San Joaquin Valley Drainage Authority

Westside San Joaquin River Watershed Coalition

Semi-Annual Monitoring Report

2014/2015 Non-Irrigation Season Report

Covering the period: September 2014 through February 2015
(Sampling Events 117 through 120, including Rain Events 16 and 17)

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Prepared by:
Summers Engineering, Inc.
Consulting Engineers
Hanford California

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SECTION 1: EXECUTIVE SUMMARY

This report covers the 2014/2015 non-irrigation season sampling events beginning September 2014 through February 2015 (Event 117 through Event 120 and Rain Event 16 and 17). 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 and are often dry or have little flow outside of the irrigation season.

The 2014/15 non-irrigation season was classified as a critical hydrologic year type for the west-side of the San Joaquin Valley and Federal water districts were limited to 0% of federal water contract allocation. There were few significant storms during the fall and winter, notwithstanding, 2 rain event samples were collected (12/4/14 and 2/10/15). See **Section 3** for a discussion of measured rainfall. Non-irrigation season monitoring samples were collected at all sites containing sufficient water in accordance with the Westside Coalition's Monitoring and Reporting Plan[1] (MRP). Scheduled sediment samples were collected in September 2014; sediment toxicity was observed at Blewett Drain, Hospital Creek, Ingram Creek, Los Banos Creek at Cox Road, Orestimba Creek at Hwy. 33, and Westley Wasteway; 5 of the 6 sediment samples met the ≤ 80% survival threshold and 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**. Since the non-irrigation season 2014/2015 was an assessment year, aquatic toxicity samples were collected monthly at all of the monitoring sites (except the 3 source water sites) that had water present. During the report period, significant aquatic toxicity was measured twice for *Selenastrum* capricornutum and 4 times for *Ceriodaphnia* dubia, and are summarized in **Table 1** below.

Table 1: Summary of Toxicity

Event	Site	Species Growth/Survival as a Percentage of Control Growth/Survival
Rain Event 16 (Dec.)	Hospital Creek @ River Road	*Selenastrum* - 39%
Rain Event 16 (Dec.)	Hospital Creek @ River Road	*Ceriodaphnia* - 20%
Event 120 (Jan.)	Ingram Creek @ River Road	*Ceriodaphnia* - 0%
Rain Event 17 (Feb.)	Salt Slough @ Sand Dam	*Selenastrum* - 64%
Rain Event 17 (Feb.)	Newman Wasteway near Hills Ferry Road	*Ceriodaphnia* - 0%
Rain Event 17 (Feb.)	Hospital Creek @ River Road.	*Ceriodaphnia* - 0%

These results, along with associated follow up testing, water quality and flow data, are summarized in **Attachment 2**. Details of the 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).

[1] MRP Order No. R5-2008-0831

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 2014/15 non-irrigation season.

Table 2: Collected Samples September 2014 through February 2015.

Map Designation	Monitoring Site	Event 117		Event 118	Event 119	Event R16	Event 120	Event R17
	Discharge Sites	September		October	November	December	January	February
1	Hospital Cr at River Road	NF	SS	NF	NF	S	NF	S
2	Ingram Cr at River Road	S	SS	S	S	S	S	NF
3	Westley Wasteway near Cox Road	S	SS	S	S	NA	S	NA
4	Del Puerto Cr near Cox Road	S	SS	S	NF	S	NF	S
5	Del Puerto Cr at Hwy 33	NF	NF	NF	NF	NF	S	S
7	Ramona Lake near Fig Avenue	S	SS	NF	NF	S	S	S
8	Marshall Road Drain near River Road	S	NP	S	S	S	NF	NF
9	Orestimba Cr at River Road	NF	NF	NF	NF	NF	NF	NF
10	Orestimba Cr at Hwy 33	S	SS	NF	NF	S	S	S
11	Newman Wasteway near Hills Ferry Road	S	SS	S	S	S	S	S
13	San Joaquin River at Lander Avenue	S	SS	S	S	S	S	S
14	Mud Slough u/s San Luis Drain	S	SS	S	S	S	S	S
15	Salt Slough at Lander Avenue	S	SS	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	SS	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	NF	NA	NF	NA
21	Poso Slough at Indiana Avenue	S	SS	S	S	S	NF	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.
SS = Sediment sampled according to the MRP.
NA = Not sampled due to lack of safe access.
NF = Not sampled due to lack of flow.
NP = Not included in the sampling plan.
NS = Not sampled - sample missed.

A new component of the Long-term Irrigated Lands Regulatory Program is the inclusion, into this Semi-annual Monitoring Report, of a summary report of the results of the recent Farm Evaluation Plan survey conducted by the Coalition. That summary report is attached to this report as **Appendix G.**

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 (No. 5-01-234), 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. See **Attachment 7**.

The MRP Order 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 parameters analyzed 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 Samples

Monitoring Site	Site Code	2014/15 Non-Irrigation Season		
		Irrigation	Non-Irrigation	Rain Event
		(Mar-Aug)	(Sep-Feb)	(2x per year)
Discharge Sites				
Blewett Drain at Highway 132	VH132	Assessment	Assessment	Rain
Poso Slough at Indiana Avenue	PSAIA	Assessment	Assessment	Rain
Hospital Creek at River Road	HCARR	Assessment	Assessment	Rain
Ingram Creek at River Road	ICARR	Assessment	Assessment	Rain
Westley Wasteway near Cox Road	WWNCR	Assessment	Assessment	Rain
Del Puerto Creek near Cox Road	DPCCR	Assessment	Assessment	Rain
Del Puerto Creek at Hwy 33	DPCHW	Assessment	Assessment	Rain
Ramona Lake near Fig Avenue	ROLFA	Assessment	Assessment	Rain
Marshall Road Drain near River Road	MRDRR	Assessment	Assessment	Rain
Orestimba Creek at River Road	OCARR	Assessment	Assessment	Rain
Orestimba Creek at Hwy 33	OCAHW	Assessment	Assessment	Rain
Newman Wasteway near Hills Ferry Road	NWHFR	Assessment	Assessment	Rain
San Joaquin River at Lander Avenue	SJRLA	Assessment	Assessment	Rain
Mud Slough u/s San Luis Drain	MSUSL	Assessment	Assessment	Rain
Salt Slough at Lander Avenue	SSALA	Assessment	Assessment	Rain
Salt Slough at Sand Dam	SSASD	Assessment	Assessment	Rain
Los Banos Creek at Highway 140	LBCHW	Assessment	Assessment	Rain
Los Banos Creek at China Camp Road	LBCCC	Assessment	Assessment	Rain

Monitoring Site	Site Code	2014/15 Non-Irrigation Season		
		Irrigation	Non-Irrigation	Rain Event
		(Mar-Aug)	(Sep-Feb)	(2x per year)
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

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.
In accordance with the MRP order, non-irrigation season monitoring was implemented at all discharge sites beginning in September 2014. Each site was visited monthly during the reporting period and samples were collected from every site 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
September	0.07	0.02	0.01
October	1.02	0.78	0.93
November	0.77	0.66	0.17
December	6.14	3.02	2.81
January	0.02	0.11	0.06
February	1.2	0.77	0.1
Report Period Total:	9.22	5.36	4.08

Rainfall during the 2014/15 non-irrigation season was significantly below normal and the 2014/15 water year type has been classified as a Critical year type. Federal water allocations throughout the Central Valley Project have been set at 0% for the 2015 irrigation season.

Event 117, September 8th and 9th, 2014.
Non-irrigation season water samples were collected at 15 discharge sites and 3 source water sites on September 9th in accordance with the Westside Coalition Monitoring and Reporting Plan (MRP). There was insufficient flow for sample collection at Hospital Creek at River Road, Del Puerto Creek at River Road, and Orestimba Creek at River Road.

Aquatic toxicity was tested against an algae (*Selenastrum*), an invertebrate (*Ceriodaphnia*), and a fathead minnow (Pimephales) in accordance with the MRP (see **Attachment 7**) at the 15 discharge sites and no toxicity was observed.

[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

Sediment samples were collected at 15 monitoring sites on September 8th. Sediment samples are tested against the amphipod Hyalella azteca. There was insufficient flow for sample collection at Del Puerto Creek at Hwy 33 and Orestimba Creek at River Road; Marshall Road Drain at River Road is not part of the sample plan. Six of the sites tested positive for toxicity; significant toxicity was observed in the Westley Wasteway near Cox Road sample (61.3% survival), the Blewett Drain sample (26.3% survival), the Hospital Creek sample (2.5% survival), the Ingram Creek sample (18.8% survival), the Los Banos Creek at China Camp Road (81.3% survival), and the Orestimba Creek at Hwy 33 (57.5% survival). Sediment from 5 of these 6 samples were sent to Caltest Laboratories for pesticide analysis. In all five sediment samples, pesticides were present in sufficient concentration to have caused the observed toxicity. See **Section 8** and **Attachment 4**.

Event 118, October 14th, 2014.

Non-irrigation season ambient water samples were collected at 13 discharge sites and source water samples were collected at 3 sites. There was insufficient flow for sample collection at Hospital Creek at River Road, Del Puerto Creek at River Road, Ramona Lake near Fig Avenue, Orestimba Creek at River Road, and Orestimba Creek at Hwy 33.

Aquatic toxicity samples were collected at 13 sites and no toxicity was observed[3].

Event 119, November 11th, 2014.

Non-irrigation season ambient water samples were collected at 11 monitoring sites and 3 source water sites. There was insufficient flow for sample collection at Blewett Drain, Hospital Creek, Del Puerto Creek near Cox Road, Del Puerto Creek at Hwy 33, Ramona Lake near Fig Avenue, Orestimba Creek at River Road, and Orestimba Creek at Hwy 33.

Aquatic toxicity samples were collected at 11 sites and no toxicity was observed.

Event R16, December 4th, 2014.

Non-irrigation season ambient water samples were collected at 14 monitoring sites and 3 source water sites in accordance with the Westside Coalition's MRP. There was insufficient flow for sample collection at Del Puerto Creek at Hwy 33, and Orestimba Creek at River Road. Due to lack of safe access, no sample collection occurred at Blewett Drain, and Westley Wasteway near Cox Road. 4,4'-DDE (0.014 µg/L), Pendimethalin (1.6 µg/L), and Diuron (0.84 µg/L) were detected in the Hospital Creek at River Road (HCARR)

Aquatic toxicity for all three indicator species was tested on all 14 monitoring sites and 3 source water sites; toxicity was observed at the HCARR site for *Selenastrum* (39% of control growthy) and *Ceriodaphnia* (20% survival). There was a ≥50% reduction in *S. capricornutum* growth in the HCARR ambient water sample relative to the corresponding Control treatment. As per the

[3] Although there was a significant reduction in algal growth in Mud Slough u/s San Luis Drain sample, foreign algal species were observed at test termination (i.e., the presence of foreign algal species is a test interference prohibiting the determination of toxicity to *Selenastrum*). Foreign algal species were not observed in the Lab Control or any other samples. The sample was re-tested using 0.2 µm filtration. There was no significant reduction in growth following 0.2 µm filtration, indicating that the sample was not toxic to algal growth.

Coalition's Quality Assurance Program Plan (QAPP), this triggered the implementation of a Toxicity Identification Evaluation (TIE) targeted for pesticides and metals. However, foreign algal species were observed in the initial test, which interferes with assessing the toxicity of the sample to *Selenastrum* (i.e., foreign species can compete with *Selenastrum* for nutrients, potentially resulting in a false positive for toxicity). Therefore, the TIE was performed following 0.2 µm filtration of the sample rather than the standard 0.45 µm filtration used during the initial test. The results are as follows:

> There was no blank interference present in the C18 SPE TIE treatment, but there was blank toxicity observed in the cation exchange treatment. The toxicity was not persistent in the Baseline (untreated HCARR sample) treatment and no foreign algal species were present. It is the laboratory's best professional judgment that the reduction in *Selenastrum* growth observed during the initial test was likely due to the foreign species competing for nutrients. However, it cannot be ruled out that toxicity was present during the initial test of the sample and that the toxicant rapidly degraded between the time of the initial test and the initiation of the TIE.

There was a ≥50% reduction in *C. dubia* survival in the HCARR ambient water sample relative to the corresponding Control treatment. As per the Coalition's QAPP, this triggered the implementation of a TIE targeted for pesticides and metals. The results are as follows:

> There was a 55% reduction in survival of the test organisms in the Baseline (untreated HCARR sample) treatment, indicating that the previously observed toxicity was persistent. There were no blank interferences present in the TIE treatments. The C18 SPE treatment was the only TIE treatment that removed the toxicity, which suggests that dissolved non-polar organic compound(s) caused the toxicity.

Event 120, January 13th, 2015.

Non-irrigation season water samples were collected at 12 discharge sites and 3 source water sites. There was insufficient flow to collect samples at Blewett Drain, Poso Slough, Hospital Creek, Del Puerto Creek near Cox Road, Marshall Road Drain, and Orestimba Creek at River Road sites. Initially, there were exceedances of Chlorpyrifos at the Ingram Creek at River Road (ICARR) site (0.410 µg/L), Westley Wasteway (0.220 µg/L), Del Puerto Creek at Hwy 33 (0.240 µg/L), Ramona Lake near Fig Avenue (0.210 µg/L), Delta Mendota Canal at DPWD Turnout (0.200 µg/L), and San Joaquin River at PID Pumps (SJRPP) (0.210 µg/L). Given the uniformity of the detection values, the large levels of the chemical present, and the absence of expected aquatic toxicity, the Coalition had the lab re-extract and re-analyze the SJRPP sample. When the result came back at 0.0067j µg/L (vs. the initial 0.210 µg/L), the Coalition had the lab re-extract and re-analyze the other six samples. That re-analysis produced a similar result as the SJRPP re-extract/re-analysis.

The results of the re-analysis were exceedances[4] of chlorpyrifos at the Ingram Creek at River Road (ICARR) site (0.58 µg/L), Westley Wasteway (0.040 µg/L), Del Puerto Creek at Hwy 33 (0.063 µg/L), and Ramona Lake near Fig Avenue (0.022 µg/L).

[4] An amended Exceedance Report was submitted to the Regional Board on 05/26/2015. See Appendix D (Summers Engineering Memorandum dated March 19, 2015) for a fuller discussion of this event.

Aquatic toxicity for all three indicator species was tested on samples at all 12 discharge sites; toxicity was observed at the ICARR site for *Ceriodaphnia* (0.0% survival). Since complete mortality was observed in the initial test of the ICARR ambient water sample, this triggered the implementation of testing of a series of dilutions of this water to determine the magnitude of the toxicity. The result of this dilution series testing is as follows:

> As in the initial test, there was complete mortality of the test organisms in the 100% ambient water concentration. Additionally, there was complete mortality in the 50% ambient water concentration and a statistically significant reduction in survival in the 25% ambient water concentration; the No Observed Effect Concentration (NOEC) was 12.5% ambient water. The EC50 was 19% ambient water, resulting in 5.3 TUa (where TUa =100/EC50).

There was a ≥50% reduction in *C. dubia* survival in the ICARR ambient water sample relative to the corresponding Control treatment. This triggered the implementation of a TIE targeted for pesticides and metals. The results are as follows:

> There was complete mortality of the test organisms in the Baseline (untreated ICARR sample) treatment, indicating that the previously observed toxicity was persistent. There were no blank interferences present in the TIE treatments. Toxicity was removed in the C18 treatment. These TIE results suggest that dissolved non-polar organic compound(s) caused the toxicity.

Rain Event 17, February 10th, 2015.

Rain Event Samples were collected at 12 discharge sites and 3 source water sites in accordance with the MRP. There was insufficient flow to collect samples at Poso Slough, Ingram Creek, Marshall Road Drain, and Orestimba Creek at River Road sites. Due to lack of safe access, no sample collection occurred at Blewett Drain, and Westley Wasteway near Cox Road. Diuron (8.3 µg/L), was detected in the Salt Slough at Sand Dam sample. Diuron (2.2 µg/L), Diazinon (0.96 µg/L), and Simazine (4.7 µg/L) were detected in the Newman Wasteway near Hills Ferry Road (NWHFR) site. 4,4'-DDE (0.013 µg/L), Chlorpyrifos (0.37 µg/L), Pendimethalin (0.69 µg/L), and Diuron (0.56 µg/L) were detected in the Hospital Creek at River Road (HCARR) site.

Aquatic toxicity for all three indicator species was tested for on all 12 discharge site samples and the 3 source water samples as well. Aquatic toxicity to *Selenastrum* was observed in the Salt Slough at Sand Dam sample (64% of control growth). The herbicide Diuron was detected in the Salt Slough at Sand Dam sample which could account for the *Selenastrum* toxicity. Aquatic toxicity was also observed to *Ceriodaphnia* in the HCARR (0.0% survival) and NWHFR (0.0% survival) samples.

Since complete mortality was observed in the initial test of the HCARR ambient water sample, this triggered the implementation of testing of a series of dilutions of this water to determine the magnitude of the toxicity. The results of this dilution series testing are as follows:

> As in the initial test, there was complete mortality of the test organisms in the 100% ambient water concentration. The No Observed Effect Concentration (NOEC) was 50%

ambient water. The EC50 was 67% ambient water, resulting in 1.5 TUa (where TUa =100/EC50).

Since there was a ≥50% reduction in *C. dubia* survival in the HCARR ambient water sample relative to the corresponding Control treatment, this triggered the implementation of a TIE targeted for pesticides and metals. The results of this TIE are as follows:

> There was a 100% reduction in survival of the test organisms in the Baseline (untreated HCARR sample) treatment, indicating that the previously observed toxicity was persistent. There were no blank interferences present in the TIE treatments. Toxicity removal was observed in the C18 SPE TIE treatment and there was a reduction in toxicity observed in the PBO treatment, which suggests that dissolved non-polar organic compound(s) and a metabolically activated substance (e.g., OP pesticides) may also have been partially responsible for the toxicity.

Since complete mortality was observed in the initial test of the NWHFR ambient water sample, this triggered the implementation of testing of a series of dilutions of this water to determine the magnitude of the toxicity. The results of this dilution series testing are as follows:

> As in the initial test, there was complete mortality of the test organisms in the 100% ambient water concentration. Additionally, there was a statistically significant reduction in survival in the 50% ambient water concentration; the No Observed Effect Concentration (NOEC) was 25% ambient water. The EC50 was 40.6% ambient water, resulting in 2.5 TUa (where TUa =100/EC50).

Since there was a ≥50% reduction in *C. dubia* survival in the NWHFR ambient water sample relative to the corresponding Control treatment, this triggered the implementation of a TIE targeted for pesticides and metals. The results of this TIE are as follows:

> There was complete mortality of the test organisms in the Baseline (untreated NWHFR sample) treatment, indicating that the previously observed toxicity was persistent. There were no blank interferences present in the TIE treatments. Toxicity removal was observed in the C18 SPE and PBO TIE treatments, which suggests that dissolved non-polar organic compound(s) and a metabolically activated substance (e.g., OP pesticides) may also have been partially responsible for the toxicity.

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 beaver dam had been constructed 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, 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

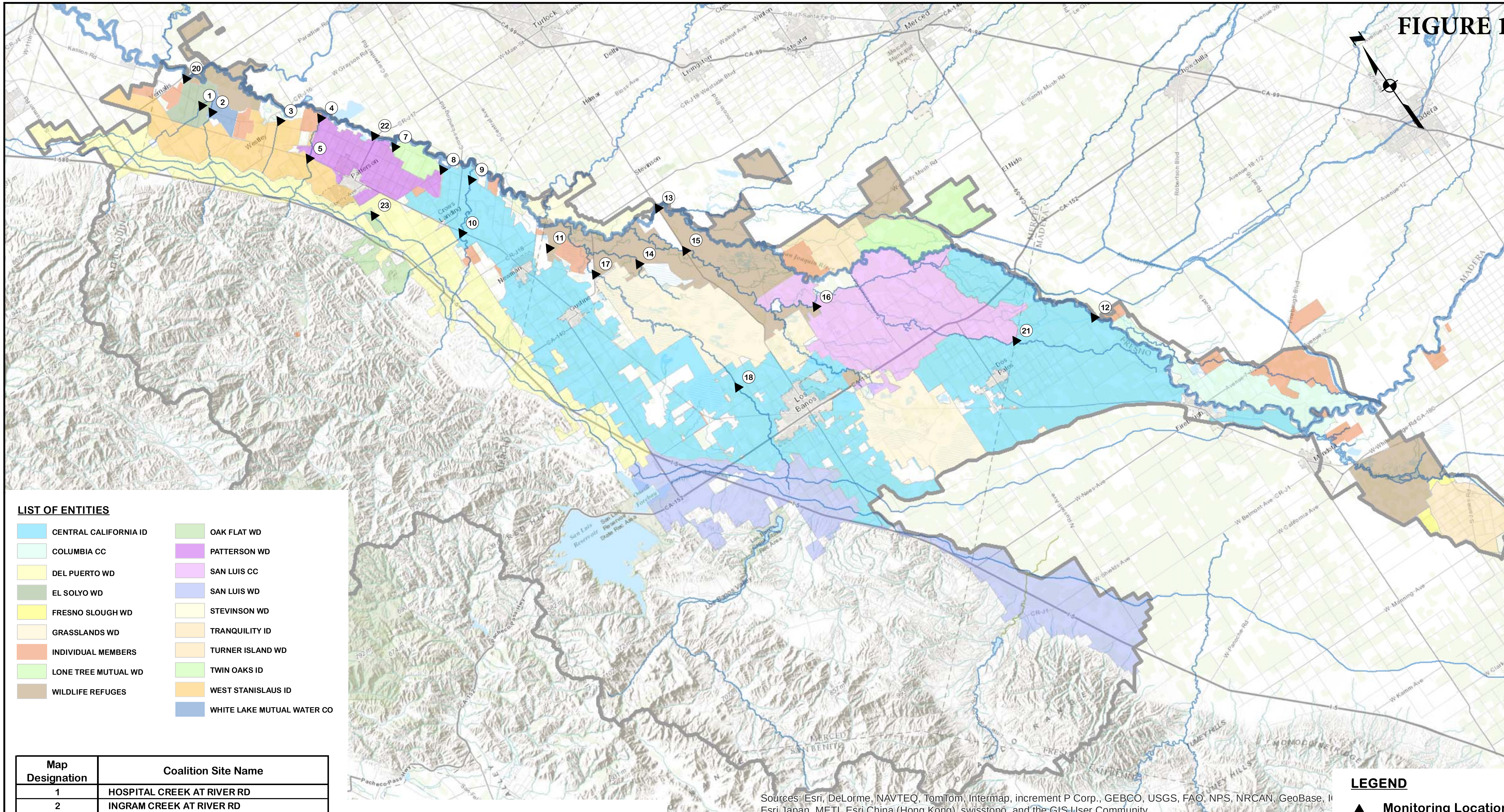
at this site. Flow at this site is calculated through an estimated velocity and cross-sectional flow area.

- 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



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

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

LEGEND

▲ Monitoring Location

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[5].

Table 7: Top 10 Crops Grown by County

Fresno	Merced	Stanislaus
Almonds	Alfalfa	Almonds
Cotton	Cotton	Alfalfa
Alfalfa	Tomatoes	Tomatoes
Tomatoes	Almonds	Grapes
Grapes	Wheat	Walnuts
Wheat	Corn	Oats
Pistachios	Oats	Wheat
Onions	Grapes	Cherries
Rice	Pistachios	Safflower
Pomegranates	Cantaloupes	Dry Beans

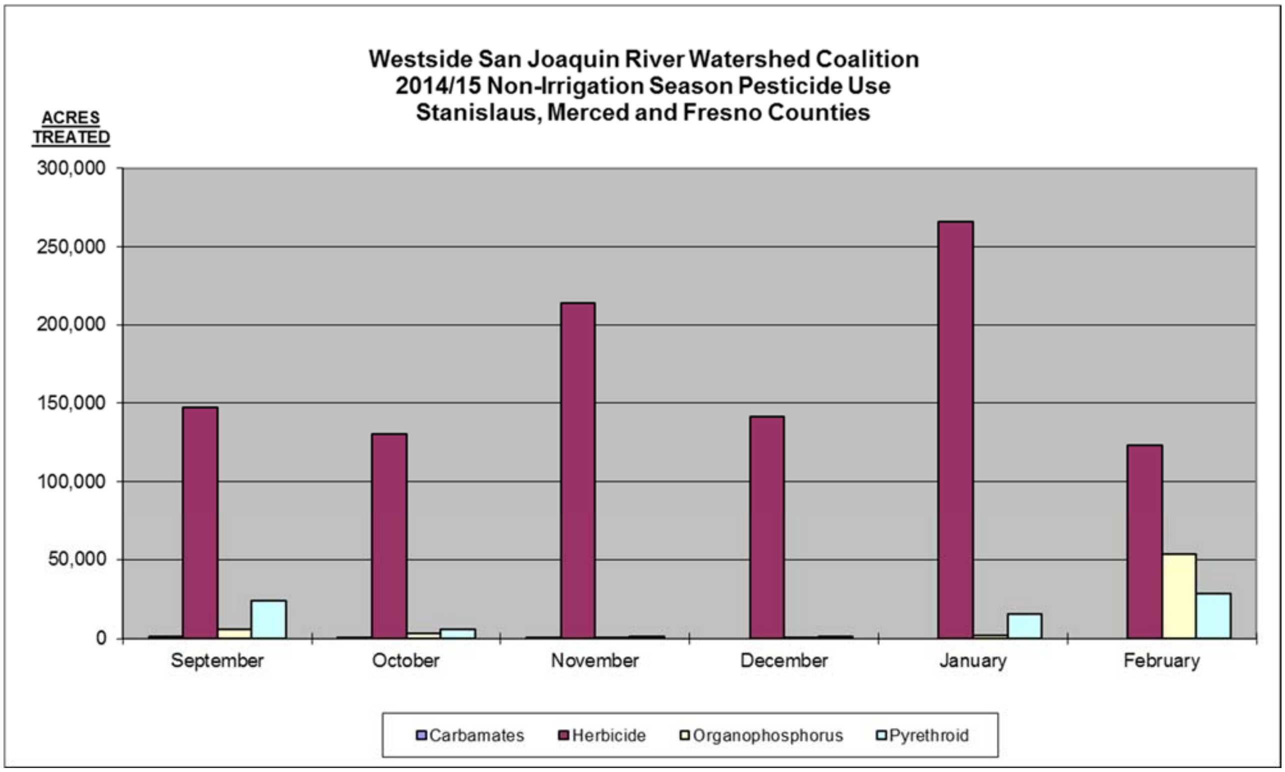
These crops are dispersed approximately evenly throughout the Coalition area, with the exceptions of cotton (mostly in the Los Banos, Dos Palos and Tranquility Subareas), and fruit trees and beans (mostly in the Patterson Subarea). The planting practices are typical for conventional agriculture within 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 furrow irrigated using either a plowed head-ditch or gated pipe, sprinkler irrigated with hand-move sprinkler pipe, or 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, and irrigation and cultivation activities beginning 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 non-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 2014/15 non-irrigation season monthly pesticide application within the Westside Coalition by pesticide group.

[5] http://nassgeodata.gmu.edu/CropScape/

Figure 2: 2014/15 Non-Irrigation Season Pesticide Use.



A more detailed review of pesticide use and detections is provided in **Section 8**. **Table 8** shows the 10 most commonly applied pesticides during the 2014/15 non-irrigation season (by acreage) within the three 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 for September 2013 – February 2014

Fresno County		Merced County		Stanislaus County	
Pesticide	**Class**	**Pesticide**	**Class**	**Pesticide**	**Class**
GLYPHOSATE, ISOPROPYLAMINE SALT	Herbicide	GLYPHOSATE, ISOPROPYLAMINE SALT	Herbicide	GLYPHOSATE, ISOPROPYLAMINE SALT	Herbicide
CHLORPYRIFOS	Organophosphorus	OXYFLUORFEN	Herbicide	LAMBDA-CYHALOTHRIN	Pyrethroid
BIFENTHRIN	Pyrethroid	DIMETHOATE	Organophosphorus	OXYFLUORFEN	Herbicide
PARAQUAT DICHLORIDE	Herbicide	CHLORPYRIFOS	Organophosphorus	DIMETHOATE	Organophosphorus
OXYFLUORFEN	Herbicide	PENDIMETHALIN	Herbicide	PENDIMETHALIN	Herbicide
DIMETHOATE	Organophosphorus	PARAQUAT DICHLORIDE	Herbicide	PARAQUAT DICHLORIDE	Herbicide
PENDIMETHALIN	Herbicide	S-METOLACHLOR	Herbicide	ESFENVALERATE	Pyrethroid
TRIFLURALIN	Herbicide	LAMBDA-CYHALOTHRIN	Pyrethroid	BIFENTHRIN	Pyrethroid
DIURON	Herbicide	TRIFLURALIN	Herbicide	CHLORPYRIFOS	Organophosphorus
SAFLUFENACIL	Herbicide	DIURON	Herbicide	SAFLUFENACIL	Herbicide

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. Three 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 both as 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 the MRP Order.

In accordance with the MRP Order, the Westside Coalition collected non-irrigation season ambient water and sediment samples starting with the September 2014 sampling event. Aquatic toxicity, pesticides and metals were analyzed at all 18 discharge sites according to the monitoring plan.

SECTION 6: FIELD AND LABORATORY QUALITY CONTROL SAMPLES

Laboratory Quality Control Samples. The three laboratories (APPL, Caltest, and PER) 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 handful of quality control tests for APPL and Caltest failed to meet acceptability criteria. These failures represented about 1.3% 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 157 duplicate analyses were completed and compared to the event sample results. Twenty one duplicate samples exceeded the 25% relative percent difference (RPD) established in the QAPP for:

Ammonia (N)	Cadmium (Total)	Copper (Total)	Lead (Total)	Nickel (Total)
Nitrate+Nitrite	TKN	Zinc (Total)	E. coli	Turbidity
TSS				

These exceedances of the field duplicate quality control criteria account for approximately 13.3% 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. Although the number of field duplicates exceeding the RPD criteria is higher than in previous report periods, the Westside Coalition does not expect these variations to impact data usability.

Six field blank sample sets were analyzed during the report period (151 result). Of these, 4 analyses resulted in values greater than 20% of the event sample result for:

Copper (dissolved) TOC

- **Pesticide Analyses.** Six field duplicate and field blank samples sets were collected during the reporting period and analyzed for pesticides (246 and 256 respectively). Calculated RPD for field duplicate did not exceeded the criteria of 25% for any analyte during this report period. Calculated RPD for field blank results exceeded the criteria of 20% 4 times, which represents 1.6% of the total. 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 (25% threshold) was not exceeded during the period of this report.
- **Sediment Toxicity Analyses.** A field duplicate sample was collected for sediment toxicity during the September sampling event (Event 117). 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: All samples were collected according to the Coalition's MRP and QAPP and were delivered, under the proper COC's to the respective laboratories for analysis.
- 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 as part of the Revised MRP.

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 non-irrigation season Assessment Monitoring schedule included in the MRP Order (as modified in the March 2012 letter. 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 in the Coalition area. This reporting period covered the 2014/15 non-irrigation season months, during which there was minimal agricultural activity. Additionally, there were few storm events during this period and two generated minimally sufficient runoff to justify a rain event sample collection. Statistically significant aquatic toxicity occurred 6 times during the period of this report; once to *Ceriodaphnia* during Event 120 and 5 times during the rain events (R16 and R17) to *Selenastrum* and *Ceriodaphnia.* The observations of aquatic toxicity are detailed in **Attachment 2**.

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

Ceriodaphnia dubia. Toxicity to *Ceriodaphnia* was observed 4 times during this report period.

- Rain Event 16 (12/4/14); Hospital Creek at River Road - 20% of laboratory control. A TIE was performed and indicated that pesticides were the likely cause. DDE (0.014 µg/L) was detected in the sample.

- Event 120 (1/13/15); Ingram Creek at River Road - 0% of laboratory control. A TIE was performed and indicated that pesticides were the likely cause. Chlorpyrifos (0.58 µg/L) was detected in the sample and is expected to be the cause of the toxicity.
- Rain Event 17 (2/10/15); Hospital Creek at River Road - 0% of laboratory control. A TIE was performed and indicated that pesticides were the likely cause. Chlorpyrifos (0.37 µg/L) and DDE (0.013 µg/L) were detected in the sample and is expected to be the cause of the toxicity.
- Rain Event 17 (2/10/15); Newman Wasteway near Hills Ferry Road - 0% of laboratory control. A TIE was performed and indicated that pesticides were the likely cause. Diazinon (0.96 µg/L) was detected in the sample and is expected to be the cause of the toxicity.

Selenastrum capricornutum (algae). Toxicity to *Selenastrum* was observed twice during the period of this report.

- Rain Event 16 (12/4/14); Hospital Creek at River Road – 39% of control growth. A TIE was performed and indicated that the reduction in Selenastrum growth observed during the initial test was likely due to the foreign species competing for nutrients. However, toxicity cannot be ruled out as the toxicant may have rapidly degraded between initial test and TIE. DDE (0.014 µg/L), Diuron (0.84 µg/L), and Pendimethalin (1.6 µg/L) were detected in the sample and could have contributed to the toxicity.
- Rain Event 17 (2/10/15); Salt Slough at Sand Dam - 64% of control growth. The sample did not meet the threshold of <50% of control; no follow-up analysis was required. Diuron (8.3 µg/L) was detected in the sample and could have contributed to the toxicity.

Sediment Toxicity (*Hyalella azteca*). Sixteen samples were collected (including one duplicate) and tested for toxicity to *Hyalella azteca* on September 8th. Statistically significant toxicity was measured at 6 sites. **Table 9** lists the Percent Survival results for the sites exhibiting sediment toxicity; follow up pesticide analysis were performed on 5 samples. **Table 10** summarizes the detected pesticide data at those 5 sites. See **Appendix C** for the full laboratory report. **Table 11** shows the sediment toxicity results since May 2011.

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

Site	Percent Survival
Blewett Drain at Highway 132*	26.3%
Hospital Creek at River Road*	2.5%
Ingram Creek at River Road*	18.8%
Los Banos Creek at China Camp Road	81.3%
Orestimba Creek at Highway 33*	57.5%
Westley Wasteway near Cox Road*	61.3%

* Sample analyzed for specific pesticides.

Table 10: Detected Pesticides in Sediment Samples (September 2014)

	Blewett Drain at Hwy 132	Hospital Creek at River Rd.	Ingram Creek at River Rd.	Orestimba Creek at Hwy 33	Westley Wasteway near Cox Road
Sediment Toxicity (% survival)	26.25	2.5	18.8	57.5	61.25
Percent Solids (%)[1]	97	97	95	96	94
Bifenthrin (ng/g dw)	3.9	1.9	4	3.6	27
Chlorpyrifos (ng/g dw)	0.67	0.65	0.67	0.22j	0.3j
Cyfluthrin (ng/g dw)	ND	ND	ND	ND	0.13j
Lambda-cyhalothrin (ng/g dw)	0.32j	8.4	5.5	0.13j	1.1
Cypermethrin (ng/g dw)	ND	ND	0.21j	ND	ND
DDD (ng/g dw)	ND	3.6	6.7	8	0.87j
DDE (ng/g dw)	10	56	95	130	17
DDT (ng/g dw)	1.8j	4.3	1.3j	1.3j	ND
Es/Fenvalerate (ng/g dw)	35	36	1.1	0.29j	0.41
Fenpropathrin (ng/g dw)	ND	ND	ND	ND	ND
Permethrin (ng/g dw)	ND	ND	0.41	0.71	0.71

1 – Dried Sediment as Extracted

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

Table 11: Sediment Toxicity Results.

Site	Sept 14 % Survival	Sept 14 Toxicity (Y/N)	March 14 % Survival	March 14 Toxicity (Y/N)	Sept 13 % Survival	Sept 13 Toxicity (Y/N)	March 13 % Survival	March 13 Toxicity (Y/N)
Blewett Drain (Vernalis at hwy 132)	**26.3**	**Y**	**61.3**	**Y**	**86.2**	**Y**	**3.75**	**Y**
Hospital Creek	**2.5**	**Y**	**87.5**	**Y**	**0**	**Y**	96.3	N
Ingram Creek	**18.8**	**Y**	**40**	**Y**	**0**	**Y**	**1.25**	**Y**
Westley Wasteway	**61.3**	**Y**	**87.5**	**Y**	**2.5**	**Y**	**1.25**	**Y**
Del Puerto Creek (Cox Rd)	86.3	N	**23.8**	**Y**	90	N	96.2	N
Del Puerto Creek (Hwy 33)					**0**	**Y**	98.8	N
Orestimba Creek at River Rd.							98.8	N
Orestimba Creek at Hwy 33	**57.5**	**Y**	**76.2**	**Y**			93.8	N
Ramona Lake at Fig Ave.	92.5	N	**81.3**	**Y**	93.3	N	**91.3**	**Y**
Newman Wasteway	96.3	N	90	N			**90**	**Y**
Poso Slough	100	N	95	N	96.3	N	98.8	N
Turner Slough			91.3	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	**81.3**	**Y**	97.5	N	83.8	N
Los Banos Creek at Hwy 140	96.3	N	**92.9**	**Y**				
Los Banos Creek at China Camp Rd.	**81.3**	**Y**	**88.8**	**Y**	**80**	**Y**	100	N
Los Banos Creek at Sunset Ave.								
Mud Slough	98.8	N	98.8	N				

Site	Sept 12 % Survival	Sept 12 Toxicity (Y/N)	March 12 % Survival	March 12 Toxicity (Y/N)	Sept 11 % Survival	Sept 11 Toxicity (Y/N)	May 11 % Survival	May 11 Toxicity (Y/N)
Blewett Drain (Vernalis at hwy 132)	**3.75**	**Y**	95	N	**56.3**	**Y**	86.3	N
Hospital Creek	**2.5**	**Y**	**81.3**	**Y**	**20**	**Y**	**8.75**	**Y**
Ingram Creek	**1.3**	**Y**	**60**	**Y**	**0**	**Y**	**16.3**	**Y**
Westley Wasteway	**13.8**	**Y**	**15**	**Y**	90	N	93.8	N
Del Puerto Creek (Cox Rd)	93.8	N	97.5	N	88.8	N	81.3	N
Del Puerto Creek (Hwy 33)			98.6	N			96.3	N
Orestimba Creek at River Rd.	77.5	N	97.5	N	96.3	N	100	N
Orestimba Creek at Hwy 33	**10**	**Y**	**36.3**	**Y**	**0**	**Y**	92.5	N
Ramona Lake at Fig Ave.	96.3	N	95	N	96.3	N	**92.5**	**Y**
Newman Wasteway	92.5	N	100	N	97.5	N		
Poso Slough	91.3	N	96.3	N	98.8	N	87.5	**Y**
Turner Slough					95	N	100	N
SJR at Lander					98.8	N		
Salt Slough at Lander					97.5	N		
Salt Slough at Sand Dam	96.3	N	92.5	N	100	N	**78.8**	**Y**
Los Banos Creek at Hwy 140					97.5	N	97.5	N
Los Banos Creek at China Camp Rd.	85	N	100	N	97.5	N	98.15	N
Los Banos Creek at Sunset Ave.								
Mud Slough					98.8	N	96.3	N

Pesticide Analyses.

A total of 12 different pesticides were detected in water samples during the 2014/15 non-irrigation season for a total of 52 detections. Ten of these detections (19%) were for legacy pesticides (DDE, DDT, Dieldrin, and Toxaphene) that are no longer used in commercial agriculture and were not applied. Of the 42 detections for applied chemicals, 10 (24%) were below the reporting limit (DNQ). Each of the applied/detected pesticides is discussed below.

- **Carbaryl (1 detection):** Carbaryl is a wide-spectrum carbamate insecticide which controls a wide range of insects on citrus, fruit, cotton, nuts, and other crops, as well as on poultry and livestock.
- **Chlorpyrifos (10 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.
- **DDT/DDE/DDD (1 DDT detection, 7 DDE detections):** DDT is an organochlorine pesticide that was banned for agricultural use in 1972. It is a legacy pesticide that is still detected in the watershed at relatively low levels. DDE and DDD have no commercial use but are compounds normally associated with the degradation of DDT.
- **Diazinon (1 detection):** Diazinon is a non-systemic organophosphate insecticide used to control a wide variety of sucking and leaf eating insects. It is used on rice, fruit trees, corn, and potatoes and on other crops.
- **Dieldrin (1 detections):** Dieldrin is an organochlorine insecticide that was used on a variety of field and orchard crops including cotton, corn, and citrus. Most uses of Dieldrin were banned in 1987.
- **Dimethoate (3 detections):** 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 (13 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.
- **Methomyl (1detection):** Methomyl is a carbamate pesticide used for foliar treatment of alfalfa for forage, vegetable, fruit and field crops, cotton, commercial ornamentals.
- **Pendimethalin (10 detections):** Pendimethalin is a selective herbicide used to control most annual grasses and certain broadleaf weeds in field corn, potatoes, rice, cotton, soybeans, and sunflowers.
- **Simazine (3 detections):** 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.
- **Toxaphene (1 detection):** Toxaphene was used as an insecticide to treat mange in cattle as well as to control pests in cotton and corn. Toxaphene was banned in the United States in 1986.

Exceedances of Recommended Water Quality Values.
Water chemistry analyses were compared to recommended water quality values[6] (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 performed analyses or observed more than 2940 field and chemistry (non-pesticide) parameters during the reporting period, during which, 272 (9%) results were greater than the RWQVs. Electrical conductivity and total dissolved solids (TDS) accounted for 85 and 79, respectively, of these exceedances (approximately 60% of the exceedances, combined). E. coli results accounted for 35 of these exceedances, 34 for boron and 11 for dissolved oxygen. The RWQV for cadmium, copper, lead, nickel, and zinc are dependent on site water hardness and is a calculated value. There were no exceedances of dissolved metals 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 the 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 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 participate in this workgroup.
    - **Dissolved Oxygen.** DO is measured through a field probe at the time of sample collection. By its nature, DO 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 and 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 an elemental metal commonly found in soils on the west side 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.

[6] Water Quality Limits were provided by the Central Valley Regional Water Quality Control Board as part of the MRP Order. Water quality limits for cadmium, copper, lead, nickel and zinc are calculated from equations provided by the Central Valley Regional Water Quality Control Board.

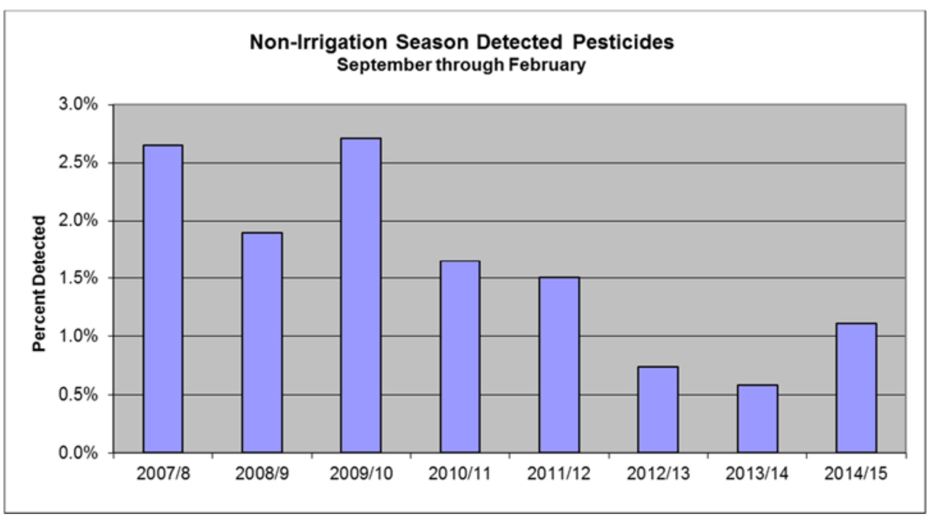
The number and type of field and general chemistry exceedances was not dramatically different than those of prior years.

- **Pesticide exceedances.** Up to 48 different pesticides were tested for at monitoring sites each month. During the period of this non-irrigation season report, pesticide samples were collected at all discharge sites, source water sites, and at all sampled sites during rain events. Samples collected within the Westside Coalition during this report period provided 4944 pesticide results, of which 98.9% resulted in no detections. Of the detected pesticides (52), 22 were greater than established RWQVs. These included:
  - Chlorpyrifos (8 exceedances)
  - DDE (7 exceedances)
  - DDT (1 exceedances)
  - Diazinon (1 exceedance)
  - Diuron (2 exceedances)
  - Methomyl (1 exceedance)
  - Simazine (1 exceedance)
  - Toxaphene (1 exceedance)

DDT, DDE (degradate of DDT), and Toxaphene are leagacy pesticides no longer in use and account for 40.9% of the exceedances.

Though the number of pesticide detections increased (as a percentage of the total results) from the previous non-irrigation season, the detection rate remains at historical lows; 1.1% this period versus 0.6% in 2013/14 and 0.7% in 2012/13. **Figure 3** shows the percent of total pesticides detected in each non-irrigation season since 2007/8 (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 has increased its outreach efforts with additional grower workshops and individual grower meetings in regions with a history of chlorpyrifos or diazinon exceedances. These meetings emphasize water quality issues related to these materials and management practices that could be implemented to reduce or eliminate discharge.

During this reporting period there was 1 detection of diazinon and 10 detections of chlorpyrifos[7] at various monitoring sites within the Westside Coalition service area. One of the detections of chlorpyrifos (0.0067j ug/L) occurred at the San Joaquin River at PID Pumps (SJRPP) monitoring site. However, even with the single "j- flagged" chlorpyrifos detection, the TMDL for the San Joaquin River was not exceeded. In accordance with the TMDL program requirements, an annual monitoring report for chlorpyrifos and diazinon monitoring results, covering the period of October 2013 through September 2014, was submitted in May 2015.

Pesticide use report (PUR) data is requested after the exceedances are detected. The Coalition maps the detection areas and provides Coalition field personnel with targeted outreach material to specific growers in the affected areas. However, the first contact with growers occurs more than 90 days after the detection is made 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 limited impact. As of the date of this report, the Westside Coalition is organizing more "one on one" grower meetings to increase awareness of the chlorpyrifos and diazinon TMDL issues as well as other water quality matters. Also, in response to the TMDL and other water quality concerns, a Stakeholder group of growers in the Hospital and Ingram creeks subwatersheds has formed. Details about this group are discussed in **Attachment 6**.

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 have been developed for specific issues within Hospital Creek, Ingram Creek, Del Puerto Creek, Westley Wasteway, Orestimba Creek, and Salt Slough (including both Salt Slough monitoring sites and Poso Slough), as well as, Blewett Drain and Marshall Road Drain. **Table 12** shows the implementation schedule listed in the Management Plan (see the Management Plan – General Approach, Table 4, October 23, 2008). In addition to these actions, the Westside Coalition reviews exceedances over the past three years to determine what modifications (if any) need to be made to the Management or Focused plans. A tally of exceedances from March 2012 through February 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 are scheduled. These are shown in **Table 13**.

[7] Two of the detections were "j-flagged" as the detections were below laboratory quantifiable limits.

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 SQMP Approval
Newman Wasteway	To be Determined by SQMP Approval
Los Banos Creek	To be Determined by SQMP Approval

1. Continue Monitoring Program.
This semi-annual monitoring report represents the 21st monitoring report submitted by the Westside Coalition since its inception in 2004. The monitoring program (as revised by the MRP Order) is designed to be a dynamic program that aggressively tracks known water quality issues and conducts broad assessment monitoring to identify new issues (see the MRP Order). The monitoring program is also designed to support the activities of the Management Plan and the Focused Watershed plans. The results of the monitoring program are reported twice annually (June and November). Beginning in March of 2011 the Westside Coalition implemented assessment monitoring at all discharge sites which continued through February 2012. The results of the assessment monitoring period were reviewed and adjustments were made to the Special Project Monitoring table included in the MRP order (see **Attachment 7**). Assessment monitoring began again in March 2014 and continued through the period of this report.

2. Develop and Implement Focused Watershed Plan.
A Focused Plan for the Ingram and Hospital Creek watersheds was developed and submitted to the Regional Board on October 23, 2008 followed by a Focused Plan for the Westley Wasteway, Del Puerto Creek, and Orestimba Creek in February 2011. The Focused Plan for Salt Slough (including Poso Slough) was adopted in December 2011. A focused plan for Blewett Drain and Marshall Road Drain was submitted In July 2013. Since that time, the Westside Coalition has

implemented a number of activities. A detailed update of the focused plan activities is included in **Attachment 6.** Additional focused plans (see **Table 13**) will be included in the Coalition's Comprehensive Surface Water Quality Management Plan (SQMP). The anticipated start date of the additional plans will be determined when the SQMP has been approved by the Regional Board.

3. Compile Management Practice Inventory.
A management plan survey for the Ingram and Hospital Creek watersheds was completed in 2010 with a similar survey completed for Del Puerto Creek, Westley Wasteway, and Orestimba Creek completed in the spring of 2011, the results of which were reported in the June 2011 SAMR. A management practice survey for Salt Slough was completed and submitted in August 2012. A management plan survey for the Blewett and Marshall drains was sent to affected growers in November 2013; the survey has been completed. The results of the survey will allow the Coalition to finalize survey findings and report on the management practice baseline, produce a summary of existing management activities, and move forward with the goals and objectives of the management plan. A 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**).

5. Determine Regional Pesticide Use.
Pesticide use report data is collected from the agricultural commissioners in the various counties occupied by the Westside Coalition. 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 2014. 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. The agreement has been 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 growers, publications distributed by the Coalition's member districts, and various meetings.

- **Direct mailings:** A variety of memo and letters were sent to various individuals and entities regarding water quality issues and upcoming meetings.
- **District Publications:** Some of the districts within the Westside Coalition publish newsletters that contain Coalition news and information and are mailed to district growers regularly.
- **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 has been on hiatus since the fall of 2014, but is slated to resume meetings in spring 2015.
- **Grower Meetings:** Several meetings were organized by various district members of the Coalition, during which the current water quality issues and future long term plans were discussed with the growers and others. These meetings are listed in **Table 14** below.
- **Observation drives:** Staff from the Westside Coalition performed weekly drives through key coalition areas and reported observations on farming activities and creek or drain flow conditions. When appropriate, this information was used during tailgate and other outreach meetings.

Table 14: Outreach Meetings

Date	Group	Location	Purpose	Attendance	Presenter
9/2/2014	SJVDA Board Meeting	Los Banos	Coalition Board Meeting	15	Business meeting, new program requirements
9/12/2014	TIWD, LTMWC,TOID Meetings	Varies	One on One NOC/FEP Training	4	Orvil deliver NOC/FEP forms.
10/1/2014	CCID NOC/FEP Form Training	Los Banos	Familiarize CCID Staff with NOC/FEP Forms to Assist Coalition Members	7	Orvil Make Presentation.
10/2/2014	TID Grower Workshop	Tranquillity	Present TID Growers NOC/FEP forms & Other Coalition Issues	55	Orvil Make Presentation.
10/7//14	SJVDA Board Meeting	Los Banos	Business Meeting, New Program requirements & Pesticide Update	15	Joe Makes Presentation
11/4/2014	SJVDA Board Meeting	Los Banos	Business Meeting, New Program requirements & Pesticide Update	15	Joe Makes Presentation
12/4/2014	Large Coalition Grower/Member	Hanford	Conference Call To Assist Grower w/FEP Issues	5	Orvil Work Through Issue With Grower/Member Technical Staff
2/1/2015	SJVDA Board Meeting	Los Banos	Business Meeting, Pesticide Update, Present NMP	25	Joe Makes Presentation
2/11/2015	West Stanislaus RCD Board	Patterson	Present Pesticide Detection Issues in West Stanislaus County	18	Orvil Presents Chlorpyrifos Data And Detection Areas
Various	Observation Drives	Varies	Observe and report sediment conditions in drains		Rich Peltzer

Grant Funding

The Westside Coalition continued to offer private grant funding to its members totaling more $30,000 for construction of new tailwater silt ponds or to maintain existing ponds. The program funds 75% of the costs of any single project, up to a maximum of $6,000 per project. A large number of sediment pond cleanout projects were completed at the end of the 2012 irrigation season (reported in the November 2012 SAMR) and no new project was funded this period. To date, $28,600 of the grant funds have been expended for this fiscal year (about 95% of the available funds). Most of these projects were in the northerly region of the Westside Coalition, affecting about 6,000 acres that drain into the Marshall Road Drain, Orestimba Creek, Spanish Land Grant Drain and Delta-Mendota Canal. See the November 2012 SAMR for details.

Proposition 84 has also been 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 has been communicated during the previous reporting period to landowners and operators through direct mailings, grower group meetings and individual contacts with landowners.

The Proposition 84 program provides 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. As of August 2014, 49 projects have been funded of which 42 have been completed; six of the seven remaining projects were awarded in August 2014. The projects will ultimately affect nearly 4,100 acres within the Westside Coalition.

In addition to grower-implemented management practices, 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 chair of the Economic and Social Impact Committee. (2) Consistent participation and economic contributions to the Central Valley Salinity Coalition, including representative serving as president of the CV 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 been participating with the US Bureau of Reclamation in implementation of a Real Time Monitoring Program (RTMP). This program is a component of the compliance with the Vernalis TMDL for salt. It is anticipated that the RTMP will be submitted to the CVSALTS Lower San Joaquin River Committee for review and comment and then would be taken to the Regional Board for approval.

11. Track Changes in Water Quality.
Water quality changes are tracked through the Westside Coalition's monitoring program (see the MRP Order). 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, and more 11,000 acres of high efficiency systems came on-line during the

2012/13 non-irrigation season within the Westside Coalition, including nearly 4,100 acres funded (or approved for funding) through the Proposition 84 program. Typically, irrigation improvements are installed during the non-irrigation season for use in the following irrigation season. For the 2014 irrigation season, San Luis Canal Company provided $1,210,000 in funding assistance for irrigation system improvements.

- **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 (although often with 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 16 samples (including one duplicate) from 15 sites collected in September (Event 117). Statistically significant toxicity was measured at 6 sites (See **Tables 10** and **11**), and follow up pesticide testing was performed on samples from 5 sites. 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 (26.3% survival):** A total of 5.96 sediment toxic units (TUs) were calculated based on the detected pesticides. Bifenthrin accounted for 1.43 TUs, chlorpyrifos accounted for 0.07 TUs, with esfenvalerate accounting for 4.32 TUs.
  - **Hospital Creek (2.5% Survival):** A total of 9.31 TUs were calculated; lambda cyhalothrin accounted for 3.77 TUs; bifenthrin accounted for 0.74 TUs, esfenvalerate accounted for 4.72 TUs, and chlorpyrifos accounted for 0.07 TUs.
  - **Ingram Creek (18.8% Survival):** A total of 3.02 TUs were calculated; bifenthrin accounted for 1.07 TUs, lambda cyhalothrin accounted for 1.71 TUs, and chlorpyrifos accounted for 0.05 TUs.
  - **Orestimba Creek at Hwy 33 (57.5% Survival):** A total of 0.74 TUs were calculated; bifenthrin accounted for 0.73 TUs, and chlorpyrifos accounted for 0.01 TUs.
  - **Westley Wasteway (61.3% Survival):** A total of 3.23 TUs; bifenthrin accounted for 3.05 TUs, lambda cyhalothrin accounted for 0.14 TUs, and chlorpyrifos accounted for 0.01 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: Fall Count of Sediment Toxicity.

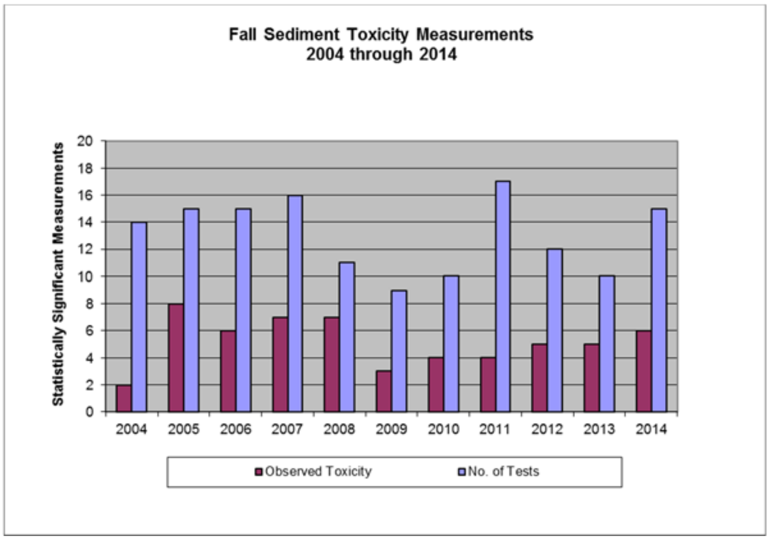


Figure 4 shows the number of statistically significant observations during the fall sediment sampling events over the last decade. The fall 2014 sediment results showed a slight increase in the total number of sites with observed toxicity as in fall 2013. Statistically, since more sites were sampled in 2014 than in 2013, there was a 20% overall reduction in ratio of toxicity to sites sampled from 2014 to 2013. 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 a hurdle. 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 5: Percent Survival Trend (Coalition Wide)

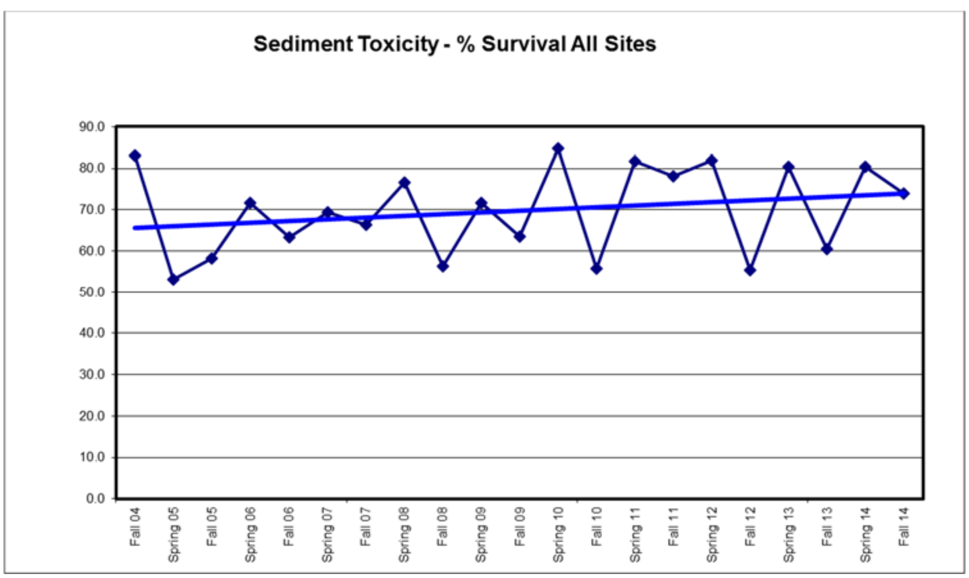


Figure 5 shows the trend of percent survival for sediment toxicity (average percent survival for all tested sites at each event), along with a linear trend line.

Based on the trend line, there appears to be an improving trend in terms of the magnitude of survival, although the most recent toxicity results were not an improvement. 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: Percent Survival Trend (Northern Sites).

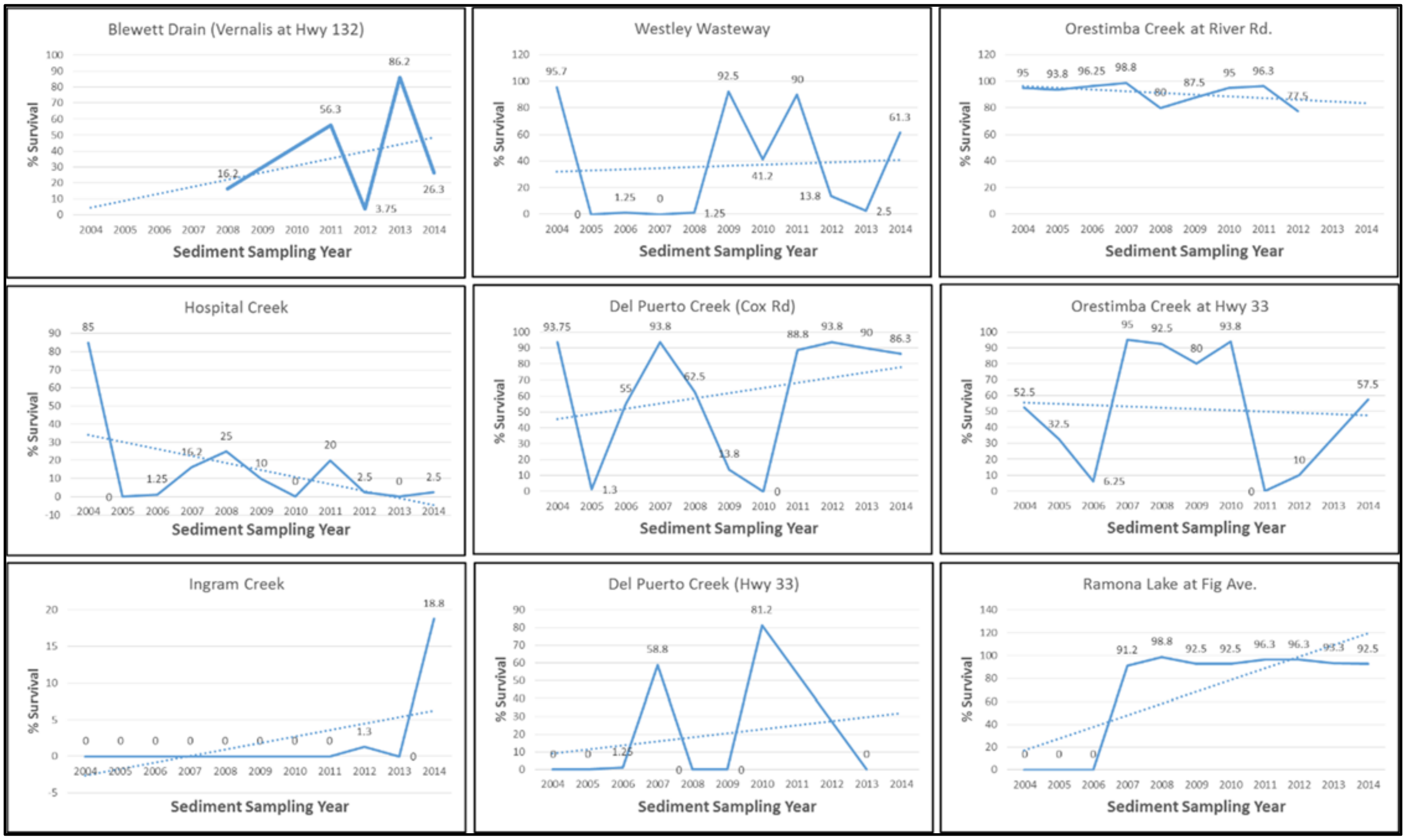


Figure 5.1 graphs the percent survival for sediment toxicity during the non-irrigation season of all discharge monitoring sites in the northerly area (north of Newman Wasteway) of the Coalition since 2004[8]. The Discharge sites have been grouped by the north/south designation to illustrate the toxicity 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 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[9]. Other of the northern sites have a very distinctive “on-again/off-again” toxicity pattern[10] to them that is, most likely, reflective of the “scouring effect” of high water flows that can pulse through the drainages. During irrigation season, high flows scour the drain bottoms and clean out the sediment.

[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] Blewett Drain. Hospital Creek, Ingram Creek, and Del Puerto Creek at Hwy 33

[10] Westley Wasteway, Del Puerto Creek at Cox Rd., and Orestimba Creek at Hwy 33

In the fall, low flows redistribute sediment back onto the drain bottom. Two sites[11] have had fairly consistent positive results. The Orestimba has been consistently positive from the inception of the monitoring program, while Ramona Lake made a dramatic turnaround for the positive in 2007, 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 sediment discharges to manageable levels, the trend for most of the northern sediment monitoring sites is in a positive direction.

Figure 5.2: Percent Survival Trend (Southern Sites).

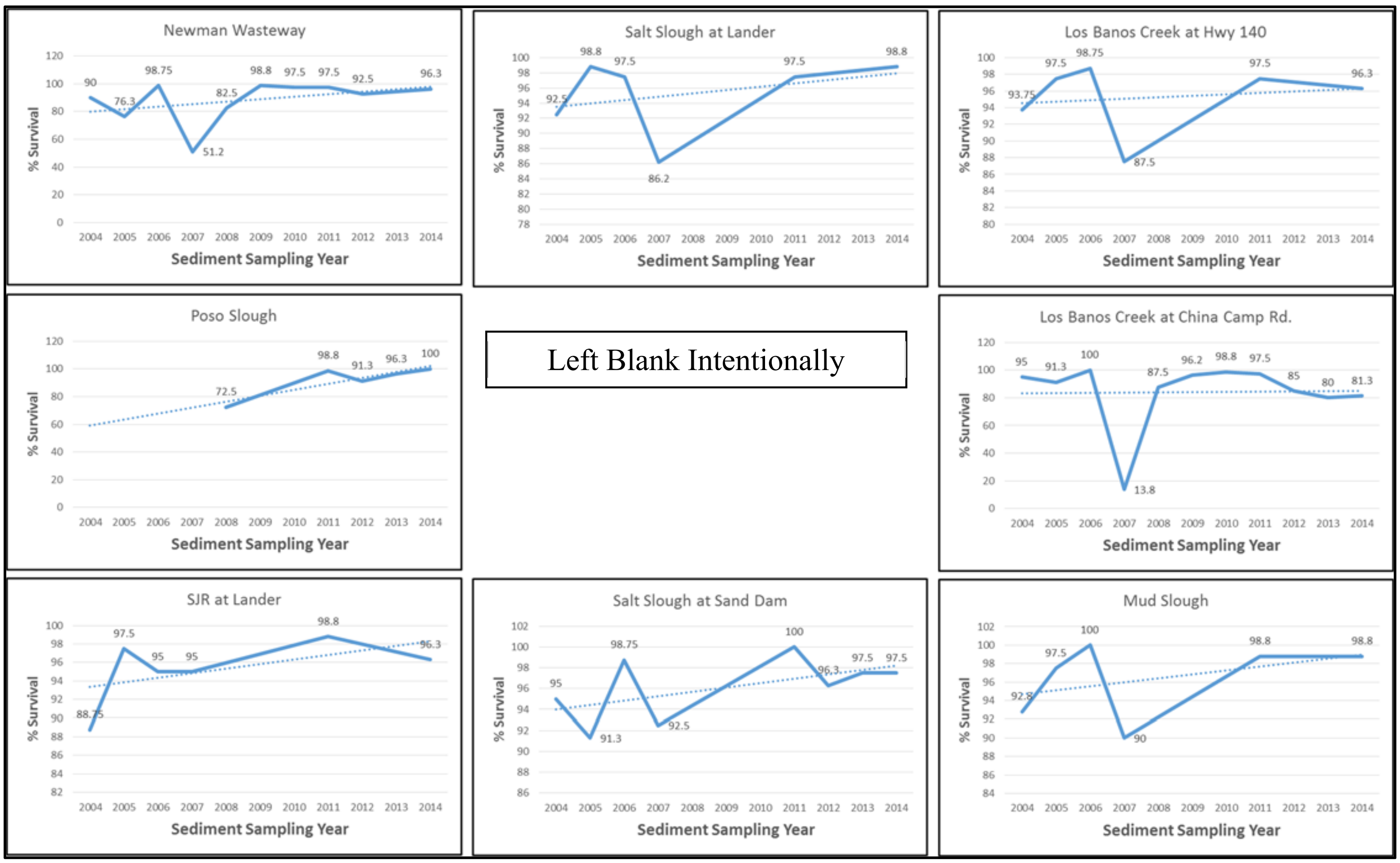


Figure 5.2 graphs the percent survival for sediment toxicity during the non-irrigation season of all discharge monitoring sites in the southerly area (south of Newman Wasteway) of the Coalition since 2004[12]. As mentioned above, the north/south grouping is illustrative of the geological differences in the separate regions. The graphs easily illustrate a very stable watershed (as it relates to sediment toxicity) with very few toxicity events[13]. Geographically, the southern area consists of

[11] Orestimba Creek at River Rd., and Ramona Lake
[12] 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
[13] Newman Wasterway-2005,2007; Poso Slough-2008; Los Banos Creek-2007

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[14] 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.

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

- **Aquatic Toxicity:** Aquatic toxicity to *Ceriodaphnia dubia*, *Pimephales promelas*, and *Selenastrum capricornutum* were tested in accordance with the MRP Order (see **Attachment 7**). A total of 249 aquatic toxicity tests were performed, which included 14 field duplicates. There were 6 observed incidences of statistically significant toxicity (2.4%) during the non-irrigation season. **Attachment 2** provides monitoring results for all of the sites that measured significant toxicity, including a discussion of the TIE and dilution series findings.

- **Pesticide Analyses:** During this reporting period, 12 different pesticides were detected in water samples during the 2014/15 non-irrigation season for a total of 52 detections. Twenty two of these detections exceeded the established RWQV for chlorpyrifos, DDE, DDT, diazinon, diuron, methomyl, simazine, and toxaphene. 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 this 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.

- **General Chemistry and Field Observations:** The monitoring results for field and general chemistry tests were fairly similar to previous irrigation seasons. EC/TDS measured the largest number of exceedances for this reporting period (85 and 79 exceedances respectively). Bacteria (E Coli) was detected in 35 samples during the monitoring period. There were 34 exceedances for boron; boron is typically connected with shallow

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

groundwater within the Westside San Joaquin Valley. Other constituent exceedances include dissolved oxygen (11 exceedances) and pH (20 exceedances). Dissolved cadmium, copper, lead, nickel, and zinc results were compared to the calculated RWQV (based on site water hardness) and no exceedances were measured during this reporting period. Ammonia (as N) and selenium each had 1 exceedance; arsenic had 6 exceedances. 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; they 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 to be 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 Management Plan and Focused Watershed Plan to address the water quality concerns discovered by previous monitoring. Implementation of these plans has begun.

As of the date of this report, the Westside Coalition monitoring program has accumulated data from 120 regularly scheduled 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 (March 2012 to February 2015) was compared to the three year period prior to management plan implementation (March 2005 to February 2008) and there are some promising improvements:

- *Ceriodaphnia* dubia toxicity: 16 exceedances out of 470 tests (3.4%) for the most current period, compared to 22 exceedances out of 382 tests (6%).
- Fathead minnow toxicity: 1 exceedances out of 254 tests (<1%) for the most current period, compared to 7 exceedances out of 385 tests (2%).
- Algae toxicity: 17 exceedances out of 327 tests (5.2%) for the most current period, compared to 32 exceedances out of 388 tests (8%).
- Chlorpyrifos: 40 exceedances out of 577 tests (6.9%) for the most current period compared to 66 exceedances out of 375 tests (17.6%).

- Diazinon: 9 exceedances out of 578 tests (1.6%) for the most current period compared to 9 exceedances out of 375 tests (2.4%).
- Total pesticide detections: Approximately 1.7% of analyzed pesticides detected in the current period versus 4.4% of analyzed pesticides detected in the period prior to management plan implementation.
- Sediment toxicity: 28 toxicity observations out of 79 tests (35%) in the current period compared to 45 observations out of 89 tests (51%).

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

Attachment 1
Sampling Event Details

Attachment 2
Significant Aquatic Toxicity Results

Attachment 3
Field Quality Control Sample Results

Attachment 4
Sediment Toxicity Follow-up Analyses

Attachment 5
Exceedance of Recommended Water Quality Values

Attachment 6
Management Plan Activities

Exceedance Tally

Pesticide Use Report Summary

(Includes partial data, duplicate records and incomplete records)

District Outreach Flyers

Management Practice Maps

Attachment 7
Special Project Monitoring and Constituents

Appendix A
Chain of Custody Sheets and Data Summary

Appendix A
Definitions

Sample Type:
E: Event sample
FD: Field duplicate sample
FB: Field blank sample.

Result Flags:
ND: Not Detected.
DNQ: Estimated result, detected below Reporting Limit.

Note: Pesticides with results indicating "Non-Detect" are not reported in this summary. See **Table 7** for a list of analytes. See **Appendix C** for the laboratory data reports.

Appendix A
Chain of Custody Sheets

Appendix A
Sediment and Aquatic Toxicity Results

Appendix A
Data Summary

Appendix B
Communication Reports
Organized by Event Date

Appendix C
Laboratory Data Reports and EDDs

Field Data Sheets
Caltest General Physical, Drinking Water Data, Nutrient Data, Metals Data
APPL Pesticide Analyses
Pacific EcoRisk Toxicity Reports
Electronic Data Deliverable Files

Appendix D
Laboratory Quality Assurance Review

Appendix E
Sampling Event Photos

Supplement to Appendix E
Sampling Event Photos

Photographs for Sampling Event 120 (Southern section) are not available; the laptop computer that housed the photographs was stolen from the water District's office. Using the data stored on the camera's hard drive and flash drive, most of the photographs were recovered. The photographs that are missing from Event 120 are as follows:

- Newman Wasteway near Hills Ferry Road
- San Joaquin River at Lander Avenue
- Mud Slough u/s San Luis Drain
- Salt Slough at Lander Avenue
- Salt Slough at Sand Dam
- Los Banos Creek at Highway 140
- Los Banos Creek at China Camp Road
- Turner Slough near Edminster Road
- Blewett Drain near Highway 132
- Poso Slough at Indiana Avenue
- San Joaquin River at Sack Dam

To prevent this from happening again, the sampling crew will download the photographs to the water District's servers, thereby having a backup file on hand.

Appendix F
Wetland Water Quality Summary

Appendix F
Summary of Management Practice Information Collected from Farm Evaluations and Managed Wetland Evaluation for 2014 Growing Season