

San Joaquin Valley Drainage Authority

**Westside San Joaquin River Watershed Coalition**  
**Monitoring Plan Update**  
In Compliance with Order No. R5-2014-0002-R2

Submitted to the California Regional Water Quality Control Board, Central Valley  
Region

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## **Section 1: Background and Need.**

The Regional Water Quality Control Board issued Order Number R5-2014-0002 (2014 Order) to growers in the Western San Joaquin River Watershed area that are members of the Westside San Joaquin River Watershed Coalition (Westside Coalition) in January 2014. This Order includes requirements for the Westside Coalition to provide an annual Monitoring Plan Update.

Prior to the adoption of the 2014 Order, the Westside Coalition performed monitoring according Order R5-2008-0831, issued September of 2008 (2008 Order). The purpose of this Monitoring Plan update is to:

- Update the monitoring plan and activities so that they comply with the 2014 Order.
- Conduct water quality monitoring to track management plan implementation success
- Adjust the Targeted Monitoring schedule according to the data acquired during the 2014-2015 Assessment Monitoring period (initiated March 2014 and completed February 2015).

This Monitoring Plan Update includes the Targeted Monitoring schedule and parameters for the period from March 2015 through February 2017. The Westside Coalition will submit an update by 15 January 2016 indicating any adjustments in this plan during the second year of Targeted Monitoring.

Based on a long history of monitoring, the Westside Coalition is continuing the general monitoring scheme of the original 2008 Order, which is also reflected in the 2014 Order. The Monitoring Plan is crafted to continue to characterize the water quality of major drainages within the Westside Coalition and support the activities of the Management Plan and associated Focused Watershed Plans. The Monitoring Plan remains a monthly program. All sites will be visited on a monthly basis and samples will be collected at accessible and flowing sites.

## Section 2: Review of Historic Data

This Monitoring Program as described in R5-2014-0002-R2 is generally consistent with the monitoring program implemented by the Westside Coalition in September 2008.

This plan is updated to include sites/constituents where exceedances were observed in the 2011 and 2013 Assessment monitoring. Three years of general chemistry data, pesticide data and toxicity data were reviewed to confirm that this monitoring program will meet the requirements of the Irrigated Lands Program. Table 1 shows the number of toxicity measurements (both aquatic and sediment) by site for the period of September 2011 through August 2014. This period includes three complete irrigation seasons and non-irrigation seasons and spans portions of two assessment periods (September 2011 through February 2012 and March 2014 through August 2014).

**Table 1: Summary toxicity measurements September 2011 through August 2014**

Monitoring Site	Ceriodaphnia dubia		Selenastrum capricornutum		Pimephales promelas		Hyalella azteca	
	Sig. Tox.	# of Tests	Sig. Tox.	# of Tests	Sig. Tox.	# of Tests	Sig. Tox.	# of Tests
Blewett Drain @ Hwy 132	0	12	0	3	0	3	4	6
Hospital Cr. @ River Rd.	0	14	0	14	0	6	4	6
Ingram Cr. @ River Rd.	2	21	3	21	0	9	6	6
Westley Wasteway nr. Cox Rd.	0	21	1	21	0	9	4	6
Del Puerto Cr near Cox Rd.	3	25	0	13	0	13	1	6
Del Puerto Cr @ Hwy 33	0	2	0	1	0	1	1	3
Ramona Lake nr Fig Ave.	0	22	0	10	0	10	1	6
Marshall Road Drain @ River Rd.	1	17	0	6	0	6	0	0
Orestimba Cr @ River Road	0	8	0	8	0	3	0	4
Orestimba Cr @ Hwy 33	2	22	4	22	0	10	4	5
Newman Wasteway nr Hills Ferry Rd.	0	24	0	13	0	13	1	5
San Joaquin River @ Lander Ave.	0	33	1	8	0	8	0	2
Mud Sl upstream of San Luis Drain	0	34	0	13	0	13	0	2
Salt Sl @ Lander Ave.	0	32	1	13	0	13	0	2
Salt Sl @ Sand Dam	1	25	2	13	0	14	0	6
Poso Sl @ Indiana Ave.	3	25	2	26	0	25	0	6
Los Banos Cr @ Hwy 140	0	36	0	35	0	13	0	2
Los Banos Cr @ China Camp Rd.	0	0	0	0	0	0	0	0
Delta-Mendota Canal @ Del Puerto WD	0	2	0	2	0	2	0	0
San Joaquin River @ PID Pump Station	0	2	0	2	0	2	0	0
San Joaquin River at Sack Dam	0	3	0	3	0	3	0	0

Details of this summary are included in the associated semi-annual reports submitted by the Westside Coalition.

From the data summarized in Table 1, some basic conclusions can be made:

- *Ceriodaphnia dubia* toxicity: Measurements of significant toxicity to water flea is not common or wide spread, but occurs frequently enough to continue monitoring.
- *Selenastrum capricornutum* toxicity: Measurements of significant toxicity to algae is not wide spread, but appears to occur chronically at a small number of sites (i.e. Orestimba Creek at Highway 33).
- *Pimephales promelas* toxicity: Measurements of significant toxicity to fathead minnow are non-existent. Since the inception of the monitoring period (July 2004), there have only three observations of aquatic toxicity to fathead minnow (out of 669 tests).
- *Hyalella azteca* toxicity: Measurements of significant sediment toxicity have been generally isolated to a handful of monitoring sites. These sites tend to have repeated results showing significant (and often severe) toxicity.

Pesticides are used by growers to control weeds and insects that are harmful to crop production. Typically, a Pest Control Advisor (PCA) will advise growers on a pesticide rotation plan that uses materials from different pesticide classes throughout the year to prevent pests from developing pesticide tolerances. Table 2 shows the number of pesticide detections and analytical results for the September 2011 to August 2014 period. The pesticide results data is summarized according to the pesticide class (or group) in order to match the laboratory analytical methods used.

**Table 2: Pesticide Detections and Tests - September 2011 through August 2014**

Monitoring Site	Organophosphate		Organochlorine		Carbamate		Herbicide	
	Detected	# of Tests	Detected	# of Tests	Detected	# of Tests	Detected	# of Tests
Blewett Drain @ Hwy 132	2	163	3	162	0	24	5	83
Hospital Cr. @ River Rd.	7	203	3	126	0	78	8	110
Ingram Cr. @ River Rd.	7	268	11	285	2	102	10	145
Westley Wasteway nr. Cox Rd.	2	283	4	304	0	60	6	147
Del Puerto Cr near Cox Rd.	1	298	7	323	1	114	12	155
Del Puerto Cr @ Hwy 33	0	45	0	49	0	18	2	24
Ramona Lake nr Fig Ave.	2	285	2	304	2	60	6	147
Marshall Road Drain @ River Rd.	5	221	1	217	0	30	9	113
Orestimba Cr @ River Road	0	60	5	76	0	24	3	32
Orestimba Cr @ Hwy 33	4	255	15	272	0	96	7	131
Newman Wasteway nr Hills Ferry Rd.	4	286	1	323	0	66	4	152
San Joaquin River @ Lander Ave.	1	273	0	88	0	36	8	152
Mud Sl upstream of San Luis Drain	1	373	2	426	1	150	7	197
Salt Sl @ Lander Ave.	3	361	0	408	4	144	10	192
Salt Sl @ Sand Dam	7	278	2	183	1	114	15	152
Poso Sl @ Indiana Ave.	12	286	4	323	1	114	16	152
Los Banos Cr @ Hwy 140	0	381	0	268	0	96	8	206
Los Banos Cr @ China Camp Rd.	0	0	0	0	0	0	0	0
Delta-Mendota Canal @ Del Puerto WD	2	390	0	0	0	0	0	108
San Joaquin River @ PID Pump Station	2	362	0	0	0	0	1	102
San Joaquin River at Sack Dam	0	364	0	0	0	0	1	102

Organophosphate (OP) pesticides include many of the insecticides commonly used within the Westside Coalition. This pesticide class includes chlorpyrifos, diazinon, and dimethoate, all of which have been tied to measurements of water flea toxicity.

Organochlorine (OC) pesticides include mostly legacy insecticides, and pesticide breakdown products that are no longer available for use in California (dicofol being the exception). Although these pesticides are no longer applied, because of their longevity, they are still detected.

Carbamate (C) pesticide(s) is a class of insecticides that does not have wide-spread use within the Westside Coalition area. The 12 detections shown in Table 3 encompass only two materials (carbaryl and methomyl) and carbamate insecticides have not been tied to any measurement of aquatic toxicity.

Herbicides (H) are the most commonly detected pesticide, with diuron and Prowl (pendimethalin) making up the vast majority of herbicide detections. Most of the measurements of algae toxicity have been tied to diuron as the likely cause.

Order R5-2014-0002-R2 notes that the specific pesticides to be included in the monitoring program are currently listed as “To Be Determined”, and will be provided at a later date through consultation with the Department of Pesticide Regulation and other qualified scientists. Until that pesticide list is developed, the Westside Coalition will continue to monitor for the pesticides listed in Table 6 (Irrigation Season) and Table 10 (Non-irrigation Season).

In addition to data collected by the Westside Coalition, pesticide use reports from the Fresno, Merced, and Stanislaus county Ag Commissioners were reviewed to estimate the overall use of the four pesticide categories within the Westside Coalition. Table 3 shows the total acres within the Westside Coalition treated in 2006 with pesticides belonging to these groups.

**Table 3: Pesticide Applications by Acres Treated - September 2013 to August 2014**

Material	Fresno (ac. treated)	Merced (ac. treated)	Stanislaus (ac. treated)	Total (ac. treated)	% of Total (%)
Carbamates	16,600	8,400	3,400	28,400	2%
Organophosphorus	85,000	78,400	41,000	204,400	12%
Organochlorine	0	0	0	0	0%
Herbicide	285,200	386,100	180,600	851,900	51%
Fungicide	61,800	43,900	39,800	145,500	9%
Insect Growth Regulator	7,600	6,400	4,800	18,800	1%
Nicotinoid	54,800	44,500	13,500	112,800	7%
Oxadiazine	14,800	16,000	4,300	35,100	2%
Pyrethroid	71,000	59,400	63,100	193,500	12%
Other Pesticide Groups	29,300	40,200	14,600	84,100	5%

As is apparent in Table 3, Carbamate pesticides make up a relatively small portion of the total pesticide applications which may contribute to why they are rarely detected.

Although there were no reported applications of any organochlorine pesticide, several legacy insecticides were detected including DDT and DDE.

### **Section 3: Proposed Monitoring Program**

#### **A. Objectives**

The objective of the monitoring program is to build on previous years of water quality data collected to comply with the 2008 Order and to comply with the requirements of Order No. R5-2014-0002-R2.

#### **B. Monitoring Program Structure**

The Monitoring Program is structured to provide representative data on all of the sub-watersheds within the Westside Coalition while maintaining a cost effective and flexible program. During the development of this plan, the previous three years of collected data were reviewed to determine where water quality issues existed and where resources should be expended. From this the Monitoring Program structure was developed. This Monitoring Plan Update also includes the monitoring to address management plans in each water body.

The Monitoring Program is structured to account for the type of water-body being monitored, amount of historical data, seasonal irrigation influence, and constituents to be analyzed.

1. Monitoring Site Groups. The monitoring sites have been designated either “Source Water Sites” or “Discharge Sites” according to what type of water is conveyed through the site.
  - Source Water monitoring sites are located on waterways that carry water primarily used to supply irrigation water used by growers in the Westside Coalition. Monitoring data from these sites is used to characterize the incoming irrigation supplies and does not represent drainage discharges.
  - Sites that convey agricultural drainage water are designated as “Discharge Sites”.

2. Monitoring Season. The constituents analyzed at a given site are controlled, to a degree, by the time of year (or season) during which the sample is collected. Tables 4-7 show the types of monitoring performed at each monitoring site during the Irrigation Season and Tables 8-11 show the monitoring performed at each monitoring site during the Non-irrigation Season.

- Irrigation Season. The majority of the land within the Westside Coalition is irrigated agriculture that is actively farmed only in the spring and summer. This is the time of year during which most of the pesticides and other constituents of concern are applied. Irrigation season sampling will occur at all discharge sites from March through August, which has typically been the irrigation season run for this region. The Westside Coalition may shift Irrigation Season sampling up or back one month to account of seasonal variations. The Regional Water Quality Control Board will be notified before this shift is enacted. Pesticide analyses and aquatic toxicity testing will be performed during irrigation season sampling. There are four “Discharge” sites that can carry agricultural runoff during the summer months and wetland irrigation runoff during the winter months (Los Banos Creek at Highway 140, Salt Slough at Lander Ave., the San Joaquin River at Lander Avenue, and Mud Slough upstream of the San Luis Drain). These four sites have the potential to carry pesticides all year and will be tested for toxicity and pesticides in all months (i.e. year-round discharge site monitoring).
- Non-Irrigation Season. The Non-Irrigation season is the period outside of the irrigation season, typically September through February. Physical and general chemical water quality monitoring will continue during the non-irrigation season, however most sites will not be tested for toxicity or pesticides, unless it is required for a management plan.
- Rain Events. The Westside Coalition will attempt to collect runoff caused by storm events twice each year. Storm event samples will be collected once enough rainfall has occurred to cause the majority of the flow at a monitoring site to consist of rain runoff and will be tested for toxicity and

pesticides, along with other physical and chemical parameters. This will be determined by the field sampling crews on a site by site basis.

3. Monitoring Categories. The monitoring program is a continuous three-year cycle (one year of Assessment, two years of Targeted monitoring) as explained below:

- Assessment Monitoring: The Assessment monitoring consists of the general water quality parameters, nutrients, pathogen indicators, water column and sediment toxicity, pesticides, and metals identified in Attachment B section III.C.3. of the General Order R5-2014-0002-R2. One year of Assessment monitoring was recently completed in February 2015.
- Targeted Monitoring: To comply with the General Order R5\_2014-0002-R2, Targeted monitoring at Discharge sites will be scheduled when the parameters of interest are expected to be present, and includes specific parameters associated with implementation of a TMDL, or for the implementation of a Management Plan that results from exceedances, and typically includes pesticide and toxicity analyses. Targeted monitoring will also include parameters not under a Management Plan that had a single water quality objective or trigger limit exceedance during the most recent Assessment Monitoring period; parameters that will allow for evaluation of trends; and parameters that will allow for evaluation of effectiveness of implemented management practices. Any revisions to the management plans that are approved by the Executive Officer will also be reflected in the monitoring schedule.

4. Special Monitoring:

- Sediment Toxicity Testing: The Westside Coalition will test chronic toxicity to *Hyalella azteca* (survival only) on sediment samples collected at the monitoring sites two times a year (typically March and September). Sediment samples will be collected at all stream locations (piped drains do not contain sediment and will not be sampled). Sediment samples that measure toxicity

≥20% difference from the control will also be tested for sediment pesticides as listed in Table 6 for the purpose of determining the probable cause of toxicity. A number of the monitoring sites within the Westside Coalition have shown chronic and severe sediment toxicity and are targeted by the Coalition's management plan for sediment management. Follow-up sediment pesticide analysis at these sites will be performed in accordance with the Management Plan. The Westside Coalition will review each set of sediment toxicity results for the sites under the Management Plan with the Regional Board liaison and determine what follow-up is appropriate.

- **Rain Events:** The Westside Coalition will make every practical effort to collect samples associated with rain runoff twice a year at each site. A rain event sample will be collected when it is determined that the majority of flow in a given water body is from rain runoff, and this determination will be made by the field sampling crews in the field. The criteria may include, but are not limited to, precipitation amounts or intensity, visually observed or measured increases in flow at the monitoring site(s) following a rainfall event, knowledge of soils or other factors affecting when storm runoff is expected to occur at monitoring sites, or consultation with Central Valley Water Board staff. Safe access will also be considered prior to sample collection: Sites where the sampling crew would be exposing themselves to potential injury or damage to private property (such as significant rutting of farm roads) may be skipped. In addition to the water quality results and field measurements, rainfall data from CIMIS stations 7 (Firebaugh/Telles), 56 (Los Banos), and 161 (Patterson) will be collected and reported for the relevant time period before and during the Rain Event sample collection. Because of the varied nature of rainfall intensity, this data will not trigger a sample collection, but be used to help qualify the nature of the samples.
- **Special Studies.** The Westside Coalition recognizes that this monitoring program does not address every possible circumstance and that some data gaps exist. Within the limits of its resources, the Westside Coalition may develop and implement special studies to address issues of concern. These

studies will be developed in coordination with the Management Plan and associated Focused Management Plans and Regional Board Staff on a case-by-case basis.

### C. Approach and methods

- **Implementation:** This monitoring program is scheduled to be implemented in the March 2015 monitoring event. Prior to that date, the existing Westside Coalition monitoring program (Order R5-2008-0831) will remain in effect. Samples will be collected according to the monitoring schedule by staff of water and irrigation districts within the Westside Coalition, using the methods described in the Field Sampling Manual and the QAPP (adopted December 2013).
- **Schedule:** The Westside Coalition will strive to maintain a consistent schedule throughout the year but may alter it to address scheduling conflicts. Typically, water samples will be collected on the second Tuesday of each month during both the irrigation and non-irrigation seasons. Sediment samples will be collected on the second Monday of the month in which they are to be collected (1 day prior to the water sample collection). Rain event samples will be collected when the field sampling crews determine that the majority of flow at a given monitoring site is from rain runoff. The timing of rain event sample collection will vary throughout the Westside Coalition.
- **Re-evaluation:** The Westside Coalition recognizes that the agricultural landscape is dynamic, and that changes in agricultural practices could introduce new water quality concerns. Every third year (beginning March 1, 2017), assessment monitoring will be conducted according to this MRP. The results of this testing, combined with the previous two years, will be evaluated to determine which additional analyses are required or can be eliminated.

#### **Section 4: Data Review and Reporting**

Data generated by the Monitoring Program will be reviewed on a continuous basis for exceedances of water quality values and other anomalies. Exceedance Reports will be submitted as required by Order R5-2014-0002-R2 and follow-up analysis, newsletters, and outreach meeting will be initiated by the Westside Coalition to address the exceedance. Semi-annual monitoring reports will be submitted to the Regional Water Quality Control Board twice a year (November 30<sup>th</sup> and June 15<sup>th</sup>). During the development of the semi-annual reports, changes to the Monitoring Program based on collected data, may be recommended. These changes will be discussed with the Regional Water Quality Control Board staff on an as-needed basis. The contents of the Semi-Annual Monitoring Reports as well as required electronic data deliverables (EDDs) will be as specified in Order R5-2014-0002-R2.

**Table 4: Westside SJRWC Field, General Physical, Drinking Water, Nutrients Monitoring Summary for 2015 - Irrigation Season**

Site Name	Site Type	SWAMP Code	Station Code	Season	Field	Drinking Water		General Physical			Nutrients			
					Measurements	TOC	Pathogen Indicators: <i>E. Coli</i>	Total Suspended Solids (TSS)	Turbidity	Hardness (as CaCO3)	Total Ammonia (as N)	Unionized Ammonia (calculated value)	Nitrogen (nitrate + Nitrite)	Soluble Orthophosphate
Hospital Creek At River Road	D	541XHCARR	HCARR	Special	X		X		X	x	x	x	x	x
Ingram Creek At River Road	D	541STC040	ICARR	Core+Special	X	X	X	X	X	x	x	x	x	x
Westley Wasteway near Cox Road	D	541XWWNCR	WWNCR	Core+Special	X	X	X	X	X	x	x	x	x	x
Del Puerto Creek Near Cox Road	D	541XDPCCR	DPCCR	Core+Special	X	X	X	X	X	x	x	x	x	x
Del Puerto Creek Near Hwy 33	D	541XDPCHW	DPCHW	Rain Only	X		X		X		x	x	x	x
Ramona Lake Near Fig Avenue	D	541XROLFA	ROLFA	Core+Special	X	X	X	X	X		x	x	x	x
Marshall Road Drain Near River Road	D	541XMRDRR	MRDRR	Core+Special	X	X	X	X	X	x	x	x	x	x
Orestimba Creek at River Road	D	541STC019	OCARR	Core+Special	X	X	X	X	X	x	x	x	x	x
Orestimba Creek at Hwy 33	D	541STC519	OCAHW	Special	X		X		X	x	x	x	x	x
Blewett Drain Near Hyw 132	D	541XVH132	VH132	Special	X		X		X		x	x	x	x
Newman Wasteway Near Hills Ferry Road	D	541XNWHFR	NWHFR	Core+Special	X	X	X	X	X		x	x	x	x
<b>San Joaquin River at Lander Avenue</b>	D	541MER522	SJRLA	Core+Special	X	X	X	X	X	x	x	x	x	x
<b>Mud Slough u/s San Luis Drain</b>	D	541XMSUSL	MSUSL	Core+Special	X	X	X	X	X		x	x	x	x
<b>Salt Slough at Lander Avenue</b>	D	541MER531	SSALA	Core+Special	X	X	X	X	X		x	x	x	x
Salt Slough at Sand Dam	D	541XSSASD	SSASD	Special	X		X		X		x	x	x	x
<b>Los Banos Creek at Hwy 140</b>	D	541MER554	LBCHW	Core+Special	X	X	X	X	X	x	x	x	x	x
Los Banos Creek at China Camp Road	D	541XLBCCC	LBCCC	Core+Special	X	X	X	X	X	x	x	x	x	x
Poso Slough at Indiana Avenue	D	541XPSAIA	PSAIA	Special	X		X		X	x	x	x	x	x
San Joaquin River at Sack Dam	SW	541MAD0007	SJRSD	Source	X		X	X	X	x				
San Joaquin River at PID Pumps	SW	541STC507	SJRPP	Source	X		X	X	X	x				
Delta Mendota Canal at DPWD Turnout	SW	541XDMCDP	DMCDP	Source	X		X	X	X	x				

D= Discharge SW= Source Water

\*\* Rain Event Sampling will include samples for all constituents at all samplable sites.

**Table 5: Westside SJRWC Metals Monitoring Summary for 2015 Monitoring Year - Irrigation Season**

Site Name	Site Type	SWAMP Code	Station Code	Irrigation (Mar-Aug)	Total Metals (Core)				Dissolved Metals (Special Sampling)				
					arsenic (total)	boron (total)	molybdenum (total)	selenium (total)	cadmium (dissolved)	copper (dissolved)	lead (dissolved)	nickel (dissolved)	zinc (dissolved)
Hospital Creek At River Road	D	541XHCARR	HCARR	Special	x	x	x		x	x	x	x	x
Ingram Creek At River Road	D	541STC040	ICARR	Core+Special	x	x	x	x	x	x	x	x	x
Westley Wasteway near Cox Road	D	541XWWNCR	WWNCR	Core+Special	x	x	x	x	x	x	x	x	x
Del Puerto Creek Near Cox Road	D	541XDPCCR	DPCCR	Core+Special	x	x	x	x	x	x	x	x	x
Del Puerto Creek Near Hwy 33	D	541XDPCHW	DPCHW	Rain Only	x	x	x	x					
Ramona Lake Near Fig Avenue	D	541XROLFA	ROLFA	Core+Special	x	x	x	x					
Marshall Road Drain Near River Road	D	541XMRDRR	MRDRR	Core+Special	x	x	x	x	x	x	x	x	x
Orestimba Creek at River Road	D	541STC019	OCARR	Core+Special	x	x	x	x	x	x	x	x	x
Orestimba Creek at Hwy 33	D	541STC519	OCAHW	Special			x	x	x	x	x	x	x
Blewett Drain Near Hyw 132	D	541XVH132	VH132	Special	x	x	x	x					
Newman Wasteway Near Hills Ferry Road	D	541XNWHFR	NWHFR	Core+Special	x	x	x	x					
<b>San Joaquin River at Lander Avenue</b>	D	541MER522	SJRLA	Core+Special	x	x	x	x	x	x	x	x	x
<b>Mud Slough u/s San Luis Drain</b>	D	541XMSUSL	MSUSL	Core+Special	x	x	x	x					
<b>Salt Slough at Lander Avenue</b>	D	541MER531	SSALA	Core+Special	x	x	x	x					
Salt Slough at Sand Dam	D	541XSSASD	SSASD	Special	x	x	x	x					
<b>Los Banos Creek at Hwy 140</b>	D	541MER554	LBCHW	Core+Special	x	x	x	x	x	x	x	x	x
Los Banos Creek at China Camp Road	D	541XLBCCC	LBCCC	Core+Special	x	x	x	x	x	x	x	x	x
Poso Slough at Indiana Avenue	D	541XPSAIA	PSAIA	Special	x	x	x	x	x	x	x	x	x
San Joaquin River at Sack Dam	SW	541MAD0007	SJRSD	Source		x				x		x	x
San Joaquin River at PID Pumps	SW	541STC507	SJRPP	Source		x				x		x	x
Delta Mendota Canal at DPWD Turnout	SW	541XDMCDP	DMCDP	Source		x				x		x	x

D= Discharge SW= Source Water

\* Hardness is required for dissolved metals evaluation.



**Table 7: Westside SJRWC Toxicity Monitoring Summary for 2015 Monitoring Year - Irrigation Season**

Site Name	Site Type	SWAMP Code	Station Code	TOXICITY					Pyrethroids, Chlorpyrifos, TOC in sediments
				Algae - Selenastrum	Fathead Minnow - Pimephales	Water Flea - Ceriodaphnia	Hyalella azteca	grain size in sediments	
Hospital Creek At River Road	D	541XHCARR	HCARR	x		x	x	x	F
Ingram Creek At River Road	D	541STC040	ICARR	x		x	x	x	F
Westley Wasteway near Cox Road	D	541XWWNCR	WWNCR	x		x	x	x	F
Del Puerto Creek Near Cox Road	D	541XDPCCR	DPCCR			x	x	x	F
Del Puerto Creek Near Hwy 33	Rain	541XDPCHW	DPCHW	x		x	x	x	F
Ramona Lake Near Fig Avenue	D	541XROLFA	ROLFA			x	x	x	F
Marshall Road Drain Near River Road	D	541XMRDRR	MRDRR	x		x			
Orestimba Creek at River Road	D	541STC019	OCARR	x		x	x	x	F
Orestimba Creek at Hwy 33	D	541STC519	OCAHW	x		x	x	x	F
Blewett Drain Near Hyw 132	D	541XVH132	VH132			x	x	x	F
Newman Wasteway Near Hills Ferry Road	D	541XNWHFR	NWHFR	x	x	x	x	x	F
<b>San Joaquin River at Lander Avenue</b>	D	541MER522	SJRLA	x		x			
<b>Mud Slough u/s San Luis Drain</b>	D	541XMSUSL	MSUSL			x			
<b>Salt Slough at Lander Avenue</b>	D	541MER531	SSALA	x		x			
Salt Slough at Sand Dam	D	541XSSASD	SSASD	x		x	x	x	F
<b>Los Banos Creek at Hwy 140</b>	D	541MER554	LBCHW	x		x			
Los Banos Creek at China Camp Road	D	541XLBCCC	LBCCC	x		x	x	x	F
Poso Slough at Indiana Avenue	D	541XPSAIA	PSAIA	x		x	x	x	F
San Joaquin River at Sack Dam	SW	541MAD0007	SJRSD						
San Joaquin River at PID Pumps	SW	541STC507	SJRPP						
Delta Mendota Canal at DPWD Turnout	SW	541XDMCDP	DMCDP						

D= Discharge SW= Source Water

F = Followup analysis performed when observed Hyalella azteca survival >20% different from control survival.

**Table 8: Westside SJRWC Field, General Physical, Drinking Water and Nutrients Monitoring Summary for 2015 - Non-Irrigation Season**

Site Name	Site Type	SWAMP Code	Station Code	Non-Irrigation (Sept-Feb)	Field Measurements	Drinking Water		General Physical			Nutrients (Core)			
					pH, conductivity, DO, temperature, flow, Photo	TOC	Pathogen Indicators: <i>E. Coli</i>	Total Suspended Solids (TSS)	Turbidity	Hardness (as CaCO3)	Total Ammonia (as N)	Unionized Ammonia (calculated value)	Nitrogen (nitrate + Nitrite)	Soluble Orthophosphate
Hospital Creek At River Road	D	541HCARR	HCARR	Core	X		X		X	x	x	x	x	x
Ingram Creek At River Road	D	541STC040	ICARR	Core	X	X	X	X	X	x	x	x	x	x
Westley Wasteway near Cox Road	D	541XWWNCR	WWNCR	Core	X	X	X	X	X	x	x	x	x	x
Del Puerto Creek Near Cox Road	D	541XDPCCR	DPCCR	Core	X	X	X	X	X	x	x	x	x	x
Del Puerto Creek Near Hwy 33	D	541XDPCHW	DPCHW	Rain Only	X		X		X		x	x	x	x
Ramona Lake Near Fig Avenue	D	541XROLFA	ROLFA	Core	X	X	X	X	X		x	x	x	x
Marshall Road Drain Near River Road	D	541XMRDRR	MRDRR	Core	X	X	X	X	X	x	x	x	x	x
Orestimba Creek at River Road	D	541STC019	OCARR	Core	X	X	X	X	X	x	x	x	x	x
Orestimba Creek at Hwy 33	D	541STC519	OCAHW	Core	X		X		X	x	x	x	x	x
Blewett Drain Near Hyw 132	D	541XVH132	VH132	Core	X		X	X	X		x	x	x	x
Newman Wasteway Near Hills Ferry Road	D	541XNWHFR	NWHFR	Core	X	X	X	X	X		x	x	x	x
<b>San Joaquin River at Lander Avenue</b>	D	541MER522	SJRLA	Core+Special	X	X	X	X	X	x	x	x	x	x
<b>Mud Slough u/s San Luis Drain</b>	D	541XMSUSL	MSUSL	Core+Special	X	X	X	X	X		x	x	x	x
<b>Salt Slough at Lander Avenue</b>	D	541MER531	SSALA	Core+Special	X	X	X	X	X		x	x	x	x
Salt Slough at Sand Dam	D	541XSSASD	SSASD	Core	X		X		X		x	x	x	x
<b>Los Banos Creek at Hwy 140</b>	D	541MER554	LBCHW	Core+Special	X	X	X	X	X	x	x	x	x	x
Los Banos Creek at China Camp Road	D	541XLBCCC	LBCCC	Core	X	X	X	X	X	x	x	x	x	x
Poso Slough at Indiana Avenue	D	541XPSAIA	PSAIA	Core	X		X	X	X	x	x	x	x	x
San Joaquin River at Sack Dam	SW	541MAD0007	SJRSD	Source	X		X	X	X	x				
San Joaquin River at PID Pumps	SW	541STC507	SJRPP	Source	X		X	X	X	x				
Delta Mendota Canal at DPWD Turnout	SW	541XDMCDP	DMCDP	Source	X		X	X	X	x				

D= Discharge SW= Source Water

\*\* Rain Event Sampling will include samples for all constituents at all samplable sites.

**Table 9: Westside SJRWC Metals Monitoring Summary for 2015 Monitoring Year - Non-Irrigation Season**

Site Name	Site Type	SWAMP Code	Station Code	Non-Irrigation (Sept-Feb)	Total Metals (Core)				Dissolved Metals (Special Sampling)				
					arsenic (total)	boron (total)	molybdenum (total)	selenium (total)	cadmium (dissolved)	copper (dissolved)	lead (dissolved)	nickel (dissolved)	zinc (dissolved)
Hospital Creek At River Road	D	541XCARR	HCARR	Core	x	x	x						
Ingram Creek At River Road	D	541STC040	ICARR	Core	x	x	x	x					
Westley Wasteway near Cox Road	D	541XWWNCR	WWNCR	Core	x	x	x	x					
Del Puerto Creek Near Cox Road	D	541XDPCR	DPCCR	Core	x	x	x	x					
Del Puerto Creek Near Hwy 33	D	541XDPCWH	DPCHW	Rain Only	x	x	x	x					
Ramona Lake Near Fig Avenue	D	541XROLFA	ROLFA	Core	x	x	x	x					
Marshall Road Drain Near River Road	D	541XMRDRR	MRDRR	Core	x	x	x	x					
Orestimba Creek at River Road	D	541STC019	OCARR	Core	x	x	x	x					
Orestimba Creek at Hwy 33	D	541STC519	OCAHW	Core			x	x					
Blewett Drain Near Hyw 132	D	541XVH132	VH132	Core	x	x	x	x					
Newman Wasteway Near Hills Ferry Road	D	541XNWHFR	NWHFR	Core	x	x	x	x					
<b>San Joaquin River at Lander Avenue</b>	D	541MER522	SJRLA	Core+Special	x	x	x	x					
<b>Mud Slough u/s San Luis Drain</b>	D	541XMSUSL	MSUSL	Core+Special	x	x	x	x					
<b>Salt Slough at Lander Avenue</b>	D	541MER531	SSALA	Core+Special	x	x	x	x					
Salt Slough at Sand Dam	D	541XSSASD	SSASD	Core	x	x	x	x					
<b>Los Banos Creek at Hwy 140</b>	D	541MER554	LBCHW	Core+Special	x	x	x	x					
Los Banos Creek at China Camp Road	D	541XLBCCC	LBCCC	Core	x	x	x	x					
Poso Slough at Indiana Avenue	D	541XPSAIA	PSAIA	Core	x	x	x	x					
San Joaquin River at Sack Dam	SW	541MAD0007	SJRSD	Source		x				x		x	x
San Joaquin River at PID Pumps	SW	541STC507	SJRPP	Source		x				x		x	x
Delta Mendota Canal at DPWD Turnout	SW	541XDMCDP	DMCDP	Source		x				x		x	x

D= Discharge SW= Source Water

\* Hardness is required for dissolved metals evaluation.



**Table 11: Westside SJRWC Toxicity Monitoring Summary for 2015 Monitoring Year - Non-Irrigation Season**

Site Name	Site Type	SWAMP Code	Station Code	TOXICITY					Pyrethroids, Chlorpyrifos, TOC in sediments
				Algae - Selenastrum	Fathead Minnow - Pimephales	Water Flea - Ceriodaphnia	Hyaella azteca	grain size in sediments	
Hospital Creek At River Road	D	541XHCARR	HCARR				x	x	F
Ingram Creek At River Road	D	541STC040	ICARR				x	x	F
Westley Wasteway near Cox Road	D	541XWWNCR	WWNCR				x	x	F
Del Puerto Creek Near Cox Road	D	541XDPCCR	DPCCR				x	x	F
Del Puerto Creek Near Hwy 33	D	541XDPCHW	DPCHW				x	x	F
Ramona Lake Near Fig Avenue	D	541XROLFA	ROLFA				x	x	F
Marshall Road Drain Near River Road	D	541XMRDRR	MRDRR						
Orestimba Creek at River Road	D	541STC019	OCARR				x	x	F
Orestimba Creek at Hwy 33	D	541STC519	OCAHW				x	x	F
Blewett Drain Near Hyw 132	D	541XVH132	VH132				x	x	F
Newman Wasteway Near Hills Ferry Road	D	541XNWHFR	NWHFR				x	x	F
<b>San Joaquin River at Lander Avenue</b>	D	541MER522	SJRLA	x		x			
<b>Mud Slough u/s San Luis Drain</b>	D	541XMSUSL	MSUSL			x			
<b>Salt Slough at Lander Avenue</b>	D	541MER531	SSALA			x			
Salt Slough at Sand Dam	D	541XSSASD	SSASD				x	x	F
<b>Los Banos Creek at Hwy 140</b>	D	541MER554	LBCHW	x		x			
Los Banos Creek at China Camp Road	D	541XLBCCC	LBCCC				x	x	F
Poso Slough at Indiana Avenue	D	541XPSAIA	PSAIA				x	x	F
San Joaquin River at Sack Dam	SW	541MAD0007	SJRSD						
San Joaquin River at PID Pumps	SW	541STC507	SJRPP						
Delta Mendota Canal at DPWD Turnout	SW	541XDMCDP	DMCDP						

D= Discharge SW= Source Water

F = Followup analysis performed when observed Hyaella azteca survival >20% different from control survival.

## APPENDIX 1

### Monitoring Sites and Locations

Table 12 lists the monitoring sites and their coordinates.

**Table 12: Monitoring Sites**

Site Name	SWAMP Code	Station Code	Latitude	Longitude
<b>Discharge Sites</b>				
Hospital Creek at River Road	541XHCARR	HCARR	37.61047	-121.23078
Ingram Creek at River Road	541STC040	ICARR	37.60022	-121.22506
Westley Wasteway near Cox Road	541XWWNCR	WWNCR	37.55822	-121.16372
Del Puerto Creek near Cox Road	541XDPCCR	DPCCR	37.53936	-121.12206
Del Puerto Creek at Hwy 33	541XDPCWH	DPCHW	37.51406	-121.15956
Ramona Lake near Fig Avenue	541XROLFA	ROLFA	37.47875	-121.06839
Marshall Road Drain near River Road	541XMRDRR	MRDRR	37.43631	-121.03617
Orestimba Creek at River Road	541STC019	OCARR	37.41386	-121.01489
Orestimba Creek at Hwy 33	541STC519	OCAHW	37.37717	-121.05856
Blewett Drain near Highway 132	541XVH132	VH132	37.64053	-121.22942
Newman Wasteway near Hills Ferry Road	541XNWHFR	NWHFR	37.32036	-120.98336
San Joaquin River at Lander Avenue**	541MER522	SJRLA	37.29506	-120.85139
Mud Slough u/s San Luis Drain**	541XMSUSL	MSUSL	37.26164	-120.90614
Salt Slough at Lander Avenue**	541MER531	SSALA	37.24797	-120.85225
Salt Slough at Sand Dam	541XSSASD	SSASD	37.13664	-120.76194
Los Banos Creek at Highway 140**	541MER554	LBCHW	37.27619	-120.95547
Los Banos Creek at China Camp Road	541XLBCCC	LBCCC	37.11447	-120.88953
Poso Slough at Indiana Avenue	541XPSAIA	PSAIA	37.00622	-120.59033
<b>Source Water Sites</b>				
San Joaquin River at Sack Dam	541MAD0007	SJRSD	36.98353	-120.50050
San Joaquin River at PID Pumps	541STC507	SJRPP	37.49739	-121.08267
Delta Mendota Canal at DPWD Turnout	541XDMCDP	DMCDP	37.43678	-121.13347

\*\*Discharge sites that are monitored year-round (both irrigation and non-irrigation season, and two rain events).