Monitoring Plan Update

2018 WY

East San Joaquin
WATER QUALITY COALITION

Irrigated Lands Regulatory Program
Central Valley Regional Water Quality Control Board

Submitted August 1, 2017

MICHAEL L. JOHNSON LLC
ECOSYSTEMS • CONSULTING

TABLE OF CONTENTS

Table of Contents i
List of Tables iii
List of Figures v
List of Acronyms vi
List of Units vii
Surface Water Monitoring Overview 1
Normal Monitoring 1
Core Site Pesticide Selection Process 1
Reduced Monitoring for the Delta RMP 2
Special Project Monitoring 7
Management Plan Monitoring 7
Total Maximum Daily Load Monitoring 12
Normal Monitoring at Core Sites 13
Core Site Pesticides 14
Core Site Toxicity 22
Core Site Metals 22
Dry Creek @ Church St 25
Prairie Flower Drain @ Crows Landing Rd 27
Highline Canal @ Hwy 99 29
Merced River @ Oakdale Rd 31
Duck Slough @ Gurr Rd 33
Cottonwood Creek @ Rd 20 35
Monitoring at Represented Sites 37
Zone 1 – Dry Creek @ Church St 42
Mootz Drain downstream of Langworth Pond 42
Zone 2 – Prairie Flower Drain @ Crows Landing Rd 44
Hatch Drain @ Tuolumne Rd 44
Hilmar Drain @ Central Ave 48
Lateral 2 ½ near Keyes Rd 49
Lateral 5 ½ @ South Blaker Rd 51
Lateral 6 and 7 @ Central Ave 52
Levee Drain @ Carpenter Rd 55
Lower Stevinson @ Faith Home Rd 58
Unnamed Drain @ Hogin Rd 60
Westport Drain @ Vivian Rd 62
Zone 3 – Highline Canal @ Hwy 99 64
Highline Canal @ Lombardy Rd 64
Mustang Creek @ East Ave 64

Zone 4 – Merced River @ Oakdale Rd 67
Bear Creek @ Kibby Rd 67
Black Rascal Creek @ Yosemite Rd 68
Canal Creek @ West Bellevue Rd 71
Howard Lateral @ Hwy 140 72
Livingston Drain @ Robin Ave 73
McCoy Lateral @ Hwy 140 76
Unnamed Drain @ Hwy 140 78
Zone 5 – Duck Slough @ Gurr Rd 80
Deadman Creek @ Gurr Rd 81
Deadman Creek @ Hwy 59 87
Miles Creek @ Reilly Rd 93
Zone 6 – Cottonwood Creek @ Rd 20 97
Ash Slough @ Ave 21 97
Berenda Slough along Ave 18 ½ 99
Dry Creek @ Rd 18 101

LIST OF TABLES

Table 1. ESJWQC 2018 WY monitoring frequency (field parameters, physical parameters, nutrients, bacteria, metals, and pyrethroids pesticides). 3
Table 2. ESJWQC 2017 WY monitoring frequency (pesticides). 5
Table 3. ESJWQC management plan strategy analysis for the 2018 WY. 9
Table 4. Management plan constituents and associated sites for which source identification analysis was conducted. 10
Table 5. ESJWQC Core sites by zone for the 2018 WY. 13
Table 6. Dry Creek @ Church St 2018 WY pesticide monitoring schedule. 16
Table 7. Prairie Flower Drain @ Crows Landing Rd 2018 WY pesticide monitoring schedule. 17
Table 8. Highline Canal @ Hwy 99 2018 WY pesticide monitoring schedule. 18
Table 9. Merced River @ Oakdale Rd 2018 WY pesticide monitoring schedule. 19
Table 10. Duck Slough @ Gurr Rd 2018 WY pesticide monitoring schedule. 20
Table 11. Cottonwood Creek @ Rd 20 2018 WY pesticide monitoring schedule. 21
Table 12. Results of the flowchart analysis for Dry Creek @ Church St. 25
Table 13. Dry Creek @ Wellsford Rd site subwatershed dissolved and total metals summary of sample counts. 26
Table 14. Results of the flowchart analysis for Prairie Flower Drain @ Crows Landing Rd. 27
Table 15. Prairie Flower Drain @ Crows Landing Rd site subwatershed dissolved and total metals summary of sample counts. 28
Table 16. Results of the flowchart analysis for Highline Canal @ Hwy 99. 29
Table 17. Highline Canal @ Hwy 99 site subwatershed dissolved and total metals summary of sample counts. 30
Table 18. Results of the flowchart analysis for Merced River @ Oakdale Rd. 31
Table 19. Merced River @ Santa Fe site subwatershed dissolved and total metals summary of sample counts. 32
Table 20. Results of the flowchart analysis for Duck Slough @ Gurr Rd. 33
Table 21. Duck Slough @ Gurr Rd subwatershed dissolved and total metals monitoring results (2017 WY) and sample counts summaries. 34
Table 22. Results of the flowchart analysis for Cottonwood Creek @ Rd 20. 35
Table 23. Cottonwood Creek @ Rd 20 subwatershed dissolved and total metals monitoring results (2017 WY) and sample counts summaries. 36
Table 24. ESJWQC sites and locations by zone. 38
Table 25. 2017 WY exceedances of the WQTL for pesticides, metals, and toxicity. 40
Table 26. Zone 1 management plan constituents and 2017 WY exceedances. 42
Table 27. Zone 2 management plan constituents and 2017 WY exceedances. 44
Table 28. Hatch Drain @ Tuolumne Rd toxicity to *S. capricornutum* MPM exceedance tally. 45
Table 29. Hilmar Drain @ Central Ave toxicity to *S. capricornutum* MPM exceedance tally. 48
Table 30. Westport Drain @ Vivian Rd toxicity to *S. capricornutum* MPM exceedance tally. 62

Table 31. Zone 3 management plan constituents and 2017 WY exceedances.....64
Table 32. Zone 4 management plan constituents and 2017 WY exceedances.....67
Table 33. Zone 5 management plan constituents and 2017 WY exceedances.....80
Table 34. Deadman Creek @ Gurr Rd toxicity to *C. dubia* MPM exceedance tally. 81
Table 35. Deadman Creek @ Gurr Rd toxicity to *P. promelas* MPM exceedance tally.....82
Table 36. Zone 6 management plan constituents and 2017 WY exceedances.....97

LIST OF FIGURES

Figure 1. Management plan strategy flowchart based on the 2014 SQMP. 8
Figure 2. ESJWQC flowchart for the monitoring strategy at Core sites. 14
Figure 3. ESJWQC flowchart for the Core site metals monitoring strategy; boron, copper and zinc are assessed through the PEP. 24
Figure 4. ESJWQC flowchart for the monitoring strategy at Represented sites. 39
Figure 5. Mootz Drain monitoring history and diuron applications. 43
Figure 6. Hatch Drain @ Tuolumne Rd applications of chlorpyrifos (2004-2016). 47
Figure 7. Lateral 2 ½ near Keyes Rd monitoring history and chlorpyrifos applications. 50
Figure 8. Lateral 6 and 7 @ Central Ave applications of chlorpyrifos (2014-2016). 54
Figure 9. Levee Drain @ Carpenter Rd applications of chlorpyrifos (2014-2016). 57
Figure 10. Lower Stevinson @ Faith Home Rd applications of chlorpyrifos (2014-2016). 59
Figure 11. Unnamed Drain @ Hogin Rd applications of chlorpyrifos (2014-2016). 61
Figure 12. Mustang Creek @ East Ave monitoring history and copper applications. 65
Figure 13. Black Rascal Creek @ Yosemite Rd copper applications (2014-2016). 70
Figure 14. Howard Lateral @ Hwy 140 monitoring history and copper applications. 73
Figure 15. Livingston Drain @ Robin Ave monitoring history and copper applications. 75
Figure 16. McCoy Lateral @ Hwy 140 applications of chlorpyrifos (2014-2016). 77
Figure 17. Unnamed Drain @ Hwy 140 applications of chlorpyrifos (2014-2016). 79
Figure 18. Deadman Creek @ Gurr copper applications (2014-2016). 83
Figure 19. Deadman Creek @ Gurr Rd applications of malathion (2006-2016). 85
Figure 20. Deadman Creek @ Hwy 59 monitoring history and chlorpyrifos applications. 88
Figure 21. Deadman Creek @ Hwy 59 copper applications (2014-2016). 90
Figure 22. Deadman Creek @ Hwy 59 applications of malathion (2014-2016). 92
Figure 23. Miles Creek @ Reilly Rd monitoring history and copper applications. 94
Figure 24. Miles Creek @ Reilly Rd monitoring history and chlorpyrifos applications. 95
Figure 25. Ash Slough @ Ave 21 monitoring history and copper applications. 98
Figure 26. Berenda Slough along Ave 18 ½ monitoring history and chlorpyrifos applications. 100
Figure 27. Berenda Slough along Ave 18 ½ monitoring history and copper applications. 101
Figure 28. Dry Creek @ Rd 18 monitoring history and copper applications. 103

LIST OF ACRONYMS

AI	Active Ingredient
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 2018 Water Year Monitoring Plan Update (2018 WY MPU) which provides the schedules and the rationale for monitoring in the 2018 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-R3 (hereafter the 'WDR' or 'Order'). Water quality results through May 2017 were evaluated to determine the 2018 WY monitoring schedule. The remaining 2017 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, 2018 and the 2018 WY monitoring schedule will be modified as needed. The Coalition will conduct monitoring at Core and Represented sites, including 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) during the 2018 WY as described below.

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 will occur once a month and will include 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 WQTL occurs at an associated Core site. The rationale for monitoring at Represented sites is discussed is the Monitoring section of this report. Attachment A is an Excel workbook that includes site information and the monitoring schedule for the 2018 WY. Table 1 and Table 2 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.

Available Pesticide Use Report (PUR) data are provided to the Coalition from each of the County Agricultural Commissioner's offices. Pesticide applications recorded in the database are associated with exceedances of Water Quality Trigger Limits (WQTLs). Pesticide Use Report data used for the 2018 WY MPU include applications of Active Ingredients (AI) that occurred through December 2016 and are considered preliminary until received from California Pesticide Information Portal (CalPIP); finalized CalPIP data are available for pesticides applied through December 2015.

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 2018 WY and hereafter, determining pesticides and metals (boron, copper, and zinc) for Core

site monitoring will occur through the Pesticide Evaluation Protocol (PEP; disseminated November 29, 2016).

The PEP process starts will comparing the pesticides applied within the subwatershed over the past three years to the 376 pesticides on the EO list. The Coalition then adds degradates for a select number of pesticides and removes pesticides from a series of steps provided in the PEP. The series of steps the Coalition used to determine the pesticides to monitor for the upcoming WY includes:

- Compiling the last three years of PUR data for each 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.
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 (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.

Due to pending communication with laboratories to address methods and costs for new pesticides in the Pesticide Evaluation Protocol, the Coalition will submit a proposal for reductions in monitoring to support the Delta Regional Monitoring Program on September 1, 2017.

Table 1. ESJWQC 2018 WY monitoring frequency (field parameters, physical parameters, nutrients, bacteria, metals, and pyrethroids pesticides).
Core sites are bolded. A complete list of sites, analytes, and months to be monitored are listed in Attachment A.

ESJWQC 2018 WY Monitoring Frequency			Field Parameters				Physical Parameters				Nutrients			Bact.	Metals[1]			Pyrethroids									Water Column Toxicity			Sediment Toxicity		
Zone	Site Name	Monitoring Type	Dissolved Oxygen	pH	Specific Conductance	Temperature	Dissolved Organic Carbon (DOC)	Suspended Solids	Total Organic Carbon (TOC)	Turbidity	Nitrate + Nitrite (as N)	Soluble Orthophosphate	Total Ammonia (as N)	*E. coli*	Copper (Dissolved)	Lead (Dissolved)	Zinc	Bifenthrin	Cyfluthrin	Cypermethrin	Esfenvalerate	Fenpropathrin	Lambda-Cyhalothrin	Permethrin	Piperonyl Butoxide	Resmethrin	*Ceriodaphnia dubia*	*Pimephales promelas*	*Selenastrum capricornutum*	*Hyalella azteca*	Grain size	Total Organic Carbon (TOC)
1	**Dry Creek @ Church St**	**C**	**12**	**12**	**12**	**12**	**6**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**3**		**1**	**5**	**2**	**3**	**4**	**2**	**4**	**3**		**1**	**12**	**11**	**10**	**2**	**2**	**2**
	Mootz Drain downstream of Langworth Pond	M																														
2	**Prairie Flower Drain @ Crows Landing Rd**	**C**	**12**	**12**	**12**	**12**	**5**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**1**			**2**		**2**	**1**		**4**	**1**			**2**	**7**	**1**	**2**	**2**	**2**
		M																									6		10			
	Hatch Drain @ Tuolumne Rd	M																											3	2	2	2
	Hilmar Drain @ Central Ave	M																											2			
	Lateral 2 ½ near Keyes Rd	M																											4			
	Lateral 5 ½ @ South Blaker Rd	M																											9			
	Lateral 6 and 7 @ Central Ave	R											1																			
	Levee Drain @ Carpenter Rd	M																									2		3	1	1	1
	Lower Stevinson @ Faith Home Rd	R											1																			
	Unnamed Drain @ Hogin Rd	R									8		1														4					
	Westport Drain @ Vivian Rd	M																											1			
3	**Highline Canal @ Hwy 99**	**C**	**12**	**12**	**12**	**12**	**8**	**12**	**12**	**12**	**12**	**12**	**12**	**12**			**2**	**1**	**5**	**1**	**2**	**3**	**3**	**2**	**2**	**2**	**11**	**11**	**9**	**2**	**2**	**2**
		M													**5**														3			
	Mustang Creek @ East Ave	M													5																	
4	**Merced River @ Oakdale Rd**	**C**	**12**	**12**	**12**	**12**	**8**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**2**		**3**	**5**	**3**	**3**	**3**	**2**	**2**	**1**	**1**	**2**	**12**	**12**	**11**	**2**	**2**	**2**
		M																														
	Bear Creek @ Kibby Rd	R																														
	Black Rascal Creek @ Yosemite Rd	R													3																	
	Canal Creek @ West Bellevue Rd	R											1														1	1	1			
	Howard Lateral @ Hwy 140	M													4																	
	Livingston Drain @ Robin Ave	M													4														2			
5	**Duck Slough @ Gurr Rd**	**C**	**12**	**12**	**12**	**12**	**9**	**12**	**12**	**12**	**12**	**12**	**12**	**12**			**1**	**4**	**4**	**3**	**3**	**3**	**5**	**3**			**7**	**9**	**12**	**1**	**1**	**1**

ESJWQC 2018 WY Monitoring Frequency			Field Parameters				Physical Parameters				Nutrients			Bact.	Metals[1]			Pyrethroids									Water Column Toxicity			Sediment Toxicity		
Zone	Site Name	Monitoring Type	Dissolved Oxygen	pH	Specific Conductance	Temperature	Dissolved Organic Carbon (DOC)	Suspended Solids	Total Organic Carbon (TOC)	Turbidity	Nitrate + Nitrite (as N)	Soluble Orthophosphate	Total Ammonia (as N)	*E. coli*	Copper (Dissolved)	Lead (Dissolved)	Zinc	Bifenthrin	Cyfluthrin	Cypermethrin	Esfenvalerate	Fenpropathrin	Lambda-Cyhalothrin	Permethrin	Piperonyl Butoxide	Resmethrin	*Ceriodaphnia dubia*	*Pimephales promelas*	*Selenastrum capricornutum*	*Hyalella azteca*	Grain size	Total Organic Carbon (TOC)
		M																									**3**	**2**		**1**	**1**	**1**
	Miles Creek @ Reilly Rd	M													1																	
		R																									4					
	Deadman Creek @ Gurr Rd	M																									1	2				
		R													3															1	1	1
	Deadman Creek @ Hwy 59	M																														
		R													2													3				
	Cottonwood Creek @ Rd 20	**C**	**12**	**12**	**12**	**12**	**7**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**1**		**4**	**5**	**2**	**1**	**2**	**3**	**4**	**6**			**10**	**10**	**10**	**2**	**2**	**2**
		M													**3**																	
6	Ash Slough @ Ave 21	M													1																	
	Berenda Slough along Ave 18 ½	M													4																	
	Dry Creek @ Rd 18	M													4																	
		Grand Total	**72**	**72**	**72**	**72**	**43**	**72**	**72**	**72**	**80**	**72**	**76**	**72**	**46**	**0**	**11**	**22**	**16**	**13**	**15**	**13**	**22**	**16**	**3**	**5**	**75**	**68**	**91**	**16**	**16**	**16**

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).

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

ESJWQC 2018 WY Monitoring Frequency			Pesticides																																											
Zone	Site Name	Monitoring Type	Diuron	Chlorpyrifos	2,4-D acids & salts	Acetamiprid	Azoxystrobin	Boscalid	Bromacil	Carbaryl	Chloropicrin	Chlorothalonil	Clothianidin	Cyprodinil	Diazinon	Dicamba	Dimethoate	Dioxin	Diuron	Dodine	Ethalfluralin	Flumioxazin	Glyphosate	Hexazinone	Imidacloprid	Iprodione	Isoxaben	Linuron	Malathion	Mancozeb	Methomyl	Norflurazon	Oryzalin	Oxyfluorfen	Paraquat Dichloride	Pendimethalin	Propiconazole	Pyraclostrobin	Pyrethrins	Rimsulfuron	Sethoxydim	Simazine	Tebuconazole	Thiamethoxam	Thiram	Triflumizole	Trifluralin
1	**Dry Creek @ Church St**	**C**			**4**	**4**	**4**	**2**			**3**	**2**	**1**	**1**				**3**				**4**	**2**	**2**	**3**	**1**	**3**			**3**		**2**	**5**	**4**	**2**	**4**	**3**	**3**		**4**	**1**	**2**	**2**			**2**	
	Mootz Drain downstream of Langworth Pond	M	2																																											
2	**Prairie Flower Drain @ Crows Landing Rd**	**C**			**1**							**1**	**1**								**1**	**2**	**2**	**3**	**1**								**5**	**2**	**4**		**5**									
		M		**6**																																										
	Hatch Drain @ Tuolumne Rd	M																																												
	Hilmar Drain @ Central Ave	M																																												
	Lateral 2 ½ near Keyes Rd	M		1																																										
	Lateral 5 ½ @ South Blaker Rd	M																																												
	Lateral 6 and 7 @ Central Ave	R		6																																										
	Levee Drain @ Carpenter Rd	M																																												
	Lower Stevinson @ Faith Home Rd	R		7																																										
	Unnamed Drain @ Hogin Rd	R																																												
	Westport Drain @ Vivian Rd	M																																												
3	**Highline Canal @ Hwy 99**	**C**			**6**	**4**	**3**	**2**			**4**	**2**	**3**	**1**		**1**	**1**	**6**	**1**			**3**	**2**	**2**	**4**	**1**	**4**			**3**	**1**	**2**	**3**	**5**	**2**	**4**	**3**	**2**		**6**	**1**	**1**	**3**		**2**	**2**	
		M		**1**																																										
	Mustang Creek @ East Ave	M																																												
		R		2																																										
4	**Merced River @ Oakdale Rd**	**C**			**5**	**2**	**3**	**3**			**4**	**2**	**2**	**2**				**5**		**1**		**3**	**2**	**1**	**2**	**2**	**4**			**3**		**2**	**4**	**4**	**2**	**4**	**2**	**3**		**4**			**3**		**3**	**2**	
		M		**2**																																										
	Bear Creek @ Kibby Rd	R																																												
	Black Rascal Creek @ Yosemite Rd	R																																												
	Canal Creek @ West Bellevue Rd	R																																												
	Howard Lateral @ Hwy 140	M																																												
	Livingston Drain @ Robin Ave	M																																												
		R																																												
	McCoy Lateral @ Hwy 140	R		2																																										
5	**Duck Slough @ Gurr Rd**	**C**			**3**	**4**	**3**	**1**			**1**	**2**	**3**	**1**	**1**		**1**	**3**	**1**	**1**		**4**	**2**	**2**	**3**	**2**	**3**			**2**	**1**	**2**	**3**	**4**	**2**	**2**	**2**	**4**	**4**	**5**	**2**		**3**				**1**

ESJWQC 2018 WY Monitoring Frequency			Pesticides																																											
Zone	Site Name	Monitoring Type	Diuron	Chlorpyrifos	2,4-D acids & salts	Acetamiprid	Azoxystrobin	Boscalid	Bromacil	Carbaryl	Chloropicrin	Chlorothalonil	Clothianidin	Cyprodinil	Diazinon	Dicamba	Dimethoate	Dioxin	Diuron	Dodine	Ethalfluralin	Flumioxazin	Glyphosate	Hexazinone	Imidacloprid	Iprodione	Isoxaben	Linuron	Malathion	Mancozeb	Methomyl	Norflurazon	Oryzalin	Oxyfluorfen	Paraquat Dichloride	Pendimethalin	Propiconazole	Pyraclostrobin	Pyrethrins	Rimsulfuron	Sethoxydim	Simazine	Tebuconazole	Thiamethoxam	Thiram	Trifluminzole	Trifluralin
		M		**3**																									**2**																	
		R																																												
	Miles Creek @ Reilly Rd	M		4																																										
		R																																												
	Deadman Creek @ Gurr Rd	M																																												
		R																											2																	
	Deadman Creek @ Hwy 59	M		3																																										
		R																																												
	Cottonwood Creek @ Rd 20	**C**		**5**	**3**	**1**	**3**	**5**	**1**	**1**	**2**	**4**	**5**	**4**	**1**			**3**	**2**	**1**		**5**	**2**	**1**	**3**	**2**	**5**	**4**	**4**	**2**	**4**	**3**	**3**	**4**	**2**	**5**	**1**	**4**	**2**	**5**		**3**	**3**	**1**		**3**	**4**
		R																																												
6	Ash Slough @ Ave 21	M																																												
	Berenda Slough along Ave 18 ½	M		2																																										
	Dry Creek @ Rd 18	M																																												
		Grand Total	**2**	**44**	**22**	**15**	**16**	**13**	**1**	**1**	**14**	**13**	**15**	**9**	**2**	**1**	**2**	**20**	**4**	**3**	**1**	**21**	**12**	**11**	**16**	**8**	**19**	**4**	**8**	**13**	**6**	**11**	**18**	**26**	**12**	**23**	**11**	**21**	**6**	**24**	**4**	**6**	**14**	**1**	**5**	**9**	**5**

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 Total Maximum Daily Load (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 will conduct the MPM as outlined in the 2014 Surface Water Quality Management Plan (SQMP; approved on November 4, 2015). The flowchart shown in Figure 1 helps 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 that will reach the 10-year compliance deadline in the next three years, and 2) recently initiated management plans or reinstated management plans that have occurred due to exceedances in the previous water years.

For any exceedances of the WQTLs for pesticides, the Coalition will begin sourcing, outreach, and monitoring activities within three years from the initiation of a management plan. Table 3 lists each site in a management plan for constituents with known agricultural sources, each constituent's compliance deadline, when the last exceedance occurred, when the Coalition expects to request the completion of the management plan, and if MPM and 2018 Focused Outreach will occur.

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

Management Plan Monitoring will occur 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 was used to determine the frequency of MPM at Represented sites:

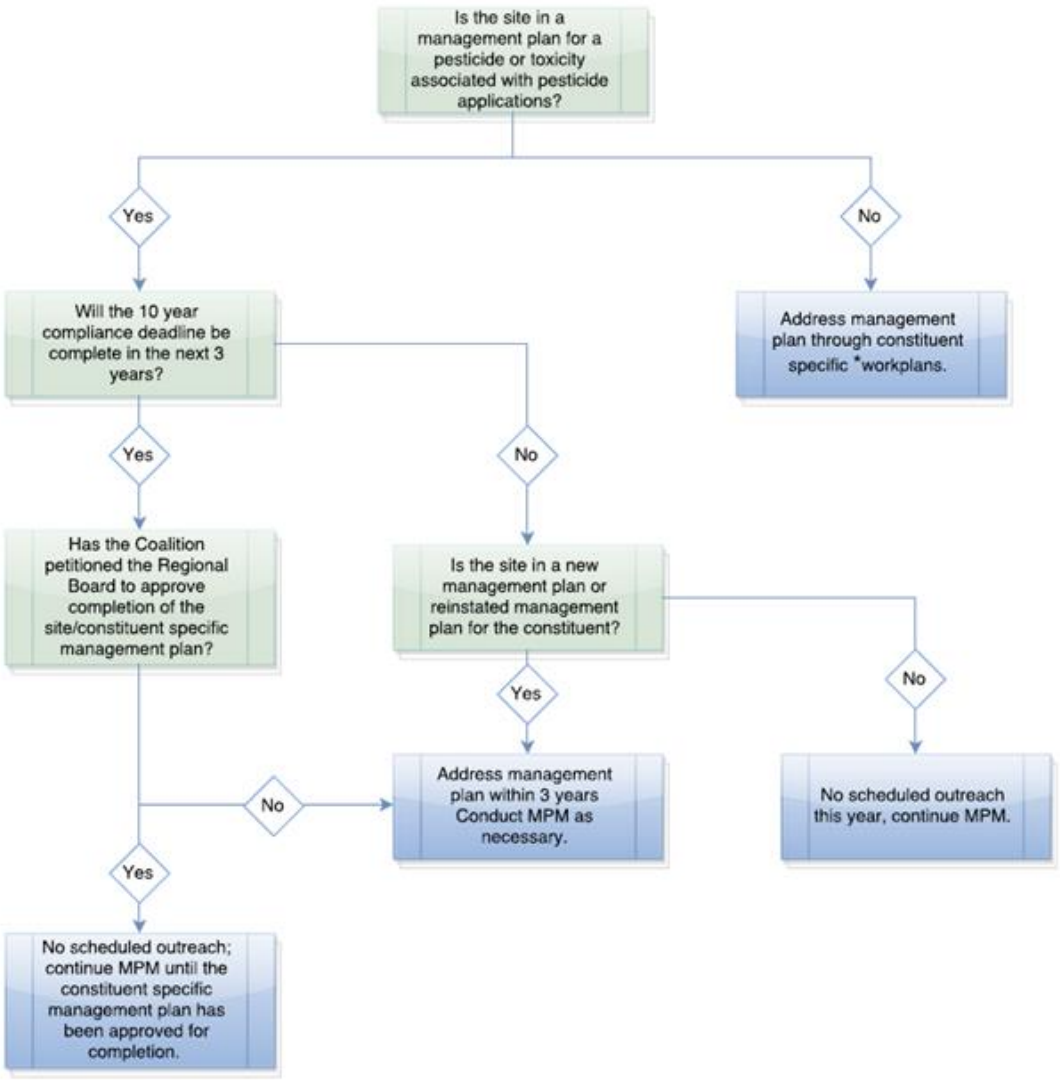
- Determine months of past exceedances for pesticides, metals, and toxicity,
- Determine months of high use and seasonal trends of pesticide use using PUR data and compare those trends with water quality data.

Constituents not applied by agriculture, including ammonia, *E. coli*, field parameters, lead, legacy pesticides (Dichlorodiphenyldichloroethylene (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. Until the Coalition receives feedback from the Regional Board, these constituents (ammonia, field parameters, lead, DDE, arsenic,

molybdenum, and nitrate) will not be monitored as part of MPM or at Represented sites. The Coalition's approach for addressing *E. coli* management plans will be submitted prior to the 2018 Annual Report (before May 1, 2018).

lists the management plans for constituents not applied by agriculture and when the preliminary analyses were submitted during the 2016 WY.

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 2018 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.)	2018 Focused Outreach	2018 MPM
2016	Duck Slough @ Gurr Rd	*H. azteca* toxicity	2010-2012; 2016-2018	2013	X	2017		X
2017	Berenda Slough along Ave 18 ½	Chlorpyrifos	2011-2013	2011	X	2017		X
2017	Deadman Creek @ Hwy 59	Chlorpyrifos	2012-2014	2011	X	2017		X
2017	Ash Slough @ Ave 21	Copper	2014-2016	2017 WY	X	2020		X
2017	Cottonwood Creek @ Rd 20	Copper	2010-2012	2017 WY	X	2020		X
2017	Dry Creek @ Rd 18	Copper	2011-2013; 2017-2019	2017 WY	X	2020		X
2017	Duck Slough @ Gurr Rd	*C. dubia* toxicity	2010-2012; 2016-2018	2015 WY	X	2018		X
2018	Deadman Creek @ Gurr Rd	*P. promelas* toxicity	2012-2014	2014 WY	X	2017		X
2018	Hatch Drain @ Tuolumne Rd	*H. azteca* toxicity	2013-2015	2014 WY	X	2017		X
2018	Hilmar Drain @ Central Ave	*S. capricornutum* toxicity	2012-2014	2017 WY	X	2020		X
2018	Highline Canal @ Hwy 99/Lombardy	Copper	2010-2012; 2016-2018	2017 WY	X	2020		X
2018	Livingston Drain @ Robin Ave	Copper	2011-2013; 2017-2019	2017 WY	X	2020		X
2018	Miles Creek @ Reilly Rd	Copper	2013-2015; 2017-2019	2017 WY	X	2020		X
2018	Prairie Flower Drain @ Crows Landing Rd	*C. dubia* toxicity	2008-2010; 2016-2018	2017 WY	X	2020		X
2019	Livingston Drain @ Robin Ave	*S. capricornutum* toxicity	2011-2013; 2017-2019	2008	X	2017		X
2019	Westport Drain @ Vivian Rd	*S. capricornutum* toxicity	2014-2016	2008	X	2017		X
2019	Hatch Drain @ Tuolumne Rd	*S. capricornutum* toxicity	2013-2015	2017 WY	X	2020		X
2019	Highline Canal @ Hwy 99/Lombardy	*S. capricornutum* toxicity	2010-2012; 2016-2018	2015 WY	X	2018		X
2019	Prairie Flower Drain @ Crows Landing Rd	*S. capricornutum* toxicity	2008-2010; 2016-2018	2017 WY	X	2020		X
2020	Deadman Creek @ Gurr Rd	*C. dubia* toxicity	2012-2014	2014 WY	X	2017		X
2020	Lateral 2 ½ near Keyes Rd	Chlorpyrifos	2011-2013; 2017-2019	2014 WY	X	2017		X
2020	Mustang Creek @ East Ave	Copper	2014-2016	2017 WY	X	2020		X
2021	Mootz Drain downstream of Langworth Pond	Diuron	2015-2017	2010		2017		X
2021	Howard Lateral @ Hwy 140	Copper	2015-2017	2017 WY		2020		X
2022	McCoy Lateral @ Hwy 140	Copper	TBD	2013		TBD		TBD
2022	Berenda Slough along Ave 18 ½	Copper	2011-2013	2017 WY		2020		X
2024	Levee Drain @ Carpenter Rd	*C. dubia* toxicity	2015-2017	2013		2017		X
2025	Lower Stevinson @ Faith Home Rd	*S. capricornutum* toxicity	TBD	2015 WY		TBD		TBD
2025	Duck Slough @ Gurr Rd	*P. promelas* toxicity	2010-2012; 2016-2018	2014 WY		2017		X
2025	Levee Drain @ Carpenter Rd	*H. azteca* toxicity	2015-2017	2014 WY		2017		X
2025	Levee Drain @ Carpenter Rd	*S. capricornutum* toxicity	2015-2017	2014 WY		2017		X
2025	Duck Slough @ Gurr Rd	Chlorpyrifos	2010-2012; 2016-2018	2015 WY		2018		X
2025	Lateral 5 ½ @ South Blaker Rd	*S. capricornutum* toxicity	2018-2020	2017 WY		2020	X	X
2026	Lateral 6 and 7 @ Central Ave	*S. capricornutum* toxicity	TBD	2015 WY		TBD		TBD
2026	Highline Canal @ Hwy 99	Chlorpyrifos	2010-2012; 2016-2018	2016 WY		2019		X
2026	Lateral 2 ½ near Keyes Rd	*S. capricornutum* toxicity	2011-2013; 2017-2019	2016 WY		2019		X
2026	Duck Slough @ Gurr Rd	Malathion	2010-2012; 2016-2018	2015 WY		2018		X
2026	Prairie Flower Drain @ Crows Landing Rd	Chlorpyrifos	2008-2010; 2016-2018	2015 WY		2018		X
2027	Merced River @ Santa Fe	Chlorpyrifos	2013-2015	2016 WY		2019		X

2028	**Canal Creek @ West Bellevue**	Copper	TBD	2017 WY		TBD		TBD

TBD – Focused Outreach within the 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.

		Core sites						Represented sites																									
Constituent	Preliminary Analysis Submittal Date	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
SC	NA[1]			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				
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
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. Prior to submission of the 2018 Annual Report, the Coalition will submit a strategy for addressing *E. coli* management plans.

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 normal monitoring and/or metals monitoring for all of the above TMDLs except for diazinon and chlorpyrifos.

Chlorpyrifos and Diazinon

The ESJWQC and the Westside Coalition 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.

NORMAL MONITORING AT CORE SITES

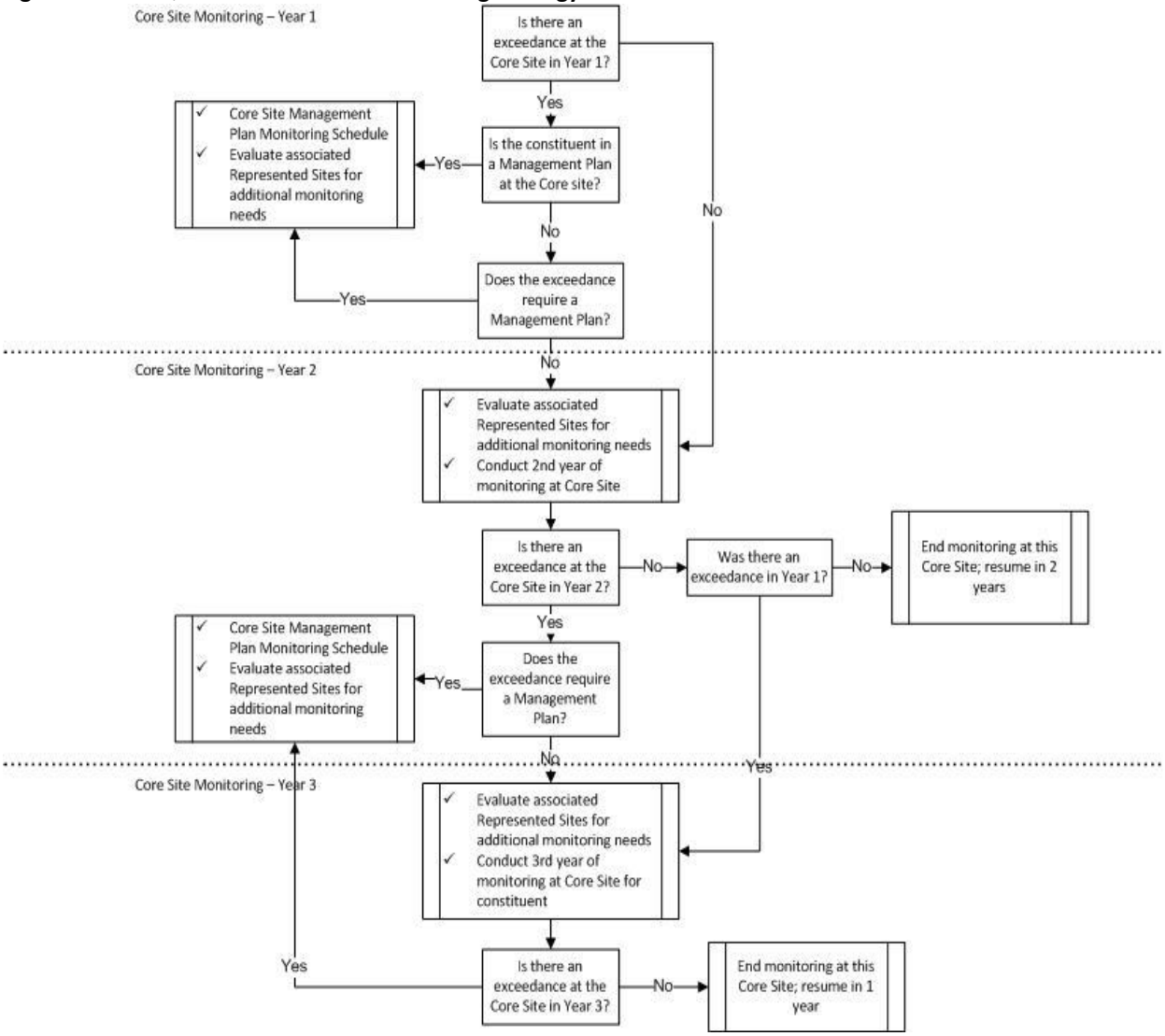
During the 2018 WY, the Coalition will monitor designated Core sites within each of the six zones in the ESJWQC region for 12 months (October 2017 through September 2018; Attachment B of the Order, Page 3). Each Core site is monitored for two consecutive years, after which, a second Core site is monitored in each zone for two years. Monitoring at the two designated Core sites are then alternated every two years. Due to site conditions and parking restrictions, the Core sites in both Zone 1 and Zone 4 have been replaced with Dry Creek @ Church St and Merced River @ Oakdale Rd; respectively (approved July 24, 2017). The Core sites listed in Table 5 are the primary set of Core sites that rotated into monitoring for the 2018 and 2019 WYs.

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 2018 WY at Core sites.

Table 5. ESJWQC Core sites by zone for the 2018 WY.

Zone	Site Type	Site Name	Station Code	Latitude	Longitude
1	Core	Dry Creek @ Church St	535XDCCHS	37.66603	-120.89825
2	Core	Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	37.44187	-121.00331
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

Figure 2. ESJWQC flowchart for the monitoring strategy at Core sites.



CORE SITE PESTICIDES

During the 2018 WY, the Coalition will monitor a set of pesticides unique to each site subwatershed.

The Coalition worked through a series of steps in the PEP to come up with a subset of pesticides to consider monitoring for the upcoming WY. A summary of the PEP steps is provided in the Normal Monitoring section of this report. The Coalition reviewed the Relative Risk Ratios to remove chemicals with low risk to aquatic life and human health. The lists of pesticides remaining were reviewed for site specific considerations. The Coalition assessed whether chemicals should be monitored based on management plan status, relative risk to aquatic life and human health, and the average percent monthly use. Completed management plans indicate that growers have implemented management practices effective in managing constituents of concern regardless of the amount applied; in these cases

the Coalition used Management Plan Monitoring and the implementation of practices to justify excluding these pesticides from the 2018 WY monitoring schedule. Chemicals with a higher probability of being detected based on use were incorporated in the monitoring schedule including pesticides within an active management plan.

The rationale for all monitoring exclusions is documented in Attachment B for each of the Core sites. The site specific considerations that resulted in additional exclusions include:

1. Constituents that have been approved for management plan completion within 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 1.0.
4. Months of monitoring where the percent monthly use is less than 10% of the total use.

During the 2018 WY, pesticide monitoring at the Core sites will occur based on the schedule provided in Table 6 through Table 11.

The Coalition will continue 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) and justification can be found by Zone in the Justification for Monitoring section of this report.

If the concentration of a constituent exceeds the WQTL at a Core site, monitoring will continue for three consecutive years (Attachment B of the Order, Page 3). However, if the exceedance of the WQTL requires the Core 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 depicts the Core site monitoring strategy.

The Coalition will monitor glyphosate and paraquat dichloride, both sediment bound constituents, twice a year during a high total suspended solid (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 WQTL for glyphosate and paraquat dichloride are 700 and 3.2 µg/L, respectively.

Table 6. Dry Creek @ Church St 2018 WY pesticide monitoring schedule.

Month	2,4-D acids & salts	Acetamiprid	Azoxystrobin	Bifenthrin	Boscalid	Chloropicrin	Chlorothalonil	Clothianidin	Copper	Cyfluthrin	Cypermethrin	Cyprodinil	Dioxin	Esfenvalerate	Fenpropathrin	Flumioxazin	Glyphosate	Hexazinone	Imidacloprid	Iprodione	Isoxaben	Lambda-cyhalothrin	Mancozeb	Norflurazon	Oryzalin	Oxyfluorfen	Paraquat dichloride	Pendimethalin	Permethrin	Propiconazole	Pyraclostrobin	Resmethrin	Rimsulfuron	Sethoxydim	Simazine	Tebuconazole	Triflumizole	Zinc	Grand Total
October																X					X				X	X		X											5
November	X												X			X					X			X	X	X		X					X					X	10
December						X												X																					2
January									X							X	X	X							X	X	X	X					X		X				10
February			X		X		X					X				X				X	X			X	X	X		X		X	X		X		X				15
March	X		X		X	X	X		X				X										X							X	X		X	X		X			13
April	X		X			X		X	X		X						X		X			X	X								X								11
May	X	X	X	X									X	X					X			X	X				X		X	X						X			13
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										5
September				X																																			1
Grand Total	**4**	**4**	**4**	**5**	**2**	**3**	**2**	**1**	**3**	**2**	**3**	**1**	**3**	**4**	**2**	**4**	**2**	**2**	**3**	**1**	**3**	**4**	**3**	**2**	**5**	**4**	**2**	**4**	**3**	**3**	**3**	**1**	**4**	**1**	**2**	**2**	**2**	**1**	**104**

Table 7. Prairie Flower Drain @ Crows Landing Rd 2018 WY pesticide monitoring schedule.

Month	2,4-D acids & salts	Bifenthrin	Chlorothalonil	Chlorpyrifos	Clothianidin	Copper	Cypermethrin	Esfenvalerate	Ethalfluralin	Flumioxazin	Glyphosate	Hexazinone	Imidacloprid	Lambda-cyhalothrin	Oxyfluorfen	Paraquat dichloride	Pendimethalin	Permethrin	Pyraclostrobin	Grand Total
October										X					X		X			3
November										X		X			X		X			4
December												X					X			2
January						X					X	X				X	X			4
February							X							X					X	4
March			X	X			X							X					X	5
April															X					1
May		X		X	X			X	X					X	X					7
June	X										X				X			X	X	5
July		X												X		X			X	4
August				X									X						X	3
Grand Total	**1**	**2**	**1**	**3**	**1**	**1**	**2**	**1**	**1**	**2**	**2**	**3**	**1**	**4**	**5**	**2**	**4**	**1**	**5**	**42**

Table 8. Highline Canal @ Hwy 99 2018 WY pesticide monitoring schedule.

Month	2,4-D acids & salts	Acetamiprid	Azoxystrobin	Bifenthrin	Boscalid	Chloropicrin	Chlorothalonil	Chlorpyrifos	Clothianidin	Copper	Cyfluthrin	Cypermethrin	Cyprodinil	Dicamba	Dimethoate	Dioxin	Diuron	Esfenvalerate	Fenpropathrin	Flumioxazin	Glyphosate	Hexazinone	Imidacloprid	Iprodione	Isoxaben	Lambda-cyhalothrin	Mancozeb	Methomyl	Norflurazon	Oryzalin	Oxyfluorfen	Paraquat dichloride	Pendimethalin	Permethrin	Piperonyl butoxide	Propiconazole	Pyraclostrobin	Resmethrin	Rimsulfuron	Sethoxydim	Simazine	Tebuconazole	Thiram	Triflumizole	Zinc	Grand Total
October	X															X															X		X										X			5
November	X															X									X				X		X								X							6
December		X															X			X		X									X		X						X							7
January	X	X						X		X						X				X	X	X			X					X	X	X	X	X					X							15
February	X				X		X			X			X		X	X				X				X	X			X		X	X		X			X	X		X		X	X			X	20
March	X		X		X	X	X			X		X				X									X		X									X	X		X			X				14
April	X		X			X					X					X			X								X												X			X				9
May			X			X					X							X	X				X			X	X		X	X					X	X									X	13
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														6
September						X																																X					X			3
Grand Total	**6**	**4**	**3**	**1**	**2**	**4**	**2**	**1**	**3**	**3**	**5**	**1**	**1**	**1**	**1**	**6**	**1**	**2**	**3**	**3**	**2**	**2**	**4**	**1**	**4**	**3**	**3**	**1**	**2**	**3**	**5**	**2**	**4**	**2**	**2**	**3**	**2**	**2**	**6**	**1**	**1**	**3**	**2**	**2**	**2**	**117**

Table 9. Merced River @ Oakdale Rd 2018 WY pesticide monitoring schedule.

Month	2,4-D acids & salts	Acetamiprid	Azoxystrobin	Bifenthrin	Boscalid	Chloropicrin	Chlorothalonil	Chlorpyrifos	Clothianidin	Copper	Cyfluthrin	Cypermethrin	Cyprodinil	Dioxin	Dodine	Esfenvalerate	Fenpropathrin	Flumioxazin	Glyphosate	Hexazinone	Imidacloprid	Iprodione	Isoxaben	Lambda-cyhalothrin	Mancozeb	Norflurazon	Oryzalin	Oxyfluorfen	Paraquat dichloride	Pendimethalin	Permethrin	Piperonyl butoxide	Propiconazole	Pyraclostrobin	Resmethrin	Rimsulfuron	Tebuconazole	Thiram	Triflumizole	Zinc	Grand Total
October						X		X																				X		X								X			6
November	X							X						X														X								X				X	6
December		X								X										X								X													4
January	X	X								X	X			X		X		X	X			X	X			X	X	X	X		X					X				X	16
February	X				X	X	X						X	X				X				X	X										X	X		X					12
March	X		X		X	X	X					X		X				X					X		X	X				X				X							13
April	X		X	X					X					X	X						X		X		X		X			X						X	X			X	14
May			X	X												X					X			X	X		X			X			X				X				10
June				X	X						X	X	X			X								X										X					X		9
July				X					X		X	X							X								X		X			X			X		X	X	X		12
August				X													X																								2
September						X											X																		X			X			4
Grand Total	**5**	**2**	**3**	**5**	**3**	**4**	**2**	**2**	**2**	**2**	**3**	**3**	**2**	**5**	**1**	**3**	**2**	**3**	**2**	**1**	**2**	**2**	**4**	**2**	**3**	**2**	**4**	**4**	**2**	**4**	**1**	**1**	**2**	**3**	**2**	**4**	**3**	**3**	**2**	**3**	**108**

Table 10. Duck Slough @ Gurr Rd 2018 WY pesticide monitoring schedule.

Month	2,4-D acids & salts	Acetamiprid	Azoxystrobin	Bifenthrin	Boscalid	Chloropicrin	Chlorothalonil	Chlorpyrifos	Clothianidin	Cyfluthrin	Cypermethrin	Cyprodinil	Diazinon	Dimethoate	Dioxin	Diuron	Dodine	Esfenvalerate	Fenpropathrin	Flumioxazin	Glyphosate	Hexazinone	Imidacloprid	Iprodione	Isoxaben	Lambda-cyhalothrin	Malathion	Mancozeb	Methomyl	Norflurazon	Oryzalin	Oxyfluorfen	Paraquat dichloride	Pendimethalin	Permethrin	Propiconazole	Pyraclostrobin	Pyrethrins	Rimsulfuron	Sethoxydim	Tebuconazole	Trifluralin	Zinc	Grand Total
October		X									X																								X			X						4
November	X														X					X					X					X	X	X							X						8
December																				X		X								X		X		X					X						8
January																X		X		X	X	X			X						X	X	X	X					X			X		10
February								X		X		X		X						X				X	X	X	X				X					X	X		X		X			14
March	X		X				X	X		X					X									X		X	X										X				X			11
April	X		X												X		X						X					X													X			7
May			X	X					X										X				X			X		X							X	X			X					10
June		X		X		X			X	X								X	X		X					X						X						X		X			X	13
July		X		X			X	X	X	X	X							X					X			X												X		X				12
August		X		X							X																						X				X							5
September					X								X						X										X						X		X	X						7
Grand Total	**3**	**4**	**3**	**4**	**1**	**1**	**2**	**3**	**3**	**4**	**3**	**1**	**1**	**1**	**3**	**1**	**1**	**3**	**3**	**4**	**2**	**2**	**3**	**2**	**3**	**5**	**2**	**2**	**1**	**2**	**3**	**4**	**2**	**2**	**3**	**2**	**4**	**4**	**5**	**2**	**3**	**1**	**1**	**109**

Table 11. Cottonwood Creek @ Rd 20 2018 WY pesticide monitoring schedule.

Month	2,4-D acids & salts	ACETAMIPRID	AZOXYSTROBIN	BIFENTHRIN	BOSCALID	BROMACIL	CARBARYL	CHLOROPICRIN	CHLOROTHALONIL	CHLORPYRIFOS	CLOTHIANIDIN	COPPER	CYFLUTHRIN	CYPERMETHRIN	CYPRODINIL	DIAZINON	DIOXIN	DIURON	DODINE	ESFENVALERATE	FENPROPATHRIN	FLUMIOXAZIN	GLYPHOSATE	HEXAZINONE	IMIDACLOPRID	IPRODIONE	ISOXABEN	LAMBDA-CYHALOTHRIN	LINURON	MALATHION	MANCOZEB	METHOMYL	NORFLURAZON	ORYZALIN	OXYFLUORFEN	PARAQUAT DICHLORIDE	PENDIMETHALIN	PERMETHRIN	PROPICONAZOLE	PYRACLOSTROBIN	PYRETHRINS	RIMSULFURON	SIMAZINE	TEBUCONAZOLE	THIAMETHOXAM	TRIFLUMIZOLE	TRIFLURALIN	ZINC	Grand Total
October	X										X						X																												X				5
November	X					X											X	X				X		X			X						X	X	X		X					X	X				X		14
December																						X					X						X		X		X												5
January		X						X	X	X		X								X		X	X				X							X	X	X	X					X	X						13
February	X								X						X		X	X				X				X	X						X	X	X		X		X			X	X						16
March			X		X			X	X		X											X				X	X		X		X						X			X		X					X		14
April			X	X	X					X	X	X			X				X						X			X		X	X	X						X		X	X	X		X		X	X	X	20
May			X		X						X		X		X						X				X			X	X	X		X						X						X		X	X	X	16
June				X	X					X	X		X		X					X					X				X	X		X						X		X				X		X		X	16
July				X	X		X		X	X		X				X							X					X	X	X		X				X		X		X	X							X	16
August				X						X											X							X										X											5
September				X										X							X																	X											4
Grand Total	**3**	**1**	**3**	**5**	**5**	**1**	**1**	**2**	**4**	**5**	**5**	**1**	**2**	**1**	**4**	**1**	**3**	**2**	**1**	**2**	**3**	**5**	**2**	**1**	**3**	**2**	**5**	**4**	**4**	**4**	**2**	**4**	**3**	**3**	**4**	**2**	**5**	**6**	**1**	**4**	**2**	**5**	**3**	**3**	**1**	**3**	**4**	**4**	**144**

CORE SITE TOXICITY

The Coalition will conduct monitoring for toxicity to *Ceriodaphnia dubia*, *Pimephales promelas*, and *Selenastrum capricornutum* based on the toxicity of the chemicals applied within the subwatershed each month. If no pesticides causing toxicity are identified during the PEP process, the Coalition proposes reduced toxicity monitoring (Attachment A and B).

CORE SITE METALS

The monitoring schedule for boron, copper, and zinc is determined through the PEP process and/or current management plans, see Attachment A for schedule. 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 303(d) list for that site or immediate downstream waterbody,
2. Adequately characterized for that site,
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 metals arsenic, cadmium, lead, molybdenum, or nickel, or selenium on the 2012 California 303(d) List of Water Quality Limited Segments.

There is a TMDL for selenium discharges on the west side of the San Joaquin River basin and a TMDL for boron for the San Joaquin River segment between the Merced and Tuolumne Rivers. The boron TMDL 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. 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 program 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).

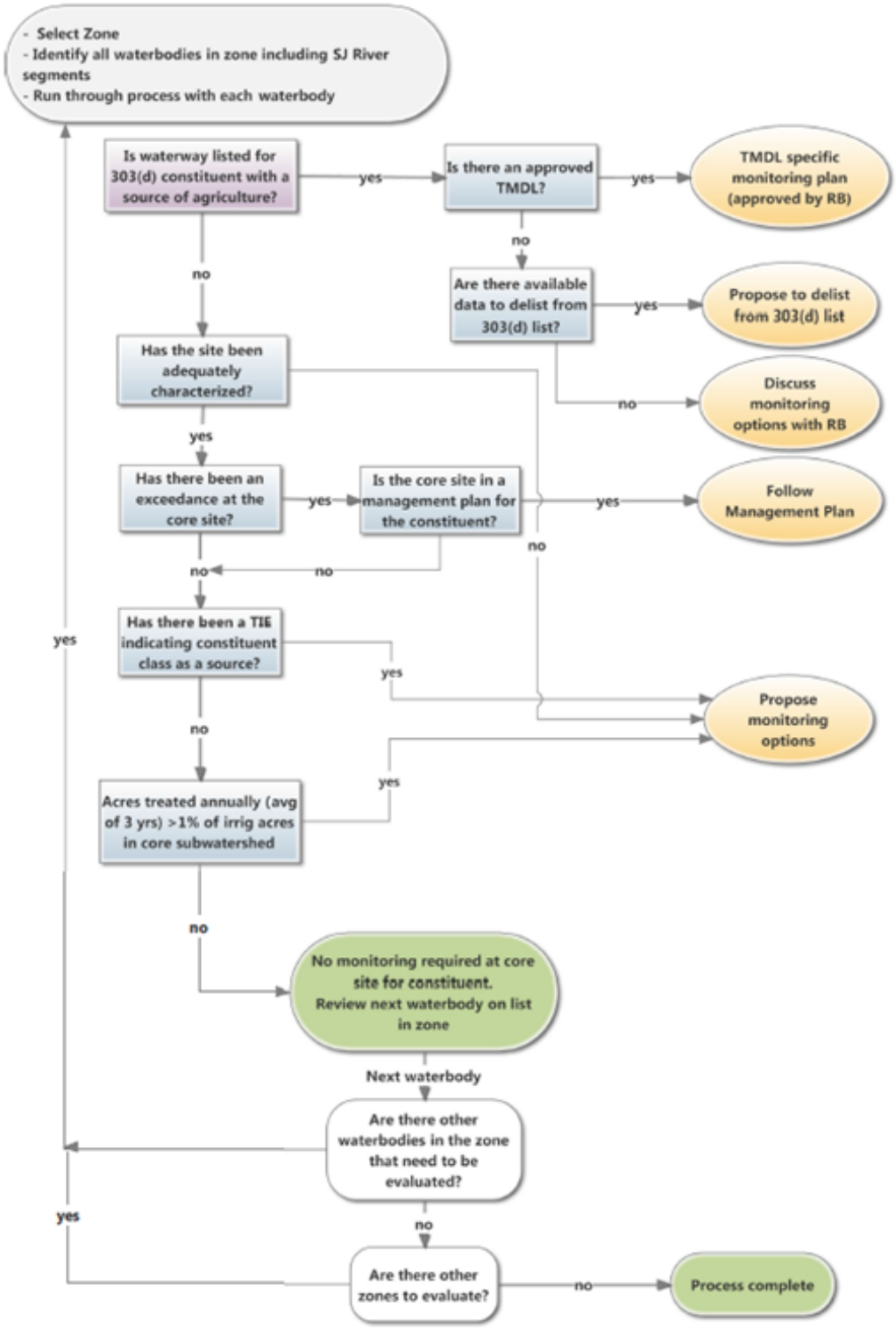
Decision 4. No monitoring is necessary (adequately characterized at the site).

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 monitor the total fraction for arsenic, boron, molybdenum, and selenium and only the dissolved fraction for cadmium, copper, lead, nickel, and zinc. The analysis for each Core site below includes rational for metals monitoring.

Figure 3. ESJWQC flowchart for the Core site metals monitoring strategy; boron, copper and zinc are assessed through the PEP.



Dry Creek @ Church St

Dry Creek @ Church St is the Core site in Zone 1 (approved July 24, 2017). The Coalition characterized the concentration of metals at Dry Creek @ Wellsford Rd and results are being transferred to Dry Creek @ Church St. 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. The decision to monitor for metals during the 2018 WY is outlined in Table 12 and the rationale is discussed below.

Table 12. Results of the flowchart analysis for Dry Creek @ Church St.
"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	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
6	Acres treated > 1%?	No	No	No	No	No	No
Monitoring Decision							
1	TMDL-specific monitoring						
2	Propose to delist from 303(d) list						
3	Monitoring according to management plan						
4	Propose monitoring plan in MPU analysis below						
5	No monitoring during the 2018 WY	X	X	X	X	X	X

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 15). 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 at Dry Creek @ Wellsford Rd.

Lead (Pb) has been monitored at the site since 2006. 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 2018 WY.

Table 13. Dry Creek @ Wellsford Rd site subwatershed dissolved and total metals summary of 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
2012	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0
2014 WY	4	4	0	4	0	4	4	0	1
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.

Prairie Flower Drain @ Crows Landing Rd

Prairie Flower Drain @ Crows Landing Rd is the Core site in Zone 2 for the 2018 WY. The decisions to monitor for metals during the 2018 WY at Prairie Flower Drain @ Crows Landing Rd are outlined in Table 14 and discussed below. A summary of the number of events metals that were monitored from 2006 through the 2015 WY and percentages of any exceedances are listed in Table 15.

Table 14. Results of the flowchart analysis for Prairie Flower Drain @ Crows Landing 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	No	Yes	No	No
4	Is waterbody in a management plan for constituent?	No	No	No	Yes	No	No
5	Has there been a TIE indicating the constituent class as causal agent?	No	No	No	No	No	No
6	Acres treated > 1%?	No	No	No	No	No	No
Monitoring Decision							
1	TMDL-specific monitoring						
2	Propose to delist from 303(d) list						
3	Monitoring according to management plan						
4	Propose monitoring plan in MPU analysis below						
5	No monitoring during the 2018 WY	X	X	X	X	X	X

Monitoring Decision #5 – No Monitoring

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

The Coalition monitored for cadmium (Cd), lead (Pb), 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 15). The Coalition determined that monitoring is not necessary for cadmium, lead, nickel, molybdenum, and selenium because they are neither applied by agriculture nor impairing water quality at Prairie Flower Drain @ Crows Landing Rd.

Arsenic was monitored at the site from 2006 through 2008 and in 2011 and 2014. An exceedance of the WQTL for arsenic (WQTL 10 µg/L) occurred in June 2007 with a concentration of 12 µg/L. This is the only exceedance of the WQTL to occur within the subwatershed; therefore, no management plan was initiated. Since arsenic 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 arsenic during the 2018 WY.

Molybdenum (Mo) has been monitored at the site since 2011. Exceedances of the WQTL occur frequently. Of 30 samples collected, 22 samples resulted in an exceedance. Since molybdenum is not applied by agriculture there is no way to differentiate months of potential risk for water quality impairments caused by this metal, if any. Future monitoring will be determined in coordination with Regional Board staff based on the preliminary analysis of sources provided by the ESJWQC on March 23, 2016. Monitoring for molybdenum is not currently scheduled for the 2018 WY.

Table 15. Prairie Flower Drain @ Crows Landing Rd site subwatershed dissolved and total metals summary of sample counts.

Metals were monitored at the site through the 2015 WY.

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	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0
2011	8	8	8	8	8	8*	12	12	12
2012	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0
2014 WY	4	4	0	4	0	12	4	0	4
2015 WY	0	0	0	0	0	10	0	0	0
Total Samples Collected	**33**	**12**	**29**	**12**	**29**	**30**	**16**	**33**	**33**
Total Exceedances	**1**	**0**	**0**	**0**	**0**	**22**	**0**	**0**	**0**
% Exceedances	**3%**	**0%**	**0%**	**0%**	**0%**	**73%**	**0%**	**0%**	**0%**

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

Highline Canal @ Hwy 99

Highline Canal @ Hwy 99 is the Core site in Zone 3. The decisions to monitor for metals at Highline Canal @ Hwy 99 during the 2018 WY are outlined in Table 16 and discussed below. A summary of the number of events during which metals were monitored through May of the 2017 WY, and percentages of any exceedances are listed in Table 17.

Table 16. Results of the flowchart 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
6	Acres treated > 1%?	No	No	No	No	No	No
Monitoring Decision							
1	TMDL-specific monitoring						
2	Propose to delist from 303(d) list						
3	Monitoring according to management plan						
4	Propose monitoring plan in MPU analysis below						
5	No monitoring during the 2018 WY	X	X	X	X	X	X

Monitoring Decision #5 - No monitoring

Arsenic, Cadmium, Molybdenum, Nickel, and Selenium

The Coalition monitored for arsenic, cadmium, nickel, and selenium from 2006 through 2008, 2011, and during the 2014 WY, and for molybdenum 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 lead management plan was approved for completion on March 25, 2016 due to improved water quality in the 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 summary of 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 new Core site in Zone 4 for the 2018 WY (approved July 24, 2017). The decisions to monitor for metals at Merced River @ Oakdale Rd during the 2018 WY 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 flowchart analysis for Merced River @ Oakdale 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?	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
6	Acres treated > 1%?	No	No	No	No	No	No
Monitoring Decision							
1	TMDL-specific monitoring						
2	Propose to delist from 303(d) list						
3	Monitoring according to management plan						
4	Propose monitoring plan in MPU analysis below						
5	No monitoring during the 2018 WY	X	X	X	X	X	X

Monitoring Decision #5 – No Monitoring

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

The Coalition monitored for arsenic, cadmium, nickel, and selenium from 2006 through 2008, 2011, and 2014, and for molybdenum 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 at Merced River @ Santa Fe Dr.

Lead

The lead management plan was approved for completion on December 4, 2015 due to improved water quality in the 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 summary of 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%**

Duck Slough @ Gurr Rd

Duck Slough @ Gurr Rd is the Core site in Zone 5 for the 2018 WY. The decisions to monitor for metals at Duck Slough @ Gurr Rd during the 2018 WY are outlined in Table 20 and discussed below. A summary of the number of events where metals were monitored and percentages of any exceedances are listed in Table 21.

Table 20. Results of the flowchart 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
6	Acres treated > 1%?	No	No	No	No	No	No
Monitoring Decision							
1	TMDL-specific monitoring						
2	Propose to delist from 303(d) list						
3	Monitoring according to management plan						
4	Propose monitoring plan in MPU analysis below						
5	No monitoring during the 2018 WY	X	X	X	X	X	X

Monitoring Decision #5 - No monitoring

Arsenic, Cadmium, Molybdenum, Nickel, and Selenium

The Coalition determined that monitoring is not necessary during the 2018 WY. Arsenic, cadmium, selenium, nickel, and molybdenum are not applied by agriculture and are not impacting water quality. The Coalition monitored for arsenic, cadmium, nickel, and selenium from 2006 through 2009, 2011, and 2014, and for molybdenum in 2008, 2009, 2011, and 2014; no exceedances of the WQTLs for any of these constituents occurred (Table 21).

Lead

The Coalition received approval for the completion of the management plan for lead on March 25, 2016. Therefore, monitoring for lead will not occur at the Core site during the 2018 WY.

Table 21. Duck Slough @ Gurr Rd subwatershed dissolved and total metals monitoring results (2017 WY) and sample counts summaries.

Metals were monitored at the site through May 2017.

Years Samples Collected	Count of Samples								
	As, Total	Cd, Dissolved	Cd, Total	Pb, Dissolved	Pb, Total	Mo, Total	Ni, Dissolved	Ni, Total	Se, Total
1/10/2017	0	0	0	0.16	0	0	0	0	0
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
2010	0	0	0	0	0	0	0	0	0
2011	8	8	8	8	8	8	11	11	10
2012	0	0	0	0	0	0	0	0	0
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*	2	0	0	0	0
2017 WY	0	0	0	1	1	0	0	0	0
Total Samples Collected	**45**	**17**	**34**	**36**	**46**	**17**	**21**	**38**	**37**
Total Exceedances	**3**	**0**	**0**	**1**	**4**	**0**	**0**	**0**	**0**
% Exceedances	**7%**	**0%**	**0%**	**3%**	**7%**	**0%**	**0%**	**0%**	**0%**

Cottonwood Creek @ Rd 20

Cottonwood Creek @ Rd 20 is the Core site in Zone 6 for the 2018 WY. The decisions to monitor for metals at Cottonwood Creek @ Rd 20 during the 2018 WY 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 flowchart 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
6	Acres treated > 1%?	No	No	No	No	No	No
Monitoring Decision							
1	TMDL-specific monitoring						
2	Propose to delist from 303(d) list						
3	Monitoring according to management plan						
4	Propose monitoring plan in MPU analysis below						
5	No monitoring during the 2018 WY	X	X	X	X	X	X

Monitoring Decision #5 - No monitoring

Arsenic, Cadmium, Molybdenum, Nickel, and Selenium

The Coalition monitored for arsenic, cadmium, molybdenum, nickel, and selenium, at various times from 2006 through 2013; no exceedances of the WQTLs occurred. The Coalition determined monitoring is not necessary during the 2018 WY since arsenic, cadmium, molybdenum, nickel, and selenium are neither applied nor impacting water quality.

Lead

The Coalition received approval to complete the lead management plan on December 4, 2015. Therefore, monitoring for lead will not occur at the Core site during the 2018 WY.

Table 23. Cottonwood Creek @ Rd 20 subwatershed dissolved and total metals monitoring results (2017 WY) and sample counts summaries.

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%**

MONITORING AT REPRESENTED SITES

The Coalition determines when to conduct MPM based on months of past exceedances and months of highest use when discharges have with 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 an associated Core site (Attachment B of the Order, Page 4). Table 24 includes the Core site for each zone and the associated Represented sites. The monitoring schedule for Represented sites, including pesticides, applied metals, and toxicity, was developed utilizing monitoring results from Core and Represented sites through May 2017 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 2017 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.
3. An exceedance of a pesticide, applied metal, or toxicity occurred at the Represented site during the 2017 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 depicts the monitoring strategy for Represented sites.

Table 25 lists the exceedances that occurred at Core and Represented sites during the 2017 WY through May 2017. Attachment A includes the 2018 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).

Monitoring of ammonia, *E. coli*, field parameters, lead, DDE, arsenic, molybdenum, and nitrate will be determined in coordination with Regional Board staff based on the preliminary analysis of sources provided by the ESJWQC during the 2016 WY (Table 4). Management Plan Monitoring for ammonia, *E. coli*, field parameters, lead, DDE, arsenic, molybdenum, and nitrate is not currently scheduled for the 2018 WY.

Management Plan Monitoring for each site in a management plan is discussed in the sections below and includes 1) a discussion of management plan constituents (pesticides, applied metals, or toxicity) that will be monitored, and 2) a determination of monitoring frequency based on past exceedances and months of highest application rates. Based on the PEP, it is possible that constituents in a management plan at the Core site are removed from monitoring. For that reason and for clarification, the Core site within each Zone and the proposed MPM is discussed at the beginning of each Zone section. The rationale for MPM and monitoring at Represented sites is discussed below each Core site evaluation by zone.

To assist with determining months to conduct MPM for pesticides and metals, the Coalition utilizes figures with PUR data and monitoring history since monitoring was first initiated for that constituent. The figures show general patterns of constituent use throughout the years and exceedances throughout

time. Through these figures, the Coalition can anticipate the most conservative months to conduct MPM (Figure 5 through

Figure 28).

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	Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	37.44187	-121.00331
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	Unnamed Drain @ Hogin Rd	535XUDAHR	37.43120	-120.99475
2	Represented	Westport Drain @ Vivian Rd	535XWDAVR	37.53682	-121.04861
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

Figure 4. ESJWQC flowchart for the monitoring strategy at Represented sites.

Table 25. 2017 WY exceedances of the WQTL for pesticides, metals, and toxicity.
Data from October 2016 through May 2017 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	Methomyl, 0.52 µg/L	*C. dubia*, % Survival	*P. promelas*, % Survival	*S. capricornutum*, Toxicity, % Growth
2	Hatch Drain @ Tuolumne Rd	1/10/2017	Represented	MPM						53
	Hatch Drain @ Tuolumne Rd	5/9/2017	Represented	MPM						29
	Hilmar Drain @ Central Ave	4/11/2017	Represented	MPM						61
	Lateral 5 ½ @ South Blaker Rd	12/9/2016	Core	NM, High TSS 2-M						21
	Lateral 5 ½ @ South Blaker Rd	1/10/2017	Core	NM, High TSS 1-P						37
	Lateral 5 ½ @ South Blaker Rd	4/11/2017	Core	NM						17
	Lateral 5 ½ @ South Blaker Rd-FD[2]	4/11/2017	Core	NM						25
	Prairie Flower Drain @ Crows Landing Rd	12/9/2016	Represented	MPM						80
	Prairie Flower Drain @ Crows Landing Rd	1/10/2017	Represented	MPM						18
	Prairie Flower Drain @ Crows Landing Rd	5/9/2017	Represented	MPM				0		
3	Highline Canal @ Hwy 99	1/10/2017	Core	NM, MPM, High TSS 1-P	10 (8.64)					
	Highline Canal @ Hwy 99	2/14/2017	Core	NM, MPM	18 (11.20)		0.69			
	Highline Canal @ Hwy 99	3/14/2017	Core	NM, MPM	8.2 (6.92)					
	Highline Canal @ Hwy 99- FD[2]	3/14/2017	Core	NM, MPM	8.3 (6.76)					
	Mustang Creek @ East Ave	10/29/2016	Represented	MPM	23 (9.7)					
	Mustang Creek @ East Ave	1/10/2017	Represented	NM, MPM	13 (8.64)					
4	Canal Creek @ West Bellevue Rd	12/9/2016	Core	NM, Non-contiguous, High TSS 2-M	34 (16.9)			60	0	88
	Canal Creek @ West Bellevue Rd	1/10/2017	Core	NM, High TSS 1-P	4.1 (3.38)					
	Howard Lateral @ Hwy 140	10/18/2016	Represented	MPM	2.2 (1.7)					
	Howard Lateral @ Hwy 140-FD[2]	10/18/2016	Represented	MPM	2.3 (1.7)					
	Howard Lateral @ Hwy 140	1/10/2017	Represented	MPM, Non-contiguous	4.4 (3.74)					
	Howard Lateral @ Hwy 140	2/14/2017	Represented	MPM	4.1 (4.09)					
	Livingston Drain @ Robin Ave	12/9/2016	Represented	MPM	5.1 (3.6)					
	Livingston Drain @ Robin Ave	1/10/2017	Represented	MPM	4 (1.87)					
	Livingston Drain @ Robin Ave	3/14/2017	Represented	MPM	2.5 (2.26)					
5	Deadman Creek @ Gurr Rd	1/10/2017	Represented	NM, MPM	6.7 (4.95)					

	Deadman Creek @ Hwy 59	1/10/2017	Represented	NM	7.1 (4.61)					
	Miles Creek @ Reilly Rd	1/10/2017	Core	NM, MPM, High TSS 1-P	5.2 (4.44)					
	Miles Creek @ Reilly Rd	5/9/2017	Core	NM, MPM		0.87		0		
6	Ash Slough @ Ave 21	1/10/2017	Represented	MPM	3.9 (2.06)					
	Berenda Slough along Ave 18 ½	3/14/2017	Represented	MPM	5.7 (2.83)					
	Berenda Slough along Ave 18 ½	4/11/2017	Represented	MPM	4.3 (2.1)					
	Cottonwood Creek @ Rd 20	4/11/2017	Represented	MPM	4.5 (2.3)					
	Dry Creek @ Rd 18	1/10/2017	Core	NM, MPM, High TSS 1-P	11 (3.02)					
	Dry Creek @ Rd 18	2/14/2017	Core	NM, MPM	13 (10.46)					
	Dry Creek @ Rd 18	3/14/2017	Core	NM, MPM	8.4 (6.92)					
	Dry Creek @ Rd 18	4/11/2017	Core	NM, MPM	9.1 (2.8)					
	Dry Creek @ Rd 18	5/9/2017	Core	NM, MPM	5.0 (1.7)					
	Dry Creek @ Rd 18-FD[2]	5/9/2017	Core	NM, MPM	4.5 (1.7)					

[1] Metal WQTL variable depending on hardness; calculated WQTL is listed in parenthesis.

[2] FD-Field duplicate; exceedance of the WQTL occurred only in the field duplicate sample.

ZONE 1 – DRY CREEK @ CHURCH ST

Dry Creek @ Church St is the Core site in Zone 1 in the 2018 WY. Dry Creek @ Church St replaces Dry Creek @ Wellsford Rd which was previously monitored by the Coalition since 2004.

Dry Creek @ Church St is in a management plan for DO, pH, and *E. coli*; no MPM is scheduled. Monitoring for DO, pH, and *E. coli* will occur monthly during the 2018 WY in accordance with the Core site monitoring strategy.

The management plan constituents for sites in Zone 1 are listed in Table 26. Monitoring for management plan constituents will occur according to the schedule provided in Attachment A.

Table 26. Zone 1 management plan constituents and 2017 WY exceedances.
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.

SITE NAME	DO	SC	pH	*E. COLI*	AMMONIA	DIURON
Dry Creek @ Church St	**M**		**M**	**M**		
Mootz Drain downstream of Langworth Pond	M	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 2017 WY, the Coalition conducted MPM for diuron in December 2016 and February 2017, no exceedances occurred. The 2017 WY was the third consecutive year with no exceedances of the diuron WQTL; therefore, the Coalition will petition for the completion of the management plan by the end of 2017.

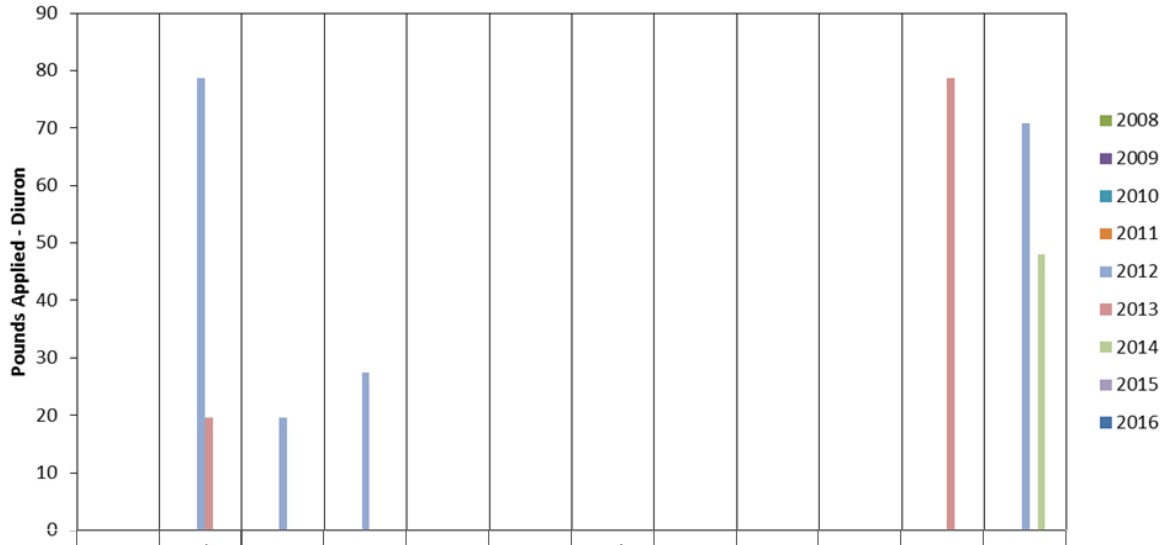
Management Plan Monitoring

Diuron

The Coalition reviewed PUR data from 2008 through December 2016. No applications of diuron have occurred within the subwatershed since December 2014 (Figure 5). The Coalition monitored for diuron in February and December for the past three years and no exceedances occurred.

Due to three years monitoring with no exceedances, the Coalition will petition for the completion of the diuron management plan in 2017. The Coalition will continue to conduct MPM in December and February of the 2018 WY until approval to complete the management plan is received.

Figure 5. Mootz Drain monitoring history and diuron applications.
Shaded cells represent months of past monitoring. Black cells depicts months in which exceedances occurred (upstream and downstream of Langworth Pond). Hatched cells indicate the site was dry. The PUR data are through December 2016.



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 WY	
Total use (2008-2016)	0	98	20	27	0	0	0	0	0	0	79	119
% Total (2008-2016)	***0%***	***29%***	***6%***	***8%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***23%***	***35%***
Total Use (2014-2016)	0	0	0	0	0	0	0	0	0	0	0	48
% Total (2014-2016)	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***100%***

Monitoring Based on Core Site Exceedances

Dry Creek @ Church St, based on water quality results from Dry Creek @ Wellsford Rd, is not in any management plans for applied constituents or toxicity and no exceedances of any constituents occurred during the 2017 WY. Based on the Coalition's monitoring strategy, no additional monitoring is required at Mootz Drain downstream of Langworth Pond during the 2018 WY.

ZONE 2 – PRAIRIE FLOWER DRAIN @ CROWS LANDING RD

Prairie Flower Drain @ Crows Landing Rd is the Core site in Zone 2 in the 2018 WY and replaces the Lateral 5 ½ @ South Blaker Rd Core site which was monitored in the 2016 and 2017 WYs. Exceedances of the WQTLs for DO and SC, and toxicity to *C. dubia* and *S. capricornutum* occurred in samples collected during the 2017 WY (up through May).

Prairie Flower Drain @ Crows Landing Rd is in a management plan for DO, pH, SC, *E. coli*, ammonia, nitrate, arsenic, molybdenum, chlorpyrifos, *C. dubia* toxicity, and *S. capricornutum* toxicity. The chlorpyrifos management plan was reinstated due to exceedances that occurred in March through July of the 2015. In the 2018 WY, the Coalition will conduct MPM for the following constituents at Prairie Flower Drain @ Crows Landing Rd:

- Chlorpyrifos (March through August)
- *C. dubia* toxicity (March through August)
- *S. capricornutum* toxicity (October, December through August)

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

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

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 2017 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 2017 WY and the 2018 WY monitoring proposal are provided below.

Selenastrum capricornutum toxicity

Samples collected from Hatch Drain @ Tuolumne Rd were toxic to *S. capricornutum* nine times from 2008 through May of 2017 (Table 28). During the 2017 WY, toxicity to algae occurred in samples collected on January 10, 2017 (53% growth compared to control) and May 9, 2017 (29% growth). Toxicity Identification Evaluations (TIEs) were conducted on six of the nine 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), and the other three TIEs were inconclusive including a TIE that was conducted on the May 9, 2017 sample.

The Coalition began MPM 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 2018 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	Pending	Pending
Overall Tally	**2**	**1**	**1**	**2**	**2**	**1**

Hyalella azteca sediment toxicity

Sediment toxicity last occurred in samples collected in March and September of 2014. The Coalition conducted MPM from 2015 through the 2017 WY during months of past toxicity. If no sediment toxicity occurs in samples collected during the 2017 WY, the Coalition will petition for the completion of the management plan due to three years with no exceedances.

During the 2018 WY, the Coalition will conduct MPM for *H. azteca* sediment toxicity in March and September or until the management plan is approved for completion.

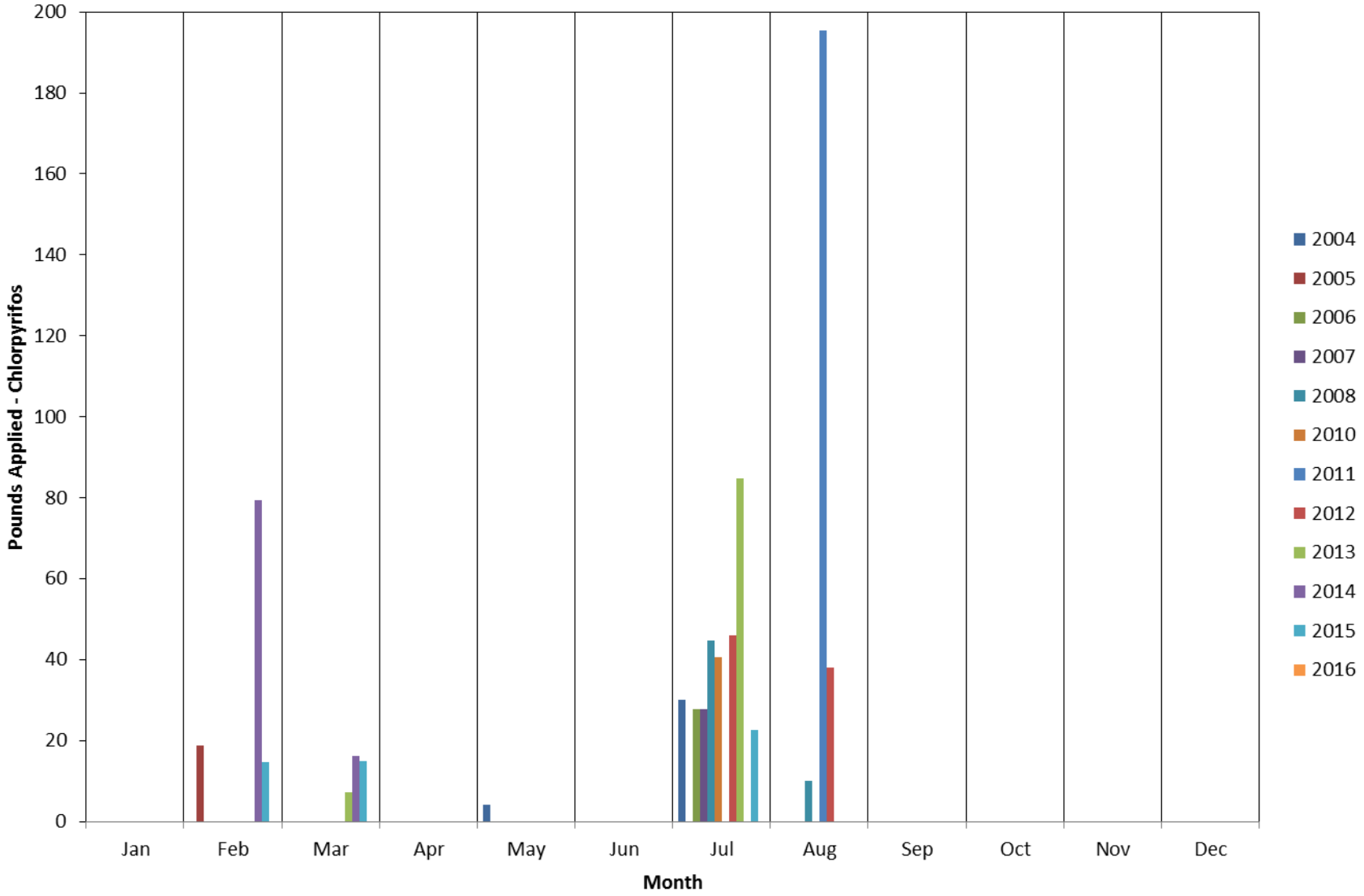
Monitoring Based on Core Site Exceedances

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 2017 WY, samples collected at the Core site 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 2007 through 2016 indicate that use within the subwatershed is minimal and occurs during the months of February, March, July, and August (Figure 6). Based on monitoring history results and declining chlorpyrifos use within the subwatershed, the Coalition will not monitor for chlorpyrifos at Hatch Drain @ Tuolumne Rd in the 2018 WY.

Figure 6. Hatch Drain @ Tuolumne Rd applications of chlorpyrifos (2004-2016).



Ceriodaphnia dubia toxicity

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. Therefore, monitoring for *C. dubia* is not scheduled in the 2018 WY.

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 2017 WY, the Coalition conducted MPM for toxicity to *S. capricornutum* and sediment toxicity to *H. azteca.* Approval to complete the *H. azteca* sediment toxicity management plan was received on April 14, 2017.

Management Plan Monitoring

Selenastrum capricornutum toxicity

S. capricornutum toxicity occurred in samples collected from Hilmar Drain @ Central Ave in July (2006), April (2007, 2008, and 2017), and September (2008, 2015, and 2016). Algae toxicity occurred in samples collected in April 2017 resulting in 61% growth compared to the control; no TIE was conducted. TIEs were initiated on three toxic samples collected between 2006 and 2017; however, all results were inconclusive due to non-persistent toxicity. Both the copper and diuron management plans were approved for completion on March 25, 2016 and are not associated with *S. capricornutum* toxicity.

The Coalition initiated MPM for *S. capricornutum* in 2013 and will continue through the 2017 WY during the months of April, July and September (Table 29).

Table 29. 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	1	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	Pending	Pending
Overall Tally	**3**	**2**	**3**

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 2017 WY, samples collected at the Core site

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 subwatershed. During the 2018 WY, monitoring for chlorpyrifos is not scheduled to occur.

Ceriodaphnia dubia toxicity

Samples collected at Hilmar Drain @ Central Ave were analyzed for toxicity to *C. dubia* from February through September 2005, March through September 2006, and February through September in 2008. The Coalition analyzed 32 samples and no toxicity occurred. Based on the completion of the chlorpyrifos management plan at Hilmar Drain @ Central Ave and monitoring history, the Coalition will not monitor for toxicity to *C. dubia* in the 2018 WY.

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 2017 WY, the Coalition conducted MPM for chlorpyrifos and toxicity to *S. capricornutum*. A summary of the monitoring results through May of the 2017 WY and the 2018 WY monitoring proposal are provided below.

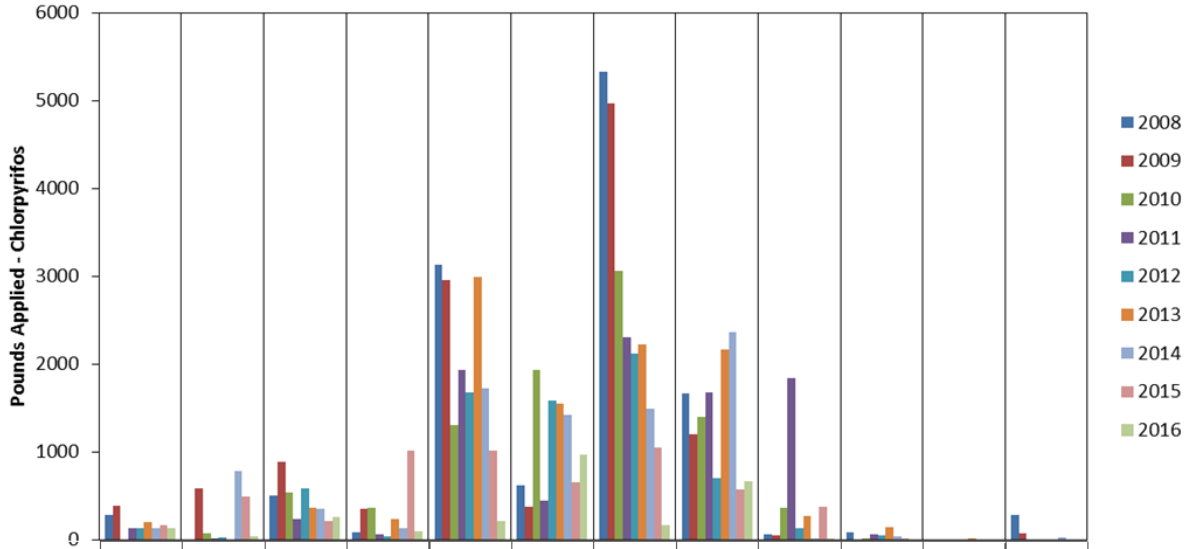
Management Plan Monitoring

Chlorpyrifos

Exceedances of the WQTL for chlorpyrifos occurred in samples collected in July 2009, April 2010, July 2010, and July 2014 (Figure 7). Applications of chlorpyrifos between May and August have decreased substantially over the past eight years (2008 through 2016; Figure 7). Pesticide Use Report data from 2016 indicate the greatest amount of applications of chlorpyrifos occurred in June (966 pounds) and August (662 pounds); which is small compared to previous years. The Coalition conducted monitoring for chlorpyrifos in July and August from 2014 through 2017 and no exceedances occurred.

If no chlorpyrifos exceedance occurs during the 2017 WY, the Coalition will have completed three years of monitoring with no exceedances of the WQTL for chlorpyrifos and will petition for the completion of the chlorpyrifos management plan. During the 2018 WY, the Coalition will conduct MPM for chlorpyrifos in July unless the management plan is approved for completion prior to July 2018.

Figure 7. Lateral 2 ½ near Keyes Rd monitoring history and chlorpyrifos applications.
Shaded cells represent months of past monitoring. Black cells depicts months in which exceedances occurred. Hatched cells indicate the site was dry and striped cells indicate monitoring is scheduled to occur during the 2017 WY. The PUR data are through December 2016.



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 WY	
Total Use (2008-2016)	1,564	2,007	3,937	2,385	16,940	9,546	22,711	12,422	3,109	392	20	391
% Total (2008-2016)	***2%***	***3%***	***5%***	***3%***	***22%***	***13%***	***30%***	***16%***	***4%***	***1%***	***0%***	***1%***
Total Use (2014-2016)	433	1,319	817	1,249	2,950	3,050	2,706	3,594	398	42	0	30
% Total (2014-2016)	***3%***	***8%***	***5%***	***8%***	***18%***	***18%***	***16%***	***22%***	***2%***	***0%***	***0%***	***0%***

Selenastrum capricornutum toxicity

The Coalition collected samples to test for toxicity to *S. capricornutum* from 2008 through 2010, and during the 2014 WY and 2015 WY for Normal Monitoring. Samples analyzed in May (2009 and 2016), June (2015), July (2015 and 2016), and August (2016) were toxic to *S. capricornutum*. TIEs were conducted on two of the six samples and 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 2018 WY, MPM for toxicity to *S. capricornutum* is scheduled to occur from May through August 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 2017 WY, samples collected at the Core site were toxic to *C. dubia* and *S. capricornutum*. Lateral 2 ½ near Keyes Rd is in a management plan for chlorpyrifos and toxicity to *S. capricornutum* and monitoring will occur according to the schedule discussed above.

***Ceriodaphnia dubia* toxicity**

Samples collected at Lateral 2 ½ near Keyes Rd were analyzed for toxicity to *C. dubia* in October and November of 2008, from April through October 2009, and March through October 2010. The Coalition collected and analyzed 17 samples and no toxicity occurred. Based on recent chlorpyrifos monitoring results, indicating no impairment, the Coalition will not monitor for toxicity to *C. dubia* in the 2018 WY.

Lateral 5 ½ @ South Blaker Rd

Lateral 5 ½ @ South Blaker Rd is a Represented site in Zone 2. The Coalition conducted two years of monitoring for dimethoate, diuron, and toxicity to *C. dubia*, *P. promelas*, and *S. capricornutum* from 2014 through the 2015 WY based on exceedances at the Prairie Flower Drain @ Crows Landing Rd Core site. Toxicity to *S. capricornutum* occurred but diuron and dimethoate were not detected in samples collected. The site rotated to a Core site for the 2016 and 2017 WY where monitoring occurred monthly for all constituents. Exceedances of the WQTL for nitrate + nitrite as N, and toxicity to *S. capricornutum* occurred frequently during the 2016 and 2017 WYs, initiating management plans for both constituents. A summary of monitoring results through May of the 2017 WY and the 2018 WY monitoring proposal are provided below.

Management Plan Monitoring

Nitrate + Nitrite as N

Monitoring for nitrate + nitrite as N occurred monthly during the 2017 WY (June through September results pending). During the 2017 WY, exceedances of the WQTL for nitrate + nitrite as N occurred in October, November, December, January, March, and April; results ranged from 14 to 30 mg/L.

During the 2018 WY, monitoring for nitrate + nitrite as N is not scheduled. The Coalition does not conduct MPM for nutrients.

***Selenastrum capricornutum* toxicity**

The Coalition collected samples to test for toxicity to *S. capricornutum* from 2013 through May 2017. Samples collected during the months of October (2013, 2014), December (2013, 2016), January (2017), February (2016), March (2014, 2015, 2016), April (2014, 2017), May (2016), June (2016), and September (2016) were toxic to *S. capricornutum*. Of the 14 toxic samples, eight TIEs were conducted and three concluded metals and non-polar organics were the sources of toxicity. Five of the TIEs conducted were inconclusive. Monitoring results from the 2016 and 2017 WYs resulted in no exceedances of either copper or herbicides.

In 2018, the Coalition will initiate Focused Outreach within the Lateral 5 ½ @ South Blaker Rd subwatershed. During the 2018 WY, the Coalition will conduct MPM for *S. capricornutum* toxicity in October, December, January through June, and 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 2017 WY, samples collected at the Core site 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. Due to two years monitoring with no exceedances, no additional monitoring is required in the 2018 WY. The Coalition will reevaluate the status of this constituent in the January 15, 2018 MPU Addendum if exceedances occur between June and September 2017.

Ceriodaphnia dubia toxicity

During the 2015 WY, the Coalition monitored for water column toxicity to *C. dubia* at Lateral 5 ½ @ South Blaker Rd for a second consecutive year due to exceedances at the Prairie Flower Drain @ Crows Landing Rd Core site. Samples were collected in March, June, July, and August in 2014 and 2015, and no toxicity occurred. The site rotated to a Core site during the 2016 and 2017 WY, samples were collected and analyzed monthly for toxicity to *C. dubia*; no toxicity occurred.

In the 2018 WY, no monitoring for toxicity to *C. dubia* is scheduled to occur as the Coalition completed four years of monitoring with no toxicity.

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 2017 WY, the Coalition monitored for diuron for a third consecutive year, based on exceedances at the Prairie Flower Drain @ Crows Landing Rd Core site. The Coalition initiated monitoring for ammonia and nitrate + nitrite as N during the 2017 WY based on exceedances at the Lateral 5 ½ @ South Blaker Rd Core site. Exceedances of the WTQL for nitrate + nitrite as N occurred during the 2017 WY, initiating the management plan in 2018. A summary of monitoring results through May of the 2017 WY and the 2018 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 *S. capricornutum* toxicity. Focused outreach has not been conducted in the site subwatershed; therefore, the Coalition will wait to conduct MPM until 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 2017 WY, samples collected at the Core site 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

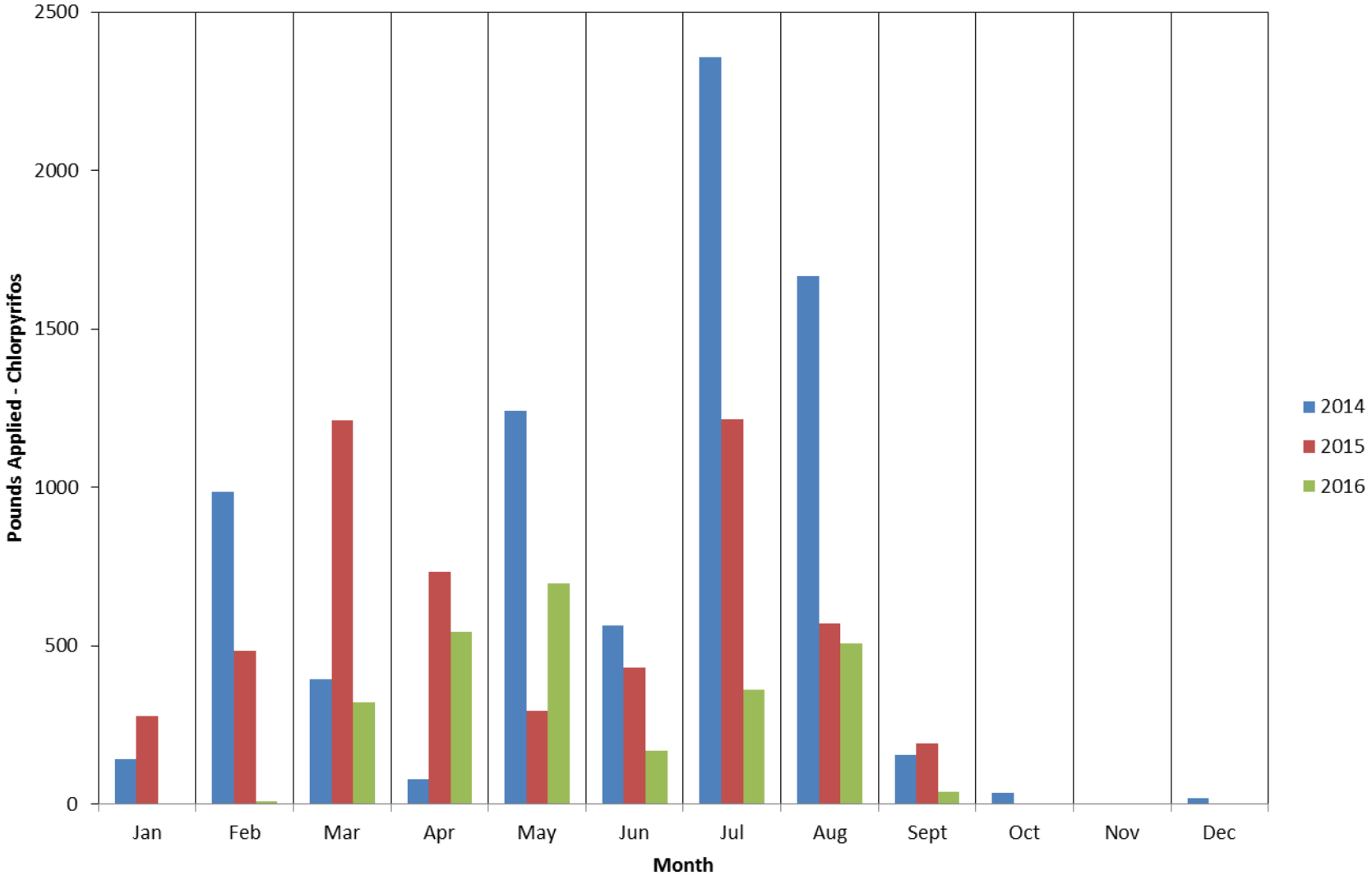
Samples were collected for ammonia in January 2017 based on a single exceedance at the Lateral 5 ½ @ South Blaker Rd Core site. A single exceedance of the WQTL occurred on January 10, 2017 (8.4 mg/L). The Coalition will continue to monitor for ammonia in January of the 2018 WY for a second consecutive year. Exceedances of the ammonium WQTL are likely a result of discharges from dairy facilities.

Chlorpyrifos

Monitoring for chlorpyrifos at Lateral 6 and 7 @ Central Ave has not occurred. Due to exceedances of the WQTL for chlorpyrifos at the Prairie Flower Drain @ Crows Landing Rd Core site during the 2015 WY, the Coalition will initiate monitoring for chlorpyrifos in the 2018 WY. The PUR data, from 2014 through 2016, indicate months of peak chlorpyrifos use occur from February through August; however, in 2016 use of chlorpyrifos declined in all months (Figure 8).

During the 2018 WY, the Coalition will monitor for chlorpyrifos from March through August based on months of peak chlorpyrifos use.

Figure 8. Lateral 6 and 7 @ Central Ave applications of chlorpyrifos (2014-2016).



Ceriodaphnia dubia toxicity

The Coalition monitored for *C. dubia* toxicity in March, April, July, and August for two consecutive years in the 2014 WY and 2015 WY and samples were not toxic. In the 2018 WY, monitoring for water column toxicity to *C. dubia* is not scheduled based on the Coalition's monitoring strategy.

Diuron

In response to algae toxicity occurring at Lateral 6 and 7 @ Central Ave in December (2013 and 2014), the Coalition initiated monitoring for diuron during the 2015 WY to coincide with monitoring for toxicity to *S. capricornutum*. Diuron was not associated with toxic samples collected in December 2014 and January 2015. Monitoring for toxicity to *S. capricornutum* stopped after the 2015 WY. The Coalition monitoring diuron for a second consecutive year during the 2016 WY and a single exceedance of the WQTL occurred in March 2016. The Coalition conducted a third year of monitoring during the 2017 WY from December through March and no exceedances occurred. Additionally, monitoring occurred concurrently with toxicity to *S. capricornutum* monitoring and

During the 2018 WY, monitoring for diuron is not scheduled to occur.

Nitrate + Nitrite as N

Monitoring for nitrate + nitrate as N occurred during the 2017 WY in October, November, February, March, and May through July based on exceedances at the Lateral 5 ½ @ South Blaker Rd Core site. Exceedances of the nitrate WQTL occurred on October 18, 2016 (14 mg/L), February 14, 2017 (32 mg/L), and March 14, 2017 (11 mg/L). The February exceedance was the second exceedance to occur within the subwatershed, triggering the initiation of a management plan in 2018.

During the 2018 WY, monitoring for nitrate + nitrite as N is not scheduled. The Coalition does not conduct MPM for nutrients.

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 2017 WY, the Coalition monitored for toxicity to *C. dubia*, *S. capricornutum*, and sediment toxicity to *H. azteca* for MPM. A summary of monitoring results through May of the 2017 WY and the 2018 WY monitoring proposal are provided below.

Management Plan Monitoring

Ceriodaphnia dubia toxicity

Samples collected from Levee Drain @ Carpenter Rd were tested for toxicity to *C. dubia* monthly in 2012 and 2013. Toxicity occurred in samples collected in February and July of 2013, initiating a management plan in 2014. A TIE was conducted on both of the samples and concluded that ammonia was the cause of toxicity in both samples. Exceedances of the WQTL for ammonia occurred in samples collected from the site in February (17 mg/L) and July (5.4 mg/L) of 2013. Management Plan Monitoring occurred in February and July from the 2014 WY through the 2017 WY and no toxicity occurred (July 2017 results pending); there have also been no exceedances of the ammonia WQTL.

Since the last toxicity in 2013, the Coalition has conducted three years of monitoring with no toxicity to *C. dubia*. During the 2017 WY, the Coalition plans to petition the Regional Board for the completion of the *C. dubia* management plan.

During the 2018 WY, the Coalition will continue to conduct MPM for toxicity to *C. dubia* in February and July or until the Coalition receives approval to complete the *C. dubia* management plan.

***Selenastrum capricornutum* toxicity**

Samples were tested for *S. capricornutum* toxicity monthly in 2012 and 2013. Samples analyzed in February (2013), June (2014), and December (2013) were toxic to *S. capricornutum*. The Coalition conducted MPM from 2014 through 2017 and no toxicity to *S. capricornutum* occurred. Based on improved water quality and three years monitoring with no toxicity, the Coalition will petition for the completion of the *S. capricornutum* management plan in 2017 (pending June 2017 results).

During the 2018 WY, the Coalition will conduct MPM for toxicity to *S. capricornutum* in December, February, and June based on months of past toxicity until approved to complete the management plan is received.

***Hyalella azteca* sediment toxicity**

Sediment toxicity to *H. azteca* occurred at Levee Drain @ Carpenter Rd in March 2012 and March 2014. The Coalition conducted MPM in March of 2015, 2016, and 2017 with no toxicity to *H. azteca*. The Coalition will submit a petition in 2017 to the Regional Board for the completion of the management plan due to three years of monitoring with no toxicity.

During the 2018 WY, the Coalition will conduct MPM for sediment toxicity in March until the Coalition receives approval to complete the management plan.

Monitoring Based on Core Site Exceedances

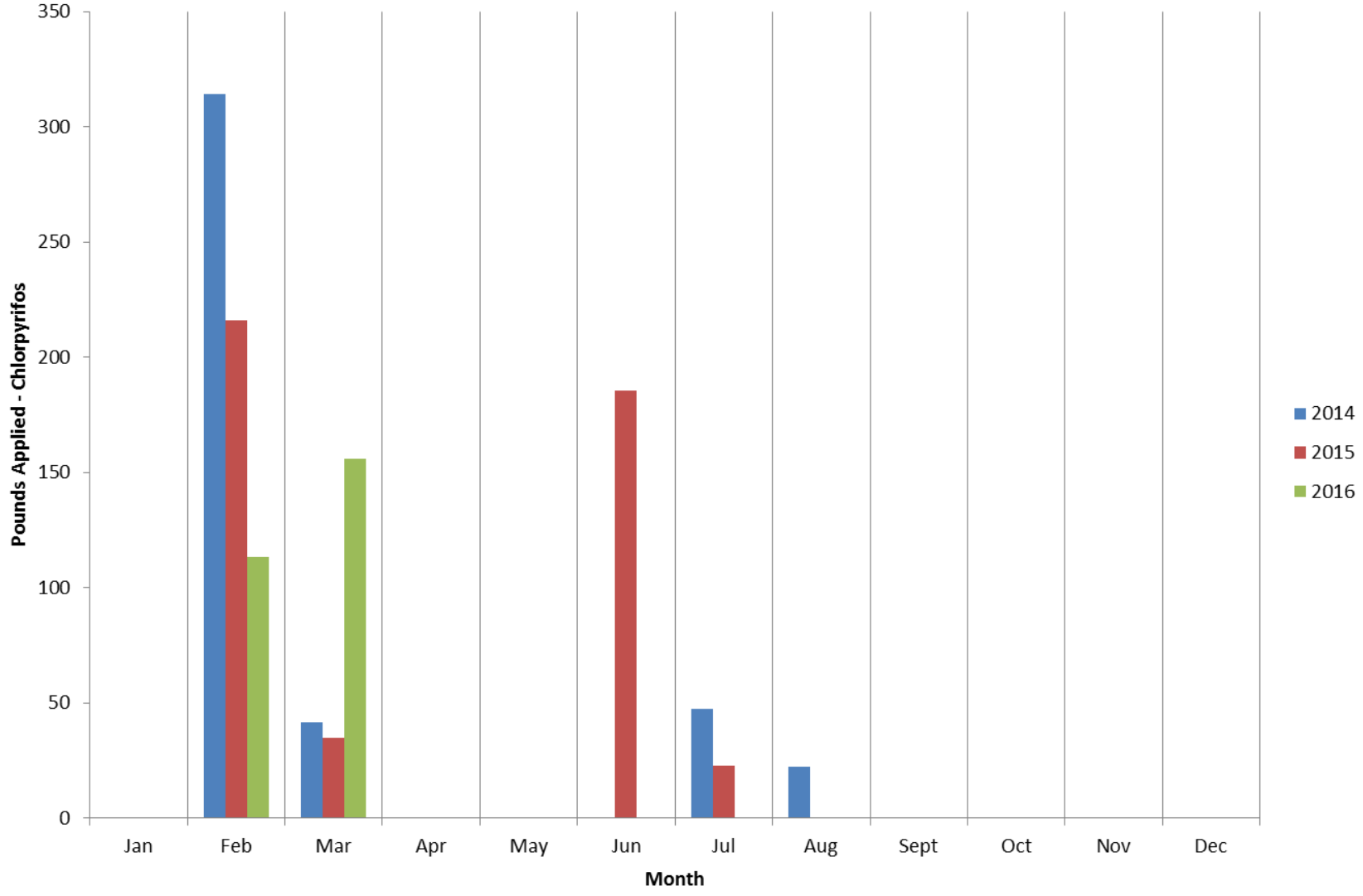
The Zone 2 Core site, Prairie Flower Drain @ Crows Landing Rd, is in a management plan for chlorpyrifos and toxicity to *C. dubia* and *S. capricornutum*. During the 2017 WY, samples collected at the Core site were toxic to *C. dubia* and *S. capricornutum*. Levee Drain @ Carpenter Rd is in a management plan for toxicity to *C. dubia* and *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 occurred. The PUR data for chlorpyrifos applications, from 2014 through 2016, indicate that use within the subwatershed occurs in February, March, June, and July (Figure 9). The amount of chlorpyrifos applied within the subwatershed is minimal and declining with the exception of March. Applications in 2016 were less than 160 lbs in the month of March (month of highest use).

During the 2018 WY, no monitoring for chlorpyrifos is scheduled based on monitoring results and minimal use of chlorpyrifos within the Levee Drain @ Carpenter Rd subwatershed.

Figure 9. Levee Drain @ Carpenter Rd applications of chlorpyrifos (2014-2016).



Lower Stevinson @ Faith Home Rd

Lower Stevinson @ Faith Home Rd is a Represented site in Zone 2. The Coalition conducted two years of monitoring for dimethoate (2014 and 2015 WY) and diuron (2015 and 2016 WY) based on exceedances at the Prairie Flower Drain @ Crows Landing Rd Core site and no exceedances occurred. In addition, the Coalition evaluated Lower Stevinson @ Faith Home Rd for toxicity to *S. capricornutum* during the 2014 and 2015 WY based on toxicity at the Prairie Flower Drain @ Crows Landing Rd Core site. Toxicity to *S. capricornutum* occurred five times during the 2014 and 2015 WY, resulting in the initiation of the management plan in the 2015 WY.

During the 2017 WY, the Coalition monitored 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 2017 WY and the 2018 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 *S. capricornutum* toxicity. 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 2017 WY, samples collected at the Core site 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

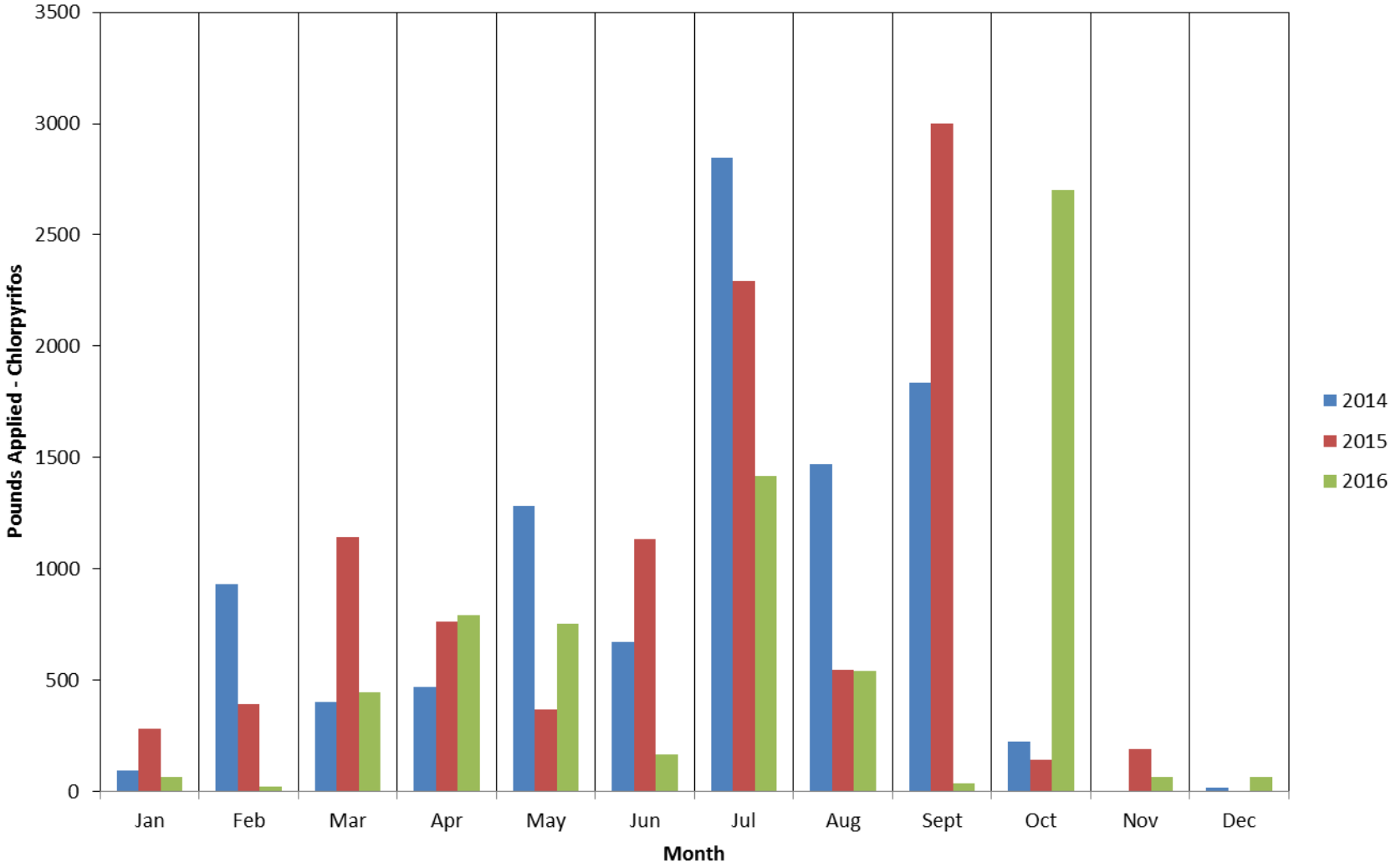
The Coalition monitored for ammonia in January during the 2017 WY and no exceedances of the ammonia WQTL occurred. Monitoring for ammonia will occur in January during the 2018 WY for a second consecutive year.

Chlorpyrifos

The Coalition will initiate monitoring for chlorpyrifos at Lower Stevinson @ Faith Home Rd due to exceedances of the chlorpyrifos WQTL that occurred during the 2015 WY at the Prairie Flower Drain @ Crows Landing Rd Core site (reinstated the management plan for 2016 WY). The PUR data for chlorpyrifos applications in the Lower Stevinson @ Faith Home Rd subwatershed, from 2014 through 2016, indicate that peak use within the subwatershed occurs in July, August, September, and October (Figure 10).

During the 2018 WY, the Coalition will monitor for chlorpyrifos at Lower Stevinson @ Faith Home Rd from April through October based on exceedances at the Prairie Flower Drain @ Crows Landing Rd Core site and months of peak use.

Figure 10. Lower Stevinson @ Faith Home Rd applications of chlorpyrifos (2014-2016).



Ceriodaphnia dubia toxicity

The Coalition monitored for *C. dubia* toxicity in March, April, July, and August for two consecutive years in the 2014 WY and 2015 WY and samples were not toxic. In the 2018 WY, monitoring for water column toxicity to *C. dubia* is not scheduled.

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. The Coalition conducted two years of monitoring for diuron (2015 and 2016 WYs) and three years of monitoring for dimethoate (2014 through 2016) based on exceedances at the Prairie Flower Drain @ Crows Landing Rd Core site. In addition, the Coalition evaluated Unnamed Drain @ Hogin Rd for toxicity to *S. capricornutum* during the 2014 and 2015 WY. No additional toxicity monitoring was necessary during the 2017 WY due to a lack of toxicity in samples collected in the 2014 and 2015 WY.

Management Plan Monitoring

Unnamed Drain @ Hogin Rd is in a management plan for the field parameters, DO and SC; therefore, no MPM is scheduled during the 2018 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 2017 WY, samples collected at the Core site were toxic to *C. dubia* and *S. capricornutum*.

Ammonia

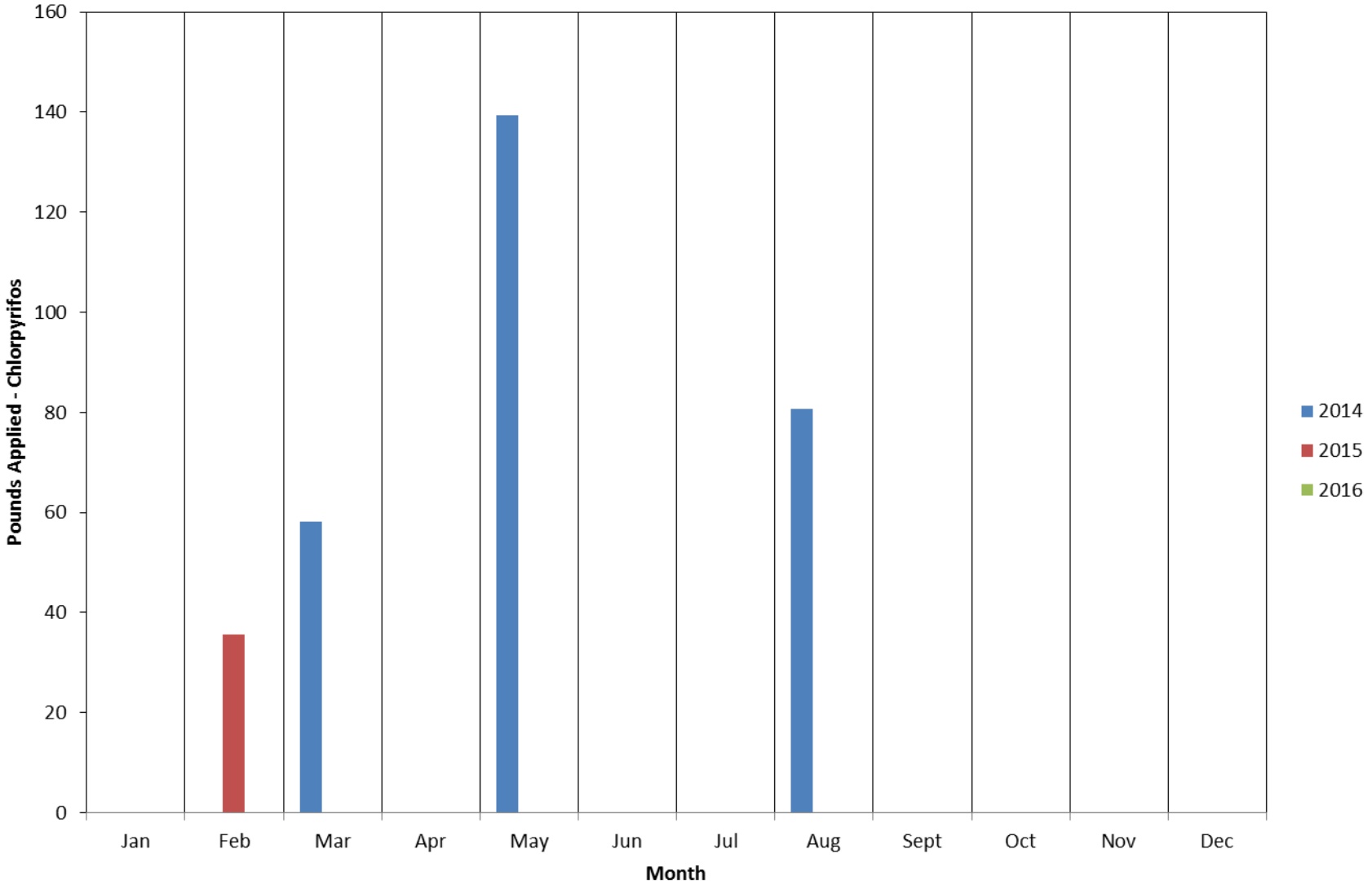
Samples were collected for ammonia in January 2017 based on exceedances at the Lateral 5 ½ @ South Blaker Rd Core site and no exceedance occurred. The Coalition will continue to monitor for ammonia in January of the 2018 WY for a second consecutive year.

Chlorpyrifos

The Coalition will initiate monitoring for chlorpyrifos at Unnamed Drain @ Hogin Rd due to exceedances of the chlorpyrifos WQTL that occurred during the 2015 WY at the Prairie Flower Drain @ Crows Landing Rd Core site (reinstated the management plan for 2016 WY). The PUR data for chlorpyrifos applications, from 2014 through 2016, indicate that use within the subwatershed is declining and no applications occurred in 2016 (Figure 11).

During the 2018 WY, the Coalition will not conduct monitoring for chlorpyrifos at Unnamed Drain @ Hogin Rd due to low to no use of chlorpyrifos in the subwatershed.

Figure 11. Unnamed Drain @ Hogin Rd applications of chlorpyrifos (2014-2016).



Ceriodaphnia dubia toxicity

The Coalition monitored for *C. dubia* toxicity in July and August for two consecutive years in the 2014 and 2015 WYs and no samples were toxic. Based on the Coalition's monitoring strategy, no additional monitoring is required for the 2018 WY.

Nitrate + Nitrite as N

Monitoring for nitrate + nitrite as N occurred during the 2017 WY in October, November, February, and March based on exceedances at the Lateral 5 ½ @ South Blaker Rd Core site. No exceedance of the nitrate WQTL occurred in samples collected from Unnamed Drain @ Hogin Rd. During the 2016 and 2017 WY, additional exceedances occurred at the Core site (Lateral 5 ½ @ South Blaker Rd) for nitrate in the months of November, December, January, April, May, June, July, and September.

Since the Coalition has not monitored Unnamed Drain @ Hogin Rd for nitrates in the irrigation season, the Coalition will continue monitoring for nitrate during months of past exceedances (October, November, February and March) and during the irrigation season (April, May, June, July, and September).

Westport Drain @ Vivian Rd

Westport Drain @ Vivian Rd is a Represented site in Zone 2. Monitoring was initiated at the site in 2007. During the 2017 WY, the Coalition monitored for chlorpyrifos and toxicity to *S. capricornutum* during MPM. Monitoring for chlorpyrifos was discontinued in April 2017 as the management plan was approved for completion on April 14, 2017.

Management Plan Monitoring

Selenastrum capricornutum toxicity

Samples collected from the site were toxic in May 2007 and February and April 2008. Of the three toxic samples, a TIE was initiated on one sample due to less than 50% growth compared to the control. Results from the TIE were inconclusive due to non-persistent toxicity. The Coalition monitored for *S. capricornutum* toxicity in February (2015, 2017), April (2016, 2017), and May (2014 through 2017) for MPM. No toxicity to *S. capricornutum* occurred during MPM in May from 2014 through 2017. Due to three years monitoring with no toxicity, the Coalition will petition for the completion of the *S. capricornutum* management plan in 2017.

The Coalition will continue to monitor for *S. capricornutum* toxicity in April during the 2018 WY. The Coalition will discontinue MPM in February and May due to four years of monitoring with no toxicity to algae (Table 30).

Table 30. Westport Drain @ Vivian Rd toxicity to *S. capricornutum* MPM exceedance tally.

Monitoring Year	Months of MPM		
	February	April	May
2007	NA	NA	1
2008	1	1	0

Monitoring Year	Months of MPM		
	February	April	May
2014	0	Dry	0
2015	0	Dry	0
2016	Dry	0	0
2017	0	0	0
Overall Tally	**1**	**1**	**1**

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 2017 WY, samples collected at the Core site were toxic to *C. dubia* and *S. capricornutum*. Westport Drain @ Vivian Rd is in a management plan for toxicity to *S. capricornutum* and monitoring will occur according to the schedule discussed above.

Chlorpyrifos

On April 14, 2017, the Coalition received approval to complete the management plan for chlorpyrifos in the Westport Drain @ Vivian Rd subwatershed. No additional monitoring is required.

Ceriodaphnia dubia toxicity

Samples collected at Westport Drain @ Vivian Rd were analyzed for toxicity to *C. dubia* from May through September 2007 and January through September 2008; 13 samples were collected and no toxicity occurred. Based on the completion of the chlorpyrifos management plan and monitoring history at the site, the Coalition does not expect water quality to be toxic to *C. dubia*.

During the 2018 WY, the Coalition will not monitor for water column toxicity to *C. dubia.*

ZONE 3 – HIGHLINE CANAL @ HWY 99

Highline Canal @ Hwy 99 remains the Core site in Zone 3 in the 2018 WY. Monitoring was initiated at Highline Canal @ Hwy 99 in 2005. During the 2017 WY, exceedances of the WQTLs for ammonia, dissolved copper, and methomyl occurred.

Highline Canal @ Hwy 99 is in a management plan for DO, pH, SC, *E. coli*, ammonia, copper, chlorpyrifos, and *S. capricornutum* toxicity. In the 2018 WY, the Coalition will conduct MPM for the following constituents at Highline Canal @ Hwy 99:

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

The management plan constituents for sites in Zone 3 are listed in Table 31. Monitoring for management plan constituents will occur according to the schedule provided in Attachment A.

Table 31. Zone 3 management plan constituents and 2017 WY exceedances.
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 2017 WY that did not initiate a management plan.

Site Name	DO	pH	SC	*E. coli*	Ammonia	Nitrate + Nitrite	Copper	Chlorpyrifos	DDE	Methomyl	*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 2018 WY. Management plan constituents for Highline Canal @ Lombardy Rd are scheduled to be monitored at Highline Canal @ Hwy 99.

Mustang Creek @ East Ave

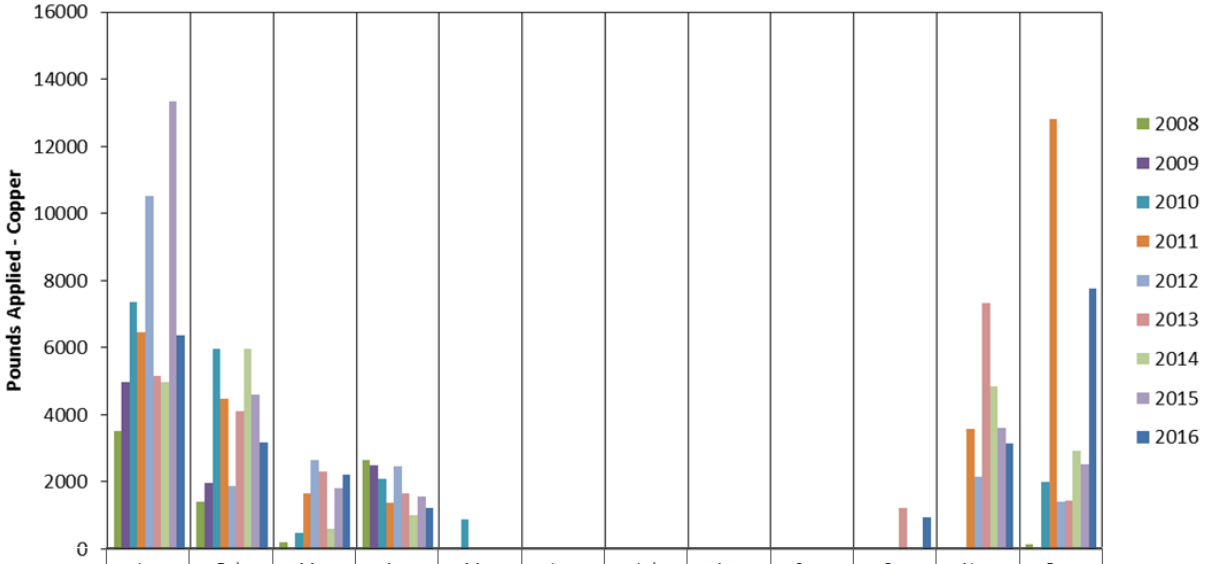
Mustang Creek @ East Ave is a Represented site in Zone 3. Monitoring was initiated at the site in 2006. During the 2017 WY, the Coalition conducted MPM for dissolved copper. A summary of monitoring results through May of the 2017 WY and the 2018 WY monitoring proposal are provided below.

Copper

Exceedances of the hardness based WQTL for dissolved copper have occurred 13 times with the most recent exceedances occurring during the 2017 WY. Exceedances of the hardness based WQTL for dissolved copper occurred in samples collected on October 29, 2016 (23 µg/L; WQTL 9.72 µg/L) and January 10, 2017 (13 µg/L; WQTL 8.65 µg/L). Past exceedances occurred in January, February, March, October, November, and December (Figure 12).

During the 2018 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 three years monitoring since the last exceedance (2010).

Figure 12. 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 2016.



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 WY	
Total Use (2008-2016)	62,627	33,504	11,921	16,524	870	0	0	0	0	2,137	24,622	31,008
% Total (2008-2016)	***34%***	***18%***	***7%***	***9%***	***0%***	***0%***	***0%***	***0%***	***0%***	***1%***	***13%***	***17%***
Total Use (2014-2016)	24,655	13,739	4,649	3,793	0	0	0	0	0	930	11,597	13,209
% Total (2014-2016)	***34%***	***19%***	***6%***	***5%***	***0%***	***0%***	***0%***	***0%***	***0%***	***1%***	***16%***	***18%***

Monitoring Based on Core Site Exceedances

The Zone 3 Core site, Highline Canal @ Hwy 99, is in a management plan for copper, chlorpyrifos, and toxicity to *S. capricornutum*. During the 2017 WY, exceedances of the WQTLs for copper and methomyl occurred at the Core site. Mustang Creek @ East Ave is in a management plan for copper and toxicity to *S. capricornutum*, monitoring will occur according to the schedule discussed above.

Chlorpyrifos

On May 30, 2012, the chlorpyrifos management plan was approved for completion in the Mustang Creek @ East Ave subwatershed. During the 2018 WY, monitoring for chlorpyrifos is not scheduled to occur.

Methomyl

From 2006 through February 2013, the Coalition monitored for methomyl 19 times; all results were non-detect. According to recent PUR data, from 2014 through 2016, methomyl is not applied in the site subwatershed; therefore, no monitoring is scheduled during the 2018 WY for methomyl.

Selenastrum capricornutum toxicity

The Coalition collected samples to test for toxicity to *S. capricornutum* 24 times from May 2006 through March 2017. 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. Despite the site being frequently dry in the past, the Coalition has demonstrated that when water is present (14 samples collected from 2009 through March 2017), *S. capricornutum* toxicity does not occur. Therefore, monitoring for *S. capricornutum* toxicity is not scheduled during the 2018 WY.

Zone 4 – Merced River @ Oakdale Rd

Merced River @ Oakdale Rd is replacing Merced River @ Santa Fe Rd and is the Core site in Zone 4 in the 2018 WY which also replaces the Canal Creek @ West Bellevue Rd Core site (monitored 2016 and 2017 WYs). Monitoring was initiated at Merced River @ Santa Fe Drive in 2004. During the 2017 WY, no exceedances of the WQTLs for DO, *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 2018 WY, in addition to monitoring monthly for Core site constituents, the Coalition will conduct MPM for chlorpyrifos in October and November due to months of past exceedances and increased use in October.

The management plan constituents for sites in Zone 4 are listed in Table 32. Monitoring for management plan constituents will occur according to the schedule provided in Attachment A.

Table 32. Zone 4 management plan constituents and 2017 WY exceedances.
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 2017 WY that did not initiate a management plan.

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

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 2017 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 2018 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 2018 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 2017 WY, no exceedances of pesticides, applied metals, or toxicity occurred at the Core site. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2017 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 subwatershed.

During the 2018 WY, monitoring for chlorpyrifos is not scheduled to occur due to completion of the management plan.

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 2017 WY, the Coalition monitored for dissolved copper in April and May and no exceedances occurred. The lead, chlorpyrifos, and *C. dubia* toxicity management plans were approved for completion on March 25, 2016.

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 2018 WY.

Monitoring Based on Core Site Exceedances

The Zone 4 Core site, Merced River @ Oakdale Rd, is in a management plan for chlorpyrifos. During the 2017 WY, no exceedances of pesticides, applied metals, or toxicity occurred at the Core site. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2017 WY.

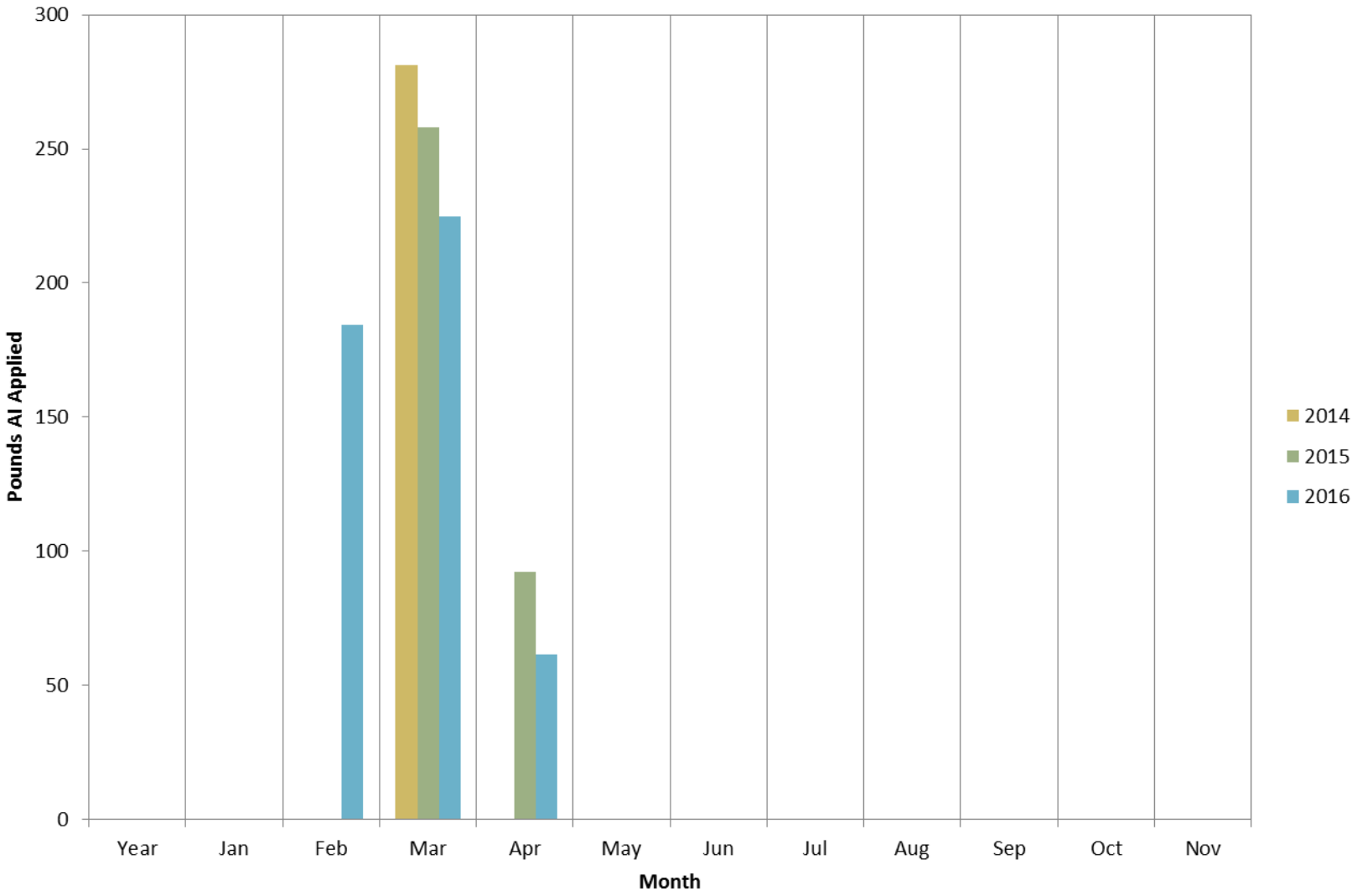
Chlorpyrifos

On March 25, 2016, the chlorpyrifos management plan was approved for completion in the Black Rascal Creek @ Yosemite Rd site subwatershed. During the 2018 WY, no additional monitoring is required.

Copper

During the 2018 WY, the Coalition will monitor for dissolved copper for a second consecutive year in February, March, and April based on copper use within the Black Rascal Creek @ Yosemite Rd subwatershed (Figure 13).

Figure 13. Black Rascal Creek @ Yosemite Rd copper applications (2014-2016).



Canal Creek @ West Bellevue Rd

Canal Creek @ West Bellevue Rd is a Represented site in Zone 4. The Coalition conducted two years of monitoring for chlorpyrifos and water column toxicity to C. dubia 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. In the 2017 WY, exceedances of the ammonia WQTL and toxicity to *C. dubia*, *P. promelas*, and *S. capricornutum* occurred at Canal Creek @ West Bellevue Rd which did not result in a management plan for any of these constituents.

Management Plan Monitoring

Management plans at Canal Creek @ West Bellevue Rd include: DO, copper, pH, *E. coli*, and SC. 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. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2017 WY at Merced River @ Santa Fe. 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 ammonia WQTL 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 occurred during the 2017 WY. Samples analyzed were collected from Canal Creek when it was a non-contiguous waterbody after a storm event on December 10, 2016; the ammonia concentration was 22 mg/L.

During the 2018 WY, the Coalition will test for ammonia in December 2017.

Chlorpyrifos

Canal Creek @ West Bellevue Rd was monitored monthly for chlorpyrifos in the 2016 and 2017 WYs; no exceedances occurred. During the 2018 WY, no additional monitoring is required for chlorpyrifos based on the Coalition's monitoring strategy.

Ceriodaphnia dubia toxicity

Toxicity to *C. dubia* occurred in samples collected from Canal Creek when it was a non-contiguous waterbody in December 2016 (61% survival compared to the control). Since survival was greater than 50% compared to the control, a TIE was not initiated. However, the concentration of ammonia was sufficiently elevated (22 mg/L) to result in reduced survival of *C. dubia*.

During the 2018 WY, the Coalition will conduct monitoring for a third consecutive year in December 2017 for toxicity to *C. dubia*.

Pimephales promelas toxicity

Toxicity to *P. promelas* occurred in samples collected from Canal Creek when it was a non-contiguous waterbody in December 2016 (0% survival). A TIE was initiated and concluded that the source of toxicity was the high concentration of ammonia (22 mg/L). The Coalition will conduct monitoring for a third consecutive year in December 2017 for toxicity to *P. promelas*.

Selenastrum capricornutum toxicity

Toxicity to *S. capricornutum* occurred in samples collected from Canal Creek when it was a non-contiguous waterbody in December 2016 (88% growth compared to the control). The Coalition will conduct monitoring for a third consecutive year during the 2018 WY for toxicity to *S. capricornutum* in December 2017.

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 2017 WY, the Coalition monitored for dissolved copper as a part of its MPM.

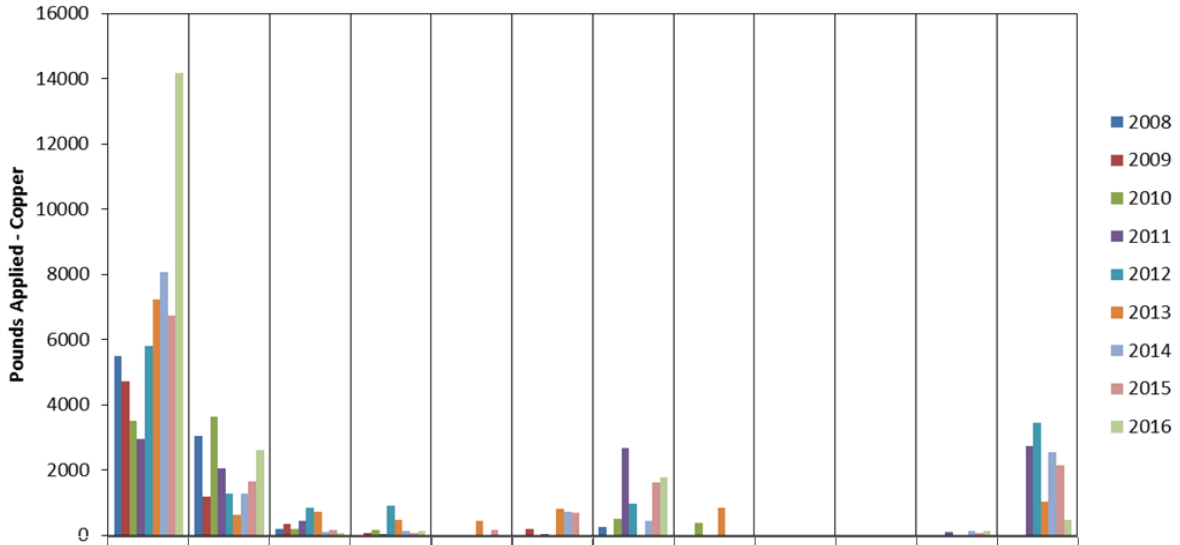
Management Plan Monitoring

Copper

Exceedances of the hardness based WQTL have occurred 10 times from 2010 through February 2017. Copper exceedances occurred in January (2017), February (2015, 2017), April (2010, 2013, 2016), July (2010), and October (2009, 2011, 2016). The Coalition initiated MPM for dissolved copper in 2011 and continued through the 2017 WY. The most recent exceedance of the hardness based WQTL occurred in February 2017 with a concentration of 4.1 µg/L (hardness based WQTL 4.09 µg/L). The PUR data, from 2014 through 2016, indicate December (11%), January (63%), and February (14%) are months in which use of copper is highest (Figure 14).

During the 2018 WY, the Coalition will conduct MPM for dissolved copper in October, January, February, and April based on months of past exceedances and months of high use.

Figure 14. Howard Lateral @ Hwy 140 monitoring history and copper applications.
Shaded cells represent months of past monitoring. Black cells depicts months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2016.



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 WY	
Total Use (2008-2016)	58,675	17,380	3,057	1,960	614	2,442	8,264	1,214	0	0	461	12,393
% Total (2008-2016)	***55%***	***16%***	***3%***	***2%***	***1%***	***2%***	***8%***	***1%***	***0%***	***0%***	***0%***	***12%***
Total Use (2014-2016)	28,966	5,566	322	315	169	1,419	3,833	0	0	0	347	5,167
% Total (2014-2016)	***63%***	***12%***	***1%***	***1%***	***0%***	***3%***	***8%***	***0%***	***0%***	***0%***	***1%***	***11%***

Monitoring Based on Core Site Exceedances

The Zone 4 Core site, Merced River @ Oakdale Rd, is in a management plan for chlorpyrifos. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2017 WY at the Core site.

Chlorpyrifos

On March 25, 2016, the management plan for chlorpyrifos was approved for completion in the Howard Lateral @ Hwy 140 subwatershed. No additional monitoring is required in the 2018 WY for chlorpyrifos.

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 2017 WY, the site was monitored for chlorpyrifos, dissolved copper, and toxicity to *S.*

capricornutum for MPM. Monitoring for chlorpyrifos was discontinued in April 2017 as the management plan was approved for completion on April 14, 2017.

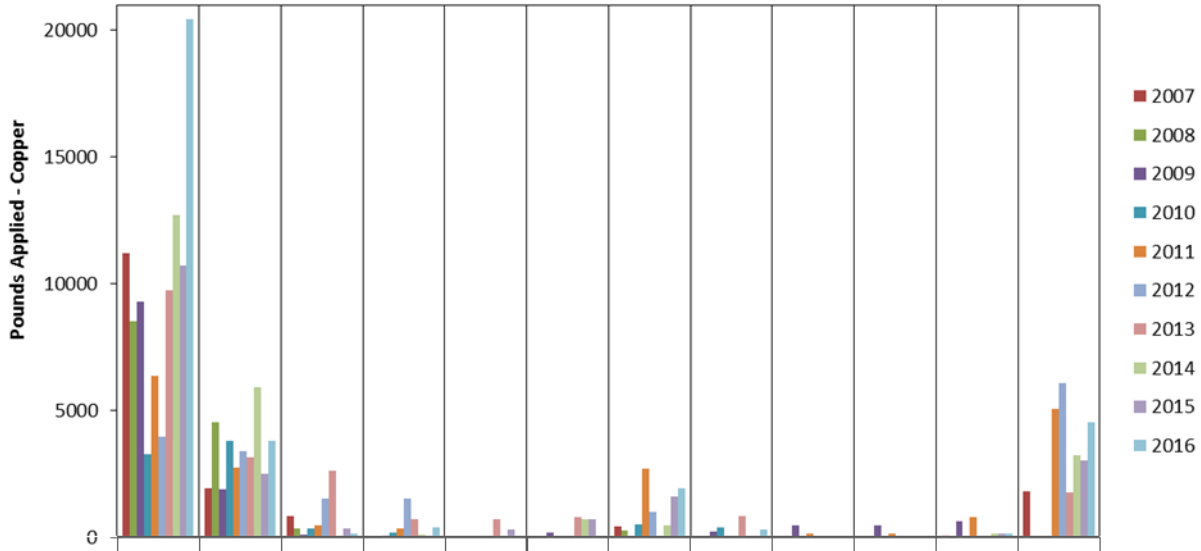
Management Plan Monitoring

Copper

Exceedances of the WQTL for copper have occurred 20 times in the site subwatershed; 10 of the exceedances were for the total fraction (2007 to 2008) and 10 were for the dissolved fraction (2011 to 2017). The most recent exceedance occurred in March 2017 (Figure 15). 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 less compared to other months.

During the 2018 WY, the Coalition will conduct MPM for dissolved copper from December through March based on months of past exceedances and high use.

Figure 15. Livingston Drain @ Robin Ave monitoring history and copper applications.
Shaded cells represent months of past monitoring. Black cells depicts months in which exceedances occurred. Hatched cells indicate the site was dry. The PUR data are through December 2016.



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 WY	
Total Use (2007-2016)	96,152	33,689	6,765	3,316	1,062	2,416	8,852	1,749	612	624	1,824	25,508
% Total (2007-2016)	***53%***	***18%***	***4%***	***2%***	***1%***	***1%***	***5%***	***1%***	***0%***	***0%***	***1%***	***14%***
Total Use (2014-2016)	43,854	12,227	538	527	348	1,419	4,000	315	0	0	389	10,810
% Total (2014-2016)	***59%***	***16%***	***1%***	***1%***	***0%***	***2%***	***5%***	***0%***	***0%***	***0%***	***1%***	***15%***

Selenastrum capricornutum toxicity

Three samples collected from Livingston Drain @ Robin Ave in February, April, and May 2008 were toxic to *S. capricornutum*; no TIEs were required. One exceedance of the WQTL for total copper coincided with the February 2008 toxicity. Since the Coalition initiated MPM in 2011, the site has been consistently dry in February (2011-2017), April (2014-2016), and May (2014-2015). Samples were collected in April 2016 and in May of 2016 and 2017 and no toxicity occurred.

During the 2018 WY, the Coalition will conduct MPM in April and May based on months of past exceedances. Five years of monitoring history in February indicates that the site is consistently dry; therefore, the Coalition did not schedule MPM in February during the 2018 WY.

Monitoring Based on Core Site Exceedances

The Zone 4 Core site, Merced River @ Oakdale Rd, is in a management plan for chlorpyrifos. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2017 WY at the Core site.

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 chlorpyrifos WQTL occurred in 2008. Due to improved water quality, the Coalition received approval to complete the chlorpyrifos management plan on April 14, 2017. During the 2018 WY, no monitoring for chlorpyrifos is required.

McCoy Lateral @ Hwy 140

McCoy Lateral @ Hwy 140 is a Represented site in Zone 4. Monitoring was initiated at the site in 2011 where monitoring occurred monthly and continued through September 2013. During the 2017 WY, no monitoring occurred since there was no MPM required and no additional monitoring required as a result of exceedances in samples collected from Canal creek @ West Bellevue Rd (Zone 4 Core site in the 2016 and 2017 WYs).

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 scheduled in order to evaluate the effectiveness of implemented management practices.

Monitoring Based on Core Site Exceedances

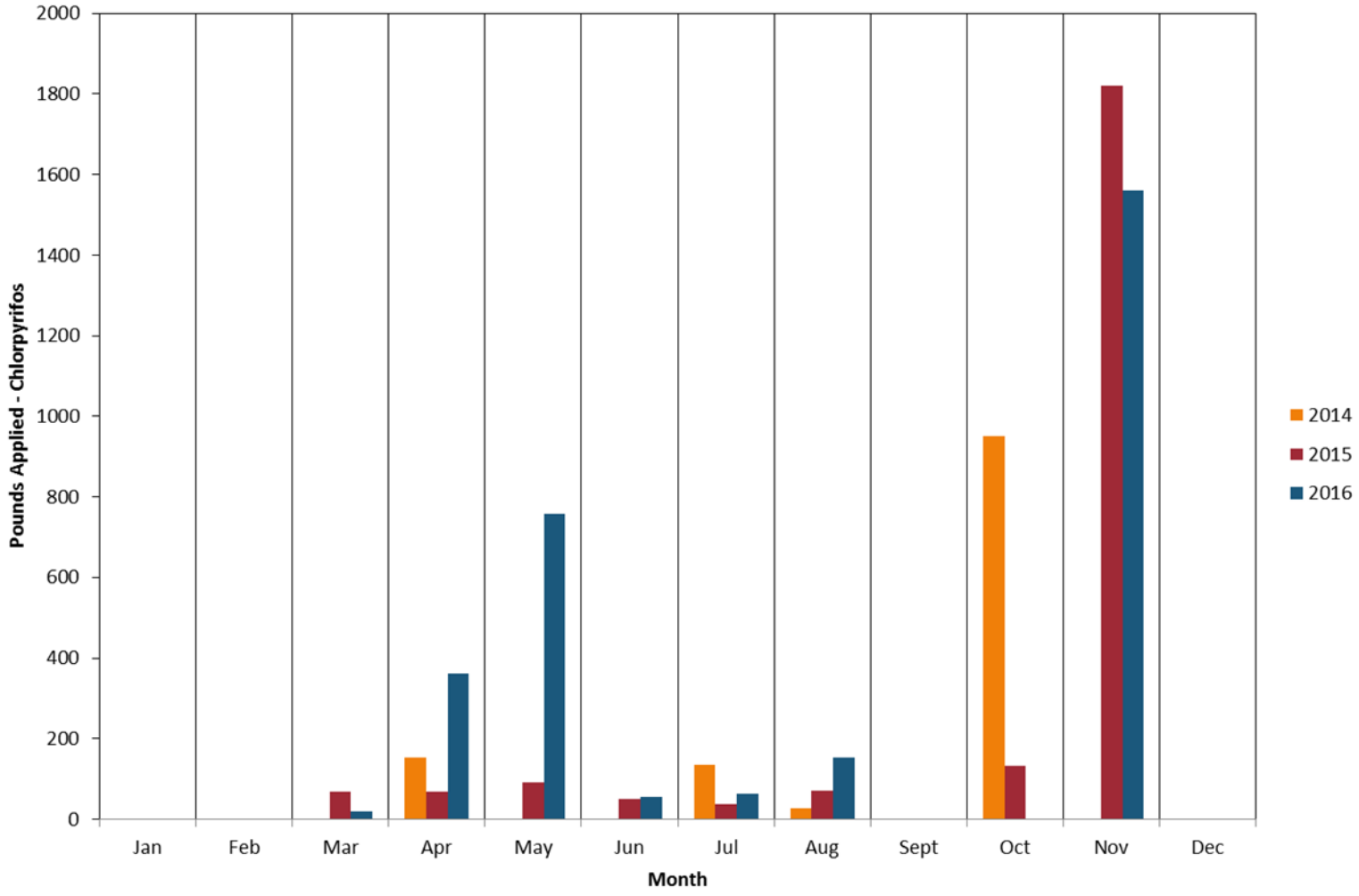
The Zone 4 Core site, Merced River @ Oakdale Rd, is in a management plan for chlorpyrifos. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2017 WY.

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.

During the 2018 WY, the Coalition will conduct monitoring for chlorpyrifos at McCoy Lateral @ Hwy 140 in November and May based on recent applications (Figure 16).

Figure 16. McCoy Lateral @ Hwy 140 applications of chlorpyrifos (2014-2016).



Unnamed Drain @ Hwy 140

Unnamed Drain @ Hwy 140 is a Represented site in Zone 4. Monitoring was initiated at the site in 2013 for Assessment Monitoring. During the 2017 WY, the Coalition monitored for dissolved copper based on a previous exceedance of the hardness based WQTL in January 2013.

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 2018 WY.

Monitoring Based on Core Site Exceedances

The Zone 4 Core site, Merced River @ Oakdale Rd, is in a management plan for chlorpyrifos. There were no other exceedances of any pesticide, applied metal, or toxicity during the 2017 WY.

Chlorpyrifos

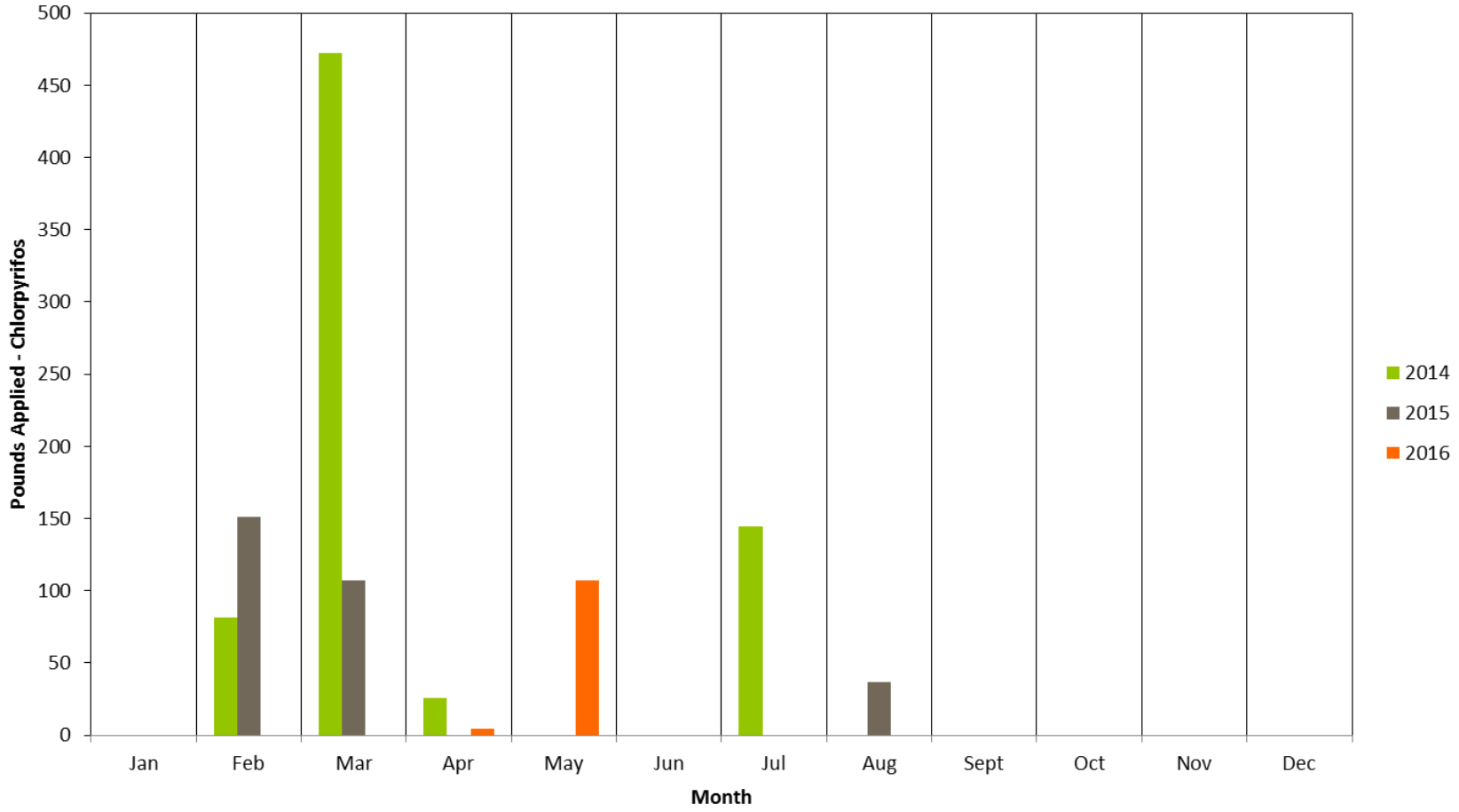
Unnamed Drain @ Hwy 140 was monitored monthly for chlorpyrifos was January through November in 2013 and in January 2014, no exceedances occurred. The PUR data for chlorpyrifos applications, from 2014 through 2016, indicate that use within the subwatershed is declining and minimal (Figure 17). In 2016, less than 150 lbs of chlorpyrifos was applied in May which was the month with the highest reported usage (Figure 17).

During the 2018 WY, no monitoring for chlorpyrifos is scheduled based on monitoring results and declining use of chlorpyrifos within the Unnamed Drain @ Hwy 140 subwatershed.

Copper

The Coalition completed the third consecutive year of monitoring for dissolved copper in January 2017 due to a single exceedance in January 2013. Monitoring for dissolved copper occurred in January and February from 2015 through 2017 and no exceedances occurred. During the 2018 WY, monitoring for dissolved copper is not scheduled.

Figure 17. Unnamed Drain @ Hwy 140 applications of chlorpyrifos (2014-2016).



ZONE 5 – DUCK SLOUGH @ GURR RD

Duck Slough @ Gurr Rd is the Core site in Zone 5 for the 2018 WY and replaces the Miles Creek @ Reilly Rd Core site which was monitored in the 2016 and 2017 WYs. Monitoring was initiated at Duck Slough @ Gurr Rd in 2004. No exceedances of pesticides, metals, or toxicity occurred during the 2017 WY at Duck Slough @ Gurr Rd.

Duck Slough @ Gurr Rd is in a management plan for DO, pH, SC, *E. coli*, ammonia, chlorpyrifos, malathion, *C. dubia* toxicity, *P. promelas* toxicity, and sediment toxicity to *H. azteca*. In the 2018 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 (February, March and July)
- Malathion (February and March)
- *C. dubia* toxicity (March, June, July)
- *P. promelas* toxicity (October and March)
- *H. azteca* toxicity (September)

The Coalition received approval to complete the *S. capricornutum* management plan on May 30, 2012. Since completion, a single sample collected on June 9, 2015 was toxic to *S. capricornutum* (37% growth compared to the control). A TIE was initiated but results were inconclusive because the toxicity was lost in the baseline tests. The Coalition monitored for *S. capricornutum* toxicity in June 2016 and the samples were not toxic; June 2017 monitoring results are pending.

During the 2018 WY, monitoring for toxicity to *S. capricornutum* will occur for Normal Monitoring as Duck Slough @ Gurr Rd is the Core site in Zone 5.

The management plan constituents in Zone 5 are listed in Table 33. Monitoring for management plan constituents will occur according to the schedule provided in Attachment A.

Table 33. Zone 5 management plan constituents and 2017 WY exceedances.
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 2017 WY that did not initiate a management plan.

Site Name	DO	pH	SC	*E. coli*	Ammonia	Arsenic	Copper	Lead	Chlorpyrifos	Diazinon	Malathion	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*
Duck Slough @ Gurr Rd	**M**	**M**	**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	X		M						
Miles Creek @ Reilly Rd	M	M		M			M		M			X			

Deadman Creek @ Gurr Rd

Deadman Creek @ Gurr Rd is a Represented site in Zone 5. Monitoring was initiated at the site in 2004. During the 2017 WY, monitoring was scheduled for chlorpyrifos and toxicity to *C. dubia* and *P. promelas* during MPM. In addition, the Coalition monitored for copper during one storm event between January and March based on an evaluation of exceedances at the Miles Creek @ Reilly Rd Core site.

Management Plan Monitoring

***Ceriodaphnia dubia* toxicity**

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 have coincided with toxicity to *C. dubia* in samples collected in February 2009, March 2010, and November 2010. In addition, chlorpyrifos was detected above the WQTL in samples collected in March 2010.

During the 2018 WY, the Coalition will conduct MPM for *C. dubia* toxicity in November. The Coalition determined MPM in February and March is no longer necessary as the Coalition has conducted MPM for toxicity to *C. dubia* for over five years with no toxicity (Table 34). Due to over three years monitoring with no toxicity, the Coalition will petition for the completion of the *C. dubia* management plan in 2017.

Table 34. 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	2018 WY
Overall Tally	**1**	**2**	**2**

***Pimephales promelas* toxicity**

Water column toxicity to *P. promelas* occurred during nine sampling events from 2006 through 2013 in January, February, March, May, June, November, and December. The TIEs conducted on the samples collected in February 2009 and November 2010 indicated ammonia was the source of toxicity; exceedances of the WQTL for ammonia in the same samples confirmed the source of toxicity. Exceedances of the WQTL for ammonia also coincided with toxic samples collected in January and December 2009, and in March and November 2010.

The Coalition will continue MPM for toxicity to *P. promelas* in November and December based on months of past toxicity. The Coalition will discontinue MPM in January, February, March, May, and June

due to over five years monitoring since the last toxic monitoring event (Table 35). The Coalition will petition for the completion of the *P. promelas* management plan due to three years monitoring with no toxicity in the Deadman Creek @ Gurr Rd site subwatershed.

Table 35. 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	Pending	2018 WY	
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, *C. dubia* toxicity, *P. promelas* toxicity, and sediment toxicity to *H. azteca*. During the 2017 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* and *P. promelas* 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 2018 WY.

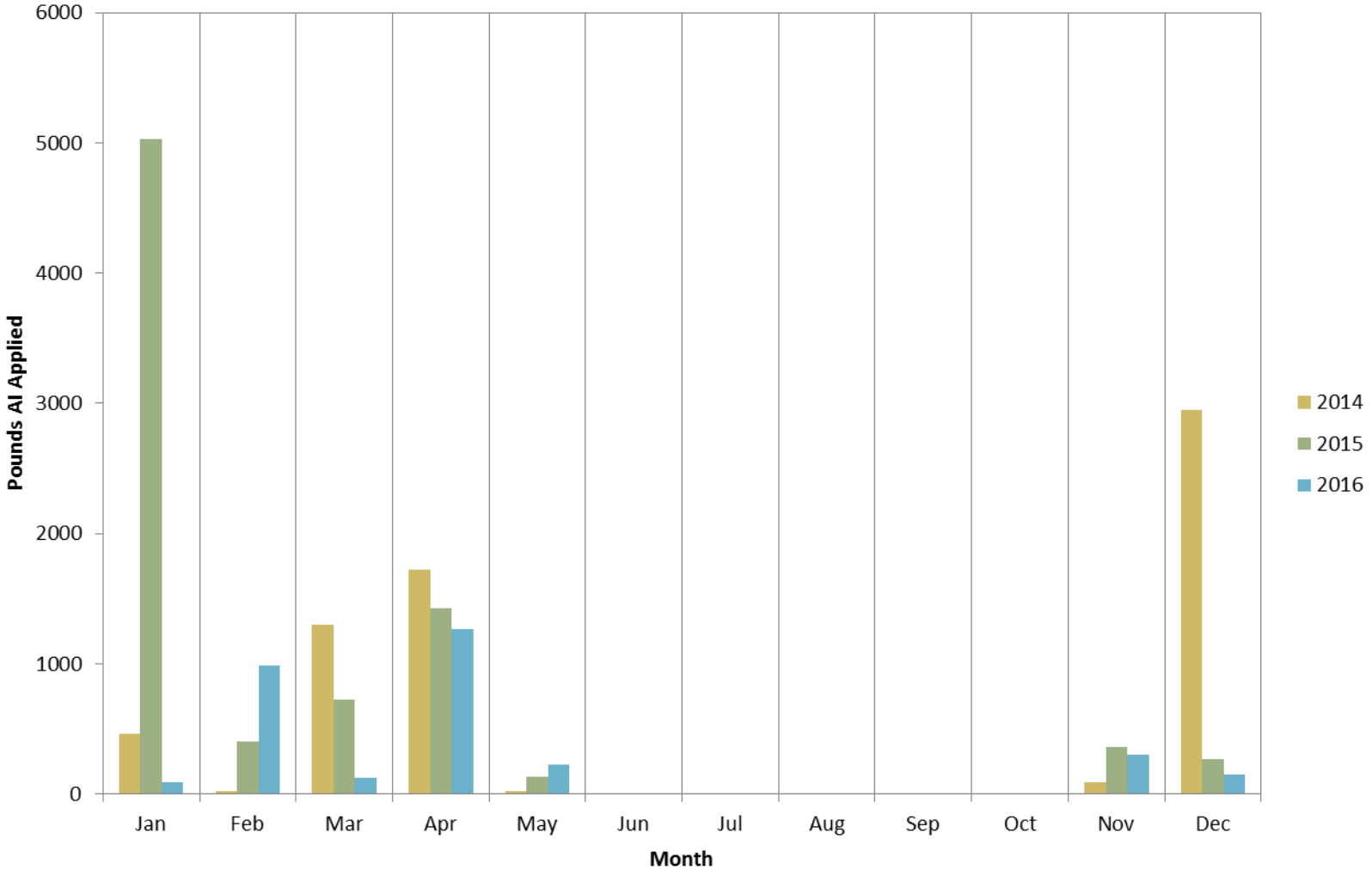
Copper

The Coalition monitored copper from 2006 through 2012 and the last exceedance of the copper WQTL occurred in January 2008. The Coalition received approval to complete the copper management plan on May 30, 2012, after demonstrating copper was no longer impairing water quality.

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. On January 10, 2017 an exceedance of the hardness based WQTL for dissolved copper occurred. Copper use within the subwatershed is highest from January through April (Figure 18). Based on the Coalition's monitoring strategy, monitoring for copper will occur for a second consecutive year during the 2018 WY.

During the 2018 WY, the Coalition will monitor for dissolved copper in January, February and April based on recent exceedances and PUR data.

Figure 18. Deadman Creek @ Gurr copper applications (2014-2016).

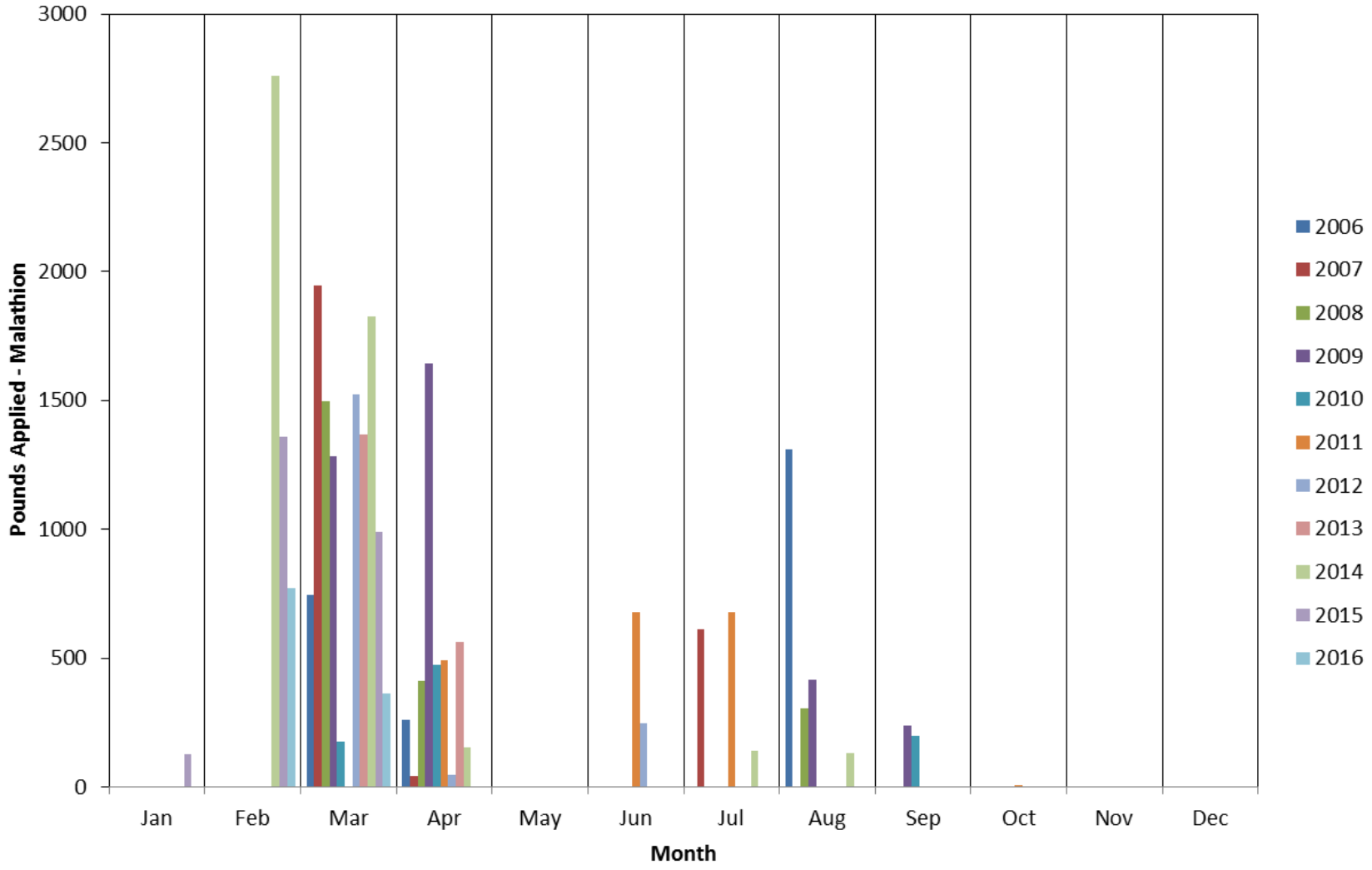


Malathion

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 2014 through 2016, indicate that use of malathion within the subwatershed has declined since samples were last collected (Figure 19).

During the 2018 WY, monitoring for malathion is not scheduled to occur based on monitoring history and declining use within the subwatershed.

Figure 19. Deadman Creek @ Gurr Rd applications of malathion (2006-2016).



Hyalella azteca sediment toxicity

Deadman Creek @ Gurr Rd was monitored in March and September from 2004 through 2010 for sediment toxicity to *H. azteca*, no toxicity occurred. Since the Coalition has not monitored for sediment toxicity since 2010 and this remains an issue at the Zone 5 Core site, the Coalition will monitor for *H. azteca* toxicity in September 2018 based on Core site exceedances.

Deadman Creek @ Hwy 59

Deadman Creek @ Hwy 59 is a Represented site in Zone 5. Monitoring was initiated at the site in 2006. During the 2017 WY, MPM was scheduled for chlorpyrifos.

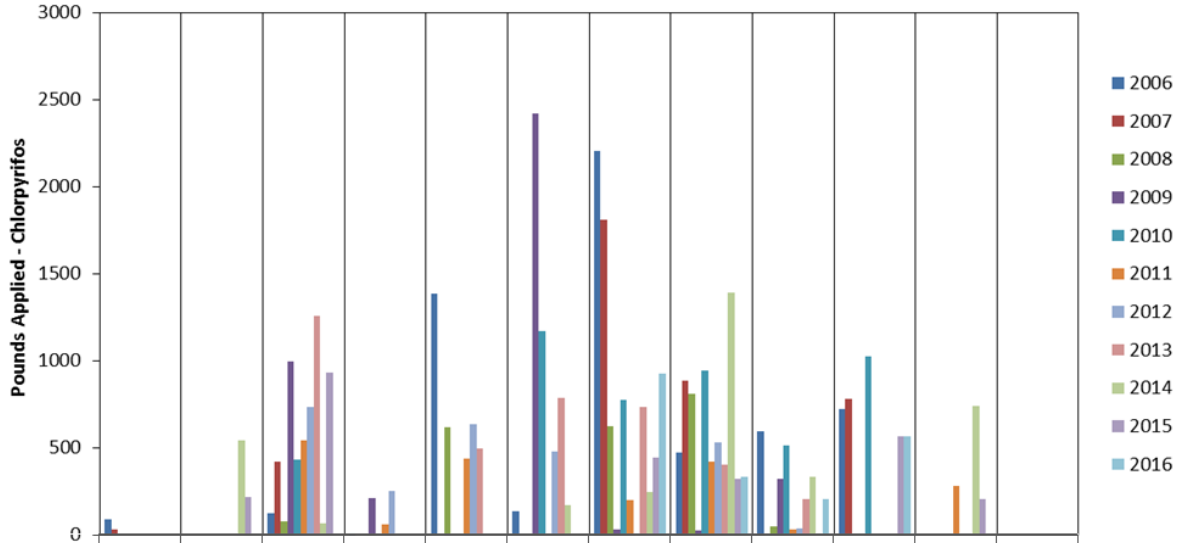
Management Plan Monitoring

Chlorpyrifos

Exceedances of the WQTL for chlorpyrifos occurred three times in April (2011), August (2007 and 2008) and September (2006, 2008, 2011). The Coalition conducted MPM during months of past exceedances from 2008 through the 2017 WY. The site is frequently dry in August and September; since MPM was initiated in 2008 the site has been dry for five out of six monitoring events in August. Chlorpyrifos use is minimal within the subwatershed, with the highest rates of application occurring in July (20%) and August (25%; Figure 20).

During the 2018 WY, the Coalition will conduct MPM for chlorpyrifos in July, August, and September. 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 2017.

Figure 20. 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 2017 WY. The PUR data are through December 2016.



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 WY	
Total Use (2006-2016)	122	763	5,587	532	3,575	5,160	8,000	6,535	2,294	3,666	1,231	0
% Total (2006-2016)	***0%***	***2%***	***15%***	***1%***	***10%***	***14%***	***21%***	***17%***	***6%***	***10%***	***3%***	***0%***
Total Use (2014-2016)	0	763	1,002	0	0	169	1,619	2,046	536	1,135	949	0
% Total (2014-2016)	***0%***	***9%***	***12%***	***0%***	***0%***	***2%***	***20%***	***25%***	***7%***	***14%***	***12%***	***0%***

Monitoring Based on Core Site Exceedances

The Zone 5 Core site, Duck Slough @ Gurr Rd, is in a management plan for chlorpyrifos, malathion, *C. dubia* toxicity, *P. promelas* toxicity, and sediment toxicity to *H. azteca*. During the 2017 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, MPM will occur according to the schedule discussed above.

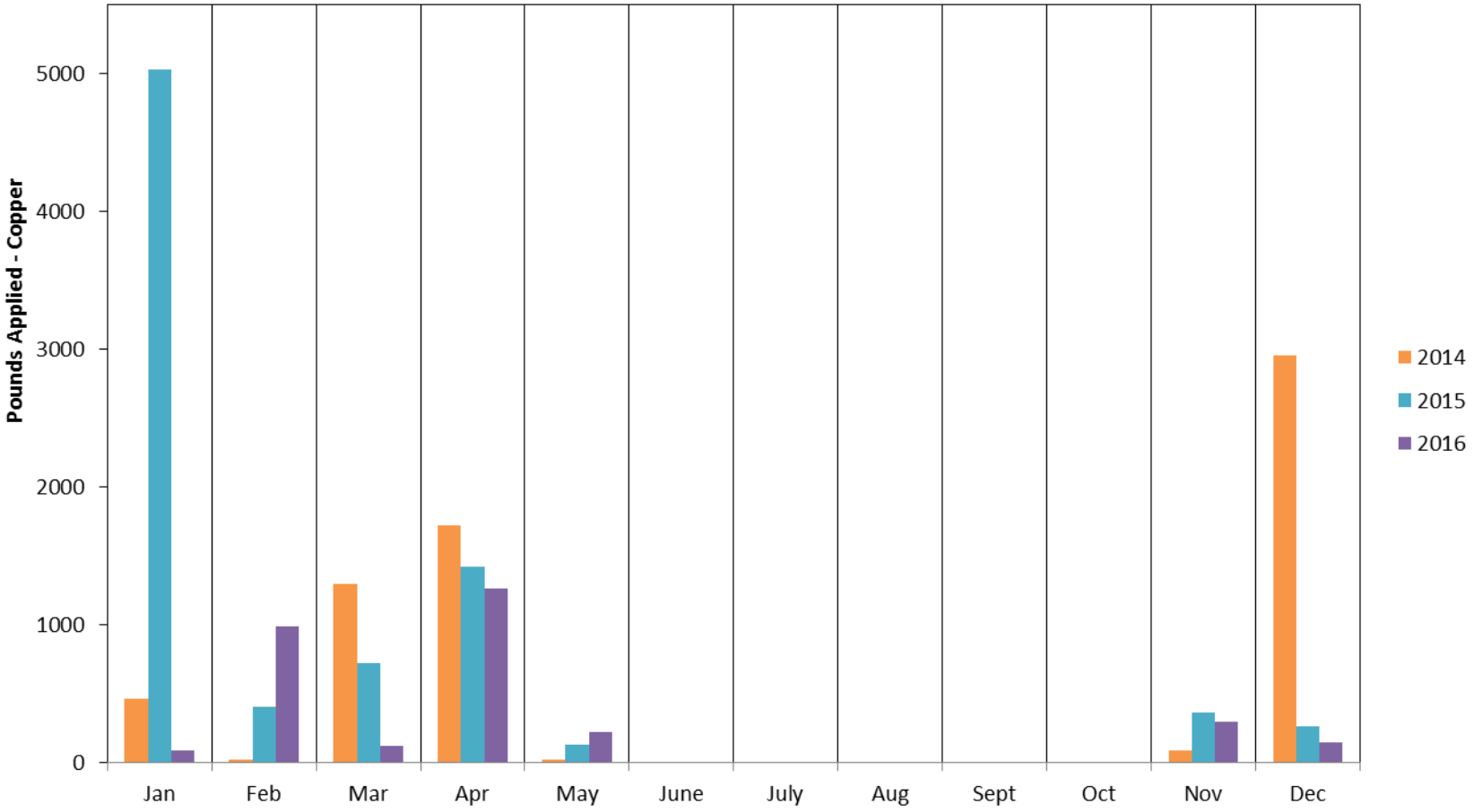
Copper

The Coalition monitored for copper in 2008 and from 2011 through 2012; 50 samples were analyzed and no exceedances of the WQTL occurred. From 2014 through 2016, products containing copper were

applied more frequently in January and April (Figure 21). During the 2017 WY, the Coalition monitored for dissolved copper during one storm event between January and March and in April based on exceedances that occurred at the Miles Creek @ Reilly Rd Core site and PUR data. Samples collected on January 10, 2017 were in exceedance of the hardness based WQTL with a concentration of 7.1 µg/L (hardness based WQTL 4.61 µg/L)

During the 2018 WY, the Coalition will monitor one storm event between January and March and in April for a second consecutive year.

Figure 21. Deadman Creek @ Hwy 59 copper applications (2014-2016).



Ceriodaphnia dubia toxicity

The Coalition monitored for toxicity to *C. dubia* at Deadman Creek @ Hwy 59 from 2006 through 2012 and monthly in 2011 and 2012; 43 samples were collected and analyzed and no samples were toxic to *C. dubia*. The Coalition determined monitoring for *C. dubia* toxicity during the 2018 WY is not necessary based on *C. dubia* and chlorpyrifos monitoring history.

Hyalella azteca sediment toxicity

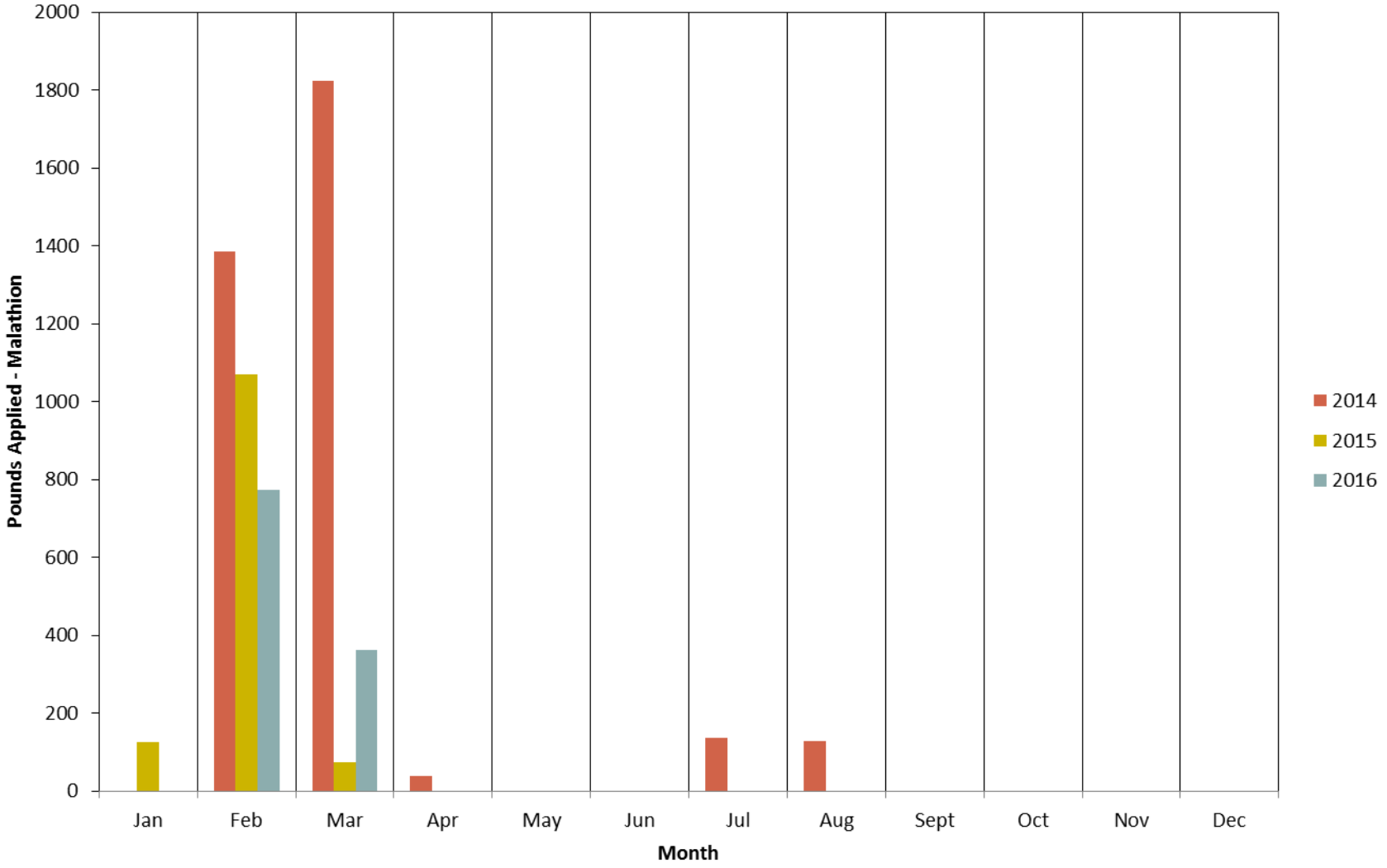
The Coalition monitored for sediment toxicity to *H. azteca* from 2006 through 2012; 10 samples were analyzed and no toxicity occurred. Based on past monitoring history, no additional monitoring for sediment toxicity to *H. azteca* is scheduled during the 2018 WY.

Malathion

The Coalition monitored for malathion at Deadman Creek @ Hwy 59 from 2006 through 2012, 43 samples were analyzed and no exceedances occurred. The PUR data, from 2014 through 2016, indicate that use of malathion within the subwatershed is declining (Figure 22). Months of peak malathion use occurs in February and March.

During the 2018 WY, the Coalition will not monitor for malathion based on monitoring history and decreased use since the site was last monitored.

Figure 22. Deadman Creek @ Hwy 59 applications of malathion (2014-2016).



Pimephales promelas toxicity

The Coalition monitored for toxicity to *P. promelas* from 2006 through 2012; 43 samples were analyzed and no toxicity occurred. Toxicity to *P. promelas* at the Core site (Duck Slough @ Gurr Rd) was attributed to chlorpyrifos concentrations. During the 2018 WY, the Coalition will not monitor for toxicity to *P. promelas* based on toxicity monitoring history and lack of water quality impairment attributed to chlorpyrifos (last exceedance in September 2011).

Miles Creek @ Reilly Rd

Miles Creek @ Reilly Rd is a rotating Core site and will be monitored as a Represented site during the 2018 WY. During the 2017 WY, MPM for copper, diazinon, and *S. capricornutum* toxicity occurred. A summary of monitoring results through May 2017 and the 2018 WY monitoring proposal are provided below.

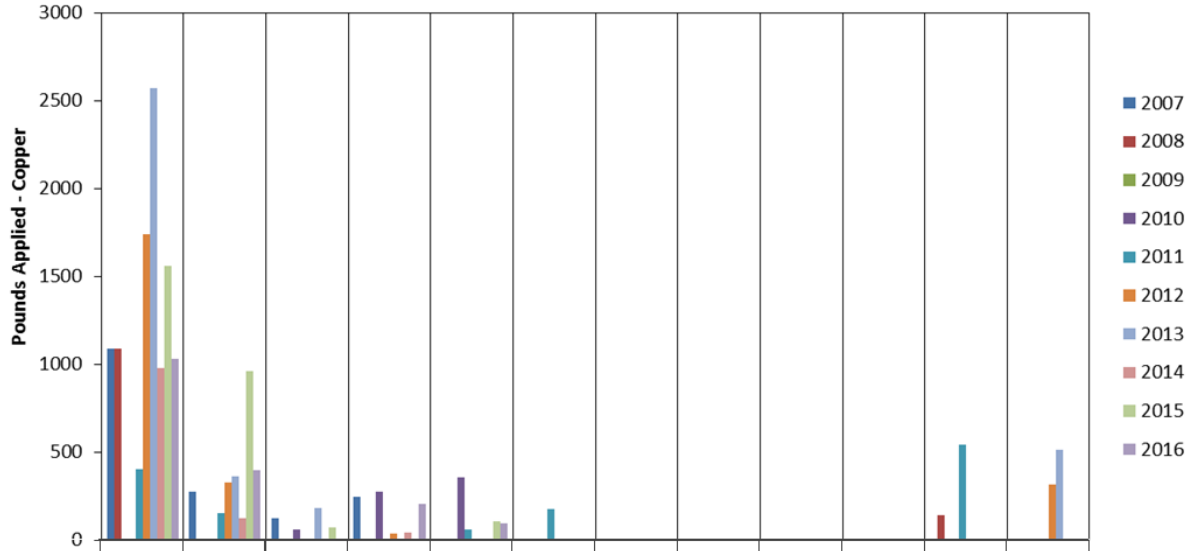
Management Plan Monitoring

Copper

The Coalition monitored for copper from 2007 through May 2017 and nine exceedances occurred. Exceedances of the WQTL for total copper occurred in January (2008, 2016, and 2017), February (2008), May (2007), June (2007), July (2008), and August (2007 and 2008). During the 2017 WY, MPM for copper was scheduled to occur in January, February, and May through August. Pesticide Use Report data from 2014 through 2016 indicate almost all applications within the subwatershed occur in January and February (Figure 23). The Coalition determined monitoring in February, May, June, July, and August is no longer necessary due to three or more years of monitoring with no exceedances and very minimal copper use.

During the 2018 WY, the Coalition will conduct MPM for copper in January based on past exceedances and copper use within the subwatershed. If the results from June, July, and August 2017 monitoring include exceedances of the copper WQTL, the Coalition will amend its monitoring schedule in the January 2018 MPU Addendum to include any additional months with exceedances.

Figure 23. 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. Striped cells indicate monitoring is scheduled to occur during the 2017 WY. The PUR data are through December 2016.



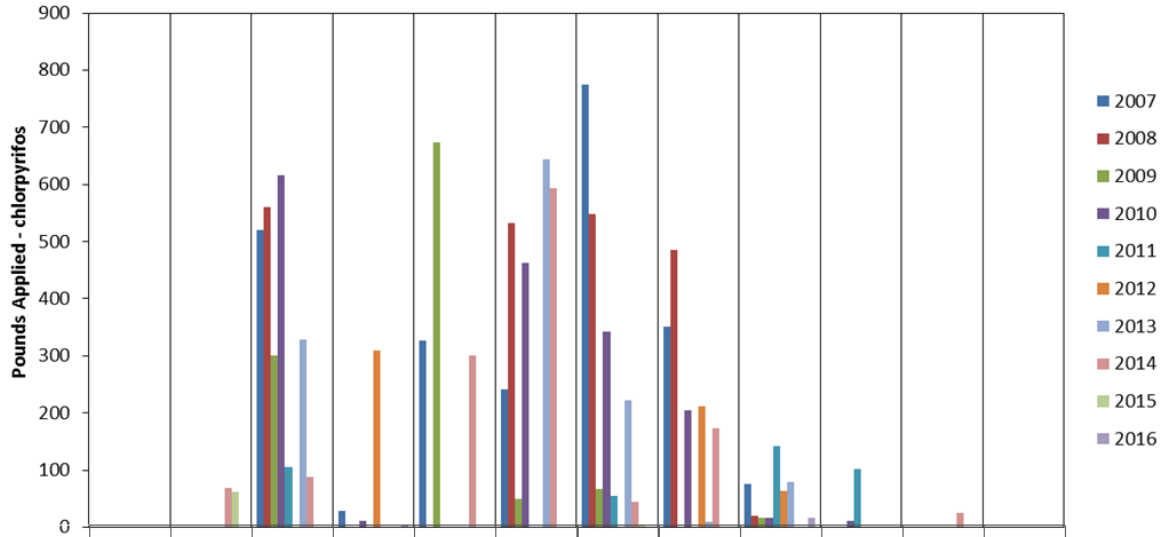
Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2007												
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017											2018 WY	
Total Use (2007-2016)	10,464	2,600	444	840	613	179	0	0	0	0	684	829
% Total (2007-2016)	***63%***	***16%***	***3%***	***5%***	***4%***	***1%***	***0%***	***0%***	***0%***	***0%***	***4%***	***5%***
Total Use (2014-2016)	3,574	1,483	74	250	198	0	0	0	0	0	0	0
% Total (2014-2016)	***64%***	***27%***	***1%***	***4%***	***4%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***

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 2009. On March 25, 2016, the Coalition received approved to complete the chlorpyrifos management plan due to no exceedances from 2013 through the 2016 WY. Samples collected on May 9, 2017 were in exceedance of the WQTL for chlorpyrifos with a concentration of 0.87 µg/L; the same samples were also toxic to *C. dubia*. This exceedance reinstated the chlorpyrifos management plan for the 2018 WY.

Overall, PUR data indicate chlorpyrifos use within the subwatershed is minimal and primarily occurs in May, June, and August (Figure 24). During the 2018 WY, the Coalition will conduct MPM for chlorpyrifos in May, June, July, and August based on past exceedances and chlorpyrifos use.

Figure 24. 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. Striped cells indicate monitoring is scheduled to occur in the 2017 WY. The PUR data are through December 2016.



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 WY	
Total Use (2007-2016)	0	131	2520	353	1302	2523	2053	1436	430	113	25	0
% Total (2007-2016)	***0%***	***1%***	***23%***	***3%***	***12%***	***23%***	***19%***	***13%***	***4%***	***1%***	***0%***	***0%***
Total Use (2014-2016)	0	131	87	3	300	593	45	174	16	0	25	0
% Total (2014-2016)	***0%***	***10%***	***6%***	***0%***	***22%***	***43%***	***3%***	***13%***	***1%***	***0%***	***2%***	***0%***

Diazinon

A single exceedance of the WQTL for diazinon occurred in February 2013. The Coalition conducted MPM from 2014 through March 2017 with no exceedances. Due to improved water quality, the Coalition received approval to complete the diazinon management plan on April 14, 2017. During the 2018 WY, monitoring for diazinon is not required.

Selenastrum capricornutum toxicity

On April 14, 2017, the management plan for toxicity to S. capricornutum was approved for completion in the Miles Creek @ Reilly Rd site subwatershed. The Coalition demonstrated that toxicity to algae is not

impairing water quality within the subwatershed and monitoring for toxicity to *S. capricornutum* is not required for the 2018 WY.

Monitoring Based on Core Site Exceedances

The Zone 5 Core site, Duck Slough @ Gurr Rd, is in a management plan for chlorpyrifos, malathion, *C. dubia* toxicity, *P. promelas* toxicity, and sediment toxicity to *H. azteca*. During the 2017 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.

***Ceriodaphnia dubia* toxicity**

The Coalition received approval to complete the *C. dubia* management plan on March 25, 2016 due to improved water quality. Miles Creek @ Reilly Rd was the Core site in Zone 5 during the 2016 and 2017 WYs and monitoring for toxicity to *C. dubia* occurred monthly. Samples collected on May 9, 2017 were toxic to *C. dubia* with 0% survival compared to the control. A TIE was initiated and concluded chlorpyrifos was the cause of toxicity. Chlorpyrifos was detected at a concentration of 0.87 µg/L in samples collected in May 2017. The single toxicity does not put Miles Creek back in a management plan for *C. dubia* since it is not a TMDL constituent like chlorpyrifos.

During the 2018 WY, the Coalition will monitor toxicity to *C. dubia* for a third consecutive year in May, June, July, and August to coincide with chlorpyrifos MPM.

***Hyalella azteca* sediment toxicity**

The Coalition monitored for sediment toxicity to *H. azteca* in 2007, 2008, and from 2013 through the 2017 WY (September 2017 results pending) and no toxicity occurred. During the 2018 WY, no additional monitoring is required based on the Coalition's monitoring strategy.

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 2018 WY, monitoring for malathion is not scheduled based on the Coalition's monitoring strategy.

***Pimephales promelas* toxicity**

Miles Creek @ Reilly Rd was monitored for toxicity to *P. promelas* in 2007, 2008, 2013, and monthly during the 2016 and 2017 WY. No toxicity to *P. promelas* occurred in the 36 samples analyzed. During the 2018 WY, monitoring for *P. promelas* is not scheduled based on the Coalition's monitoring strategy.

ZONE 6 – COTTONWOOD CREEK @ RD 20

Cottonwood Creek @ Rd 20 is the Core site in Zone 6 in the 2018 WY and replaces the Dry Creek @ Rd 18 Core site which was monitored in the 2016 and 2017 WYs. Monitoring was initiated at Cottonwood Creek @ Rd 20 in 2005. During the 2017 WY, a single exceedance of the WQTL for copper occurred.

Cottonwood Creek @ Rd 20 is in a management plan for *E. coli* and copper. During the 2018 WY, MPM for copper will occur in January when copper use is high and water is most likely present, April (based on past exceedances and to capture the beginning of the irrigation season), and in July (to capture one event at the end of the irrigation season).

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 36. Zone 6 management plan constituents and 2017 WY exceedances.
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 2017 WY that did not initiate a management plan.

Site Name	DO	SC	pH	*E. coli*	Copper	Chlorpyrifos	Diuron	*S. capricornutum*
Cottonwood Creek @ Rd 20				**M**	**M**			
Ash Slough @ Ave 21		X			M			
Berenda Slough along Ave 18 ½	M		M	M	M	M		
Dry Creek @ Rd 18		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 2017 WY, MPM was scheduled for dissolved copper.

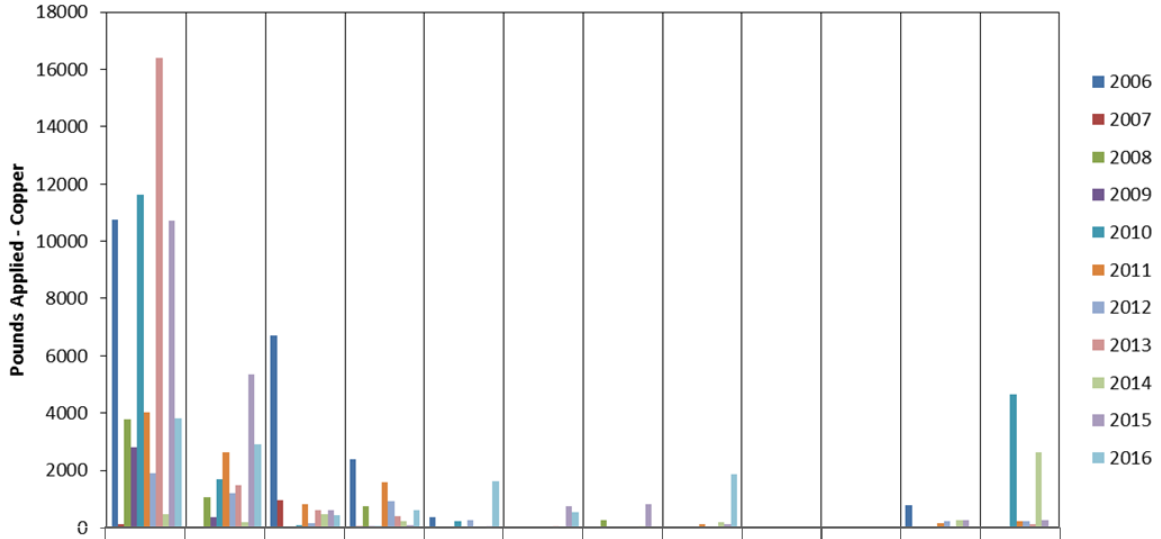
Management Plan Monitoring

Copper

Past exceedances of the WQTL for total copper occurred from May through September 2006, and for dissolved copper in May 2009 and April 2010. The site has been dry during most monitoring events. Exceedances of the WQTL for copper occur when enough volume is present to collect a sample, with the exception of March 2016 (Figure 25). High use occurs consistently in January and February making up 67% of the total use from 2014 through 2016 (Figure 25). The site is at risk for water quality impairments related to copper when enough water is present to collect a sample.

During the 2018 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; use is minimal and the site has been dry during monitoring for the past three years. The Coalition determined it is not necessary to conduct MPM June through September; copper MPM has occurred for six years with no exceedances and use is minimal during those months.

Figure 25. 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 2016.



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 WY	
Total Use (2006-2016)	66,402	16,887	10,815	7,051	2,447	1,322	1,094	2,308	0	0	1,691	8,149
% Total (2006-2016)	***56%***	***14%***	***9%***	***6%***	***2%***	***1%***	***1%***	***2%***	***0%***	***0%***	***1%***	***7%***
Total Use (2014-2016)	14,998	8,464	1,485	915	1,630	1,275	847	2,184	0	0	529	2,898
% Total (2014-2016)	***43%***	***24%***	***4%***	***3%***	***5%***	***4%***	***2%***	***6%***	***0%***	***0%***	***2%***	***8%***

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 2017 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 2017 WY, MPM was scheduled for chlorpyrifos and dissolved copper.

Management Plan Monitoring

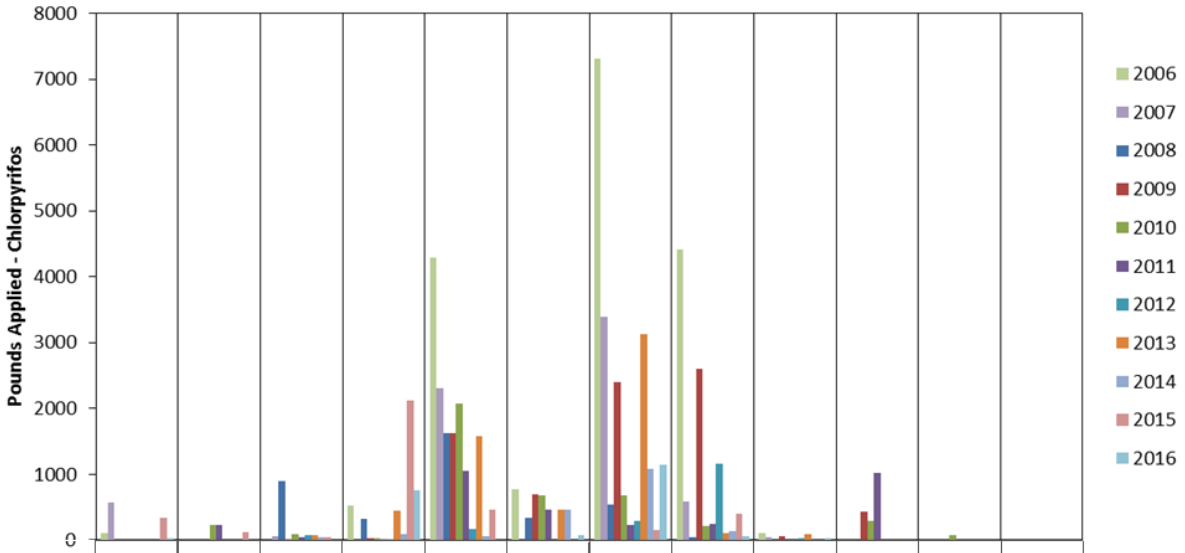
During the 2018 WY, MPM is scheduled for chlorpyrifos and copper at Berenda Slough @ Ave 18 ½.

Chlorpyrifos

Exceedances of the WQTL for chlorpyrifos occurred during July and September 2006, July 2007, and April 2011. The Coalition initiated MPM in 2011 and continued through the 2017 WY during months of past exceedances and months of high use (Figure 26). Chlorpyrifos use within the subwatershed is highest in April (39%) and July (31%) based on PUR data from 2014 through 2016. The site is frequently dry during the irrigation months, including the months of past exceedances.

During the 2018 WY, the Coalition will conduct MPM for chlorpyrifos in April and September based on previous exceedances and high use. Monitoring in July will be discontinued due to no exceedances in the last four samples analyzed during that month (pending July 2017 results).

Figure 26. Berenda Slough along Ave 18 ½ 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 2016.



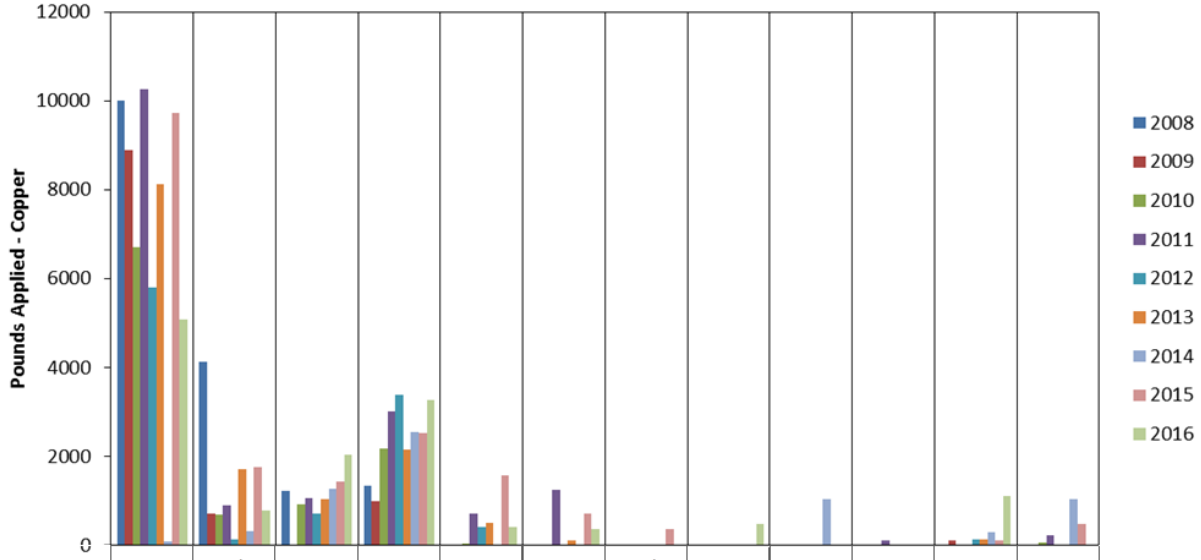
Monitoring Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2006												
2007												
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017											2018 WY	
Total Use (2006-2016)	1,047	569	1,321	4,334	15,236	3,938	20,357	9,962	348	1,734	69	0
% Total (2006-2016)	***2%***	***1%***	***2%***	***7%***	***26%***	***7%***	***35%***	***17%***	***1%***	***3%***	***0%***	***0%***
Total Use (2014-2016)	375	121	88	2,967	526	533	2,385	608	30	0	0	0
% Total (2014-2016)	***5%***	***2%***	***1%***	***39%***	***7%***	***7%***	***31%***	***8%***	***0%***	***0%***	***0%***	***0%***

Copper

Water quality impairments related to copper are common in the site subwatershed; 16 exceedances of the hardness based WQTL for dissolved copper have occurred from 2011 through May 2017. At least one exceedance has occurred every month, with the exception of March (Figure 27). The exceedances that occurred during May through September do not coincide with high copper use and is an indication that copper water quality impairments are not due entirely to agricultural sources. Copper use in the subwatershed follows a trend in which high use occurs in January and declines substantially through the rest of the year. In recent years, the site has been dry frequently. During the 2017 WY, exceedances of the WQTL for copper occurred in samples collected in January and April after rainfall events.

During the 2018 WY, the Coalition will conduct MPM for dissolved copper from January through April.

Figure 27. 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 2016.



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 WY	
Total Use (2006-2016)	64,688	11,077	9,623	21,344	3,643	2,424	366	466	1,040	108	1,839	1,784
% Total (2006-2016)	***55%***	***9%***	***8%***	***18%***	***3%***	***2%***	***0%***	***0%***	***1%***	***0%***	***2%***	***2%***
Total Use (2014-2016)	14,890	2,839	4,709	8,317	1,977	1,073	366	466	1,040	0	1,489	1,507
% Total (2014-2016)	***39%***	***7%***	***12%***	***22%***	***5%***	***3%***	***1%***	***1%***	***3%***	***0%***	***4%***	***4%***

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 2017 WY. Monitoring for copper during the 2018 WY at Berenda Slough @ Ave 18 ½ will occur for MPM based on the schedule discussed above.

Dry Creek @ Rd 18

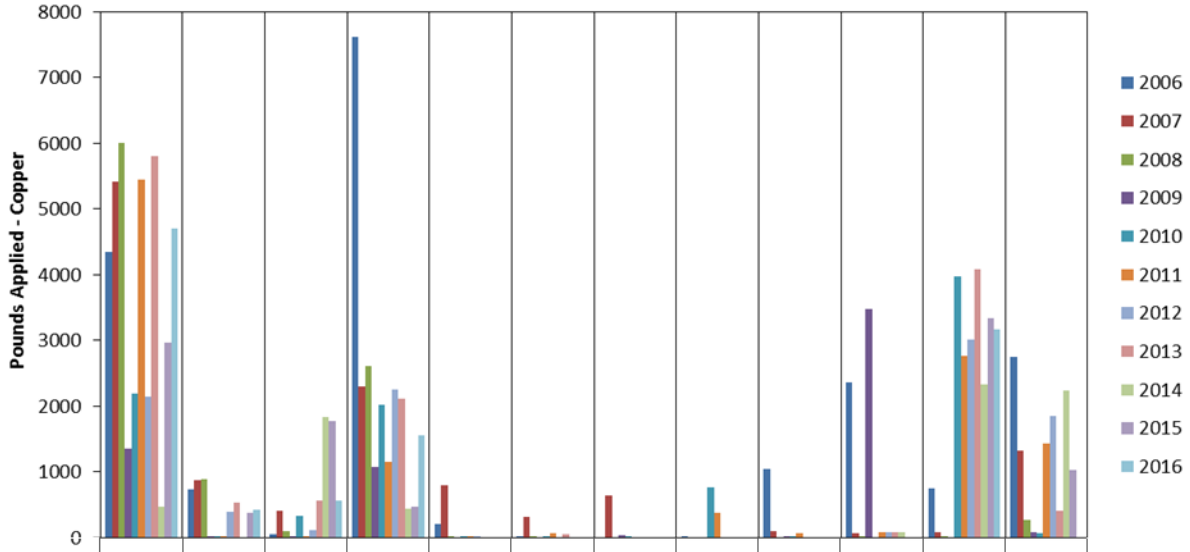
Dry Creek @ Rd 18 is a rotating Core site and will be monitored as a Represented site during the 2018 WY. During the 2017 WY, MPM for dissolved copper occurred. A summary of monitoring results through May 2017 and the proposed monitoring schedule for the 2018 WY is provided below.

Copper

The Coalition monitored for copper from 2006 through the 2017 WY. Exceedances of the WQTL for copper occurred monthly during the 2016 and 2017 WY. Copper exceedances occur during months of high use, such as January and March, and months of no reported use (May through September). Monitoring results indicate applications of copper by growers are not the only source of copper within the subwatershed.

The Coalition determined monitoring for copper from May through September is not necessary, as copper applications by growers have not occurred from 2014 through 2017 (Figure 28). Additionally, no monitoring will occur from October through December as no exceedances have occurred and the site is frequently dry during winter months. During the 2018 WY, the Coalition will conduct MPM for copper from January through April based on past exceedances and reported pesticide use by growers (Figure 28).

Figure 28. 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 2016.



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 WY	
Total Use (2006-2016)	40,853	4,215	5,734	23,612	1,037	437	666	1,154	1,197	6,242	23,520	11,464
% Total (2006-2016)	*34%*	*4%*	*5%*	*20%*	*1%*	*0%*	*1%*	*1%*	*1%*	*5%*	*20%*	*10%*
Total Use (2014-2016)	8,135	797	4,166	2,461	0	0	0	0	0	83	8,848	3,277
% Total (2014-2016)	*29%*	*3%*	*15%*	*9%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*32%*	*12%*

Selenastrum capricornutum toxicity

The management plan for toxicity to *S. capricornutum* was approved for completion on April 14, 2017. The Coalition will not conduct monitoring for algae toxicity during the 2018 WY.

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 2017 WY. Monitoring for copper during the 2018 WY at Dry Creek @ Rd 18 will occur based on the MPM schedule discussed above.