

Chlorpyrifos use and detections in surface waters of California



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Environmental Monitoring
Nov 18, 2013

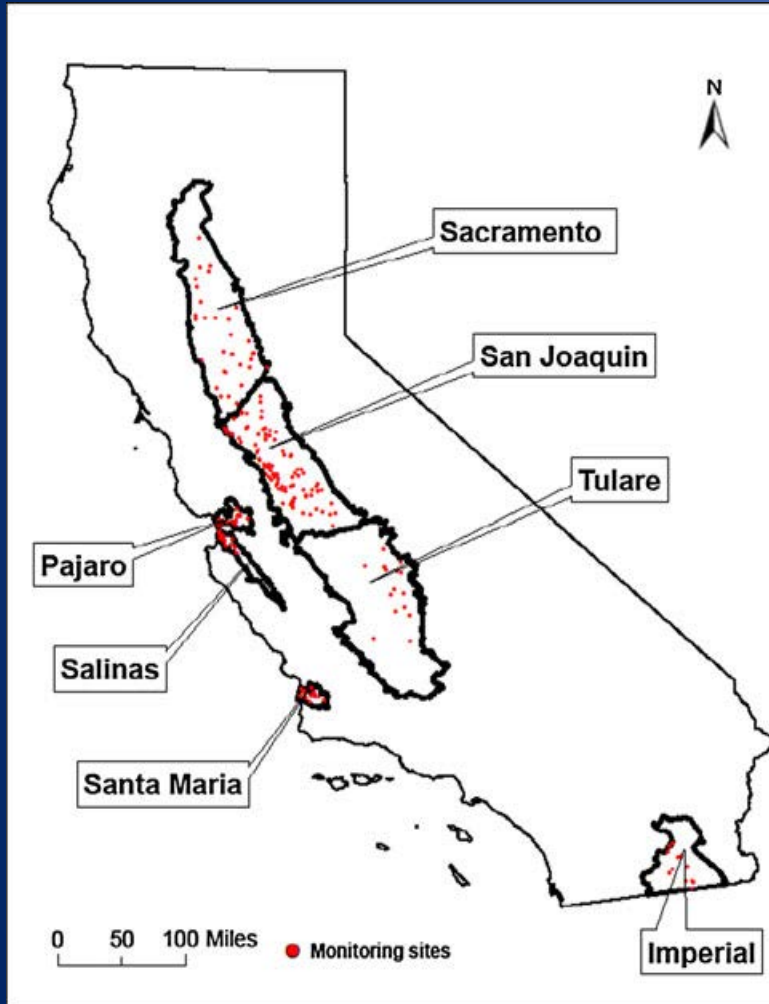
Objectives

- Identify areas of frequent chlorpyrifos detections
- Investigate use patterns associated with chlorpyrifos detections in surface water

Data sources

- 1) Surface water monitoring data
 - Time period : 2006-2010
 - Water Boards, DPR and USGS studies
- 2) Pesticide use data:
 - Time period: 2006-2010
 - Uses within each watershed

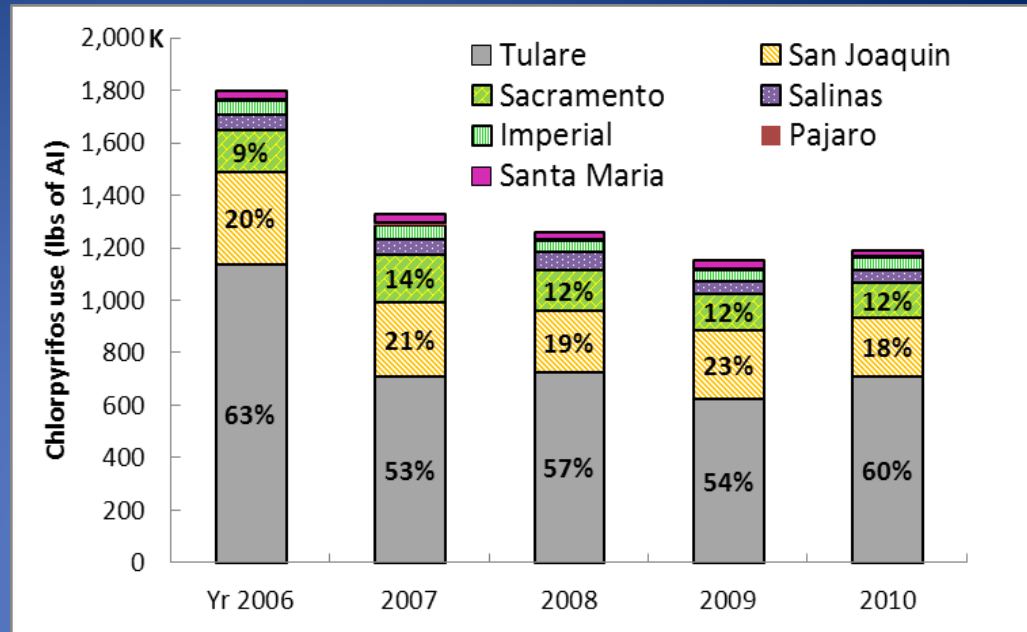
Areas of concern



Region	Sites	samples	Detect %	Exceed %
Santa Maria	19	84	79.8	57.1
Imperial	15	72	47.2	30.6
Salinas	20	241	44.0	26.1
Pajaro	21	68	17.6	13.2
San Joaquin	96	1575	12.9	6.5
Sacramento	35	352	5.1	0.6
Tulare	16	103	1.0	1.0
All Regions	222	2495	17.7	9.9

^a The lowest U.S.EPA benchmark of 0.04 $\mu\text{g}/\text{L}$ was used to determine number of exceedances.

Use amount vs. use intensity



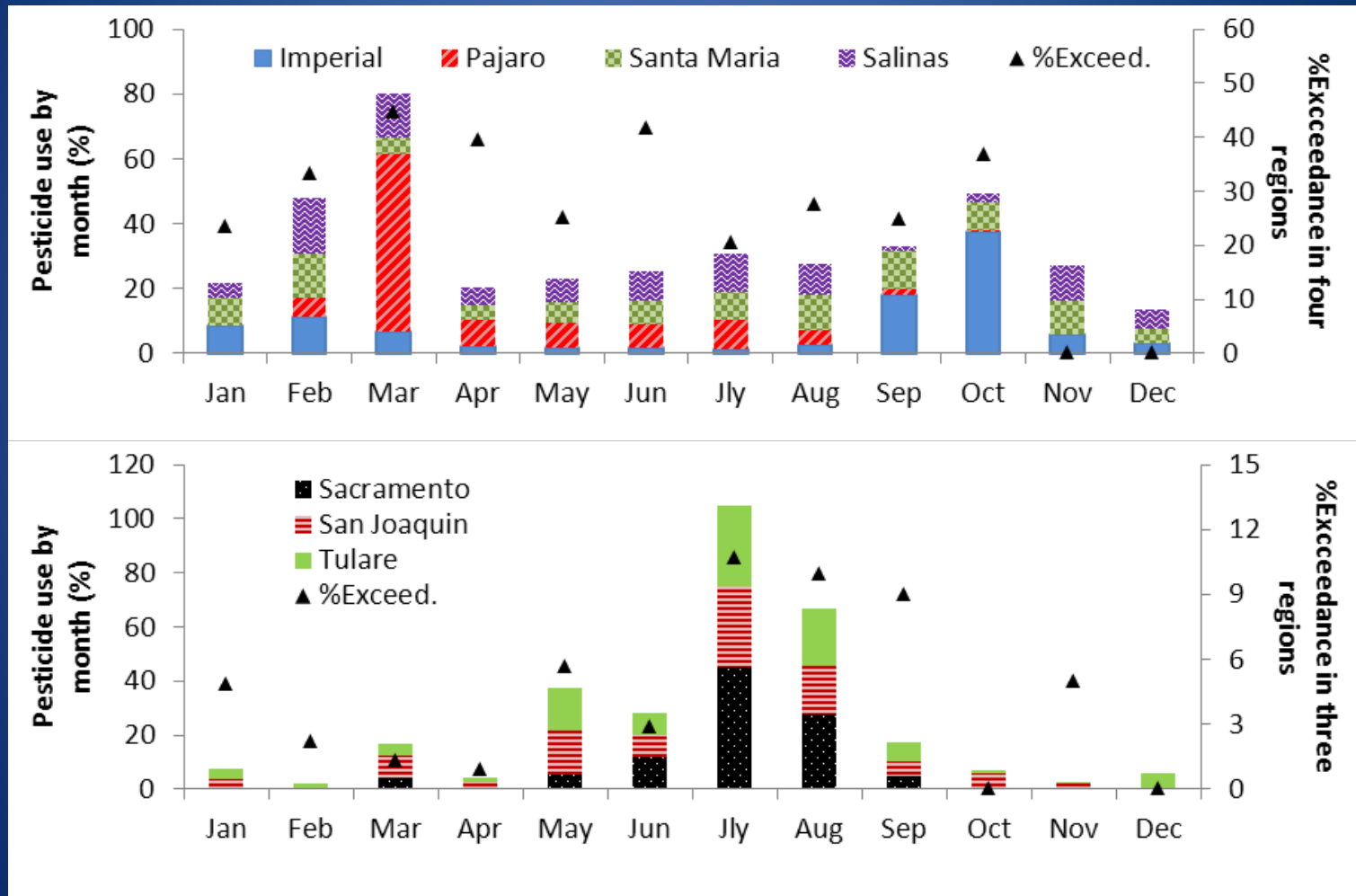
Region	Sites	Monitoring Results in Surface Water			Pesticide Use		
		samples	Detect%	Exceed%	lbs/year ^b	acre/year ^c	lbs/acre
Santa Maria	19	84	79.8	57.1	27,705	16,878	1.64
Imperial	15	72	47.2	30.6	47,946	31,726	1.51
Salinas	20	241	44.0	26.1	56,908	44,982	1.27
Pajaro	21	68	17.6	13.2	6,723	4,878	1.38
San Joaquin	96	1575	12.9	6.5	270,871	216,430	1.25
Sacramento	35	352	5.1	0.6	154,617	107,545	1.44
Tulare	16	103	1.0	1.0	779,716	605,869	1.29
All Regions	222	2495	17.7	9.9	1,344,486	1,028,308	1.31

Crops & irrigation

Region	Crop	Total (lbs)	Major Irrigation
Tulare	Almond	1,194,140	drip/micro
	Orange	647,130	drip/micro
	Alfalfa	521,801	gravity
	Cotton	476,993	gravity
	All Crops	3,898,613	
San Joaquin	Almond	453,072	drip/micro
	Walnut	309,647	drip/micro gravity
	Alfalfa	233,398	gravity
	Grapes, Wine	126,826	drip/micro
	All Crops	1,354,356	
Sacramento	Walnut	497,586	drip/micro sprinkler
	Almond	191,882	drip/micro
	Alfalfa	54,797	gravity
	All Crops	773,087	

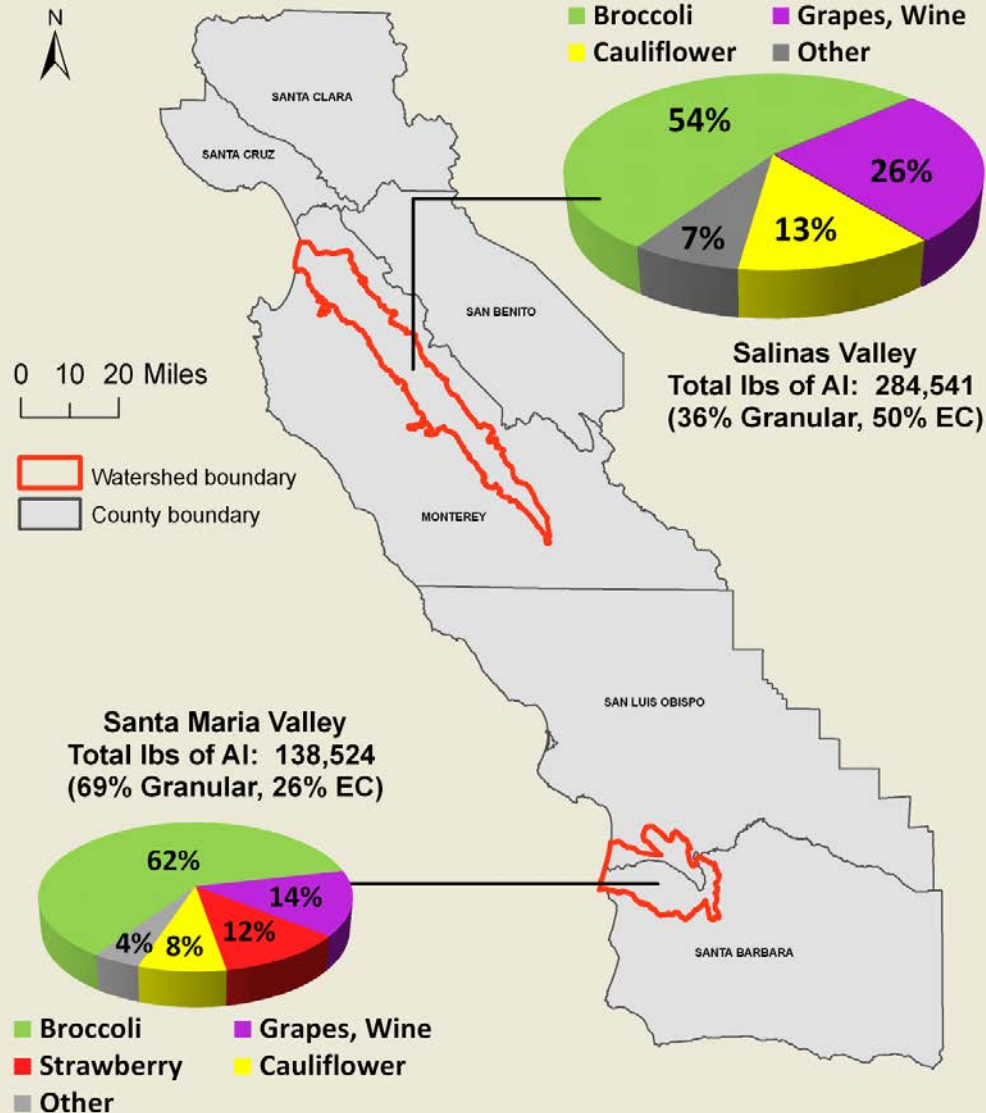
Region	Crop	Total (lbs)	Major* Irrigation
Salinas	Broccoli	153,695	sprinkler drip/micro
	Grapes, Wine	72,971	drip/micro
	Cauliflower	37,324	sprinkler drip/micro
	All Crops	284,541	
Imperial	Sugarbeet	128,883	gravity
	Alfalfa	89,456	gravity
	Corn	12,281	gravity
	All Crops	239,728	
Santa Maria	Broccoli	86,061	sprinkler drip/micro
	Grapes, Wine	19,707	drip/micro
	Strawberry	15,891	sprinkler drip/micro
	Cauliflower	10,915	sprinkler drip/micro
	All Crops	138,524	
Pajaro	Apple	8,762	sprinkler drip/micro
	Cabbage	4,059	sprinkler
	Corn	3,123	drip/micro
	All Crops	33,613	

Monthly variation of pesticide use



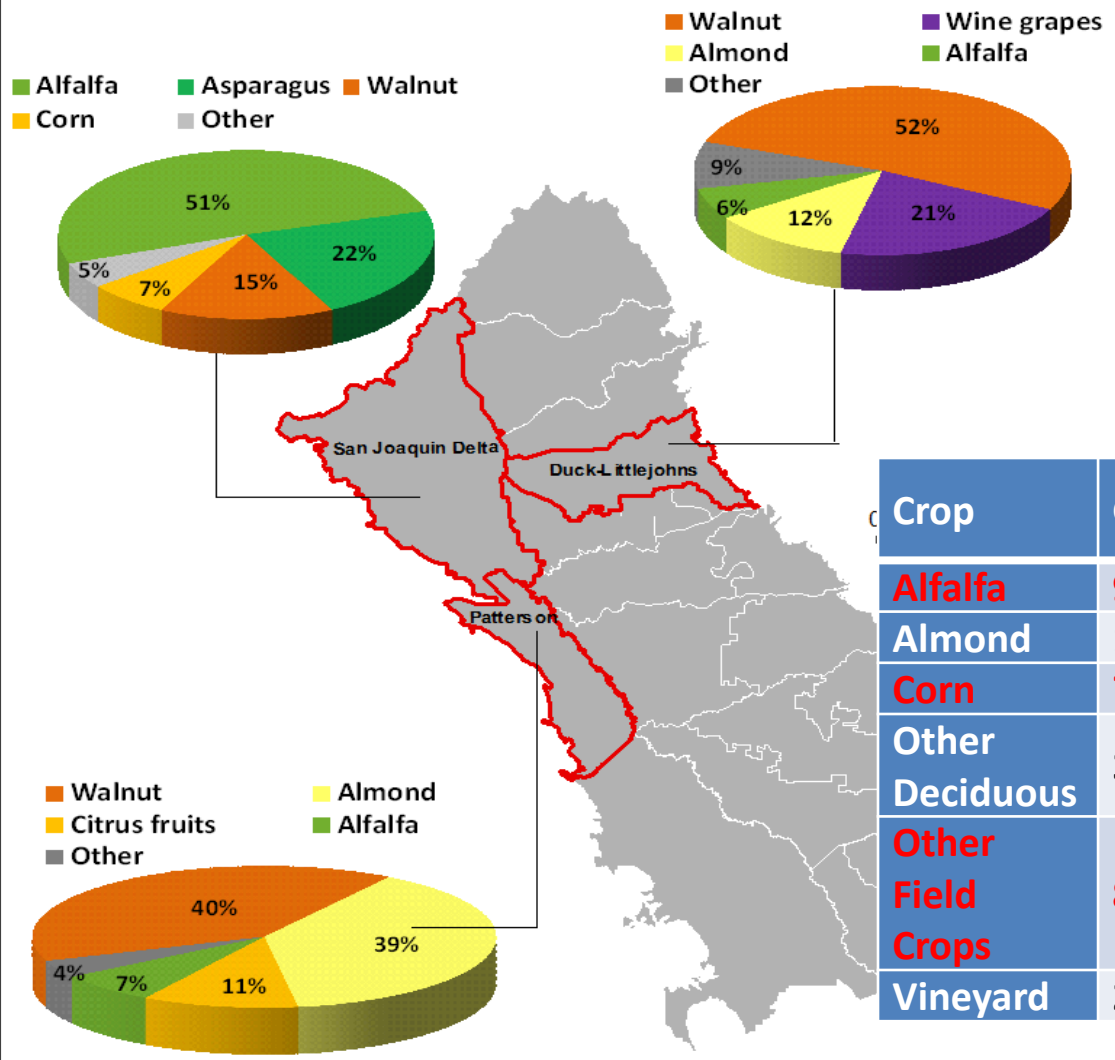
Central Coast

Chlorpyrifos use in Salinas and Santa Maria Valley (2006 - 2010)



San Joaquin Valley

Chlorpyrifos use in the San Joaquin Valley (2010-2012)



Crop	Gravity	Sprinkler	Low Volume	Other
Alfalfa	92.9	1.4	2.8	2.9
Almond	16.8	12.7	68.7	1.8
Corn	73.0	0.5	6.5	20.1
Other Deciduous	37.6	24.8	37.0	0.6
Other Field Crops	81.3	13.4	5.4	--
Vineyard	28.6	0.8	67.8	2.7

Summary

- Areas of concern: Central Coast, Imperial Valley, San Joaquin Valley
- Associated use factors: use intensity, crop type, irrigation management, use timing
- Central Coast: major crops include broccoli, cauliflower, and strawberry
- San Joaquin Valley: alfalfa, asparagus, and corn