



DPR Surface Water Monitoring Program

CA Water Quality
Monitoring Council
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Monitoring Objectives

- Monitor California surface waters to determine the presence of pesticides
- Determine if concentrations are at levels that are potentially toxic to aquatic species
- Source identification
- Evaluate seasonal trends
- Evaluate regional trends



Monitoring Prioritization

- Automated ranking system of currently registered active ingredients
- Based on reported use (PUR), aquatic benchmarks, and physiochemical properties
- Prioritize to watershed level
- Different use patterns (crop, structural, etc.)

The screenshot shows the 'Configuration' tab of the software. It includes sections for 'Use patterns' with checkboxes for 'Agricultural use', 'Urban use' (checked), and 'Rights of way' (site_code=40). There is also a field for 'Or, user-specified site_code(s)'. The 'PUR data' section has a range from 2012 to 2014. The 'Toxicity data' section has radio buttons for 'Acute', 'Chronic', and 'Both' (selected), and checkboxes for 'USEPA Aquatic Life Benchmarks' (checked), 'Supplemented by Benchmark Equivalent', 'USEPA Drinking Water Standard', and 'USEPA Human Health Benchmark'. A note at the bottom states: 'Note: if multiple toxicity databases are selected, the lowest toxicity value for each pesticide will be used for prioritization'. A 'Prioritize...' button is at the bottom right.

The screenshot shows the 'Advanced Options' tab of the software. It includes sections for 'Options for PUR data processing' with checkboxes for 'County/region based prioritization' (checked), 'Month/season based prioritization', 'Redefine the probabilities for pesticide use ranking' (with values 2,4,8,16,70), and 'Monitoring recommendations for pesticide degradates'. There is a section for 'Site-specific analysis for historical monitoring data' with radio buttons for 'for one site' and 'OR, for all sites in a county'. There is a 'Download (or import) PUR data for the year of 2014' section with radio buttons for 'Download from Oracle' and 'Import from text files'. The 'Options for reporting' section has a 'Max. number of top pesticides for reporting' set to 50, and checkboxes for 'Only report pesticides recommended for monitoring and with [final score]>= 9 and [use score]>= 3'. A 'Prioritize...' button is at the bottom right.

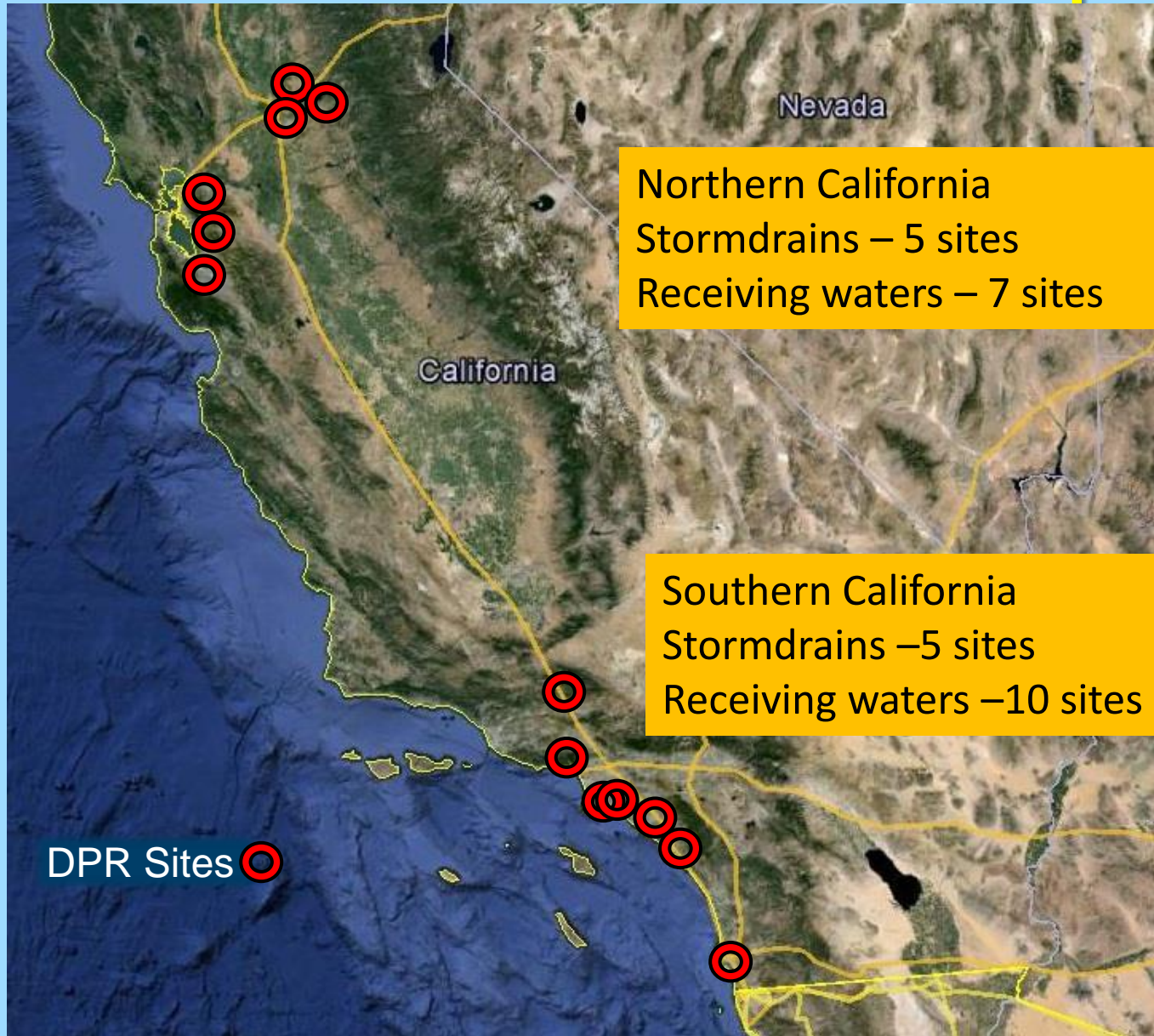
Urban Prioritization

Pesticide	Use (lbs)	Use score	Benchmark (ppb)	Tox score	Final score	Recom
BIFENTHRIN	118,154	5	0.0013	7	35	TRUE
PERMETHRIN	175,809	5	0.0014	7	35	TRUE
CYFLUTHRIN	61,876	5	0.0074	7	35	TRUE
FIPRONIL	67,915	5	0.011	6	30	TRUE
LAMBDA-CYHALOTHRIN	14,349	4	0.002	7	28	TRUE
DELTAMETHRIN	17,551	4	0.0041	7	28	TRUE
CHLOROTHALONIL	95,326	5	0.6	5	25	FALSE
CYPERMETHRIN	39,965	4	0.069	6	24	TRUE
DDVP	2,093	3	0.0058	7	21	TRUE
DIQUAT DIBROMIDE	15,432	4	0.75	5	20	FALSE
IMIDACLOPRID	61,514	5	1.05	4	20	TRUE

Ag Prioritization

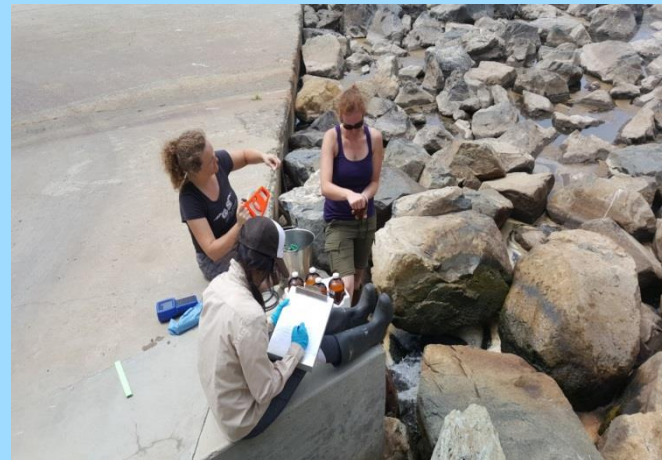
Pesticide	Use (lbs)	Use score	Benchmark (ppb)	Tox score	Final score	Recom
CHLORPYRIFOS	1,289,882	5	0.04	6	30	TRUE
OXYFLUORFEN	661,651	5	0.29	5	25	TRUE
PARAQUAT DICHLORIDE	784,656	5	0.396	5	25	TRUE
CHLOROTHALONIL	1,062,048	5	0.6	5	25	FALSE
MALATHION	403,606	4	0.035	6	24	TRUE
BIFENTHRIN	161,353	3	0.0013	7	21	TRUE
PERMETHRIN	113,399	3	0.0014	7	21	TRUE
LAMBDA-CYHALOTHRIN	5,7937.8	3	0.002	7	21	TRUE
DIMETHOATE	262,142	4	0.5	5	20	TRUE
METHOMYL	270,824	4	0.7	5	20	TRUE
S-METOLACHLOR	280,515	4	1	5	20	TRUE

Urban - Where we sample

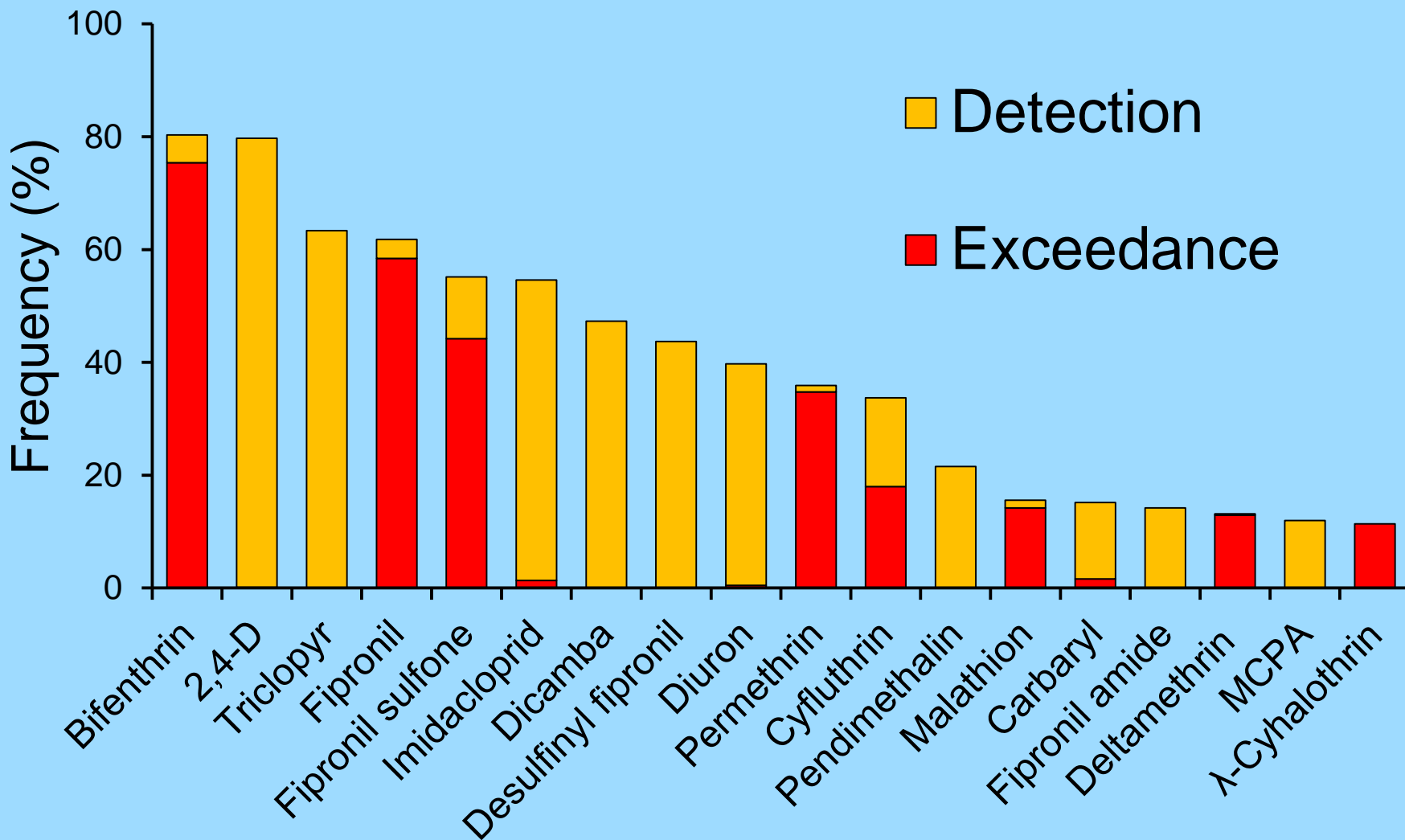


Sampling Protocol

- 2008 – Present
- 4 – 5 events per year
 - 2 storm events
 - 2 dry season
- Sites located at storm drains and receiving waters
- Water samples analyzed for ~35 pesticides
- Water quality and flow recorded

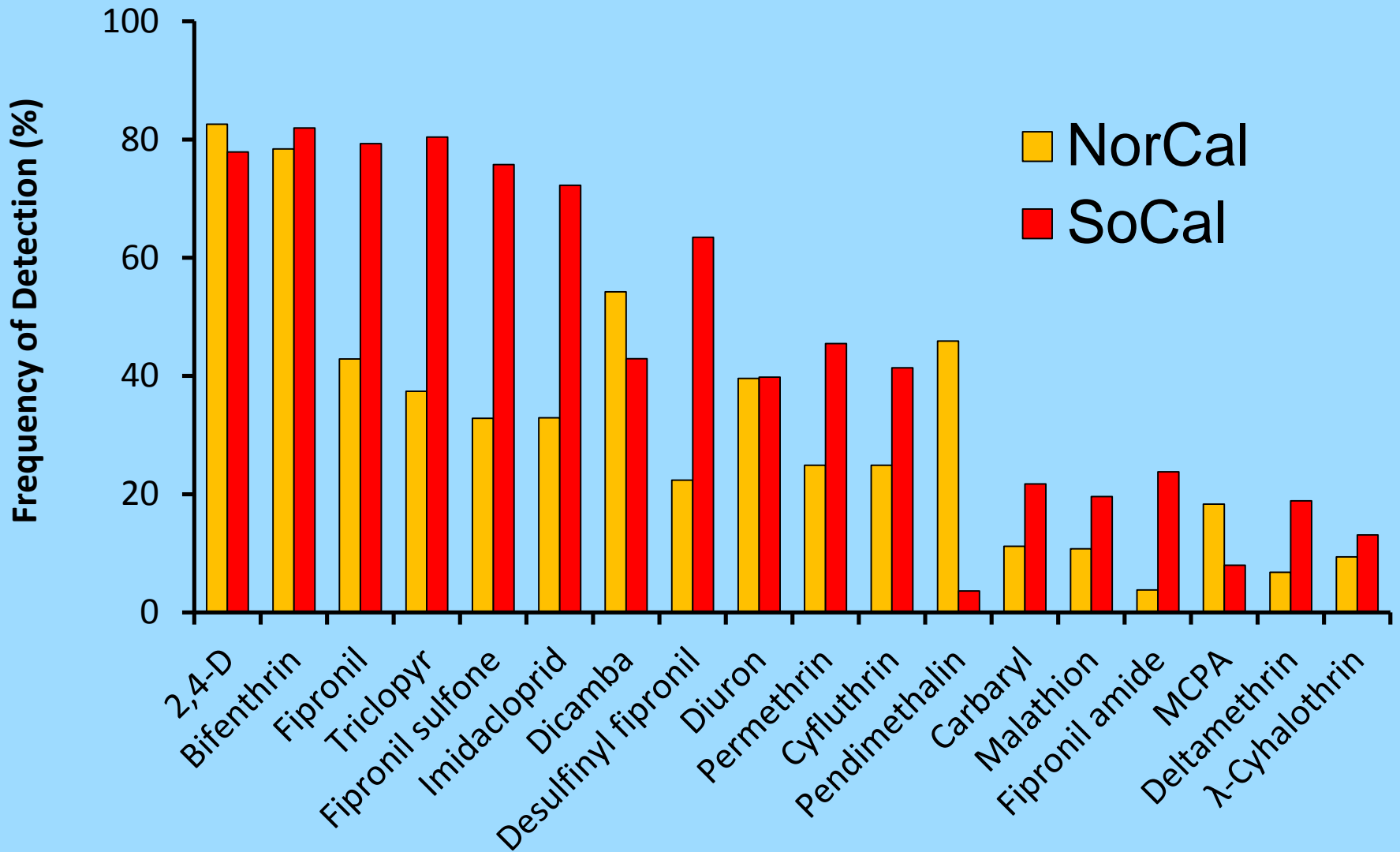


Statewide Exceedances 2009-2016



* Pesticides with FD<10% not shown

Regional Differences



* Pesticides with average FD<10% not shown

Effect of Stormwater

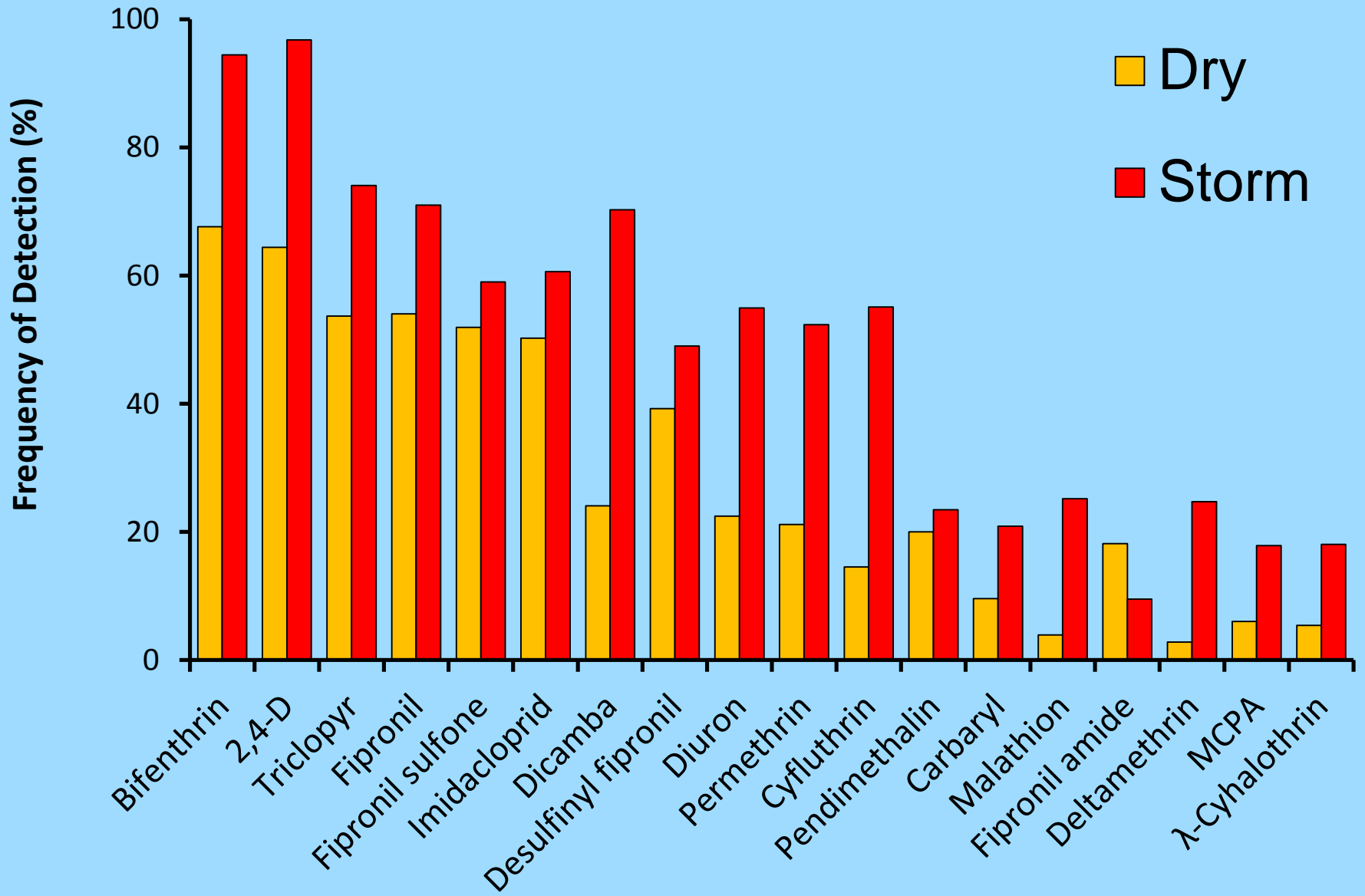


Dry Season



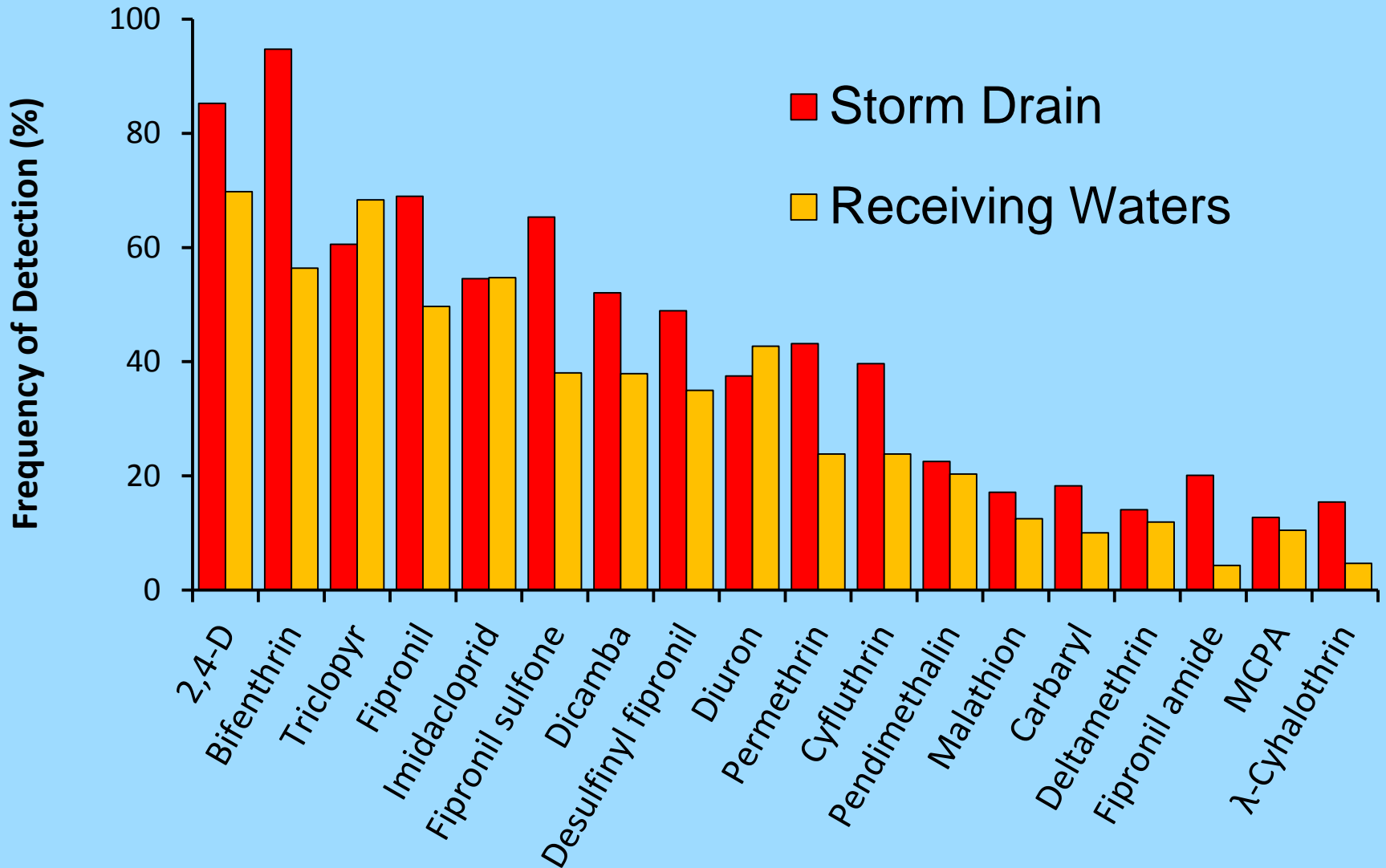
Rain Event

Seasonality



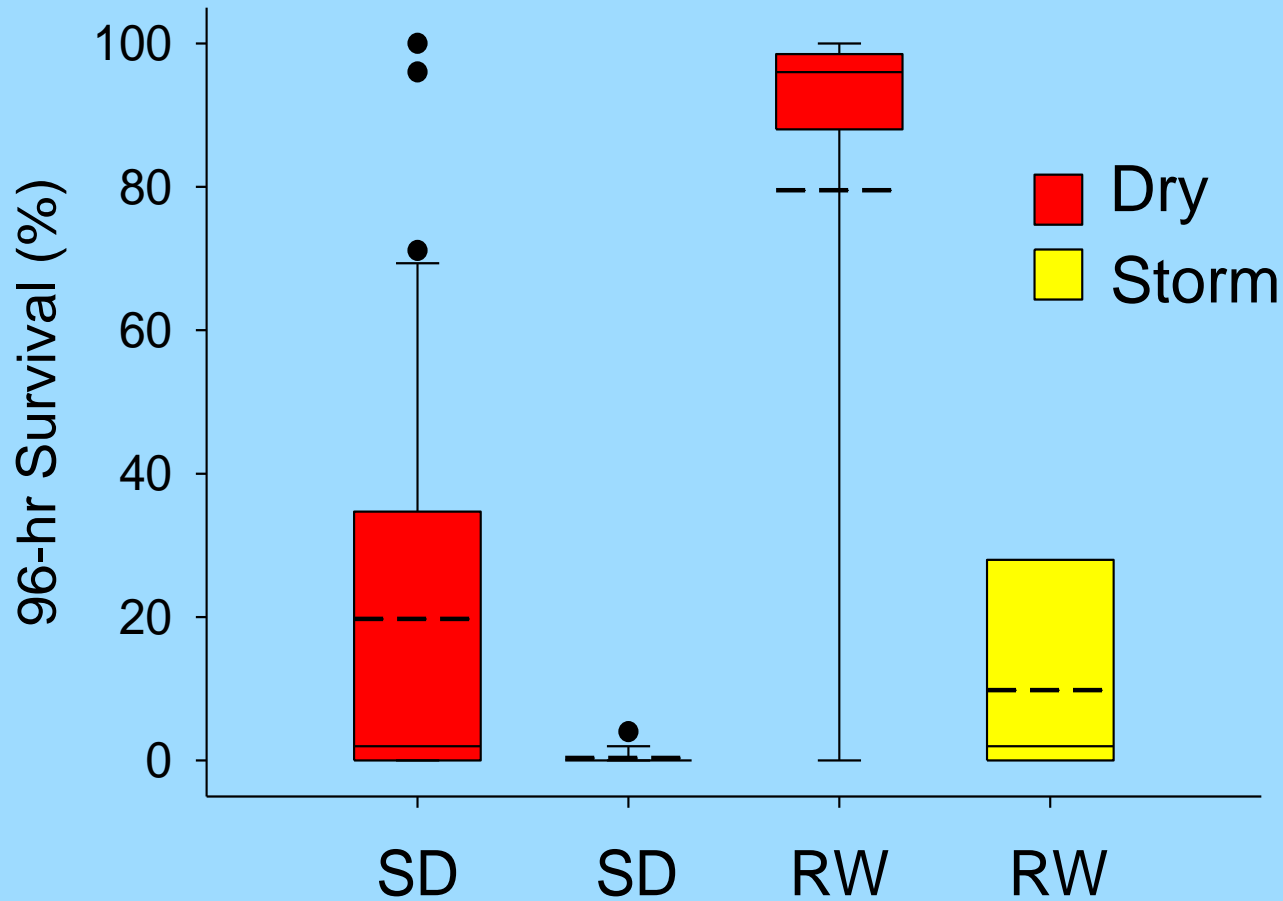
* Pesticides with average FD<10% not shown

Hydrological Effects



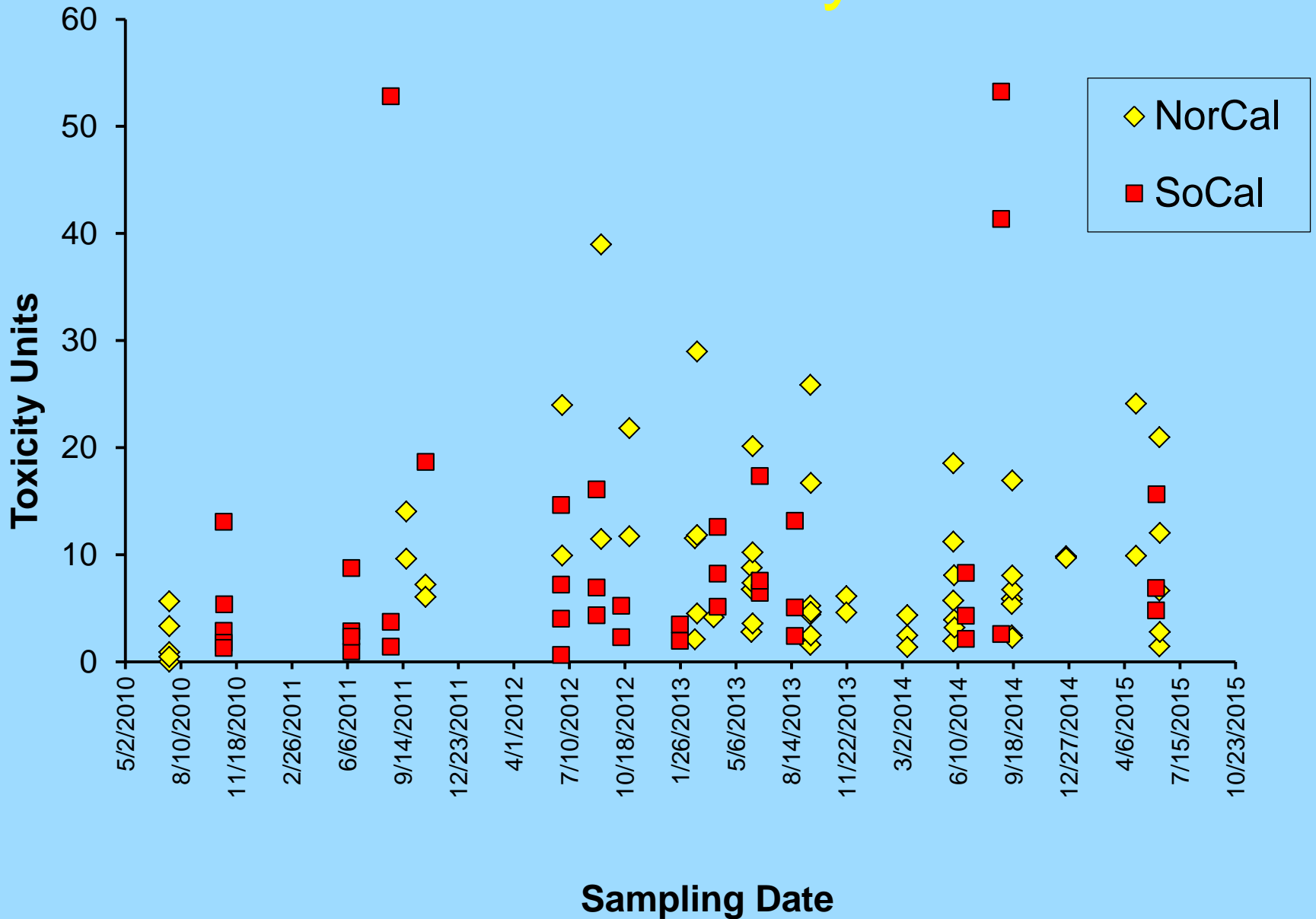
* Pesticides with average FD < 10% not shown

Water Toxicity

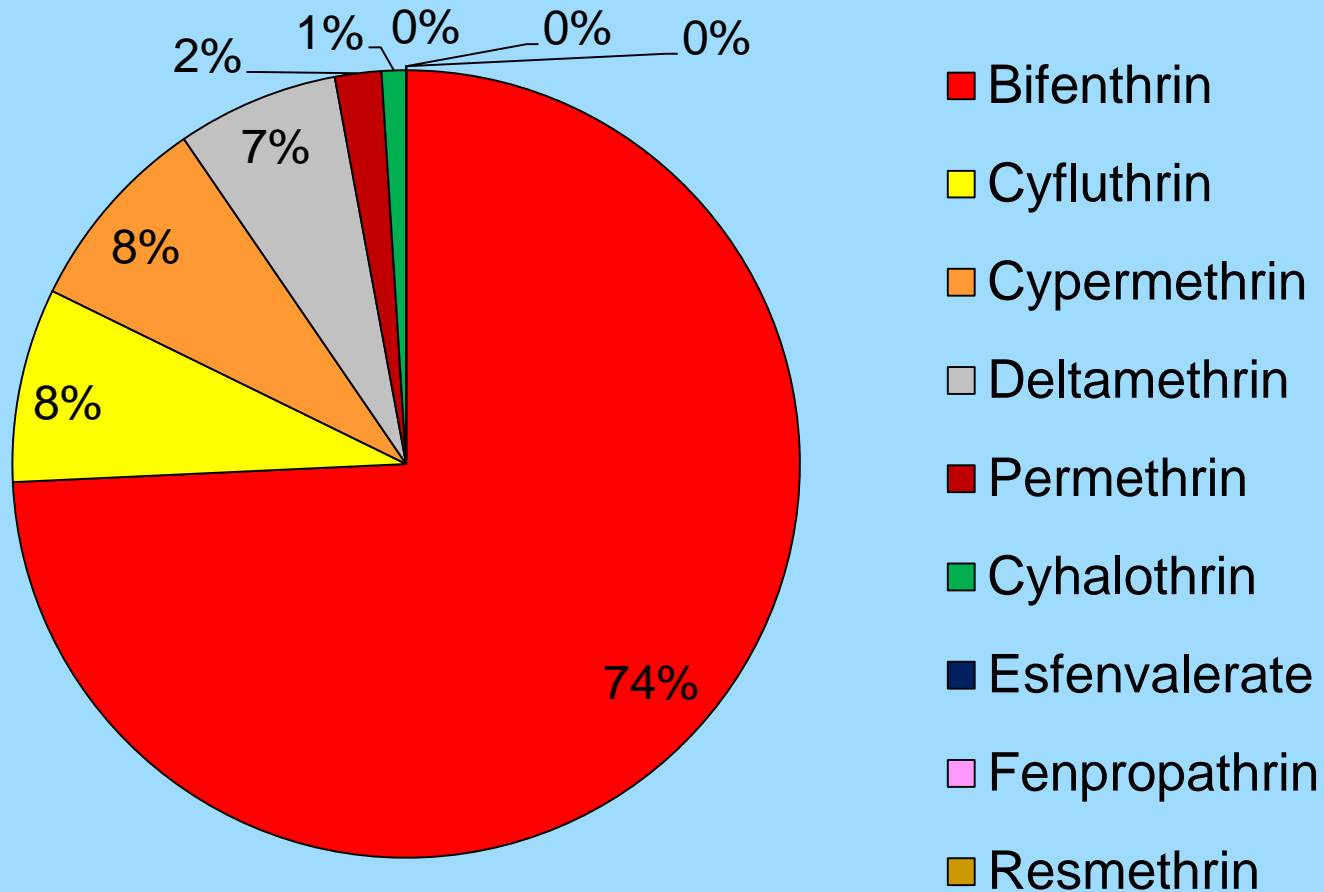


SD= Storm Drain
RW=Receiving Waters
Dash=Mean

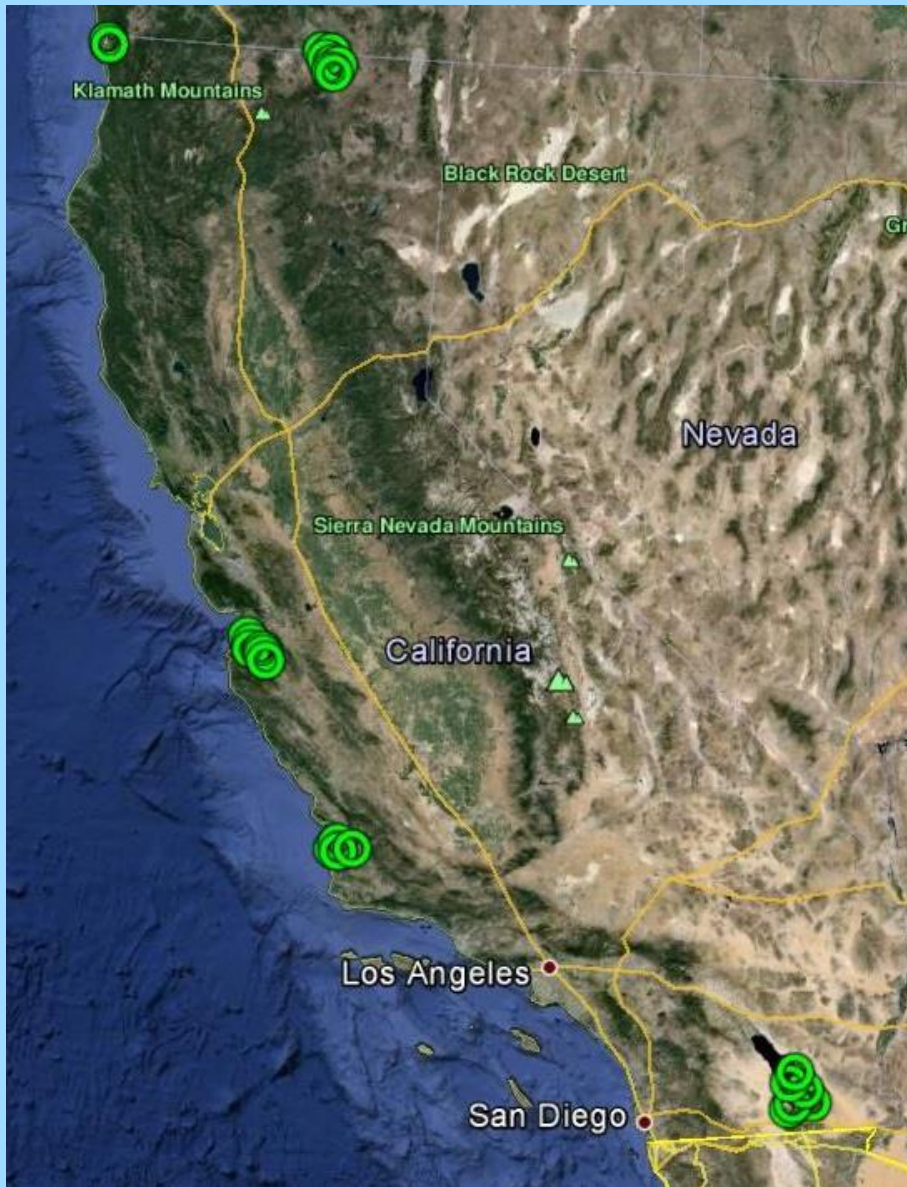
Sediment Toxicity Units



Toxicity Unit Contributions



Ag - Where we sample



Northern California
Ag Drain – 6 sites
Receiving waters – 2 sites

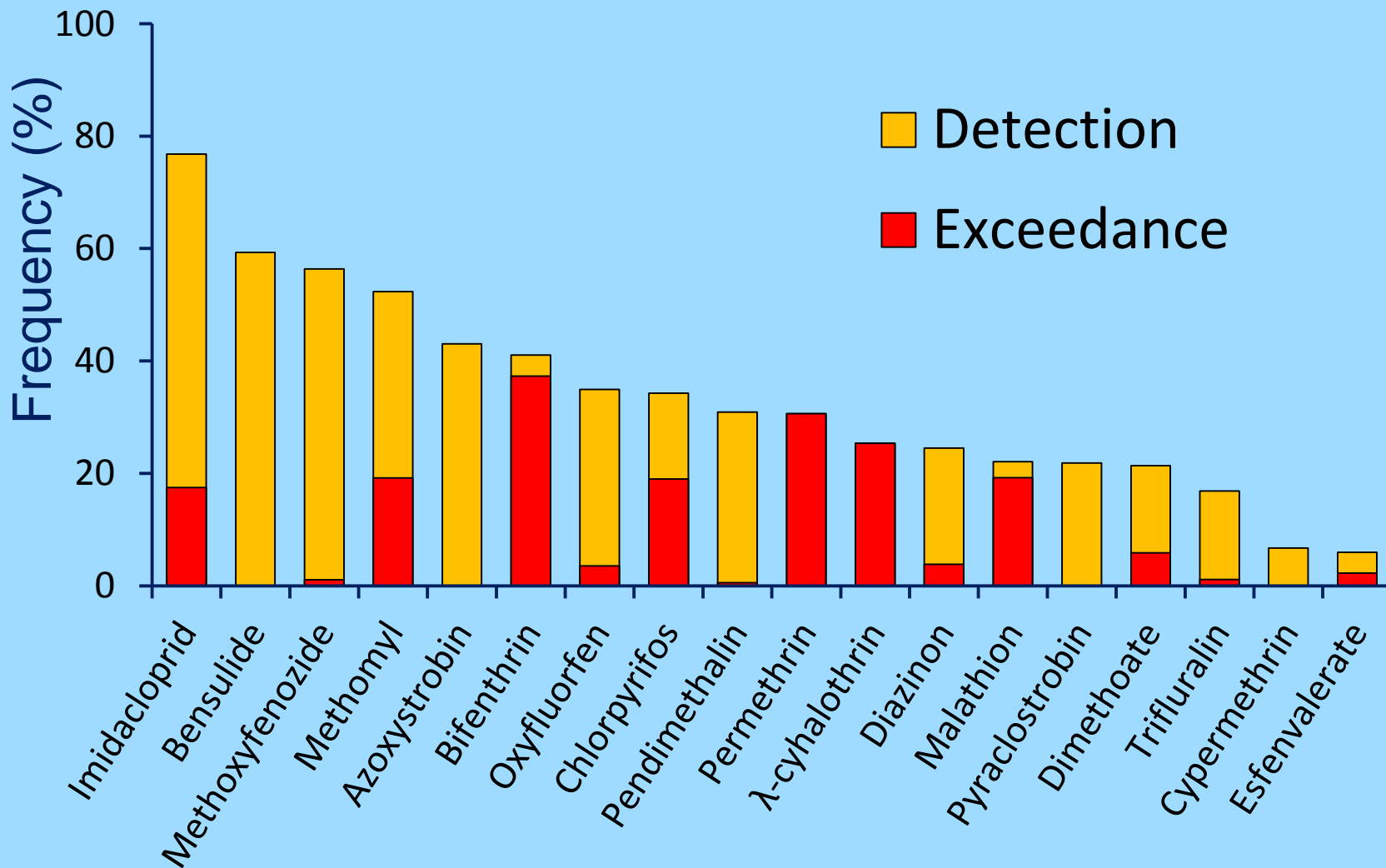
Southern California
Ag Drain – 8 sites
Receiving waters – 8 sites

Sampling Protocol

- 2007 – Present
- 11 events per year
 - 6 events in Salinas Valley
 - 3 events in Santa Maria Valley
 - 2 events in Imperial Valley
- Sites located at agricultural ditches and drains, and receiving waters
- Water samples analyzed for ~30 pesticides
- Water quality and flow recorded



Statewide Exceedances 2011-2015

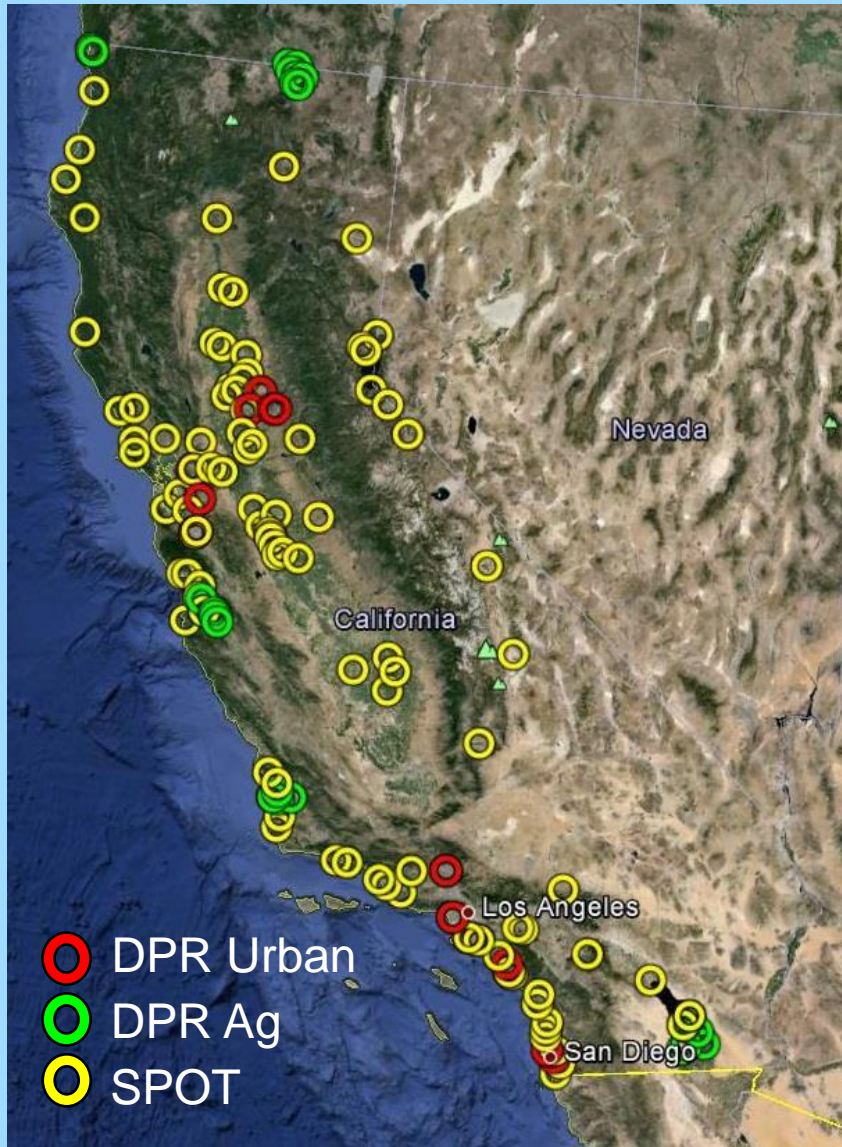


Surface Water Database (SURF)

	<u>Water</u>	<u>Sediment</u>
Oldest Record	1990	1986
Agencies	43	25
Counties	53	54
Sites	1,430	1,666
Records	488,954	72,177

<http://www.cdpr.ca.gov/docs/emon/surfwtr/surfcont.htm>

DPR & SPOT Collaboration



Watershed	Land Use (Primary)	SPOT Proximity
Salt Creek	Urban	Same
Bouquet Canyon Creek	Urban	Same
Ballona Creek	Urban	Same
Coyote Creek	Urban	Same
Guadalupe Creek	Urban	Same
Los Angeles River	Urban	Same
Pleasant Grove Creek	Urban	Downstream
San Diego River	Urban	Upstream
Salinas River	Agriculture	Same
Alamo River	Agriculture	Same
New River	Agriculture	Downstream
Santa Maria River	Agriculture	Orcutt Creek



Questions?