an important indicator of the nitrogen content in a sample. There are several samples (Figure 2, Coalition's request) in which TKN concentrations are high. This could be mostly organic N (Total Ammonia Nitrogen is not shown in Figure 2) and it could be bound in algae, detritus, manure, etc. Nitrogen is biodegradable and that alone creates an oxygen demand. Also, the nitrogen tied up in organic matter will eventually be released as

Adminsitrative Record
Page 21928

inorganic nitrogen first as ammonia and eventually as nitrate after nitrification. Thus, if the Coalition is looking at Total N released into the environment, it cannot ignore TKN.

Table 4. Summary of monitoring results for TKN and Othophosphate

Year	2006	2007	2008	2009
No. Tests	140	234	328	38
No. Detects	124	223	325	38
No. Exceedances	0	0	0	0

The Coalition stated that total-P and orthophosphate are correlated and that total-P "captures the variability" in orthophosphate. The correlation appears to be reasonable and acceptable. However, orthophosphate is soluble and easily taken up by algae and plants. Therefore, in most systems in which N is present in excess, phosphorus in general, and especially orthophosphate because of its ready availability, are critical factors in the process of eutrophication.

Staff recommendation

Given the information provided, Staff recommends that the Coalition should continue monitoring for TKN and soluble orthophosphate under the approved MRP Plan monitoring frequency.

DLH \\R5S Sections\Irrigated Lands Assessment Planning\Units\Monitoring Implementation\Coalition Groups\East_San_Joaquin_WQC\MRPP_QAPP_ WER\2010-DropConstituents\StaffRev\2011-0506-StaffAppr-Memo.doc