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Central Valley Regional Water Quality Control Board

23 April 2012

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PESTICIDE AND TOXICITY EXCEEDANCES IN WESTSIDE COALITION AREA

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff has reviewed pesticide and toxicity monitoring results provided by the Westside San Joaquin River Watershed Coalition (Coalition) since 2004. Based on this review, there appears to be a decreasing trend in the frequency of exceedances for several constituents (see attached Staff Technical Memorandum). However, the rate and magnitude of exceedances of some constituents (e.g. chlorpyrifos, malathion, diuron, *C. dubia, H. azteca*, *S. capricornutum*, etc.) is still a concern, particularly in watersheds where the Coalition has implemented management plan actions for more than one year.

I would like to discuss options for additional steps that could be taken by the Coalition and the ILRP to reduce, and ultimately eliminate, exceedances of water quality objectives. The Coalition and ILRP staff has a standing Quarterly meeting scheduled for Wednesday May 2nd. I would like to include this item as a high priority in our agenda for that meeting.

Please feel free to email or call me at 916-464-4813, if you have any questions prior to our meeting.

Susan Fregien
Senior Environmental Scientist
Monitoring & Implementation Unit
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cc: Chris Linneman, Westside Coalition
Joe Karkoski, ILRP
Chris Jimmerson, ILRP
Jelena Hartman, ILRP

TO: Joe Karkoski, Chief
Supervising WRCE
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FROM: Jelena Hartman
Environmental Scientist
MONITORING AND IMPLEMENTATION UNIT
IRRIGATED LANDS REGULATORY PROGRAM

DATE: 12 April 2012

SUBJECT: REVIEW OF PESTICIDE AND TOXICITY EXCEEDANCES IN THE WESTSIDE SAN JOAQUIN RIVER WATERSHED COALITION AREA

This memorandum reviews monitoring results for pesticides and toxicity, and management plan actions that have been taken by the Westside San Joaquin River Watershed Coalition (Westside Coalition).

The Westside Coalition has been monitoring water quality on the west side of the San Joaquin River since 2004. Based on data collected from 2004 to 2010, specific water quality concerns have been identified. In addition to field and general chemistry constituents that frequently exhibit exceedances, pesticides, and aquatic and sediment toxicity emerged as parameters of special concern in the Westside Coalition region (Table 1).

As required by the Monitoring and Reporting Program (MRP) Order No. R5-2008-0831, the Westside Coalition developed a General Approach Management Plan for all subwatersheds to address water quality issues identified by the monitoring program. In addition to creating a management practice inventory, and conducting general outreach and education, a tiered approach was developed to allow focus on high priority water quality issues. Focused Watershed Plans (Focused Plans) describe intensified efforts within specific subwatersheds to address the highest tier of management plan priorities - aquatic toxicity, pesticides, sediment toxicity, and sediment discharge.

The Focused Plan strategy for aquatic toxicity and pesticide exceedances includes grower education and providing motivation and support to implement management practices that control application (reduced pesticide use, calibration of sprayers, vegetated buffer zones) and reduce tailwater discharges (high-efficiency irrigation, tailwater return/recirculation). The approach to address sediment toxicity, sediment and associated hydrophobic compound (chlorpyrifos , pyrethroids, legacy pesticides) discharges focuses on identifying and promoting management practices that reduce sediment in tailwater and stormwater (use of polyacrylamide flocculent, settling ponds, drip irrigation) and management practices that reduce pesticide use (integrated pest management).

In response to the 1 December 2010 compliance deadline for the diazinon and chlorpyrifos Total Maximum Daily Load (TMDL), the Westside Coalition increased outreach in 2010 with workshops, individual grower meetings, field visits, newsletters, and a review of the individual growers' management practices. In 2011, the Westside Coalition continued Management and Focused Plan activities, and efforts to address exceedances. Information was distributed ahead of pesticide applications in the spring, the Coalition followed up on exceedance with notices and surveys, held meetings and workshops with growers and agricultural pest control advisers, reviewed parcels, visited individual growers in watersheds with exceedances, and advised on best management practices to prevent spray drift and reduce irrigation drainage after pesticide application.

The three-year running tally of exceedances suggests potential improvements in water quality since the development and implementation of the 2008 Management Plan (Table 2). However, several high priority constituents remain a concern in the Westside Coalition region (Table 2). In 2011, water column toxicity to *Ceriodaphnia dubia* was observed nine times, twice to *Selenastrum capricornutum*, and sediment toxicity to *Hyalella azteca* was detected ten times in the Westside Coalition region. Pesticides that exceeded the water quality value in 2011 were diazinon (1 exceedance) and chlorpyrifos (17), diuron (8), malathion (5), toxaphene (2), and legacy pesticides DDT (6) and DDE (41). While a decrease in the proportion of pesticide exceedances implies a positive trend (Figure 1), there have been new detections of toxaphene and malathion, and measured chlorpyrifos concentrations remain elevated.

Despite an apparent decrease in the frequency of chlorpyrifos exceedances (Figure 1), the magnitude of 2011 exceedances was greater than in previous years, with the median chlorpyrifos concentration six times the water quality value (Figure 2). Furthermore, nine out of ten subwatersheds with chlorpyrifos exceedances in 2011 have had multiple exceedances of the chlorpyrifos water quality value in the past (Table 3). The data indicate little or no change in the number of chlorpyrifos exceedances at Ingram Creek, Del Puerto Creek, Orestimba Creek, Westley Wasteway, Poso Slough, and Marshall Road Drain subwatersheds. With the exception of Marshall Road Drain, Focused Plans are under way at subwatersheds with frequent chlorpyrifos exceedances.

Conclusions

There have been encouraging changes in the water quality in the Westside Coalition region since the implementation of Management Plan and Focused Plans. However, aquatic and sediment toxicity, and pesticide exceedances are still common in the area. Despite the overall decrease in the number of exceedances in the Coalition region, recurring exceedances in watersheds with Focused Plans, and the increase in magnitude of chlorpyrifos exceedances suggest that current approach has had mixed results.

The Westside Coalition should continue with the implementation of the Management Plan and Focused Plans. Options that could aid in addressing the remaining water quality issues in the Westside Coalition region may include different or additional management practices[1], and identifying Program participants that are causing or contributing to exceedances of applicable water quality standards[2].

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[1] Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Order No. R5-2006-0053, Attachment B, page 6

[2] Westside San Joaquin River Watershed Coalition Management Plan - General Approach, page 30

Table 1. Number of toxicity and pesticide exceedances and tests in samples from the Westdide Coalition area from 2004 to 2010 (only parameters with exceedances from 2004 to 2010 are included).

	Parameter	Exceedances	Tests	% Exceedance
Toxicity	*Ceriodaphnia dubia*	100	982	10%
	Hyalella azteca	79	169	47%
	Pimephales promelas	11	597	2%
	Selenastrum capricornutum	82	848	10%
Organochlorine Pesticides	Chlordane, trans-	8	434	2%
	DDD(p,p')	4	487	1%
	DDE(p,p')	170	448	38%
	DDT(p,p')	55	489	11%
	Dieldrin	27	488	6%
	Endosulfan I	2	435	0.5%
	Endrin	1	488	0.2%
	HCH, alpha	3	436	1%
	HCH, beta	1	437	0.2%
	HCH, delta	1	432	0.2%
	Heptachlor	1	436	0.2%
	Toxaphene	1	438	0.2%
Herbicides	Diuron	50	580	9%
	Simazine	8	663	1%
Organophosphate Pesticides	Chlorpyrifos[1]	154	941	16%
	Diazinon[1]	15	953	2%
	Dimethoate	34	966	4%
	Malathion[2]	21	941	2%
	Methamidophos	2	668	0.3%
	Methyl Parathion[2]	16	942	2%
Carbamate Pesticides	Carbofuran[2]	1	296	0.3%
	Methomyl	1	296	0.3%

[1]Pesticide Total Maximum Daily Load (Basin Plan, page IV-36.03)

[2]Under prohibition of discharge (Basin Plan page IV-25.00)

Table 2. Comparison of the number of exceedances* in the Westside Coalition area: 2006-2008 versus 2009-2011.

	2006-2008	2009-2011
Ceriodaphnia dubia	31	31
Selenatrum capricornutum	45	5
Hyalella azteca	39	29
Chlorpyrifos	70	63
DDT	44	16
DDE	94	117
Diazinon	7	2
Diuron	35	14
Malathion	8	13
Toxaphene	0	3

*only analytes with exceedances in 2011 are tabulated

Table 3. Summary of chlorpyrifos exceedances in the Westside Coalition area

	2005	2006	2007	2008	2009	2010	2011
Hospital Creek at River Road	1	-	4	3	5	3	1
Ingram Creek at River Road	2	2	3	1	2	2	2
Del Puerto Creek near Cox Road	2	1	1	-	-	2	3
Orestimba Creek at Hwy 33	3	2	2	3	-	2	1
Orestimba Creek at River Road	3	3	2	3	2	2	2
Westley Wasteway near Cox Road	1	1	1	1	-	1	1
Poso Slough at Indiana Ave	-	-	-	3	1	-	2
Salt Slough at Lander Avenue	6	2	1	2	4	-	-
Salt Slough at Sand Dam	6	2	1	2	2	2	1
Blewett Drain at Highway 132	-	-	-	4	1	1	-
Delta Mendota Canal at DPWD	-	-	-	1	-	1	-
Los Banos Creek at China Camp Road	-	-	1	-	1	1	-
Los Banos Creek at Hwy 140	-	-	-	1	-	-	-
Marshall Road Drain near River Road	3	1	2	3	2	3	2
Mud Slough Upstream of San Luis Drain	-	1	1	1	-	-	-
Newman Wasteway near Hills Ferry Road	1	-	2	1	-	-	-
Ramona Lake near Fig Avenue	-	1	-	-	-	-	2
San Joaquin River at PID Pumps	-	-	-	1	2	3	-
SJR at Lander Avenue	-	-	1	-	-	-	-
SJR at Sack Dam	-	-	-	2	-	1	-
Total	**28**	**16**	**22**	**32**	**22**	**24**	**17**

Dashed lines indicate implementation of Focused Watershed Management Plans.

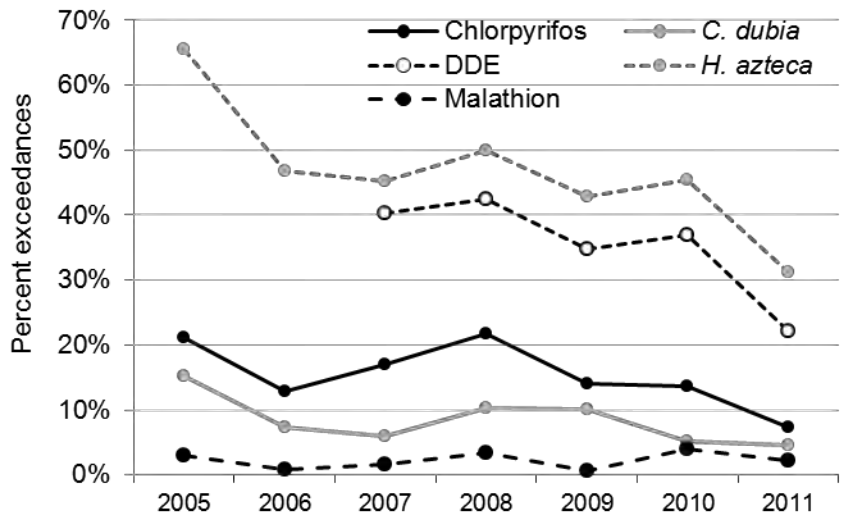

Figure 1. Percent exceedances of chlorpyrifos, DDE, malathion, aquatic toxicity to *C. dubia* and sediment toxicity to *H. azteca* in the Westside Coalition area summarized by year.

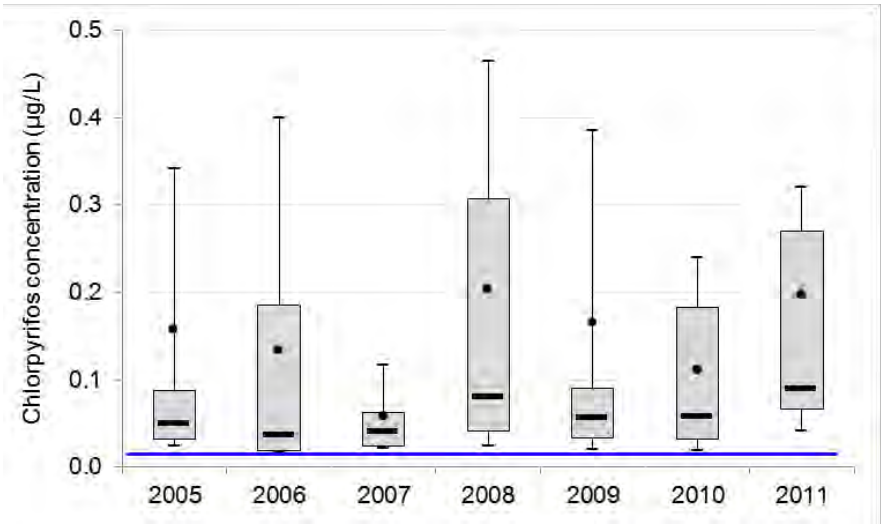

Figure 2. Magnitude of chlorpyrifos exceedances in the Westside Coalition region. Boxes show the 25th and 75th percentile and the median (horizontal line); whiskers show the 10th and 90th percentile; dots indicate the average chlorpyrifos concentrations. The blue line shows the water quality value for chlorpyrifos (0.015 µg/L).