November 16, 2021

Patrick Pulupa, Executive Officer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114

Sacramento Valley Water Quality Coalition Surface Water Monitoring Reduction Request

Dear Mr. Pulupa:

The Sacramento Valley Water Quality Coalition (Coalition) respectfully asks for your determination on a request to implement reductions in the Coalition's current surface water quality monitoring schedule it has followed since October 2013. This monitoring schedule is characterized as two years of "assessment" monitoring followed by two years of "core" monitoring. The Coalition has monitored dozens of sites in the Sacramento Valley since January 2005 under the Monitoring and Reporting Program requirements included as part of its original 2003 Conditional Waiver of Waste Discharge Requirements (WDR) and later its 2014 WDR. A review of water quality monitoring data collected over the past eight monitoring years (since October 2013) generally shows minor variability between percent detections and percent exceedances (where Irrigated Lands Regulatory Program (ILRP) trigger limits exist) for monitored parameters when comparing "assessment years" to "core years". The following information provides support for allowing the Coalition to implement an assessment-core-core (A-C-C) monitoring schedule beginning in the 2023 monitoring year (Oct. 1, 2022 – Sep. 30, 2023). An A-C-C monitoring schedule will continue to adequately characterize discharges from irrigated agricultural lands, provide Regional Water Quality Control Board Central Valley Region (Central Valley Water Board) staff with sufficient data to determine the presence of potential surface water quality impacts in receiving waters, and afford Coalition members information to allow them to avoid or reduce discharges from irrigated lands.

COALITION MONITORING BACKGROUND

The Coalition's monitoring year (MY) tracks the California Department of Water Resources (DWR) water year: October 1 through September 30. The Coalition has been collecting surface water quality samples since the 2005 MY, when the Coalition collected its first sample in January 2005. During the first four years of monitoring, the Coalition visited from 27 to 60 monitoring sites per year and amassed over 64,000 water quality results. These first four years of monitoring were conducted to build a robust, ambient water quality dataset to characterize water quality in receiving waters that receive agricultural discharges in the Sacramento Valley.

455 Capitol Mall, Suite 703 / Sacramento, CA 95814-4495 / Phone (916) 442-8333 / Fax (916) 442-4035
www.svwqc.org

The data collected during the Coalition's first four years of monitoring were foundational to the understanding of agriculture's water quality impacts to area receiving waters. Based on these data, which identified those parameters that were not detected and those that were detected either above or below relevant water quality objectives (i.e., ILRP trigger limits), the Central Valley Water Board in 2009 approved an amendment to the Coalition's Monitoring and Reporting Program (MRP; MRP Order No. R5-2009-0875) that allowed a more refined assessment of surface water quality focused on those parameters detected in the water bodies monitored by the Coalition.

Beginning in the 2009 MY and continuing through the 2013 MY, the Coalition continued its implementation of a vigorous surface water monitoring program that resulted in the collection of over 6,500 environmental water quality results each year for the 5-year period. As the Coalition transitioned from its Conditional Waiver to a WDR, and with consideration of the nine years of surface water quality data collected at that point, the Central Valley Water Board approved a Monitoring and Reporting Program (MRP Order No. R5-2014-0030-R1) that required the Coalition to implement two years of high intensity monitoring, called assessment monitoring, followed by two years of basic monitoring, referred to as core monitoring. This assessment-assessment-core-core (A-A-C-C) schedule began with the monitoring conducted for the 2014 MY and continues to the present. These monitoring data, covering October 2013 through June 2021, adequately represent the contributions of irrigated agriculture to receiving waters in the Sacramento Valley with implementation of established education and outreach programs by the 13 subwatersheds that comprise the Coalition, as well as the implementation of a mature ILRP by the Coalition.

RESULTS OF MONITORING DATA EVALUATION

When a monitoring program has collected data for a number of years, it's important to occasionally take a step back to assess the information gathered. The review of surface water quality data presented below was designed to determine if there are opportunities to re-focus Coalition monitoring in the future. It's important to understand if the value put into the Coalition's MRP is providing the characterization of surface water quality in the Sacramento Valley that was envisioned by the Central Valley Water Board upon adoption of the MRP Order. It's not uncommon for an environmental monitoring program to collect a large amount of data in the beginning of its monitoring endeavors and then evaluate if monitoring can be more focused while still providing the data necessary to identify changes in the environment and direct management actions, as necessary. Upon review of the surface water quality data collected from October 2013 through June 2021, several factors emerged that the Coalition feels supports a re-examination of the A-A-C-C monitoring schedule that it is currently required to implement.

The current data assessment grouped analytes into six major categories and focused on annual percent detections and annual percent exceedances of an ILRP trigger limit. Non-pyrethroid pesticides were further evaluated on an individual pesticide basis for those pesticides showing some detections during the period October 2013 through June 2021. The following discussion covers the information presented in **Table 1**, **Table 2**, and **Table 3**.

Non-Pyrethroid Pesticides
Non-pyrethroid pesticides constitute the largest category of parameters monitored and analyzed by the Coalition. Approximately 30% of all non-pyrethroid pesticides monitored during the 2014 through 2021 monitoring years were detected at some time during that period. Non-pyrethroid pesticides detected at least once during this period are shown in **Table 3**. Conversely, 70% of non-pyrethroid pesticides analyzed during this period were not detected (non-detect or ND) in any water quality samples. A table of non-detect, non-pyrethroid pesticides is provided in **Attachment A**. As seen in **Table 3**, some pesticides were not required to be monitored by the Coalition during certain monitoring years because they had yet to be identified as potential water quality pollutants of concern (i.e., not included in Executive Officer List or not sufficiently represented in pesticide use reporting (PUR) data). In other instances, non-pyrethroid pesticides that were historically monitored were not required to be monitored ("NM" designation in **Table 3**) during a particular year because PUR data showed that the pesticide was not applied in an appreciable amount to require monitoring. Since the 2018 MY, the Coalition has followed the ILRP Pesticides Evaluation Protocol to determine whether a particular pesticide is monitored at a Coalition monitoring site during a particular monitoring year.

From an analyte category perspective, non-pyrethroid pesticide detections range from 1.4 to 7.6% during assessment years and from 1.6 to 10% during core years (see **Table 1**). Many non-pyrethroid pesticides don't have an ILRP trigger limit to which to compare detected concentrations, which additionally limits the exceedance frequency for this analyte category (see **Table 2**). Non-pyrethroid pesticide exceedances range from 0.1 to 0.9% during assessment years and from 0.4 to 1.5% during core years, as presented in **Table 2**. Note that the detected, legacy organochlorine compounds included in **Table 3** are 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT; these shouldn't be confused with the non-detect 2,4'-DDD, 2,4'-DDE, and 2,4'-DDT compounds shown in the table in **Attachment A**. **Table 3** provides percent detections, exceedance numbers, and percent exceedances (where ILRP trigger limits exist) on a monitoring year basis, and average percent detection for the period October 2013 through June 2021 for each non-pyrethroid pesticide.

Pyrethroid Pesticides
The monitoring of pyrethroid pesticides by the Coalition during the past four years was prompted by the Central Valley Water Board's actions to control pyrethroid pesticide discharges in the Central Valley. A Pyrethroid Pesticides Control Program was established with approval of the Central Valley Pyrethroid Pesticides Total Maximum Daily Load (TMDL) and Basin Plan Amendment (Resolution R5-2017-0057; approved by the Office of Administrative Law on 19 February 2019; hereafter Pyrethroid Pesticides Control Program). Pyrethroid pesticide detections in water range from 7.1 to 9.6% during assessment years and from 6.6 to 6.8% during core years (see **Table 1**). Analysis of sediment for pyrethroids only occurs when a *Hyalella* sediment toxicity test shows significant toxicity and survival in the environmental sample is less than 80% of the control sample. During monitoring years when these two criteria are not met, there is no analysis of pyrethroids in Coalition sediment samples.

Table 1. Percent Detections by Analyte Category: Monitoring Years 2014–2021.

Analyte Category	Percent Detections by Monitoring Year							
	2014	2015	2016	2017	2018	2019	2020	2021*
	Assess	Assess	Core	Core	Assess	Assess	Core	Core
Non-Pyrethroid Pesticides	1.8	1.4	2.4	1.6	3.7	7.6	1.7	10.0
Pyrethroid Pesticides (water)	NM	NM	NM	NM	7.1	9.6	6.6	6.8
Pyrethroid Pesticides (sed)^	25.5	NM	NM	NM	24.2	9.1	3.0	NM
Copper, Lead, Zinc	100.0	100.0	100.0	100.0	100.0	98.8	100.0	92.6
Arsenic, Boron, Selenium	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nutrients	82.3	88.2	90.3	93.3	87.5	87.9	94.4	84.5

* 2021 MY results considered through June 2021. NM = Not Monitored
^ Sediment pyrethroid concentrations are only measured when a *Hyalella* sediment toxicity test shows significant toxicity and survival < 80% of the laboratory control.

Table 2. Percent Exceedances by Analyte Category: Monitoring Years 2014–2021.

Analyte Category	Percent Exceedances by Monitoring Year							
	2014	2015	2016	2017	2018	2019	2020	2021*
	Assess	Assess	Core	Core	Assess	Assess	Core	Core
Non-Pyrethroid Pesticides	0.9	0.1	0.4	0.8	0.4	0.4	1.5	---
Pyrethroid Pesticides (water)	NM	NM	NM	NM	1.1	2.9	0.0	0.9
Pyrethroid Pesticides (sed)^	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Copper, Lead, Zinc	0.9	1.2	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Arsenic, Boron, Selenium	22.5	62.5	57.1	50.0	80.0	33.3	50.0	66.7
Nutrients	0.7	1.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	2.0
Toxicity (water)	**0.0**	1.0	3.4	4.8	**0.0**	0.4	**0.0**	10.5
Toxicity (sed.)	6.5	**0.0**	**0.0**	**0.0**	12.5	7.1	33.3	**0.0**

Percent Exceedance only calculated for analyte with an ILRP trigger limit
* 2021 MY results considered through June 2021. NM = Not Monitored n/a = not applicable
^ There are no ILRP trigger limits for pyrethroid pesticides measured in sediment.

Table 3. Percent Detections and Percent Exceedances of Non-Pyrethroid Pesticides: Monitoring Years 2014–2021.

Analyte Name	WQO	2014 Assessment % Detect	2014 Assessment # of Exc	2014 Assessment % Exc	2015 Assessment % Detect	2015 Assessment # of Exc	2015 Assessment % Exc	2016 Core % Detect	2016 Core # of Exc	2016 Core % Exc	2017 Core % Detect	2017 Core # of Exc	2017 Core % Exc	2018 Assessment % Detect	2018 Assessment # of Exc	2018 Assessment % Exc	2019 Assessment % Detect	2019 Assessment # of Exc	2019 Assessment % Exc	2020 Core % Detect	2020 Core # of Exc	2020 Core % Exc	2021* Core % Detect	2021* Core # of Exc	2021* Core % Exc	Avg % Detection
Pesticides with Some Detections																										
Acetamiprid														ND			5.9%	---	---	ND			NM			2.9
Bromacil		2.4%	---	---	ND			11.1%	---	---	ND			NM			NM			NM			NM			2.1
Carbaryl	Yes	4.9%	0	0.0%	6.7%	0	0.0%	11.1%	0	0.0%	NM			ND			ND			ND			NM			4.0
Chlorpyrifos	Yes	23.8%	3	3.6%	15.1%	5	5.2%	12.5%	1	4.2%	ND			1.9%	1	1.9%	ND			ND			ND			11.1
Clothianidin														9.1%	---	---	14.3%	---	---	ND			NM			9.5
Cyprodinil														ND			25.0%	---	---	ND			ND			8.6
DDD(p,p)	Yes	2.7%	1	2.7%	ND			ND			ND			ND			ND			NM			NM			1.2
DDE(p,p)	Yes	8.1%	3	8.1%	ND			ND			ND			ND			ND			NM			NM			3.2
DDT(p,p)	Yes	5.4%	2	5.4%	ND			ND			ND			ND			ND			NM			NM			2.4
Diazinon		1.2%	1	1.2%	ND			ND			ND			5.1%	2	5.1%	ND			6.3%	1	6.3%	ND			1.3
Dichlorophenoxyacetic Acid, 2,4-														21.2%	---	---	3.3%	---	---	ND			ND			11.9
Dichlorvos	Yes	1.2%	0	0.0%	1.0%	1	1.0%	ND			5.6%	1	5.6%	ND			ND			NM			NM			1.2
Dicofol		ND			2.8%	---	---	ND			NM			ND			NM			NM			NM			1.7
Diflubenzuron		ND			2.2%	---	---	ND			ND			ND			NM			NM			NM			0.8
Dimethoate	Yes	11.3%	0	0.0%	ND			ND			NM			ND			ND			ND			NM			4.3
Diuron	Yes	17.1%	0	0.0%	4.4%	1	2.2%	11.1%	0	0.0%	ND			10.3%	0	0.0%	16.7%	0	0.0%	NM			ND			10.6
Ethalfluralin														3.7%	---	---	11.5%	---	---	ND			NM			6.8
Glyphosate	Yes													9.1%	0	0.0%	11.8%	0	0.0%	NM			NM			10.7
Hexazinone		ND			1.5%	---	---	ND			ND			ND			ND			ND			NM			0.7
Imidacloprid														26.5%	---	---	29.4%	---	---	ND			ND			25.7
Malathion	Yes	1.2%	1	1.2%	1.0%	1	1.0%	ND			ND			ND			7.7%	1	7.7%	ND			ND			1.1
Mancozeb (Ziram)														4.8%	---	---	NM			NM			NM			4.8
Methomyl	Yes	ND			2.2%	0	0.0%	ND			ND			ND			ND			ND			NM			0.7
Metolachlor		10.3%	---	---	3.4%	---	---	ND			5.6%	---	---	12.5%	---	---	NM			NM			NM			5.6
Metribuzin														33.3%	---	---	ND			ND			NM			20.0
Naled		ND			2.3%			ND			5.6%	---	---	ND			NM			NM			NM			1.5
Oryzalin		2.4%	---	---	4.4%	---	---	50.0%	---	---	ND			ND			ND			NM			NM			6.0
Oxyfluorfen		15.3%	---	---	17.9%	---	---	33.3%	---	---	11.1%	---	---	29.0%	---	---	44.4%	---	---	33.3%	---	---	ND			20.7
Propiconazole														50.0%	---	---	75.0%	---	---	NM			80.0%	---	---	72.7
Pyraclostrobin														ND			3.1%	---	---	ND			ND			1.4
Simazine	Yes	ND			1.7%	0	0.0%	ND			ND			12.5%	0	0.0%	ND			NM			ND			3.2
Total Exceedances		11			8			1			1			3			1			1			0			

*2021 MY results considered through June 2021.

NM = Not Monitored | Assessment Year | --- = No ILRP Trigger | ND | Not Required to be Monitored

The Pyrethroid Pesticides Control Program requires that six individual pyrethroids are considered together, along with particulate and dissolved organic carbon concentrations, when determining if detected pyrethroid concentrations collectively result in an exceedance of an additive concentration goal (the additive concentration goal serves as a trigger limit). Pyrethroid pesticide exceedances range from 1.1 to 2.9% during assessment years and from 0 to 0.9% during core years, as shown in **Table 2**. Percent exceedance is not calculated for pyrethroids concentrations measured in the sediment as no ILRP trigger limits exist for pyrethroids detected in this matrix.

Copper, Lead, and Zinc

Trace metals were divided into two groups, those that are commonly attributed to anthropogenic sources and those that are commonly attributed to natural background sources. Included within the former group were copper, lead, and zinc. Copper is an active ingredient in numerous pesticides and those pesticides are applied at high rates in the Sacramento Valley. There are no current, direct agricultural uses of lead in the Sacramento Valley. However, lead arsenate was used for decades as an agricultural insecticide and for mosquito abatement before it was banned on August 1, 1988. Zinc salts (zinc chloride, zinc oxide, and zinc sulfate) are used as herbicides and fungicides mostly in structural pest control and industrial processes. More significant, non-pesticidal use of zinc salts in the U.S. includes use in fertilizers, animal feed, dry cell batteries, and as galvanizers. As an active ingredient, zinc is applied in small amounts (on a relative basis) in the Sacramento Valley. All three of these trace metals are found in soil at natural background concentrations specific to distinct regions. Soils are transported to receiving waters where these trace metals are detected in the water column and sediments.

As a group, copper-lead-zinc detections are essentially 100% across both assessment and core monitoring years (see **Table 1**). Conversely, copper-lead-zinc exceedances are essentially 0% across both assessment and core monitoring years, as shown in **Table 2**. The concentrations of all three trace metals generally observed in Coalition receiving waters are well below concentrations that would exceed relevant water quality objectives.

Arsenic, Boron, and Selenium

The second trace metals group considered in the current assessment is one that comprises arsenic, boron, and selenium. These three trace metals are largely natural background elements in the soils and alluvial sediments on the westside of the Sacramento Valley. Arsenic is also measured in North Delta receiving waters and found at elevated concentrations in groundwater. Arsenic in the form of lead arsenate was once applied as an insecticide, but such applications have been banned for over 33 years. Boron is found in various insecticides (borax, boric acid, boron oxide) and is an essential micronutrient in some fertilizers. Boron-containing insecticides constitute very few agricultural applications of the trace metal in the Sacramento Valley. Selenium has no pesticidal use in the Sacramento Valley and is an essential plant micronutrient in some fertilizers. All three of these trace metals are found in soil and alluvial sediments at natural background concentrations (sometimes elevated) specific to distinct regions. Soils are transported to receiving waters where these trace metals are detected in the water column and sediments. Finally, all three of these trace metals can be found in groundwater primarily as a result of leaching from rocks and soils containing these elements.

As a group, arsenic-boron-selenium detections are 100% across both assessment and core monitoring years (see **Table 1**). The relatively high concentrations of these trace metals resulted in percent exceedances that range from 22.5 to 80% during assessment years and from 50 to 66.7% during core years, as shown in **Table 2**.

Nutrients

Nitrogen and phosphorus compounds are ubiquitous across aquatic ecosystems. They show high rates of detection during both assessment year monitoring (range: 82.3 – 88.2%) and core year monitoring (range: 84.5 – 94.4%), as presented in **Table 1**. These high rates of detection do not translate into high rates of exceedance of ILRP trigger limits for nitrogen compounds (ammonia as N, nitrate as N, nitrite as N, and nitrate + nitrite as N; there are no ILRP trigger limits for phosphorus compounds). Percent exceedances range from 0.7 to 1.0% during assessment years and from 0 to 2.0% during core years, as shown in **Table 2**. Five of the eight monitoring years considered showed no exceedances for nitrogen compounds.

Water and Sediment Toxicity

There is no row for "toxicity percent detection" in **Table 1** because Coalition toxicity testing is linked to a test for statistical significance of observed toxicity in the environmental sample as compared to the laboratory control. In this way, percent exceedance is the appropriate measure of the frequency of toxicity observed in Coalition water quality and sediment samples. Water column toxicity tests considered in the current assessment include testing for the following test organism-toxicity end point combinations: *Ceriodaphnia dubia* survival, *Hyalella azteca* survival (water column), *Pimephales promelas* survival (only monitored during 2014 and 2015 MYs), and *Selenastrum capricornutum* growth. **Table 2** shows mostly low percent exceedances for water column toxicity tests that range from 0 to 1.0% for assessment years and from 0 to 10.5% for core years. The elevated exceedance rate (10.5%) observed during the first nine months of the 2021 MY is attributed to six exceedances observed for *Hyalella* water column tests that are being run for the first time this MY as part of the baseline monitoring required under the Pyrethroid Pesticides Control Program.

Sediment toxicity testing using *Hyalella azteca* also has a toxicity endpoint of survival and Coalition samples show percent exceedances that range from 0 to 12.5% for assessment years and from 0 to 33.3% for core years. The elevated exceedance rate (33.3%) observed during the 2020 MY is attributed to single exceedances of the *Hyalella* sediment test observed at three separate monitoring sites during a core year when overall monitoring frequency was reduced.

DISCUSSION

Non-Pyrethroid Pesticides

The information summarized in **Table 3** for non-pyrethroid pesticides shows mostly low detection rates and few exceedances of ILRP trigger limits for these compounds, where such trigger limits exist. Much of the table is populated with the acronym "ND" (meaning non-detect) showing that during many monitoring years individual pesticides were never detected in Coalition water samples. The "# of Exc" and "% Exc" statistics provided for each monitoring year for those pesticides with ILRP trigger limits do not lend themselves to making an accurate guess as to which non-pyrethroid pesticide exceedances led to the triggering of a Management Plan. During the period under review, only two Management Plans were triggered for non-pyrethroid pesticides – one for chlorpyrifos and one for diazinon – both at the Gilsizer Slough at George Washington Blvd. monitoring site.

As a category of analytes, non-pyrethroid pesticides show relatively low variability in percent detections and percent exceedances across different monitoring years within and between assessment and core years (see **Table 1** and **Table 2**). However, the statistics presented in **Table 3** illustrate the variability observed when evaluating non-pyrethroid pesticides on an individual basis. Because the Coalition monitors, analyzes, evaluates, and tracks non-pyrethroid pesticides on an individual basis, it is always aware of detections, exceedances, and trends observed for these analytes. Additionally, education and outreach efforts at the subwatershed and Coalition levels are highly responsive to ILRP trigger limit exceedances for pesticides when they occur.

Pyrethroid Pesticides

The attention of the Coalition and its members to the agricultural and non-agricultural uses of pyrethroid pesticides has increased greatly since the adoption of the TMDL and Pyrethroid Pesticides Control Program. The Coalition has monitored for pyrethroid pesticides since January 2018 and is nearing completion of the required one year of baseline monitoring under the Pyrethroid Pesticides Control Program. With only four years available for comparison, percent detections (see **Table 1**) and percent exceedances (see **Table 2**) of pyrethroid pesticides show low variability across different monitoring years within and between assessment and core years.

The Coalition acknowledges that its future monitoring and potential management actions to control the agricultural discharge of pyrethroids to receiving waters is dependent upon meeting the requirements of the Pyrethroid Pesticides Control Program and the monitoring of this category of analytes may be little affected by the broader monitoring reduction request made in this communication.

Copper, Lead, and Zinc

This group of trace metals is detected in most every water sample analyzed for them, yet there have been extremely few exceedances of relevant water quality objectives for these constituents. It is anticipated that the percent detections and percent exceedances for these three trace metals observed during the period under review will remain similar in future monitoring years.

Arsenic, Boron, and Selenium

Similar to the other group of trace metals described above, arsenic, boron, and selenium are detected in every water sample analyzed for them. It should be noted that the exceedances for these three trace metals shown in **Table 2** were observed at four monitoring sites, two located in Yolo County, one in Sacramento County, and one in Sutter County. Source Evaluation

Reports prepared by the Coalition for selenium[1] and arsenic[2] found that the elevated concentrations of these constituents measured in receiving waters was the result of natural background concentrations in the soil and alluvial sediments within specific drainages and the use of groundwater (containing these constituents) as an irrigation source in these areas. During periods of limited surface water supplies (which correspond to low in-stream flows), groundwater containing these three trace metals is applied as an irrigation source. Any agricultural runoff to surface waters during these periods likely would contain elevated concentrations of these three trace metals via irrigation with groundwater and the runoff would comingle with low surface water flows that ostensibly feature elevated concentrations of dissolved constituents. The Selenium Source Evaluation Report also stated that elevated concentrations of boron in Yolo County are also the result of natural background concentrations in soil, alluvial sediments, and groundwater. It is anticipated that the percent detections and percent exceedances for these three trace metals observed during the period under review at these four monitoring sites will remain similar in future monitoring years.

Nutrients

The high percentage of detections (nitrogen and phosphorous compounds – see **Table 1**) and the low percentage of exceedances (nitrogen compounds – see **Table 2**) for nutrients are illustrative of a category of analytes that are detected in a great many Coalition receiving waters, yet concentrations are low enough to result in very few exceedances of relevant water quality objectives. Throughout the Coalition's 16-year monitoring history, only a single Management Plan for nitrate as N has been triggered. That Management Plan was triggered in November 2009 and deemed completed by the Central Valley Water Board in February 2012. It is anticipated that the percent detections and percent exceedances for nutrients observed during the period under review will remain similar in future monitoring years.

Water and Sediment Toxicity

The Coalition performs many more toxicity tests on water samples as compared to sediment samples. In fact, sediment toxicity testing using the test organism *Hyalella azteca* only accounts for a little less than 13% of all toxicity tests performed by the Coalition. As shown in **Table 2**, both water and sediment toxicity tests show a moderate amount of variability in percent exceedances between monitoring years. In roughly 30-50% of toxicity exceedances observed, there has been no clear agricultural source that could have caused or contributed to the exceedance. This is based on a review of PUR data showing antecedent pesticide applications near in space and time to the location and date of the observed exceedance, and a review of contemporaneous water quality data collected at the exceedance site, if available. Throughout the Coalition's 16-year monitoring history, there have been no chronic patterns of toxicity observed at any Coalition monitoring site.

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[1] Sacramento Valley Water Quality Coalition. 2012. *Source Evaluation Report: Selenium in Willow Slough Bypass.* Prepared by Larry Walker Associates. March.

[2] Sacramento Valley Water Quality Coalition. 2013. *Source Evaluation Report: Arsenic in Grand Island Drain.* Prepared by Larry Walker Associates. August.

Management Plan Completion

An instructive indicator of management practices implementation and associated water quality protection for Central Valley agricultural coalitions is the frequency at which Management Plans are triggered and the rate at which they are deemed to be completed by the Central Valley Water Board. The Likert plot of required (i.e., triggered) versus completed Management Plans presented in **Figure 1** shows the triggering and completion of Management Plans on an annual basis over a 16-year period. During the first five years of Coalition monitoring, a total of 34 individual Management Plans were triggered across multiple analyte categories. Beginning in 2010, the Coalition submitted its first Requests to Complete Management Plans (RTCs) that used monitoring data and education and outreach documentation to show that a particular water quality issue no longer persisted at a Coalition monitoring site. Coalition members have worked diligently each year since Management Plans were triggered to implement management practices to avoid or limit agricultural discharges to receiving waters, and when exceedances of ILRP trigger limits occur they re-double their efforts to avoid a reoccurrence.

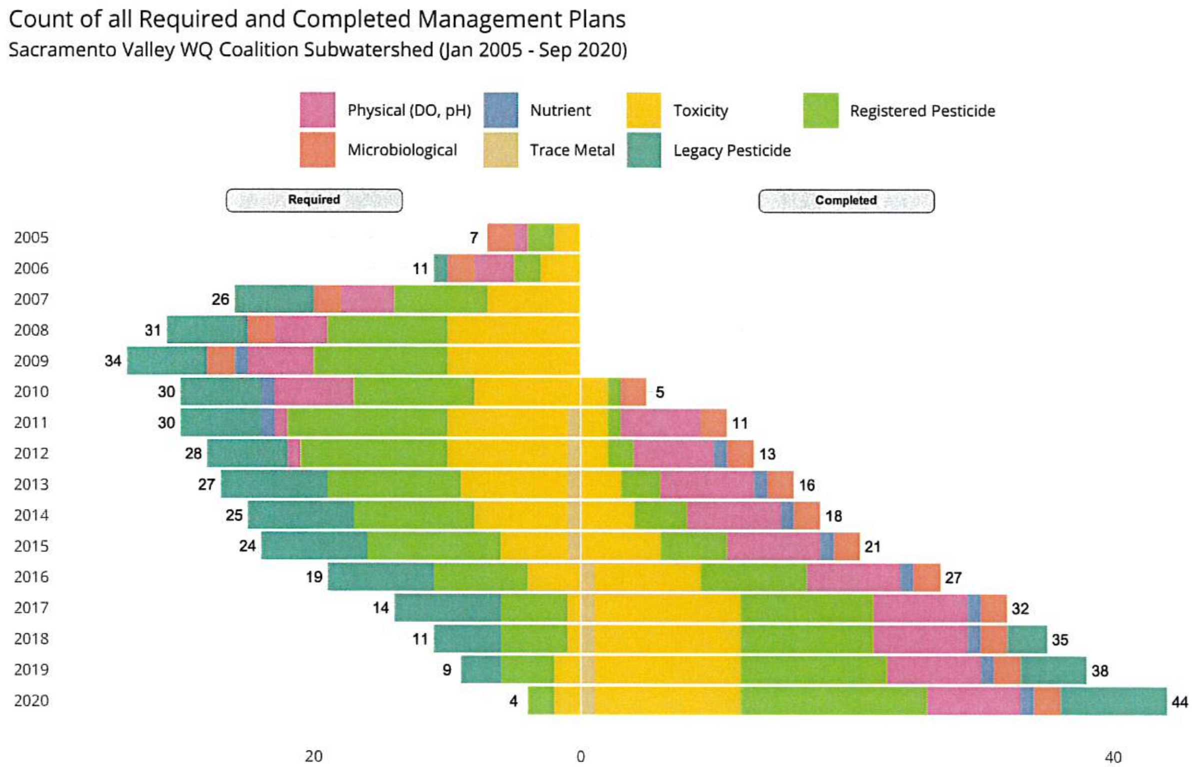

Figure 1. Annual Comparison of Required versus Completed Management Plans in the Sacramento Valley Coalition Watershed: 2005 – 2020.

The Coalition currently has four active Management Plans: two for toxicity in Ulatis Creek, one for chlorpyrifos in Gilsizer Slough, and one for diazinon in Gilsizer Slough. A Request to Complete two of those active Management Plans ((1) unknown toxicity to *Selenastrum* in Ulatis Creek and (2) chlorpyrifos in Gilsizer Slough) will be submitted to the Central Valley Water Board for approval in early 2022.

PROPOSAL FOR REVISION TO EXISTING MONITORING SCHEDULE

Based on the review of surface water monitoring data collected from October 2013 through June 2021, the Coalition believes that sufficient water quality data would be available under a proposed A-C-C (assessment-core-core) monitoring schedule to allow for the timely identification of water quality issues and the continued protection of beneficial uses in the multiple Sacramento Valley receiving waters monitored by the Coalition. A comparison of the existing A-A-C-C monitoring schedule to the proposed A-C-C schedule is provided in **Table 4** for the monitoring years 2022 through 2033. The total monitoring year types for each monitoring schedule over the 12-year period shown in **Table 4** are summarized below:

Existing A-A-C-C schedule: 6 assessment years, 6 core years

Proposed A-C-C schedule: 4 assessment years, 8 core years

The Coalition suggests that the proposed A-C-C monitoring schedule begins with the 2022 MY, which will serve as the first assessment year of the three-year cycle. Approval of the revised schedule is not needed prior to the start of the 2022 MY but will be required when determining whether the 2023 MY will be a core (A-C-C) or assessment (A-A-C-C) monitoring year.

Table 4. Comparison of Existing and Proposed Monitoring Schedules: 2022–2033.

Monitoring Schedule	Monitoring Year											
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Existing	**A**	**A**	C	C	**A**	**A**	C	C	**A**	**A**	C	C
Proposed	**A**	C	C	**A**	C	C	**A**	C	C	**A**	C	C

A = Assessment Monitoring C = Core Monitoring

Support and Mitigation Measures for an A-C-C Monitoring Schedule

The following information revealed by the evaluation of Coalition monitoring data support the transition from six assessment years to four assessment years over a 12-year period. Additional measures already required by the ILRP and some not currently implemented by the Coalition (shown in italics) are noted below to underscore the ability of both the Coalition and Central Valley Water Board staff to identify potential surface water quality issues in a timely manner and ensure the continued protection of beneficial uses in Coalition receiving waters.

- Non-pyrethroid pesticides show mostly low detection rates and very few exceedances of ILRP trigger limits, where such limits exist (see **Table 3**).
  - *As a means to routinely track detection frequency of pesticides that lack an ILRP trigger limit, the Coalition will begin tracking percent detection of these pesticides on an annual basis and provide the information in tabular form in the Annual Monitoring Report beginning with the report for the 2021 MY. This will help identify increases in detection frequency and/or the need for trigger limit development, since changes in detection rates will be less obvious without two consecutive years of assessment monitoring.*
- The long-standing requirement for follow-up monitoring for two years after an exceedance of an ILRP trigger limit is observed will continue. The follow-up monitoring of exceedances always acts to confirm whether the original exceedance was an isolated

incident or the emergence of a more persistent water quality issue that needs to be addressed through the implementation of a Management Plan.

- The Coalition possesses a smaller dataset to evaluate percent detections and percent exceedances for pyrethroid pesticides. The summary statistics for four years of pyrethroid pesticides data presented in **Table 1** and **Table 2** provide a limited assessment of irrigated agriculture's discharge of this class of insecticides to receiving waters as growers learn about the very low levels of detection that can result in an exceedance of the additive concentration goal and adjust their pyrethroid application and discharge management practices accordingly. Existing data show that the Coalition's members likely will need to implement additional management practices to control the discharge of pyrethroid pesticides from irrigated agricultural lands. Future pyrethroid monitoring and management practices implementation/Management Plan development will be required under the Pyrethroid Pesticides Control Program regardless of any action taken by the Executive Officer pursuant to this request.
- The observed variability for percent detections and percent exceedances for individual non-pyrethroid and pyrethroid pesticides, as well as percent exceedances for water and sediment toxicity, when comparing these metrics within and between assessment and core monitoring years will be assessed as part of the routine trend analysis performed by the Coalition and reported in Annual Monitoring Reports that are associated with assessment monitoring years. The complete trend analysis is only performed after the first assessment year because of the larger amount of new data provided through assessment monitoring as compared to core monitoring. This being the case, the Coalition would perform the trend analysis every three years under an A-C-C monitoring schedule, whereas previously this was performed every four years under the A-A-C-C schedule. A trend analysis that uses a reduced list of analytes will continue to be performed during core years. Additionally, the Pesticides Evaluation Protocol will continue to direct which pesticides are monitored each year based on application rate in individual Coalition drainages and relative risk of a given pesticide.
- As categories of analytes, trace metals and nutrients are almost always detected in Coalition water samples, regardless of the intensity of monitoring (see **Table 1**). Copper, lead, zinc, and nitrogen compounds are detected at concentrations that very seldom cause exceedances of relevant water quality objectives (see **Table 2**). Arsenic and boron routinely trigger exceedances at a handful of westside Sacramento Valley monitoring locations where these two trace metals are present at elevated background concentrations in soil, alluvial sediments, and groundwater. Arsenic is also measured at elevated concentrations at one North Delta monitoring site where elevated concentrations exist in groundwater. Trace metals and nutrient contributions from irrigated agriculture pose little threat to Sacramento Valley surface waters.
- A shift to an A-C-C monitoring schedule would not change the monitoring frequency at:
  - Integration Sites.
  - Representative Sites in the five[3] subwatersheds that the Central Valley Water Board has approved for the Reduced Monitoring Option.
  - Monitoring sites under an active Management Plan.

[3] On August 13, 2021, the Central Valley Water Board approved for exemption from the Irrigated Lands Regulatory Program 7,000 irrigated acres of pasture and hay operations in the Goose Lake area.

CONCLUSION

Based on the monitoring results summarized above for the period October 2013 through June 2021, the Coalition believes that a shift to an A-C-C monitoring schedule would not limit the identification of potential new or persistent water quality issues in receiving waters. The Coalition's monitoring data show that surface water quality is quite good in drainages receiving agricultural discharges in the Sacramento Valley. Exceedances of ILRP trigger limits are low and where they have occurred and a Management Plan was triggered, Coalition members have worked diligently to complete them as quickly as possible. The data also show that detections and exceedances generally do not vary widely from one assessment year to another and support omitting a second consecutive assessment year without jeopardizing the adequacy of the Coalition's Monitoring and Reporting Program to detect potential water quality issues in the Sacramento Valley Watershed should they be present. An A-C-C monitoring schedule will continue to adequately characterize discharges from irrigated agricultural lands, provide Central Valley Water Board staff with sufficient data to determine the presence of potential surface water quality impacts in receiving waters, and afford Coalition members information to allow them to avoid or reduce discharges from irrigated lands through the implementation of management practices.

Sincerely,

David J. Guy
President
Northern California Water Association

Attachment A:

Non-Detect Pesticides: October 2013 – June 2021

AnalyteName	MY 2014 Assess	MY 2015 Assess	MY 2016 Core	MY 2017 Core	MY 2018 Assess	MY 2019 Assess	MY 2020 Core	MY 2021* Core
Pesticides with No Detections across All Monitoring Years (MY = Oct. 1 – Sept. 30)								
Aldicarb	✓	✓	✓	✓	NM	NM	NM	NM
Aldrin	✓	✓	✓	NM	✓	NM	NM	NM
Aminocarb	✓	✓	✓	✓	NM	NM	NM	NM
Atrazine	NM	NM	NM	NM	✓	✓	✓	✓
Azinphos-methyl	✓	✓	✓	✓	✓	NM	NM	NM
Barban	✓	✓	✓	✓	NM	NM	NM	NM
Benomyl/Carbendazim	✓	✓	✓	✓	NM	NM	NM	NM
Carbofuran	✓	✓	✓	✓	NM	NM	NM	NM
Chlordane, cis	✓	✓	✓	NM	✓	NM	NM	NM
Chlordane, trans	✓	✓	✓	NM	✓	NM	NM	NM
Chloropicrin	NM	NM	NM	NM	✓	✓	✓	✓
Chlorothalonil	✓	✓	✓	✓	✓	✓	✓	✓
Chloroxuron	✓	✓	✓	✓	NM	NM	NM	NM
Chlorpropham	✓	✓	✓	✓	NM	NM	NM	NM
Dacthal	✓	✓	NM	NM	✓	NM	NM	NM
DDD(o,p)	✓	✓	✓	NM	✓	NM	NM	NM
DDE(o,p)	✓	✓	✓	NM	✓	NM	NM	NM
DDT(o,p)	✓	✓	✓	NM	✓	NM	NM	NM
Demeton	✓	✓	✓	NM	NM	NM	NM	NM
Dieldrin	✓	✓	✓	NM	✓	NM	NM	NM
Disulfoton	✓	✓	✓	NM	NM	NM	NM	NM
Dodine	NM	NM	NM	NM	✓	✓	NM	NM
Endosulfan I	✓	✓	✓	NM	✓	NM	NM	NM
Endosulfan II	✓	✓	✓	NM	✓	NM	NM	NM
Endosulfan sulfate	✓	✓	✓	NM	✓	NM	NM	NM
Endrin	✓	✓	✓	NM	✓	NM	NM	NM
Endrin Aldehyde	✓	✓	✓	NM	✓	NM	NM	NM
Endrin Ketone	✓	✓	✓	NM	✓	NM	NM	NM
Ethoprop	✓	✓	✓	NM	NM	NM	NM	NM
Fenchlorphos	✓	✓	✓	NM	NM	NM	NM	NM
Fensulfothion	✓	✓	✓	NM	NM	NM	NM	NM
Fenthion	✓	✓	✓	NM	NM	NM	NM	NM
NM = Not Monitored	*2021 MY results considered through June 2021							

AnalyteName	MY 2014 Assess	MY 2015 Assess	MY 2016 Core	MY 2017 Core	MY 2018 Assess	MY 2019 Assess	MY 2020 Core	MY 2021* Core
Pesticides with No Detections across All Monitoring Years (MY = Oct. 1 – Sept. 30)								
Fenuron	✓	✓	✓	✓	NM	NM	NM	NM
Flumioxazin	NM	NM	NM	NM	✓	NM	✓	NM
Fluometuron	✓	✓	✓	✓	NM	NM	NM	NM
HCH, alpha	✓	✓	✓	NM	✓	NM	NM	NM
HCH, beta	✓	✓	✓	NM	✓	NM	NM	NM
HCH, delta	✓	✓	✓	NM	✓	NM	NM	NM
HCH, gamma	✓	✓	✓	NM	✓	NM	NM	NM
Heptachlor	✓	✓	✓	NM	✓	NM	NM	NM
Heptachlor epoxide	✓	✓	✓	NM	✓	NM	NM	NM
Hexachlorobenzene	✓	NM	NM	NM	NM	NM	NM	NM
Linuron	✓	✓	✓	✓	✓	✓	NM	NM
Methamidophos	✓	NM	NM	NM	NM	NM	NM	NM
Methidathion	✓	✓	✓	NM	✓	✓	NM	NM
Methiocarb	✓	✓	✓	✓	✓	✓	NM	NM
Methoxychlor	✓	✓	✓	NM	✓	NM	NM	NM
Mevinphos	✓	✓	✓	NM	NM	NM	NM	NM
Mexacarbate	✓	✓	✓	✓	NM	NM	NM	NM
Mirex	✓	NM	NM	NM	NM	NM	NM	NM
Monuron	✓	✓	✓	✓	NM	NM	NM	NM
Neburon	✓	✓	✓	✓	NM	NM	NM	NM
Nonachlor, cis-	✓	NM	NM	NM	NM	NM	NM	NM
Nonachlor, trans-	✓	NM	NM	NM	NM	NM	NM	NM
Oxamyl	✓	✓	✓	✓	NM	NM	NM	NM
Oxychlordane	✓	NM	NM	NM	NM	NM	NM	NM
Paraquat	NM	NM	NM	NM	✓	✓	✓	✓
Parathion, Methyl	✓	✓	✓	NM	NM	NM	NM	NM
Pendimethalin	NM	NM	NM	NM	✓	✓	✓	✓
Perthane	✓	NM	NM	NM	NM	NM	NM	NM
Phorate	✓	✓	✓	NM	✓	✓	NM	NM
Phosmet	✓	✓	✓	NM	NM	NM	NM	NM
Prometryn	NM	NM	NM	NM	✓	✓	✓	NM
Propachlor	✓	✓	✓	✓	NM	NM	NM	NM
Propham	✓	✓	✓	✓	NM	NM	NM	NM
Propoxur	✓	✓	✓	✓	NM	NM	NM	NM
Pyridaben	NM	NM	NM	NM	✓	✓	✓	✓
Siduron	✓	✓	✓	✓	NM	NM	NM	NM
NM = Not Monitored	*2021 MY results considered through June 2021							

AnalyteName	MY 2014 Assess	MY 2015 Assess	MY 2016 Core	MY 2017 Core	MY 2018 Assess	MY 2019 Assess	MY 2020 Core	MY 2021* Core
Pesticides with No Detections across All Monitoring Years (MY = Oct. 1 – Sept. 30)								
Sulprofos	✓	✓	✓	NM	NM	NM	NM	NM
Tebuthiuron	✓	✓	✓	✓	NM	NM	NM	NM
Tetrachlorvinphos	✓	✓	✓	NM	NM	NM	NM	NM
Tokuthion	✓	✓	✓	NM	NM	NM	NM	NM
Trichloronate	✓	✓	✓	NM	NM	NM	NM	NM
Trifluralin	NM	NM	NM	NM	✓	✓	✓	✓
NM = Not Monitored	*2021 MY results considered through June 2021							