California Department of Pesticide Regulation
Environmental Monitoring Branch

Urban Monitoring In Northern California - June 8, 2015

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I. Urban monitoring main objectives:

1) Roseville: Pesticide trends, since 2008 of top priority pesticides (Appendix I)
2) Folsom: Pesticide trends; effectiveness of a constructed water quality pond to remove frequently detected pesticides (Appendix II)
3) Sacramento (Arcade Creek) and San Francisco Bay Area – detection of more commonly detected pesticides
4) Other: some toxicity testing (96 hour water column testing, *Hyalella azteca*)

II. Sampling Plan

1) Monitor 4x a year (equally, dry season and storm monitoring) (Roseville and Folsom sites)
2) Water and sediment at most sites; toxicity at subset of sites

III. Sampling sites and areas:

1) Roseville: Four long term monitoring sites (three stormdrain outfalls from specific neighborhoods, and Pleasant Grove Creek) (Appendix III)
2) Folsom: Two storm drain outfalls from specific neighborhoods, which flow into a city owned constructed water quality pond; one outfall from the pond, and one creek (Appendixes IV and V)
    a. Mass loading into/out CWQP (flow meters via UCD)
5) Sacramento - Arcade Creek
6) San Francisco Bay Area – four sites (all creeks /rivers Alameda, Contra Costa, Santa Clara counties)

IV. Why was pyrethroid regulation 6970, Surface Water Protection in Outdoor Nonagricultural Settings, enacted? (Appendix VI)

4) High urban use
5) High runoff potential, frequently detected in urban surface waters
6) Highly toxic to sensitive aquatic organisms in water and sediment
7) Laboratory toxicity tests correlate with pyrethroid toxicity units

V. Surface Water Regulations: are pyrethroid concentrations at long term monitoring sites changing? (Appendix VII)

1) Dry event monitoring – decrease in bifenthrin concentrations
2) Rain event monitoring – no change in bifenthrin concentrations
3) Sediment – no significant trend or change in concentration

Appendix I. Top priority pesticides, Placer and Sacramento County 2015.

Chem_ code	Pesticide	Use (lb/ai)	Use Score	US EPA Benchmark (ppb)	Tox score	Final score
2008	Permethrin	10,862	5	0.0106	6	30
2223	Cyfluthrin	7,468	5	0.0125	6	30
2300	Bifenthrin	20,378	5	0.075	6	30
2297	Lambda-cyhalothrin	465	3	0.0035	7	21
3995	Fipronil	4,394	4	0.11	5	20
2171	Cypermethrin	2,028	4	0.195	5	20
1929	Pendimethalin	3,479	4	5.2	4	16
2236	Prodiamine	3,424	4	6.5	4	16
367	Malathion	882	3	0.295	5	15
105	Carbaryl	1,489	3	0.85	5	15
3010	Deltamethrin	406	2	0.055	6	12
231	Diuron	737	3	2.4	4	12
3938	Chlorfenapyr	707	3	2.915	4	12
1868	Oryzalin	1718	4	15.4	3	12
2308	Dithiopyr*	2,613	4	20	3	12
3849	Imidacloprid	3,810	4	34.5	3	12
1973	Oxyfluorfen	77	2	0.29	5	10
2149	Sulfometuron-methyl*	162	2	0.45	5	10
636	2,4-D	713	3	13.1	3	9
2276	Propiconazole*	541	3	21	3	9
2170	Triclopyr	1,431	3	70	3	9
5331	Indoxacarb*	585	3	84	3	9
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1855/5820	Glyphosate (isopropyl amine/K salt)*	39,077	5	34700	1	5

Yellow highlight = pyrethroids

*Not monitored in northern California urban monitoring program

Appendix II. Commonly detected pesticides in northern California monitoring.

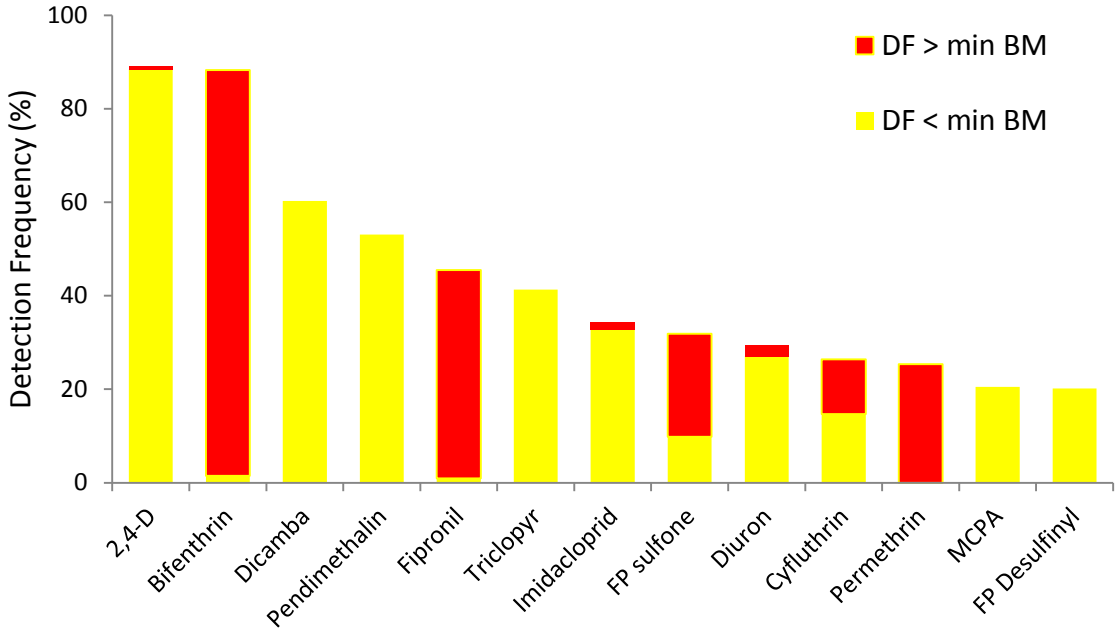


Figure 1. Pesticides most frequently detected in northern California water monitoring, Sacramento area. Pendimethalin and diuron not monitored in Folsom.

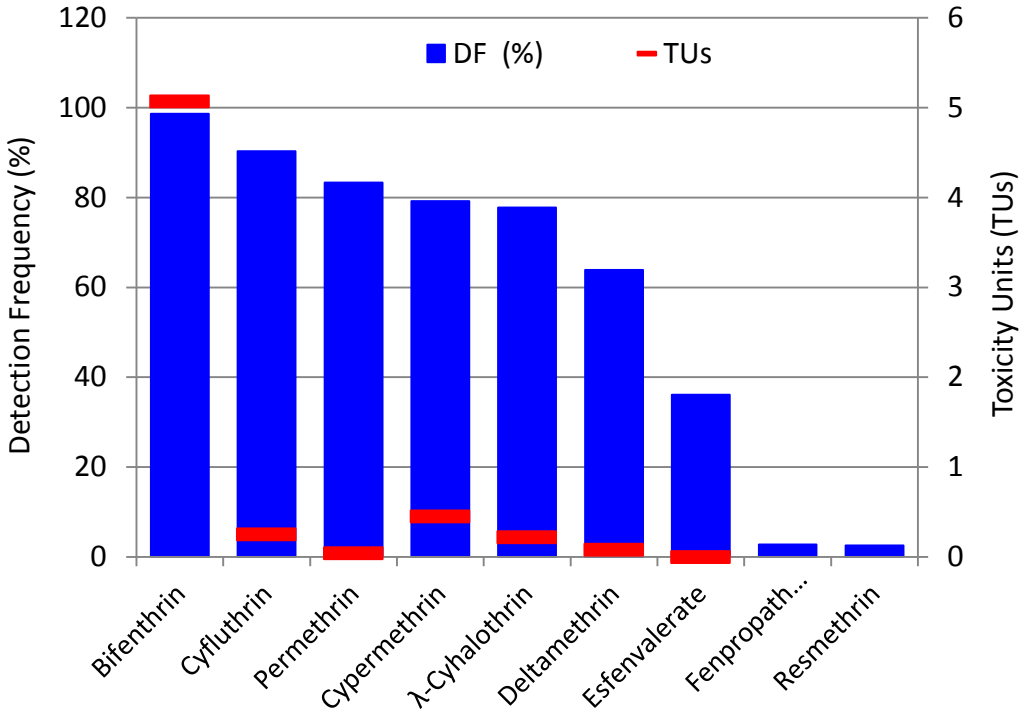
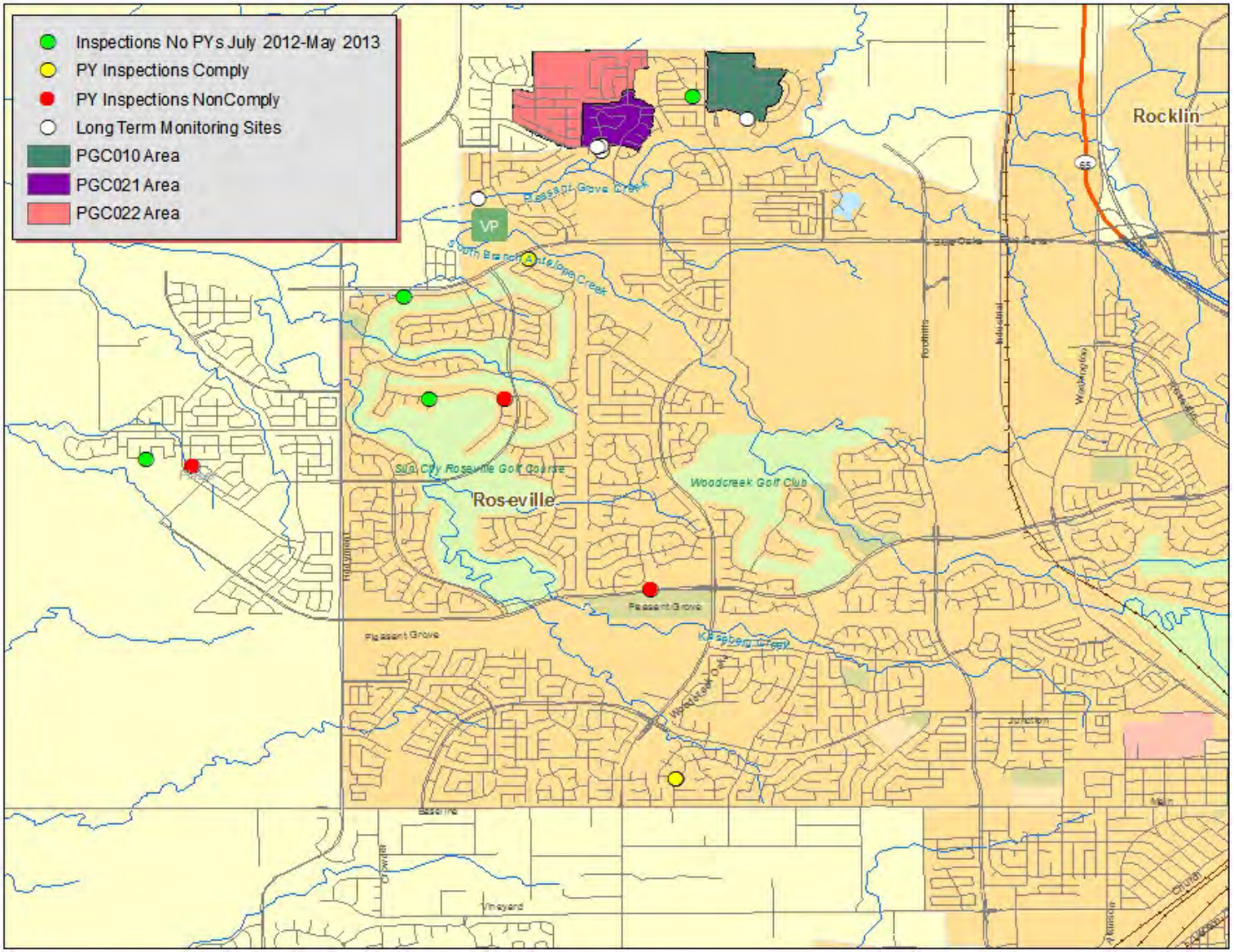
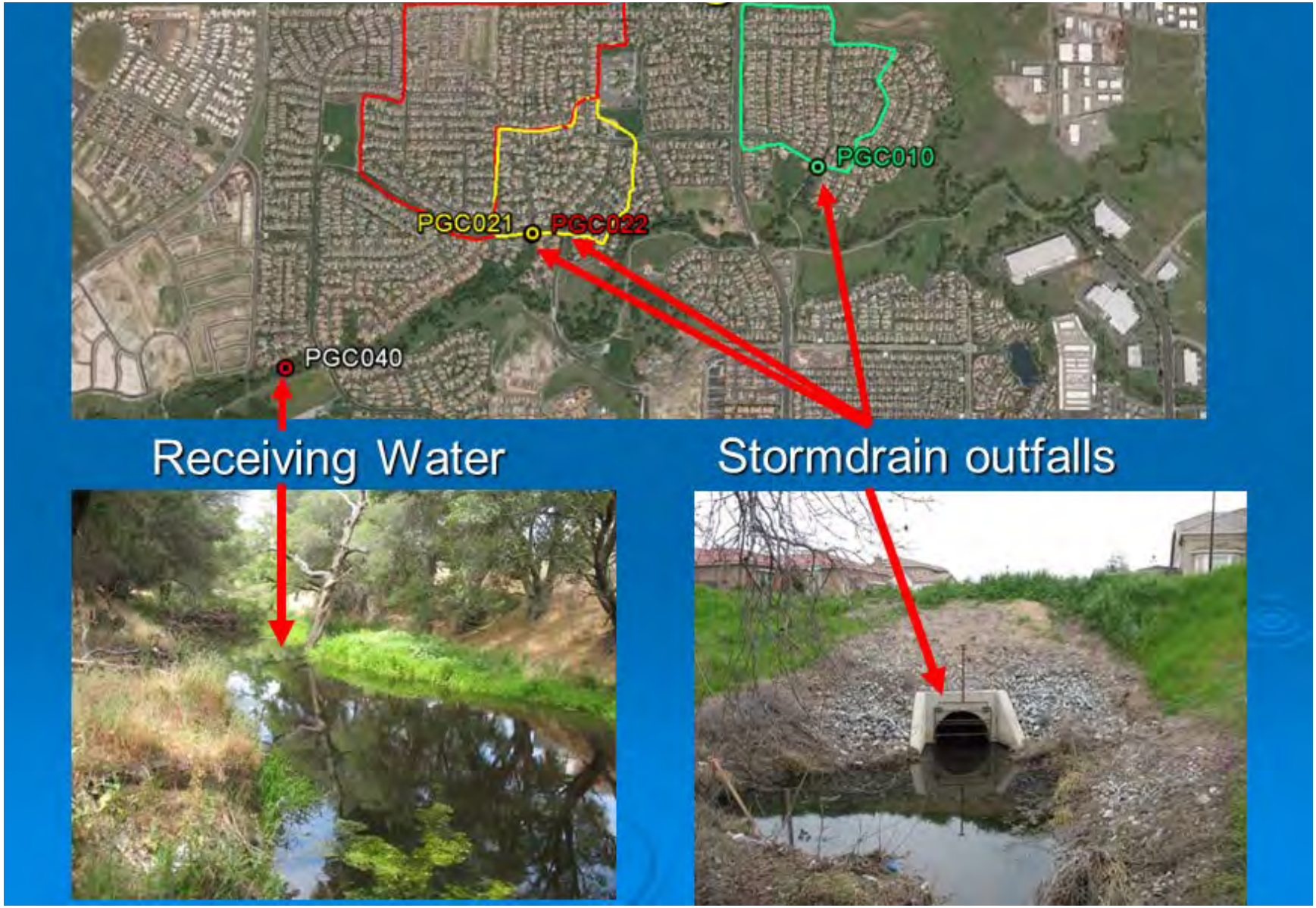


Figure 2. Pyrethroid detection frequency and calculated toxicity units, in sediments, northern California. No TUs for fenpropathrin or resmethrin.

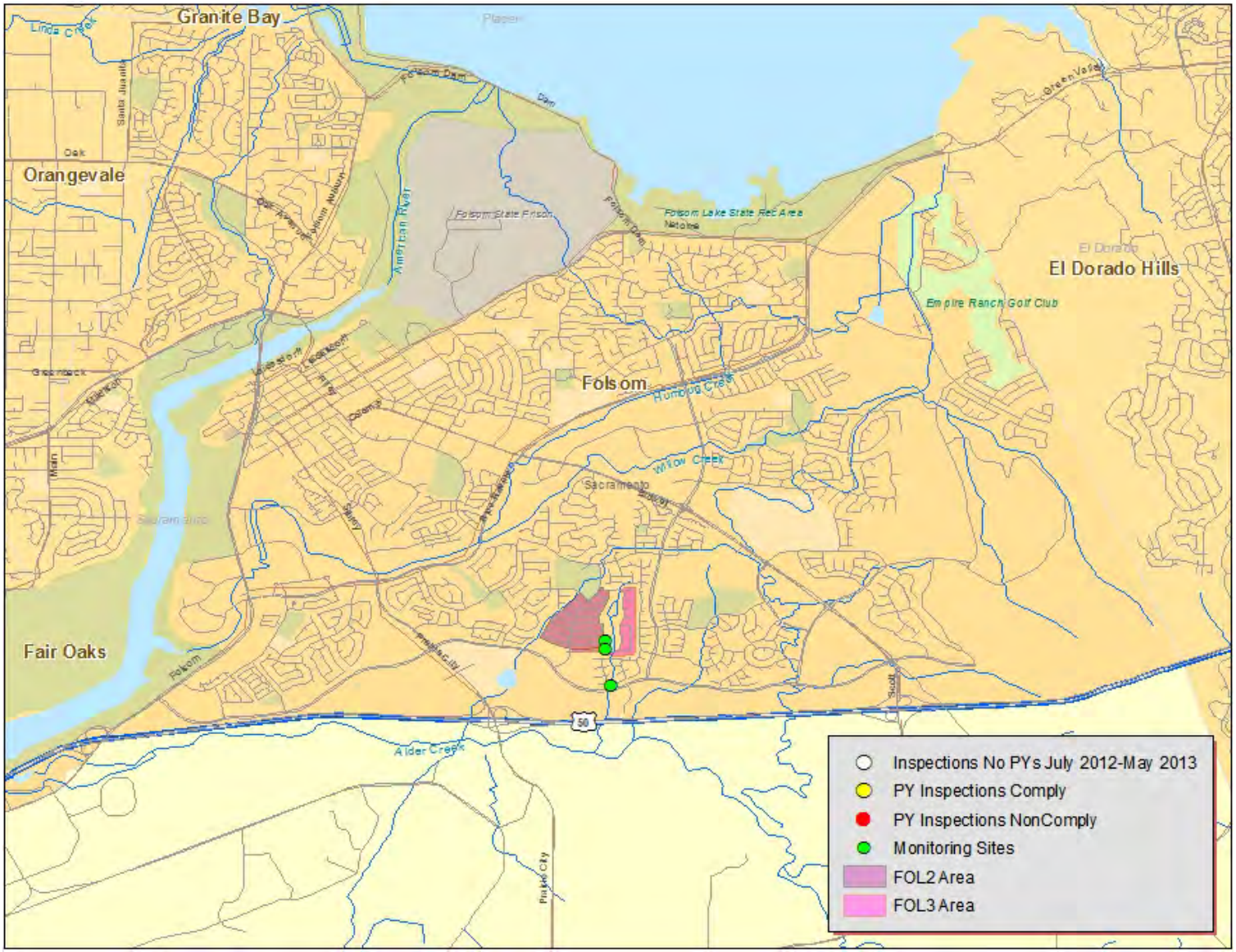
Appendix III. Monitoring Area, Roseville California



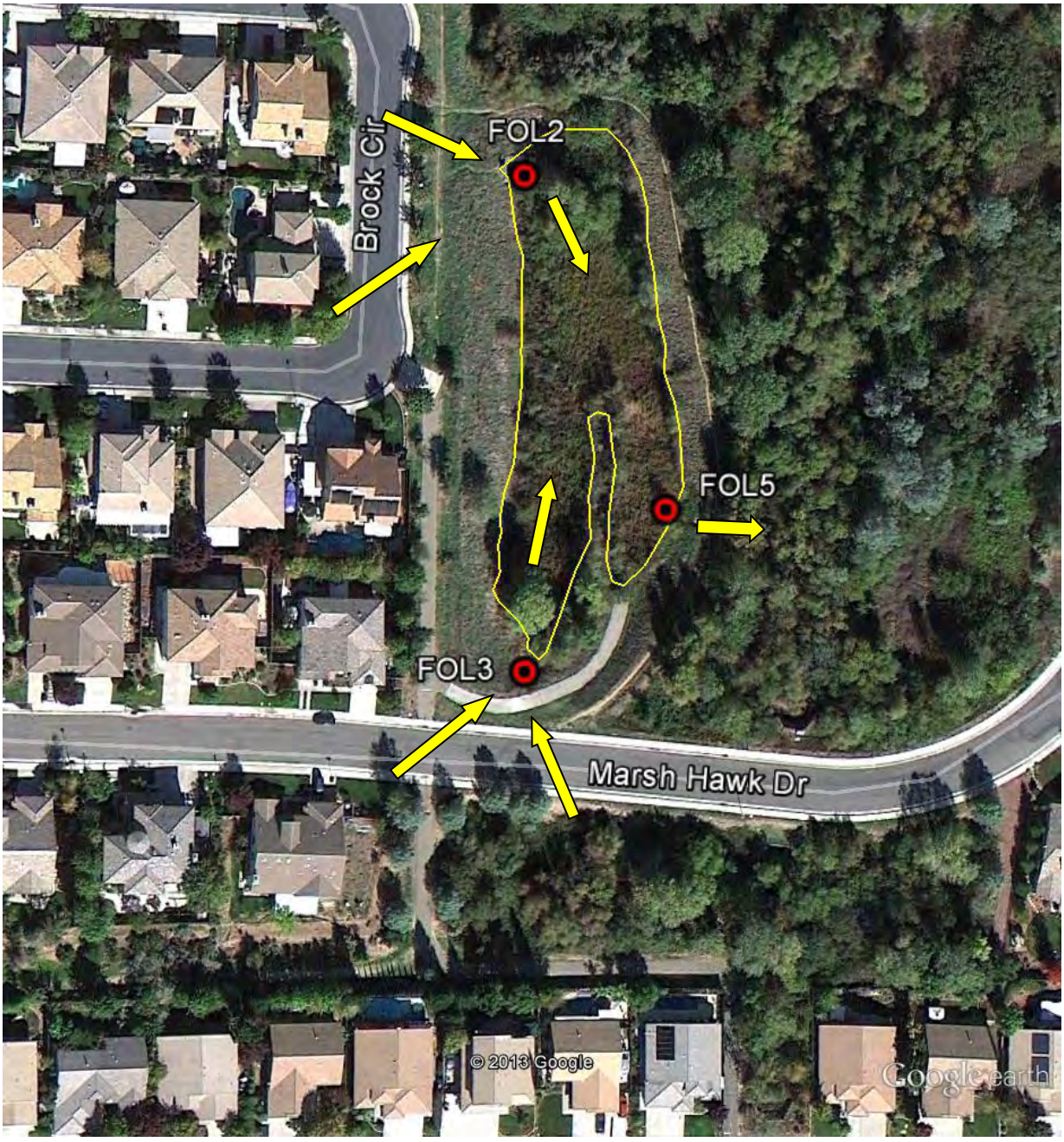
Appendix III (continued)



Appendix IV. Montoring Area, Folsom California

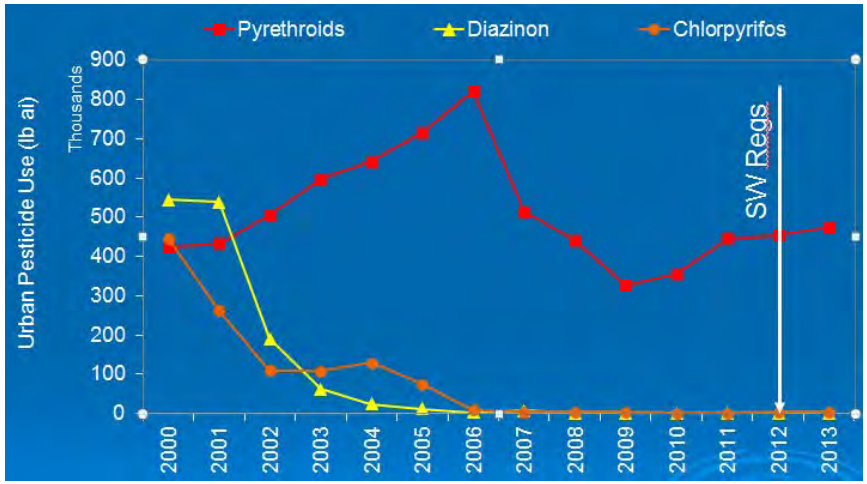


Appendix V. Constructed Water Quality Treatment Pond in Folsom California

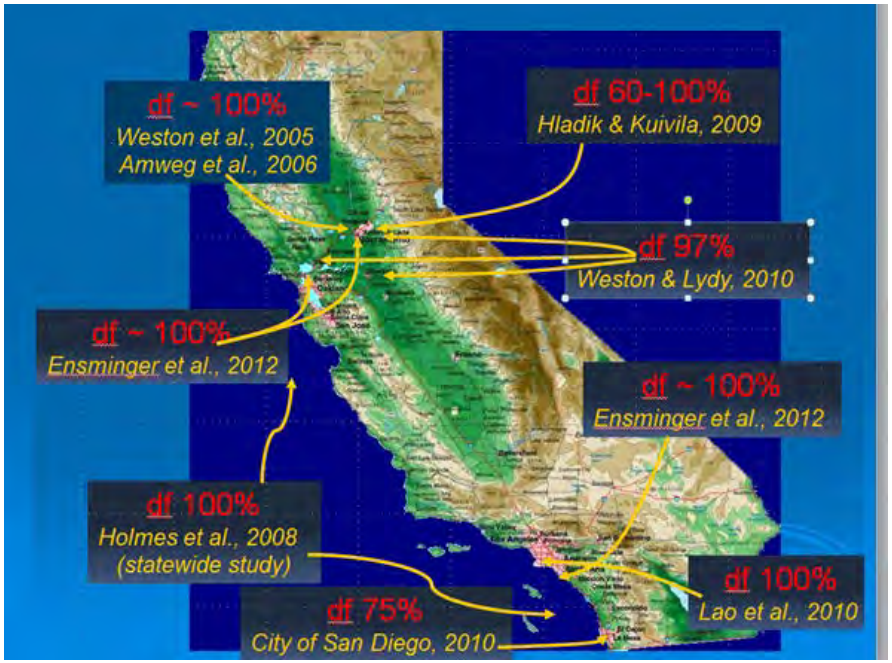


Appendix VI. Why pyrethroid regulation 6970, Surface Water Protection in Outdoor Nonagricultural Settings?

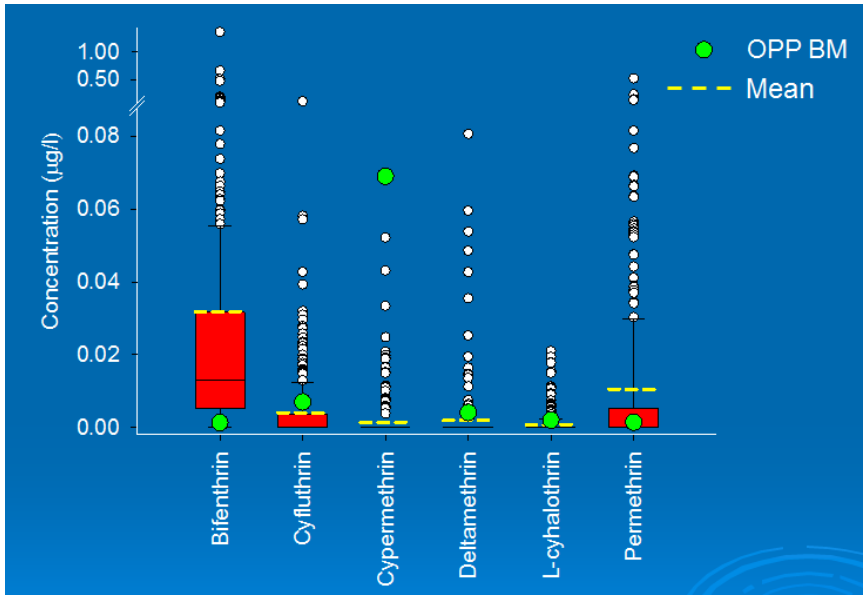
High urban use



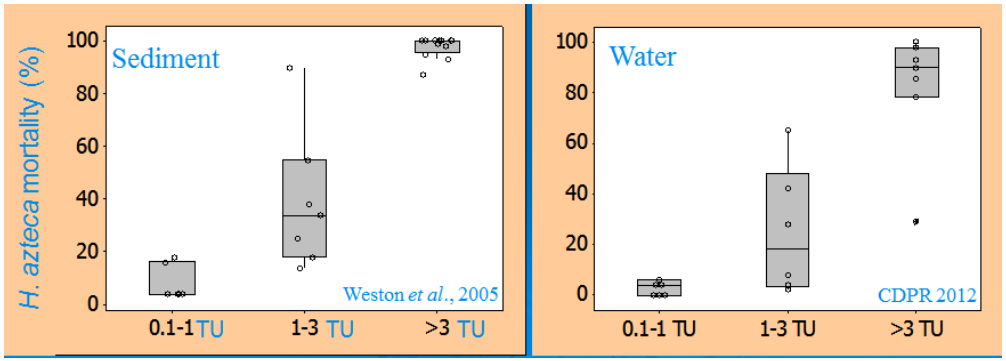
High detection frequency



Highly toxic

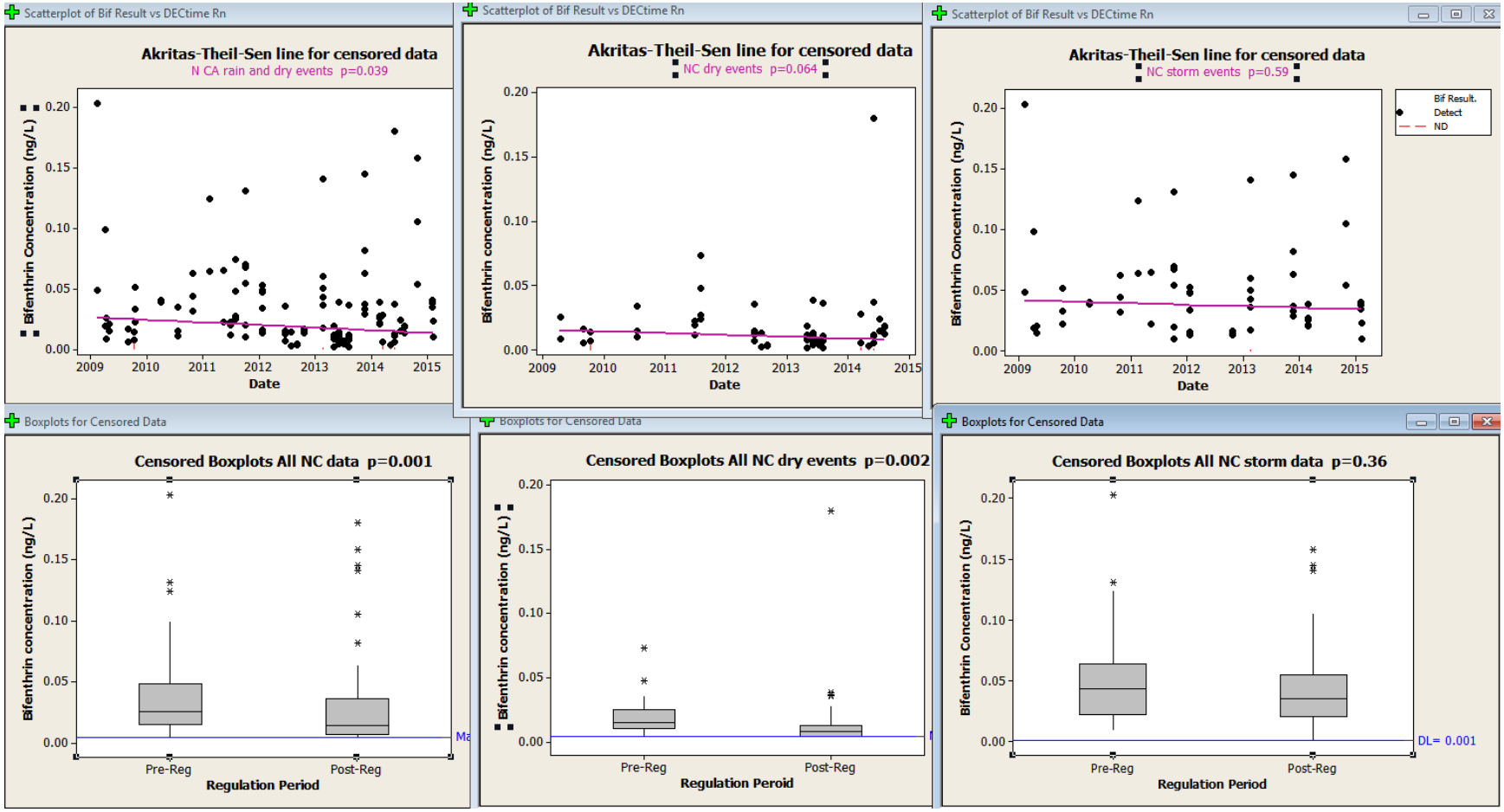


Laboratory toxicity correlated to TUs

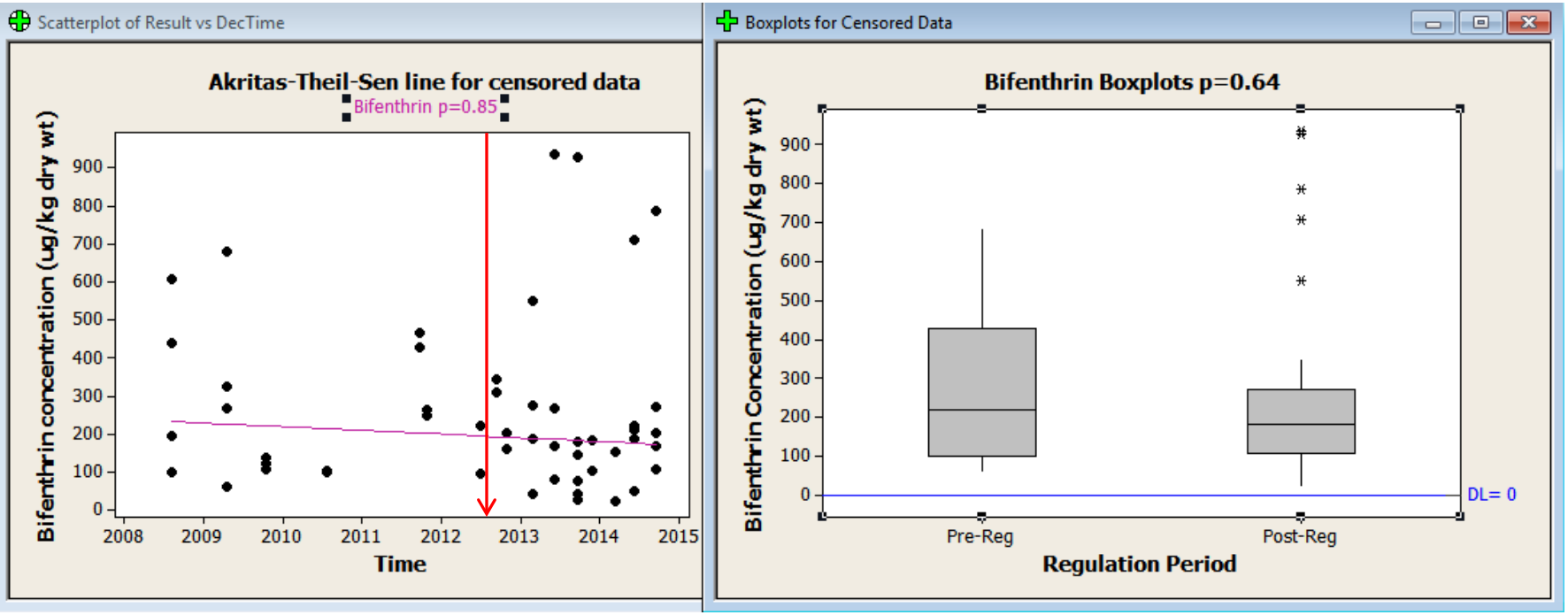


Appendix VII. Trends in bifenthrin concentrations at long term monitoring sites.

Water: (~) Significant decreasing trend during dry-season monitoring at storm drain outfalls



Sediment – No significant trend (red arrow marks the adoption of Pyrethroid regulations 6970):



Appendix VIII. Reports

Sampling Plan

Ambient and Mitigation Monitoring in Urban Areas in Northern California during Fiscal Year 2014-2015. http://www.cdpr.ca.gov/docs/emon/pubs/protocol/study269protocol2014_15.pdf

Monitoring Reports

Michael Ensminger and Kevin Kelley. 2011. Monitoring Urban Pesticide Runoff in Northern California, 2008 – 209. Study 249 http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/study_249_ensminger.pdf

Michael Ensminger and Kevin Kelley. 2011. Monitoring Urban Pesticide Runoff in Northern California, 2009 – 2010. Study 249. http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/report_264.pdf

Peer Reviewed Journal Articles

Robert Budd, Michael Ensminger, Dan Wang, and Kean S. Goh. 2015. Monitoring Fipronil and Degradates in California Surface Waters, 2008–2013. J. Environ. Quality 44(3): doi:10.2134/jeq2015.01.0018

Ensminger, M. P., R. Budd, K. C. Kelley, and K.S. Goh. 2013. Pesticide Occurrence and Aquatic Benchmark Exceedances in Urban Surface Waters and Sediments in Three Urban Areas of California, USA, 2008-2011. Environ. Monit. Assess. 185: 3697-3710