San Joaquin Valley Drainage Authority

Westside San Joaquin River Watershed Coalition

Semi-Annual Monitoring Report
2015 Irrigation Season Report

Covering the period: March 2015 through August 2015
(Sampling Events 121 through 126)

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2	Title Page	Cover
3	Table of Contents	Table of Contents
4	Executive Summary	Section 1
5	Description of the Coalition Group Geographical Area	Section 2
6	Monitoring Objectives and Design	Section 2
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10	Management Plan Status Update	Section 9, Attachment 6
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12	Sampling and Analytical Methods	Sections 2, 5, & 7
13	Laboratory and Field Quality Control Results	Section 6, Attachment 3, Appendix D
14	Summary of Quality Assurance Evaluation Results	Section 6, Appendix D
15	Method Used to Obtain Flow	Section 6
16	Summary of Exceedances and Related Pesticide Use Information	Sections 4, 8, Attachments 2 & 5, & Appendix B
17	Actions Taken to Address Water Quality Exceedances	Section 9
18	Evaluate monitoring data: identify temporal/spatial trends/patterns;	Sections 8, 9, Attachment 6, & Appendix G
19	Summary of Nitrogen Management Plan information	**N/A**
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21	Summary of mitigation monitoring	**N/A**
22	Summary of education and outreach activities	Section 9, Table 14
23	Conclusions and Recommendations	Section 11
	Copies of Chain of Custody Sheets	Appendix A
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SECTION 1: EXECUTIVE SUMMARY

This report covers the 2015 irrigation season sampling events beginning March 2015 through August 2015 (Event 121 through Event 126). 18 of the 21 monitoring sites within the Westside San Joaquin River Watershed Coalition (Westside Coalition) are located on streams that are dominated by summer agricultural drainage runoff.

The 2015 irrigation season was classified as a critical hydrologic year type for the westside of the San Joaquin Valley with Federal Water Contractors receiving 0% of federal water contract allocation. There were no significant storms during the report period. See **Section 3** for a discussion of measured rainfall. Irrigation season monitoring samples were collected at all sites containing sufficient water in accordance with the Westside Coalition's Monitoring and Reporting Plan[1]. Sediment samples were collected in March 2015, as scheduled. Severe sediment toxicity (<80% survival) was observed at the Blewett Drain, Hospital Creek, Ingram Creek, Westley Wasteway, and Orestimba Creek at Hwy. 33 sites; less significant sediment toxicity (>80 Survival) was observed at the Ramona Lake and Newman Wasteway sites. The five sediment samples exhibiting severe toxicity were tested for selected pesticides. See **Sections 8** and **9.**

Attachment 1 details the samples collected at each site during each sampling event. A summary of the monitoring results is presented in **Appendix A**. During the report period, significant aquatic toxicity was measured one time for *Ceriodaphnia dubia* (water flea) which is summarized in **Table 1** below.

Table 1: Summary of Aquatic Toxicity

Event	Site	Species/% Survival or % Control Growth
124 (June)	Mud Slough u/s San Luis Drain	*Ceriodaphnia dubia* – 45% Survival

These results, along with associated follow up testing, water quality and flow data, are summarized in **Attachment 2**. Details of aquatic toxicity analyses are included in **Appendix C**.

Quality control samples were collected in addition to the event analysis sample. The quality control samples included field blanks, field duplicates, laboratory blanks and spike, and matrix spike/matrix spike duplicate samples (MS/MSD).

There were a handful of minor quality control issues, including exceedance of the field duplicate relative percent difference (RPD) value, and surrogate, matrix spike, or laboratory spike recoveries outside of the expected range. None of these issues are expected to affect data usability. Results of the Field Quality Control samples are discussed in **Section 6** and **Attachment 3**. A review of laboratory quality assurance activities is included in **Appendix D.**

Table 2 lists the sites that were sampled during the 2015 irrigation season.

[1] Attachment B to Order R5-2014-0002-R1: Monitoring and Reporting Program

Table 2: Collected Samples - March 2015 through August 2015

Map Designation	Monitoring Site	Event 121		Event 122	Event 123	Event 124	Event 125	Event 126
	Discharge Sites	March		April	May	June	July	August
1	Hospital Cr at River Road	S	SS	S	S	NF	S	S
2	Ingram Cr at River Road	S	SS	S	S	S	S	S
3	Westley Wasteway near Cox Road	S	SS	S	S	S	S	NF
4	Del Puerto Cr near Cox Road	S	SS	S	S	S	S	NF
5	Del Puerto Cr at Hwy 33	NP	SS	NP	NP	NP	NP	NP
7	Ramona Lake near Fig Avenue	S	SS	S	S	S	NF	NF
8	Marshall Road Drain near River Road	NF	NP	NF	S	NF	NF	NF
9	Orestimba Cr at River Road	NF	NF	NF	NF	NF	NF	NF
10	Orestimba Cr at Hwy 33	S	SS	S	NF	S	NF	NF
11	Newman Wasteway near Hills Ferry Road	S	SS	S	S	S	S	S
13	San Joaquin River at Lander Avenue	S	NP	S	S	S	S	S
14	Mud Slough u/s San Luis Drain	S	NP	S	S	S	NF	NF
15	Salt Slough at Lander Avenue	S	NP	S	S	S	S	S
16	Salt Slough at Sand Dam	S	SS	S	S	S	S	S
17	Los Banos Creek at Highway 140	S	NP	S	S	S	S	S
18	Los Banos Creek at China Camp Road	S	SS	S	S	S	S	S
20	Blewett Drain near Highway 132	S	SS	S	S	S	S	NF
21	Poso Slough at Indiana Avenue	S	SS	S	S	S	S	NF
	Source Water Sites							
12	San Joaquin River at Sack Dam	S	NP	S	S	S	S	S
22	San Joaquin River at PID Pumps	S	NP	S	S	S	S	S
23	Delta Mendota Canal at Del Puerto WD	S	NP	S	S	S	S	S

Notes:	S = Water sampled according to the MRP.		NF = Not sampled due to lack of flow.
	SS = Sediment sampled according to the MRP.		NP = Not included in the sampling plan.
	NA = Not sampled due to lack of safe access.		NS = Not sampled - sample missed.

SECTION 2: COALITION AND MONITORING PROGRAM DESCRIPTION

On February 2, 2014 The San Joaquin Valley Drainage Authority (SJVDA) submitted a Notice of Intent (NOI) to act as the third-party group to represent growers affected by the Waste Discharge Requirements General Order for Growers within the Western San Joaquin River Watershed (Order No.R5-2014-002). With a letter dated March 17, 2014, the Regional Water Quality Control Board approved the SJVDA NOI. The SJVDA, a joint powers agency, is the umbrella organization for the Westside Coalition.

The Westside Coalition watershed generally lies on the west-side of the San Joaquin River from approximately the Stanislaus River on the north to 10 miles south of Mendota and encompasses an area of approximately 460,000 acres. There are approximately 4,000 landowners and 1,500 operators within the watershed. Most of the watershed receives water supplies from the Central Valley Project, while certain areas receive water from the State Water Project. In addition, some areas receive supplies from the San Joaquin River and local water sources, one area receives a Kings River supply, and some areas receive water from groundwater wells. The Delta-Mendota Canal and San Luis Canal run through the watershed. Water deliveries are made to Federal Central Valley Project Contractors and to San Joaquin River Exchange Contractors from these facilities. State water deliveries are also made to one area.

The Grassland Drainage Area encompasses 97,400 acres that are geographically within the watershed. The Grassland Drainage Area is covered under waste discharge requirements (R5-2015-0094), which regulates the discharge of subsurface drainage water through the San Luis Drain to the San Joaquin River. Tailwater is aggressively controlled and not allowed to

discharge from the region. The area coordinates a separate monitoring and reporting program under the above waste discharge requirements.

The Westside Coalition area also includes federal, state and private managed wetlands. These areas share water delivery and drainage conveyance systems with the surrounding agricultural areas. Due to the integrated nature of the water facilities the managed wetlands have joined the Westside Coalition as a wetland sub-watershed participant to comply with the Conditional Waiver to effectively and efficiently address water quality issues. The effects of discharges from the wetland areas are covered in this monitoring program.

The communities of Grayson, Westley, Vernalis, Crows Landing, Patterson, Newman, Gustine, Stevinson, Los Banos, Dos Palos, South Dos Palos, Firebaugh, Mendota and Tranquillity lie within the geographic area of the Westside Coalition. These communities do not have discharges from irrigated lands and are not included in the Westside Coalition, but contribute storm waters and municipal waste waters to the watershed and may impact discharges from irrigated lands.

Interstate Highway 5, State Highways 33, 140, 165, 152, and many county roads run through the geographic area of the Westside Watershed. Storm water discharges from these roads and highways can contribute contaminants to the same water bodies that carry agricultural return water.

On July 30, 2004, the Westside Coalition received approval for its irrigated agricultural monitoring plan from the Central Valley Regional Water Quality Control Board. The first sampling event took place on July 6, 2004, with subsequent event samples collected monthly. In February, 2008, the Westside Coalition received approval for a revised Monitoring and Reporting Plan (Revised MRP). The Revised MRP was designed to focus monitoring efforts at sites with known water or sediment issues and to support the Management Plan issues. The Revised MRP was implemented in March of 2008. Monitoring and Reporting Program Order No. R5-2008-0831 (MRP Order or MRP) was issued by the Regional Board in September 2008. This order was largely reflective of the Revised MRP and took effect in March 2009, modified after the 2011/12 assessment period. Currently, the Westside Coalition is monitoring and reporting pursuant to Attachment B to Order R5-2014-0002-R1, which took effect January 15, 2015. See **Attachment 7**.

The current MRP includes a targeted monthly sampling plan for 21 monitoring sites within the Coalition area as well as plans for sampling two rain events during each year. The monitoring sites include 3 source water sites and 18 sites that discharge agricultural drain water.
During any given sampling event, each accessible site is visited, visually assessed, and samples are collected in accordance with the field sampling manual. See **Table 2.**

The objectives of the original monitoring program are:

- To assess the existing water quality characteristics of major agricultural drains within the watershed area.
- To determine the location and magnitude of water quality problems.
- To determine the cause of water quality problems and develop solutions.

Two sampling crews have been trained by the analytical laboratories to collect samples according to the Westside Coalition's QAPP and Field Sampling Manual. These crews are responsible for collecting samples at each of the 21 sites; the field coordinator for the northerly region is responsible for collecting samples north of Newman Wasteway. The field coordinator for the southerly region is responsible for collecting samples south of (and including) Newman Wasteway. The sampling responsibilities include completion of the field data sheets, collection of water and sediment samples, completion of labels and chain of custody sheets, and coordination with the labs for sample pickup. The MRP Sample Regimens at each site are shown in **Table 3**. The laboratory, method, and constituent groups analyzed are shown in **Table 4** and a list of specific analytes is included in **Attachment 7**.

Table 3: Monitoring Stations and Sampling Regimens

Monitoring Site	Site Code	Season Type		
		Irrigation (Mar-Aug)*	Non-Irrigation (Sep-Feb)*	Rain Event (2x per year)
Discharge Sites				
Blewitt Drain Highway 132	VH132	Core + Special	Core	Rain**
Poso Slough at Indiana Avenue	PSAIA	Special	Core	Rain**
Hospital Creek at River Road	HCARR	Special	-	Rain**
Ingram Creek at River Road	ICARR	Core + Special	Core	Rain**
Westley Wasteway near Cox Road	WWNCR	Core + Special	Core	Rain**
Del Puerto Creek near Cox Road	DPCCR	Core + Special	Core	Rain**
Del Puerto Creek at Hwy 33	DPCHW	-	-	Rain**
Ramona Lake near Fig Avenue	ROLFA	Core + Special	Core	Rain**
Marshall Road Drain near River Road	MRDRR	Core + Special	Core	Rain**
Orestimba Creek at River Road	OCARR	Core + Special	Core	Rain**
Orestimba Creek at Hwy 33	OCAHW	Special	-	Rain**
Newman Wasteway near Hills Ferry Road	NWHFR	Core + Special	Core	Rain**
San Joaquin River at Lander Avenue	SJRLA	Core + Special	Core + Special	Rain**
Mud Slough u/s San Luis Drain	MSUSL	Core + Special	Core + Special	Rain**
Salt Slough at Lander Avenue	SSALA	Core + Special	Core + Special	Rain**
Salt Slough at Sand Dam	SSASD	Special	-	Rain**
Los Banos Creek at Highway 140	LBCHW	Core + Special	Core + Special	Rain**
Los Banos Creek at China Camp Road	LBCCC	Core + Special	Core	Rain**
Source Water Sites				
San Joaquin River at Sack Dam	SJRSD	Source	Source	Source
Delta Mendota Canal at Del Puerto WD	DMCDP	Source	Source	Source
San Joaquin River at PID Pumps	SJRPP	Source	Source	Source

* Irrigation season is defined as March through August. Non-irrigation season is defined as September through February. The Westside Coalition, in collaboration with the Regional Water Quality Control Board, may shift the seasons up or back 1 month to account for actual irrigation practices.

Table 4: Analytes, Laboratories, and Methods

	Constituent	Laboratory	Method	Units	Laboratory SOP No.
Field Data	pH	Field Crew	YSI meter	-	Field Manual
	Temperature	Field Crew	YSI meter	ºC	Field Manual
	Conductivity	Field Crew	YSI meter	µmhos/cm	Field Manual
	Dissolved Oxygen	Field Crew	YSI meter	mg/L	Field Manual
	Flow	Field Crew	Estimate	cfs	Field Manual
Gen. Phy. / D.W.	Color (A.P.H.A.)	Caltest	SM 2120B	-	COLOR-rev4E
	pH	Caltest	SM 4500-H+B	-	PH-rev4
	TDS	Caltest	SM 2540C	mg/L	TDS-rev4E
	TSS	Caltest	SM 2540D	mg/L	TSS-rev4
	Turbidity	Caltest	SM 2130B	NTU	TURB-rev4E
	Hardness	Caltest	EPA 130.2	mg/L	HARD-rev5E
	Metals	Caltest	EPA 200.7, 200.8	mg/L	M-ICP-rev10E & 2008rev5Ea
	Bromide/Nitrate	Caltest	EPA 300.0	mg/L	DIONEX-rev5E
	Nitrogen, Nitrite	Caltest	EPA 354.1	mg/L	NO2-rev6
	TKN	Caltest	EPA 351.3	mg/L	NH3-TKN-rev6E
	Phosphate	Caltest	EPA 365.2	mg/L	PHOS-rev4
	Ammonia (as N)	Caltest	EPA 350.2	mg/L	NH3-TKN-rev6E
	DOC	Caltest	SM 5310-B/C	mg/L	TOC-D0C-rev7E
	TOC	Caltest	SM 5310-B/C	mg/L	TOC-D0C-rev7E
	Fecal coliform	Caltest	SM20-9221B/E	mpn/100ml	MMOMUG-rev8E
	E. Coli	Caltest	SM 9221BF/9223-B	mpn/100ml	MMOMUG-rev8E
Pesticides	Organophosphates	APPL	EPA 8141A	µg/L	ANA8141A
	Organochlorines	APPL	8081A/8082	µg/L	ANA8081A
	Carbamates	APPL	EPA 8321A LL	µg/L	HPL8321A
	Herbicides	APPL	EPA 8141A	µg/L	ANA8151A
Sediment	Organochlorine	Caltest	SW846 8081	mg/kg (dry)	8081rev8
	Pyrethroid	Caltest	SW846 8270(SIM)	mg/kg (dry)	Pyrethroidsrev4a
	% Solids	Caltest	EPA 160.3	%	Residue-rev6
	TOC	Caltest	EPA 9060A	%	WalkleyBlack TOC
Toxicity	*Ceriodaphnia d.*	PER	EPA-821-R-02-012	% survival	Acute Cerio SOP
	Selenastrum c.	PER	EPA-821-R-02-013 & EPA-600-4-91-002	cell growth	Chronic Selenastrum SOP
	Pimephales p.	PER	EPA-821-R-02-012	% survival	Acute FHM SOP
	Hyalella a.	PER	EPA-600-R-99-064	% survival	10-D HyalellaAcuteSedTest

Caltest Labs in Napa, California
APPL Labs in Fresno, California
Pacific EcoRisk (PER) in Fairfield, California

Aquatic toxicity samples were collected and analyzed by Pacific EcoRisk, Inc. using the methods described below:

- *Ceriodaphnia dubia*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (USEPA 2002a).
- *Pimephales promelas*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (USEPA 2002a).
- *Selenastrum capricornutum*: "Short-term Methods for Estimated the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms" (USEPA 2002b).
- *Hyalella azteca*: "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Organisms" (USEPA 2000).

SECTION 3: MONITORING EVENT SUMMARIES

Monitoring Event Summaries.

Beginning in March 2015 and in accordance with the MRP, irrigation season monitoring was implemented at the discharge sites indicated in Table 3 above. The monitoring sites were visited monthly during the reporting period and samples were collected from the sites with sufficient water to submerge and fill a sample container.

Three CIMIS[2] stations were monitored by the Westside Coalition for rainfall: Patterson, Los Banos, and Firebaugh. **Table 5** summarizes the monthly rainfall measured at each station.

Table 5: Monthly Rainfall in Inches

Month	Patterson	Los Banos	Firebaugh
March	0.85	0.13	0.31
April	0.46	0.56	0.48
May	0.21	0.07	0.24
June	0.00	0.00	0.0
July	0.03	0.00	0.0
August	0.04	0.06	0.01
Report Period Total	**1.59**	**0.82**	**1.04**

Rainfall during the 2015 irrigation season was typical of spring/summer precipitation conditions and no significant storms occurred.

Event 121, March 9th and 10th, 2015.

Irrigation season water samples were collected at 15 discharge sites and 3 source water sites on March 9th in accordance with the Westside Coalition MRP. There was insufficient flow for sample collection at Marshall Road Drain near River Road and Orestimba Creek at River Road. Aquatic toxicity was tested for algae, invertebrates, and fish in accordance with the Monitoring Order (see **Attachment 7**).

No aquatic toxicity was observed in any of the samples.

Sediment samples were collected at 12 monitoring sites on March 10th. Significant toxicity was observed in the Blewett Drain (50.0% survival) sample, the Hospital Creek sample (27.5% survival), the Ingram Creek sample (20.0% survival), the Westley Wasteway sample (65.7% survival), the Ramona Lake sample (91.3% survival), the Orestimba Creek at Highway 33 sample (85.0% survival), and the Newman Wasteway near Hills Ferry Rd (86.3% survival). Although the toxicity in the Ramona Lake and Newman Wasteway samples were statistically significant, they did not require follow-up testing. Sediment from the Blewett Drain, Hospital Creek, Ingram Creek, Westley Wasteway, and Orestimba Creek at Hwy 33 samples were sent to Caltest Laboratories for pesticide analysis. In those five sediment samples, pesticides were present in sufficient concentration to have caused the observed toxicity. See **Section 8** and **Attachment 4**.

[2] California Irrigation Management Information System, http://wwwcimis.water.ca.gov/cimis/welcome.jsp
CIMIS Site Designations: Patterson – 161; Los Banos – 056; Firebaugh/Telles – 007

Event 122, April 14th, 2015.
Irrigation season water samples were collected at 15 discharge sites and 3 source water sample sites. There was insufficient flow to collect samples at Marshall Road Drain near River Road and Orestimba Creek at River Road sites. Aquatic toxicity was tested for algae, invertebrates, and fish in accordance with the Monitoring Order (see **Attachment 7**).

No aquatic toxicity was observed in any of the samples.

Event 123, May 13th, 2015.
Irrigation season water samples were collected at 15 discharge sites and 3 source water sites on May 12th. There was insufficient flow to collect samples at the Orestimba Creek at River Road and Orestimba Creek at Hwy 33 sites. Aquatic toxicity was tested for algae, invertebrates, and fish in accordance with the Monitoring Order (see **Attachment 7**).

No aquatic toxicity was observed in any of the samples.

Event 124, June 9th, 2015.
Irrigation season water samples were collected at 14 monitoring sites and 3 source water sites on June 9th in accordance with the Westside Coalition's MRP. There was insufficient flow at Hospital Creek at River Road, Marshall Road Drain near River Road, and Orestimba Creek at River Road sites for sample collection. Aquatic toxicity was tested for algae, invertebrates, and fish in accordance with the Monitoring Order (see **Attachment 7**). Significant toxicity was observed in the Mud Slough upstream of San Luis Drain (MSUSL) site for *Ceriodaphnia* (45% survival). There was a ≥50% difference in *Ceriodaphnia* survival in the MSUSL ambient water sample relative to the corresponding Control treatment. As per the Coalition's Quality Assurance Program Plan (QAPP), that triggered the implementation of a Toxicity Identification Evaluation (TIE) targeted for pesticides and metals. The results are as follows:

> There was a 95% reduction in survival of the test organisms in the Baseline untreated MSUSL sample treatment, indicating that the previously observed toxicity was persistent. There was 90% mortality observed in the Conductivity Control. There were no blank interferences present in the TIE treatments. Toxicity was not removed in any of the TIE treatments, but survival increased from 5% (baseline) to 30% in the centrifugation treatment and 50% in the centrifugation + C18 SPE treatment. These results suggest that a particulate associated contaminant and a dissolved non-polar organic contaminant accounted for some of the toxicity. However, when the results of the TIE are combined with similar results of the initial test (toxicity observed in the conductivity Control and 100% MSUSL sample), you cannot rule out that the toxicity was caused by the elevated conductivity (6465 µS/cm.) in the sample.

No pesticides were detected in the MSUSL sample.

Event 125, July 14th, 2015.
Irrigation season water samples were collected at 12 discharge sites and 3 source water sites. Due to insufficient flow, no samples were collected at the Ramona Lake near Fig Avenue, Marshall Road Drain near River Road, Orestimba Creek at River Road, Orestimba Creek at

Highway 33, and Mud Slough u/s San Luis Drain sites. Aquatic toxicity samples were collected in accordance with the MRP. Aquatic toxicity was tested for algae, invertebrates, and fish in accordance with the Monitoring Order (see **Attachment 7**). The PMSD for the Hospital Creek and Poso Slough samples were near or above the EPA 90th percentile limit of 29% due to the presence of foreign algal species (i.e., the presence of foreign algal species is a test interference prohibiting the determination of toxicity to *S. capricornutum*). The sample was 0.2 µm filtered and then retested with "Lab Control 3." No foreign algal species were observed following the 0.2 µm filtration.

The mean survival response of *Ceriodaphnia* for "Lab Control 3" failed to meet test acceptability criteria; accordingly, the associated samples were immediately retested with "Lab Control 4."

No aquatic toxicity was observed in any of the samples.

Event 126, August 11th, 2015.
Irrigation season water samples were collected at 8 discharge sites and 3 source water sites. There was insufficient flow at the Blewett Drain near Highway 132, Westley Wasteway near Cox Road, Del Puerto Creek near Cox Road, Ramona Lake near Fig Avenue, Marshall Road Drain near River Road, Orestimba Creek at River Road, Orestimba Creek at Hwy 33, Mud Slough upstream of San Luis Drain, and Poso Slough at Indiana Avenue sites. Aquatic toxicity was tested for algae, invertebrates, and fish in accordance with the Monitoring Order (see **Attachment 7**).

No aquatic toxicity was observed in any of the samples.

SECTION 4: SAMPLING SITE AND WATERSHED DESCRIPTIONS

Figure 1 shows the Westside Coalition area and the location of the monitoring sites. Following is a description and rationale for the monitoring sites:

- Blewett Drain near Highway 132 (originally called Vernalis at Highway 132 [VH132]). This site is located at the northerly boundary of the Westside Coalition. The cropping pattern for discharges into this drain is similar to that of Hospital Creek. Flow at this site is calculated as an estimated velocity and measured flow area. The Westside Coalition began monitoring this site in 2008.
- Poso Slough at Indiana Avenue (PSAIA). This site is located on Poso Slough near the boundary between San Luis Canal Company and Central California Irrigation District in the Dos Palos Subarea of the Westside Coalition. Flow at this site is calculated as an estimated velocity and measured flow area. The Westside Coalition began monitoring this site in 2008. Poso Slough is a tributary to Salt Slough, discharging upstream of the Sand Dam monitoring site.
- Hospital Creek at River Road (HCARR). This site is a significant drainage for the Patterson Subarea of the Westside Coalition and has been monitored since July 2004 for a variety of constituents. Sediment discharge, sediment toxicity, aquatic toxicity (water flea), and pesticides have been measured at this site. It is on the 303(d) list for pesticides. Flow at this site is measured by a rectangular weir.

- Ingram Creek at River Road (ICARR). This site is a significant drainage for the Patterson Subarea of the Westside Coalition and has been monitored since July 2004 for a variety of constituents. Sediment discharge, sediment toxicity, aquatic toxicity (water flea), and pesticides have been measured at this site. It is on the 303(d) list for pesticides. Flow at this site is measured by a rectangular weir.
- Westley Wasteway near Cox Road (WWNCR). Westley Wasteway is a significant drainage for the Patterson Subarea for both tailwater and storm runoff. Land use upstream of this monitoring station is similar to that of Del Puerto Creek. This site has been monitored for a variety of constituents since 2004. Sediment discharge, sediment toxicity, aquatic toxicity (water flea), and pesticides have been measured at this site. Flow at this site is measured by a rectangular weir.
- Del Puerto Creek near Cox Road (DPCCR) and Del Puerto Creek near Highway 33 (DPCHW). Del Puerto Creek is on the 303(d) list for pesticides and is a major drainage for the Patterson Subarea and major storm runoff collector. Two stations are identified on this water-body; one near the discharge to the San Joaquin River, and one at Highway 33, near the middle of the Patterson Subarea. Biological assessments are performed on Del Puerto Creek to assess its overall health, which will be useful in relating to collected water quality data. Both of these sites have been monitored for a variety of constituents since 2004. Sediment discharge, sediment toxicity, aquatic toxicity (water flea), and pesticides have been measured at both sites. At the Highway 33, flow is estimated using the float method. A family of beavers have constructed a dam downstream of the Cox Road site, creating a backwater that prevents safe flow measurement at the site. The Coalition is considering options to address this issue.
- Ramona Lake near Fig Avenue (ROLFA). This site monitors discharge from a small lake as it flows into the San Joaquin River. Agricultural and storm runoff from the Patterson Subarea can discharge into the lake. This site has been monitored for a variety of constituents since 2004. Some pesticides have been measured at this site.
- Marshall Road Drain near River Road (MRDRR). This site monitors a pipe drain that carries agricultural and storm runoff from the Patterson Subarea of the Westside Coalition. This site has been monitored for a variety of constituents since 2004. Some pesticides and aquatic toxicity have been measured at this site. Flow from this site is measured by a weir within the pipe. During periods of high flow, the weir can become submerged and incapable of measuring flow.
- Orestimba Creek at River Road (OCARR) and Highway 33 (OCAHW). There are two monitoring locations on Orestimba Creek; one near the discharge point to the San Joaquin River; and one upstream at Highway 33. Orestimba Creek is similar to that of Del Puerto in both the surrounding landscape and discharged water quality. It is on the 303(d) list for pesticides, is a major drainage for the Patterson Subarea, and is included in the biological assessment portion of the monitoring program. Pesticides, sediment discharge, sediment toxicity, and aquatic toxicity have been measured at these sites. USGS monitors and reports flow at Orestimba Creek at River Road. Flow at Orestimba Creek at Highway 33 is calculated through an estimated velocity and cross-sectional flow area.
- Newman Wasteway near Hills Ferry Road (NWHFR). The Newman Wasteway is a significant drainage for the Patterson Subarea and is on the 303(d) list for salt and pesticides. This site measures drainage that originates from the southerly region of the

Patterson Subarea, and has been monitored for a variety of constituents since 2004. Pesticides, sediment discharge, sediment toxicity, and aquatic toxicity have been measured at this site. Flow at this site is calculated through an estimated velocity and cross-sectional flow area.

- The San Joaquin River at Lander Avenue (SJRLA). This site is both a receiving water body for agricultural and storm drainage and a source water for districts that pump from the San Joaquin River. It also receives drainage flows from irrigated wetlands in the fall and winter months. It has been monitored for a variety of constituents since 2004, and pesticides, sediment toxicity, and aquatic toxicity have been measured. Flow at this site is reported by a nearby CDEC station.
- Mud Slough upstream of the San Luis Drain (MSUSL). This site measures drainage originating from the Dos Palos and Los Banos Subareas that flow through the wetlands as well as the wetlands themselves. Mud Slough is on the 303(d) list for a variety of constituents. In addition to the Westside Coalition's monitoring program, the Central Valley Regional Water Quality Control Board's Surface Water Ambient Monitoring Program (SWAMP) collects and analyzes samples from this site throughout the year. These samples are analyzed for selenium, boron, and EC, along with other constituents. Flow at this site is calculated as the difference between the flow downstream of the San Luis Drain (reported by CDEC) and the measured San Luis Drain Discharge. The SWAMP Data is available via the internet at: http://www.waterboards.ca.gov/centralvalley/programs/agunit/swamp/index.html.
- Salt Slough at Lander Avenue (SSALA) Salt Slough at Lander Avenue measures agricultural, storm, and wetland runoff from the Dos Palos and Los Banos Subareas, and has been monitored (and 303(d) listed) for a variety of constituents since 2004. In addition to the Westside Coalition's monitoring program, the Central Valley Regional Water Quality Control Board, SWAMP collects and analyzes samples from this site throughout the year. These samples are analyzed for selenium, boron, and EC, along with other constituents. Flow at this site is reported by CDEC. The SWAMP Data is available via the internet at: http://www.waterboards.ca.gov/centralvalley/programs/agunit/swamp/index.html.
- Salt Slough at Sand Dam (SSASD). This site is upstream of the Lander Avenue site and measures agricultural and storm drainage originating in portions of the Dos Palos Subarea. Pesticides and aquatic toxicity have been measured at this site, which has been monitored for a variety of constituents since 2004. Flow at this site is measured by a weir.
- Los Banos Creek at Highway 140 (LBCHW). This site carries agricultural, storm and irrigated wetland runoff from the Los Banos Subarea. Some pesticides have been measured at this site. Flow at this site is calculated through an estimated velocity and cross-sectional flow area.
- Los Banos Creek at China Camp Road (LBCCC). This site monitors agricultural and storm runoff from the Los Banos Subarea, upstream of the Highway 140 site. There is a farmer-maintained dam downstream of this site which is frequently used to stop flows so that it may be diverted for irrigation. Flow at this site is calculated through an estimated velocity and cross-sectional flow area.

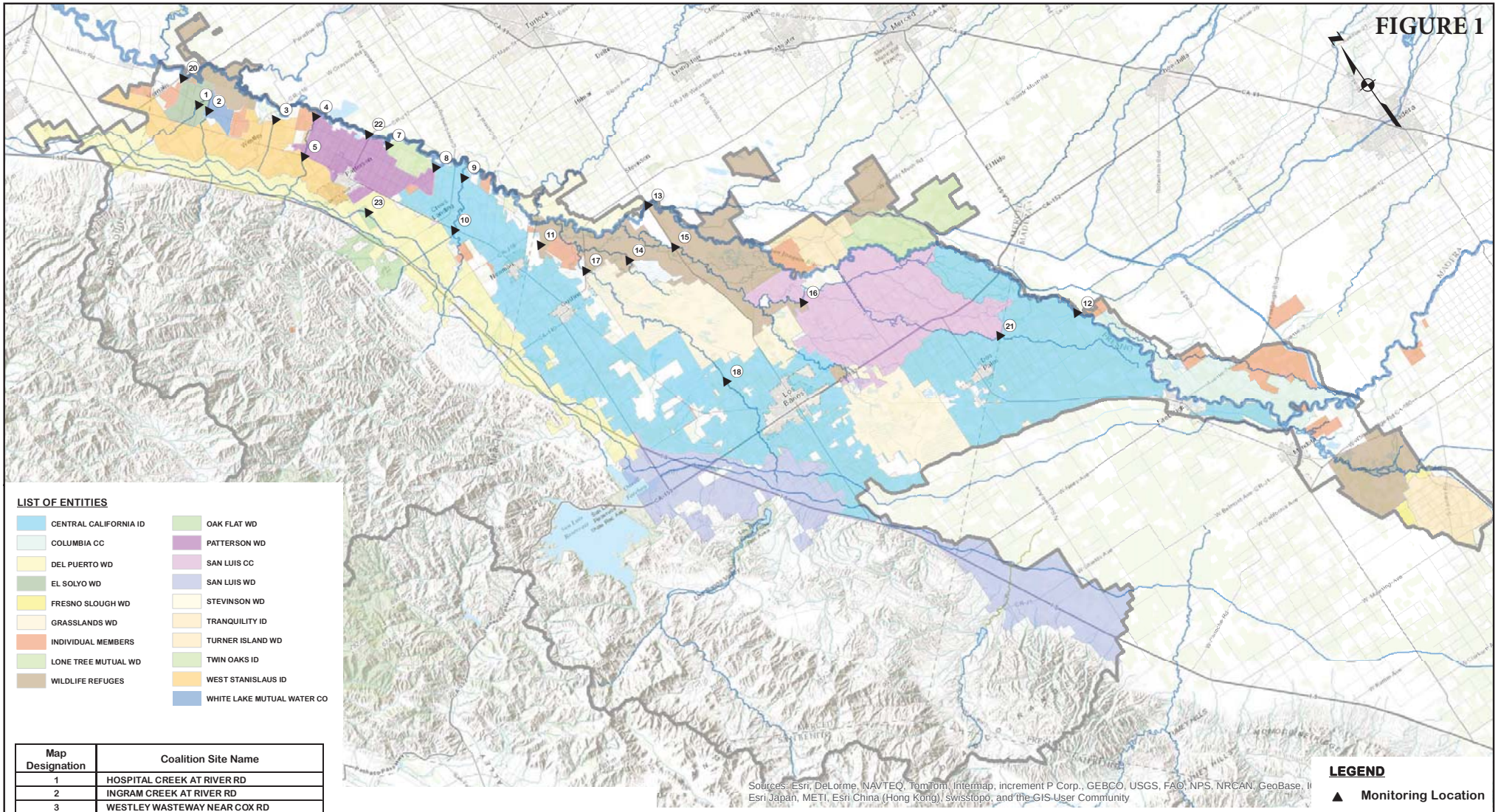
- San Joaquin River at Sack Dam (SJRSD). This is a source water monitoring site located at the diversion point for San Luis Canal Company. This site is monitored for source water constituents. Flow at this site is measured across the dam.
- Delta Mendota Canal at Del Puerto Water District (DMCDP). This site monitors water quality in the Delta Mendota Canal at a Del Puerto Water District turnout. This site characterizes the source water quality typical of the Delta Mendota Canal, and is monitored for source water constituents. Flow is not measured at this site.
- San Joaquin River at Patterson Irrigation District Pumps (SJRPP). This monitoring site is located at the Patterson Irrigation District pump station on the San Joaquin River and characterizes the source water quality of the San Joaquin River in the Patterson Subarea. This site is monitored for source water constituents. Flow from this site is reported by CDEC. This site is the same as the San Joaquin River at Las Palmas site listed in the Chlorpyrifos and Diazinon TMDL program.

Table 6 lists the monitoring sites and coordinates in the WGS84 datum.

Table 6: Monitoring Site Coordinates

Site	Latitude (N)	Longitude (W)
Hospital Cr at River Road	37.61047	121.23078
Ingram Cr at River Road	37.60022	121.22506
Westley Wasteway near Cox Road	37.55822	121.16372
Del Puerto Cr near Cox Road	37.53936	121.12206
Del Puerto Cr at Hwy 33	37.51406	121.15956
Ramona Lake near Fig Avenue	37.47875	121.06839
Marshall Road Drain near River Road	37.43631	121.03617
Orestimba Cr at River Road	37.41386	121.01489
Orestimba Cr at Hwy 33	37.37717	121.05856
Newman Wasteway near Hills Ferry Road	37.32036	120.98336
San Joaquin River at Sack Dam	36.98353	120.50050
San Joaquin River at Lander Avenue	37.29506	120.85139
Mud Slough u/s San Luis Drain	37.26164	120.90614
Salt Slough at Lander Avenue	37.24797	120.85225
Salt Slough at Sand Dam	37.13664	120.76194
Los Banos Creek at Highway 140	37.27619	120.95547
Los Banos Creek at China Camp Road	37.11447	120.88953
Blewett Drain at Highway 132	37.64053	121.22942
Poso Slough at Indiana Ave	37.00622	120.59033
SJR at PID Pumps	37.49739	121.08267
DMC at Del Puerto WD	37.43678	121.13347

FIGURE 1



LIST OF ENTITIES

- CENTRAL CALIFORNIA ID
- COLUMBIA CC
- DEL PUERTO WD
- EL SOLYO WD
- FRESNO SLOUGH WD
- GRASSLANDS WD
- INDIVIDUAL MEMBERS
- LONE TREE MUTUAL WD
- WILDLIFE REFUGES
- OAK FLAT WD
- PATTERSON WD
- SAN LUIS CC
- SAN LUIS WD
- STEVINSON WD
- TRANQUILITY ID
- TURNER ISLAND WD
- TWIN OAKS ID
- WEST STANISLAUS ID
- WHITE LAKE MUTUAL WATER CO

Map Designation	Coalition Site Name
1	HOSPITAL CREEK AT RIVER RD
2	INGRAM CREEK AT RIVER RD
3	WESTLEY WASTEWAY NEAR COX RD
4	DEL PUERTO CREEK NEAR COX RD
5	DEL PUERTO CREEK NEAR HWY 33
7	ROMONA LAKE NEAR FIG AVE
8	MARSHALL RD DRAIN NEAR RIVER RD
9	ORESTIMBA CREEK AT RIVER RD
10	ORESTIMBA CREEK AT HWY 33
11	NEWMAN WASTEWAY NEAR HILLS FERRY RD
12	SJR AT SAC DAM
13	SJR AT LANDER AVE
14	MUD SLOUGH U/S OF SAN LUIS DRAIN

Map Designation	Coalition Site Name
15	SALT SLOUGH AT LANDER AVE
16	SALT SLOUGH AT SAND DAM
17	LOS BANOS CREEK AT HWY 140
18	LOS BANOS CREEK AT CHINA CAMP RD
20	BLEWETT DRAIN NEAR HWY 132
21	POSO SLOUGH AT INDIANA AVE
22	SJR AT PID PUMPS
23	DMC AT DEL PUERTO WD

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, I
Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

LEGEND

▲ Monitoring Location

LIST OF ABBREVIATIONS

CC	CANAL COMPANY
CO	COMPANY
ID	IRRIGATION DISTRICT
WD	WATER DISTRICT

ACKNOWLEDGEMENTS

Basemap courtesy of Esri, DeLorme, NAVTEQ, TomTom,Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

SCALE IN MILES

0 5.5 11

NAD83 Cailfornia State Plane

SAN JOAQUIN VALLEY DRAINAGE AUTHORITY

WESTSIDE SAN JOAQUIN RIVER WATERSHED COALITION

MONITORING LOCATIONS

SUMMERS ENGINEERING INC.
Consulting Engineers
HANFORD CALIFORNIA
MAY 2013

MAPS\Wside coalition\05-08-13-wside coalition district map.mxd

More than 59 different varieties of crops are grown within the Westside Coalition watershed area, ranging from fruit and nut trees to melons and cotton. **Table 7** shows the top ten crops within the Coalition area based on 2014 irrigation season USDA data (2015 data is not yet available).

Table 7: Top 10 Crops Grown by County

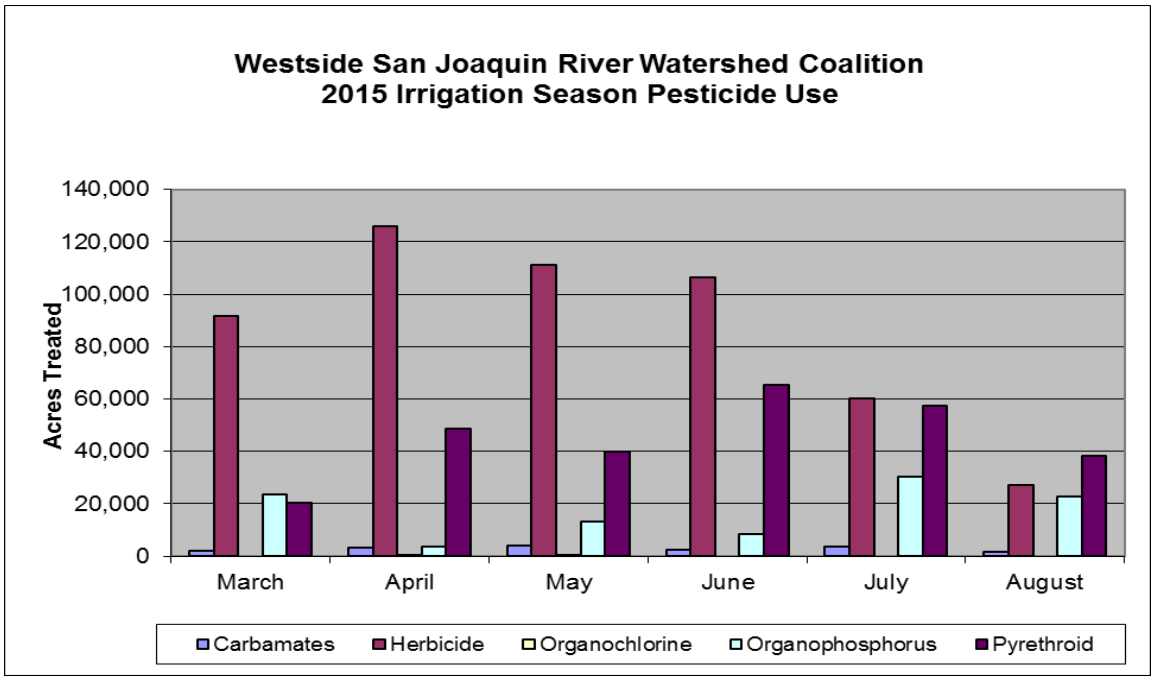
Fresno	Merced	Stanislaus
Almonds	Alfalfa	Almonds
Cotton	Cotton	Alfalfa
Alfalfa	Tomatoes	Tomatoes
Tomatoes	Almonds	Grapes
Grapes	Hay/Non Alfalfa	Walnuts
Winter Wheat	Winter Wheat	Oats
Pistachios	Corn	Hay/Non Alfalfa
Onions	Oats	Cherries
Rice	Grapes	Spring Wheat
Pomegranates	Pistachios	Winter Wheat

These crops are dispersed approximately evenly throughout the Coalition area, with the exceptions of cotton (mostly in the Los Banos, Dos Palos and Tranquillity Subareas), and fruit trees (mostly in the Patterson Subarea). The planting practices are typical for conventional agriculture within the Central Valley. A complete crop list and detailed crop calendar was presented in the "Watershed Evaluation Report", submitted in April, 2004.

Annual field crops are typically planted as seed or transplants after the field has been pre-irrigated to provide salt leaching and soil moisture for germination. These crops can be irrigated using various methods, such as, furrow irrigated using a plowed head-ditch or gated pipe; sprinkler irrigated with hand-move sprinkler pipe; sub-surface drip irrigated. Permanent field crops such as pasture or alfalfa are usually flood or sprinkler irrigated. The younger fruit and nut trees are almost universally irrigated with drip or micro-sprinkler systems, though some of the older orchards are still flood irrigated.

The irrigation season is typically the peak of agricultural activity, with most planting occurring between March and May. Intensive irrigation and cultivation activities begin just after planting and carrying on until harvest. Harvest timing is dependent on crop and weather conditions and may be as early as July or as late as October. Pesticide applications during the irrigation season include both insecticides and herbicides and will be applied according to the growth stage of the affected crop and the actual pest pressures. **Figure 2** shows the 2015 irrigation season monthly pesticide application within the Westside Coalition by pesticide group. Note that data for the full period is not yet available from all the county Agricultural Commissioners.

Figure 2: 2015 Irrigation Season Pesticide Use.



A more detailed review of pesticide use and detections is provided in **Section 8**. **Table 8** below shows the 10 most commonly applied pesticides during the 2015 irrigation season (by acreage) within the three predominate counties occupied by the Westside Coalition. A complete list of reported pesticide applications is included in **Attachment 6**.

Table 8: Most Commonly Applied Pesticides by County - 2015 Irrigation Season

Fresno County		Merced County		Stanislaus County	
Pesticide	**Class**	**Pesticide**	**Class**	**Pesticide**	**Class**
GLYPHOSATE	Herbicide	GLYPHOSATE	Herbicide	LAMBDA-CYHALOTHRIN	Pyrethroid
BIFENTHRIN	Pyrethroid	TRIFLURALIN	Herbicide	GLYPHOSATE	Herbicide
LAMBDA-CYHALOTHRIN	Pyrethroid	S-METOLACHLOR	Herbicide	BIFENTHRIN	Pyrethroid
TRIFLURALIN	Herbicide	BIFENTHRIN	Pyrethroid	DIMETHOATE	Organophosphorus
CHLORPYRIFOS	Organophosphorus	LAMBDA-CYHALOTHRIN	Pyrethroid	OXYFLUORFEN	Herbicide
S-METOLACHLOR	Herbicide	BETA-CYFLUTHRIN	Pyrethroid	PARAQUAT DICHLORIDE	Herbicide
OXYFLUORFEN	Herbicide	DIMETHOATE	Organophosphorus	SAFLUFENACIL	Herbicide
SAFLUFENACIL	Herbicide	PENDIMETHALIN	Herbicide	PENDIMETHALIN	Herbicide
PERMETHRIN	Pyrethroid	OXYFLUORFEN	Herbicide	ESFENVALERATE	Pyrethroid
MALATHION	Organophosphorus	CHLORPYRIFOS	Organophosphorus	PERMETHRIN	Pyrethroid

SECTION 5: FIELD SAMPLING PROCEDURE

Field water quality data and sample collections were collected as outlined in the Westside Coalition's Quality Assurance Project Plan (QAPP) and Field Sampling Manual. Two sampling crews have been trained by the analytical laboratories to collect samples according to the Westside Coalition's QAPP and Field Sampling Manual. These crews are responsible for collecting samples at each of the monitoring sites. The field coordinator for the northerly region is responsible for collecting samples from north of Newman Wasteway. The field coordinator for the southerly region is responsible for collecting samples south of (and including) Newman Wasteway. The sampling responsibilities include completion of the field data sheets, collection of water and sediment samples, completion of labels and chain of custody sheets, and coordination with the labs for sample pickup. Samples are collected as either a direct grab from the water-body or as a bucket grab, where a large volume of water is collected in a stainless steel bucket and transferred to the sample bottles. Details of these collection methods are explained in the Field Sampling Manual. The list of tested constituents is discussed in Attachment B to Order R5-2014-0002-R1.

In accordance with the Order, the Westside Coalition collected Irrigation Season samples (See **Table 2** above) starting with the March 2015 sample event. Aquatic toxicity, pesticides, and metals are analyzed at all discharge sites according to the monitoring plan. See **Attachment 7**.

SECTION 6: FIELD AND LABORATORY QUALITY CONTROL SAMPLES

Laboratory Quality Control Samples. The three laboratories that perform analyses for the Westside Coalition monitoring activities are certified through the National Environmental Laboratory Accreditation Program (NELAP) and perform all testing and analyses according to the most current NELAP standards, including the performance of several quality control tests to ensure all methods and equipment are operating correctly. A few control tests for Pacific EcoRisk, APPL, and Caltest failed to meet acceptability criteria. These failures represented less than 4% of the total QA/QC analyses performed by each lab and do not affect data usability. Details of the laboratory quality control review are included in **Appendix D**. Although the Westside Coalition reviews each of the laboratories' QA/QC results, it considers each of the laboratories to be experts in their respective fields and defers to their judgment regarding data acceptability.

Field Quality Control Samples. Field quality control samples included the collection of field duplicate samples for sediment and aquatic toxicity analysis, and the collection of both field duplicate and field blank samples for pesticides, drinking water, and general physical constituent analysis. It should be noted that the field duplicate samples are typically collected as separate samples simultaneously with the event sample (as opposed to field split samples). The calculated RPD between the event sample and field duplicate sample should be considered a measurement of site water variability.

- **Water Chemistry Analyses.** Six sets of field duplicate and field blank samples were collected during the reporting period and analyzed for general chemistry and drinking water constituents. A comparison of the event samples, duplicate samples, and blank

samples is tabulated in **Attachment 3**. A total of 156 duplicate analyses were completed and compared to the event sample results. Ten (10) duplicate samples exceeded the 25% relative percent difference (RPD) established in the QAPP for:

Ammonia (N)	Cadmium (total)	E. coli	TKN	TSS

These exceedances of the field duplicate quality control criteria account for less than 7% of the field duplicates analyzed and are reflective of the complicated nature of the site water and the naturally occurring variations of the stream water quality. The Westside Coalition does not expect these variations to impact data usability.

Six field blank sample sets were analyzed during the report period (156 results, total). Of these, five (5) analyses resulted in values greater than 20% of the event sample result for:

Copper (dissolved)	DOC	Lead (dissolved)	TOC	Zinc (dissolved)

- **Pesticide Analyses.** Six field duplicate and field blank samples sets were collected during the reporting period and analyzed for pesticides (246 duplicate and 252 blank results). Calculated RPD for field duplicate had no (0) exceedances of the 25% threshold criteria and the field blank results had no (0) exceedances of the 20% threshold criteria during this report period. The results of the field blank, field duplicate and event sample comparisons are tabulated in **Attachment 3**.

- **Aquatic Toxicity Analyses.** Field duplicate samples were collected and analyzed for toxicity to all species tested during the report period. The calculated RPD value did not exceeded the 25% threshold for any of the sampling events for this report period.

- **Sediment Toxicity Analyses.** A field duplicate sample was collected for sediment toxicity during the March sampling event (Event 121). The measured RPD was 1.2%.

Completeness for sampling collection and analysis was reviewed for samples collected during this monitoring program. Completeness was measured for sample collection and transit, sample analysis, and field quality control samples.

- Collection and Transit: Completeness for this report period is 100%.
- Sample Analysis: Completeness for sample analysis during this reporting period is 100%.
- Field Quality Control Samples: All field quality control samples were collected and analyzed. Completeness for toxicity duplicate samples is 100% for this reporting period. The completeness for field blank and duplicate samples is 100% for both pesticide analyses and water chemistry samples.

SECTION 7: ANALYTICAL METHODS

Table 4 indicates the laboratories responsible for the analytical results of this monitoring program, the analytical method used, and the standard operating procedure (SOP) document

number. This table reflects the constituents analyzed per Attachment B to Order R5-2014-0002-R1

Chain of Custody (COC) sheets were maintained from the time of sample collection to receipt at the laboratories. Copies of the COC sheets are included in **Appendix A**, along with a summary of the data results. The data summary includes all of the field readings, analytical chemistry results, pesticide scan results, and toxicity screening test results. The original laboratory reports are included in **Appendix C**. These reports also include all of the field and internal quality control results.

The laboratory original data sheets (raw data) for the toxicity results are included in **Appendix C**, as part of the laboratory reports. Raw data for general physical results, drinking water results, and pesticide results are kept by the laboratories for a minimum of five years and are available upon request.

SECTION 8: DATA INTERPRETATION

The primary objective of the monitoring program is to identify water bodies that are adversely affected by agricultural discharges and to help determine the impacts of management activities. The monitoring program has used a combination of toxicity tests and pesticide analyses, along with close coordination among districts and growers to not only identify problem areas but also to determine the magnitude and cause of the problems. During this report period, toxicity analyses for all three species along with pesticide analyses and metals analyses were performed according to the irrigation season monitoring schedule included in Attachment B to Order R5-2014-0002-R1 (See **Attachment 7**).

The Westside Coalition's monitoring program includes 21 monitoring sites on the Westside of the San Joaquin Valley (see **Table 2** and **Figure 1**). These sites are representative of the various regions within the Coalition and include agricultural discharge sites, storm drainage sites, and irrigation source water sites. A summary of this data is presented in **Appendix A**, and the laboratory data reports are provided in **Appendix C**.

All of the analyzed parameters were reviewed regularly to evaluate the overall health of the water bodies within the Coalition area. This reporting period covered the 2015 irrigation season months, during which there was significant agricultural activity. Statistically significant aquatic toxicity occurred three times during two sample events. These observations of aquatic toxicity are summarized below and detailed in **Attachment 2**.

<u>*Selenastrum capricornutum* (algae).</u> There were no observations of *Selenastrum* toxicity during this report period.

<u>*Ceriodaphnia dubia* (water flea).</u> There was one observation of Ceriodaphnia dubia toxicity during this report period.

- Event 124 (9/9/2015); Mud Slough upstream of San Luis Drain - 45% survival as compared to the laboratory control. A TIE was performed and indicated that a particulate associated contaminant and a dissolved nonpolar organic contaminant accounted for some of the

toxicity, but you cannot rule out that the toxicity was caused by the elevated conductivity (6465 µS/cm) in the sample.

Pimephales promelas (fathead minnow). There were no observations of fathead minnow toxicity during this report period.

Sediment Toxicity (*Hyalella azteca*). Twelve samples and one duplicate sample were collected and tested for toxicity to *Hyalella azteca* on March 9, 2015. Statistically significant toxicity was measured at seven sites – five of which exhibited severe toxicity (<80% survival). Follow up pesticide analysis were performed on those five samples. **Table 9** lists the results for the sites exhibiting sediment toxicity. **Table 10** summarizes the detected pesticide data at those four sites. See **Appendix C** for the full laboratory report. **Table 11** shows the sediment toxicity results since September 2011.

Table 9: Sites Exhibiting Statistically Significant Toxicity to *Hyalella azteca.*

Site	Percent Survival
Blewett Drain at Highway 132*	50.0%
Hospital Creek at River Road*	27.5%
Ingram Creek at River Road*	20.0%
Westley Wasteway near Cox Road*	65.7%
Ramona Lake near Fig Avenue	91.3%
Orestimba Creek at Highway 33*	85.0%**
Newman Wasteway near Hills Ferry Road	86.3%

* Sample analyzed for specific pesticides.

** Large worms observed in Replicate C where only 1 test organism was found at termination. Replicate removed from analysis due to potential interference from the indigenous organisms that were observed. Outlier detected via Dean and Dixon in remaining 7 replicates. Results are presented with outlier excluded. With outlier included the survival would be 74.3%. Toxicity observed both including and excluding outlier. Follow up analysis was performed based on the outlier inclusive 74.3% survival.

Table 10: Detected Pesticides in Sediment Samples - March 2015

	Blewett Drain at Hwy 132	Hospital Creek at River Road	Ingram Creek at River Road	Westley Wasteway near Cox Road	Orestimba Creek at Highway 33
Sediment Toxicity (% survival)	50.0	27.5	20.0	65.7	85.0
Percent Solids (%)	99	98	94	95	93
Bifenthrin (ng/g)	3.3	3.8	2.7	8.0	20
Chlorpyrifos (ng/g)	0.98	2.9	4.5	0.31**j**	1.1
Lambda-cyhalothrin (ng/g)	0.18**j**	1.2	3.5	0.56	0.71
Cyfluthrin (ng/g)	ND	ND	ND	ND	0.18**j**
Cypermethrin (ng/g)	ND	ND	1.5	ND	ND
DDD (ng/g)	ND	ND	5.1**j**	ND	17
DDE (ng/g)	5.3**j**	180	130	34	230
DDT (ng/g)	ND	62	ND	ND	6.5**j**
Es/Fenvalerate (ng/g)	1.6	1.0	0.69	0.73	0.4
Total Organic Carbon (mg/kg)	4,900	5,950	7,400	22,600	26,000

Details of the sediment pesticide analyses are in **Attachment 4.**

Table 11: Sediment Toxicity Results.

Site	Mar 15 % Survival	Mar 15 Toxicity (Y/N)	Sept 14 % Survival	Sept 14 Toxicity (Y/N)	Mar 14 % Survival	Mar 14 Toxicity (Y/N)	Sept 13 % Survival	Sept 13 Toxicity (Y/N)
Blewett Drain (Vernalis at hwy 132)	**50.0**	**Y**	**26.3**	**Y**	**61.3**	**Y**	**86.2**	**Y**
Hospital Creek	**27.5**	**Y**	**2.5**	**Y**	**87.5**	**Y**	**0**	**Y**
Ingram Creek	**20.0**	**Y**	**18.8**	**Y**	**40**	**Y**	**0**	**Y**
Westley Wasteway	**65.7**	**Y**	**61.3**	**Y**	**87.5**	**Y**	**2.5**	**Y**
Del Puerto Creek (Cox Rd)	100.0	N	86.3	N	**23.8**	**Y**	90	N
Del Puerto Creek (Hwy 33)	91.3	N					**0**	**Y**
Orestimba Creek at River Rd.								
Orestimba Creek at Hwy 33	**85.0**	**Y**	**57.5**	**Y**	**76.2**	**Y**		
Ramona Lake at Fig Ave.	**91.3**	**Y**	92.5	N	**81.3**	**Y**	93.3	N
Newman Wasteway	**86.3**	**Y**	96.3	N	90	N		
Poso Slough	98.8	N	100	N	95	N	96.3	N
SJR at Lander			96.3	N	96.3	N		
Salt Slough at Lander			98.8	N	95	N		
Salt Slough at Sand Dam	97.5	N	97.5	N	**81.3**	**Y**	97.5	N
Los Banos Creek at Hwy 140			96.3	N	**92.9**	**Y**		
Los Banos Creek at China Camp Rd.	97.5	N	**81.3**	**Y**	**88.8**	**Y**	**80**	**Y**
Mud Slough			98.8	N	98.8	N		

Site	Mar 13 % Survival	Mar 13 Toxicity (Y/N)	Sept 12 % Survival	Sept 12 Toxicity (Y/N)	Mar 12 % Survival	Mar 12 Toxicity (Y/N)	Sept 11 % Survival	Sept 11 Toxicity (Y/N)
Blewett Drain (Vernalis at hwy 132)	**3.75**	**Y**	**3.75**	**Y**	95	N	**56.3**	**Y**
Hospital Creek	96.3	N	**2.5**	**Y**	**81.3**	**Y**	**20**	**Y**
Ingram Creek	**1.25**	**Y**	**1.3**	**Y**	**60**	**Y**	**0**	**Y**
Westley Wasteway	**1.25**	**Y**	**13.8**	**Y**	**15**	**Y**	90	N
Del Puerto Creek (Cox Rd)	96.2	N	93.8	N	97.5	N	88.8	N
Del Puerto Creek (Hwy 33)	98.8	N			98.6	N		
Orestimba Creek at River Rd.	98.8	N	77.5	N	97.5	N	96.3	N
Orestimba Creek at Hwy 33	93.8	N	**10**	**Y**	**36.3**	**Y**	**0**	**Y**
Ramona Lake at Fig Ave.	**91.3**	**Y**	96.3	N	95	N	96.3	N
Newman Wasteway	**90**	**Y**	92.5	N	100	N	97.5	N
Poso Slough	98.8	N	91.3	N	96.3	N	98.8	N
SJR at Lander							98.8	N
Salt Slough at Lander							97.5	N
Salt Slough at Sand Dam	83.8	N	96.3	N	92.5	N	100	N
Los Banos Creek at Hwy 140							97.5	N
Los Banos Creek at China Camp Rd.	100	N	85	N	100	N	97.5	N
Mud Slough							98.8	N

Pesticide Analyses.
A total of ten different pesticides were detected in water samples during the 2015 irrigation season for a total of 45 detections. Each of the detected pesticides is discussed below.

- **Carbaryl (1 detection):** Carbaryl is a wide-spectrum carbamate insecticide used to control a wide range of insects in citrus, fruit, nuts, cotton, corn, and other vegetable crops.
- **Chlorpyrifos (2 detections):** Chlorpyrifos is a common organophosphate pesticide used to control a wide range of insects in orchards, pasture, and field crops. It can be used as a dormant spray for fruit and nut trees. Chlorpyrifos use during this reporting season likely occurred on field and forage crops (corn, cotton, and alfalfa) in the fall and as dormant sprays on fruit and nut trees in the mid to late winter.
- **Cyanazine (1 detection):** Cyanazine a triazine, is used as a pre- and post-emergent herbicide to control annual grasses and broadleaf weeds. It is used mostly on corn, cotton, and some on grain crops.
- **DDE (3 detections):** DDE has no commercial use but is a compound normally associated with the degradation of DDT. DDT is an organo-chlorine pesticide that was banned for agricultural use in 1972. It is a legacy pesticide that can still be detected in the watershed at relatively low levels.
- **Dimethoate (4 detection):** Dimethoate is an organophosphate pesticide used to control a wide range of insects. It is used on a variety of field crops including alfalfa, beans, tomatoes, and cotton.
- **Diuron (16 detections):** Diuron is a substitute urea herbicide used to control weeds in a variety of field crops including cotton, alfalfa, walnuts and wheat. It is also effective in controlling algae.
- **Malathion (2 detections):** Malathion, an organophosphate insecticide, is used to control a variety of insects on fruits and vegetables.
- **Methomyl (3 detections):** Methomyl is a carbamate insecticide used to control a variety of pests on vegetable, fruit, and field crops.
- **Pendimethalin (12 detections):** Pendimethalin is a selective herbicide used to control most annual grasses and certain broadleaf weeds in field corn, potatoes, rice, cotton, soybeans, tobacco, peanuts, sunflowers and vineyards.
- **Simazine (1 detection):** Simazine is a selective triazine herbicide. It is used to control broad-leaved weeds and annual grasses in field, berry fruit, vegetable and ornamental crops, on turf-grass, and in orchards and vineyards.

Exceedances of Recommended Water Quality Values.
Water chemistry analyses were compared to recommended water quality values[3] (RWQV). **Attachment 5** tabulates all of the RWQV exceedances for the reporting period by site.

- **Field, General Physical and Drinking Water Quality Exceedances.** Comparisons were made to several RWQVs. **Attachment 5** tabulates the results for these constituents and the comparison to the RWQVs. The Westside Coalition analyzed or observed 2,665

[3] Water Quality Limits were provided by the Central Valley Regional Water Quality Control Board as part of Attachment B to Order R5-2014-0002-R1. Water quality limits for cadmium, copper, lead, nickel and zinc are calculated from equations provided by the Central Valley Regional Water Quality Control Board.

field and chemistry (non-pesticide) parameters during the reporting period, during which, 265 (9.9%) results were greater than the RWQVs. Electrical conductivity and total dissolved solids (TDS) accounted for 90 and 69 exceedances respectively. Combined, they accounted for 60% of the exceedances. E. coli results accounted for 29 of these exceedances, 19 for boron and 20 for dissolved oxygen. The RWQV for cadmium, copper, lead, nickel, and zinc are dependent on site water hardness and is a calculated value. There was one exceedances of dissolved copper (HCARR - E126); there were no other dissolved metals exceedances during this report period. Potential causes for EC/TDS, E. coli, DO, and boron exceedances are discussed below.

- **EC/TDS.** Electrical Conductivity and TDS are measures of the amount of salts dissolved in the water column. There are a variety of sources of salts that may be contributing to these results including natural marine sediments, accretion of shallow/perched ground water, and irrigation source water. Additionally, many growers rely on groundwater wells to supplement surface water supplies; most of the groundwater wells within the Westside Coalition are more saline than the surface water sources.
- **E. coli.** E. coli is a measurement of bacteria in the water column. The Westside Coalition has participated in a study to attempt to identify the source of these exceedances. The preliminary results were not conclusive, however human sources were identified as the possible cause for at least some of the exceedances. There is also some suspicion that E. coli colonies have become self-sustaining within some watersheds. The Westside Coalition's Management Plan, approved November 18, 2008, and discusses future activities related to the E. coli exceedances. In a letter dated February 17, 2012, the Westside Coalition was requested to participate in a group discussion to develop a joint work plan. The Westside Coalition will continue to participate in this workgroup.
- **Dissolved Oxygen.** Dissolved Oxygen (DO) is measured through a field probe at the time of sample collection. DO, by its nature, is highly variable and influenced by a variety of conditions including sunlight exposure (related to time of day and time of year), turbidity, biological growth/decay, and channel turbulence. The cause of the DO exceedances measured during this report period is not immediately clear, in many cases, a low DO measurement is accompanied with no flow – indicating that the water is stagnant.
- **Boron.** Boron is a metalloid element commonly found in soils on the Westside of the San Joaquin Valley. It is not applied by growers for any agricultural purpose but may be dissolved in tail water, storm runoff, subsurface flows, or groundwater supplies.

The number of field and general chemistry exceedances were less than the 2014 irrigation season (9.9% this year compared to 15% in 2014, for approximately the same number of samples).

- **Pesticide exceedances.** Up to 48 different pesticides were tested for at monitoring sites each month. Samples collected within the Westside Coalition during this report period provided

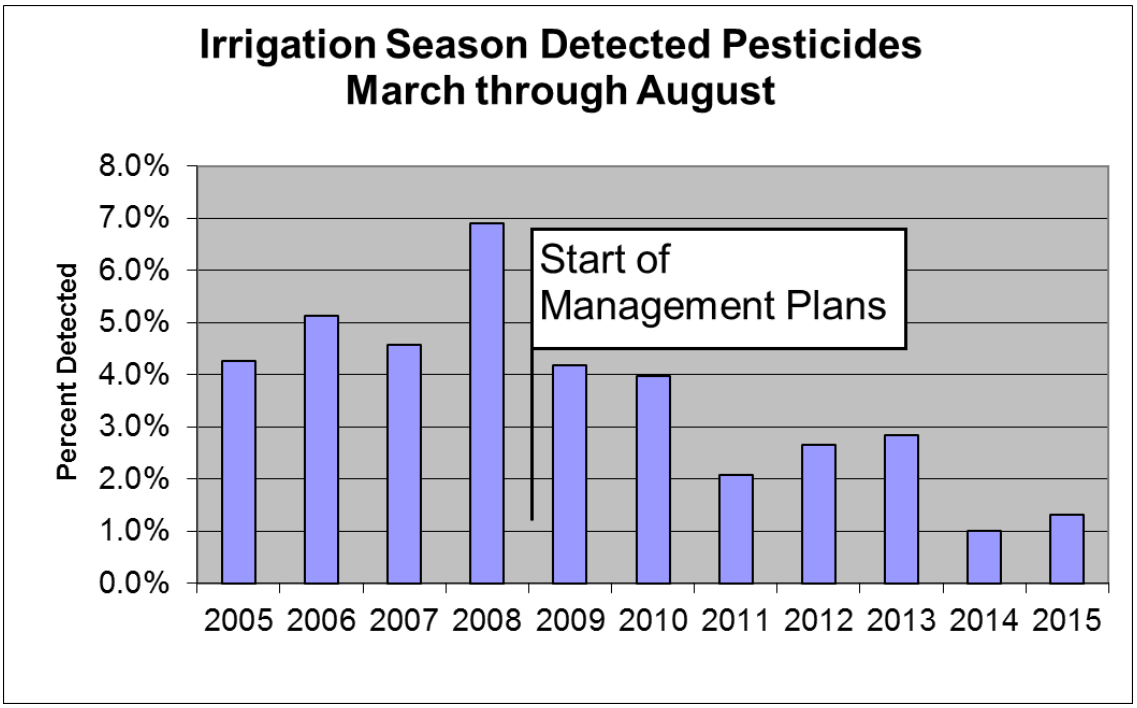
more than 3,410 pesticide results, nearly 99% of which resulted in no detection. Of the detected pesticides (45), 8 were greater than established RWQVs. These included:

- Chlorpyrifos (2 exceedances)
- DDE (3 exceedances)
- Malathion (2 exceedances)
- Methomyl (1 exceedances)

DDE (degradate of DDT) is a legacy pesticide no longer in use and accounts for nearly 38% of the exceedances.

As a percentage of the number of pesticide tests, there were slightly more pesticides detected during this reporting period as compared to the previous irrigation season (1.3% this period versus 1% for the 2014 irrigation season). **Figure 3** shows the percent of total pesticides detected in each irrigation season since 2005 (number of detections / number of results).

Figure 3: Percent of Total Pesticides Detected.



Chlorpyrifos and Diazinon. In 2010, the Regional Board implemented a chlorpyrifos and diazinon TMDL on the San Joaquin River. In response to this TMDL, the Westside Coalition increased its outreach efforts with additional grower workshops and individual grower meetings in regions with a history of chlorpyrifos or diazinon exceedances. These meetings emphasized the water quality issues related to these materials and management practices that could be implemented to reduce or eliminate discharge. During this reporting period there were 0 detections of diazinon and 2 detections (March 2015) of chlorpyrifos, 1 detection each at the Hospital Creek at River Road and Del Puerto Creek near Cox Road monitoring sites. It should be noted that none of these detections occurred within the San Joaquin River. Letters and notices were given to District Managers of Central California

Irrigation District, San Luis Canal Company, West Stanislaus Irrigation District, Del Puerto Water District, and Patterson Irrigation District regarding the chlorpyrifos detections and other pesticide and toxicity exceedances. The letters and notices were distributed to growers within the respective districts. In April 2015, the Coalition mailed a letter that discussed the Chlorpyrifos detections and exceedances and urged growers to adjust their farming practices to curtail the exceedances. The letter was widely distributed to the affected growers through direct mailings by the Coalition and it was also posted on the District's websites. Pesticide use report (PUR) data was requested after the March exceedances were detected. The Coalition mapped the detection areas and provided Coalition field personnel with targeted outreach material to specific growers in the affected areas. However, the first contact with growers was not until early June and by that time the relevancy of the information has lost its impact. The reason for the lag is that the data from the County Ag Commissioners lags about 90 days behind the chemical application. Without real-time pesticide application data, the outreach efforts will have a muted impact.

In addition to its monthly monitoring program, the Westside Coalition also participates in the San Joaquin River Chlorpyrifos and Diazinon TMDL program. The Westside Coalition collects monthly water samples for chlorpyrifos and diazinon analysis at the San Joaquin River at Sack Dam, Lander Avenue, and Las Palmas Avenue (near the PID pumps) and collaborates with the Eastside Coalition in the development of the TMDL monitoring report and outreach activities. During the TMDL program reporting period, chlorpyrifos was detected at the Las Palmas Avenue monitoring site (0.0067j µg/L) on 1/13/15; though detected, it was below the threshold for an exceedance. Diazinon was not detected at any of the San Joaquin River monitoring sites sampled by the Westside Coalition. An annual monitoring report for the San Joaquin River Chlorpyrifos and Diazinon TMDL program covering October 2013 through September 2014 was submitted to the Central Valley Regional Water Quality Control Board in May 2015. Partially in response to these water quality concerns, a Stakeholder group of growers in the Hospital and Ingram creeks subwatersheds was formed in 2012. The group had recently been on hiatus, but has since resumed quarterly meetings beginning in March 2015.

SECTION 9: ACTIONS TAKEN TO ADDRESS WATER QUALITY IMPACTS – MANAGEMENT PLAN ACTIVITIES

In October 2008, the Westside Coalition submitted a Management Plan and Focused Watershed Plan (Focused Plan) which described the actions that would be taken to address the water quality issues identified by the monitoring program. The Management Plan described a general approach that covered all of the subwatersheds within the Westside Coalition. Focused Plans were developed for specific issues within Hospital Creek, Ingram Creek, Del Puerto Creek, Westley Wasteway, Orestimba Creek, Salt Slough (including both Salt Slough monitoring sites and Poso Slough), Blewett and Marshall Road Drain subwatersheds (submitted July 2013; approved). **Table 12** shows the implementation schedule listed in the Management Plan (see Management Plan: General Approach, Table 4; October 23, 2008). In addition to these actions, the Westside Coalition reviewed exceedances over the past three years to determine what modifications (if any) should be made to the Management or Focused plans. A tally of exceedances from September 2012 through August 2015 is included in **Attachment 6**, along

with a more detailed review of Management Plan activities. Based on the review of that data, additional focused plans were scheduled and are shown in **Table 13**.

Table 12: Management Plan Implementation Schedule

Item	Action	Affecting	Estimated Start	Estimated Completion
1	Continue monitoring program	All Categories	On-going	On-going
2	Develop and implement Focused Plan	Site-specific	July 2008	Complete for FP1, FP2, FP3, and FP4
3	Compile MP inventory	All Categories	Jan. 2009	Complete for FP1, FP2, FP3, and FP4
4	Develop subwatershed maps	All Categories	On-going	Complete for FP1, FP2, FP3, and FP4
5	Determine regional pesticide application	Pesticides, aquatic toxicity	On-going	Annually updated
6	Continue participation in the Dissolved Oxygen Study	Dissolved Oxygen	On-going	On-going
7	Analyze results of E. coli study and map/inventory potential sources	E. coli	Sept. 2007	Completed Jan. 2010
8	Continue outreach and education efforts	All Categories	On-going	On-going
9	Analyze for correlation between low DO and other parameters	Dissolved Oxygen	Sept. 2008	Completed June 2009
10	Continue participation in the Salinity TMDL Program	EC/TDS	On-going	On-going
11	Track changes in water quality	All Categories	On-going	On-going

Table 13: Anticipated Focused Plan Schedule

Subwatershed	Anticipated Start Date
Ramona Lake	To be Determined by CSQMP Approval
Newman Wasteway	To be Determined by CSQMP Approval
Los Banos Creek	To be Determined by CSQMP Approval

1. Develop Comprehensive Surface Water Quality Management Plan.

A Comprehensive Surface Water Quality Management Plan (CSQMP) was developed and submitted to the Regional Board on July 27, 2015. This Plan utilizes a two-stage approach to address identified water quality issues within the Westside Coalition. In the first stage, a general approach is described that will be common to all the Coalition Group subwatersheds. This approach will identify the common strategies that will be implemented in the subwatersheds, but which will vary among constituent types, i.e., the approach that will be used to address toxicity will be distinctly different than the approach that will be used to address the exceedances for *E. coli*.

The second stage is the use of Focused Watershed Management Plans (Focused Plans), which identify a much more specific strategy to achieve Management Plan implementation and improvements in water quality in specific watersheds. The Focused Plans will identify water quality improvement goals and appropriate management practices (MPs) for implementation, will set forth timelines for implementation, and will describe the tracking mechanism to measure progress toward the goals. As of 2015, four Focused Plans have been implemented, covering nine subwatersheds and their representative areas. There are three subwatersheds and

representative areas (**See Table 13**) that were identified through assessment monitoring as needing management plans. Their implementation schedule will be determined when the CSQMP receives Regional Board approval. A detailed update of the focused plan activities is included in **Attachment 6.**

2. Continue Monitoring Program.

This semi-annual monitoring report represents the 22nd monitoring report submitted by the Westside Coalition since its inception in 2004. The monitoring program (as revised by Attachment B to Order R5-2014-0002-R1) is designed to be a dynamic program that aggressively tracks known water quality issues and conducts broad assessment monitoring to identify new issues. The monitoring program is also designed to support the activities of the current Focused Watershed Management Plans and the Comprehensive Surface Water Quality Management Plan (CSQMP) when its final approval is received from the Regional Board (submitted July 2015). The results of the monitoring program are reported twice annually (June and November). In March of 2014 the Westside Coalition implemented assessment monitoring at all discharge sites which continued through February 2015. The results of the assessment monitoring period were reviewed and adjustments made to the Special Project Monitoring table included in the MRP order (see **Attachment 7**).

3. Compile Management Practice Inventory.

A requirement of General Order R5-2014-0002 was that all growers in the Westside Coalition complete a Farm Evaluation (FE) survey for crop-year 2014. The FE survey is, among other things, The Westside Coalition received those surveys and compiled the data for analysis. Using the initial analysis, a Summary FE Report was submitted to the Regional Board under the cover of the June 15, 2015 SAMR (**Appendix G**). Beginning in November of 2015, a new round of FE Surveys will be sent to growers in High Vulnerability (HV) areas for surface and/or ground water and will be returned to the Westside Coalition by March 1, 2016. The new data will be compiled and submitted to the Regional Board as an Appendix to the June 2016 SAMR. A brief summary of the survey results are included in **Attachment 6**.

4. Develop Subwatershed Maps.

The Westside Coalition submitted subwatershed maps for the major watersheds within its boundaries in 2008. These maps were based on known drainage patterns and available mapping information. As part of the focused plans, the Westside Coalition collected highly detailed drainage information on the Ingram and Hospital Creek subwatersheds. Draft maps for the Westley Wasteway, Del Puerto Creek, Orestimba Creek, and Salt Slough subwatersheds have been developed and submitted in previous SAMRs. New draft maps for Blewett Drain and Marshall Road Drain have been submitted to the Regional Board as part of Focused Plan IV (see **Attachment 6**). Subwatershed maps are contemplated for Ramona Lake, Newman Wasteway, and Los Banos Creek and will be produced at such time when the CSQMP is formally approved by the Regional Board. HV area maps are currently being created based on the data generated from the Groundwater Assessment Report (GAR) that was accepted and approved on September 16, 2015. This data, when complete, will be incorporated with existing surface water HV maps.

5. Determine Regional Pesticide Use.

Pesticide use report data is collected from the agricultural commissioners in the various counties in the Westside Coalition's service area. In addition to general trends analysis, specific regional pesticide use data is periodically reviewed to attempt to compare with pesticide detections through the monitoring program. Limitations with pesticide use report data completeness and availability limit the usefulness of this data for that purpose. A summary of available pesticide use data is provided in **Attachment 6**.

6. Continue Participation in the Dissolved Oxygen Study.

On January 27, 2005 the Central Valley Regional Water Quality Control Board adopted Resolution R5-2005-0005 which included a TMDL directed to the point and non-point discharges that contribute to the dissolved oxygen impairment in the Stockton Deepwater Ship Channel (DO TMDL). As part of the DO TMDL certain studies were required. The San Joaquin Valley Drainage Authority received funds from the State Water Resources Control Board to undertake these studies (Recipient Agreement ERP-02D-P63). These studies were completed in June of 2008. The project established a series of monitoring stations, developed a DO model, characterized the fate of algae and nutrients, developed linkages between flow, algae, nutrients, and dissolved oxygen. The last set of studies, focused in the downstream tidal reach of the San Joaquin River between Mossdale and Turner Cut, has been completed. These studies, referred to as the "Downstream Studies", were funded by the California Department of Fish and Wildlife's Ecosystem Restoration Program. The studies were initiated in January 2011 and the final reports were submitted to Regional Board staff in September 2015. The Regional Board is developing recommendations for future actions to address the remaining dissolved oxygen impairment. The Westside Coalition has maintained the monitoring sites within boundaries of the Westside Coalition to maintain the data availability. The Westside Coalition also is prepared to continue to participate in the DO TMDL as further actions are developed. The SJVDA is currently participating with other stakeholders to provide funding for operation of the aerator installed by the Department of Water Resources. A funding agreement was completed in April 2012 between the parties and a mechanism in place to fund short term operation of the Stockton Deepwater Ship Channel aerator until May 2014. That agreement was extended until May 2015 and is expected to be extended through May 2016. The aerator has been very successful in meeting DO levels and is expected to be continued.

7. Analyze results of E. coli study and map/inventory potential sources.

Since 2007, the Westside Coalition has participated in studies and other investigations to attempt to identify the source and cause of various E. coli exceedances (reported in previous SAMRs). A technical committee is currently developing an approach plan with which the Westside Coalition will participate.

8. Continue Reporting and Outreach.

Westside Coalition outreach during this report period included direct mailings to grower, publications distributed by the districts, and various meetings.

- Direct Mailings. The Westside Coalition mailed a Nitrogen Management Plan (NMP) meeting invitation to the entire Coalition in March 2015. At the NMP meeting the NMP template was introduced to the attendees, as well as a comprehensive suite of Coalition related issues, i.e., pesticide detections and best management practices. In April 2015, a

packet of information about recent chlorpyrifos detections and the San Joaquin River chlorpyrifos TMDL was sent to growers in proximity to the river and its tributaries in the Coalition. Two Coalition articles were published (April and August) in the Merced County Farm News publication that discussed current Coalition information.

- District Publications. In March 2015 the Coalition provided a news and information flyer to all of its member Districts. It discussed a series of chlorpyrifos exceedances in the Coalition and asked for the grower's cooperation when using that product. Some of the Districts mailed the flyer to their constituents while other used their mass email capabilities to distribute the flyer to their constituents. See **Attachment 6**.
- Stakeholder Meeting. Beginning in November 2012, growers within the Hospital and Ingram creek subwatersheds formed a stakeholder group to discuss issues related to the ILRP, water quality conditions and management practices that they could implement at the farm level. The Stakeholder group had been on a short hiatus, but has since resumed with meetings in April and July of 2015.
- Grower Meetings. Three grower NMP workshops were organized by the Coalition and held in March 2015. Over 2400 invitations (**see Attachment** 6) were sent to Coalition members inviting them to the workshops, along with the NMP presentation, current water quality issues and the Long-term Irrigated Lands Regulatory Program were presented and discussed with the growers. These meetings are listed in **Table 14**.
- Individual (tailgate) Meetings. Staff members of the Westside Coalition conducted tailgate meetings with twenty-two Coalition growers to provide written information packets (**see Attachment 6**) and to discuss water quality issues and management practices. These meetings were triggered primarily by chlorpyrifos exceedances in January and February 2015.
- Observation Drives. Staff from the Westside Coalition drove through key coalition areas on various dates and reported observations on farming activities and creek/drain flow conditions. When appropriate, this information was used during tailgate and other outreach meetings.

Table 14 below lists the outreach activities performed during this reporting period coalition-wide.

Table 14: Outreach Meetings and Activities

Date	Group	Location	Description	Attendance	Presenter
3/3/2015	Coalition Growers - Southern Coalition Area	Los Banos	Update of ILRP and pesticide exceedances; presentation of NMP.	480	Joe M and Orvil make presentation.
3/4/2015	Coalition Growers - Middle Coalition Area	Newman	Update of ILRP and pesticide exceedances; presentation of NMP.	225	Joe M and Orvil make presentation.
3/5/2015	Coalition Growers - Northern Coalition Area	Westley	Update of ILRP and pesticide exceedances; presentation of NMP.	75	Joe M and Orvil make presentation.
3/16/2015	One-on One Visits	Northerly area	Present chlorpyrifos packets and discuss BMP's	2	Dave Woolley
4/7/2015	SJVDA Board Meeting	Los Banos	Business Meeting, Pesticide Update, Present NMP	25	Joe Makes Presentation

Date	Group	Location	Description	Attendance	Presenter
4/8/2015	West Stanislaus RCD Board	Patterson	Follow-up of Pesticide Detection Issues in West Stanislaus County	18	Orvil Presents New Chlorpyrifos Data And Outreach Efforts
4/13/2015	Hospital-Ingram Stakeholder Meeting	Westley	Discuss recent Chlorpyrifos Detections in Stakeholder Area	14	Orvil Presents Chlorpyrifos Exceedances Data
5/13/2015	West Stanislaus RCD Board	Patterson	Discuss Chlorpyrifos Outreach and Pilot Carbon-sock Project	15	Dave Woolley and Catiie Campodonico
5/14/2015	Field Meeting with Large Farm Companies	Westley	Visit and Discuss New Proposed Monitoring Sites	4	Orvil Mckinnis and Chris Linneman
6/9/2015	SJVDA Board Meeting	Los Banos	Business Meeting, Pesticide Update, Present NMP	25	Joe Makes Presentation
6/10/2015	West Stanislaus RCD Board	Patterson	Discuss Chlorpyrifos Outreach and Pilot Carbon-sock Project	16	Dave Woolley and Catiie Campodonico
6/1 - 6/30	One-on One Visits	Northerly area	Present chlorpyrifos packets and discuss BMP's	20	Dave Woolley
7/6/2015	Hospital-Ingram Stakeholder Meeting	Westley	Group Discusses New Monitoring Sites to Account for Surfacewater Supply	12	Joe Makes Presentation
7/7/2015	SJVDA Board Meeting	Los Banos	Business Meeting, Pesticide Update, Present NMP	25	Joe Makes Presentation
7/8/2015	West Stanislaus RCD Board	Patterson	Discuss Pilot Carbon-sock Project	18	Dave Woolley and Catiie Campodonico
8/4/2015	SJVDA Board Meeting	Los Banos	Business Meeting, Pesticide Update, Present NMP	25	Joe Makes Presentation
8/12/2015	West Stanislaus RCD Board	Patterson	Discuss Pilot Carbon-sock Project	18	Dave Woolley and Catiie Campodonico

Grant Funding

Proposition 84 was made available in 2012 through a program managed by CURES and funded by the State Water Resources Control Board. Information on the grant funding availability was communicated to landowners and operators through direct mailings, grower group meetings and individual contacts with landowners.

The Proposition 84 program provided funding for projects in the Central Valley primarily for the purpose of improving irrigation systems. Outreach by CURES was focused on landowners with fields along waterways with management plans in place by the local watershed coalition and located in the northern San Joaquin Valley, San Joaquin County/Sacramento Rivers Delta and southern Sacramento Valley. Through March 2015, 49 projects on 4,100 acres within the Westside Coalition were ultimately funded.

Several districts within the Westside Coalition have implemented or are in the process of implementing a number of regional drainage management projects. Although these project differ in approach, they all capture tailwater flows and return them to the irrigation system, thereby

reducing the volume of tailwater discharged from the respective watershed. See **Attachment 6** for a more detailed discussion.

9. Analyze for Correlation Between Low DO and Other Parameters.
The Westside Coalition has performed a preliminary review of the low DO measurements and other data. A summary of this review was included in the November 2009 Semi-Annual Monitoring Report. No additional work has been performed on this issue.

10. Continue Participation in the Salinity TMDL Program.
The Westside Coalition is actively engaged in the Central Valley Salinity Alternatives for Long-term Sustainability (CVSALTS) process and is an active member of the Central Valley Salinity Coalition that has been organized to facilitate the funding of the CVSALT effort. The Coalition's participation includes both monetary contributions and a substantial commitment of staff time.

Specific actions by the Westside Coalition to support the CVSALT efforts include: (1) Coalition representative's consistent participation in the CVSALT committees and sub-committees including serving as co-chair of the Technical Advisory Committee and Project Management of CVSALT studies. (2) Consistent participation and economic contributions to the Central Valley Salinity Coalition. In addition, the San Joaquin Valley Drainage Authority is providing contracting and contract administration services for the CVSALT effort. The Westside Coalition has committed to substantial resources to help ensure that the CVSALT effort results in an effective and efficient salinity management program for the Central Valley.

The SJVDA has organized the Real Time Management Steering Committee to facilitate compliance with the San Joaquin River Salt and Boron TMDL. Membership in the Steering Committee is through participating in a Memorandum of Understanding. Participants to date include the San Joaquin Valley Drainage Authority on behalf of the Westside San Joaquin River Watershed Coalition, the San Luis & Delta-Mendota Water Authority on behalf of the Grassland Basin Drainers and the East San Joaquin Water Quality Coalition. Cooperating agencies include California Department of Water Resources. The first meeting of the Steering Committee was held on October 6, 2015. The SJVDA has been participating with the US Bureau of Reclamation in implementation of the Real Time Monitoring Program (RTMP).

11. Track Changes in Water Quality.
Water quality changes are tracked through the Westside Coalition's monitoring program. Water quality data is reported and summarized twice annually.

Other Activities:

- **Conversion to high efficiency irrigation systems:** Several of the districts within the Westside Coalition have implemented grant and loan programs to assist growers in upgrading their irrigation systems. Typically, irrigation improvements are installed during the non-irrigation season for use in the following irrigation season.
- **NRCS EQUIP Funding:** The National Resource Conservation Service (NRCS) provides funding to growers for the construction of various improvements including

distribution systems (i.e. canal lining or piping) and irrigation system improvements (such as drip or micro-sprinklers). Funding is provided directly to growers (often with co-financial assistance from the Districts) and typically covers the cost of materials.

Monitoring Results:
Data gathered since the inception of the monitoring program has allowed the Westside Coalition to identify problem areas and issues. Details of sites exhibiting significant toxicity during this monitoring period are included in **Attachment 2** and all results that exceeded RWQVs are included in **Attachment 5**. This information, along with results from previous years will be used as talking points during upcoming grower meetings to outline the problem issues and sites. The Management Plan and Focused Watershed Plan also outline approaches that will be implemented to address the highlighted issues. A number of preliminary conclusions can be made from the data collected so far:

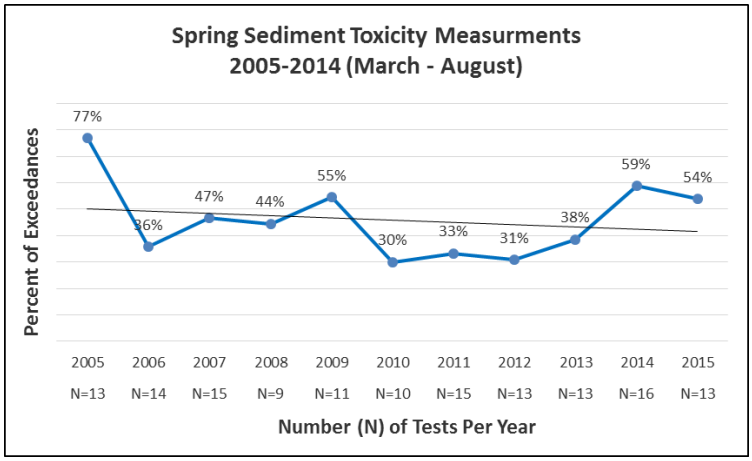
- **Sediment Toxicity:** Sediment toxicity tests were performed on 12 samples and one duplicate sample collected in March (Event 121). Statistically significant toxicity was measured at seven sites (See **Tables 10** and **11**), although 4 of the ten measured survival greater than 85%. Follow up pesticide testing was performed on four samples exhibiting severe toxicity (<80%). These results were compared to literature values for the purpose of determining the probable cause of toxicity in each sample. In all cases pesticides were present in sufficient quantity to have caused the toxicity.

    - **Blewett Drain at Highway 132** (50.0% survival): A total of 1.69 sediment toxic units (TUs) were calculated based on the detected pesticides. Bifenthrin accounted for 1.28 TUs, esfenvalerate 0.21 TUs, lambda-cyhalothrin 0.08 TUs, permethrin 0.01 TUs, and chlorpyrifos accounted for 0.11 TUs.
    - **Hospital Creek at River Road** (27.5% Survival): 2.04 TUs were calculated, with bifenthrin 1.20 TUs, and lambda cyhalothrin 0.44 TUs, esfenvalerate 0.11 TUs, permethrin 0.02 TUs, and chlorpyrifos accounted for 0.27 TUs.
    - **Ingram Creek at River Road** (20.0% Survival): A total of 2.53 TUs were calculated with bifenthrin 0.66 TUs, cypermethrin 0.50 TUs, lambda cyhalothrin 0.99 TUs, esfenvalerate 0.06 TUs, and chlorpyrifos, accounted for 0.32 TUs.
    - **Orestimba Creek at Highway 33** (85.0% survival): 1.47 TUs were calculated, with bifenthrin 1.38 TUs, cyfluthrin 0.01 TUs, lambda cyhalothrin 0.06 TUs, esfenvalerate 0.02, and chlorpyrifos accounted for 0.01 TUs.
    - **Westley Wasteway at Cox Road** (65.7% survival): 0.73 TUs were calculated, with bifenthrin 0.65 TUs, lambda cyhalothrin 0.05 TUs, esfenvalerate 0.06, and chlorpyrifos accounted for 0.02 TUs.

Bifenthrin, Lambda-cyhalothrin, and Esfenvalerate are all pyrethroids used on a variety of field and tree crops including, tomatoes, corn, beans, alfalfa, walnuts, and almonds, all of which are grown in the northerly part of the Westside Coalition. The majority of walnut and almond orchards within the Westside Coalition are irrigated with micro-sprinklers and drip systems which do not generate significant tailwater. It is likely that the discharge of these materials were from field crops using furrow or other surface irrigation methods.

Figure 4 shows the percentage of test exceedances during the spring sediment sampling events since 2005. The spring 2015 sediment results show a smaller percentage of test exceedances than the previous year, and within the exceedance group, the measured toxicity at three of the sites was relatively mild. With the 2015 results included, the yearly trend of the percentage of exceedances is moving down. The Westside Coalition believes the best way to reduce sediment toxicity will be through the management of sediment discharges at the farm level. However, the steep land slopes and erodible condition of the soil, particularly in the Patterson Subarea, continues to be an obstacle to overcome. Sedimentation ponds and tailwater return ponds, along with grower awareness of the issue will likely reduce the amount of sediment load leaving the farm and depositing in the waterways. The Coalition's Management Plan and Focused Watershed Plan include management approaches to address sediment toxicity. There appears to be an improving trend in sediment toxicity, possibly due to the Coalition's outreach efforts.

Figure 4: Percent Test Exceedance



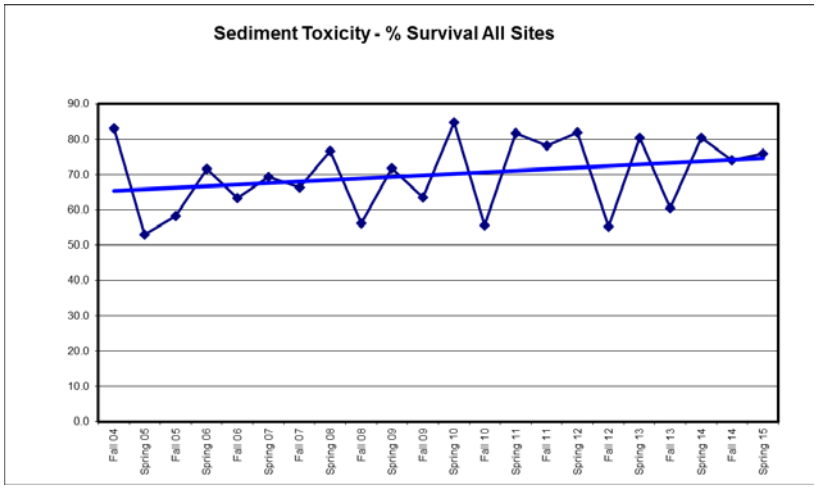


Figure 5: Percent Survival Trend.

Figure 5 shows the trend of percent survival for sediment toxicity (average percent survival for all tested sites at each event), along with a linear trend line. Based on the trend line, there appears to be an improving trend in terms of the magnitude of survival. Consistent with previous sediment toxicity data sets, it is also apparent that the magnitude of fall survival is generally worse than that of spring survival.

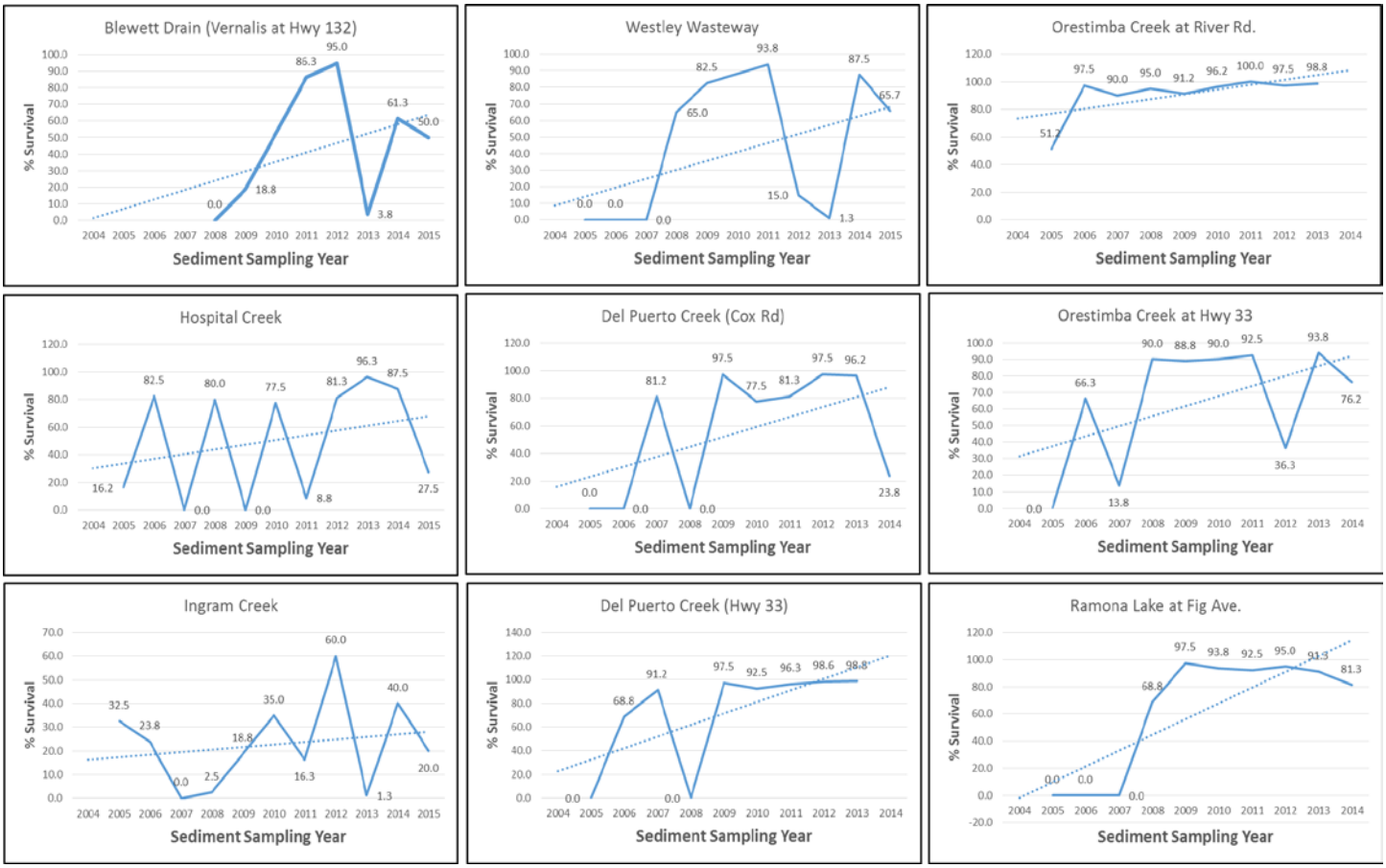
Figure 5.1 graphs the percent survival for sediment toxicity during the irrigation season of all discharge monitoring sites in the northerly area (north of Newman Wasteway) of the Coalition since 2005[4]. The Discharge sites have been grouped by the north/south designation to illustrate the toxicity issues the northern portion of the Coalition has, as compared to the southern portion. Given the steep slopes and highly erodible soil conditions of the northern area, toxicity continues

[4] It should be noted that there are data gaps on some of the graphs, including graphs that have no 2015 sediment sampling year. The graph lines have been allowed to flow through the gaps for illustrative purposes.

to be of great concern to the Coalition. As the graphs illustrate, some of the northern sites have chronic toxicity problems that the Coalition has addressed in Management Plans for those areas[5]. Other of the northern sites have a very distinctive "on-again/off-again" toxicity pattern[6] to them. Likely, that is reflective of the "scouring effect" of high water flows that can pulse through the drainages. When low flows return they can redistribute sediment back onto the drain bottom. Two sites[7] have had fairly consistent positive results. The Orestimba Creek at River Rd. site has been consistently positive from the inception of the monitoring program, while Ramona Lake made a dramatic turnaround for the positive in 2008, and has consistently performed well since.

The graphs demonstrate that some progress has been made in the northern sub-watersheds, and this is due, in part, to the efforts of the Coalition and Growers through the implementation of Focused Management Plans in those watersheds. While more work remains to be done to reduce

Figure 5.1: Percent Survival Trend (Northern Sites)

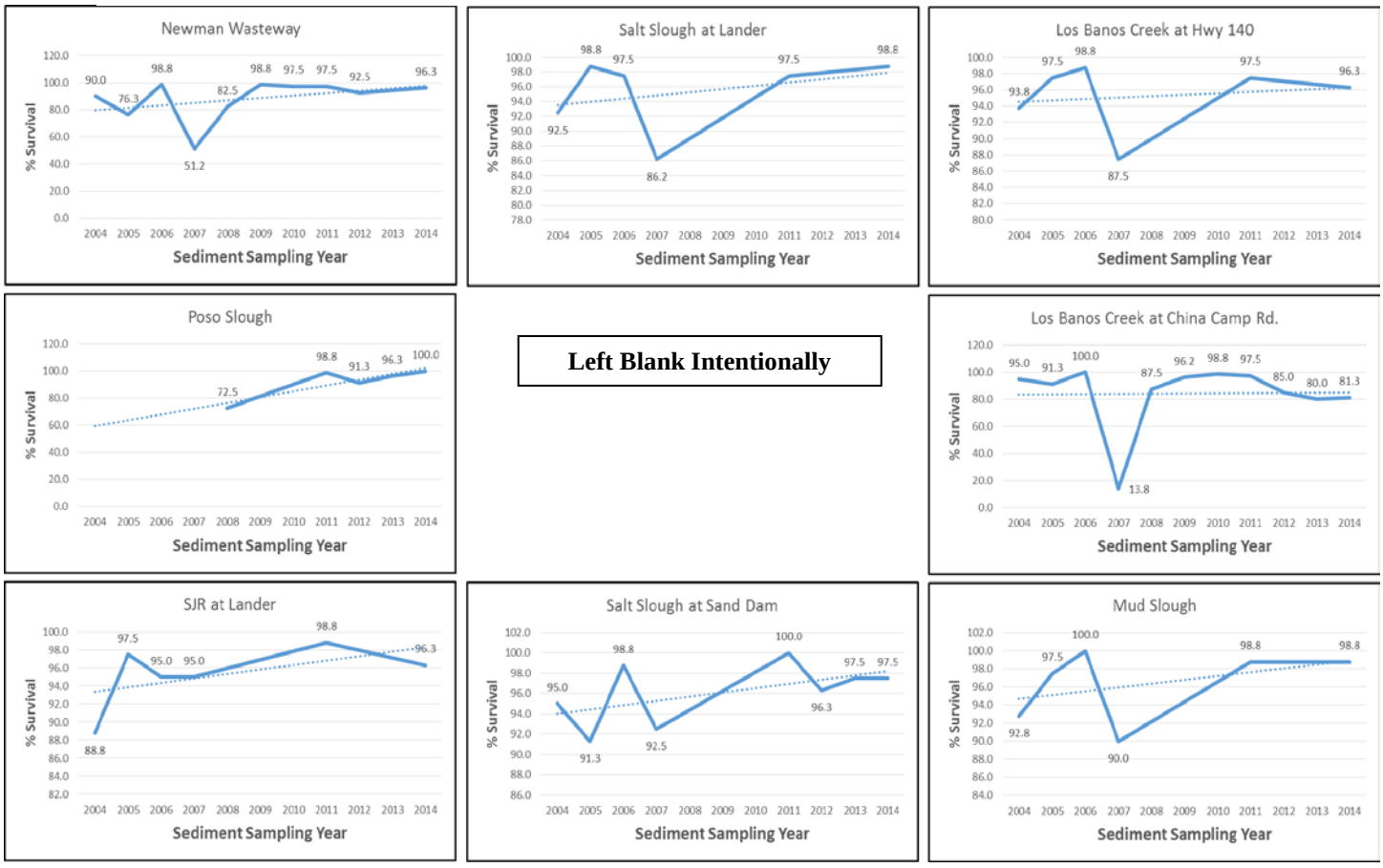


sediment discharges to manageable levels, the trend for most of the northern sediment monitoring sites is in a positive direction

[5] Blewett Drain. Hospital Creek, Ingram Creek, and Del Puerto Creek at Hwy 33
[6] Westley Wasteway, Del Puerto Creek at Cox Rd., and Orestimba Creek at Hwy 33
[7] Orestimba Creek at River Rd., and Ramona Lake

Figure 5.2 graphs the percent survival for sediment toxicity during the non-irrigation season of all discharge monitoring sites in the southerly area (south of Newman Wasteway) of the Coalition since 2004[8]. As mentioned above, the north/south grouping is illustrative of the geological differences in the separate regions. The graphs easily illustrate a very stable watershed (as it relates to sediment toxicity) with very few toxicity events[9]. Geographically, the southern area consists of flatter ground and more cohesive soils (as compared to the northern area) which helps to reduce sediment migration. The southern area is also marked by larger water districts that have more resources available to co-fund region-wide water conservation projects. Thousands of acres have been converted to high efficiency irrigation systems[10] that drastically reduce surface water run-off. The districts have also co-funded irrigation water return systems that capture tail-water in ponds and return the captured water to the head of the ditch to be reused; a benefit of this system is that the irrigation water is allowed to decant in the ponds and release the sediment out of suspension before being released down-stream.

Figure 5.2: Percent Survival Trend (Southern Sites).



[8] It should be noted that there are data gaps on some of the graphs. The graph lines have been allowed to flow through the gaps for illustrative purposes

[9] Newman Wasterway-2005,2007; Poso Slough-2008; Los Banos Creek-2007

[10] Buried drip, micro-sprinkler, sprinkler, gated pipe, et al.

Overall, the sediment toxicity sampling results indicate where the Coalition should focus its efforts and resources.

- **Aquatic Toxicity:** Aquatic toxicity to *Ceriodaphnia dubia* (water flea), *Pimephales Promelas* (fathead minnow), and *Selenastrum capricornutum* (algae) were tested in accordance with the MRP Order (see **Attachment 7**). A total of 141 aquatic toxicity tests were performed, including 18 field duplicates. Aquatic toxicity was observed once to Ceriodaphnia dubia. **Attachment 2** provides monitoring results for all of the sites that measured significant toxicity, including a discussion of the TIE findings.

- **Pesticide Analyses:** During the 2015 irrigation season, 10 different pesticides were detected in water samples for a total of 45 detections. Eight of these detections exceeded the established RWQV, including 2 for chlorpyrifos and none for diazinon. See **Attachment 2**.

- **Chlorpyrifos and Diazinon TMDL Program:** In addition to its monthly monitoring program, the Westside Coalition also participates in the San Joaquin River Chlorpyrifos and Diazinon TMDL program. The Westside Coalition collects monthly water samples for chlorpyrifos and diazinon analysis at the San Joaquin River at Sack Dam, Lander Avenue, and Las Palmas Avenue (near the PID pumps) and collaborates with the Eastside Coalition in the development of the TMDL monitoring report and outreach activities. During the last reporting period (2014/15 non-irrigation season), chlorpyrifos was detected at the Las Palmas Avenue monitoring site (0.0067j µg/L) on 1/13/15; though detected, it was below the threshold for an exceedance. Diazinon was not detected at any of the San Joaquin River monitoring sites sampled by the Westside Coalition. An annual monitoring report for the San Joaquin River Chlorpyrifos and Diazinon TMDL program covering October 2013 through September 2014 was submitted to the Central Valley Regional Water Quality Control Board in May 2015.

- **General Chemistry and Field Observations:** The monitoring results for field and general chemistry tests were generally similar to previous irrigation seasons. EC/TDS measured the largest number of exceedances for this reporting period (90 and 69 exceedances, respectively). Bacteria continues to be a larger source of exceedances (29 for E. coli during this period). There were also 19 boron exceedances. Boron is typically connected with shallow groundwater within the Westside San Joaquin Valley, and given the dismal water supply, growers likely relied more on wells than is typical for a more normal water year. Dissolved cadmium, copper, lead, nickel, and zinc results were compared to the calculated RWQV (based on site water hardness) and one exceedance for copper was measured during this reporting period. With many of these constituents, the source of the exceedance is neither clear nor easily traceable, and often can be found in the source water itself (such as the San Joaquin River at Sack Dam or the Delta-Mendota Canal).

SECTION 10: COMMUNICATION REPORTS

Exceedance reports were submitted to the Central Valley Regional Water Quality Control Board in response to monitoring results for the reporting period. These reports are included in **Appendix B.**

Follow-up included reporting statistically significant toxic events and exceedances of water quality values to the overlying districts, PCA's and to individual Coalition participants. The districts would then communicate with the affected growers to notify them that there is a problem. Meetings are then organized at the Coalition level as required to inform landowners, operators, PCA's, chemical applicators and others on monitoring results and likely best management measures that could be undertaken to minimize these problems (see **Table 14**).

SECTION 11: CONCLUSIONS AND RECOMMENDATIONS

The Westside Coalition's monitoring program has identified constituents of concern (see **Attachments 2** and **5**). The Westside Coalition has submitted a Comprehensive Surface Water Quality Management Plan (CSQMP), per General Order R5-2014-0002, to address the water quality concerns discovered by previous monitoring. While final approval of the CSQMP is pending from the Regional Board, the Westside Coalition continues implementation of its previously approved Focused Management Plans.

The Westside Coalition monitoring program has accumulated data from 126 regular monitoring events and 17 rain events. Data from this reporting period has verified previously identified water quality issues but has also showed some indications of an improving trend in water quality (see **Section 9**). The Westside Coalition began implementation of management plans in 2008. For a basis of comparison, data from the most recent three year period (September 2012 to August 2015) was compared to the three year period prior to management plan implementation (September 2005 to August 2008) and there are some promising improvements:

- Ceriodaphnia dubia toxicity: 13 exceedances out of 401 tests (3.2%) for the most current period, compared to 25 exceedances out of 394 tests (6%).
- Fathead minnow toxicity: 0 exceedances out of 223 tests (0.0%) for the most current period, compared to 5 exceedances out of 309 tests (2%).
- Algae toxicity: 8 exceedances out of 290 tests (2.8%) for the most current period, compared to 33 exceedances out of 345 tests (10%).
- Chlorpyrifos: 35 exceedances out of 545 tests (6.4%) for the most current period compared to 67 exceedances out of 390 tests (17%).
- Diazinon: 9 exceedances out of 545 tests (1.7%) for the most current period compared to 6 exceedances out of 391 tests (2%).
- Total pesticide detections: Approximately 1.3% of analyzed pesticides detected in the current period verses almost 5% of analyzed pesticides detected in the period prior to management plan implementation.
- Sediment toxicity: 28 toxicity observations out of 77 tests (36.4%) in the current period compared to 38 observations out of 85 tests (45%).

A complete tally of exceedances by site and constituent is included in **Attachment 6**.