MLJ ENVIRONMENTAL

Monitoring Plan Update

2019 WY (October 2018 – September 2019)

East San Joaquin Water Quality Coalition

Central Valley Regional Water Board

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LIST OF ACRONYMS

AI	Active Ingredient
AACGU	AACGU Concentration Goal Unit
C	Core site
CalPIP	California Pesticide Information Portal
CVRWQCB	Central Valley Regional Water Quality Control Board (Regional Board)
DDE	Dichlorodiphenyldichloroethylene
DO	Dissolved Oxygen
DPR	Department of Pesticide Regulation
DWSC	Deep Water Ship Channel
ESJWQC	East San Joaquin Water Quality Coalition
ILRP	Irrigated Lands Regulatory Program
MPM	Management Plan Monitoring
MPU	Monitoring Plan Update
MRP	Monitoring and Reporting Program
PEP	Pesticide Evaluation Protocol
pH	Power of Hydrogen
PUR	Pesticide Use Report
R	Represented site
RMP	Regional Monitoring Program
SC	Specific Conductance
SQMP	Surface Water Quality Management Plan
TIE	Toxicity Identification Evaluation
TOC	Total Organic Carbon
TSS	Total Suspended Solids
TMDL	Total Maximum Daily Load
WDR	Waste Discharge Requirements General Order for Growers within the Eastern San Joaquin River Watershed, Order R5-2012-0116 (The Order)
WQTL	Water Quality Trigger Limit
WY	Water Year

LIST OF UNITS

cfs	cubic feet per second
lbs	pounds
L	liter
mg	milligram
µg	microgram

SURFACE WATER MONITORING OVERVIEW

This East San Joaquin Water Quality Coalition (ESJWQC or Coalition) is submitting the 2019 Water Year Monitoring Plan Update (2019 WY MPU) which provides the schedules and the rationale for monitoring in the 2019 Water Year (WY) based on the requirements in the Waste Discharge Requirements General Order for Growers within the Eastern San Joaquin River Watershed, Order R5-2012-0116-R4 (hereafter the 'WDR' or 'Order'). Water quality results through May 2018 were evaluated to determine the 2019 WY monitoring schedule. The remaining 2018 WY monitoring results (June through September) and associated Pesticide Use Report (PUR) data will be evaluated in an addendum to the MPU to be submitted on January 15, 2019; the 2019 WY monitoring schedule will be modified as needed. The Coalition will conduct monitoring at Core and Represented sites during the 2019 WY as described below. Monitoring includes Management Plan Monitoring (MPM), Total Maximum Daily Load (TMDL) monitoring, and monitoring for sediment-bound constituents during periods with elevated concentrations of Total Suspended Solids (TSS).

NORMAL MONITORING

The Coalition conducts Normal Monitoring (NM) at Core and Represented sites to characterize discharge from irrigated agriculture. As described in the Monitoring and Reporting Program (MRP), Attachment B to the WDR, surface water monitoring at Core sites occurs once a month and includes an assessment of field parameters, nutrients, pathogens, pesticides, metals, and toxicity to water column and sediment test species. The Coalition evaluates the potential risk for water quality impairments at Represented sites when an exceedance of a Water Quality Trigger Limit (WQTL) occurs at an associated Core site. The rationale for monitoring at Represented sites is discussed in the Monitoring at Represented Sites section of this report. Attachment A is an Excel workbook that includes site information and the monitoring schedule for the 2019 WY. Table 1 and Table 2 below provide the frequency of monitoring for each constituent at each Core and Represented site.

The Coalition attempts to sample two storm events per year. A storm monitoring event is defined as monitoring within three days of a rainfall event that exceeds 0.25 inches within 24 hours.

The Coalition samples every site scheduled for monitoring; however, certain field conditions can prevent samples from being collected. If a site has no water during the scheduled sampling event, the Coalition identifies the site as 'dry' and no samples are collected. If a site does not have enough water for sample collection, the Coalition identifies the site as 'too shallow' or 'non-contiguous' (puddle-like conditions; waterbody not connected upstream or downstream) and no samples are collected (approved as Amendment to the Quality Assurance Project Plan on April 12, 2017). The Coalition collects field measurements (DO, pH, SC) during every monitoring event when water samples are able to be collected.

Available Pesticide Use Report (PUR) data are provided to the Coalition from each of the County Agricultural Commissioner's offices and compiled into an internal database with data that are available from the California Pesticide Information Portal (CalPIP). Pesticide applications recorded in the database are associated with exceedances of WQTLs. The PUR data used for the 2019 WY MPU include applications of Active Ingredients (AI) that occurred from January 2017 through December 2017 and are considered preliminary until formally QA/QC'd through the California Department of Pesticide Regulations (CDPR) and made available on CalPIP. CalPIP data are available for pesticides applied through December 2016.

Core Site Pesticide Selection Process

As indicated in the WDR, MRP (Attachment B, page 6), pesticide monitoring is to be identified by the Coalition using a list of pesticides and a set of evaluation factors provided by the Executive Officer (EO). For the 2019 WY, the schedule for monitoring pesticides and metals (boron, copper, and zinc) at Core sites will occur based on the results of the Pesticide Evaluation Protocol (PEP; disseminated November 29, 2016).

The PEP process starts with evaluating pesticides applied within the site subwatershed over the past three years that are listed on the EO list (376 pesticides). The degradates of parent pesticides are added to the evaluation list before a series of pesticide elimination steps are conducted as listed in the PEP. The series of steps the Coalition used to determine which pesticides to monitor for the upcoming WY includes:

- Compiling the last three years of PUR data for each site subwatershed
- Excluding pesticides not on the EO's list of pesticides,
- Adding degradates of any parent compounds that have reported usage,
- Grouping pesticides with the same toxicant in water,
- Calculating the cumulative monthly average for each pesticide,
- Calculating the annual use averaged by month for each pesticide,
- Calculating the Aquatic Life Relative Risk Ratio (cumulative monthly average divided by aquatic life reference value), and
- Calculating the Human Health Relative Risk Ratio (annual monthly use divided by human health reference value).

The last five years of monitoring data were then evaluated against the relative risk ratios to determine if previous monitoring was sufficient to characterize the potential impact of the pesticides on aquatic life (explained in the Pesticide Monitoring at Core Sites section of this report). Pesticides were excluded from monitoring if any of the evaluation steps below were true.

1. Pesticides with an organic carbon partitioning coefficient (K_{oc}) greater than 100,000 and aquatic life reference value above 1 µg/L,
2. Pesticides with a hydrolysis half-life of less than one day, and
3. Pesticides with both vapor pressure greater than $1x10^{-4}$ mPa and Henry's Law Constant greater than 100 Pa m^3/mol.

Attachment B includes an Excel workbook with exclusion notes of the PEP process and additional site-specific rationale for the exclusion of pesticides. Site specific considerations are discussed in the Core Site Pesticides section of this report.

Reduced Monitoring for the Delta RMP

The ESJWQC contributes funds to the Delta Regional Monitoring Program (Delta RMP) which is a coordinated monitoring effort across many entities. The program is designed to fill data gaps related to contaminants, water quality impairments, aquatic health, and also reduce redundant monitoring efforts and cost.

For the 2019 WY, the Coalition is proposing to continue reduced monitoring for toxicity to *Pimephales promelas* at Core sites and eliminate monitoring at Highline Canal @ Lombardy Rd; this is consistent with the monitoring swap approved for the 2018 WY.

During the 2019 WY, the Coalition will monitor for *P. promelas* during months scheduled for MPM and at Represented sites as determined necessary.

Table 1. ESJWQC 2018 WY monitoring frequency (field parameters, physical parameters, nutrients, bacteria, and metals).

Core sites are bolded. A complete list of sites, analytes, and months to be monitored are listed in Attachment A.

2019 WY Sample Counts			Field Parameters				Physical Parameters				Bacteria	Nutrients			Metals							
Zone	Site Name	2019 WY Monitoring Type	Oxygen, Dissolved	pH	Specific Conductivity	Temperature	Dissolved Organic Carbon	Total Organic Carbon	Total Suspended Solids	Turbidity	*E. coli*	Ammonia as N	Nitrate + Nitrite as N	OrthoPhosphate as P	Arsenic	Cadmium	Copper	Lead	Molybdenum	Nickel	Selenium	Hardness as CaCO3
Zone 1	Dry Creek @ Church St	C	12	12	12	12	6	12	12	12	12	12	12	12								
Zone 2	Westport Drain @ Vivian Rd	C	11	11	11	11	7	11	11	10	11	11	11	11	4	4		4	4	4	4	4
	Hatch Drain @ Tuolumne Rd	R	10	10	10	10	8	8														
	Hilmar Drain @ Central Ave	R	9	9	9	9	8	8														
	Lateral 2 1/2 near Keyes Rd	R	6	6	6	6	5	5														
	Lateral 5 1/2 @ South Blaker Rd	R	11	11	11	11	8	8														
	Lateral 6 and 7 @ Central Ave	R	9	9	9	9	8	8				1										
	Levee Drain @ Carpenter Rd	R	7	7	7	7	7	7														
	Lower Stevinson @ Faith Home Rd	R	10	10	10	10	8	8														
	Prairie Flower Drain @ Crows Landing Rd	R	8	8	8	8	5	5														
	Unnamed Drain @ Hogin Rd	R	7	7	7	7	7	7														
Zone 3	Highline Canal @ Hwy 99	C	12	12	12	12	7	12	12	11	12	12	12	12								5
		MPM															5					
	Mustang Creek @ East Ave	MPM															5					5
		R	8	8	8	8																
Zone 4	Merced River @ Oakdale Rd	C	12	12	12	12	8	12	12	12	12	12	12	12								
	Bear Creek @ Kibby Rd	R	3	3	3	3																
	Black Rascal Creek @ Yosemite Rd	R	3	3	3	3											3					3
	Howard Lateral @ Hwy 140	MPM	4	4	4	4											4					4
	Livingston Drain @ Robin Ave	MPM	4	4	4	4											4					4
	McCoy Lateral @ Hwy 140	R	4	4	4	4																
Zone 5	Duck Slough @ Gurr Rd	C	12	12	12	12	9	12	12	12	12	12	12	12								
	Deadman Creek @ Gurr Rd	R	6	6	6	6											4					4
	Deadman Creek @ Hwy 59	MPM															4					4
		R	6	6	6	6																
	Miles Creek @ Reilly Rd	MPM	2	2	2	2											1					1
Zone 6	Cottonwood Creek @ Rd 20	C	11	11	11	11	7	11	11	11	11	11	11	11			1					6
		MPM															5					
	Ash Slough @ Ave 21	MPM	1	1	1	1											1					1
	Berenda Slough along Ave 18 1/2	MPM	4	4	4	4											4					4
	Dry Creek @ Rd 18	MPM	4	4	4	4											4					4
TMDL	San Joaquin River above Maze Boulevard	OP-TMDL	6	6	6	6																
	San Joaquin River at Airport Way near Vernalis	OP-TMDL	6	6	6	6																
	SJR @ Hills Ferry	OP-TMDL	6	6	6	6																

C –Core site
M – Management Plan Monitoring
R - Represented site
[1] Hardness will be analyzed with dissolved metals.

Table 2. ESJWQC 2017 WY monitoring frequency (pesticides and toxicity).

Core sites are bolded. A complete list of sites, analytes, and months to be monitored are listed in Attachment A.

2019 WY Sample Counts			Pesticides																															Pyrethroid							Water Column Toxicity			Sed Tox		
Zone	Site Name	2019 WY Monitoring Type	2,4-DB	Acetamiprid	Bromacil	Carbaryl	Chloropicrin	Chlorothalonil	Chlorpyrifos	Cyprodinil	Diazinon	2,4-D	Dimethoate	Diuron	Ethalfluralin	Glyphosate	Hexazinone	Imidacloprid	Iprodione	Linuron	Malathion	Mancozeb	Methomyl	Oryzalin	Oxyfluorfen	Paraquat	Pendimethalin	Propiconazole	Pyraclostrobin	Simazine	Trifluralin	Bifenthrin	Cyfluthrin	Cyhalothrin, lambda-	Cypermethrin	Esfenvalerate/Fenvalerate,	Fenpropathrin	Permethrin	Ceriodaphnia dubia	Pimephales promelas	Selenastrum capricornutum	Hyalella azteca	Grain size	Total Organic Carbon
Zone 1	Dry Creek @ Church St	C	2				2	2	1	1						2		3	1			1			4	2	5		2	2		5	2	3	3	4	1	4	9	9	8	2	2	2
Zone 2	Westport Drain @ Vivian Rd	C	2					2	2				3		1	2					2		1		5	2	3					4	2	4		2		1	7	8	7	2	2	2
	Hatch Drain @ Tuolumne Rd	MPM																																							3	1		
		R																													3		4				2	2					
	Hilmar Drain @ Central Ave	MPM																																						3				
		R							1																						4	3	5	3				2					
	Lateral 2 1/2 near Keyes Rd	MPM																																						4				
		R																													3	3	4	2	4	4	2	6					
	Lateral 5 1/2 @ South Blaker Rd	MPM																																						11				
		R																													4	5	3	3	1	2	1						
	Lateral 6 and 7 @ Central Ave	R							6																						4	5	3	3	1	2	2						
	Levee Drain @ Carpenter Rd	MPM																																						1				
		R																													4	1	3	2			3						
	Lower Stevinson @ Faith Home Rd	R							7																						4	4	4	4	3	2	1						
	Prairie Flower Drain @ Crows Landing Rd	MPM							3																													4		8			
		R																													1		5	2			1						
	Unnamed Drain @ Hogin Rd	R																													3		6				2	4					
Zone 3	Highline Canal @ Hwy 99	C	2				3	2		1		2		1		2		2				1		1	3	2	4	1	2	2		4	5	3	3	2	1	2	9	8	9	2	2	2
		MPM							1																															3				
	Mustang Creek @ East Ave	R							4																													1						
Zone 4	Merced River @ Oakdale Rd	C		1			3	2					1			2		2			4				4	2	5		4	3		4	4	3	3	3		1	11	12	10	2	2	2
		MPM							3																																			
	Bear Creek @ Kibby Rd	R							3																																			
	McCoy Lateral @ Hwy 140	R							4																																			
Zone 5	Duck Slough @ Gurr Rd	C	4			1	1	4		1			1			2	1	2						1	3	2	3		1			6	3	5	4	3	3	4	7	10	8	2	2	2
		MPM							3												2																			3					
	Deadman Creek @ Gurr Rd	MPM																																						1	1				
		R																																								1		
	Deadman Creek @ Hwy 59	R							3												1																								
	Miles Creek @ Reilly Rd	MPM							1																																			
Zone 6	Cottonwood Creek @ Rd 20	C			1	1	1	3	4	1	1	1		3		2		3		1	4		2	2	4	2	5		6	4	3	5	2	4	1	2	3	3	10	9	9	2	2	2
TMDL	San Joaquin River above Maze Boulevard	OP-TMDL							6		6																																		
	San Joaquin River at Airport Way near Vernalis	OP-TMDL							6		6																																		

2019 WY Sample Counts			Pesticides																														Pyrethroid							Water Column Toxicity			Sed Tox		
Zone	Site Name	2019 WY Monitoring Type	2,4-DB	Acetamiprid	Bromacil	Carbaryl	Chloropicrin	Chlorothalonil	Chlorpyrifos	Cyprodinil	Diazinon	2,4-D	Dimethoate	Diuron	Ethalfluralin	Glyphosate	Hexazinone	Imidacloprid	Iprodione	Linuron	Malathion	Mancozeb	Methomyl	Oryzalin	Oxyfluorfen	Paraquat	Pendimethalin	Propiconazole	Pyraclostrobin	Simazine	Trifluralin	Bifenthrin	Cyfluthrin	Cyhalothrin, Lambda-	Cypermethrin	Esfenvalerate/Fenvalerate,	Fenpropathrin	Permethrin	Ceriodaphnia dubia	Pimephales promelas	Selenastrum capricornutum	Hyalella azteca	Grain size	Total Organic Carbon
	SJR @ Hills Ferry	OP-TMDL							6		6																																		

C-Core site
M-Management Plan Monitoring
R-Represented site

SPECIAL PROJECT MONITORING

Special Project Monitoring includes 1) site specific MPM to address sites in a management plan, 2) monitoring during High TSS events, and 3) monitoring for parameters associated with a TMDL.

Management Plan Monitoring

Management Plan Monitoring is conducted as part of the Coalition's management plan strategy that involves identifying contaminant sources and evaluating the effectiveness of newly implemented management practices. The Coalition conducts MPM as outlined in the 2014 Surface Water Quality Management Plan (SQMP; approved on November 4, 2015). The flowchart in Figure 1 is used to determine what action is required to remain in compliance with deadlines and address all constituents in a management plan within a practicable timeframe. The Coalition uses the flowchart to evaluate 1) management plans reaching the 10-year compliance deadline in the next three years, and 2) recently initiated management plans or reinstated management plans due to exceedances in the previous water years.

For any exceedances of the WQTLs for pesticides, the Coalition begins sourcing, outreach, and monitoring activities within three years from the initiation of a management plan (Table 3).

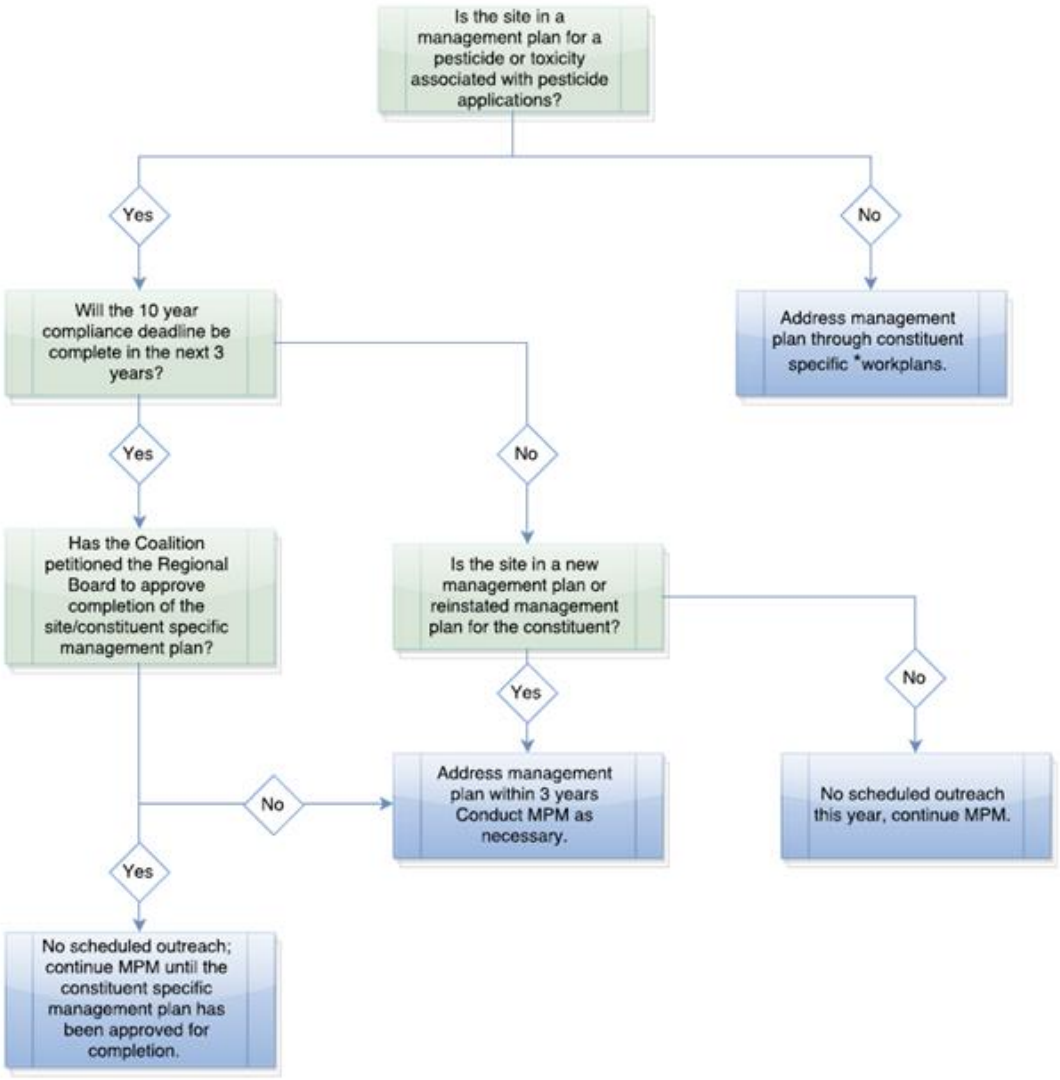
The Coalition will conduct MPM at Core sites according to the frequency outlined in Attachment B of the Order (Table 1 and Table 2).

Management Plan Monitoring occurs at Represented sites at a frequency that corresponds to the potential discharge of the constituent based on PUR data and past exceedances. The following process is used to determine the frequency of MPM at Represented sites:

- Determine months of past exceedances for pesticides, metals, and toxicity,
- Determine months of high use and seasonal trends of pesticide use using PUR data, and compare those trends with water quality data.

Constituents not applied by agriculture, including ammonia, *E. coli*, field parameters, lead, legacy pesticides such as dichlorodiphenyldichloroethylene or DDE, metals (arsenic and molybdenum), and nitrates are not easily traced and multiple sources may contribute to the levels detected in the waterbodies. The Coalition submitted preliminary source analyses for all constituents that are not applied by agriculture during the 2016 WY according to the schedule outlined in the 2014 SQMP. The Coalition provided evidence that suggests detections of these constituents in waterbodies could be the result of 1) natural occurrences in the environment, 2) the constituent could be applied by other entities in the Coalition region, and/or 3) the constituent is an artifact of use that has since been discontinued. The amount these sources contribute to water quality impairments is unknown and there is not enough evidence to suggest management practices implemented by growers will improve water quality. The Coalition does not monitor ammonia, field parameters, lead, DDE, arsenic, molybdenum, and nitrate as part of MPM or at Represented sites. The Coalition will work with Regional Board to determine next steps upon review of the preliminary source analysis. The Coalition's approach for addressing *E. coli* management plans was submitted on April 30, 2018 and Coalition staff will work with Regional Board staff to address any questions or concerns.

Figure 1. Management plan strategy flowchart based on the 2014 SQMP.



*Workplan timelines are proposed in the SQMP (submitted May 1, 2014 and resubmitted March 10, 2015).

Table 3. ESJWQC management plan strategy analysis for the 2019 WY.

Sites are listed in order of the 10-year deadline alphabetically. The MPM schedule is included in the Excel workbook in Attachment A.

10 Yr Compliance Deadline	Site	Constituent	Last Outreach Date	Last Exceedance	10 Year Deadline Next 3 Yrs	Petition to Complete (if no exd.)	2019 Focused Outreach	2019 MPM
2017	Ash Slough @ Ave 21	Copper	2014-2016	2017 WY	X			X
2017	Duck Slough @ Gurr Rd	*C. dubia*	2010-2012; 2016-2018	2015 WY	X	X		X
2017	Dry Creek @ Rd 18	Copper	2011-2013; 2017-2019	2017 WY	X			X
2017	Cottonwood Creek @ Rd 20	Copper	2010-2012	2018 WY	X		X	X
2017	Deadman Creek @ Hwy 59	Chlorpyrifos	2012-2014	2011	X	X		X
2018	Prairie Flower Drain @ Crows Landing Rd	*C. dubia*	2008-2010; 2016-2018	2018 WY	X			X
2018	Highline Canal @ Hwy 99/ Lombardy	Copper	2010-2012; 2016-2018	2017 WY	X			X
2018	Livingston Drain @ Robin Ave	Copper	2011-2013; 2017-2019	2018 WY	X			X
2018	Deadman Creek @ Gurr Rd	*P. promelas*	2012-2014	2014 WY	X	X		X
2018	Hatch Drain @ Tuolumne Rd	*H. azteca*	2013-2015	2014 WY	X	X		X
2018	Hilmar Drain @ Central Ave	*S. capricornutum*	2012-2014	2017 WY	X			X
2018	Miles Creek @ Reilly Rd	Copper	2013-2015; 2017-2019	2017 WY	X			X
2019	Prairie Flower Drain @ Crows Landing Rd	*S. capricornutum*	2008-2010; 2016-2018	2018 WY	X			X
2019	Highline Canal @ Hwy 99/Lombardy	*S. capricornutum*	2010-2012; 2016-2018	2015 WY	X	X		X
2019	Hatch Drain @ Tuolumne Rd	*S. capricornutum*	2013-2015	2018 WY	X			X
2020	Deadman Creek @ Gurr Rd	*C. dubia*	2012-2014	2014 WY	X	X		X
2020	Mustang Creek @ East Ave	Copper	2014-2016	2017 WY	X			X
2021	Howard Lateral @ Hwy 140	Copper	2015-2017	2018 WY	X			X
2022	Berenda Slough along Ave 18 1/2	Copper	2011-2013	2017 WY				X
2022	McCoy Lateral @ Hwy 140	Copper	NA	2013				
2025	Duck Slough @ Gurr Rd	Chlorpyrifos	2010-2012; 2016-2018	2015 WY		X		X
2025	Levee Drain @ Carpenter Rd	*S. capricornutum*	2015-2017	2017 WY				X
2025	Lateral 5 1/2 @ South Blaker Rd	*S. capricornutum*	2018-2020	2018 WY				X
2025	Lower Stevinson @ Faith Home Rd	*S. capricornutum*	NA	2015 WY		X		
2026	Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	2008-2010; 2016-2018	2017 WY				X
2026	Duck Slough @ Gurr Rd	Malathion	2010-2012; 2016-2018	2015 WY		X		X
2026	Highline Canal @ Hwy 99	Chlorpyrifos	2010-2012; 2016-2018	2016 WY				X
2026	Lateral 2 1/2 near Keyes Rd	*S. capricornutum*	2011-2013; 2017-2019	2016 WY				X
2026	Lateral 6 and 7 @ Central Ave	*S. capricornutum*	NA	2015 WY		X		
2027	Merced River @ Oakdale Rd	Chlorpyrifos	2013-2015	2018 WY				X
2028	Miles Creek @ Reilly Rd	Chlorpyrifos	2013-2015; 2017-2019	2017 WY				X
2028	Canal Creek @ West Bellevue	Copper	NA	2017 WY				
2029	Deadman Creek @ Hwy 59	Copper	2012-2014	2018 WY				X
2029	Cottonwood Creek @ Rd 20	Chlorpyrifos	2010-2012	2018 WY			X	X

TBD – Focused Outreach within the site subwatershed has not occurred to initiate MPM. For any exceedances of WQTLs for pesticides that trigger a management plan, the Coalition will begin sourcing, outreach, and monitoring activities within 3 years from the initiation of the management plan

Table 4. Management plan constituents and associated sites for which source identification analysis was conducted.

Constituent	Preliminary Analysis Submittal Date	Core sites						Represented sites																							
		Cottonwood Creek @ Rd 20	Dry Creek @ Church St	Duck Slough @ Gurr Rd	Highline Canal @ Hwy 99	Merced River @ Oakdale Rd	Prairie Flower Drain @ Crows Landing Rd	Ash Slough @ Ave 21	Bear Creek @ Kibby Rd	Berenda Slough along Ave 18 ½	Black Rascal Creek @ Yosemite Rd	Canal Creek @ West Bellevue Rd	Deadman Creek @ Gurr Rd	Deadman Creek @ Hwy 59	Dry Creek @ Rd 18	Hatch Drain @ Tuolumne Rd	Highline Canal @ Lombardy Rd	Hilmar Drain @ Central Ave	Howard Lateral @ Hwy 140	Lateral 2 ½ near Keyes Rd	Lateral 5 ½ @ South Blaker Rd	Lateral 6 and 7 @ Central Ave	Levee Drain @ Carpenter Rd	Livingston Drain @ Robin Ave.	Lower Stevinson @ Faith Home Rd	McCoy Lateral @ Hwy 140	Miles Creek @ Reilly Rd	Mootz Drain downstream of Langworth Pond	Mustang Creek @ East Ave	Unnamed Drain @ Hogin Rd	Unnamed Drain @ Hwy 140	Westport Drain @ Vivian Rd
DO	2/2/2016		X	X	X	X	X			X	X	X	X	X		X	X	X	X			X	X	X	X		X	X	X	X	X	X
pH	2/2/2016		X	X	X		X		X	X	X	X	X	X	X		X		X	X	X	X	X		X	X	X	X				X	X
SC	NA[1]			X	X		X					X	X		X	X	X	X	X	X	X	X	X	X		X			X	X	X		X
Ammonia	4/4/2016			X	X		X						X					X					X			X			X				
Nitrate	4/4/2016						X									X		X			X	X	X		X					X			X
E. coli	NA[2]	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X		X	X			X	X	X	X		X	X
Arsenic	3/23/2016			X									X	X		X																	
Copper	3/23/2016	X			X			X		X		X			X		X		X						X		X	X		X			
Molybdenum	3/23/2016						X																										
DDE	5/2/2016																													X			

NA-Not Applicable; a preliminary analysis was not submitted in the 2016 WY.

[1]Salinity is being addressed by CV-SALTS which is a collaborative effort to develop and implement a salinity and nitrate management program and Basin Plan Amendment.

[2]The Coalition currently relies on existing agricultural practices to manage *E. coli* pollution.

Total Maximum Daily Load Monitoring

The ESJWQC will monitor parameters that are part of an adopted TMDL with a source of agriculture, in accordance with adopted Basin Plan provisions or as directed by the Executive Officer. Currently, the ESJWQC TMDL parameters for the San Joaquin River include salt, boron, diazinon, and chlorpyrifos. The ESJWQC utilizes existing monitoring data collected during NM and/or metals monitoring for all of the above TMDLs except for diazinon and chlorpyrifos.

Chlorpyrifos and Diazinon

The ESJWQC and the Westside San Joaquin River Water Coalition (WSJRWC) collaborated to develop a monitoring plan for assessing compliance with concentration-based loads of chlorpyrifos and diazinon at six compliance sites in the Lower San Joaquin River. Those compliance sites are identified in the Basin Plan Amendment (October 2005). The ESJWQC conducts monitoring to assess compliance at three of the six compliance points: San Joaquin River at Hills Ferry Rd, San Joaquin River at the Maze Blvd Bridge, and San Joaquin River at the Airport Way Bridge near Vernalis. These sites are monitored once during the winter storm season (January or February) and monthly from May through September.

MONITORING AT CORE SITES

During the 2019 WY, the Coalition monitors designated Core sites within each of the six zones in the ESJWQC region for 12 months (October 2018 through September 2019). Each Core site is monitored for two consecutive years, after which, a second Core site is monitored in each zone for two years. Monitoring at the two designated Core sites is alternated every two years.

The Core sites listed in Table 5 are the primary set of Core sites that rotated into monitoring for the 2018 and 2019 WYs. Due to influences on water quality from non-agricultural sources, the Coalition requested to exchange Prairie Flower Drain @ Crows Landing Rd (monitor as Represented site beginning in 2019 WY) with Westport Drain @ Vivian Rd (designate as the new Core site in Zone 2) beginning October 2018 (July 20, 2018; pending approval). The Coalition anticipates the request will be approved prior to monitoring in October 2018. This 2019 WY MPU provides the PEP schedule and MPM schedule for the new Core site, Westport Drain @ Vivian Rd. Additional monitoring at Represented sites was evaluated based on exceedances that occurred at Prairie Flower Drain @ Crows Landing Rd during the 2018 WY. If the request to monitor Westport Drain @ Vivian Rd is not approved, the Coalition will submit a revised monitoring schedule.

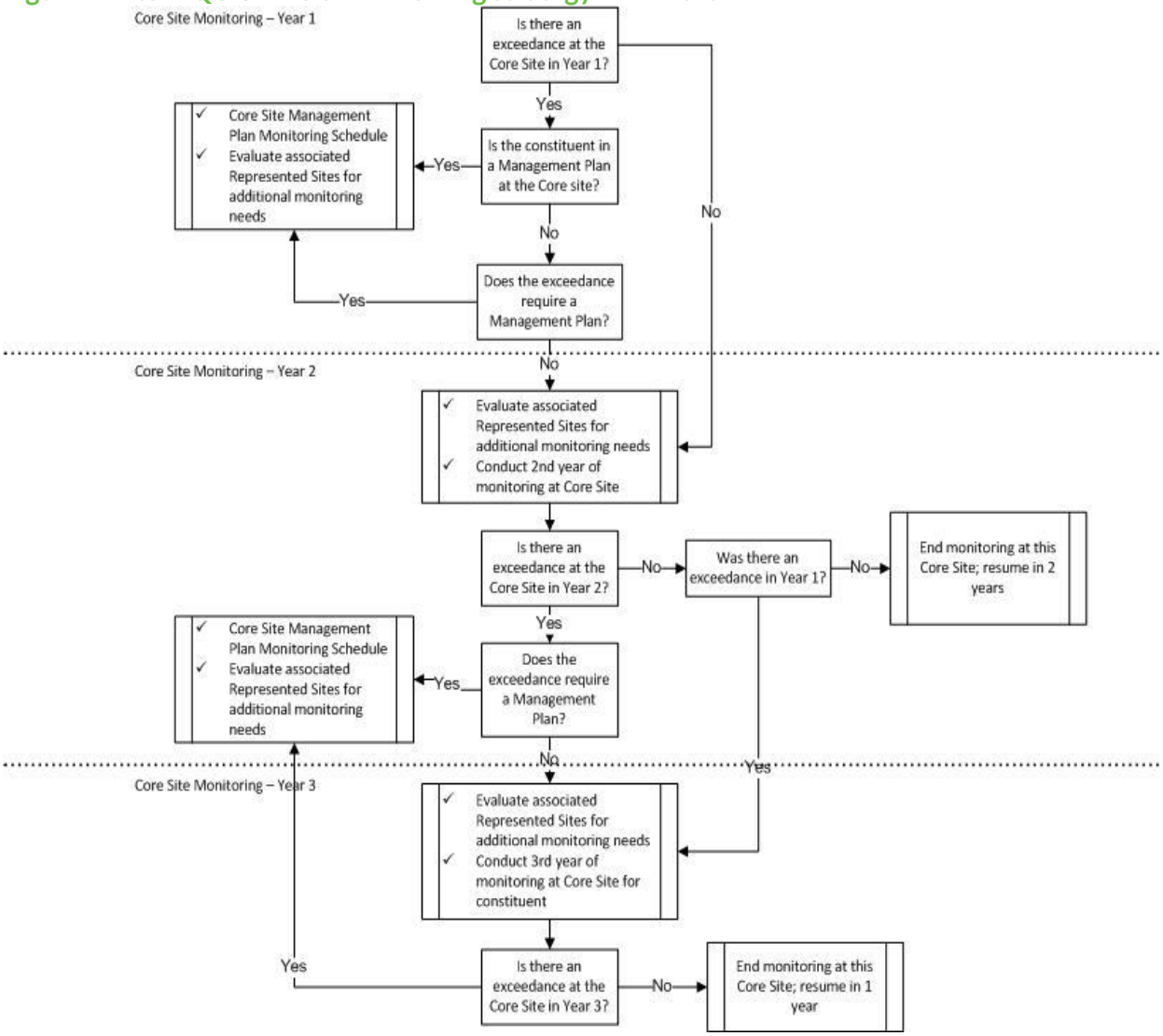
The Coalition will monitor field parameters, nutrients, bacteria, water column and sediment toxicity at each Core site as indicated in (Table 1). Table 1 lists all monitoring constituents and outlines the monitoring frequency during the 2019 WY at Core sites.

Table 5. ESJWQC Core sites by zone for the 2019 WY.

Zone	Site Type	Site Name	Station Code	Latitude	Longitude
1	Core	Dry Creek @ Church St	535XDCCHS	37.66603	-120.89825
2	Core	Westport Drain @ Vivian Rd[1]	535XWDAVR	37.53682	-121.04861
3	Core	Highline Canal @ Hwy 99	535XHCHNN	37.41254	-120.75941
4	Core	Merced River @ Oakdale Rd	535XMRORD	37.45417	-120.60778
5	Core	Duck Slough @ Gurr Rd	535XDSAGR	37.21408	-120.56126
6	Core	Cottonwood Creek @ Rd 20	545XCCART	36.86860	-120.18180

[1] Core site for 2019 WY. Prairie Flower Drain @ Crows Landing Rd was the Core site from the 2014 through the 2018 WY.

Figure 2. ESJWQC Core site monitoring strategy flowchart.



CORE SITE PESTICIDES

The Coalition utilizes steps in the PEP to establish a subset of pesticides to consider for monitoring in the upcoming WY. The Coalition reviews the relative risk ratios to exclude chemicals with low risk to aquatic life and human health. The lists of pesticides remaining are reviewed for site specific considerations. The Coalition assessed whether chemicals should be monitored based on management plan status, the relative risk to aquatic life and human health, and the average percent monthly use. Completed management plans indicate growers have implemented management practices effective in managing constituents of concern regardless of the amount applied. In these cases, the Coalition assesses MPM results and the implementation of practices to justify excluding these pesticides from the 2019 WY monitoring schedule. Chemicals with a higher probability of being detected based on use are incorporated into the monitoring schedule including pesticides in active management plans.

The rationale for all monitoring exclusions is documented for each of the Core sites in Attachment B of this MPU. The site-specific considerations resulting in additional exclusions include:

1. Constituents that have been approved for management plan completion in the last three years,
2. Months of monitoring where at least two samples have been analyzed with no detections greater than 10% of the aquatic life reference value,
3. Months of monitoring for pesticides with an aquatic life ratio less than 50, and
4. Months of monitoring where the percent monthly use is less than 10% of the total use.

During the 2019 WY, pesticide monitoring at Core sites will occur based on the schedule provided in Table 6 through Table 11.

The Coalition still conducts MPM for chemicals that were excluded through the PEP and site-specific evaluation. The MPM schedule for constituents in a management plan at Core sites is provided in the monitoring schedule (Attachment A).

If the concentration of a constituent exceeds the WQTL at a site, monitoring will continue for a total of three consecutive years. However, if the exceedance of the WQTL requires the site to be placed in a management plan for that constituent, future monitoring will be determined in the MPU the following year as part of MPM. The flowchart in Figure 2 depict the Core site monitoring strategy.

The Coalition monitors glyphosate and paraquat dichloride, both sediment bound constituents, twice a year during a high TSS event; once during a storm event between January and March and once during an irrigation event based on months of highest use. Since monitoring for glyphosate and paraquat dichloride began in 2006, there have been no exceedances. The current WQTLs for glyphosate and paraquat dichloride are 700 and 3.2 µg/L, respectively.

Table 6. Dry Creek @ Church St 2019 WY pesticide and toxicity monitoring schedule.

Month	2,4-DB	Bifenthrin	Chloropicrin	Chlorothalonil	Chlorpyrifos	Cyfluthrin	Lambda-Cyhalothrin	Cypermethrin	Cyprodinil	Esfenvalerate	Fenpropathrin	Glyphosate	Imidacloprid	Iprodione	Mancozeb	Oxyfluorfen	Paraquat	Pendimethalin	Permethrin	Pyraclostrobin	Simazine	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	*Hyalella azteca*	Grand Total
October																X		X					X		3
November																X		X					X		3
December	X		X																			X	X		5
January	X											X				X		X			X		X		5
February				X					X					X		X	X	X		X	X	X	X		12
March				X														X		X		X	X	X	7
April			X					X				X	X		X				X			X	X		9
May		X					X			X			X						X			X			7
June		X				X	X	X		X			X				X		X			X	X		11
July		X					X	X		X												X			6
August		X								X	X								X			X			6
September		X			X	X																X		X	6
Grand Total	**2**	**5**	**2**	**2**	**1**	**2**	**3**	**3**	**1**	**4**	**1**	**2**	**3**	**1**	**1**	**4**	**2**	**5**	**4**	**2**	**2**	**9**	**8**	**2**	**71**

Table 7. Westport Drain @ Vivian Rd 2019 WY pesticide and toxicity monitoring schedule.

Month	2,4-DB	Bifenthrin	Chlorothalonil	Chlorpyrifos	Cyfluthrin	Lambda-Cyhalothrin	Dimethoate	Esfenvalerate	Ethalfluraline	Glyphosate	Malathion	Methomyl	Oxyfluorfen	Paraquat	Pendimethalin	Permethrin	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	*Hyalella azteca*	Grand Total
October													X					X		2
November																				0
December	X												X		X			X		4
January			X					X		X			X	X	X		X	X		8
February	X			X		X	X				X		X				X	X		8
March			X			X	X				X	X			X		X	X	X	9
April						X														1
May		X						X	X							X	X	X		6
June		X		X													X			3
July		X			X	X	X										X			5
August		X			X					X			X	X			X	X		7
September																			X	1
Grand Total	**2**	**4**	**2**	**2**	**2**	**4**	**3**	**2**	**1**	**2**	**2**	**1**	**5**	**2**	**3**	**1**	**7**	**7**	**2**	**54**

Table 8. Highline Canal @ Hwy 99 2019 WY pesticide and toxicity monitoring schedule.

Month	2,4-D	2,4-DB	Bifenthrin	Chloropicrin	Chlorothalonil	Chlorpyrifos	Copper	Cyfluthrin	Lambda- Cyhalothrin	Cypermethrin	Cyprodinil	Diuron	Esfenvalerate	Fenpropathrin	Glyphosate	Imidacloprid	Mancozeb	Oryzalin	Oxyfluorfen	Paraquat	Pendimethalin	Permethrin	Propiconazole	Pyraclostrobin	Simazine	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	*Hyalella azteca*	Grand Total
October																					X						X		2
November																			X						X		X		3
December		X					X					X							X		X					X	X		7
January	X	X				X	X								X			X	X	X	X	X			X	X	X		13
February					X		X				X										X		X	X		X	X		8
March	X			X	X		X	X		X														X		X	X	X	10
April			X	X			X	X		X							X									X	X		8
May			X	X				X	X	X			X			X											X	X		9
June			X					X	X						X							X					X	X		7
July			X					X	X							X												X			5
August													X	X						X								X	X		5
September																													X	1
Grand Total	2	2	4	3	2	1	5	5	3	3	1	1	2	1	2	2	1	1	3	2	4	2	1	2	2	9	10	2	78

Table 9. Merced River @ Oakdale Rd 2019 WY pesticide and toxicity monitoring schedule.

Month	Acetamiprid	Bifenthrin	Chloropicrin	Chlorothalonil	Chlorpyrifos	Cyfluthrin	Lambda-Cyhalothrin	Cypermethrin	Dimethoate	Esfenvalerate	Glyphosate	Imidacloprid	Malathion	Oxyfluorfen	Paraquat	Pendimethalin	Permethrin	Pyraclostrobin	Simazine	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	*Hyalella azteca*	Grand Total
October			X		X								X							X	X		5
November					X									X					X	X	X		5
December	X									X				X		X				X	X		6
January										X	X			X	X		X		X	X	X		8
February														X		X		X	X		X		5
March			X	X					X							X		X		X	X	X	8
April				X				X				X				X				X	X		6
May		X					X	X		X		X				X				X	X		8
June		X				X	X	X										X		X			6
July		X				X	X				X		X		X			X		X	X		9
August		X				X							X							X			4
September			X			X							X							X	X	X	6
Grand Total	**1**	**4**	**3**	**2**	**2**	**4**	**3**	**3**	**1**	**3**	**2**	**2**	**4**	**4**	**2**	**5**	**1**	**4**	**3**	**11**	**10**	**2**	**76**

Table 10. Duck Slough @ Gurr Rd 2019 WY pesticide and toxicity monitoring schedule.

Month	2,4-DB	Bifenthrin	Carbaryl	Chloropicrin	Chlorothalonil	Chlorpyrifos	Cyfluthrin	Lambda-Cyhalothrin	Cypermethrin	Cyprodinil	Dimethoate	Esfenvalerate	Fenpropathrin	Glyphosate	Hexazinone	Imidacloprid	Malathion	Oryzalin	Oxyfluorfen	Paraquat	Pendimethalin	Permethrin	Pyraclostrobin	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	*Hyalella azteca*	Grand Total
October									X													X		X			3
November	X																	X	X						X		4
December	X														X				X		X				X		5
January					X							X		X					X	X	X			X	X		8
February	X						X	X		X	X										X			X	X		8
March	X				X	X		X									X						X	X	X	X	9
April		X														X								X			3
May		X	X					X					X			X								X			6
June		X		X			X	X				X	X	X										X	X		9
July		X			X	X	X	X	X			X										X		X	X		10
August		X			X				X											X		X		X	X		7
September		X							X				X									X		X		X	6
Grand Total	**4**	**6**	**1**	**1**	**4**	**2**	**3**	**5**	**4**	**1**	**1**	**3**	**3**	**2**	**1**	**2**	**1**	**1**	**3**	**2**	**3**	**4**	**1**	**10**	**8**	**2**	**78**

Table 11. Cottonwood Creek @ Rd 20 2019 WY pesticide and toxicity monitoring schedule.

Month	Bifenthrin	Bromacil	Carbaryl	Chloropicrin	Chlorothalonil	Chlorpyrifos	Copper	Cyfluthrin	Lambda-Cyhalothrin	Cypermethrin	Cyprodinil	Diazinon	2,4-D Acids & Salts	Diuron	Esfenvalerate	Fenpropathrin	Glyphosate	Imidacloprid	Linuron	Malathion	Methomyl	Oryzalin	Oxyfluorfen	Paraquat	Pendimethalin	Permethrin	Pyraclostrobin	Simazine	Trifluralin	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	*Hyalella azteca*	Grand Total
October																																	0
November		X					X							X									X	X		X			X	X	X	X	10
December																							X		X						X		3
January						X	X								X		X						X	X	X	X			X		X	X		11
February					X						X		X	X									X		X		X	X		X	X		10
March				X	X		X												X						X		X	X	X	X	X	X	11
April	X				X		X		X					X		X		X		X	X						X			X	X		12
May	X							X	X									X		X	X						X		X	X	X		10
June						X		X							X			X								X	X			X			7
July	X		X			X			X			X					X			X							X			X	X		10
August	X					X			X							X				X						X				X			7
September	X									X						X								X		X				X	X	X	8
Grand Total	5	1	1	1	3	4	4	2	4	1	1	1	1	3	2	3	2	3	1	4	2	2	4	2	5	3	6	4	3	10	9	2	100

CORE SITE TOXICITY

The Coalition will conduct monitoring for toxicity to *Ceriodaphnia dubia* and *Selenastrum capricornutum* based on the chemicals determined to need monitoring through the PEP. The Coalition associated chemicals on the EO List to a chemical type (from CDPR) and then assigned the appropriate toxicity code (Appendix I). For example, chemicals that are classified as herbicides or contain copper were designated as toxic to *S. capricornutum* and chemicals classified as insecticides were designated as toxic to *C. dubia*. Appendix I includes the specific associations between chemical name, chemical type and toxicity code.

CORE SITE METALS

The monitoring schedule for boron, copper, and zinc at Core sites is determined through the PEP process and/or current management plans. The results of the PEP are used to establish the monitoring frequency for applied metals. Metals that are not applied by agriculture (arsenic, cadmium, lead, molybdenum, nickel, and selenium) are evaluated using the flowchart in Figure 3 to determine the timing and frequency of monitoring.

The flowchart is used to determine whether a metal is:

1. On the 2014 California 303(d) List of Water Quality Limited Segments 303(d) list for that site or immediate downstream waterbody,
2. Adequately characterized for that site (at least three years of monitoring data),
3. Impairing the water quality for that site,
4. Currently in an active management plan,
5. Has been identified in a TIE as a causal agent, and
6. Applied to >1% irrigated acres (average of 3 years).

None of the Core site waterbodies are listed for arsenic, cadmium, lead, molybdenum, nickel, or selenium on the 303(d) list.

There is a TMDL for selenium discharges on the west side of the San Joaquin River basin which is not part of the Coalition's region. There is also a TMDL for boron for the San Joaquin River segment between the Merced and Tuolumne Rivers which is being addressed through the Sacramento River and San Joaquin River Basin Plan amendment process for the Control of Salt and Boron Discharges into the San Joaquin River. Therefore, there is currently no required TMDL monitoring at any of the Core sites for either selenium or boron.

If a metal is not listed on the 303(d) list for the Core site waterbody, past monitoring results are reviewed to determine if the site has been adequately characterized and if there have been recent exceedances of the WQTL for the metal.

These evaluations lead to one of the following decisions:

Decision 1. Monitor based on TMDL requirements.

Decision 2. Follow the monitoring strategy as described in the ESJWQC 2014 SQMP (constituent in a management plan due to two or more exceedances of the WQTL in a three-year period).

Decision 3. Develop a monitoring schedule based on past results and pesticide application data (not adequately characterized at the site).

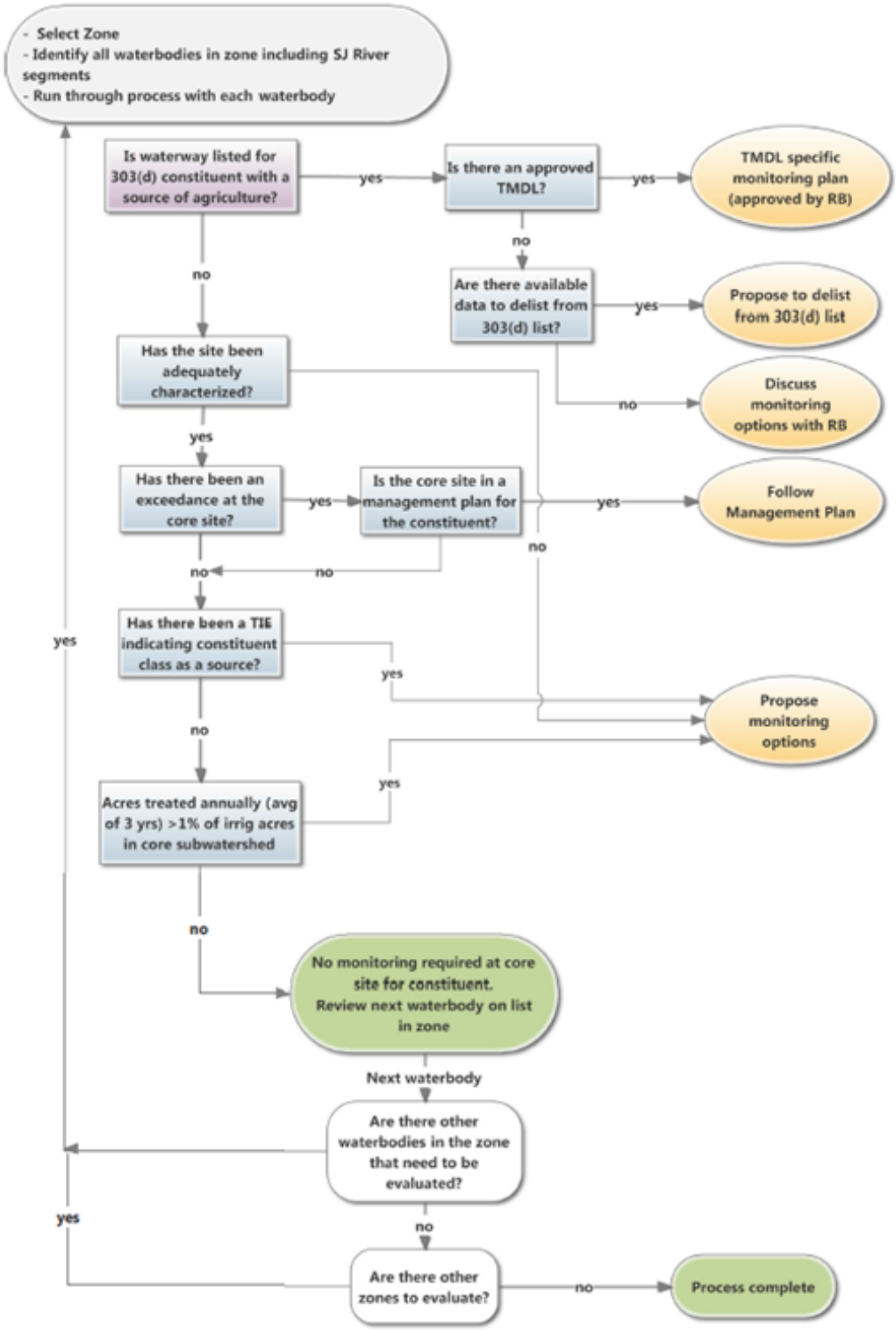
Decision 4. No monitoring is necessary (site adequately characterized).

The Coalition defines a site as adequately characterized if there are three years of monitoring data for the constituent of concern. However, if the constituents are not applied by agriculture or occur naturally in the environment, they may be deemed as adequately characterized in a site subwatershed with less than three years of monitoring data if no exceedances of the WQTL have occurred.

The goal of adequate characterization is to establish that the concentration of the metal does not impair beneficial uses. The Coalition can use the combined history of monitoring for the total fraction and the dissolved fraction to demonstrate adequate characterization, provided there are no exceedances of the WQTLs for either the total or dissolved fractions of any metal.

If monitoring for metals is determined necessary through either the flow chart in Figure 3 or the PEP process, the Coalition will have samples analyzed for the total fraction of arsenic, boron, molybdenum, and selenium and only the dissolved fraction of cadmium, copper, lead, nickel, and zinc. The analysis for each Core site below includes rational for metals monitoring.

Figure 3. ESJWQC Core site metals monitoring flowchart.
Boron, copper, and zinc are assessed through the PEP.



Dry Creek @ Church St

Dry Creek @ Church St is the Core site in Zone 1. The Coalition characterized the concentration of metals in Dry Creek using results from samples collected at Dry Creek @ Wellsford Rd. Dry Creek @ Wellsford Rd was replaced with Dry Creek @ Church St starting in July 2017. The decisions for metals monitoring during the 2019 WY are outlined in Table 12 and the rationale is discussed below. A summary of the number of events during which metals were monitored from 2006 through the 2014 WY and percentages of any exceedances are listed in Table 13.

Table 12. Results of the metals monitoring analysis for Dry Creek @ Church St.

"X" indicates a specific monitoring decision per each constituent. Questions 4 – 5 are evaluated using results from Dry Creek @ Wellsford Rd.

Question Number	Flowchart Question	Arsenic	Cadmium	Lead	Molybdenum	Nickel	Selenium
1	Is site on 303d list for constituent?	No	No	No	No	No	No
2	Has the site been adequately characterized?	Yes	Yes	Yes	Yes	Yes	Yes
3	Has there been an exceedance?	No	No	No	No	No	No
4	Is waterbody in a management plan for constituent?	No	No	No	No	No	No
5	Has there been a TIE indicating the constituent class as causal agent?	No	No	No	No	No	No
	Monitoring Decision						
1	TMDL-specific monitoring	NA	NA	NA	NA	NA	NA
2	Propose to delist from 303(d) list	NA	NA	NA	NA	NA	NA
3	Monitoring according to management plan	NA	NA	NA	NA	NA	NA
4	Propose monitoring plan in MPU analysis below	NA	NA	NA	NA	NA	NA
5	No monitoring during the 2019 WY	X	X	X	X	X	X

NA – Not applicable

Monitoring Decision #5 – No Monitoring

Arsenic, Cadmium, Lead, Molybdenum, Nickel, Selenium

The Coalition monitored for arsenic (As), cadmium (Cd), nickel (Ni), and selenium (Se) from 2006 through 2008, 2011, and during two storm and two irrigation events in the 2014 WY; no exceedances of the WQTLs occurred (Table 13). Molybdenum (Mo) was monitored in 2013 and no exceedances occurred. The Coalition determined that monitoring is not necessary for arsenic, cadmium, nickel, molybdenum, and selenium because they are neither applied by agriculture nor impairing water quality.

Lead (Pb) was monitored at the site from 2006 through the 2014 WY. Exceedances of the WQTL occurred once for total lead in February 2008. Lead is not applied by agriculture and, based on water quality results, is not impairing water quality in the site subwatershed. The Coalition determined that monitoring is not necessary for lead during the 2019 WY.

Table 13. Dry Creek @ Wellsford Rd site subwatershed dissolved and total metals sample counts.

Metals were monitored at the site through August 2014.

Years Samples Collected	Count of Samples								
	As, Total	Cd, Dissolved	Cd, Total	Pb, Dissolved	Pb, Total	Mo, Total	Ni, Dissolved	Ni, Total	Se, Total
2006	5	0	5	0	5	0	0	5	5
2007	8	0	8	0	8	0	0	8	4
2008	8	0	8	0	8*	0	0	8	8
2009	0	0	0	1	1	0	0	0	0
2010	0	0	0	6	6	0	0	0	0
2011	8	8	8	8	8	8	12	12	12
2014 WY	4	4	0	4	0	4	4	0	4
Total Samples Collected	**33**	**12**	**29**	**19**	**36**	**12**	**16**	**33**	**33**
Total Exceedances	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
% Exceedances	**0%**	**0%**	**0%**	**0%**	**2.8%**	**0%**	**0%**	**0%**	**0%**

*An asterisk indicates an exceedance occurred in samples collected for that year.

Westport Drain @ Vivian Rd

Westport Drain @ Vivian Rd is the proposed Core site in Zone 2 for the 2019 WY and will be the first year that this site is monitored as a Core site. The decisions for metals monitoring during the 2019 WY at Westport Drain @ Vivian Rd are outlined in Table 14 and discussed below. A summary of the number of events during which metals were monitored from 2007 through 2008 and percentages of any exceedances are listed in Table 15.

Table 14. Results of the metals monitoring analysis for Westport Drain @ Vivian Rd.

"X" indicates a specific monitoring decision per each constituent.

Question Number	Flowchart Question	Arsenic	Cadmium	Lead	Molybdenum	Nickel	Selenium
1	Is site on 303d list for constituent?	No	No	No	No	No	No
2	Has the site been adequately characterized?	No	No	No	No	No	No
3	Has there been an exceedance?	No	No	No	No	No	No
4	Is waterbody in a management plan for constituent?	No	No	No	No	No	No
5	Has there been a TIE indicating the constituent class as causal agent?	No	No	No	No	No	No
Monitoring Decision							
1	TMDL-specific monitoring	NA	NA	NA	NA	NA	NA
2	Propose to delist from 303(d) list	NA	NA	NA	NA	NA	NA
3	Monitoring according to management plan	NA	NA	NA	NA	NA	NA
4	Propose monitoring plan in MPU analysis below	X	X	X	X	X	X
5	No monitoring during the 2019 WY	NA	NA	NA	NA	NA	NA

NA – Not applicable

Monitoring Decision #5 – Proposed Monitoring Plan

Arsenic, Cadmium, Lead, Molybdenum, Nickel, and Selenium

The Coalition monitored for arsenic (As), cadmium (Cd), lead (Pb), molybdenum (Mo), nickel (Ni), and selenium (Se) from 2007 through 2008; no exceedances of the WQTLs occurred (Table 15).

Due to only two years of metals monitoring conducted, the Coalition will monitor for metals during two storm and two irrigation events during the 2019 WY. This site will be characterized after this 2019 WY.

Table 15. Westport Drain @ Vivian Rd site subwatershed dissolved and total metals sample counts.

Years Samples Collected	Number of Samples Collected					
	As, Total	Cd, Total	Pb, Total	Mo, Total	Ni, Total	Se, Total
2007	5	5	5	0	5	1
2008	9	9	9	0	9	9
Total Samples Collected	**14**	**14**	**14**	**0**	**14**	**10**
Total Exceedances	**0**	**0**	**0**	**0**	**0**	**0**
% Exceedances	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**

Highline Canal @ Hwy 99

Highline Canal @ Hwy 99 is the Core site in Zone 3. The decisions for metals during the 2019 WY at Highline Canal @ Hwy 99 are outlined in Table 16 and discussed below. A summary of the number of events during which metals were monitored through the 2016 WY, and percentages of any exceedances are listed in Table 17.

Table 16. Results of the metals monitoring analysis for Highline Canal @ Hwy 99.

"X" indicates a specific monitoring decision per each constituent.

Question Number	Flowchart Question	Arsenic	Cadmium	Lead	Molybdenum	Nickel	Selenium
1	Is site on 303d list for constituent?	No	No	No	No	No	No
2	Has the site been adequately characterized?	Yes	Yes	Yes	Yes	Yes	Yes
3	Has there been an exceedance?	No	No	Yes	No	No	No
4	Is waterbody in a management plan for constituent?	No	No	No	No	No	No
5	Has there been a TIE indicating the constituent class as causal agent?	No	No	No	No	No	No
Monitoring Decision							
1	TMDL-specific monitoring	NA	NA	NA	NA	NA	NA
2	Propose to delist from 303(d) list	NA	NA	NA	NA	NA	NA
3	Monitoring according to management plan	NA	NA	NA	NA	NA	NA
4	Propose monitoring plan in MPU analysis below	NA	NA	NA	NA	NA	NA
5	No monitoring during the 2019 WY	X	X	X	X	X	X

NA – Not applicable

Monitoring Decision #5 - No monitoring

Arsenic, Cadmium, Molybdenum, Nickel, and Selenium

The Coalition monitored for arsenic (As), cadmium (Cd), nickel (Ni), and selenium (Se) from 2006 through 2008, 2011, and during the 2014 WY; molybdenum (Mo) was monitored in 2011 and during the 2014 WY; no exceedances of the WQTLs occurred (Table 17). The Coalition determined that monitoring is not necessary for arsenic, cadmium, nickel, molybdenum, and

selenium because these metals are not applied by agriculture and are not impairing water quality in the site subwatershed.

Lead

The Coalition monitored for lead (Pb) from 2006 through the 2016 WY. The lead management plan was approved for completion on March 25, 2016 due to improved water quality in the site subwatershed. Therefore, monitoring for lead is no longer required at Highline Canal @ Hwy 99

Table 17. Highline Canal @ Hwy 99 site subwatershed dissolved and total metals sample counts.

Metals were monitored at the site through February 2016.

Years Samples Collected	Count of Samples								
	As, Total	Cd, Dissolved	Cd, Total	Pb, Dissolved	Pb, Total	Mo, Total	Ni, Dissolved	Ni, Total	Se, Total
2006	5	0	5	0	5*	0	0	5	5
2007	7	0	7	0	7*	0	0	7	3
2008	8	0	8	0	8	0	0	8	8
2009	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0
2011	6	6	6	6	6	6	9	9	9
2012	0	0	0	1	1	0	0	0	0
2013	0	0	0	6	6	0	0	0	0
2014 WY	3	3	1	5	0	3	3	0	3
2015 WY	0	0	0	5	0	0	0	0	0
2016 WY	0	0	0	1	0	0	0	0	0
Total Samples Collected	**29**	**9**	**28**	**24**	**33**	**9**	**12**	**29**	**28**
Total Exceedances	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**0**
% Exceedances	**0%**	**0%**	**0%**	**0%**	**14%**	**0%**	**0%**	**0%**	**0%**

* indicates an exceedance occurred in samples collected for that year.

Merced River @ Oakdale Rd

Merced River @ Oakdale Rd is the Core site in Zone 4 for the 2019 WY. The Coalition characterized the concentration of metals in Merced River using results from samples collected at Merced River @ Santa Fe. Merced River @ Santa Fe was replaced with Merced River @ Oakdale Rd starting in July 2017. The decisions for metals monitoring during the 2019 WY at Merced River @ Oakdale Rd are outlined in Table 18 and discussed below. A summary of the number of events during which metals were monitored, the results, and percentages of any exceedances are listed in Table 19.

Table 18. Results of the metals monitoring analysis for Merced River @ Oakdale Rd.

"X" indicates a specific monitoring decision per each constituent. Questions 4 -5 are evaluated using results from Merced River @ Santa Fe.

Question Number	Flowchart question	Arsenic	Cadmium	Lead	Molybdenum	Nickel	Selenium
1	Is site on 303d list for constituent?	No	No	No	No	No	No
2	Has the site been adequately characterized?	Yes	Yes	Yes	Yes	Yes	Yes
3	Has there been an exceedance?	No	No	No	No	No	No
4	Is waterbody in a management plan for constituent?	No	No	No	No	No	No
5	Has there been a TIE indicating the constituent class as causal agent?	No	No	No	No	No	No
	Monitoring Decision						
1	TMDL-specific monitoring	NA	NA	NA	NA	NA	NA
2	Propose to delist from 303(d) list	NA	NA	NA	NA	NA	NA
3	Monitoring according to management plan	NA	NA	NA	NA	NA	NA
4	Propose monitoring plan in MPU analysis below	NA	NA	NA	NA	NA	NA
5	No monitoring during the 2019 WY	X	X	X	X	X	X

NA – Not applicable

Monitoring Decision #5 – No Monitoring

Arsenic, Cadmium, Lead, Molybdenum, Nickel, and Selenium

The Coalition monitored for arsenic (As), cadmium (Cd), nickel (Ni), and selenium (Se) from 2006 through 2008, 2011, and 2014, and for molybdenum (Mo) beginning in October 2008 through March 2009, 2011, and two storm events in 2014; no exceedances of the WQTLs occurred (Table 12). The Coalition determined that monitoring is not necessary for arsenic, cadmium, selenium, nickel, and molybdenum because they are neither applied by agriculture nor impairing water quality.

Lead

The Coalition monitored for lead (Pb) from 2006 through the 2015 WY. The lead management plan was approved for completion on December 4, 2015 due to improved water quality in the site subwatershed. Therefore, monitoring for lead is no longer required at Merced River @ Oakdale Rd.

Table 19. Merced River @ Santa Fe site subwatershed dissolved and total metals sample counts.
Metals were monitored at the site through February 2015.

Year Samples Collected	Count of Samples								
	As, Total	Cd, Dissolved	Cd, Total	Pb, Dissolved	Pb, Total	Mo, Total	Ni, Dissolved	Ni, Total	Se, Total
2006	5	0	5	0	5	0	0	5	5
2007	8	0	8	0	8	0	0	8	4
2008	11	3	11	3	11	3	3	11	11
2009	4	4	4	4	4	4	5	5	5
2010	0	0	0	6	6	0	0	0	0
2011	8	8	8	8	8	8	12	12	12
2014WY	2	2	0	3	1	2	2	0	2
2015 WY	0	0	0	3	0	0	0	0	0
Total Collected	**38**	**17**	**36**	**27**	**43**	**17**	**22**	**41**	**39**
Total Exceedances	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**
% Exceedances	**0%**	**0%**	**0%**	**0%**	**4.6%**	**0%**	**0%**	**0%**	**0%**

*An asterisk indicates an exceedance occurred in samples collected for that year.

Duck Slough @ Gurr Rd

Duck Slough @ Gurr Rd is the Core site in Zone 5 for the 2019 WY. The decisions for metals monitoring during the 2019 WY at Duck Slough @ Gurr Rd are outlined in Table 20 and discussed below. A summary of the number of events during which metals were monitored, the results, and percentages of any exceedances are listed in Table 21.

Table 20. Results of the metals monitoring analysis for Duck Slough @ Gurr Rd.
"X" indicates a specific monitoring decision per each constituent.

Question Number	Flowchart Question	Arsenic	Cadmium	Lead	Molybdenum	Nickel	Selenium
1	Is site on 303d list for constituent?	No	No	No	No	No	No
2	Has the site been adequately characterized?	Yes	Yes	Yes	Yes	Yes	Yes
3	Has there been an exceedance?	Yes	No	Yes	No	No	No
4	Is waterbody in a management plan for constituent?	Yes	No	No	No	No	No
5	Has there been a TIE indicating the constituent class as causal agent?	No	No	No	No	No	No
Monitoring Decision							
1	TMDL-specific monitoring	NA	NA	NA	NA	NA	NA
2	Propose to delist from 303(d) list	NA	NA	NA	NA	NA	NA
3	Monitoring according to management plan	NA	NA	NA	NA	NA	NA
4	Propose monitoring plan in MPU analysis below	NA	NA	NA	NA	NA	NA
5	No monitoring during the 2019 WY	X	X	X	X	X	X

NA – Not applicable

Monitoring Decision #5 - No monitoring

Cadmium, Molybdenum, Nickel, and Selenium

The Coalition monitored for cadmium (Cd), nickel (Ni), and selenium (Se) from 2006 through 2009, 2011, and 2014, and for molybdenum (Mo) in 2008, 2009, 2011, and 2014; no exceedances of the

WQTLs occurred (Table 21). The Coalition determined that monitoring is not necessary during the 20182019 WY.

Arsenic

Three exceedances of the WQTL for arsenic (As) occurred during High TSS monitoring in March, August, and November. All samples were collected when the waterbody was non-contiguous. Samples were last collected for arsenic during the 2016 WY and no exceedances occurred. The site is currently in a management plan for arsenic and a preliminary source identification study was submitted in 2016. During the 2019 WY, monitoring for arsenic is not scheduled to occur as it is not applied by agriculture and is naturally occurring.

Lead

The Coalition received approval for the completion of the lead (Pb) management plan on March 25, 2016. Due to one exceedance in 2016, the Coalition conducted monitoring for lead during the 2017 and 2018 WYs. During the 2018 WY, the site was monitored during one storm for dissolved lead and no exceedance occurred. Monitoring for lead will not occur during the 2019 WY due to no exceedances and management plan completion.

Table 21. Duck Slough @ Gurr Rd site subwatershed dissolved and total metals sample counts and 2018 WY monitoring results.

Metals were monitored at the site through May 2018.

Years Samples Collected	Count of Samples								
	As, Total	Cd, Dissolved	Cd, Total	Pb, Dissolved	Pb, Total	Mo, Total	Ni, Dissolved	Ni, Total	Se, Total
2006	5	0	5	0	5	0	0	5	5
2007	8	0	8	0	8*	0	0	8	4
2008	9	1	9	1	9*	1	1	9	9
2009	4	4	4	4	4	4	5	5	5
2011	8	8	8	8	8	8	11	11	10
2013	0	0	0	7	7	0	0	0	0
2014 WY	4*	4	0	8	2	4	4	0	4
2015 WY	3*	0	0	4	0	0	0	0	0
2016 WY	4*	0	0	2*	0	0	0	0	0
2017 WY	0	0	0	1	0	0	0	0	0
2018 WY	0	0	0	1	0	0	0	0	0
Total Samples Collected	**45**	**17**	**34**	**36**	**43**	**17**	**21**	**38**	**37**
Total Exceedances	**3**	**0**	**0**	**1**	**4**	**0**	**0**	**0**	**0**
% Exceedances	**7%**	**0%**	**0%**	**3%**	**9%**	**0%**	**0%**	**0%**	**0%**

*An asterisk indicates an exceedance occurred in samples collected for that year.

Cottonwood Creek @ Rd 20

Cottonwood Creek @ Rd 20 is the Core site in Zone 6 for the 2019 WY. The decisions for metals monitoring during the 2019 WY at Cottonwood Creek @ Rd 20 are outlined in Table 22. A summary of the number of events during which metals were monitored and percentages of any exceedances are listed in Table 23.

Table 22. Results of the metals monitoring analysis for Cottonwood Creek @ Rd 20.

"X" indicates a specific monitoring decision per each constituent.

Question Number	Flowchart Question	Arsenic	Cadmium	Lead	Molybdenum	Nickel	Selenium
1	Is site on 303d list for constituent?	No	No	No	No	No	No
2	Has the site been adequately characterized?	Yes	Yes	Yes	Yes	Yes	Yes
3	Has there been an exceedance?	No	No	Yes	No	No	No
4	Is waterbody in a management plan for constituent?	No	No	No	No	No	No
5	Has there been a TIE indicating the constituent class as causal agent?	No	No	No	No	No	No
	Monitoring Decision						
1	TMDL-specific monitoring	NA	NA	NA	NA	NA	NA
2	Propose to delist from 303(d) list	NA	NA	NA	NA	NA	NA
3	Monitoring according to management plan	NA	NA	NA	NA	NA	NA
4	Propose monitoring plan in MPU analysis below	NA	NA	NA	NA	NA	NA
5	No monitoring during the 2019 WY	X	X	X	X	X	X

NA – Not applicable

Monitoring Decision #5 - No monitoring

Arsenic, Cadmium, Molybdenum, Nickel, and Selenium

The Coalition monitored for arsenic (As), cadmium (Cd), molybdenum (Mo), nickel (Ni), and selenium (Se), at various times from 2006 through 2013; no exceedances of the WQTLs occurred. The Coalition determined monitoring is not necessary during the 2019 WY since arsenic, cadmium, molybdenum, nickel, and selenium are neither applied nor impacting water quality.

Lead

The Coalition received approval to complete the lead (Pb) management plan on December 4, 2015. Therefore, monitoring for lead will not occur at the Core site during the 2019 WY.

Table 23. Cottonwood Creek @ Rd 20 site subwatershed dissolved and total metals sample counts.

Metals were monitored at the site through January 2013.

Years Samples Collected	Count of Samples								
	As, Total	Cd, Dissolved	Cd, Total	Pb, Dissolved	Pb, Total	Mo, Total	Ni, Dissolved	Ni, Total	Se, Total
2006	5	0	5	0	5*	0	0	5	5
2007	5	0	5	0	5	0	0	5	2
2008	7	0	7	0	7*	0	0	7	7
2009	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0
2011	8	8	8	8	8	8	10	10	9
2012	0	0	0	0	0	0	0	0	0
2013	0	0	0	1	1	0	0	0	0
Total Samples Collected	**25**	**8**	**25**	**9**	**26**	**8**	**10**	**27**	**23**
Total Exceedances	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**
% Exceedances	**0%**	**0%**	**0%**	**0%**	**12%**	**0%**	**0%**	**0%**	**0%**

*An asterisk indicates an exceedance occurred in samples collected for that year.

MONITORING AT REPRESENTED SITES

The Coalition determines when to conduct MPM based on months of past exceedances and months of high pesticide use when discharges have the greatest potential to impact water quality. In addition, the Coalition monitors to evaluate the potential risk for water quality impairments at Represented sites when an exceedance of a WQTL occurs at the associated Core site of that zone. Table 24 includes the Core sites for each zone and the associated Represented sites. The monitoring schedule for Represented sites, including pesticides, applied metals, and toxicity, utilizes monitoring result data through May 2018 from Core and Represented sites based on the following criteria:

1. An exceedance of the WQTL of a pesticide, applied metal, or toxicity occurred at the Core site in the same zone during the 2018 WY,
2. The Core site is in a management plan for a pesticide, applied metal, or toxicity and monitoring at the Represented site is necessary to characterize potential discharge, and
3. An exceedance of a pesticide, applied metal, or toxicity occurred at the Represented site during the 2018 WY.

The Coalition monitors Represented sites for a minimum of two years during the time(s) of year with the highest applications of a constituent (s). If two or more exceedances occur at the Represented site within three years (or one exceedance for TMDL constituents), a management plan is initiated. The flowchart in Figure 4 depict the monitoring strategy for Represented sites.

Table 25 lists the exceedances that occurred at Core and Represented sites from October 2017 through May 2018. Attachment A includes the 2019 WY monitoring schedule. Represented sites are not evaluated for metals that are not applied by agriculture; however, in some cases, the Coalition may conduct MPM for these constituents on a site- by- site basis (Attachment A).

Management Plan Monitoring is discussed in the sections below and includes 1) a discussion of management plan constituents (pesticides, applied metals, or toxicity) to be monitored, and 2) a determination of monitoring frequency based on past exceedances and months of highest pesticide use. Each Zone discussion starts with an overview of Core site MPM scheduled for the 2019 WY prior to evaluating Represented site monitoring for each site in the Zone.

To assist with determining months to conduct MPM for pesticides, metals, and toxicity, the Coalition utilizes the PUR data and monitoring history graphs for that constituent. The graphs indicate general pesticide use patterns throughout the years and exceedances over time. The Coalition utilizes these graphs to select the most conservative months to conduct MPM (Figure 5 through Figure 33).

Table 24. ESJWQC sites and locations by zone.

Zone	Site Type	Site Name	Station Code	Latitude	Longitude
1	Core	Dry Creek @ Church St	535XDCCHS	37.66674	-120.89822
1	Represented	Mootz Drain downstream of Langworth Pond	535XMDDLP	37.70539	-120.89569
2	Core	Westport Drain @ Vivian Rd[1]	535XWDAVR	37.56382	-121.04861
2	Represented	Hatch Drain @ Tuolumne Rd	535XHDATR	37.51498	-121.01229
2	Represented	Hilmar Drain @ Central Ave	535XHDACA	37.39058	-120.95820
2	Represented	Lateral 2 ½ near Keyes Rd	535LTHNKR	37.54766	-121.08509
2	Represented	Lateral 5 ½ @ South Blaker Rd	535LFHASB	37.45827	-120.96730
2	Represented	Lateral 6 and 7 @ Central Ave	535LSSACA	37.39779	-120.95960
2	Represented	Levee Drain @ Carpenter Rd	535XLDACR	37.48062	-121.03106
2	Represented	Lower Stevinson @ Faith Home Rd	535LSAFHR	37.37248	-120.92324
2	Represented	Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	37.44187	-121.00331
2	Represented	Unnamed Drain @ Hogin Rd	535XUDAHR	37.43120	-120.99475
3	Core	Highline Canal @ Hwy 99	535XHCHNN	37.41254	-120.75941
3	Represented	Highline Canal @ Lombardy Rd	535XHCALR	37.45547	-120.72181
3	Represented	Mustang Creek @ East Ave	535XMCAEA	37.49180	-120.68390
4	Core	Merced River @ Oakdale Rd	535XMRORD	37.45417	-120.60778
4	Represented	Bear Creek @ Kibby Rd	535XBCAKR	37.31230	-120.41535
4	Represented	Black Rascal Creek @ Yosemite Rd	535BRCAYR	37.33202	-120.39435
4	Represented	Canal Creek @ West Bellevue Rd	535CCAWBR	37.36090	-120.54940
4	Represented	Howard Lateral @ Hwy 140	535XHLAHO	37.30790	-120.78200
4	Represented	Livingston Drain @ Robin Ave	535XLDARA	37.31693	-120.74229
4	Represented	McCoy Lateral @ Hwy 140	535XMLAHO	37.30968	-120.78771
4	Represented	Unnamed Drain @ Hwy 140	535XUDAHO	37.31331	-120.89218
5	Core	Duck Slough @ Gurr Rd	535XDSAGR	37.21408	-120.56126
5	Represented	Deadman Creek @ Gurr Rd	535XDCAGR	37.19514	-120.56147
5	Represented	Deadman Creek @ Hwy 59	535DMCAHF	37.19755	-120.48763
5	Represented	Miles Creek @ Reilly Rd	535XMCARR	37.25830	-120.47524
6	Core	Cottonwood Creek @ Rd 20	545XCCART	36.86860	-120.18180
6	Represented	Ash Slough @ Ave 21	545XASAAT	37.05448	-120.41575
6	Represented	Berenda Slough along Ave 18 ½	545XBSAAE	37.01820	-120.32650
6	Represented	Dry Creek @ Rd 18	545XDCARE	36.98180	-120.22056
	OP-TMDL	SJR @ Hills Ferry	541STC512	37.34250	-120.97722
	OP-TMDL	San Joaquin River above Maze Boulevard	541STC510	37.64194	-121.22778
	OP-TMDL	San Joaquin River at Airport Way near Vernalis	541SJC501	37.67556	-121.26417

[1] Represented sites were evaluated for additional monitoring based on management plans and exceedances that occurred during the 2018 WY at the Prairie Flower Drain @ Crows Landing Rd Core site.

Figure 4. ESJWQC Represented site monitoring strategy flowchart.

Table 25. 2018 WY exceedances of the WQTLs for pesticides, metals, and toxicity.

Data from October 2017 through May 2018 are listed by zone and alphabetically by site. The WQTL is listed after each constituent.

Zone	Site Name	Sample Date	Site Type	Sampling Type	Copper (Dissolved; µg/L), Variable[1]	Chlorpyrifos, 0.015 µg/L	Pyrethroids, AACGU >1	*C. dubia*, % Survival	*S. capricornutum*, Toxicity, % Growth
2	Hatch Drain @ Tuolumne Rd	1/10/2018	Represented	MPM					19
	Lateral 5 1/2 @ South Blaker Rd	1/10/2018	Represented	MPM					24
	Prairie Flower Drain @ Crows Landing Rd	1/10/2018	Core	NM, MPM, High TSS 1-P				0	
	Prairie Flower Drain @ Crows Landing Rd	2/13/2018	Core	NM, MPM					61
	Prairie Flower Drain @ Crows Landing Rd	5/8/2018	Core	NM, MPM			1.296		42
	Prairie Flower Drain @ Crows Landing Rd-FD	5/8/2018	Core	NM, MPM					47
3	Highline Canal @ Hwy 99	10/10/2017	Core	NM				55	
4	Black Rascal Creek @ Yosemite Rd	3/5/2018	Represented	NM	4.6 (2.6)				
	Howard Lateral @ Hwy 140	1/10/2018	Represented	MPM	5 (2.3)				
	Howard Lateral @ Hwy 140	4/9/2018	Represented	NM, MPM	3.6 (2.6)				
	Livingston Drain @ Robin Ave	1/10/2018	Represented	MPM	4.9 (2.3)				
	Merced River @ Oakdale Rd	11/7/2017	Core	MPM		0.019			
5	Deadman Creek @ Hwy 59	3/5/2018	Represented	NM	7.1 (7.08)				
6	Cottonwood Creek @ Rd 20	11/7/2017	Core	NM, MPM	1.7 (1.67)				
	Cottonwood Creek @ Rd 20 -FD	11/7/2017	Core	NM, MPM	1.7 (1.67)				

[1] Metal WQTL variable depending on hardness; calculated WQTL is listed in parenthesis.
MPM- Management Plan Monitoring
NM- Normal Monitoring
High TSS 1-P- High Total Suspended Solids monitoring event for paraquat and glyphosate.
FD- Field duplicate; exceedance of the WQTL occurred only in the field duplicate sample.

ZONE 1 – REPRESENTED SITE MONITORING SCHEDULE

Core Site Monitoring Results

Dry Creek @ Church St is the Core site in Zone 1 in the 2019 WY. Dry Creek @ Church St replaces Dry Creek @ Wellsford Rd which was previously monitored by the Coalition from 2004 through July 2017. Exceedances of the WQTLs for DO and *E. coli* occurred in samples collected during the 2018 WY (up through May).

Dry Creek @ Church St is in a management plan for DO, pH, *E. coli*, and ammonia; no MPM is scheduled (management plans were transferred from Dry Creek @ Wellsford Rd). Monitoring for DO, pH, *E. coli*, and ammonia will occur monthly during the 2019 WY in accordance with the Core site monitoring strategy (Table 26; Attachment A monitoring schedule).

Table 26. Zone 1 management plan constituents.
Core site is bolded. An 'M' indicates a current management plan constituent and an 'M' in red text indicates exceedances in the 2018 WY triggered a management plan.

Site Name	DO	SC	pH	*E. coli*	Ammonia
Dry Creek @ Church St	**M**		**M**	**M**	**M**
Mootz Drain downstream of Langworth Pond	M	M		M	M

Mootz Drain downstream of Langworth Pond

Mootz Drain downstream of Langworth Pond is a Represented site in Zone 1. Monitoring was initiated at Mootz Drain @ Langworth Pond in 2008 and moved to Mootz Drain downstream of Langworth Pond in 2009. During the 2018 WY, the Coalition conducted MPM for diuron. Approval to complete the diuron management plan was received on January 31, 2018.

Management Plan Monitoring

Mootz Drain downstream of Langworth Pond is in a management plan for the DO, SC, *E. coli*, and ammonia. The Coalition does not conduct MPM for these constituents; therefore, no MPM is scheduled for this site subwatershed during the 2019 WY.

Monitoring Based on Core Site Exceedances

Dry Creek @ Church St is not in any management plans for applied constituents or toxicity and no exceedances occurred during the 2018 WY. Based on the Coalition's monitoring strategy, no monitoring is required at Mootz Drain downstream of Langworth Pond during the 2019 WY.

ZONE 2 – REPRESENTED SITE MONITORING SCHEDULE

Core Site Monitoring Results

Prairie Flower Drain @ Crows Landing Rd was the Core site in Zone 2 during the 2018 WY. The Coalition has requested to monitor at Westport Drain @ Vivian Rd as the Core site in the 2019 WY. Since Prairie Flower Drain @ Crows Landing Rd was the Core site in the previous year, Represented site monitoring for all sites in Zone 2 will be based on these results. Exceedances of the WQTLs for DO, SC, *E. coli*, ammonia, nitrate, AACGU pyrethroids, and toxicity to *C. dubia* and *S. capricornutum* occurred in samples collected during the 2018 WY from Prairie Flower Drain @ Crows Landing Rd (data through May).

Westport Drain @ Vivian Rd was a Represented site in Zone 2 during the 2018 WY and will become the Core site in the 2019 WY (pending approval). Management plan constituents include: DO, pH, SC, E. coli, and nitrate. During the 2018 WY, MPM for toxicity to *S. capricornutum* was scheduled to occur in April; however, the management plan was approved for completion on January 31, 2018 and monitoring was not conducted. Monitoring for DO, pH, SC, *E. coli*, and nitrate + nitrite as N will occur monthly during the 2019 WY in accordance with the Core site monitoring strategy.

The management plan constituents for sites in Zone 2 are listed in Table 27. Monitoring for management plan constituents will occur according to the schedule provided in Attachment A.

Table 27. Zone 2 management plan constituents.

Core site is bolded. An 'M' indicates a current management plan constituent and an 'M' in red text indicates exceedances in the 2018 WY which triggered a management plan. An 'X' indicates one exceedance occurred during the 2018 WY and a management plan was not triggered.

Site Name	DO	pH	SC	*E. coli*	Ammonia	Nitrate + Nitrite	Arsenic	Molybdenum	Chlorpyrifos	AACGU for Pyrethroids	*C. dubia*	*S. capricornutum*	*H. azteca*
Westport Drain @ Vivian Rd	**M**	**M**	**M**	**M**		**M**							
Hatch Drain @ Tuolumne Rd	M		M	M		M	M					M	M
Hilmar Drain @ Central Ave	M		M	M	M	M						M	
Lateral 2 ½ near Keyes Rd		M	M									M	
Lateral 5 ½ @ South Blaker Rd		M	M	M		M						M	
Lateral 6 and 7 @ Central Ave	M	M	M			M						M	
Levee Drain @ Carpenter Rd	M	M	M	M	M	M						M	
Lower Stevinson @ Faith Home Rd	M	M	M			M						M	
Prairie Flower Drain @ Crows Landing Rd	M	M	M	M	M	M		M	M	X	M	M	
Unnamed Drain @ Hogin Rd	M		M										
Westport Drain @ Vivian Rd	M	M	M	M		M							

All Represented sites in Zone 2 have been scheduled for pyrethroids monitoring during the 2019 WY due to the exceedance of the AACGU for pyrethroids at Prairie Flower Drain @ Crows

Landing Rd. All Represented sites in Zone 2 have either not been monitored for pyrethroids or were last monitored between 2005 and 2008; therefore, monitoring for pyrethroids at all Represented sites in Zone 2 is scheduled to occur during the 2019 WY (Table 29 through Table 40; Attachment B schedule and monthly monitoring decisions). The Coalition selected constituents and months to monitor based on results from the PEP process.

Hatch Drain @ Tuolumne Rd

Hatch Drain @ Tuolumne Rd is a Represented site in Zone 2 and monitoring was initiated at the site in 2007. During the 2018 WY, the Coalition conducted MPM for toxicity to *S. capricornutum* and sediment toxicity to *H. azteca*. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Toxicity to *Selenastrum capricornutum*

Samples collected from Hatch Drain @ Tuolumne Rd were toxic to *S. capricornutum* 11 times from 2008 through May of 2018 (Table 28). During the 2018 WY, toxicity to algae occurred in samples collected on January 10, 2018 (19% growth compared to control). Toxicity Identification Evaluations (TIEs) were conducted on seven of the eleven samples. Two TIEs indicated metals and non-polar organics were the source of toxicity (February and April 2008 samples; one TIE indicated ammonia was the source of toxicity (July 2014, 66.5 mg/L). The other four TIEs were inconclusive including the TIE that was conducted on the January 10, 2018 sample.

The Coalition began MPM at Hatch Drain @ Tuolumne Rd for *S. capricornutum* toxicity in 2013. The Coalition collected samples during the months of February, April, and August from 2013 through 2017 and no toxicity to *S. capricornutum* occurred; therefore, no additional monitoring is required in these months (Table 28).

During the 2019 WY, the Coalition will conduct MPM for *S. capricornutum* toxicity in January, May, and July.

Table 28. Hatch Drain @ Tuolumne Rd toxicity to *S. capricornutum* MPM exceedance tally.

Monitoring Year	Months of MPM					
	January	February	April	May	July	August
2008	1	1	1	1	1	1
2013	0	0	0	0	0	0
2014	0	0	0	0	1	0
2015	0	0	0	0	0	0
2016	Dry	Dry	Dry	Dry	0	0
2017	1	0	0	1	1	0
2018	1	X	X	0	Pending	X
Overall Tally	**3**	**1**	**1**	**2**	**3**	**1**

X- Monitoring not scheduled to occur.

Sediment toxicity to *Hyalella azteca*

Sediment toxicity last occurred in samples collected in March and September of 2014. The Coalition conducted MPM from 2015 through the 2018 WYs during months of past toxicity. If no sediment toxicity occurs in samples collected during the 2018 WY, the Coalition will petition for the completion of the management plan due to three years with no exceedances.

During the 2019 WY, the Coalition will conduct MPM for sediment toxicity to *H. azteca* in September or until the management plan is approved for completion. Monitoring in the month of March is not scheduled for the 2019 Wy due to three or more years monitoring with no toxicity.

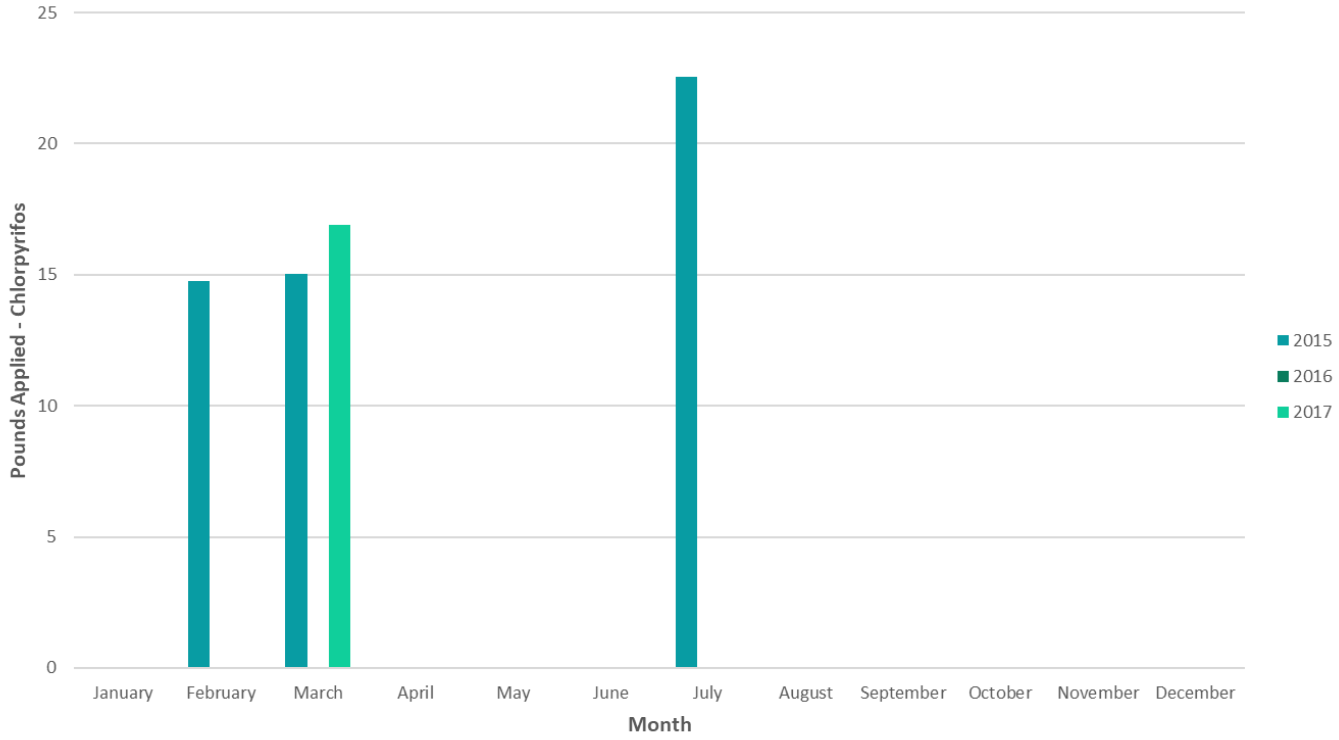
Monitoring Based on Core Site Exceedances

The Zone 2 Core site, Prairie Flower Drain @ Crows Landing Rd, is in a management plan for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. During the 2018 WY, samples collected at the Core site contained concentrations in exceedance of the AACGU pyrethroid limit and were toxic to *C. dubia* and *S. capricornutum*. Hatch Drain @ Tuolumne Rd is in a management plan for toxicity to *S. capricornutum* and monitoring will occur according to the evaluation provided above.

Chlorpyrifos

Hatch Drain @ Tuolumne Rd was monitored monthly for chlorpyrifos in 2007 and 2008; no exceedances occurred. The PUR data for chlorpyrifos applications from 2015 through 2017 indicates that use within the site subwatershed was minimal. In 2017, only 17 pounds of chlorpyrifos were applied and no use occurred in 2016. Based on monitoring history results and the minimal use of chlorpyrifos, the Coalition did not schedule to monitor for chlorpyrifos at Hatch Drain @ Tuolumne Rd in the 2019 WY (Figure 5).

Figure 5. Hatch Drain @ Tuolumne Rd applications of chlorpyrifos (2015-2017).

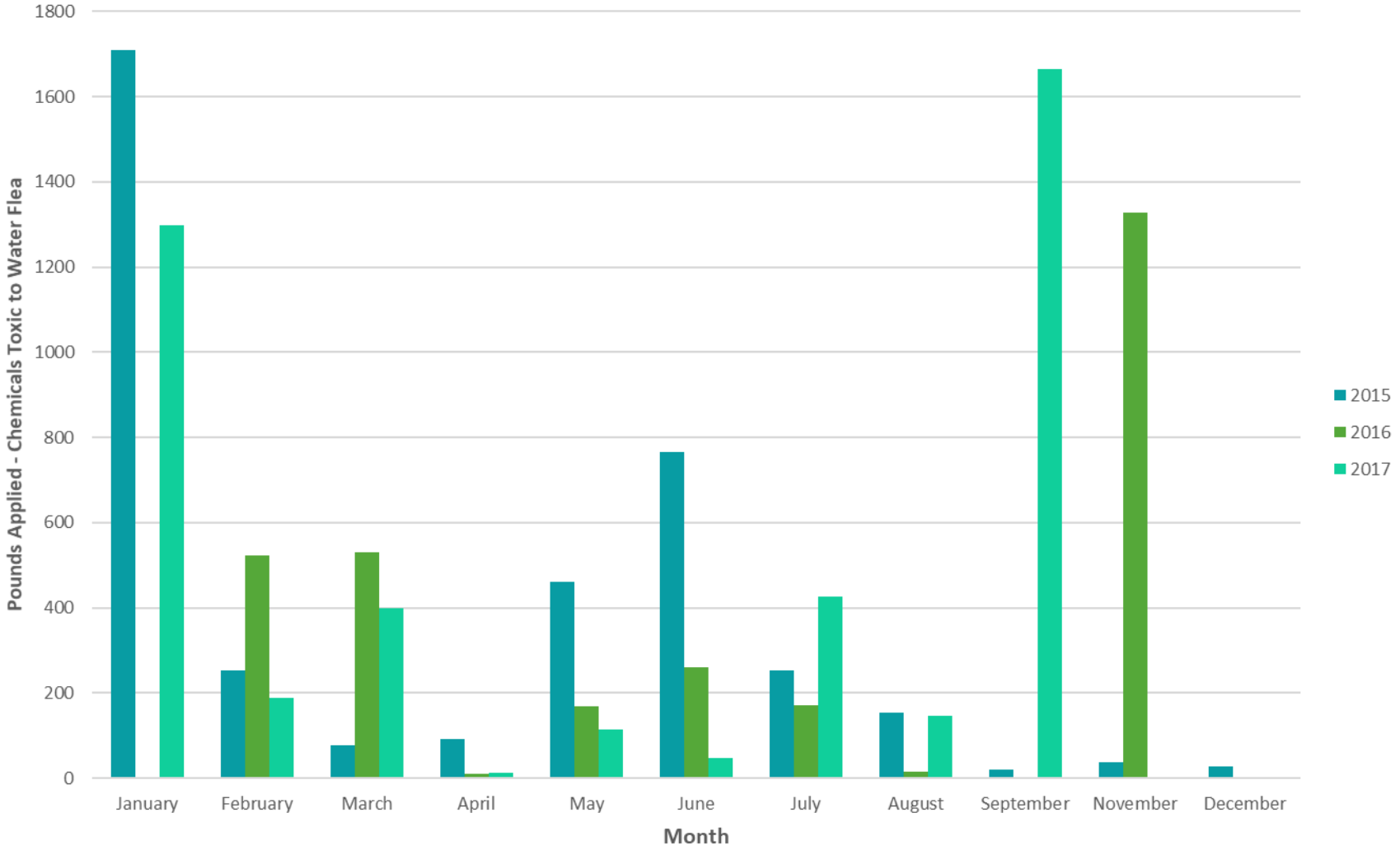


Toxicity to *Ceriodaphnia dubia*

Samples collected at Hatch Drain @ Tuolumne Rd were analyzed for toxicity to *C. dubia* from May through September 2007 and January through October 2008; 13 samples were collected and no toxicity occurred. The Coalition monitored for toxicity to *C. dubia* in July of 2015 and 2016 at Hatch Drain @ Tuolumne Rd based on high applications of organophosphates in July; no toxicity occurred.

Samples collected from the Core site that were toxic to *C. dubia* during the 2018 WY were collected after a storm and ammonia was determined to be the source of toxicity. Due to minimal monitoring during the winter storm season for ammonia and a review of PUR data, the Coalition will monitor for toxicity to *C. dubia* after two storm events, one during a storm event in October through December and the second during a storm event in January through March during the 2019 WY (Figure 6).

Figure 6. Hatch Drain @ Tuolumne Rd applications of chemicals toxic to *C. dubia* (2015-2017).



AACGU for Pyrethroids

Samples collected at Hatch Drain @ Tuolumne Rd were analyzed for pyrethroids in the water column (permethrin, bifenthrin, lambda-cyhalothrin, and cypermethrin) from May 2007 through September 2008. The Coalition collected 15 samples and all were non-detect. Due to the recent exceedance of the AACGU for pyrethroids at Prairie Flower Drain @ Crows Landing Rd, the Coalition will initiate pyrethroid monitoring during the 2019 WY at Hatch Drain @ Tuolumne Rd (Table 29).

Table 29. Pyrethroid monitoring schedule at Hatch Drain @ Tuolumne Rd during the 2019 WY.
Pyrethroids and months of monitoring determined by PEP.

Month	Bifenthrin	Lambda-Cyhalothrin	Permethrin
February		X	
March		X	
April			X
May		X	X
June	X		
July	X		
August	X		
September		X	

Hilmar Drain @ Central Ave

Hilmar Drain @ Central Ave is a Represented site in Zone 2. Monitoring was initiated at the site in 2005. During the 2018 WY, the Coalition conducted MPM for toxicity to *S. capricornutum*. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Toxicity to *Selenastrum capricornutum*

Toxicity to *S. capricornutum* occurred in six samples collected from Hilmar Drain @ Central Ave in April, July, and September. The TIEs initiated on four toxic samples collected between 2006 and 2017 indicated the results were inconclusive due to non-persistent toxicity. Both the copper and diuron management plans for Hilmar Drain @ Central Ave were approved for completion on March 25, 2016.

During the 2019 WY, MPM for toxicity to *S. capricornutum* is scheduled to occur during the months of April, July, and September (Table 30).

Table 30. Hilmar Drain @ Central Ave toxicity to *S. capricornutum* MPM exceedance tally.

Monitoring Year	Months of MPM		
	April	July	September
2006	NA	1	0
2007	1	0	0
2008	1	0	1
2009	0	NA	0
2013	0	0	0
2014 WY	0	0	0
2015 WY	0	0	1
2016 WY	0	0	1
2017 WY	1	1	0
2018 WY	0	Pending	Pending
Overall Tally	**3**	**2**	**3**

NA – Not applicable

Monitoring Based on Core Site Exceedances

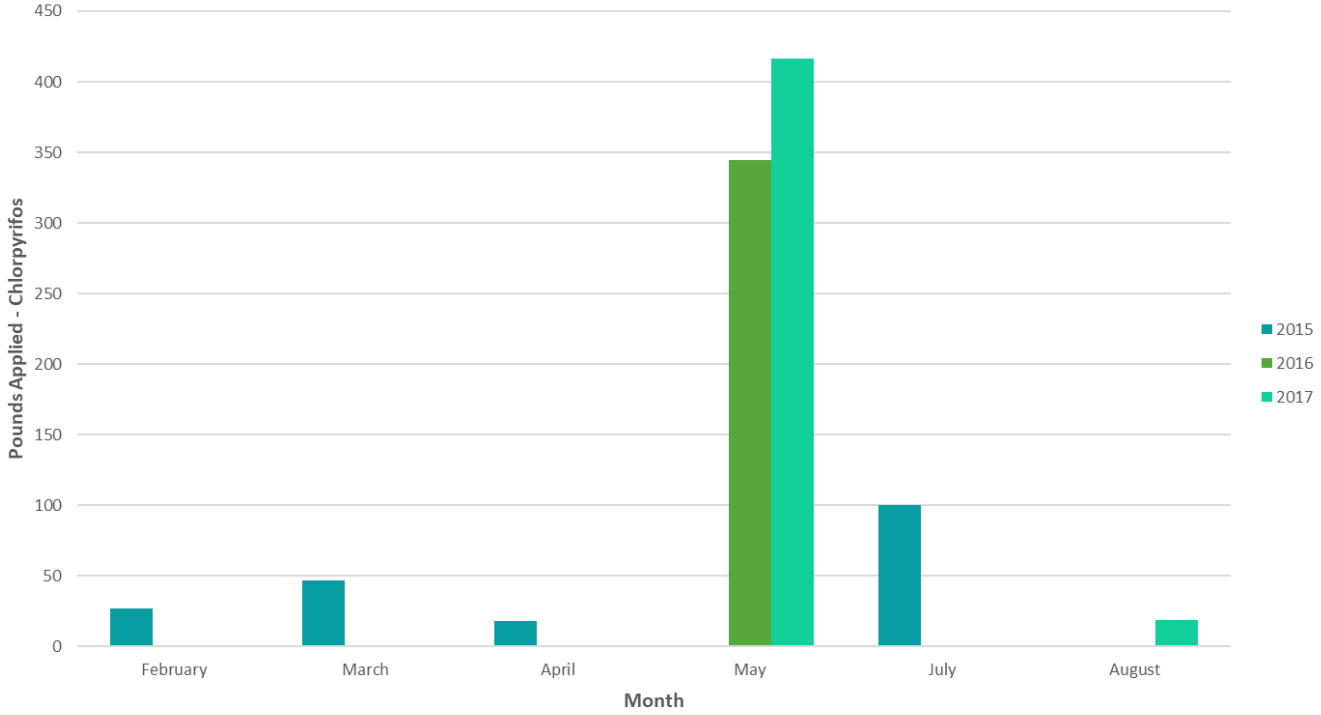
The Zone 2 Core site, Prairie Flower Drain @ Crows Landing Rd, is in a management plan for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. During the 2018 WY, samples collected at the Core site contained concentrations in exceedance of the AACGU pyrethroid limit and were toxic to *C. dubia* and *S. capricornutum*. Hilmar Drain @ Central Ave is in a management plan for toxicity to *S. capricornutum* and monitoring will occur according to the schedule discussed above.

Chlorpyrifos

On May 30, 2012, the Coalition received approval to complete the management plan for chlorpyrifos in the Hilmar Drain @ Central Ave site subwatershed. The site was monitored for chlorpyrifos from February 2005 through September 2008. Thirty samples were analyzed and one exceedance occurred in July 2006. Due to the amount of time since the site was last monitored and an increase in use during 2016 and 2017, the Coalition will conduct monitoring for chlorpyrifos during the 2019 WY.

During the 2019 WY, monitoring for chlorpyrifos will occur in May based on months of peak use from 2015 through 2017 (Figure 7).

Figure 7. Hilmar Drain @ Central Ave applications of chlorpyrifos (2015-2017).

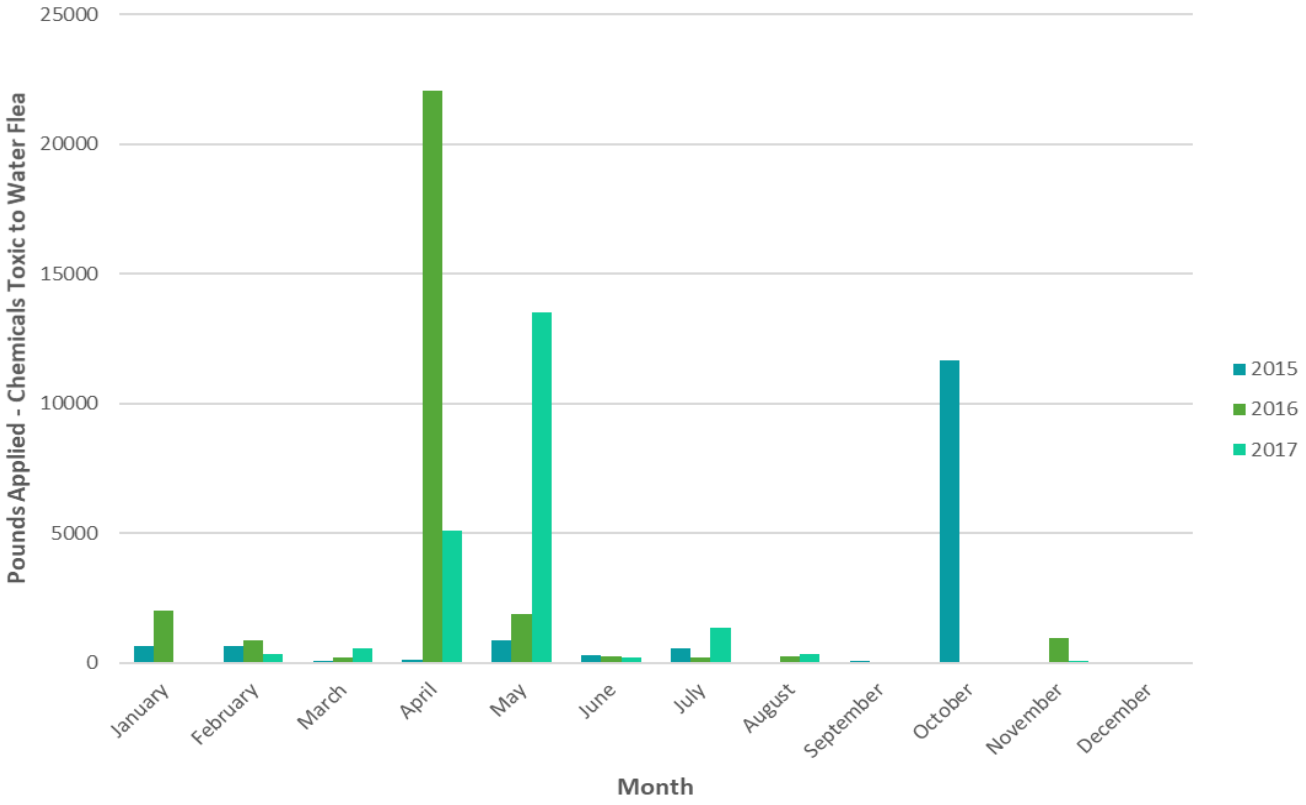


Toxicity to *Ceriodaphnia dubia*

Samples collected at Hilmar Drain @ Central Ave were analyzed for toxicity to *C. dubia* 32 times from February through September 2005, March through September 2006, and February through September in 2008; no toxicity occurred. Based on a review of recent PUR data and length of time since samples were last collected, the Coalition will monitor for toxicity to *C. dubia* during the 2019 WY (Figure 8).

During the 2019 WY, monitoring for toxicity to *C. dubia* will occur in April and May based on months of peak use and to coincide with chlorpyrifos monitoring.

Figure 8. Hilmar Drain @ Central Ave applications of chemicals toxic to *C. dubia* (2015-2017).



AACGU for Pyrethroids

Samples were collected and analyzed 24 times from Hilmar Drain @ Central Ave for pyrethroids in the water column (permethrin, bifenthrin, lambda-cyhalothrin, and cypermethrin) from September 2006 through September 2008; all results were non-detect. Due to the recent exceedance of the AACGU for pyrethroids at Prairie Flower Drain @ Crows Landing Rd and the length of time since pyrethroids were last analyzed, the Coalition will initiate pyrethroid monitoring during the 2019 WY at Hilmar Drain @ Central Ave (Table 31).

Table 31. Pyrethroid monitoring schedule at Hilmar Drain @ Central Ave during the 2019 WY.
Pyrethroids and months of monitoring determined by PEP.

Month	Bifenthrin	Cyfluthrin	Cypermethrin	Lambda-Cyhalothrin
January		X		
February			X	X
March		X	X	X
April			X	X
May	X	X		X
June	X			
July	X			
August	X			X

Lateral 2 ½ near Keyes Rd

Lateral 2 ½ near Keyes Rd is a Represented site in Zone 2. Monitoring was initiated at the site in 2008. During the 2018 WY, the Coalition conducted MPM for toxicity to *S. capricornutum*. On January 31, 2018 the Coalition received approval to complete the chlorpyrifos management plan; no samples were collected for chlorpyrifos during the 2018 WY. A summary of the monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Toxicity to *Selenastrum capricornutum*

The Coalition collected samples to test for toxicity to *S. capricornutum* from 2008 through 2010 and from the 2014 WY through the 2018 WY. Toxicity to S. capricornutum occurred in six samples collected in May, June, July, and August. The TIEs conducted on two of the six samples concluded metals and non-polar organics (July and August 2016 samples) were responsible for the toxicity. Percent growth was greater than 50% compared to the control for the other toxic samples and no TIEs were required.

During the 2019 WY, MPM for toxicity to *S. capricornutum* is scheduled to occur from May through August.

Monitoring Based on Core Site Exceedances

The Zone 2 Core site, Prairie Flower Drain @ Crows Landing Rd, is in a management plan for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. During the 2018 WY, samples collected at the Core site contained concentrations in exceedance of the AACGU pyrethroid limit and were toxic to *C. dubia* and *S. capricornutum*. Lateral 2 ½ near Keyes Rd is in a management plan for toxicity to *S. capricornutum* and monitoring will occur according to the schedule discussed above.

Toxicity to *Ceriodaphnia dubia*

Samples collected from Lateral 2 ½ near Keyes Rd were analyzed a total of 17 times for toxicity to *C. dubia* in October and November of 2008, from April through October 2009, and March through October 2010; no toxicity occurred. Based on a review of recent PUR data and five or more years since water quality was last monitored, the Coalition scheduled monitoring for toxicity to *C. dubia* during the 2019 WY (Figure 9).

During the 2019 WY, the Coalition will monitor for toxicity to *C. dubia* during one storm event that occurs between October and December 31st and during the irrigation season from April through August.

Chlorpyrifos

The management plan for chlorpyrifos was approved for completion on January 31, 2018; therefore, no monitoring is scheduled to occur during the 2019 WY.

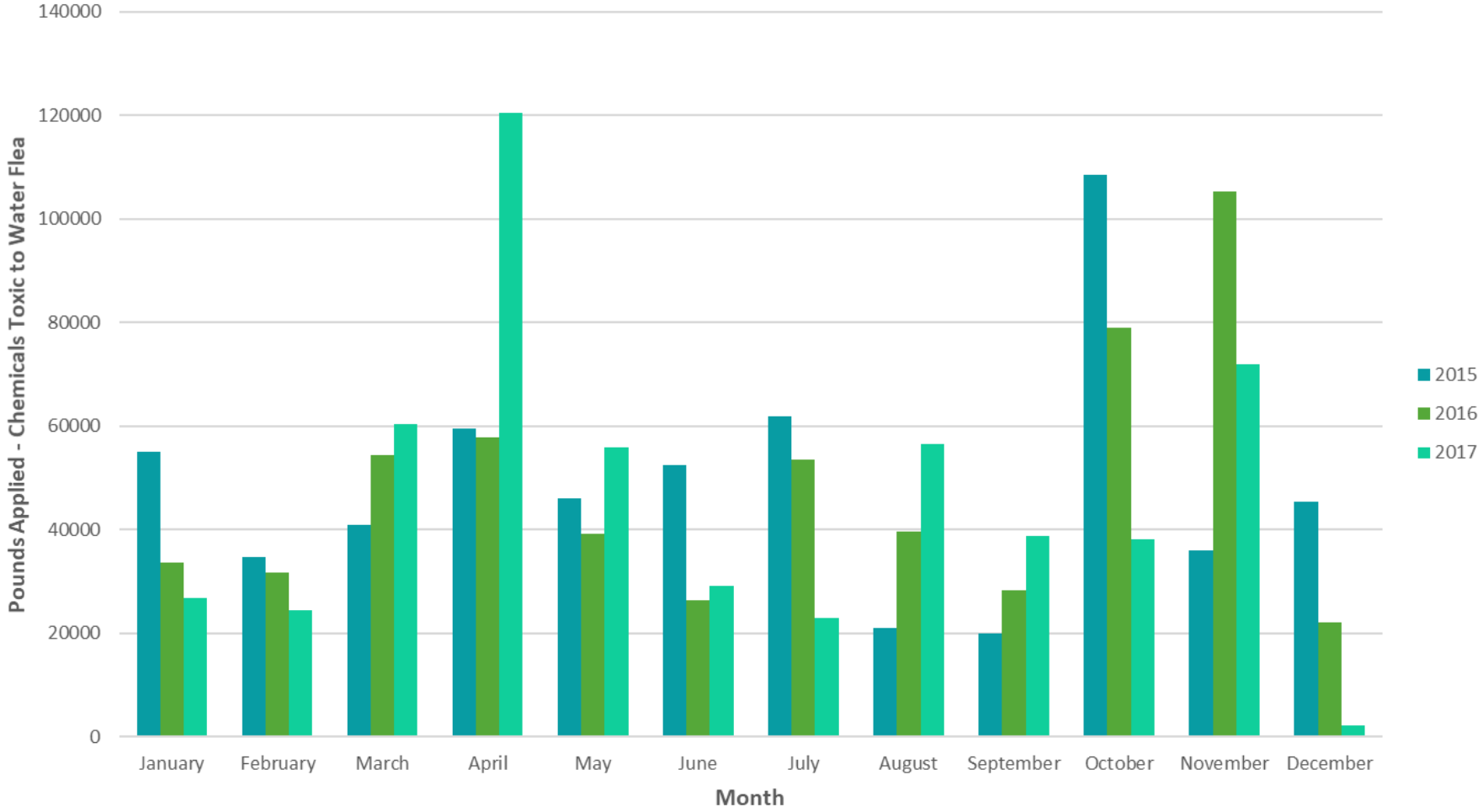
AACGU for Pyrethroids

Monitoring for pyrethroids in the water column has not occurred at Lateral 2 ½ near Keyes Rd. Due to the recent exceedance of the AACGU for pyrethroids at Prairie Flower Drain @ Crows Landing Rd, the Coalition will initiate pyrethroid monitoring during the 2019 WY at Lateral 2 ½ near Keyes Rd (Table 32).

Table 32. Pyrethroid monitoring schedule at Lateral 2 ½ near Keyes Rd during the 2019 WY.
Pyrethroids and months of monitoring determined by PEP.

Month	Bifenthrin	Cyfluthrin	Cypermethrin	Esfenvalerate	Fenpropathrin	Lambda-Cyhalothrin	Permethrin
April			X		X	X	X
May	X	X		X	X	X	X
June	X	X		X		X	
July	X	X	X	X	X	X	
August				X	X		

Figure 9. Lateral 2 ½ near Keyes Rd applications of chemicals toxic to *C. dubia* (2015-2017).



Lateral 5 ½ @ South Blaker Rd

Lateral 5 ½ @ South Blaker Rd is a rotating Core site in Zone 2. Monitoring was initiated at the site in October 2013 when the Coalition conducted two years of monitoring for dimethoate, diuron, and toxicity to *C. dubia*, *P. promelas*, and *S. capricornutum* based on exceedances at the Prairie Flower Drain @ Crows Landing Rd Core site. During the 2018 WY, the Coalition conducted MPM for toxicity to *S. capricornutum*. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Toxicity to *Selenastrum capricornutum*

The Coalition collected samples to test for toxicity to *S. capricornutum* from October 2013 through May 2018. Samples collected during the months of October (2013, 2014), December (2013, 2016), January (2017, 2018), February (2016), March (2014, 2015, 2016), April (2014, 2017), May (2016), June (2016), August (2017), and September (2016) were toxic to *S. capricornutum*. Of the 16 toxic samples, 10 TIEs were conducted and four concluded metals and non-polar organics were the sources of toxicity. Six of the TIEs conducted were inconclusive. Monitoring from the 2016 and 2017 WYs resulted in no exceedances of either copper or herbicides.

During the 2019 WY, the Coalition will conduct MPM for *S. capricornutum* toxicity in October and December through September based on months of past toxicity.

Monitoring Based on Core Site Exceedances

The Zone 2 Core site, Prairie Flower Drain @ Crows Landing Rd, is in a management plan for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. During the 2018 WY, samples collected at the Core site contained concentrations in exceedance of the AACGU pyrethroid limit and were toxic to *C. dubia* and *S. capricornutum*. Lateral 5 ½ @ South Blaker Rd is in a management plan for toxicity to *S. capricornutum* and monitoring will occur according to the schedule discussed above.

Chlorpyrifos

Lateral 5 ½ @ South Blaker Rd was monitored monthly for chlorpyrifos during the 2016 and 2017 WY and was not detected in any samples. No additional monitoring is required for chlorpyrifos in the 2019 WY because there has been two years of monitoring with no exceedances.

Toxicity to *Ceriodaphnia dubia*

Samples collected from Lateral 5 ½ @ South Blaker Rd were analyzed 33 times for toxicity to *C. dubia* from March 2014 through September 2017 and no toxicity occurred.

In the 2019 WY, no monitoring for toxicity to *C. dubia* is scheduled to occur as the Coalition completed two years of monitoring with no toxicity.

AACGU for Pyrethroids

Monitoring for pyrethroids in the water column has not occurred at Lateral 5 ½ @ South Blaker Rd. Due to the recent exceedance of the AACGU for pyrethroids at Prairie Flower Drain @ Crows Landing Rd, the Coalition will initiate pyrethroid monitoring in the water column during the 2019 WY at Lateral 5 ½ @ South Blaker Rd (Table 33).

Table 33. Pyrethroid monitoring schedule at Lateral 5 ½ @ South Blaker Rd during the 2019 WY.

Pyrethroids and months of monitoring determined by PEP.

Month	Bifenthrin	Cyfluthrin	Cypermethrin	Esfenvalerate	Fenpropathrin	Lambda-Cyhalothrin	Permethrin
January							X
February			X				
March		X	X				
April	X	X	X		X		
May	X	X				X	
June	X	X				X	
July	X	X				X	
August				X	X		

Lateral 6 and 7 @ Central Ave

Lateral 6 and 7 @ Central Ave is a Represented site in Zone 2. Monitoring was initiated at the site in the 2014 WY. During the 2018 WY, the Coalition monitored for ammonia for a second consecutive year and initiated monitoring for chlorpyrifos based on exceedances at the Prairie Flower Drain Core site. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Management plans at Lateral 6 and 7 @ Central Ave include: DO, pH, SC, nitrate + nitrite as N, and toxicity to *S. capricornutum*. Focused outreach has not been conducted in the site subwatershed. Therefore, the Coalition will wait to conduct MPM for toxicity to *S. capricornutum* until focused outreach is scheduled in order to evaluate the effectiveness of implemented management practices.

Monitoring Based on Core Site Exceedances

The Zone 2 Core site, Prairie Flower Drain @ Crows Landing Rd, is in a management plan for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. During the 2018 WY, samples collected at the Core site contained concentrations in exceedance of the AACGU pyrethroid limit and were toxic to *C. dubia* and *S. capricornutum*. Lateral 6 and 7 @ Central Ave is in a management plan for

toxicity to *S. capricornutum* and monitoring will occur when focused outreach is initiated in the site subwatershed.

Ammonia

Monitoring for ammonia in January was initiated at the site during the 2017 WY based on an exceedance that occurred at the Lateral 5 ½ @ South Blaker Rd Core site. An exceedance of the WQTL for ammonia occurred in January 2017 at Lateral 6 and 7 @ Central Ave and no exceedance occurred during the 2018 WY.

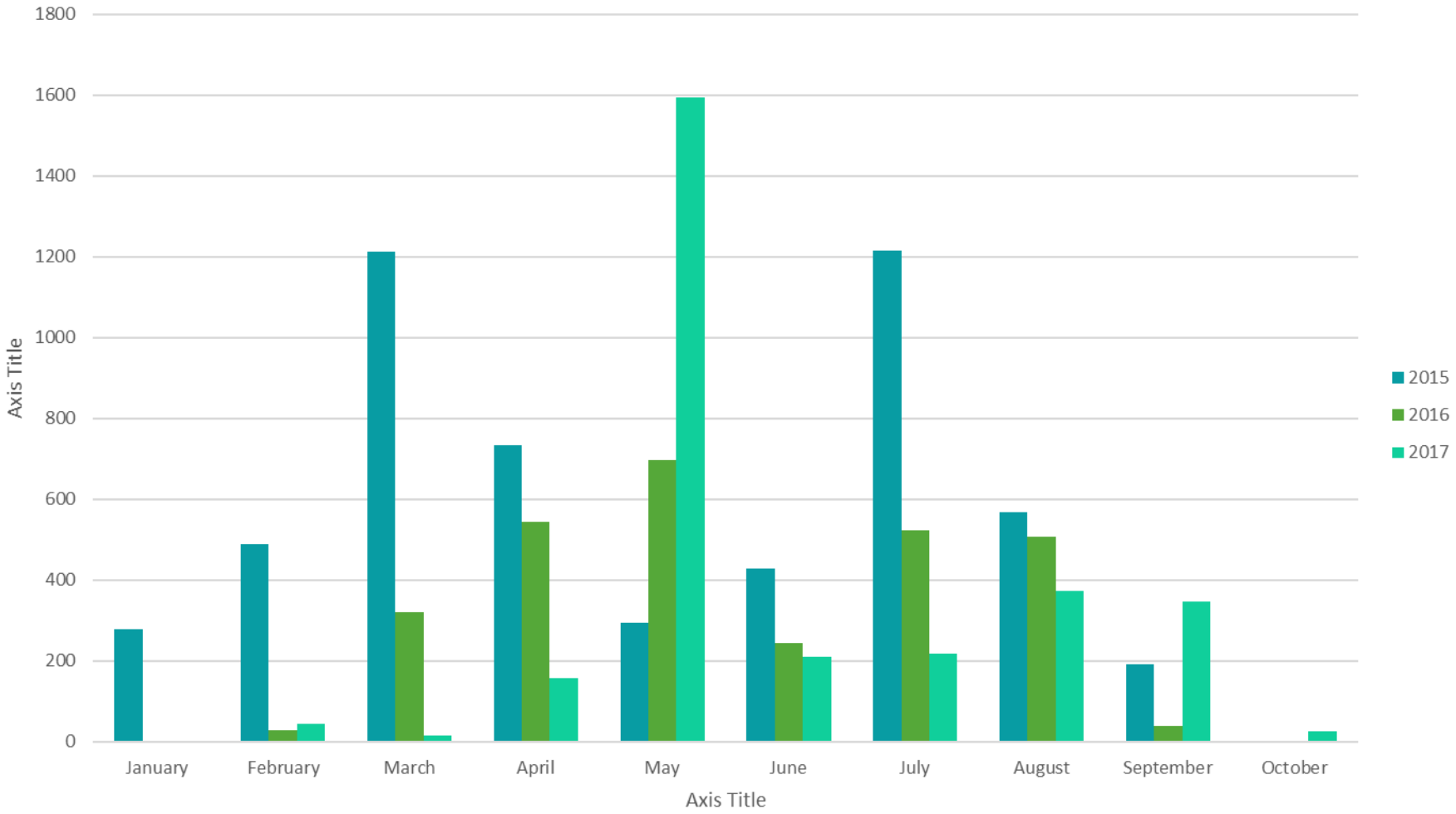
During the 2019 WY the Coalition will monitor for ammonia in January for a third consecutive year.

Chlorpyrifos

The Coalition initiated chlorpyrifos monitoring during the 2018 WY based on exceedances that occurred at the Prairie Flower Drain @ Crows Landing Rd Core site. During the 2018 WY, monitoring occurred from March through August and there were no detections. The PUR data, from 2015 through 2017, indicate months of peak chlorpyrifos use occur from February through August; however, in 2017 use of chlorpyrifos declined to almost no use in February and March (Figure 10).

During the 2019 WY, the Coalition will monitor for chlorpyrifos for a second consecutive year from April through September based on months of peak chlorpyrifos use.

Figure 10. Lateral 6 and 7 @ Central Ave applications of chlorpyrifos (2015-2017).



Toxicity to *Ceriodaphnia dubia*

The Coalition monitored for toxicity to *C. dubia* in March, April, July, and August for two consecutive years in the 2014 and 2015 WYs and samples were not toxic. In the 2019 WY, monitoring for toxicity to *C. dubia* is not scheduled to occur based on recent monitoring results that indicate no impairment.

AACGU for Pyrethroids

Monitoring for pyrethroids in the water column has not occurred at Lateral 6 and 7 @ Central Ave. Due to the recent exceedance of the AACGU for pyrethroids at Prairie Flower Drain @ Crows Landing Rd, the Coalition will initiate pyrethroid monitoring during the 2019 WY at Lateral 6 and 7 @ Central Ave (Table 34).

Table 34. Pyrethroid monitoring schedule at Lateral 6 and 7 @ Central Ave during the 2019 WY.
Pyrethroids and months of monitoring determined by PEP.

Month	Bifenthrin	Cyfluthrin	Cypermethrin	Esfenvalerate	Fenpropathrin	Lambda-Cyhalothrin	Permethrin
January							X
February			X				
March		X	X				
April	X	X	X		X		
May	X	X				X	
June	X	X				X	X
July	X	X				X	
August				X	X		

Levee Drain @ Carpenter Rd

Levee Drain @ Carpenter Rd is a Represented site in Zone 2. Monitoring was initiated at the site in 2012. During the 2018 WY, MPM for toxicity to *S. capricornutum* occurred. Approval to complete the management plans for toxicity to *C. dubia* and *H. azteca* was received on January 31, 2018 and no monitoring occurred during the 2018 WY. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Toxicity to *Selenastrum capricornutum*

Samples were tested for *S. capricornutum* toxicity monthly in 2012 and 2013. The Coalition initiated MPM in 2014 and has continued MPM every year.

Toxicity to S. capricornutum occurred in four samples collected in February, June, and December. Monitoring occurred for S. capricornutum toxicity during the 2018 WY in December, February, and June and no toxicity occurred.

During the 2019 WY, the Coalition will conduct MPM for toxicity to *S. capricornutum* in June based on months of past toxicity. Monitoring in December and February will not occur during the 2019 WY due to three or more years of monitoring with no toxicity.

Monitoring Based on Core Site Exceedances

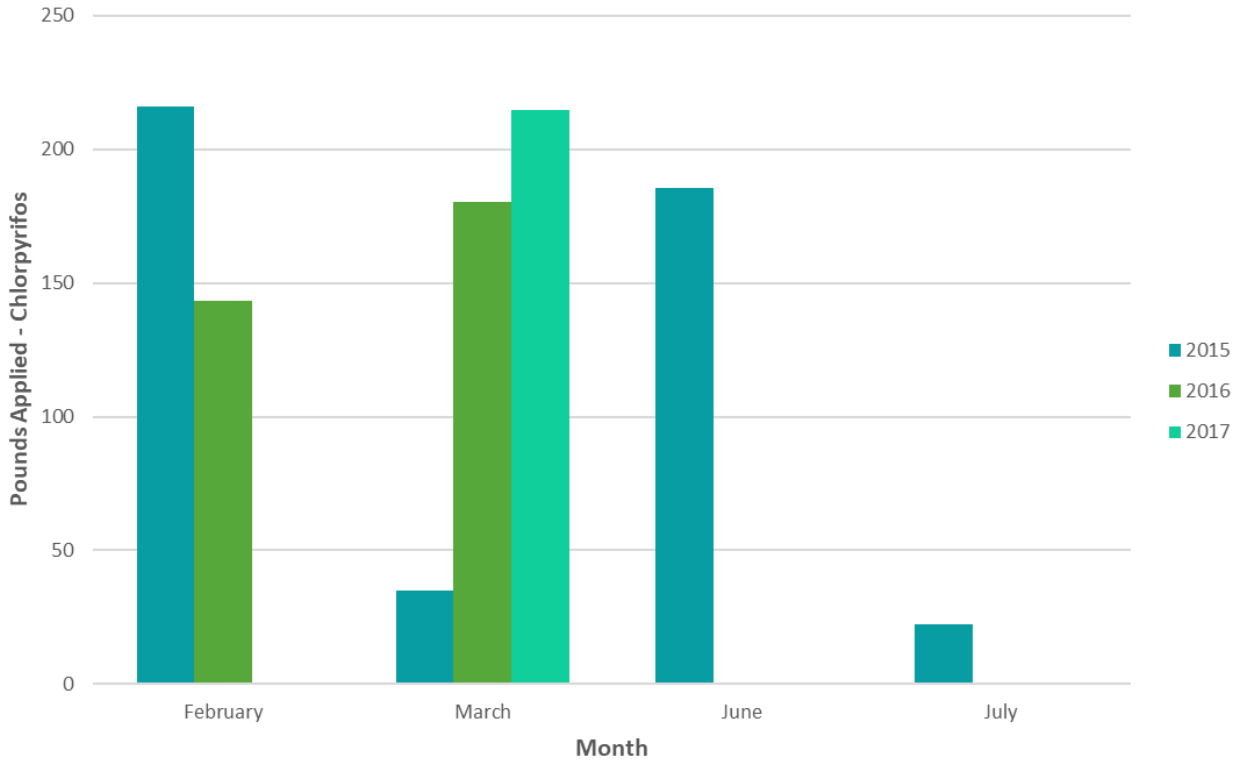
The Zone 2 Core site, Prairie Flower Drain @ Crows Landing Rd, is in a management plan for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. During the 2018 WY, samples collected at the Core site contained concentrations in exceedance of the AACGU pyrethroid limit and were toxic to *C. dubia* and *S. capricornutum*. Levee Drain @ Carpenter Rd is in a management plan for toxicity to *S. capricornutum*, monitoring will occur according to the schedule discussed above.

Chlorpyrifos

Levee Drain @ Carpenter Rd was monitored monthly for chlorpyrifos from January through December 2012 and January through September 2013; no exceedances of the chlorpyrifos WQTL occurred. The most recent PUR data indicates that chlorpyrifos applications only occurred in March (Figure 11). The amount of chlorpyrifos applied within the site subwatershed is minimal and overall use is declining.

During the 2019 WY, no monitoring for chlorpyrifos is scheduled based on monitoring results and minimal use of chlorpyrifos within the Levee Drain @ Carpenter Rd site subwatershed.

Figure 11. Levee Drain @ Carpenter Rd applications of chlorpyrifos (2015-2017).



AACGU for Pyrethroids

Monitoring for pyrethroids in the water column has not occurred at Levee Drain @ Carpenter Rd. Due to the recent exceedance of the AACGU for pyrethroids at Prairie Flower Drain @ Crows Landing Rd, the Coalition will initiate pyrethroid monitoring during the 2019 WY at Levee Drain @ Carpenter Rd (Table 35).

Table 35. Pyrethroid monitoring schedule at Levee Drain @ Carpenter Rd during the 2019 WY.
Pyrethroids and months of monitoring determined by PEP.

Month	Bifenthrin	Cyfluthrin	Cypermethrin	Lambda-Cyhalothrin	Permethrin
February			X	X	
March			X	X	X
April					X
May	X			X	X
June	X				
July	X	X			
August	X				

Lower Stevinson @ Faith Home Rd

Lower Stevinson @ Faith Home Rd is a Represented site in Zone 2. Monitoring was initiated at the site during the 2014 WY when the Coalition conducted two years of monitoring for dimethoate, diuron, and toxicity to *S. capricornutum*. During the 2018 WY, the Coalition monitored for ammonia and chlorpyrifos. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Management plans at Lower Stevinson @ Faith Home Rd include: DO, pH, SC, nitrate + nitrite as N, and toxicity to *S. capricornutum*. Focused outreach has not been conducted in the site subwatershed. Therefore, the Coalition will wait to conduct MPM until focused outreach occurs in order to evaluate the effectiveness of implemented management practices.

Monitoring Based on Core Site Exceedances

The Zone 2 Core site, Prairie Flower Drain @ Crows Landing Rd, is in a management plan for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. During the 2018 WY, samples collected at the Core site contained concentrations in exceedance of the AACGU pyrethroid limit and were toxic to *C. dubia* and *S. capricornutum*. Lower Stevinson @ Faith Home Rd is in a management plan for toxicity to *S. capricornutum* and monitoring will occur when focused outreach is scheduled.

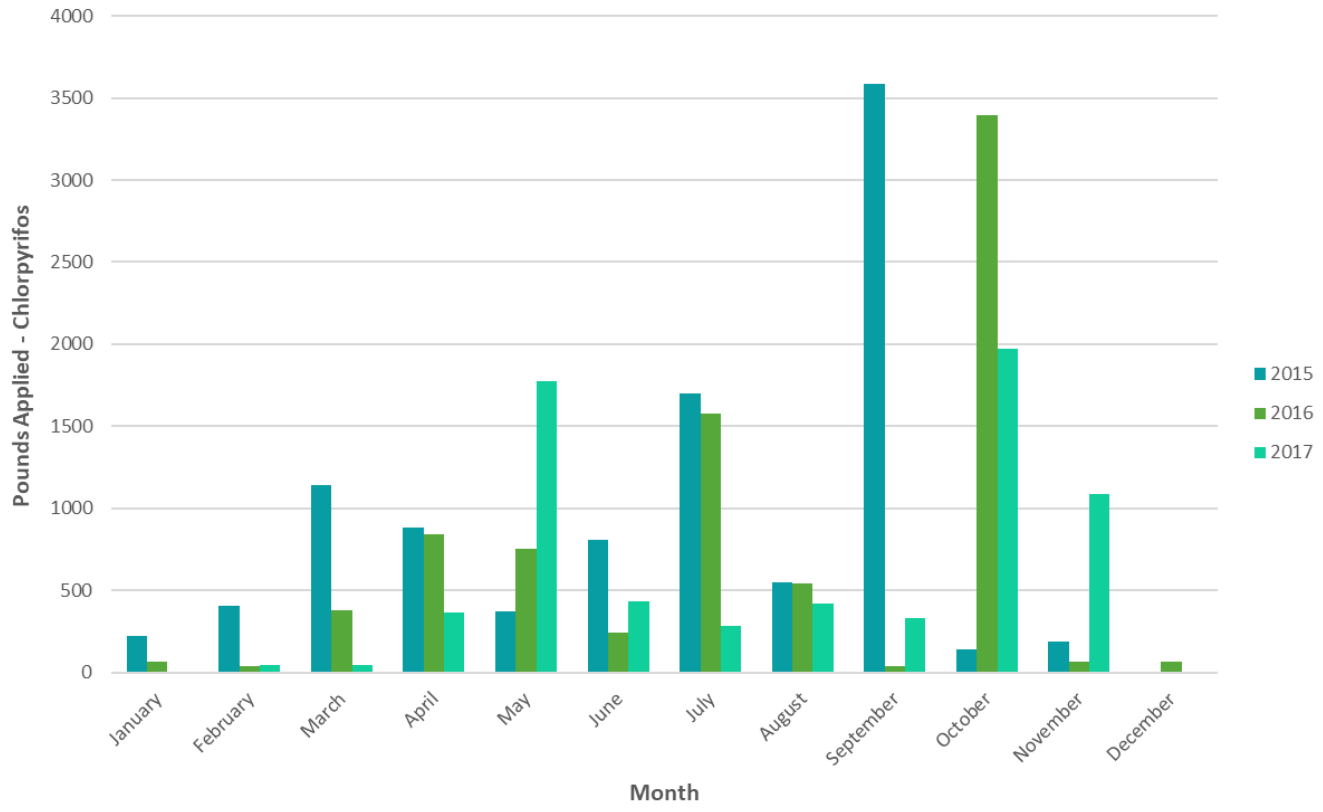
Ammonia

The Coalition monitored for ammonia in January, based on previous exceedances at the Core site, during the 2018 WY and no exceedances of the ammonia WQTL occurred. Two years of monitoring with no exceedances is complete and monitoring for ammonia during the 2019 WY is not scheduled.

Chlorpyrifos

The Coalition initiated chlorpyrifos monitoring in the site subwatershed during the 2018 WY based on exceedances that occurred at the Prairie Flower Drain @ Crows Landing Rd Core site during the 2015 WY; this was the first year that chlorpyrifos was tested for at this site. During the 2019 WY, monitoring is scheduled to occur in October, November, and from April through August based on months of peak use (Figure 12).

Figure 12. Lower Stevinson @ Faith Home Rd applications of chlorpyrifos (2015-2017).



Toxicity to *Ceriodaphnia dubia*

The Coalition monitored for toxicity to *C. dubia* in March, April, July, and August for two consecutive years in the 2014 WY and 2015 WY and samples were not toxic. In the 2019 WY, monitoring for water column toxicity to *C. dubia* is not scheduled.

AACGU for Pyrethroids

Monitoring for pyrethroids in the water column has not occurred at Lower Stevinson @ Faith Home Rd. Due to the recent exceedance of the AACGU for pyrethroids at Prairie Flower Drain @ Crows Landing Rd, the Coalition will initiate pyrethroid monitoring during the 2019 WY at Lower Stevinson @ Faith Home Rd (Table 36).

Table 36. Pyrethroid monitoring schedule at Lower Stevinson @ Faith Home Rd during the 2019 WY.

Pyrethroids and months of monitoring determined by PEP.

Month	Bifenthrin	Cyfluthrin	Cypermethrin	Esfenvalerate	Fenpropathrin	Lambda-Cyhalothrin	Permethrin
January							X
February			X				
March			X				
April	X	X	X		X	X	
May	X	X	X	X		X	
June	X	X		X		X	
July	X	X				X	
August				X	X		

Prairie Flower Drain @ Crows Landing Rd

Prairie Flower Drain @ Crows Landing Rd will be a Represented site beginning in the 2019 WY. The site was monitored as the Zone 2 Core site during the 2014 WY, 2015 WY, and 2018 WY. During the 2018 WY, the Coalition conducted MPM for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. Additionally, the site was monitored for constituents based on PEP results. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

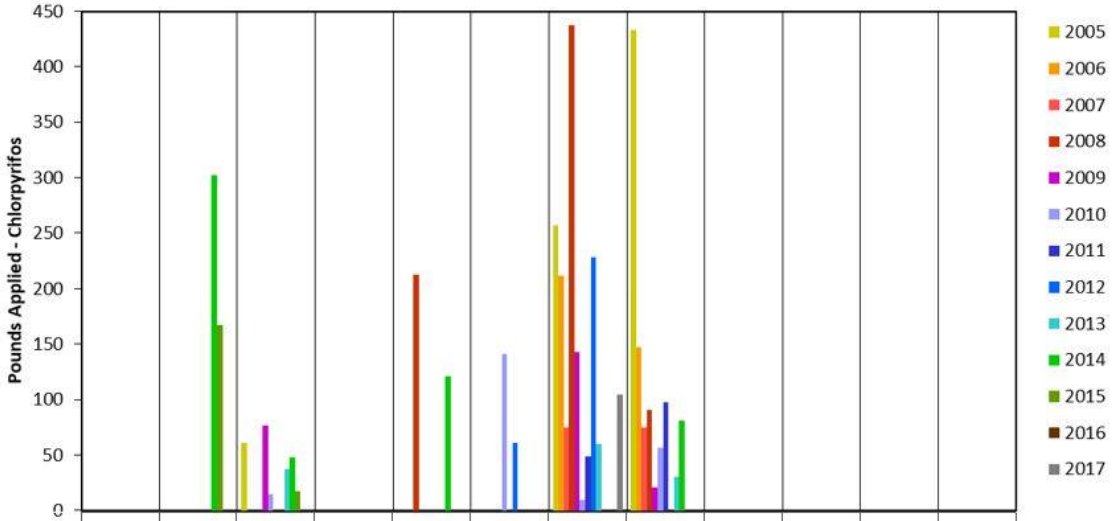
Chlorpyrifos

Prairie Flower Drain @ Crows Landing Rd was monitored monthly during the 2015 WY and exceedances of the WQTL for chlorpyrifos occurred from March through August 2015. The management plan for chlorpyrifos was reinstated for the 2016 WY and monitoring occurred from 2016 through May 2018, one exceedance occurred in August 2017.

During the 2019 WY, the Coalition will monitor for chlorpyrifos in March, July, and August based on months of peak use and months of past exceedances (Figure 13).

Figure 13. Prairie Flower Drain @ Crows Landing Rd monitoring history and chlorpyrifos applications.

Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2005												
2006												
2007												
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017												
2018											2019WY	
Total Use (2005-2017)	0	470	254	0	333	202	1,574	1,031	0	0	0	0
% Total (2005-2017)	*0%*	*12%*	*7%*	*0%*	*9%*	*5%*	*41%*	*27%*	*0%*	*0%*	*0%*	*0%*
Total Use (2015-2017)	0	168	18	0	0	0	104	0	0	0	0	0
% Total (2015-2017)	*0%*	*58%*	*6%*	*0%*	*0%*	*0%*	*36%*	*0%*	*0%*	*0%*	*0%*	*0%*

Toxicity to *C. dubia*

Toxicity to *C. dubia* occurred 12 times in samples collected from Prairie Flower Drain @ Crows Landing Rd from March through September. During the 2018 WY, a single sample resulted in toxicity to *C. dubia* in January 2018 during normal monitoring (0% survival compared to the control). A TIE was initiated and results were inconclusive.

During the 2019 WY, the Coalition will conduct MPM for toxicity to *C. dubia* in January, March, May, and August based on months of past exceedances (Table 37). Monitoring in April, June, July, and September is not scheduled due to three or more years since the last exceedance.

Table 37. Prairie Flower Drain @ Crows Landing Rd toxicity to *C. dubia* MPM exceedance tally.

Year	Months of MPM								
	January	February	March	April	May	June	July	August	September
2007	NA	0	0	0	0	0	0	0	1
2008	0	0	Dry	0	0	0	0	0	0
2010	NA	NA	NA	NA	NA	NA	NA	NA	0
2011	0	0	0	0	0	0	0	1	0
2012	NA	NA	0	NA	NA	NA	NA	NA	NA
2013	NA	NA	0	NA	NA	NA	NA	1	0
2014	0	0	0	0	0	0	0	0	0
2015	0	0	1	1	1	1	1	0	0
2016	NA	NA	0	0	0	0	0	0	0
2017	NA	NA	0	0	1	0	0	1	NA
2018	1	0	Dry	0	0	Pending	Pending	Pending	NA
Overall Tally	**1**	**0**	**1**	**1**	**2**	**1**	**1**	**3**	**0**

NA- Not applicable, monitoring not scheduled.

Toxicity to *S. capricornutum*

Twenty-four samples collected from 2008 through the 2018 WY resulted in toxicity during the months of January through August, October, and December; toxicity has not occurred in samples collected during September or November. The most recent sample collected that resulted in toxicity to *S. capricornutum* occurred in May 2018 (47% growth compared to the control).

Of the eight TIEs conducted, only two concluded metals and/or non-polar organics (April 2008) and metals and/or ammonia (May 2009) were the sources of toxicity. The TIEs for the other toxic samples were either not conducted due to the result being above 50% compared to the control or inconclusive due to non-persistent or unknown toxicity.

During the 2018 WY, the Coalition will conduct MPM for *S. capricornutum* toxicity in December, January, February, March, and May through August based on months of past toxicity. The Coalition will discontinue monitoring for toxicity to *S. capricornutum* during the months of April, and October due to three years or more years of monitoring with no toxicity (Table 38).

Table 38. Prairie Flower Drain @ Crows Landing Rd toxicity to *S. capricornutum* MPM exceedance tally.

Monitoring Year	Months of MPM									
	January	February	March	April	May	June	July	August	October	December
2008	1	1	0	1	1	0	0	0	NA	NA
2009	NA	NA	NA	0	1	NA	NA	NA	NA	NA
2010	1	0	NA	0	0	NA	NA	NA	NA	NA
2011	0	1	0	0	0	0	0	0	1	1
2012	0	0	NA	NA	NA	NA	NA	NA	NA	NA
2013	1	0	NA	0	0	NA	NA	NA	1	1
2014	0	0	1	0	0	0	0	0	Dry	0
2015	0	1	0	0	1	1	1	1	0	Dry
2016	0	0	1	0	0	0	1	0	0	1
2017	1	0	0	0	0	0	0	0	0	0
2018	0	1	Dry	0	1	Pending	Pending	Pending		
Overall Tally	**4**	**4**	**2**	**1**	**4**	**1**	**2**	**1**	**2**	**3**

NA- Not applicable, monitoring not scheduled for that month.

Monitoring Based on Core Site Exceedances

Due to a single exceedance of the AACGU Concentration Goal Unit for pyrethroids (AACGU for pyrethroids), the Coalition plans to monitor for pyrethroids for a second year (based on PEP results). During the 2019 WY, the Coalition is scheduled to conduct a second year of Represented monitoring at Prairie Flower Drain @ Crows Landing Rd for pyrethroids according the schedule in Table 39.

Table 39. Pyrethroid monitoring schedule at Prairie Flower Drain @ Crows Landing Rd during the 2019 WY.

Pyrethroids and months of monitoring determined by PEP.

Month	Bifenthrin	Cypermethrin	Lambda-Cyhalothrin	Permethrin
February		X	X	
March		X	X	
May	X		X	X
June			X	
July			X	

Unnamed Drain @ Hogin Rd

Unnamed Drain @ Hogin Rd is a Represented site in Zone 2. Monitoring was initiated at the site during the 2014 WY when the Coalition conducted monitoring for diuron (2015 and 2016 WYs), dimethoate (2014 through 2016), and toxicity to *S. capricornutum* (2014 and 2015 WYs) based on exceedances at the Prairie Flower Drain @ Crows Landing Rd Core site. During the 2018 WY, the Coalition conducted monitoring for ammonia and nitrate + nitrite as N based on exceedances at the Lateral 5 ½ @ South Blaker Rd Core site. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Unnamed Drain @ Hogin Rd is in a management plan for DO and SC; therefore, no MPM is scheduled during the 2019 WY.

Monitoring Based on Core Site Exceedances

The Zone 2 Core site, Prairie Flower Drain @ Crows Landing Rd, is in a management plan for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. During the 2018 WY, samples collected at the Core site contained concentrations in exceedance of the AACGU pyrethroid limit and were toxic to *C. dubia* and *S. capricornutum*.

Ammonia

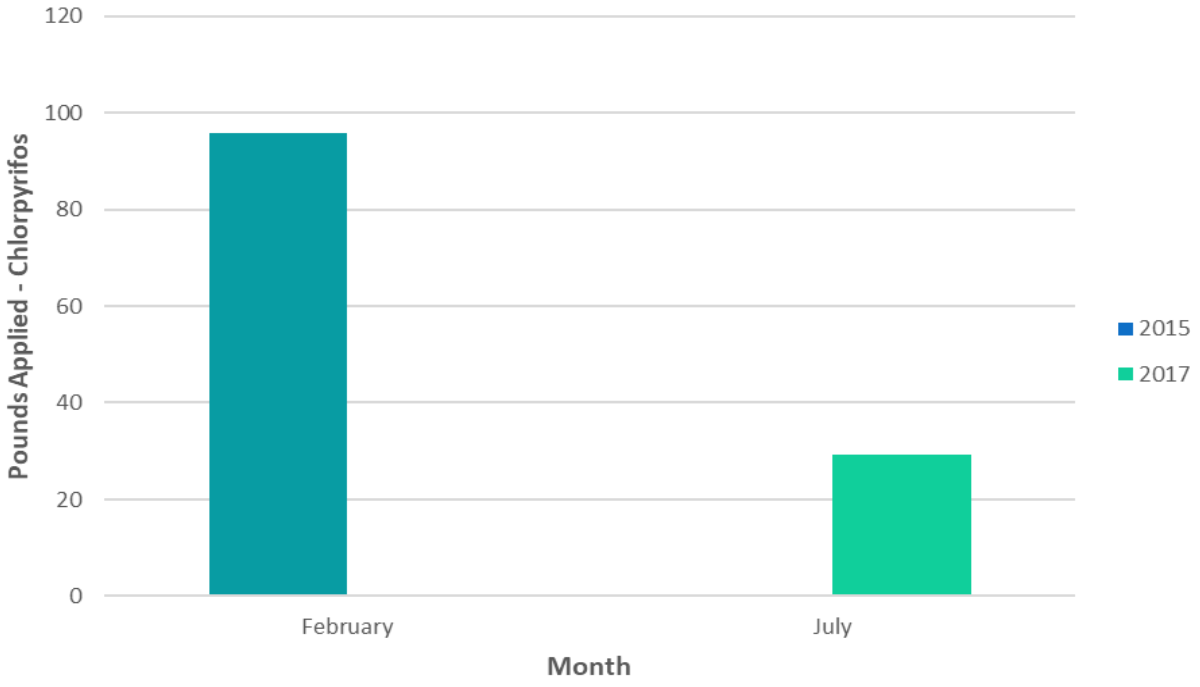
The Coalition collected samples for ammonia in January of 2017 and 2018 based on exceedances at the Lateral 5 ½ @ South Blaker Rd Core site and no exceedance occurred. During the 2019 WY, monitoring for ammonia is not scheduled to occur due to two years of monitoring with no exceedances.

Chlorpyrifos

Monitoring for chlorpyrifos has not occurred at Unnamed Drain @ Hogin Rd. The PUR data for chlorpyrifos applications, from 2015 through 2017, indicate that use within the site subwatershed is minimal. In 2017, less than 30 pounds was applied in the subwatershed (Figure 14).

During the 2019 WY, the Coalition will not conduct monitoring for chlorpyrifos at Unnamed Drain @ Hogin Rd due to low use in the site subwatershed.

Figure 14. Unnamed Drain @ Hogin Rd applications of chlorpyrifos (2015-2017).

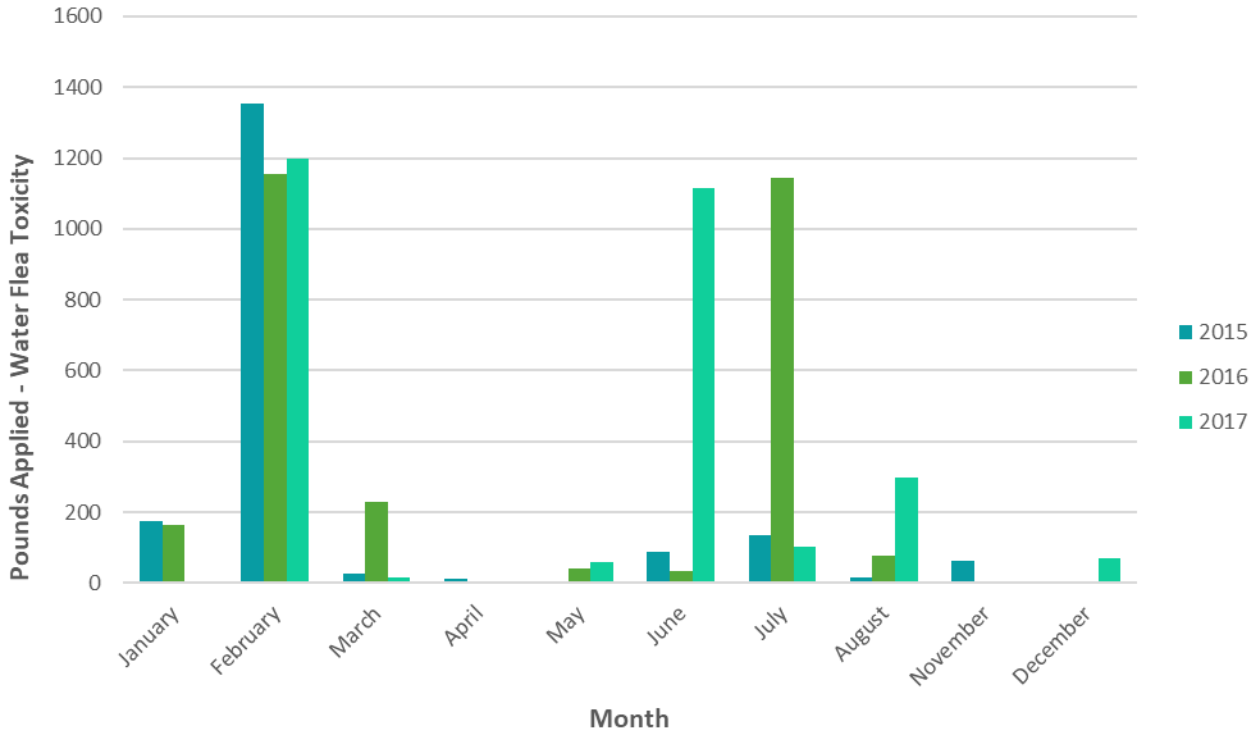


Toxicity to *Ceriodaphnia dubia*

The Coalition monitored for toxicity to *C. dubia* in July and August for two consecutive years in the 2014 and 2015 WYs and no samples were toxic. Based on a review of the last three years of PUR data associated with toxicity to *C. dubia*, the Coalition will monitor for toxicity during the 2019 WY (Figure 15).

During the 2019 WY, the Coalition will monitor for toxicity to *C. dubia* in February, March, June, and July based on months of peak use and no monitoring history in early spring months.

Figure 15. Unnamed Drain @ Hogin Rd applications of chemicals toxic to *C. dubia* (2015-2017).



Nitrate + Nitrite as N

Monitoring for nitrate + nitrite as N occurred during the 2017 and 2018 WYs. During the 2018 WY, monitoring occurred in October, November, February through July, and September based on exceedances at the Lateral 5 ½ @ South Blaker Rd Core site. No exceedance of the WQTL for nitrate + nitrite as N occurred in samples collected from Unnamed Drain @ Hogin Rd.

During the 2019 WY, monitoring for nitrate + nitrite as N is not scheduled to occur due to two years monitoring with no exceedances.

AACGU for Pyrethroids

Monitoring for pyrethroids in the water column has not occurred at Unnamed Drain @ Hogin Rd. Due to the recent exceedance of the AACGU for pyrethroids at Prairie Flower Drain @ Crows Landing Rd, the Coalition will initiate pyrethroid monitoring during the 2019 WY at Unnamed Drain @ Hogin Rd (Table 36).

Table 40. Pyrethroid monitoring schedule at Unnamed Drain @ Hogin Rd during the 2019 WY.
Pyrethroids and months of monitoring determined by PEP.

Month	Bifenthrin	Lambda-Cyhalothrin	Permethrin
February		X	
March		X	
April		X	
May		X	X
June	X	X	X
July	X	X	
August	X		

Toxicity to *Selenastrum capricornutum*

The Coalition collected 16 samples to test for toxicity to *S. capricornutum* monthly in 2013 and during the 2014 and 2015 WYs for one storm event between January and March, and in June, and July; no toxicity occurred. Based on past monitoring results and no toxic samples, the Coalition will not monitor for toxicity to *S. capricornutum* during the 2019 WY.

ZONE 3 – REPRESENTED SITE MONITORING SCHEDULE

Core Site Monitoring Results

Highline Canal @ Hwy 99 remains the Core site in Zone 3 in the 2019 WY. Monitoring was initiated at Highline Canal @ Hwy 99 in 2005. During the 2018 WY, samples collected in October 2017 were toxic to *C. dubia*, no additional exceedances occurred. This was the first C. dubia toxicity to occur at the site since September 2006. During the 2019 WY, the Coalition will continue to monitor for toxicity to *C. dubia* in months determined necessary through the PEP (Table 8).

Highline Canal @ Hwy 99 is in a management plan for DO, pH, SC, *E. coli*, ammonia, copper, chlorpyrifos, and toxicity to *S. capricornutum*. During the 2019 WY, the Coalition will conduct MPM for the following constituents at Highline Canal @ Hwy 99:

- Dissolved copper (December and January through April)
- Chlorpyrifos (January)
- *S. capricornutum* toxicity (June, July, and September)

The management plan constituents for sites in Zone 3 are listed in Table 41. Monitoring for management plan constituents will occur according to the schedule provided in Attachment A.

Table 41. Zone 3 management plan constituents.

Core site is bolded. An 'M' indicates a current management plan constituent and an 'M' in red text indicates exceedances in the 2017 WY triggered a management plan. An 'X' indicates one exceedance occurred during the 2018 WY that did not initiate a management plan.

Site Name	DO	pH	SC	*E. coli*	Ammonia	Nitrate + Nitrite	Copper	Chlorpyrifos	DDE	*C. dubia*	*S. capricornutum*
Highline Canal @ Hwy 99	**M**	**M**	**M**	**M**	**M**		**M**	**M**		**X**	**M**
Highline Canal @ Lombardy Rd[1]	M	M	M	M			M				M
Mustang Creek @ East Ave	M		M	M		M	M		M		

[1]Highline Canal @Lombardy management plans are addressed at Highline Canal @ Hwy 99 based on the Delta RMP reduced monitoring schedule.

Highline Canal @ Lombardy Rd

Monitoring will not occur at Highline Canal @ Lombardy Rd during the 2019 WY in exchange for contributing to the Delta RMP. Management plan constituents for Highline Canal @ Lombardy Rd are scheduled to be monitored at the downstream site, Highline Canal @ Hwy 99.

Mustang Creek @ East Ave

Mustang Creek @ East Ave is a Represented site in Zone 3. Monitoring was initiated at the site in 2006. During the 2018 WY, the Coalition conducted MPM for dissolved copper. A summary of monitoring results through May of the 2018 WY, and the 2019 WY monitoring proposal are provided below.

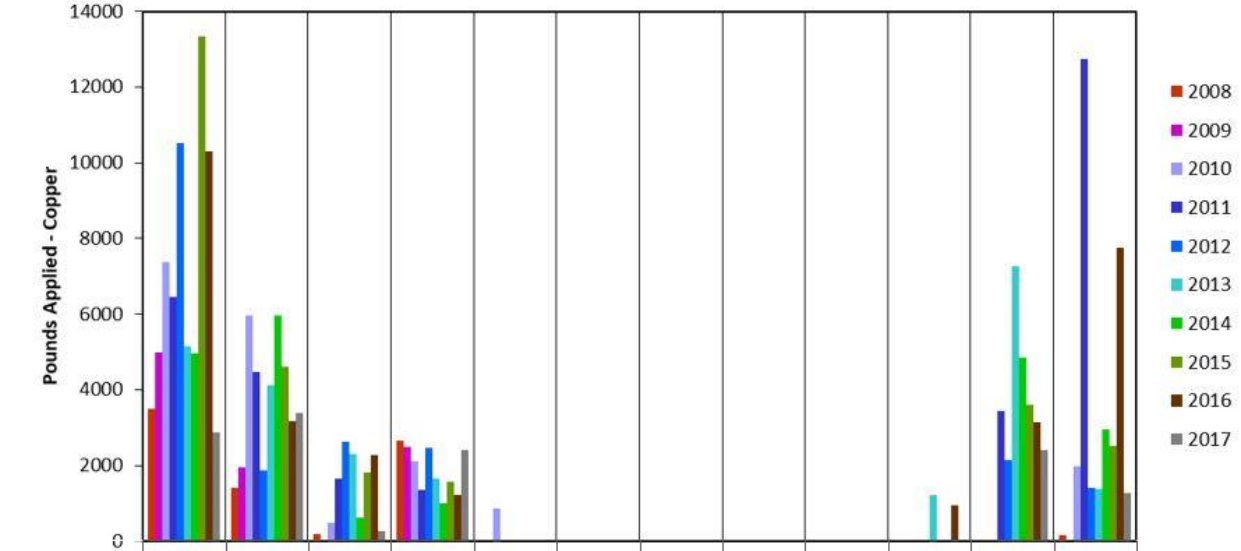
Management Plan Monitoring

Copper

Exceedances of the hardness based WQTL for dissolved copper have occurred 13 times with the most recent exceedances during the 2017 WY. Past exceedances occurred in January, February, March, October, November, and December (Figure 16).

During the 2019 WY, MPM for copper will occur in October, November, December, January, and March based on past exceedances and PUR data. The Coalition did not schedule MPM in February due to four years monitoring since the last exceedance (2010).

Figure 16. Mustang Creek @ East Ave monitoring history and copper applications.
Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017												
2018											2019WY	
Total Use (2008-2017)	69,416	36,869	12,229	18,917	870	0	0	0	0	2,137	26,850	32,131
% Total (2008-2017)	*35%*	*18%*	*6%*	*9%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*13%*	*16%*
Total Use (2015-2017)	26,485	11,145	4,356	5,198	0	0	0	0	0	930	9,169	11,550
% Total (2015-2017)	*38%*	*16%*	*6%*	*8%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*13%*	*17%*

Monitoring Based on Core Site Exceedances

The Zone 3 Core site, Highline Canal @ Hwy 99, is in a management plan for ammonia, copper, chlorpyrifos, and toxicity to *S. capricornutum*. During the 2018 WY, toxicity to *C. dubia* occurred at the Core site. Mustang Creek @ East Ave is in a management plan for copper and monitoring will occur according to the schedule discussed above.

Ammonia

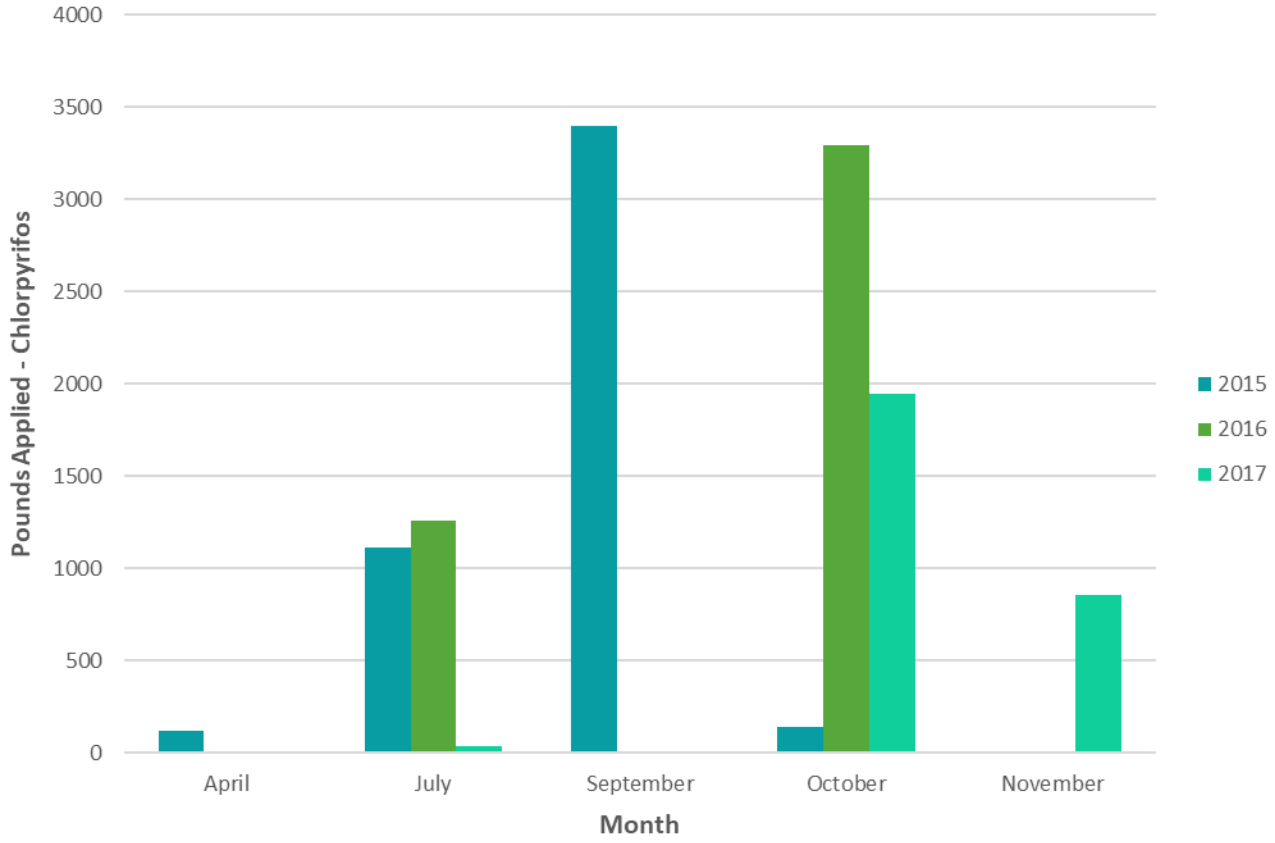
Eight samples were collected for ammonia from February 2009 through April 2010 and one exceedance occurred (October 2009, 2.3 mg/L). The Coalition monitored for ammonia in January and February of 2013 with no exceedances. During the 2019 WY, monitoring for ammonia is not scheduled to occur due to no ammonia impairment during the winter months in which

Chlorpyrifos

On May 30, 2012, the chlorpyrifos management plan was approved for completion in the Mustang Creek @ East Ave site subwatershed. During the 2019 WY, the Coalition will monitor for chlorpyrifos due to the length of time since it was last monitored.

The Coalition will monitor in July, September, October, and November of the 2019 WY based on months of peak use.

Figure 17. Mustang Creek @ East Ave chlorpyrifos applications (2015-2017).



Toxicity to *Ceriodaphnia dubia*

The Coalition collected samples to test for toxicity to *C. dubia* 20 times from May 2006 through April 2010, and January and February of 2013. A single sample collected January 2008 was toxic to *C. dubia* with 0% survival compared to the control. A TIE was conducted and concluded pyrethroid insecticides as the probable cause of toxicity. Based on Core site monitoring results and five or more years since samples were last collected (October 2009), the Coalition will test for toxicity to *C. dubia* in October during the 2019 WY.

Toxicity to *Selenastrum capricornutum*

The Coalition collected samples to test for toxicity to *S. capricornutum* 18 times from May 2006 through April 2010. A single sample collected February 2008 was toxic to *S. capricornutum* with 25% growth compared to the control. The TIE initiated on the sample lost all toxicity and toxicity

was not persistent in the resample. The Coalition conducted Represented site monitoring for toxicity to *S. capricornutum* in January and February of 2013, February 2014, and December through March of the 2017 WY and no toxicity occurred. Based on recent monitoring results, the Coalition will not conduct monitoring for toxicity to *S. capricornutum* during the 2019 WY.

Zone 4 – Represented Site Monitoring Schedule

Core Site Monitoring Results

Merced River @ Oakdale Rd replaced Merced River @ Santa Fe Rd and is the Core site in Zone 4 in the 2019 WY. During the 2018 WY, exceedances of the WQTLs for *E. coli*, and chlorpyrifos occurred.

Merced River @ Oakdale Rd is in a management plan for DO, *E. coli*, and chlorpyrifos based on the management plan constituents at Merced River @ Santa Fe Rd. The chlorpyrifos management plan was reinstated in 2017 due to an exceedance that occurred in November 2015. During the 2019 WY, the Coalition will conduct MPM for chlorpyrifos in September, October, and November due to months of past exceedances and times of peak use.

The management plan constituents for sites in Zone 4 are listed in Table 42. Monitoring for management plan constituents will occur according to the schedule provided in Attachment A.

Table 42. Zone 4 management plan constituents.

Core site is bolded. An 'M' indicates a current management plan constituent and an 'M' in red text indicates exceedances in the 2018 WY triggered a management plan. An 'X' indicates one exceedance occurred during the 2018 WY that did not initiate a management plan.

Site Name	DO	pH	SC	*E. coli*	Copper	Chlorpyrifos
Merced River @ Oakdale Rd[1]	**M**			**M**		**M**
Bear Creek @ Kibby Rd		M		M		
Black Rascal Creek @ Yosemite Rd	M	M		M	X	
Canal Creek @ West Bellevue Rd	M	M	M	M	M	
Howard Lateral @ Hwy 140	M	M	M	M	M	
Livingston Drain @ Robin Ave	M	M		M	M	
McCoy Lateral @ Hwy 140		M			M	
Unnamed Drain @ Hwy 140	M	M		M		

[1]Past monitoring results are from Merced River @ Santa Fe Rd (2004 – July 2017).

Bear Creek @ Kibby Rd

Bear Creek @ Kibby Rd is a Represented site in Zone 4. Monitoring was initiated at the site in 2005. During the 2018 WY, no monitoring occurred as water quality impairments due to pesticides, metals, or toxicity have not occurred at Bear Creek @ Kibby Rd since 2008. Therefore, no MPM is required in the 2019 WY.

Management Plan Monitoring

Bear Creek @ Kibby Rd is in a management plan for pH and *E. coli*. The management plans for DO, copper, chlorpyrifos, and toxicity to *C. dubia* have been approved for completion. Based on the Coalition's monitoring strategy, MPM for pH and *E. coli* are not required for the 2019 WY.

Monitoring Based on Core Site Exceedances

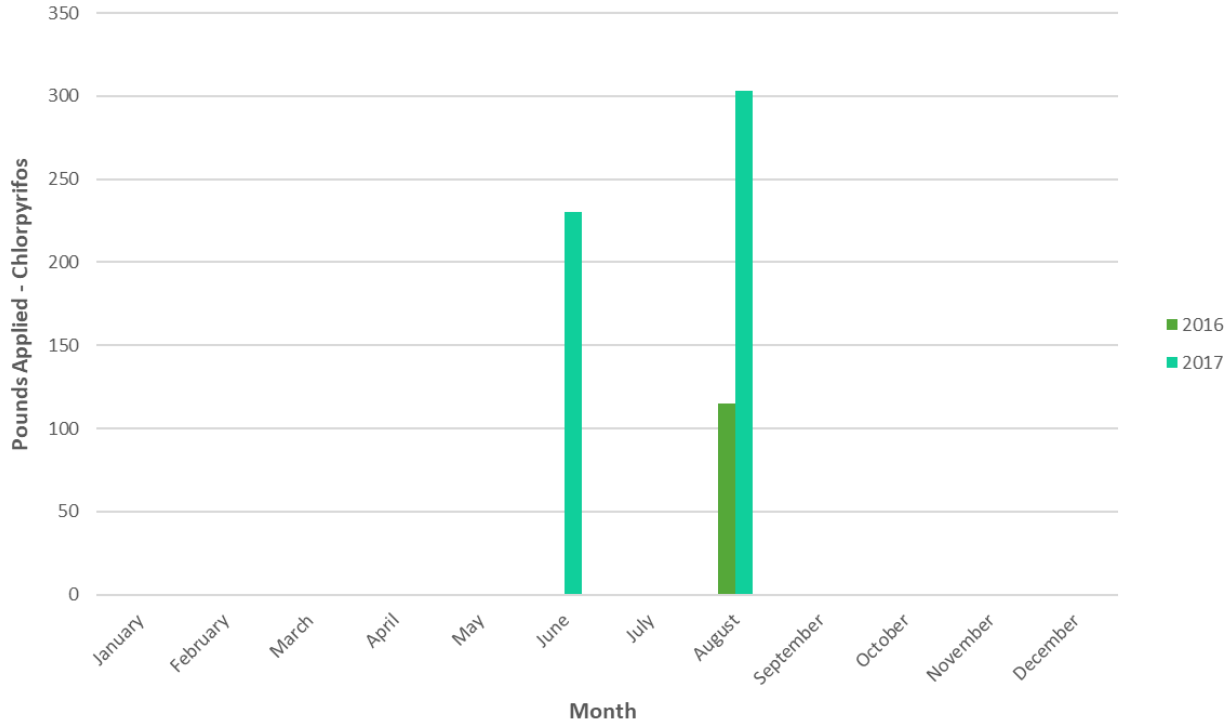
The Zone 4 Core site, Merced River @ Oakdale Rd, is in a management plan for chlorpyrifos due to an exceedance that occurred in November 2015. During the 2018 WY, an exceedance of the WQTL for chlorpyrifos occurred at the Core site in November 2017. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2018 WY.

Chlorpyrifos

Monitoring for chlorpyrifos at Bear Creek @ Kibby Rd occurred during two storm events and the irrigation season from 2005 through 2008. Exceedances of the WQTL for chlorpyrifos occurred in May (2006), July (2007), and February (2008). The Coalition conducted MPM in May and July from 2010 through 2012 and no exceedances occurred. On May 30, 2012, the management plan for chlorpyrifos was approved for completion within the Bear Creek @ Kibby Rd site subwatershed.

Based on recent exceedances at the Core site and an evaluation of recent PUR data (Figure 18), monitoring for chlorpyrifos will occur at Bear Creek @ Kibby Rd from June through August.

Figure 18. Bear Creek @ Kibby Rd chlorpyrifos applications (2015-2017).



Black Rascal Creek @ Yosemite Rd

Black Rascal Creek @ Yosemite Rd is a Represented site in Zone 4. Monitoring was initiated at the site in 2006. During the 2018 WY, the Coalition monitored for dissolved copper in February, March, and April. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Black Rascal Creek @ Yosemite Rd is in a management plan for DO, pH, and *E. coli*. Based on the Coalition's monitoring strategy, MPM for DO, pH, and *E. coli* is not scheduled for the 2019 WY.

Monitoring Based on Core Site Exceedances

During the 2018 WY, an exceedance of the WQTL for chlorpyrifos occurred at the Merced River @ Oakdale Rd Core site. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2018 WY.

Chlorpyrifos

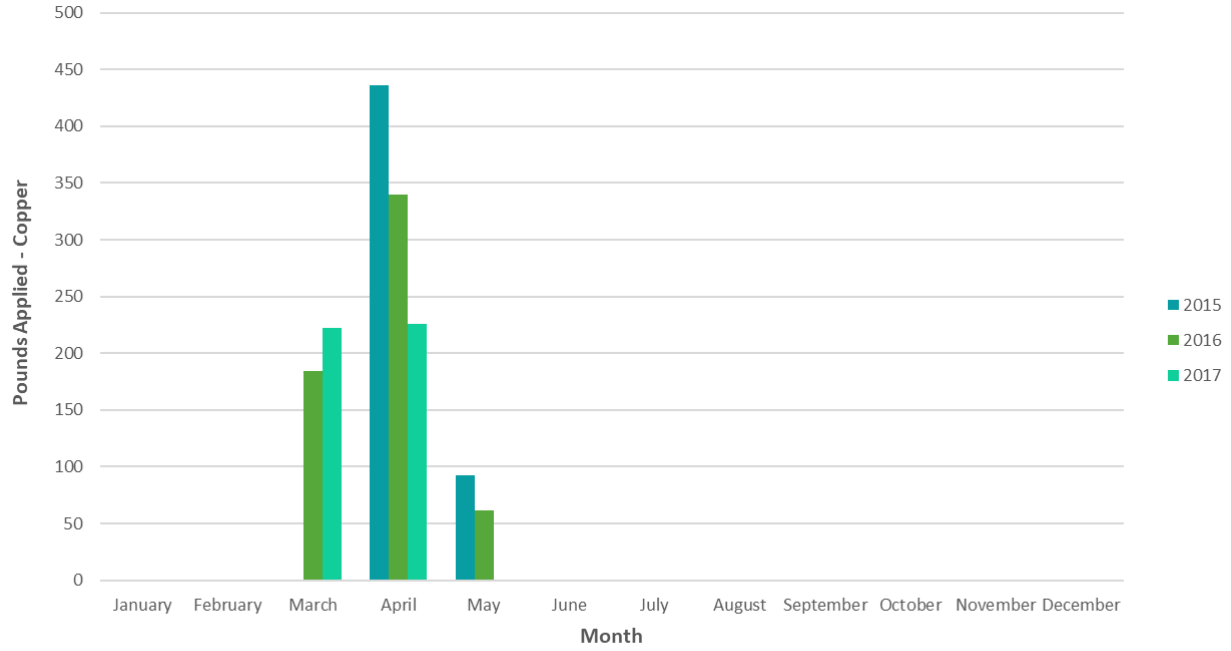
On March 25, 2016, the chlorpyrifos management plan was approved for completion in the Black Rascal Creek @ Yosemite Rd site subwatershed. During the 2019 WY, no additional monitoring is required due to recent management plan completion.

Copper

The Coalition initiated monitoring for dissolved copper during the 2017 WY due to exceedances at the Canal Creek @ West Bellevue Rd Core site, no exceedances occurred. Monitoring continued during the 2018 WY from February through April. Samples collected in March 2018 had a concentration of dissolved copper in exceedances of the hardness based WQTL (4.6 µg/L, WQTL 2.6 µg/L). This was the first exceedance to occur since monitoring was initiated in 2017; therefore, the Coalition will continue monitoring for a third year.

During the 2019 WY, monitoring for dissolved copper will occur in March, April, and May based on peak use (Figure 19).

Figure 19. Black Rascal Creek @ Yosemite Rd copper applications (2015-2017).



Canal Creek @ West Bellevue Rd

Canal Creek @ West Bellevue Rd is a rotating Core site for Zone 4 and will be monitored as a Represented site during the 2019 WY. Represented site monitoring was initiated at the site during the 2014 and 2015 WYs. The site rotated to a Core site during the 2016 and 2017 WY where monitoring occurred monthly for Core site constituents. During the 2018 WY, monitoring for ammonia and toxicity to *C. dubia*, *P. promelas*, and *S. capricornutum* occurred at Canal Creek @ West Bellevue Rd; no exceedances occurred. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Management plans at Canal Creek @ West Bellevue Rd include: DO, pH, SC, *E. coli*, and copper. Management Plan Monitoring for dissolved copper will be scheduled once focused outreach is initiated in the site subwatershed, as described in the Management Plan Monitoring section of this report.

Monitoring Based on Core Site Exceedances

The Zone 4 Core site, Merced River @ Oakdale Rd, is in a management plan for chlorpyrifos. During the 2018 WY, an exceedance of chlorpyrifos occurred at the Merced River @ Oakdale Rd Core site in November 2017. A single exceedance of the WQTL for ammonia occurred in samples

collected from Canal Creek @ West Bellevue Rd while the site was monitored as a Core site in the 2016 and 2017 WYs. The exceedance of the WQTL for ammonia occurred in December 2017 and is associated with toxicity to *C. dubia*, *P. promelas*, and *S. capricornutum*.

Ammonia

A single exceedance of the WQTL for ammonia (22 mg/L) occurred during the 2017 WY. Samples analyzed were collected from a non-contiguous waterbody after a storm event on December 10, 2016.

During the 2018 WY, the Coalition completed the third year of monitoring for ammonia in December and no exceedance occurred. Therefore, monitoring is not scheduled to occur during the 2019 WY for ammonia.

Chlorpyrifos

Canal Creek @ West Bellevue Rd was monitored monthly for chlorpyrifos in the 2016 and 2017 WYs; no exceedances occurred. During the 2019 WY, monitoring for chlorpyrifos is not scheduled to occur based on recent monitoring results.

Toxicity to *C. dubia, P. promelas, and S. capricornutum*

Toxicity to all three test species occurred in samples collected from Canal Creek @ West Bellevue Rd when it was a non-contiguous waterbody in December 2016. The concentration of ammonia was sufficiently elevated (22 mg/L) to result in reduced survival of *C. dubia* and *P. promelas*. Based on updated toxicity threshold protocol (SWAMP protocol), the sample is no longer considered toxic to *S. capricornutum* with 88% growth compared to the control.

During the 2018 WY, the Coalition completed the third year of monitoring for toxicity to *C. dubia*, *P. promelas*, and *S. capricornutum* in December and no toxicity occurred. Therefore, monitoring is not scheduled to occur during the 2019 WY for toxicity testing.

Howard Lateral @ Hwy 140

Howard Lateral @ Hwy 140 is a Represented site in Zone 4. Monitoring was initiated at the site in 2009. During the 2018 WY, the Coalition monitored for dissolved copper for MPM. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

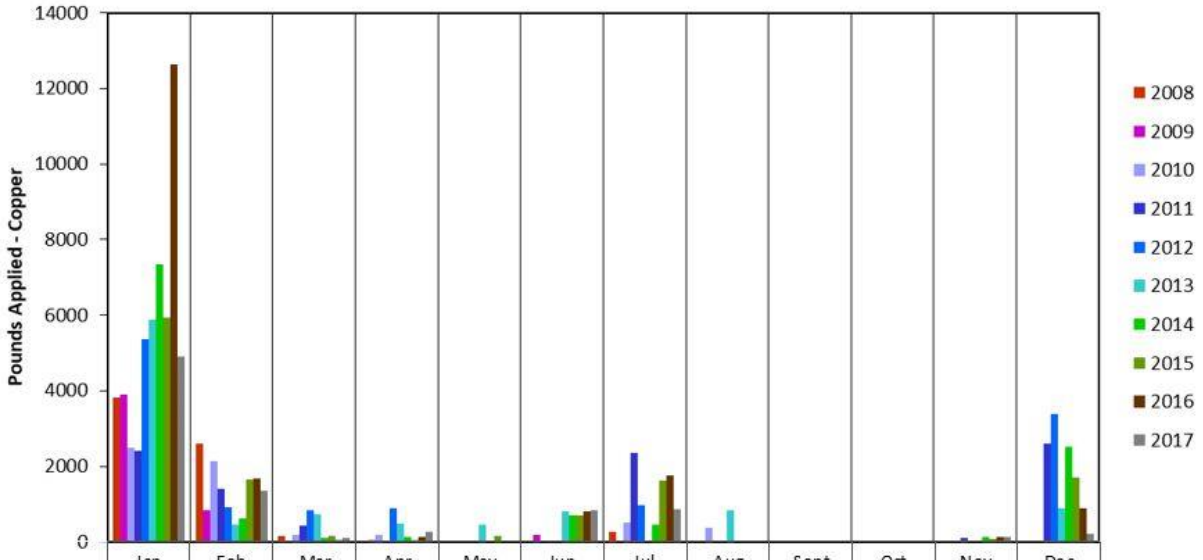
Management Plan Monitoring

Copper

Exceedances of the hardness based WQTL have occurred 12 times from 2010 through April 2018. Copper exceedances occurred in January, February, April, July, and October. The Coalition initiated MPM for dissolved copper in 2011 and continued through the 2018 WY. The most recent exceedances of the hardness based WQTL occurred in January and April of 2018. The PUR data, from 2015 through 2017, indicate January (60%), February (12%), and July (11%) are months in which use of copper is highest (Figure 20).

During the 2019 WY, the Coalition will conduct MPM for dissolved copper in January, February, April, and July based on months of past exceedances and months of high use.

Figure 20. Howard Lateral @ Hwy 140 monitoring history and copper applications.
Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017												
2018											2019WY	
Total Use (2008-2017)	54,638	13,642	2,760	2,224	614	4,073	8,822	1,214	0	0	598	12,180
% Total (2008-2017)	***54%***	***14%***	***3%***	***2%***	***1%***	***4%***	***9%***	***1%***	***0%***	***0%***	***1%***	***12%***
Total Use (2015-2017)	23,456	4,659	309	447	169	2,338	4,257	0	0	0	359	2,806
% Total (2015-2017)	***60%***	***12%***	***1%***	***1%***	***0%***	***6%***	***11%***	***0%***	***0%***	***0%***	***1%***	***7%***

Monitoring Based on Core Site Exceedances

During the 2018 WY, an exceedance of chlorpyrifos occurred at the Core site in November 2017. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2018 WY.

Chlorpyrifos

On March 25, 2016, the management plan for chlorpyrifos was approved for completion in the Howard Lateral @ Hwy 140 site subwatershed. No additional monitoring is scheduled in the 2019 WY for chlorpyrifos due to recent management plan completion.

Livingston Drain @ Robin Ave

Livingston Drain @ Robin Ave is a Represented site in Zone 4. Monitoring was initiated at the site in 2007. During the 2018 WY, MPM for dissolved copper occurred. Monitoring for toxicity to *S. capricornutum* was scheduled to occur during the 2018 WY but the management plan was approved for completion prior to scheduled monitoring (approved January 31, 2018).

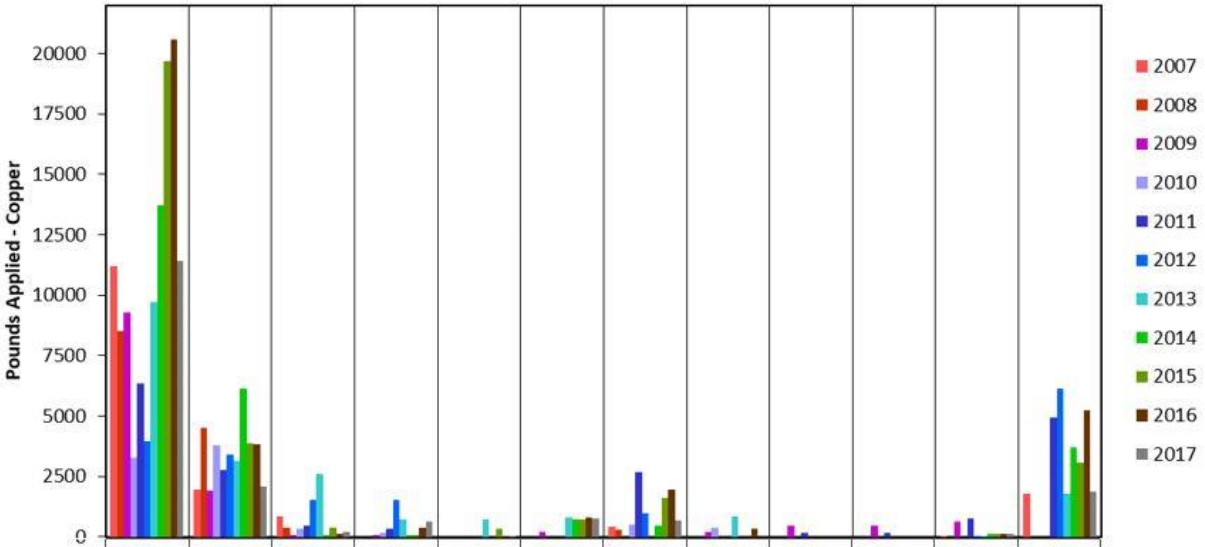
Management Plan Monitoring

Copper

Exceedances of the WQTL for copper have occurred 19 times in the site subwatershed; nine of the exceedances were for the total fraction (2007 to 2008) and 10 were for the dissolved fraction (2011 to 2018). The most recent exceedance occurred in January 2018 (Figure 21). Applications of products containing copper primarily occur in December, January, and February. However, exceedances of the WQTL for dissolved copper have occurred in May, June, July and September when use is minimal compared to other months.

During the 2019 WY, the Coalition will conduct MPM for dissolved copper from December through March based on months of past exceedances and high use.

Figure 21. Livingston Drain @ Robin Ave monitoring history and copper applications.
Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2007					■	■	■	▒	■			
2008	■	■	▨	▒	▒	■	■	▒	▒			
2009												
2010												
2011	▨	▨			▒	▒	■		■			
2012	▒	■										▨
2013	▒	▨			▒	▒	▒		▨			■
2014	▨	▨			▨	▨	▒		▨			▨
2015	▨	▨	▨		▨	▨	▒		▨			■
2016	■	▨	■									▨
2017	■	▨	■									■
2018	■	▨	▨								2019WY	
Total Use (2007-2017)	117,690	37,363	6,973	3,933	1,086	3,978	9,540	1,749	612	624	1,961	28,449
% Total (2007-2017)	***55%***	***17%***	***3%***	***2%***	***1%***	***2%***	***4%***	***1%***	***0%***	***0%***	***1%***	***13%***
Total Use (2015-2017)	51,672	9,789	698	1,070	372	2,268	4,239	315	0	0	404	10,112
% Total (2015-2017)	***64%***	***12%***	***1%***	***1%***	***0%***	***3%***	***5%***	***0%***	***0%***	***0%***	***0%***	***12%***

Monitoring Based on Core Site Exceedances

During the 2018 WY, an exceedance of chlorpyrifos occurred at the Core site in November 2017. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2018 WY.

Chlorpyrifos

The Coalition conducted MPM for chlorpyrifos at Livingston Drain @ Robin Ave in 2011, 2013, and from the 2014 WY through April 2017; the last exceedance of the WQTL for chlorpyrifos occurred in 2008. Due to improved water quality, the Coalition received approval to complete the chlorpyrifos management plan on April 14, 2017. During the 2019 WY, no monitoring for chlorpyrifos is required due to recent management plan completion.

McCoy Lateral @ Hwy 140

McCoy Lateral @ Hwy 140 is a Represented site in Zone 4. Monitoring was initiated at the site in 2011 and occurred monthly through September 2013. During the 2018 WY, the Coalition monitored for chlorpyrifos based on exceedances that occurred at the Merced River Core Site during the 2015 WY. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

McCoy Lateral @ Hwy 140 is in a management plan for pH and copper. Focused outreach has not been conducted in the site subwatershed; therefore, the Coalition will wait to conduct MPM until focused outreach is scheduled in order to evaluate the effectiveness of implemented management practices.

Monitoring Based on Core Site Exceedances

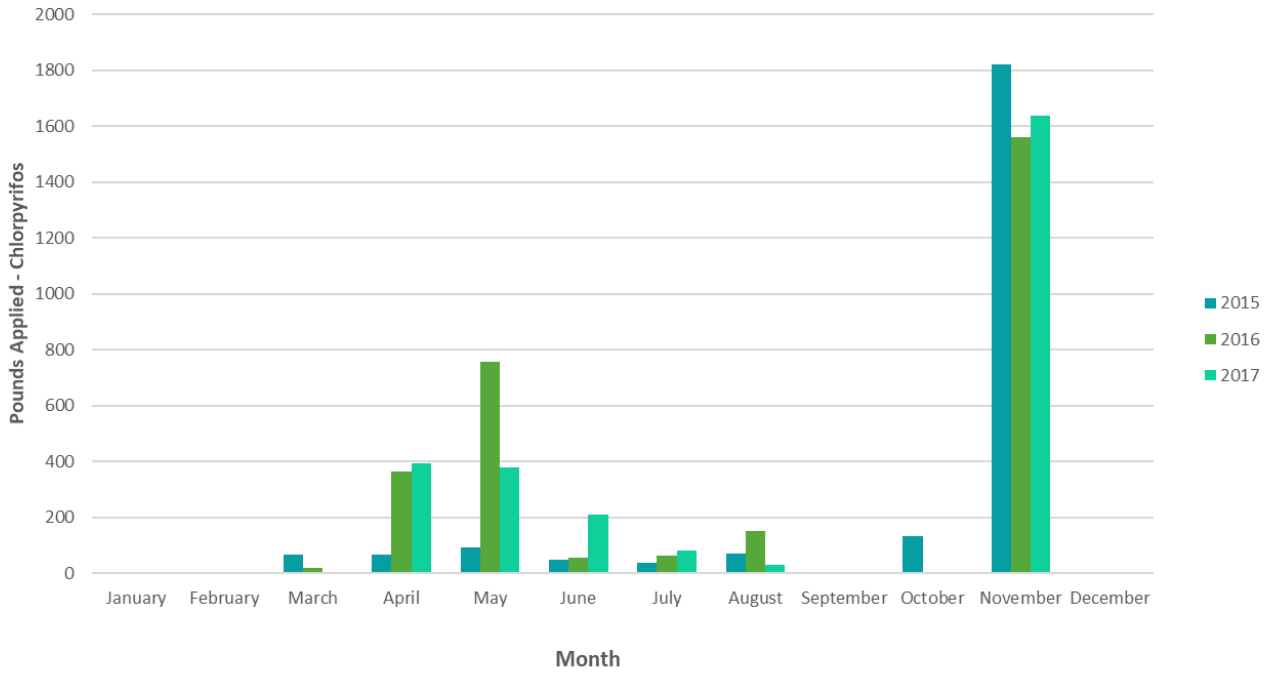
During the 2018 WY, an exceedance of chlorpyrifos occurred at the Core site in November 2017. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2018 WY.

Chlorpyrifos

Monitoring for chlorpyrifos at McCoy Lateral @ Hwy 140 occurred during two storm events and the irrigation season in 2011 and 2012 and no exceedances occurred. The Coalition initiated monitoring for chlorpyrifos during the 2018 WY in November and May based on exceedances that occurred at the Merced River Core site and no exceedances occurred.

During the 2019 WY, the Coalition will conduct a second year of monitoring for chlorpyrifos at McCoy Lateral @ Hwy 140 in November and April through June based on a review of the last three years of PUR data (Figure 22).

Figure 22. McCoy Lateral @ Hwy 140 applications of chlorpyrifos (2015-2017).



Unnamed Drain @ Hwy 140

Unnamed Drain @ Hwy 140 is a Represented site in Zone 4. Monitoring was initiated at the site in 2013 and all constituents were monitored monthly. Monitoring for copper also occurred during the 2016 and 2017 WY due to an exceedance that occurred during 2013 monitoring. No additional exceedances occurred and no management plan was initiated. During the 2018 WY, no monitoring occurred at the site.

Management Plan Monitoring

Unnamed Drain @ Hwy 140 is in a management plan for DO and pH. Based on the Coalition's monitoring strategy, MPM for DO and pH is not required for the 2019 WY.

Monitoring Based on Core Site Exceedances

During the 2018 WY, an exceedance of chlorpyrifos occurred at the Core site in November 2017. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2018 WY.

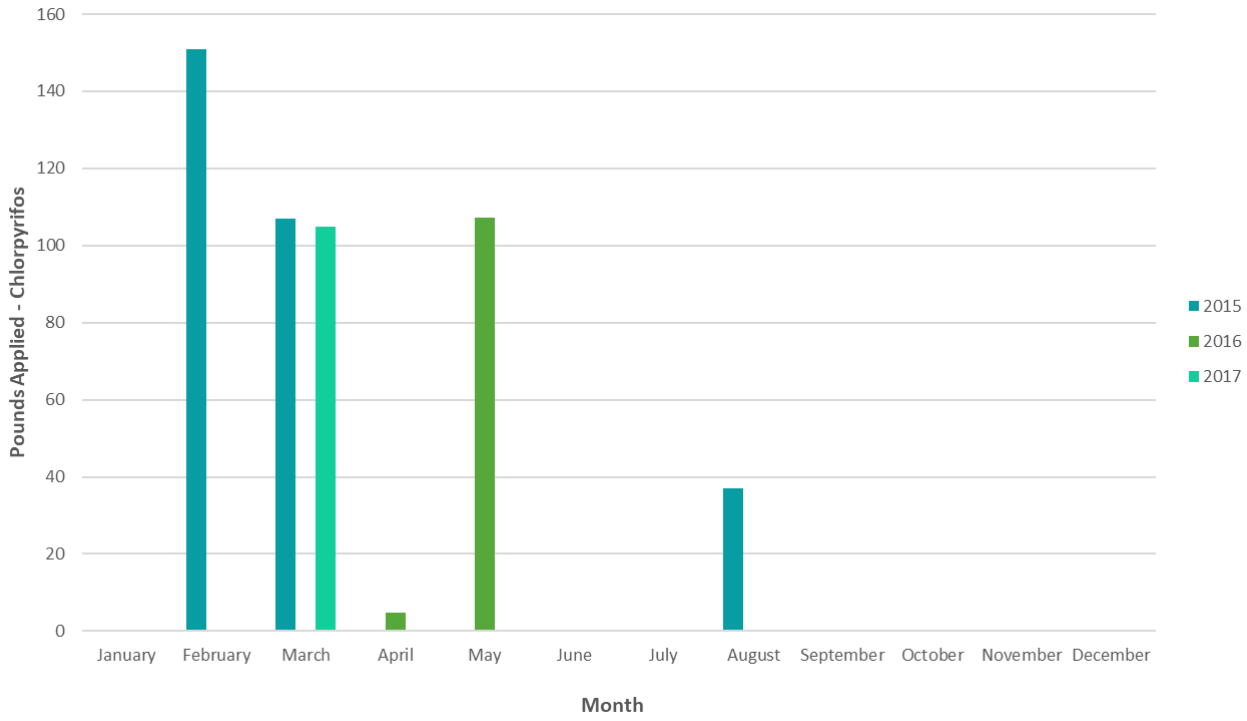
Chlorpyrifos

Unnamed Drain @ Hwy 140 was monitored monthly for chlorpyrifos from January through September 2013, November 2013, and in January 2014, no exceedances occurred. The PUR data for chlorpyrifos applications, from 2015 through 2017, indicate that use within the site

subwatershed is declining and minimal (Figure 23). In 2017, less than 120 pounds of chlorpyrifos was applied in March which was the month with the highest reported usage.

During the 2019 WY, no monitoring for chlorpyrifos is scheduled based on past monitoring results and declining use of chlorpyrifos within the Unnamed Drain @ Hwy 140 site subwatershed.

Figure 23. Unnamed Drain @ Hwy 140 applications of chlorpyrifos (2015-2017).



ZONE 5 – REPRESENTED SITE MONITORING SCHEDULE

Core Site Monitoring Results

Duck Slough @ Gurr Rd is the Core site in Zone 5 for the 2019 WY. Monitoring was initiated at Duck Slough @ Gurr Rd in 2004. No exceedances of pesticides, metals, or toxicity occurred during the 2018 WY at Duck Slough @ Gurr Rd.

Duck Slough @ Gurr Rd is in a management plan for DO, pH, SC, *E. coli*, ammonia, chlorpyrifos, malathion, and toxicity to *C. dubia*. During the 2019 WY, in addition to monitoring monthly for Core site constituents, the Coalition will conduct MPM for the following constituents at Duck Slough @ Gurr Rd:

- Chlorpyrifos (March, July, and August)
- Malathion (March and April)
- *C. dubia* toxicity (March, June, July)

The management plan constituents in Zone 5 are listed in Table 43. Monitoring for management plan constituents will occur according to the schedule provided in Attachment A.

Table 43. Zone 5 management plan constituents.

Core site is bolded. An 'M' indicates a current management plan constituent and an 'M' in red text indicates exceedances in the 2018 WY triggered a management plan. An 'X' indicates one exceedance occurred during the 2018 WY that did not initiate a management plan.

Site Name	DO	pH	SC	*E. coli*	Ammonia	Arsenic	Copper	Chlorpyrifos	Malathion	*C. dubia*	*P. promelas*
Duck Slough @ Gurr Rd	**M**	**M**	**M**	**M**	**M**	**M**		**M**	**M**	**M**	
Deadman Creek @ Gurr Rd	M	M	M	M	M	M	X			M	M
Deadman Creek @ Hwy 59	M	M		M		M	M	M			
Miles Creek @ Reilly Rd	M			M			M	M			

Deadman Creek @ Gurr Rd

Deadman Creek @ Gurr Rd is a Represented site in Zone 5 and monitoring was initiated at the site in 2004. During the 2018 WY, MPM for toxicity to *C. dubia* and *P. promelas* was scheduled to occur; however, the site was dry, no samples could be collected. Samples were collected for copper and sediment toxicity to *H. azteca* based on exceedances that occurred at the Miles Creek @ Reilly Rd Core site. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

Toxicity to *Ceriodaphnia dubia*

Water column toxicity to *C. dubia* occurred five times in samples collected from Deadman Creek @ Gurr Rd (February 2009, March 2009 and 2010, and November 2010 and 2013). The TIEs concluded ammonia was the source of toxicity in the samples collected in February 2009 and November 2013. Exceedances of the WQTL for ammonia also coincided with toxicity to *C. dubia* in samples collected in February 2009, March 2010, and November 2010 (TIE was not required for these samples). In addition, chlorpyrifos was detected above the WQTL in samples collected in March 2010.

During the 2019 WY, the Coalition will conduct MPM for *C. dubia* toxicity during one storm event that occurs between October 1st and December 31st. The Coalition determined MPM in February and March is no longer necessary as the Coalition has conducted MPM for toxicity to *C. dubia* during these months for over five years with no toxicity (Table 44). Due to over three years monitoring with no toxicity, the Coalition will petition for the completion of the *C. dubia* management plan in 2018.

Table 44. Deadman Creek @ Gurr Rd toxicity to *C. dubia* MPM exceedance tally.

Monitoring Year	Months of MPM		
	February	March	November
2009	1	1	NA
2010	0	1	1
2012	0	0	NA
2013	0	0	1
2014	0	0	Dry
2015	Dry	Dry	Dry
2016	0	0	0
2017	0	0	Dry
Overall Tally	**1**	**2**	**2**

Toxicity to *Pimephales promelas*

Water column toxicity to *P. promelas* occurred during nine sampling events from 2006 through 2013 in January, February, March, May, June, November, and December.

During the 2019 WY, the Coalition will continue MPM for toxicity to *P. promelas* during one storm event that occurs between October 1st and December 31st. The Coalition will discontinue MPM in January, February, March, May, and June due to over five years of monitoring during these months with no toxicity (Table 45). The Coalition will petition for the completion of the *P. promelas* management plan based on three or more years monitoring with no toxicity in 2018.

Table 45. Deadman Creek @ Gurr Rd toxicity to *P. promelas* MPM exceedance tally.

Monitoring Year	Months of MPM						
	January	February	March	May	June	November	December
2006	NA	NA	NA	0	1	NA	NA
2007	NA	0	0	1	0	NA	NA
2008	0	0	NA	0	0	0	0
2009	1	1	0	0	0	0	1
2010	0	0	1	0	0	1	0
2012	0	0	0	NA	NA	NA	NA
2013	0	0	0	0	0	1	1
2014	0	0	0	0	0	Dry	Dry
2015	Dry	Dry	Dry	Dry	Dry	Dry	Dry
2016	Dry	0	0	0	0	0	Dry
2017	0	0	0	0	0	Dry	Dry
Overall Tally	**1**	**1**	**1**	**1**	**1**	**2**	**2**

Monitoring Based on Core Site Exceedances

The Zone 5 Core site, Duck Slough @ Gurr Rd, is in a management plan for chlorpyrifos, malathion, and toxicity to *C. dubia*. During the 2018 WY, no exceedances of the WQTLs for pesticides, applied metals or toxicity occurred at the Core site. Deadman Creek @ Gurr Rd is in a management plan for *C. dubia* toxicity, monitoring will occur according to the schedule discussed above.

Chlorpyrifos

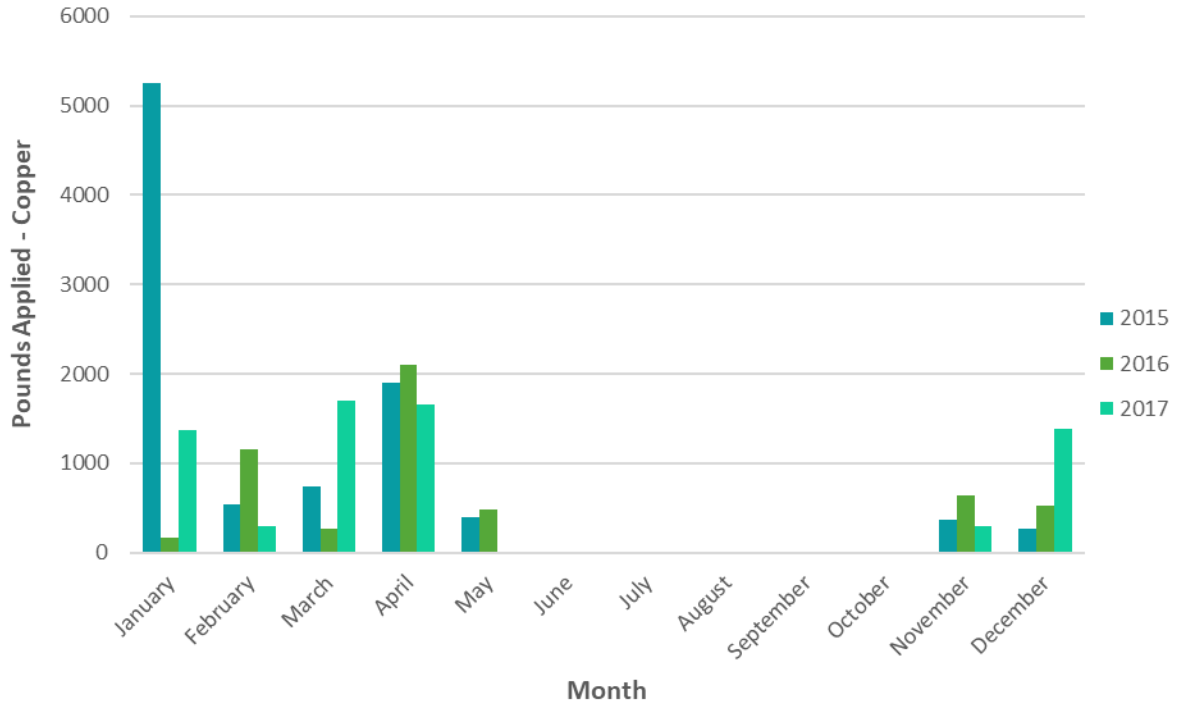
On April 14, 2017, the management plan for chlorpyrifos within the Deadman Creek @ Gurr Rd site subwatershed was approved for completion. No additional monitoring is required for the 2019 WY.

Copper

During the 2017 WY, monitoring for copper was scheduled to occur during one storm event due to an exceedance that occurred at the Miles Creek @ Reilly Rd Core site in January 2016. Samples collected on January 10, 2017 from Deadman Creek @ Gurr Rd resulted in an exceedance of the hardness based WQTL for dissolved copper. The Coalition completed a second year of monitoring during the 2018 WY and no exceedances occurred. Copper use within the site subwatershed is highest from December through April.

During the 2019 WY, the Coalition will monitor for dissolved copper for a third consecutive year from January through April based on months of peak use (Figure 24). Monitoring was not scheduled in December, as the site is consistently dry during that month (Table 45).

Figure 24. Deadman Creek @ Gurr Rd copper applications (2015-2017).

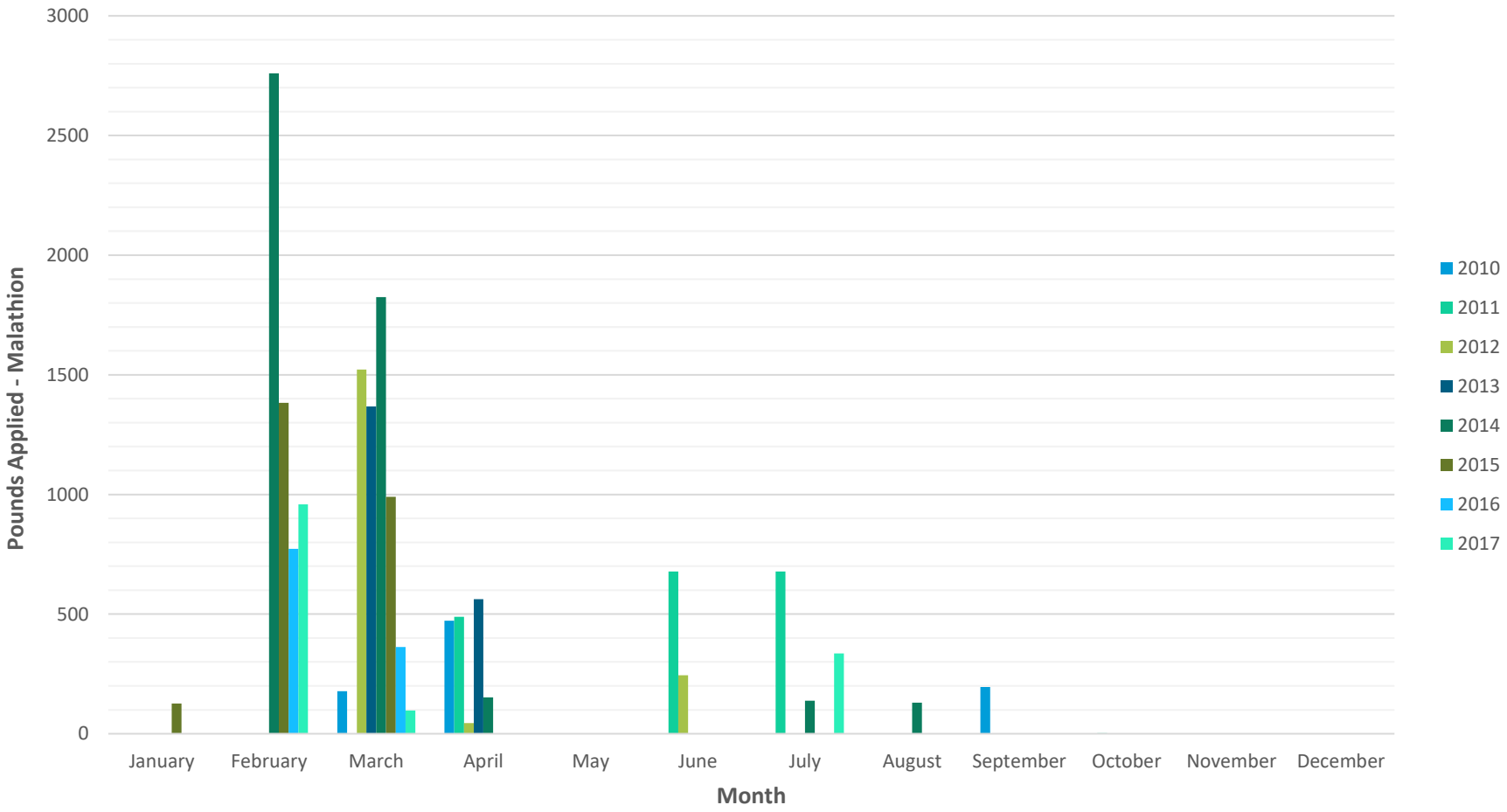


Malathion

Deadman Creek @ Gurr Rd was monitored for malathion from 2006 through 2010, 48 samples were analyzed and a single exceedance occurred (August 2006). The PUR data for malathion applications, from 2015 through 2017, indicate that use of malathion in the site subwatershed has declined since samples were last collected in 2010 (Figure 25).

During the 2019 WY, monitoring for malathion is not scheduled to occur based on monitoring history and declining use within the site subwatershed.

Figure 25. Deadman Creek @ Gurr Rd applications of malathion (2010-2017).



Sediment toxicity to *Hyalella azteca*

Deadman Creek @ Gurr Rd was monitored in March and September from 2004 through 2010 for sediment toxicity to *H. azteca*, no toxicity occurred. Monitoring for sediment toxicity was initiated in September 2018 based on the Core site management plan.

During the 2019 WY, the Coalition will complete a second year of monitoring for sediment toxicity in September 2019.

Deadman Creek @ Hwy 59

Deadman Creek @ Hwy 59 is a Represented site in Zone 5 and monitoring was initiated at the site in 2006. During the 2018 WY, MPM was scheduled for chlorpyrifos. Monitoring for copper also occurred during the 2018 WY based on exceedances that occurred at the Miles Creek @ Reilly Rd Core site. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

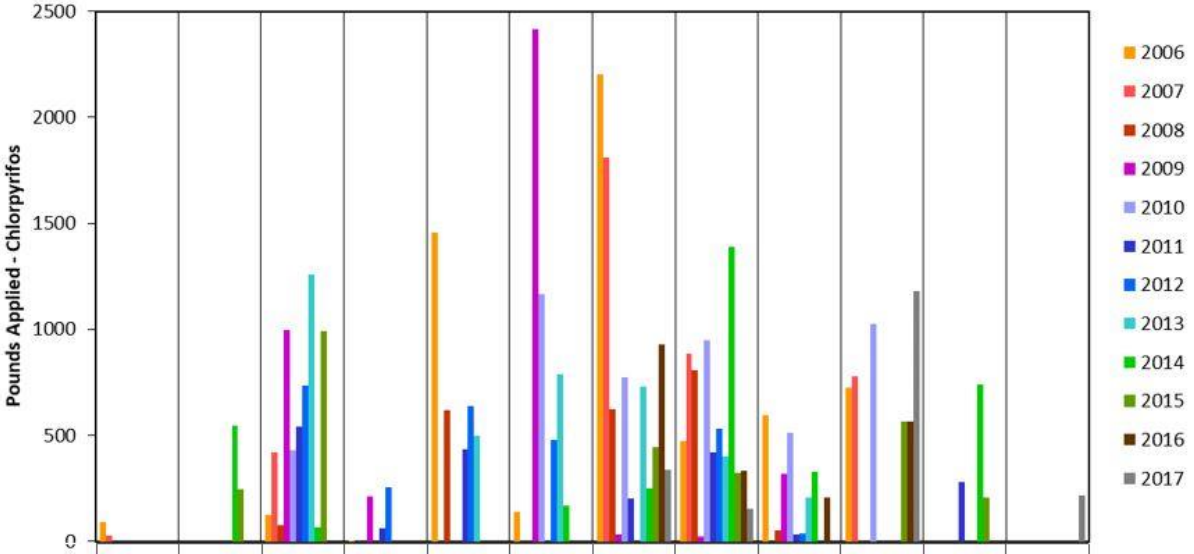
Management Plan Monitoring

Chlorpyrifos

Exceedances of the WQTL for chlorpyrifos have occurred six times, in April, August, and September. Since the last exceedance in 2011, the Coalition has conducted seven years of MPM during months of past exceedances and peak use. Thirteen of the 22 scheduled monitoring events in the past seven years have been dry, making it difficult to indicate water quality improvements. Chlorpyrifos use in the site subwatershed has declined in the last three years and is minimal. The PUR data indicate peak use occurred in March (15%), July (25%), and August (12%) from 2015 through 2017 (Figure 26).

During the 2019 WY, the Coalition will conduct MPM for chlorpyrifos in March, July, and August. The Coalition will discontinue MPM in April due to four years of monitoring with no exceedances. Due to over three years monitoring with no exceedances, the Coalition will petition for the completion of the chlorpyrifos management plan in 2018.

Figure 26. Deadman Creek @ Hwy 59 monitoring history and chlorpyrifos applications.
Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. Striped cells indicate monitoring is scheduled to occur in the 2018 WY. The PUR data are through December 2017.



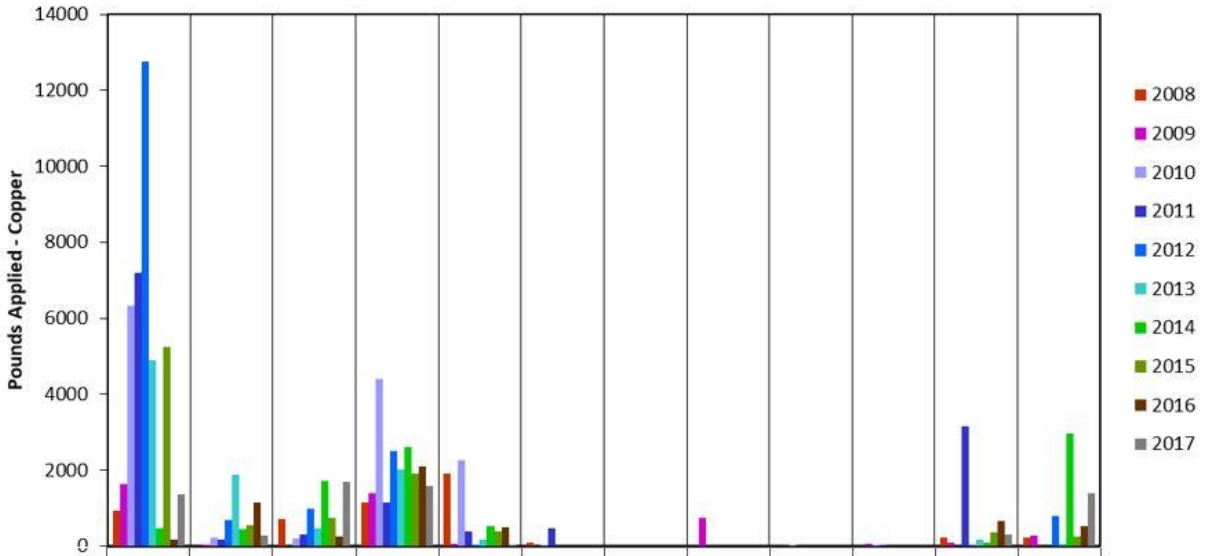
Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2006												
2007												
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017												
2018											2019WY	
Total Use (2006-2017)	122	789	5,642	532	3,647	5,160	8,339	6,691	2,294	4,847	1,231	218
% Total (2006-2017)	*0%*	*2%*	*14%*	*1%*	*9%*	*13%*	*21%*	*17%*	*6%*	*12%*	*3%*	*1%*
Total Use (2015-2017)	0	244	989	0	0	0	1,709	813	205	2,317	208	218
% Total (2015-2017)	*0%*	*4%*	*15%*	*0%*	*0%*	*0%*	*25%*	*12%*	*3%*	*35%*	*3%*	*3%*

Copper

Monitoring for copper was initiated at Deadman Creek @ Hwy 59 during the irrigation season of 2008. The site was then monitored monthly for all constituents in 2011 and 2012 and 28 samples were collected for copper analyses; no exceedances occurred. During the 2017 WY, the Coalition scheduled monitoring to occur during one storm event based on exceedances that occurred at the Miles Creek Core site. In January 2017, an exceedance of the hardness based WQTL for dissolved copper occurred. During the 2018 WY, monitoring occurred in January, March, and April based on months of past exceedances and peak use. A second exceedance occurred in samples collected in March 2018, initiating the management plan for the 2019 WY.

During the 2019 WY, MPM for dissolved copper will occur from January through April based on months of past exceedances and peak use (Figure 27).

Figure 27. Deadman Creek @ Hwy 59 monitoring history and copper applications.
Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. Striped cells indicate monitoring is scheduled to occur in the 2018 WY. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017												
2018											2019WY	
Total Use (2008-2017)	40,982	5,430	7,077	20,778	6,200	589	0	739	22	84	5,062	6,469
% Total (2008-2017)	***44%***	***6%***	***8%***	***22%***	***7%***	***1%***	***0%***	***1%***	***0%***	***0%***	***5%***	***7%***
Total Use (2015-2017)	6,794	1,988	2,706	5,599	876	0	0	0	0	0	1,306	2,171
% Total (2015-2017)	***32%***	***9%***	***13%***	***26%***	***4%***	***0%***	***0%***	***0%***	***0%***	***0%***	***6%***	***10%***

Monitoring Based on Core Site Exceedances

During the 2018 WY, no exceedances of the WQTLs for pesticides, applied metals or toxicity occurred at the Core site. Deadman Creek @ Hwy 59 is in a management plan for chlorpyrifos and copper, MPM will occur according to the schedule discussed above.

Toxicity to *Ceriodaphnia dubia*

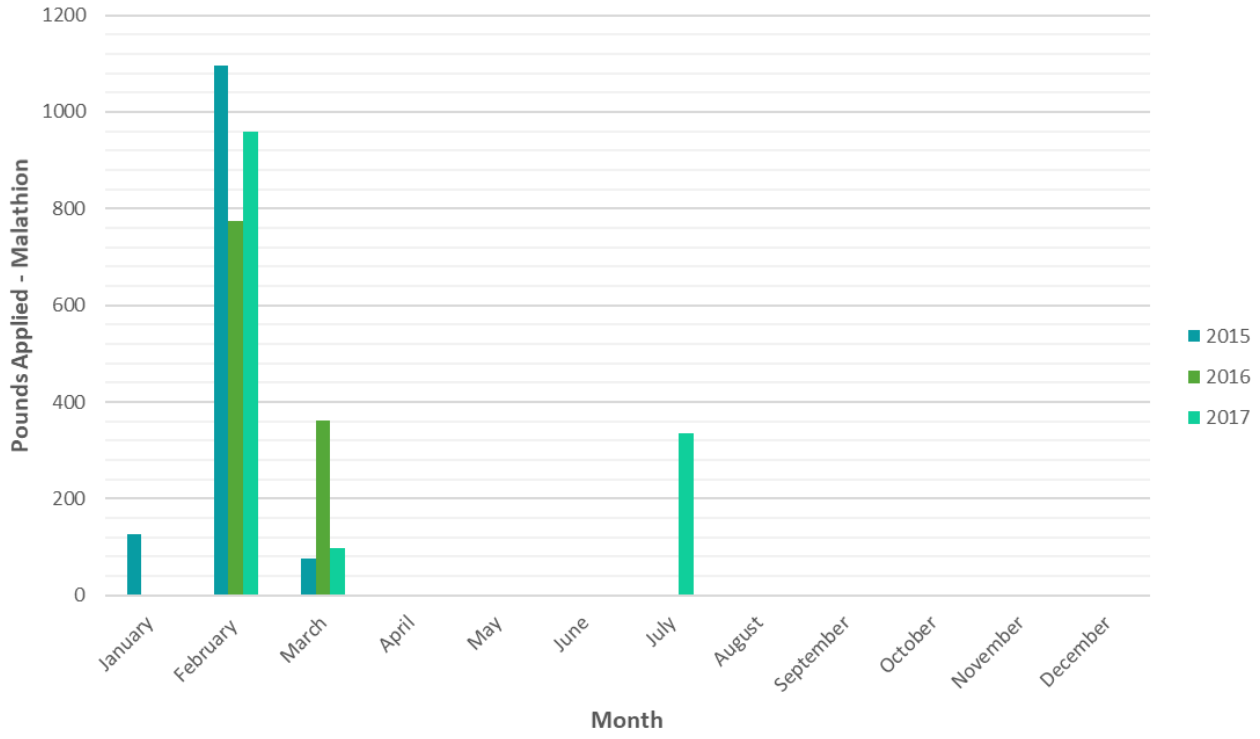
The Coalition monitored for toxicity to *C. dubia* at Deadman Creek @ Hwy 59 during one storm event and during the irrigation season from 2006 through 2008 (21 samples collected). From 2011 through 2012 the Coalition monitored for toxicity to *C. dubia* monthly (22 samples collected). In total, 43 samples were collected and analyzed and no samples were toxic to *C. dubia*. The Coalition determined monitoring for *C. dubia* toxicity during the 2019 WY is not necessary based on past monitoring results.

Malathion

The Coalition monitored for malathion at Deadman Creek @ Hwy 59 during one storm event and during the irrigation season from 2006 through 2008 (21 samples collected). From 2011 through 2012 the Coalition monitored for malathion monthly (22 samples collected). In total, 43 samples were analyzed and no exceedances occurred. The PUR data, from 2015 through 2017, indicate that use of malathion primarily occurs in February (Figure 28).

During the 2019 WY, the Coalition will monitor for malathion in February to ensure malathion is not impairing water quality.

Figure 28. Deadman Creek @ Hwy 59 applications of malathion (2015-2017).



Miles Creek @ Reilly Rd

Miles Creek @ Reilly Rd is a rotating Core site for Zone 5 and will be monitored as a Represented site during the 2019 WY. During the 2018 WY, MPM for copper and chlorpyrifos occurred. In

addition, monitoring for toxicity to *C. dubia* occurred for a second year due to a toxic sample collected during the 2017 WY. A summary of monitoring results through May 2018 and the 2019 WY monitoring proposal are provided below.

Management Plan Monitoring

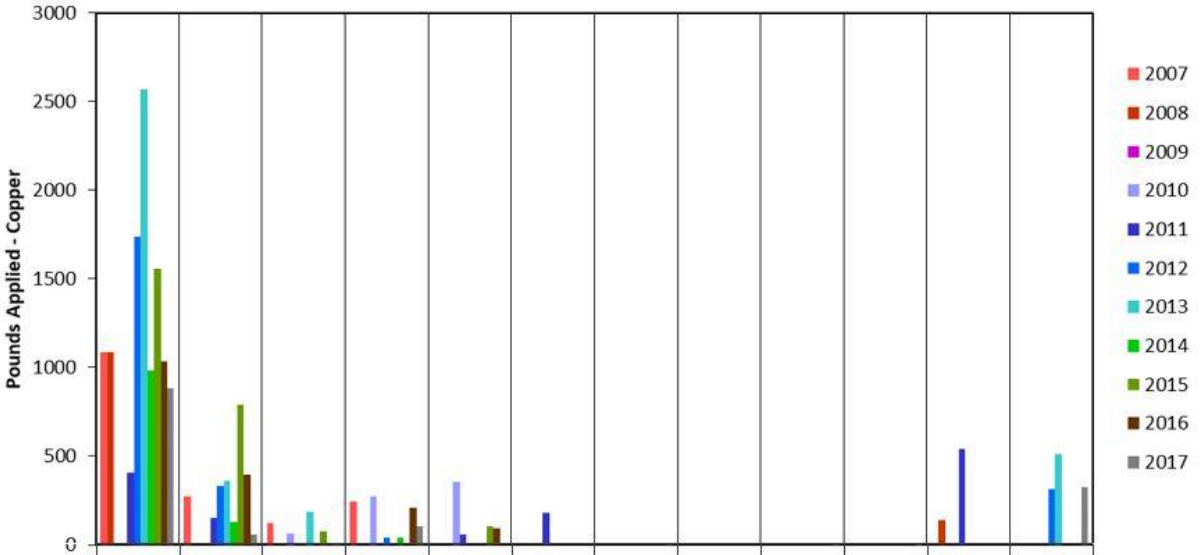
Copper

The Coalition monitored for copper from 2007 through January 2018 and nine exceedances occurred. Exceedances of the WQTL for total copper occurred in January, February, May, June, July, and August. The PUR data from 2015 through 2017 indicate almost all applications within the site subwatershed occur in January and February (Figure 29). The Coalition determined monitoring in February, May, June, July, and August is no longer necessary due to four or more years of monitoring with no exceedances and very minimal copper use.

During the 2019 WY, the Coalition will conduct MPM for copper in January based on past exceedances and copper use within the site subwatershed.

Figure 29. Miles Creek @ Reilly Rd monitoring history and copper applications.

Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2007												
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017												
2018											2019WY	
Total Use (2007-2017)	11,347	2,487	444	918	613	179	0	0	0	0	684	1,153
% Total (2007-2017)	*64%*	*14%*	*2%*	*5%*	*3%*	*1%*	*0%*	*0%*	*0%*	*0%*	*4%*	*6%*
Total Use (2015-2017)	3,476	1,245	74	316	198	0	0	0	0	0	0	324
% Total (2015-2017)	*62%*	*22%*	*1%*	*6%*	*4%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*6%*

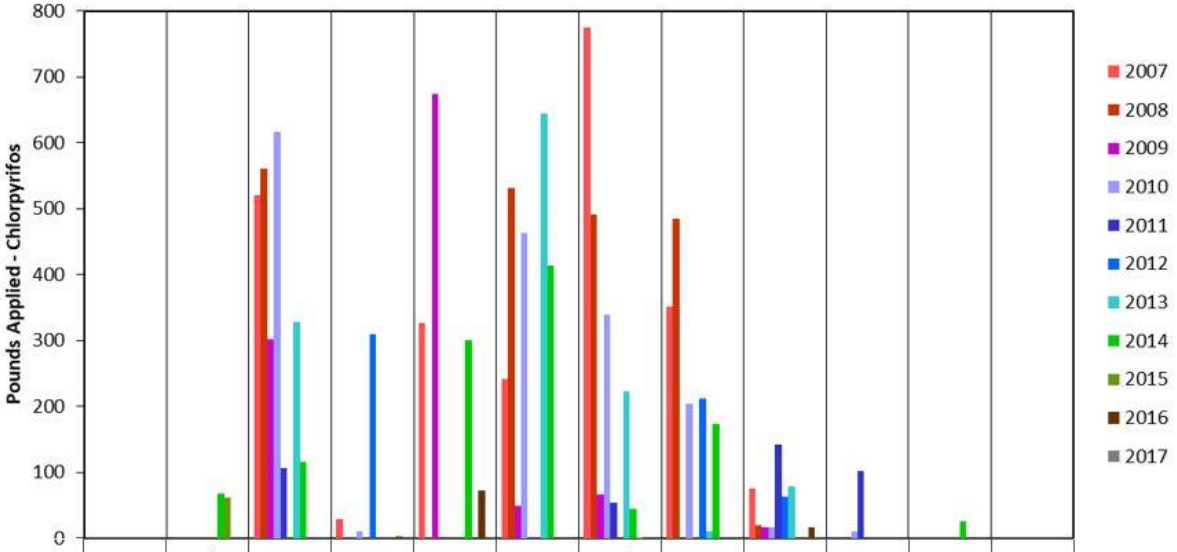
Chlorpyrifos

The Coalition monitored for chlorpyrifos from 2007 through 2009, and from 2013 through the 2017 WY. Prior to the 2017 WY, the last exceedances of the WQTL for chlorpyrifos occurred in 2009. On March 25, 2016, the Coalition received approval to complete the chlorpyrifos management plan due to no exceedances from 2013 through the 2016 WY. An exceedance of the WQTL for chlorpyrifos occurred on May 9, 2017; the same samples were also toxic to *C. dubia*. This exceedance caused the management plan for chlorpyrifos to be at this site for the 2018 WY.

Overall, PUR data indicate chlorpyrifos use within the site subwatershed is minimal and primarily occurs in May, June, and August (Figure 30). However, chlorpyrifos use in the past three years within the watershed has primarily occurred in February and May. During the 2019 WY, the

Coalition will conduct MPM for chlorpyrifos in May based on peak use and when the last exceedance occurred.

Figure 30. Miles Creek @ Reilly Rd monitoring history and chlorpyrifos applications.
Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2007												
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017												
2018											2019WY	
Total Use (2007-2017)	0	131	2548	353	1375	2343	1992	1436	430	113	25	0
% Total (2007-2017)	*0%*	*1%*	*24%*	*3%*	*13%*	*22%*	*19%*	*13%*	*4%*	*1%*	*0%*	*0%*
Total Use (2015-2017)	0	62	0	3	73	0	0	0	16	0	0	0
% Total (2015-2017)	*0%*	*40%*	*0%*	*2%*	*47%*	*0%*	*0%*	*0%*	*10%*	*0%*	*0%*	*0%*

Monitoring Based on Core Site Exceedances

During the 2018 WY, no exceedances of the WQTLs for pesticides, applied metals or toxicity occurred at the Core site. Miles Creek @ Reilly Rd is in a management plan for chlorpyrifos; MPM will occur according to the schedule discussed above.

Toxicity to *Ceriodaphnia dubia*

The Coalition monitored for toxicity to *C. dubia* monthly during the 2016 and 2017 WYs when Miles Creek @ Reilly Rd was the Core site. Toxicity to *C. dubia* occurred in samples collected in

May 2017. During the 2018 WY, monitoring for toxicity to *C. dubia* occurred for a third consecutive year from May through August, no toxicity occurred.

During the 2019 WY, monitoring for toxicity to *C. dubia* is not scheduled to occur based on the Coalition's monitoring strategy. If a sample collected from June through August 2018 is toxic, the Coalition will amend the monitoring schedule to include MPM for *C. dubia* toxicity.

Malathion

Miles Creek @ Reilly Rd was monitored for malathion in 2007, 2008, 2013, and monthly during the 2016 and 2017 WY. Out of 36 samples analyzed, only one exceedance occurred in April 2013. During the 2019 WY, monitoring for malathion is not scheduled based on the Coalition's monitoring strategy.

ZONE 6 – REPRESENTED SITE MONITORING SCHEDULE

Core Site Monitoring Results

Cottonwood Creek @ Rd 20 is the Core site in Zone 6 for the 2019 WY. Monitoring was initiated at Cottonwood Creek @ Rd 20 in 2005. During the 2018 WY, a single exceedance of the WQTL for copper occurred in November 2017.

Cottonwood Creek @ Rd 20 is in a management plan for *E. coli* and copper. During the 2019 WY, MPM for copper will occur during months of high use from January through April and during one storm event that occurs between October 1st and December 31st.

The management plan constituents in Zone 6 are listed in Table 28. Monitoring for management plan constituents will occur according to the schedule provided in Attachment A.

Table 46. Zone 6 management plan constituents.

Core site is bolded. An 'M' indicates a current management plan constituent and an 'M' in red text indicates exceedances in the 2018 WY triggered a management plan. An 'X' indicates one exceedance occurred during the 2018 WY that did not initiate a management plan.

Site Name	DO	SC	pH	*E. coli*	Copper
Cottonwood Creek @ Rd 20	**X**			**M**	**M**
Ash Slough @ Ave 21		M			M
Berenda Slough along Ave 18 ½	M		M	M	M
Dry Creek @ Rd 18	M	M	M	M	M

Ash Slough @ Ave 21

Ash Slough @ Ave 21 is a Represented site in Zone 6. Monitoring was initiated at the site in 2005. During the 2018 WY, MPM was scheduled for dissolved copper and no exceedances occurred. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

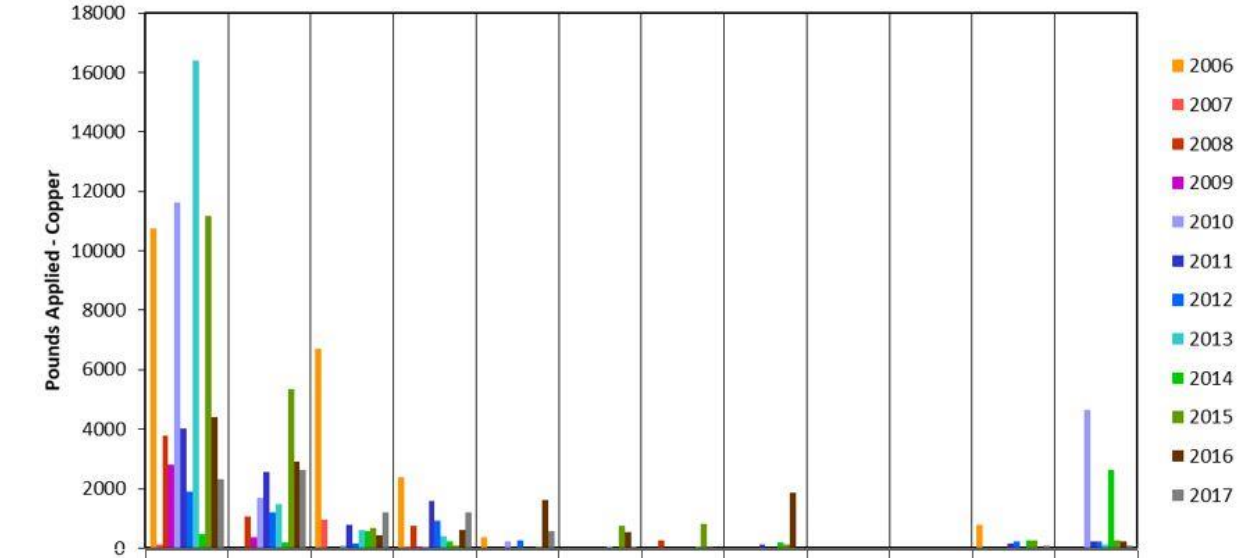
Management Plan Monitoring

Copper

Past exceedances of the WQTL for total copper occurred from May through September 2006, and for dissolved copper in May 2009, April 2010, and January 2017. The site has been dry during most monitoring events. Exceedances of the WQTL for copper have typically occurred when enough water volume is present to collect a sample (Figure 31). The PUR data indicate increased use of copper occurs consistently in January and February making up 71% of the total use from 2015 through 2017 (Figure 31).

During the 2019 WY, the Coalition will conduct MPM for copper during one storm event scheduled from January through March, when copper use is high and water is most likely present. The Coalition determined it is not necessary to conduct MPM in April; copper use is minimal and the site is typically dry in April, as observed from 2014 through 2016.

Figure 31. Ash Slough @ Ave 21 monitoring history and copper applications.
Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2006					■	■	■	■	■			
2007				▨	▨	▨	▨	▨	▨			
2008	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
2009	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
2010	▨	▨	▨	■	▨	▨	▨	▨	▨	▨	▨	▨
2011												
2012												
2013												
2014	▨	▨		▨	▨	▨	▨	▨	▨			
2015	▨			▨	▨	▨	▨	▨	▨			▨
2016	▨	▨	▨	▨								
2017	■											
2018	▨		▨	▨							2019WY	
Total Use (2006-2017)	69,745	19,465	12,164	8,247	3,027	1,370	1,142	2,308	0	0	1,783	8,453
% Total (2006-2017)	***55%***	***15%***	***10%***	***6%***	***2%***	***1%***	***1%***	***2%***	***0%***	***0%***	***1%***	***7%***
Total Use (2015-2017)	17,883	10,900	2,310	1,890	2,210	1,322	866	1,981	0	0	357	569
% Total (2015-2017)	***44%***	***27%***	***6%***	***5%***	***5%***	***3%***	***2%***	***5%***	***0%***	***0%***	***1%***	***1%***

Monitoring Based on Core Site Exceedances

The Zone 6 Core site, Cottonwood Creek @ Rd 20, is in a management plan for copper. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2018 WY. Monitoring for copper during the 2018 WY at Ash Slough @ Ave 21 will occur based on the MPM schedule discussed above.

Berenda Slough along Ave 18 ½

Berenda Slough along Ave 18 ½ is a Represented site in Zone 6. Monitoring was initiated at the site in 2006. During the 2018 WY, the Coalition conducted MPM for chlorpyrifos and copper. Approval to complete the chlorpyrifos management plan was received on January 31, 2018. A summary of monitoring results through May of the 2018 WY and the 2019 WY monitoring proposal are provided below.

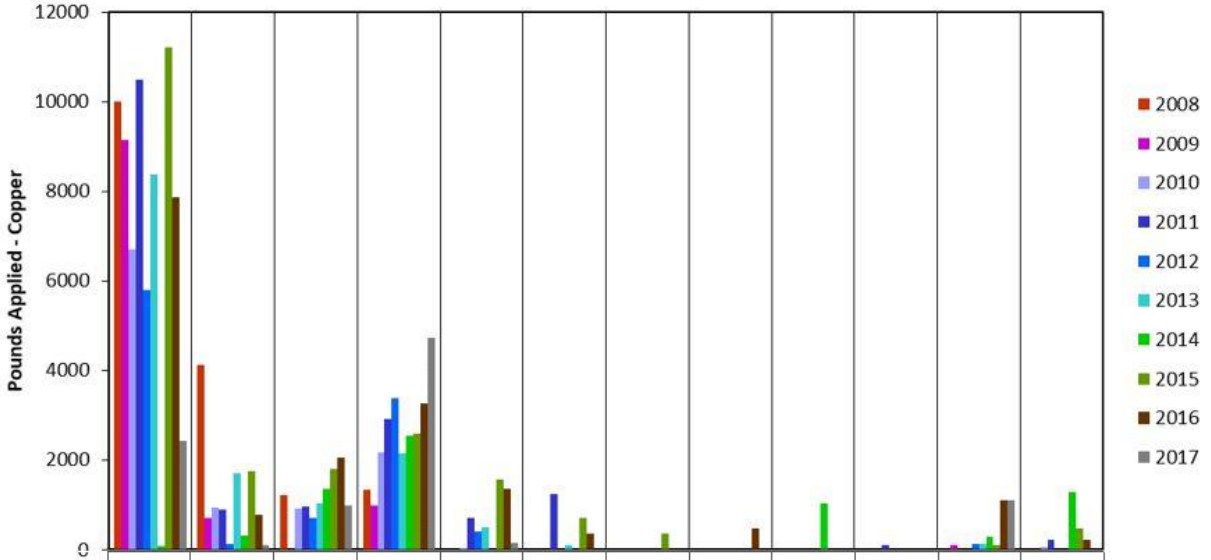
Management Plan Monitoring

Copper

Exceedances of the hardness based WQTL for dissolved copper occurred 11 times in 2011. From 2012 through 2014 the Coalition monitored for dissolved copper monthly, two exceedances occurred in June and July of 2012. Since 2012, the site has been primarily dry except during the winter months after significant rainfall. Monitoring continued from 2015 through the 2018 WY for MPM, four exceedances occurred with the most recent exceedance in April 2017. Due to dry site conditions, the Coalition conducts monitoring from January through April during times of peak use and increased precipitation. During the 2018 WY, exceedances of the WQTL for copper did not occur.

During the 2019 WY, the Coalition will continue to conduct MPM for dissolved copper from January through April.

Figure 32. Berenda Slough along Ave 18 ½ monitoring history and copper applications.
Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017												
2018											2019WY	
Total Use (2008-2017)	72,115	11,428	10,994	26,054	4,718	2,424	366	466	1,040	108	2,934	2,243
% Total (2008-2017)	*53%*	*8%*	*8%*	*19%*	*3%*	*2%*	*0%*	*0%*	*1%*	*0%*	*2%*	*2%*
Total Use (2015-2017)	21,492	2,624	4,816	10,576	3,053	1,073	366	466	0	0	2,301	681
% Total (2015-2017)	*45%*	*6%*	*10%*	*22%*	*6%*	*2%*	*1%*	*1%*	*0%*	*0%*	*5%*	*1%*

Monitoring Based on Core Site Exceedances

The Zone 6 Core Site, Cottonwood Creek @ Rd 20, is in a management plan for copper. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2018 WY. Monitoring for copper during the 2019 WY at Berenda Slough @ Ave 18 ½ will occur for MPM based on the schedule discussed above.

Dry Creek @ Rd 18

Dry Creek @ Rd 18 is a rotating Core site and will be monitored as a Represented site during the 2019 WY. During the 2018 WY, MPM for dissolved copper occurred. A summary of monitoring

results through May 2018 and the proposed monitoring schedule for the 2019 WY is provided below.

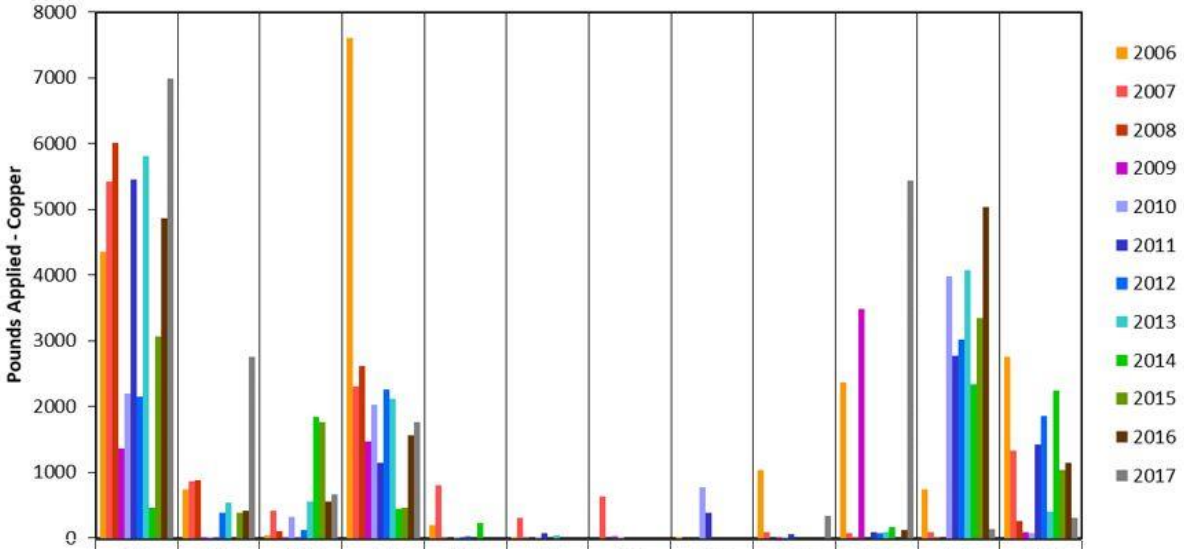
Management Plan Monitoring

Copper

The Coalition monitored for copper from 2006 through 2008 and then from 2011 through the 2018 WY. Exceedances of the WQTL for copper occurred monthly during the 2016 and 2017 WYs. Copper exceedances occurred all throughout the year, during months of high use and months of no reported use (May through September). The fact that exceedances still occur in months when no applications have occurred indicates there are other sources of copper in the site subwatershed.

The Coalition determined monitoring for copper from May through September is not necessary, as copper applications by growers have not occurred from 2015 through 2017 (Figure 33). Additionally, no monitoring will occur from October through December as no exceedances have occurred during these months and the site is frequently dry during winter months. During the 2019 WY, the Coalition will conduct MPM for copper from January through April based on past exceedances and peak use months (Figure 33).

Figure 33. Dry Creek @ Rd 18 monitoring history and copper applications.
Shaded cells represent months of past monitoring. Black cells depict months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2017.



Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2006					■	■	■	■	■			
2007		■		■	■	■	■	■	▨			
2008	■	■		■	■	■	■	■	▨			
2009												
2010												
2011	■	▒		■	■	■	■	■	■			
2012	▒	▒										
2013	■	▒	▒	▒	▒	■	■	■	■	▒	▒	▨
2014	▨	■		▨	▒	▒	▨	▨	▒			
2015	▨	▒		▒	▒	▨	▨	▨	▨		▨	▨
2016	▨	■	■	■	■	■	■	■	■			▨
2017	■	■	■	■	■	■	■	■	■			
2018	▨	▨	▨	▨							2019WY	
Total Use (2006-2017)	48,096	6,969	6,390	25,762	1,270	437	666	1,154	1,541	11,878	25,526	12,917
% Total (2006-2017)	***34%***	***5%***	***4%***	***18%***	***1%***	***0%***	***0%***	***1%***	***1%***	***8%***	***18%***	***9%***
Total Use (2015-2017)	14,913	3,551	2,983	3,783	0	0	0	0	344	5,553	8,518	2,488
% Total (2015-2017)	***35%***	***8%***	***7%***	***9%***	***0%***	***0%***	***0%***	***0%***	***1%***	***13%***	***20%***	***6%***

Monitoring Based on Core Site Exceedances

The Zone 6 Core Site, Cottonwood Creek @ Rd 20, is in a management plan for copper. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2018 WY. Monitoring for copper during the 2019 WY at Dry Creek @ Rd 18 will occur based on the MPM schedule discussed above.

2019 WY Monitoring Plan Update Addendum

June – September 2018 Data

East San Joaquin Water Quality Coalition

Central Valley Regional Water Board

January 31, 2019

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SUMMARY

Based on the requirements in the Order R5-2012-0116-R4, a monitoring schedule is submitted annually in the Monitoring Plan Update (MPU) which is due August 1 prior to the monitoring water year (WY). The Coalition submitted the 2019 WY MPU on August 1, 2018 (conditionally approved September 21, 2018 and revised September 28, 2018). In order to determine the constituent, monitoring frequency, and where Management Plan Monitoring (MPM) and Normal Monitoring (NM) should occur, the Coalition utilized the Pesticide Evaluation Protocol (for Core sites only), reviewed available monitoring results, and reviewed Pesticide Use Report (PUR) data through December 2017. The August 1 MPU submittal includes an assessment of data through May of that year and this addendum addresses monitoring results from June through September 2018 and any monitoring schedule updates required due to exceedances that occurred during that timeframe.

UPDATES TO THE 2019 WY MPU

Updates made to the monitoring schedule based on June through September results are included in Table 1. The exceedances that occurred from June through September are discussed below and included in Table 2.

Two exceedances of the Water Quality Trigger Limits (WQTLs) for copper and the acute pyrethroid goal unit were incorrectly reported to the Regional Board and evaluated for monitoring in the 2019 WY MPU submitted on August 1, 2018. Since the receival of the conditional approval for the 2019 WY MPU (September 21, 2018), these exceedances have been removed from the data and the monitoring schedule has been updated as discussed by Zone below.

Table 1. June through September 2018 exceedances and 2019 WY monitoring schedule additions.

Zone	Site Name	Site Type	Year	Month	Chlorpyrifos	Malathion	Sediment Toxicity to *H. Azteca*
2	Lateral 2 ½ near Keyes Rd	Represented	2019	September			R
2	Prairie Flower Drain @ Crows Landing Rd	Represented	2019	September			R
4	Bear Creek @ Kibby Rd	Represented	2019	September			R
4	Black Rascal Creek @ Yosemite Rd	Represented	2019	September			R
4	Howard Lateral @ Hwy 140	Represented	2019	September			R
4	Livingston Drain @ Robin Ave	Represented	2019	September			R
4	McCoy Lateral @ Hwy 140	Represented	2019	September			R
4	Unnamed Drain @ Hwy 140	Represented	2019	September			R
6	Ash Slough @ Ave 21	Represented	2019	February*	R	R	

R – Represented site monitoring

*Monitoring required for one storm event between February 1 and March 31, 2019.

MONITORING EVALUATION

From June through September 2018, the Coalition monitored Core sites for field parameters, bacteria, nutrients, PEP constituents, water column toxicity, and sediment toxicity to *H. azteca*. Sediment toxicity to *H. azteca* occurred at the Zone 1, Zone 2, and Zone 4 Core sites in September 2018. Exceedances of the WQTLs for chlorpyrifos and malathion occurred at the Zone 6 Core site. Included below is the rationale for monitoring by Zone.

Zone 1

Sediment Toxicity to *H. azteca*

Sediment samples collected for NM from Dry Creek @ Church St on September 11, 2018 were analyzed for toxicity to *H. azteca*; the sample was toxic with 25% survival compared to the control. Sediment toxicity last occurred in samples collected from Dry Creek @ Wellsford Rd on September 6, 2011. During the 2019 WY, the Coalition will continue to monitor for sediment toxicity in March and September at Dry Creek @ Church St for Core site monitoring (2019 WY MPU).

The Coalition evaluated the need for sediment toxicity monitoring at the Represented site Mootz Drain downstream of Langworth Pond. If sites had two years of monitoring that didn't result in toxicity or three years of monitoring that didn't result in the initiation of a management plan in the past five years, monitoring was determined to not be required. Due to two years of monitoring in the past five years (from 2014 through 2018) with no toxicity, the Coalition determined monitoring for sediment toxicity is not required at Mootz Drain downstream of Langworth Pond.

Zone 2

Sediment Toxicity to *H. azteca*

Sediment samples collected for NM from Prairie Flower Drain @ Crows Landing Rd on September 11, 2018 were analyzed for toxicity to *H. azteca*; the sample was toxic with 4% survival compared to the control. Sediment toxicity last occurred in samples collected on March 10, 2015. A management plan was not initiated due to more than three years since the last toxic sample was collected. The Coalition will add monitoring for toxicity to *H. azteca* at Prairie Flower Drain @ Crows Landing Rd in September 2019. If the September 2019 sediment samples are not toxic, the Coalition will not schedule monitoring in 2020 due to five continuous years of monitoring, from 2014 through 2018, that didn't result in the initiation of a management plan.

The Coalition evaluated the need for sediment toxicity monitoring at the Represented sites in Zone 2. No monitoring was scheduled at Hatch Drain @ Tuolumne Rd, Hilmar Drain @ Central Ave, and Levee Drain @ Carpenter Rd as the management plans were approved for completion in 2019, 2016, and 2018. All remaining Zone 2 Represented sites, with the exception of Lateral 2 ½ near Keyes Rd, have had at least two years of sediment toxicity monitoring in the past five years

that didn't result in the initiation of a management plan. Only the Lateral 2 ½ near Keyes Rd site subwatershed was determined to need monitoring in the 2019 WY for toxicity to *H. azteca*. Monitoring for sediment toxicity occurred at Lateral 2 ½ near Keyes Rd in 2009, 2010, and 2014 with no toxicity. Due to only one year of monitoring within the last five years, the Coalition will add monitoring for sediment toxicity to *H. azteca* at Lateral 2 ½ near Keyes Rd in September 2019.

Water Column Toxicity to *S. capricornutum*

Water column toxicity to *S. capricornutum* occurred on September 11, 2018 in samples collected from Hilmar Drain @ Central Ave (77% growth compared to the control) and Lateral 5 ½ @ South Blaker Rd (82% growth). During the 2019 WY, Management Plan Monitoring (MPM) is scheduled to occur in September for toxicity to *S. capricornutum* at both sites (2019 WY MPU).

Pyrethroids

In the 2019 WY MPU August 1 submittal, Zone 2 Represented sites were evaluated for the need for pyrethroid monitoring due to an incorrectly reported exceedance of the acute concentration goal unit at Prairie Flower Drain @ Crows Landing Rd on May 8, 2018. Based on corrected trigger limit information, the evaluation and scheduling of pyrethroid monitoring for Zone 2 Represented site subwatersheds is being rescinded. However, the Coalition will continue a second year of monitoring for pyrethroids at Prairie Flower Drain @ Crows Landing Rd to complete the site characterization for pyrethroids.

As of March 2019, the Coalition will use the chronic pyrethroid trigger formula to determine exceedances based on guidance from the Regional Board.

Zone 4

Sediment Toxicity to *H. azteca*

Sediment samples collected for NM from Merced River @ Oakdale Rd on September 11, 2018 were analyzed for toxicity to *H. azteca*; the sample was toxic with 10% survival compared to the control. This was the first sediment toxicity to occur at the site. During the 2019 WY, the Coalition will continue to monitor for sediment toxicity to *H. azteca* in March and September at Merced River @ Oakdale Rd for Core site monitoring (2019 WY MPU).

The Coalition evaluated the need for *H. azteca* toxicity monitoring at the Represented sites in Zone 4. No sediment toxicity monitoring was scheduled at Canal Creek @ West Bellevue Rd since the site was last monitored during the 2016 and 2017 WYs. Because more than five years have passed since samples were last analyzed for sediment toxicity, the Coalition will add monitoring in September 2019 at the remaining Zone 4 Represented sites: 1) Bear Creek @ Kibby Rd 2) Black Rascal Creek @ Yosemite Rd, 3) Howard Lateral @ Hwy 140, 4) Livingston Drain @ Robin Ave, 5) McCoy Lateral @ Hwy 140, and 6) Unnamed Drain @ Hwy 140.

Zone 5

Copper

Samples collected on March 5, 2018 from Deadman Creek @ Hwy 59 were analyzed for dissolved copper and results were incorrectly reported to the Regional Board as an exceedance that triggered the initiation of a management plan. The Coalition included a MPM schedule in the 2019 WY MPU for dissolved copper. Since no management plan was initiated, the monitoring type for copper has been updated from "MPM" to "R" in the schedule provided in Attachment A. Represented site monitoring for dissolved copper is scheduled for the third year during the 2019 WY at Deadman Creek @ Hwy 59 site subwatershed.

Zone 6

Organophosphates

Samples collected from Cottonwood Creek @ Rd 20 on June 12, 2018 were analyzed for chlorpyrifos and malathion and exceedances of the WQTLs for both constituents occurred (Table 2). During the 2019 WY, monitoring at the Core site, Cottonwood Creek @ Rd 20, is scheduled for chlorpyrifos and malathion according to the results of the PEP (2019 WY MPU). Since a management plan for chlorpyrifos was triggered for the 2019 WY, the monitoring type for chlorpyrifos has been updated from "Core" to "MPM" in the schedule provided in Attachment A.

The Coalition evaluated the need for chlorpyrifos and malathion monitoring at Represented sites in Zone 6. In 2010, the Coalition monitored for malathion at Ash Slough @ Ave 21 and the chlorpyrifos management plan was approved for completion. Due to more than five years since the site was last monitored for chlorpyrifos and malathion, the Coalition evaluated PUR data from 2015 through 2017 to evaluate months of highest use. Based on the Coalition's evaluation monitoring for chlorpyrifos and malathion will occur for one storm event from February 1 through March 31, 2019 (Figure 1 and Figure 2). Ash Slough is an ephemeral stream that is consistently dry during the irrigation season; therefore, no monitoring is scheduled in June or July for chlorpyrifos or malathion.

Monitoring for chlorpyrifos last occurred at Berenda Slough along Ave 18 ½ during the 2016 and 2017 WYs with no exceedances. During the 2019 WY, monitoring for chlorpyrifos is not scheduled to occur. The Coalition last monitored for malathion at Berenda Slough along Ave 18 ½ in 2011 and 2012. Since the only applications in the last three years occurred during August of 2017, along with the ephemeral nature of the stream during summer months, the Coalition did not schedule monitoring for malathion at Berenda Slough along Ave 18 ½ in August of the 2019 WY (Figure 3).

Copper

An exceedance of the hardness based WQTL for dissolved copper occurred in samples collected on July 10, 2018 from Cottonwood Creek @ Rd 20. An evaluation of the Represented sites was not required, as all Zone 6 site subwatersheds are already in a management plan for copper and MPM is scheduled to occur during the 2019 WY based on months of peak use (2019 WY MPU).

Figure 1. Ash Slough @ Ave 21 applications of chlorpyrifos (2015-2017).

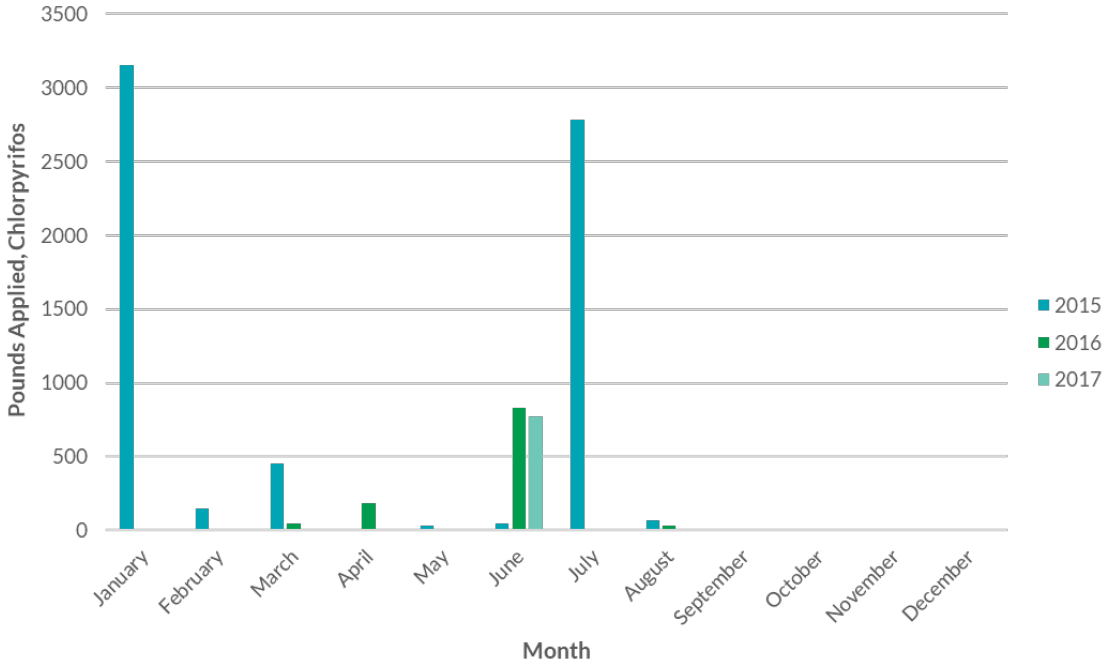

Figure 2. Ash Slough @ Ave 21 applications of malathion (2015-2017).

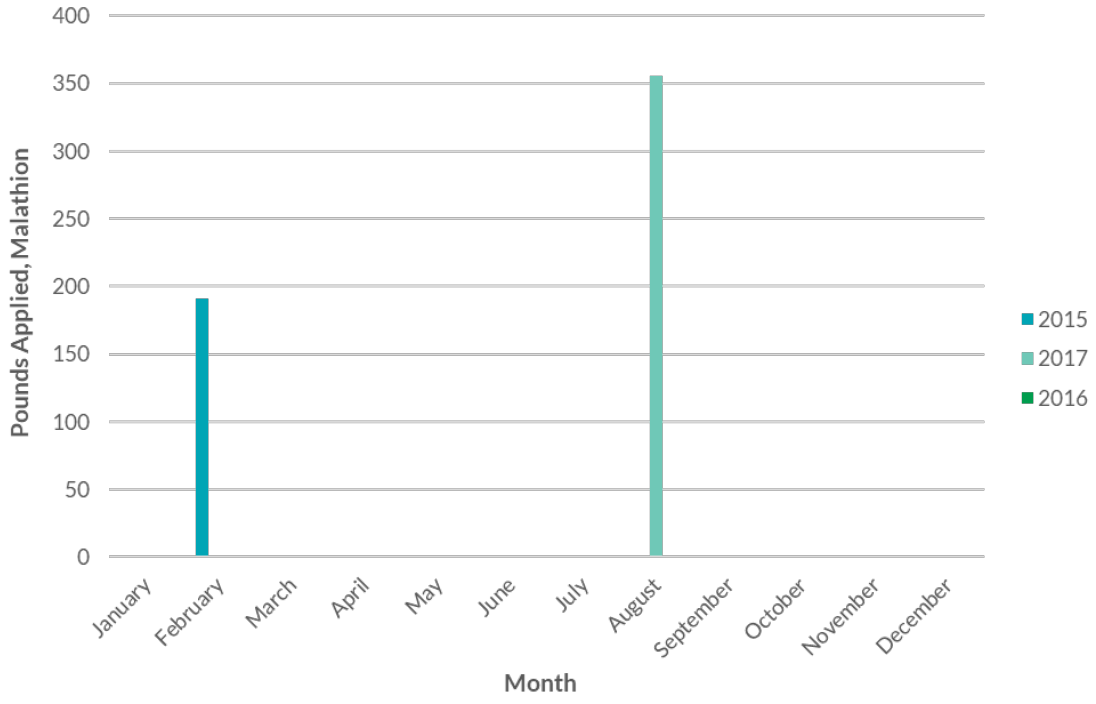

Figure 3. Berenda Slough along Ave 18 1/2 applications of malathion (2015-2017).

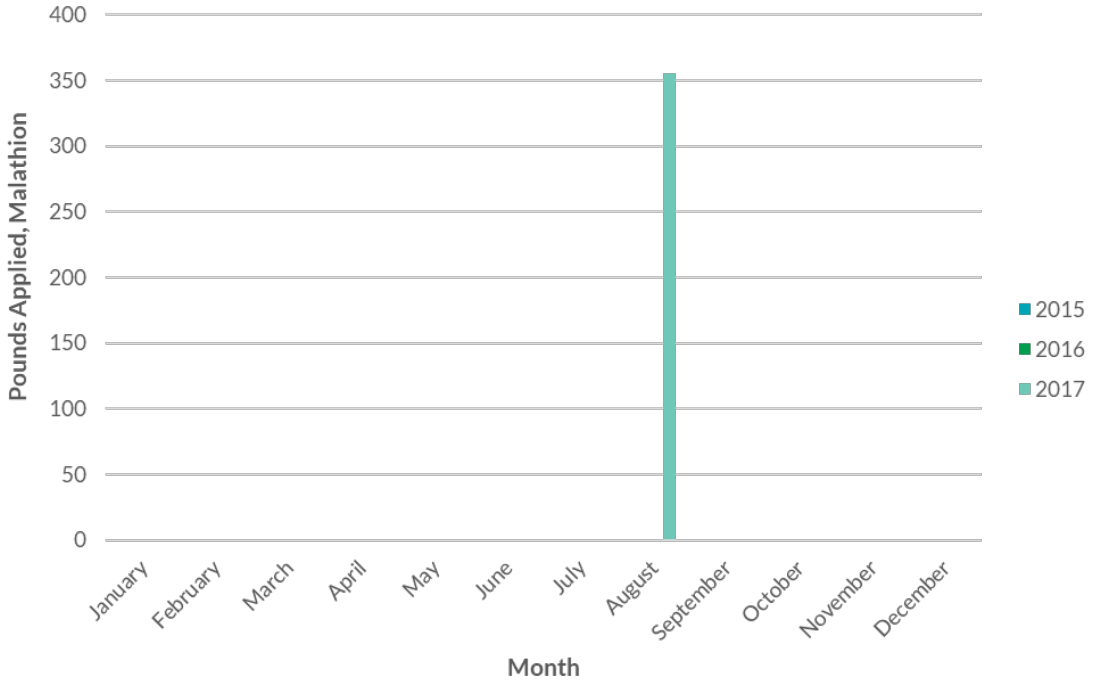

Table 2. Exceedances of the WQTLs from June 1, 2018 through September 30, 2018.

Listed by zone and alphabetically by site name.

Zone	Site Name	Sample Date	Season	Site Type	DO (<7 mg/L)	pH (<6.5 or >8.5)	SC (>700 µS/cm)	*E. coli* (235 MPN/100)	Ammonia (1.5 mg/L or variable based on pH/temp)	Copper, dissolved (hardness based WQTL)	Nitrate + Nitrite (10 mg/L)	Chlorpyrifos, 0.015 µg/L	Malathion, ND	*S. capricornutum*, % Growth	*H. azteca*, % Survival
1	Dry Creek @ Church St	6/12/2018	Irrigation 3	Core	6.2										
2	Lateral 6 and 7 @ Central Ave	6/12/2018	Irrigation 3	Represented			1179								
2	Levee Drain @ Carpenter Rd	6/12/2018	Irrigation 3	Represented	0.68		1956								
2	Prairie Flower Drain @ Crows Landing Rd	6/12/2018	Irrigation 3	Core	1.23		1597	285.1			20				
2	Unnamed Drain @ Hogin Rd	6/12/2018	Irrigation 3	Represented	0.93		929								
3	Highline Canal @ Hwy 99	6/12/2018	Irrigation 3	Core	6.34	8.7									
4	Merced River @ Oakdale Rd	6/12/2018	Irrigation 3	Core	5.03										
5	Duck Slough @ Gurr Rd - FD	6/12/2018	Irrigation 3	Core				260.3							
6	Cottonwood Creek @ Rd 20	6/12/2018	Irrigation 3	Core								0.025	0.03		
1	Dry Creek @ Church St	7/10/2018	Irrigation 4	Core	5.07			579.4							
2	Hatch Drain @ Tuolumne Rd	7/10/2018	Irrigation 4	Represented	0.32		1438								
2	Hilmar Drain @ Central Ave	7/10/2018	Irrigation 4	Represented	6.9		926								
2	Lateral 6 and 7 @ Central Ave	7/10/2018	Irrigation 4	Represented		8.52									
2	Prairie Flower Drain @ Crows Landing Rd	7/10/2018	Irrigation 4	Core	1.44		1035	1986.3	5						
2	Unnamed Drain @ Hogin Rd	7/10/2018	Irrigation 4	Represented	3.58		1011								
4	Merced River @ Oakdale Rd	7/10/2018	Irrigation 4	Core	6.02										
5	Duck Slough @ Gurr Rd	7/10/2018	Irrigation 4	Core				517.2							
5	Miles Creek @ Reilly Rd	7/10/2018	Irrigation 4	Represented	6.2										
6	Cottonwood Creek @ Rd 20	7/10/2018	Irrigation 4	Core						4.8 (4.6)					
6	Cottonwood Creek @ Rd 20-FD	7/10/2018	Irrigation 4	Core						5.8 (4.6)					
1	Dry Creek @ Church St	8/14/2018	Irrigation 5	Core				272.3							
2	Lateral 2 1/2 near Keyes Rd	8/14/2018	Irrigation 5	Represented		8.74									
2	Prairie Flower Drain @ Crows Landing Rd	8/14/2018	Irrigation 5	Core	0.72		1775	>2419.6							
2	Prairie Flower Drain @ Crows Landing Rd-FD	8/14/2018	Irrigation 5	Core				>2419.6							
4	Merced River @ Oakdale Rd	8/14/2018	Irrigation 5	Core	5.61										
5	Duck Slough @ Gurr Rd	8/14/2018	Irrigation 5	Core	5.82										
5	Miles Creek @ Reilly Rd	8/14/2018	Irrigation 5	Represented	6.98										

1	Dry Creek @ Church St	9/11/2018	Irrigation 6	Core	6.78										25
2	Hatch Drain @ Tuolumne Rd	9/11/2018	Irrigation 6	Represented	0.94		1257								
2	Hilmar Drain @ Central Ave	9/11/2018	Irrigation 6	Represented	6.48		1034							77	
2	Lateral 5 1/2 @ South Blaker Rd	9/11/2018	Irrigation 6	Represented										82	
4	Merced River @ Oakdale Rd	9/11/2018	Irrigation 6	Core				770.1							10
2	Prairie Flower Drain @ Crows Landing Rd	9/11/2018	Irrigation 6	Core	0.87		2148	435.2							4
2	Unnamed Drain @ Hogin Rd	9/11/2018	Irrigation 6	Represented	6.2		834								
5	Deadman Creek @ Gurr Rd	9/11/2018	Irrigation 6	Represented	5.34										