

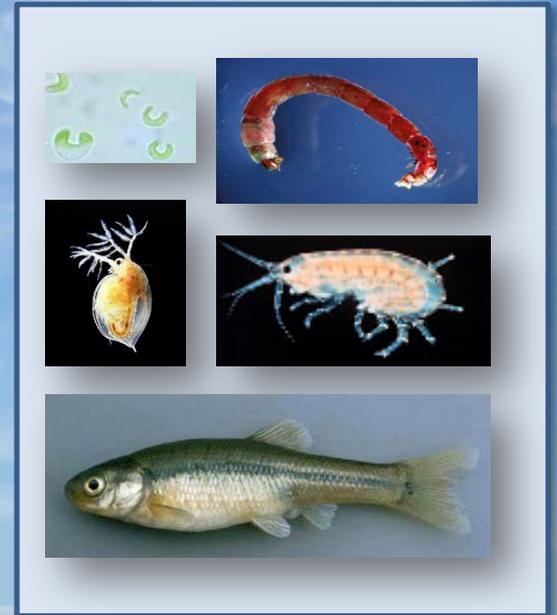
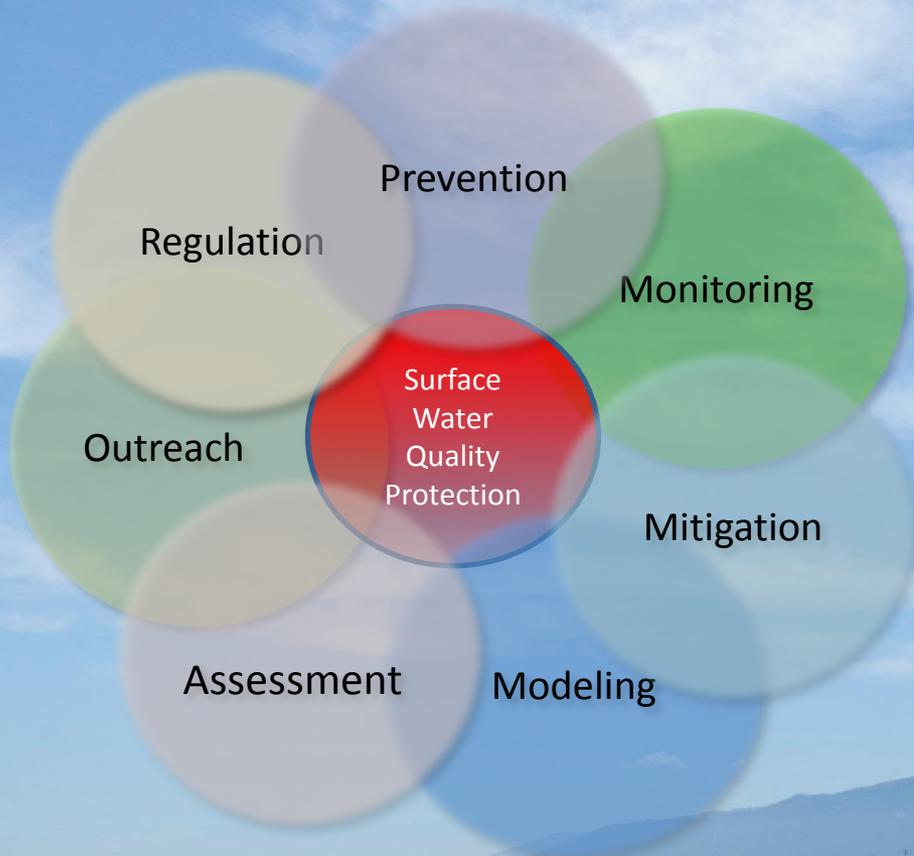


DPR Surface Water Monitoring Program

California Water Quality
Science Symposium
June 29, 2016

Robert Budd, PhD
Environmental Monitoring Branch
Department of Pesticide Regulation

Program Overview



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.)

Pesticide Prioritization for Surface Water Monitoring, V...

Help

Configuration | **Advanced Options** | Watershed

Use patterns

Agricultural use Urban use "Rights of way" (site_code=40)

Or, user-specified site_code(s)=

PUR data

Based on PUR data from to

Toxicity data

Acute Chronic Both

USEPA Aquatic Life Benchmarks

Supplemented by Benchmark Equivalent (based on FOOTPRINT PPDB)

USEPA Drinking Water Standard

USEPA Human Health Benchmark

Note: if multiple toxicity databases are selected, the lowest toxicity value for each pesticide will be used for prioritization

Pesticide Prioritization for Surface Water Monitoring, V...

Help

Configuration | **Advanced Options** | Watershed

Options for PUR data processing

County/region based prioritization

Month/season based prioritization

Redefine the probabilities for pesticide use ranking

Monitoring recommendations for pesticide degradates

Site-specific analysis for historical monitoring data

for one site (by SURF site_code)

OR, for all sites in a county (by county code)

data analysis with all SURF data, not limited by user-specified years/months

Download (or import) PUR data for the year of

Download from Oracle Import from text files

Options for reporting

Max. number of top pesticides for reporting:

Only report pesticides recommended for monitoring and with [final score]>= and [use score]>=

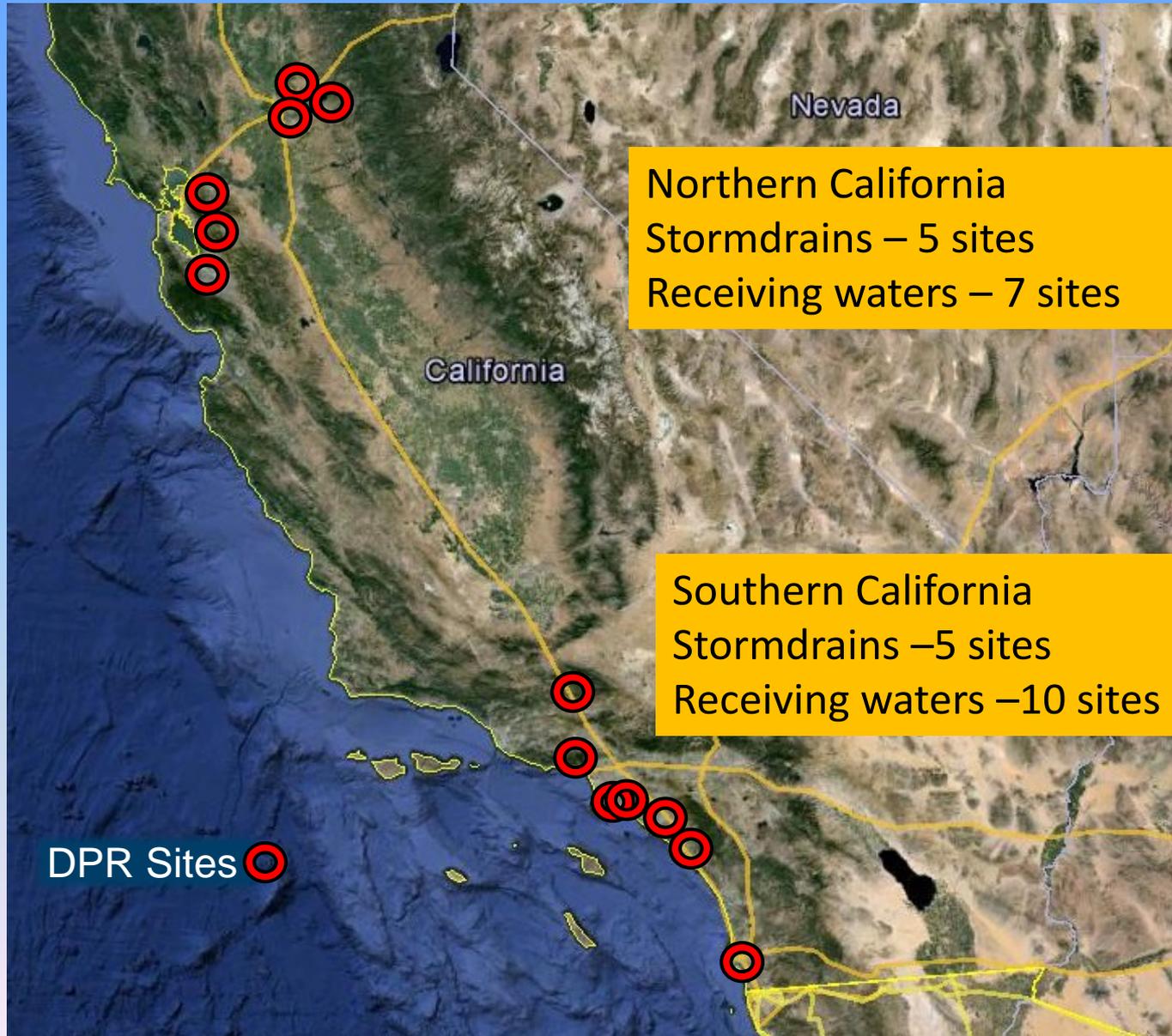
Urban Prioritization

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

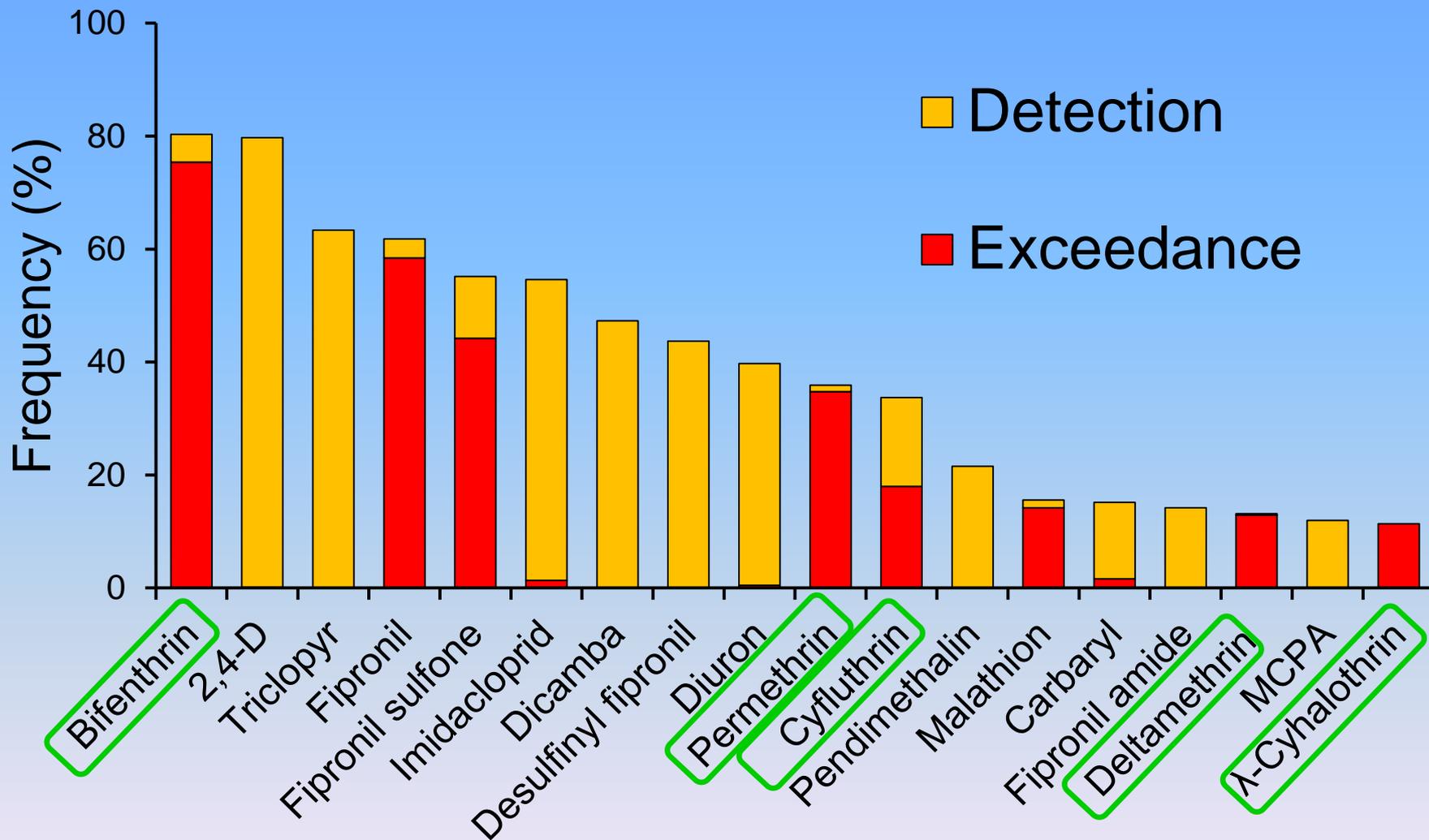


Sampling Protocol

- 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

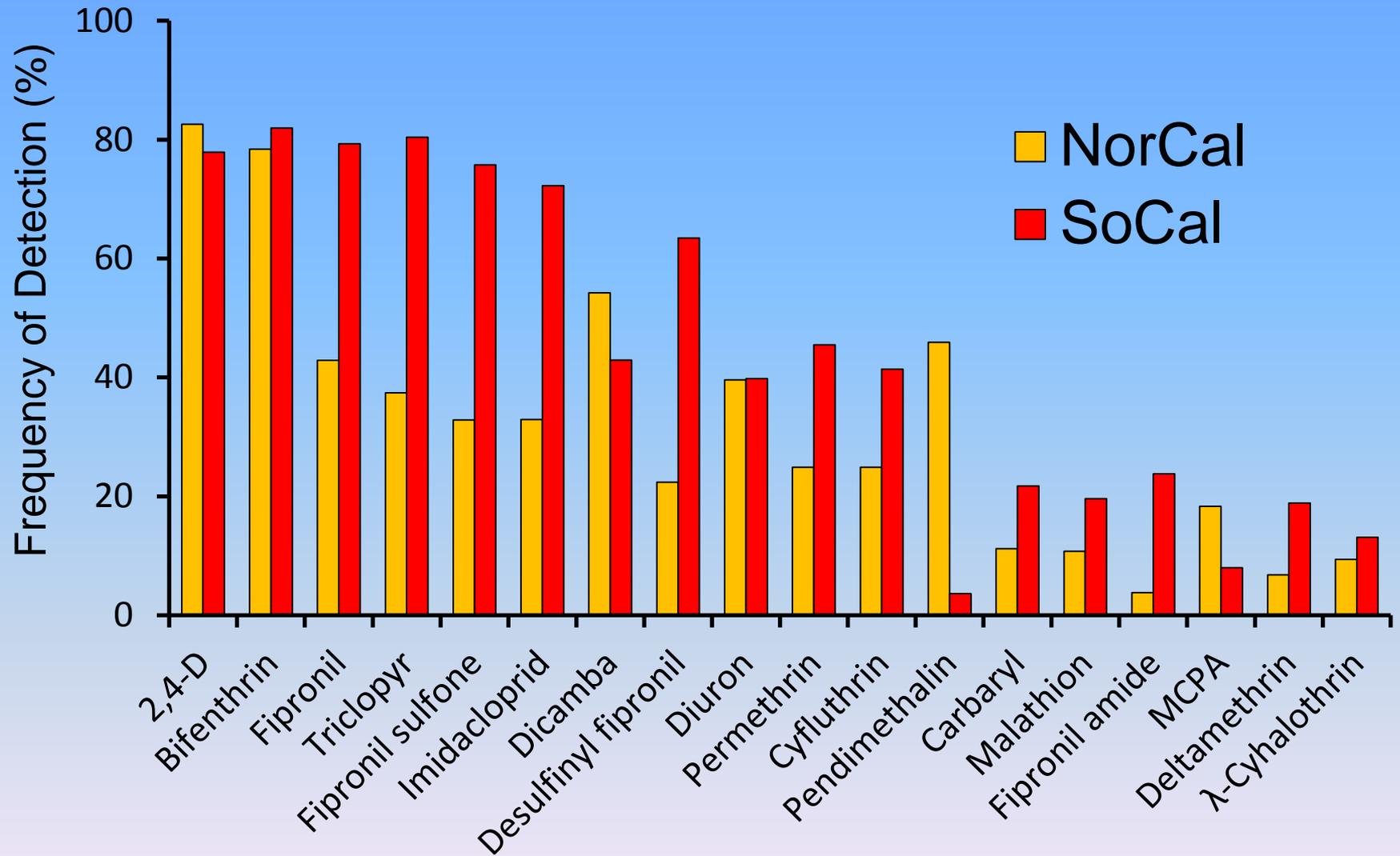


Statewide Exceedances 2009-2016



* Pesticides with FD<10% not shown

Regional Differences



* Pesticides with average FD<10% not shown

Stormwater

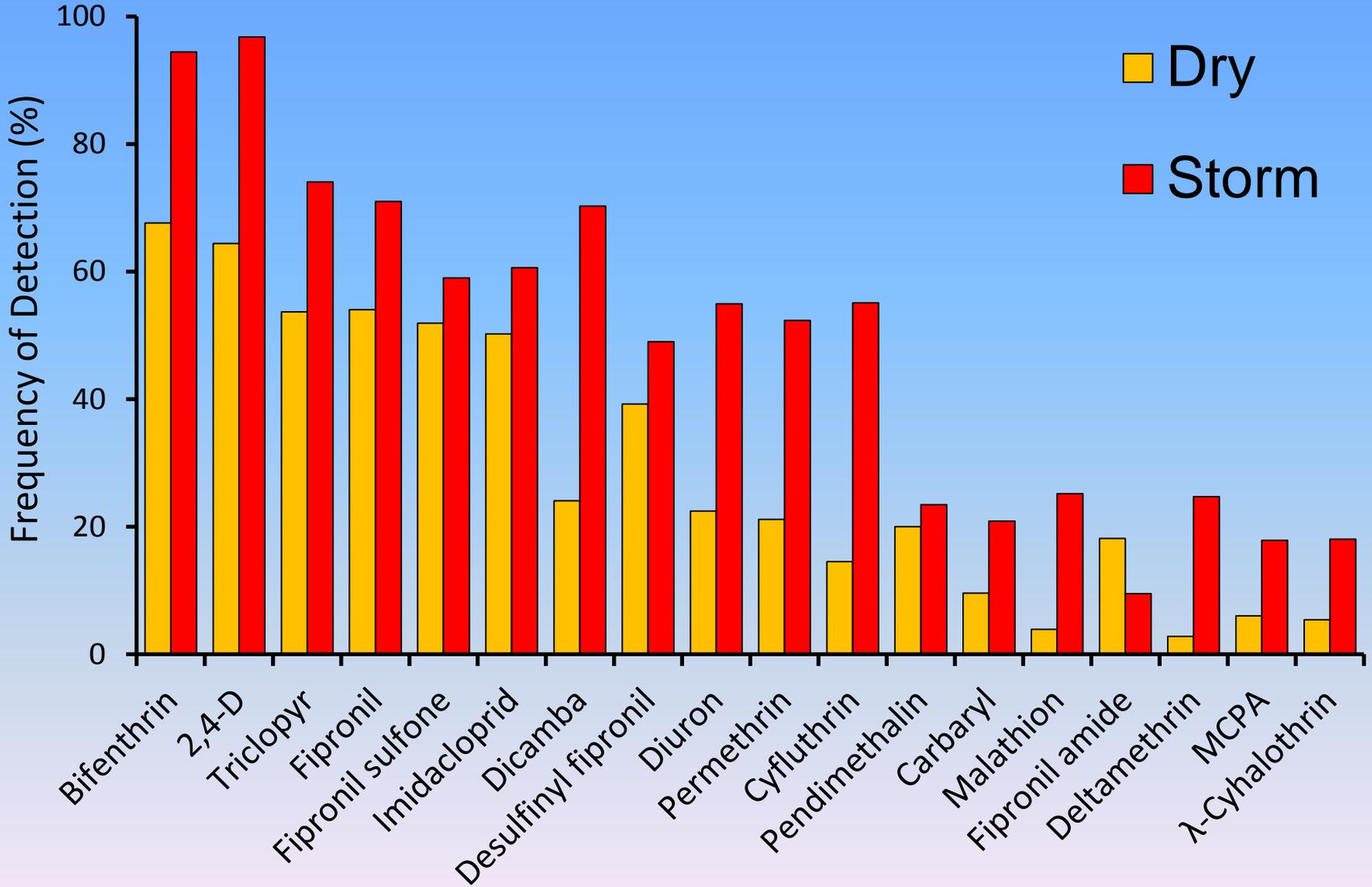


Dry Season



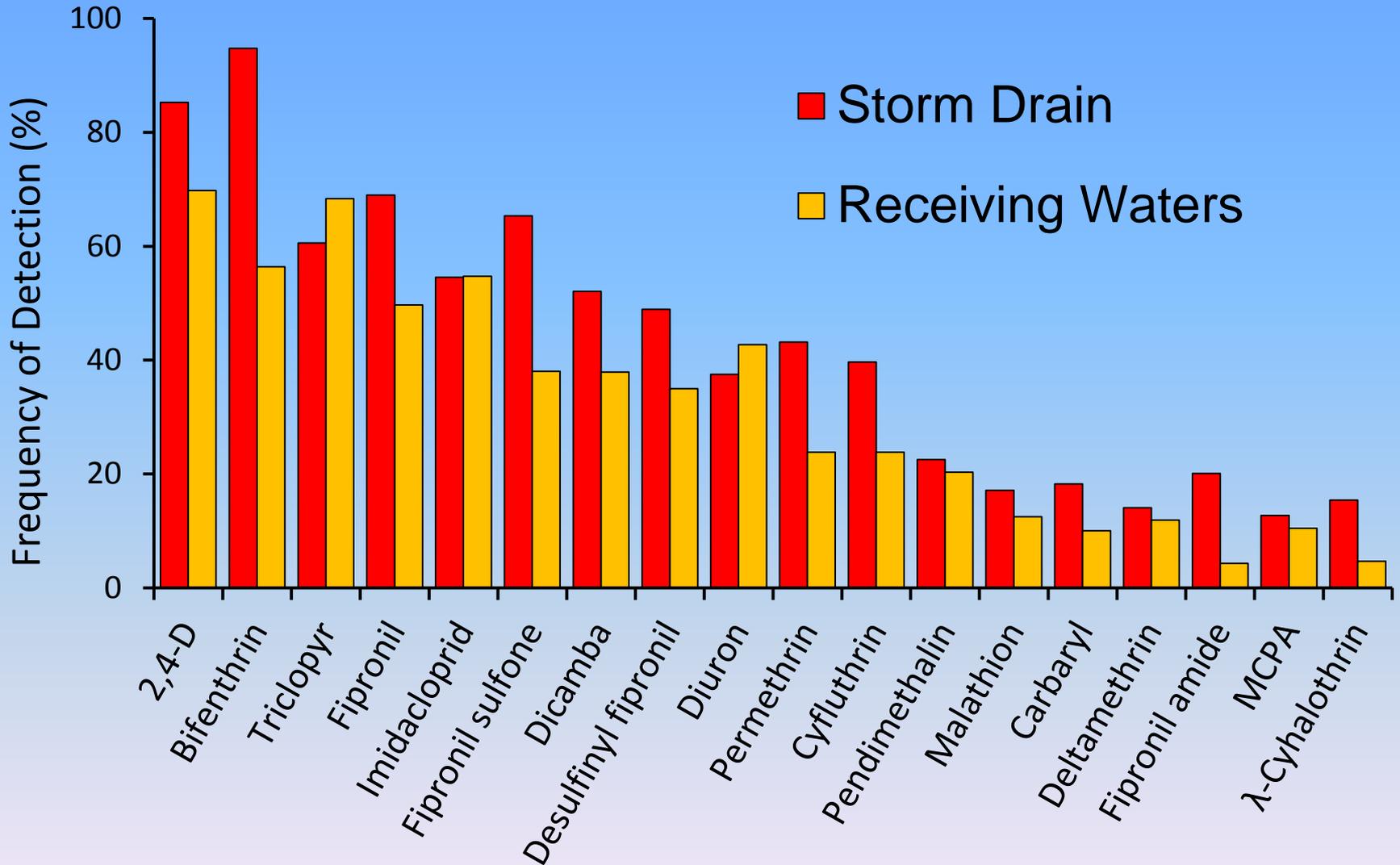
Rain Event

Seasonality



* Pesticides with average FD<10% not shown

Hydrological Effects

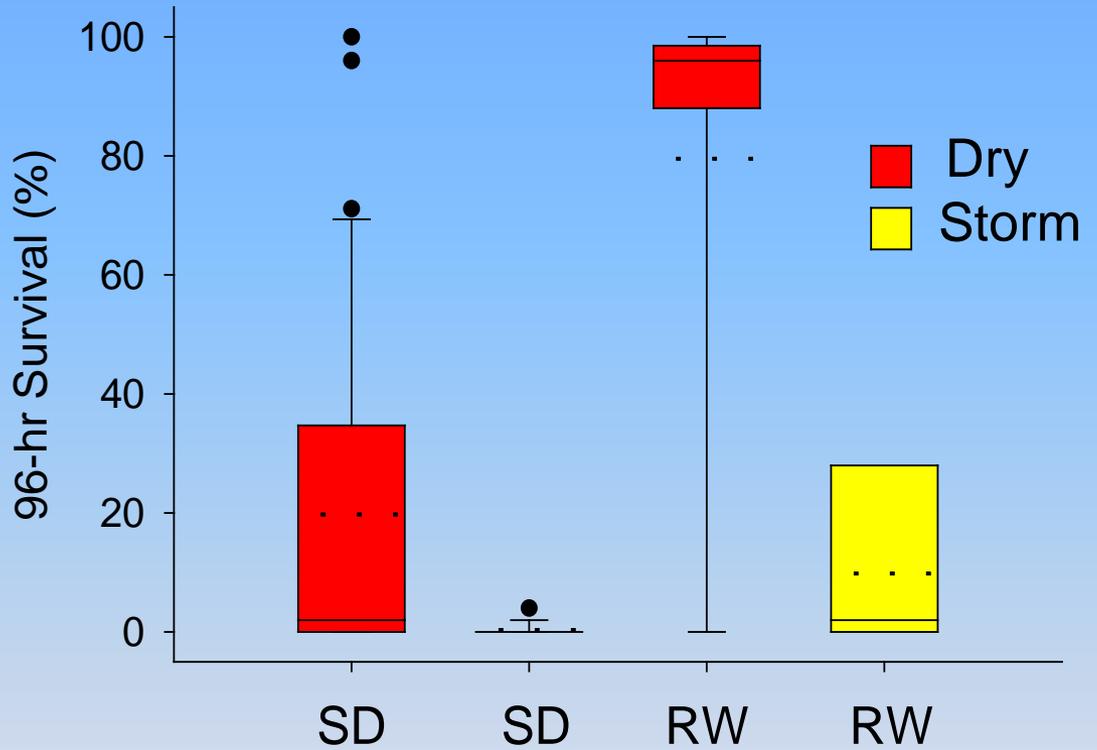


* Pesticides with average FD<10% not shown

Water Toxicity

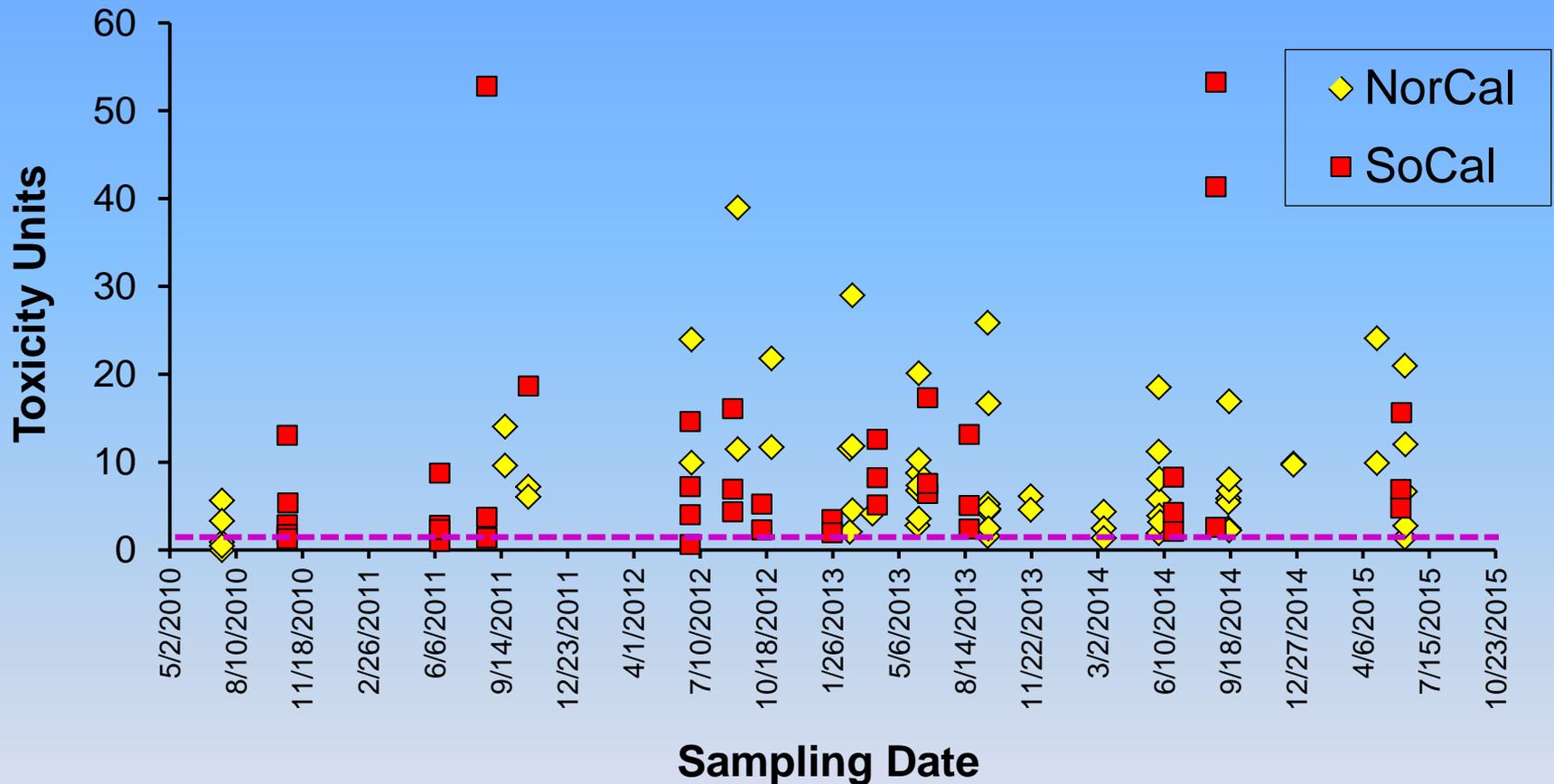


H. azteca



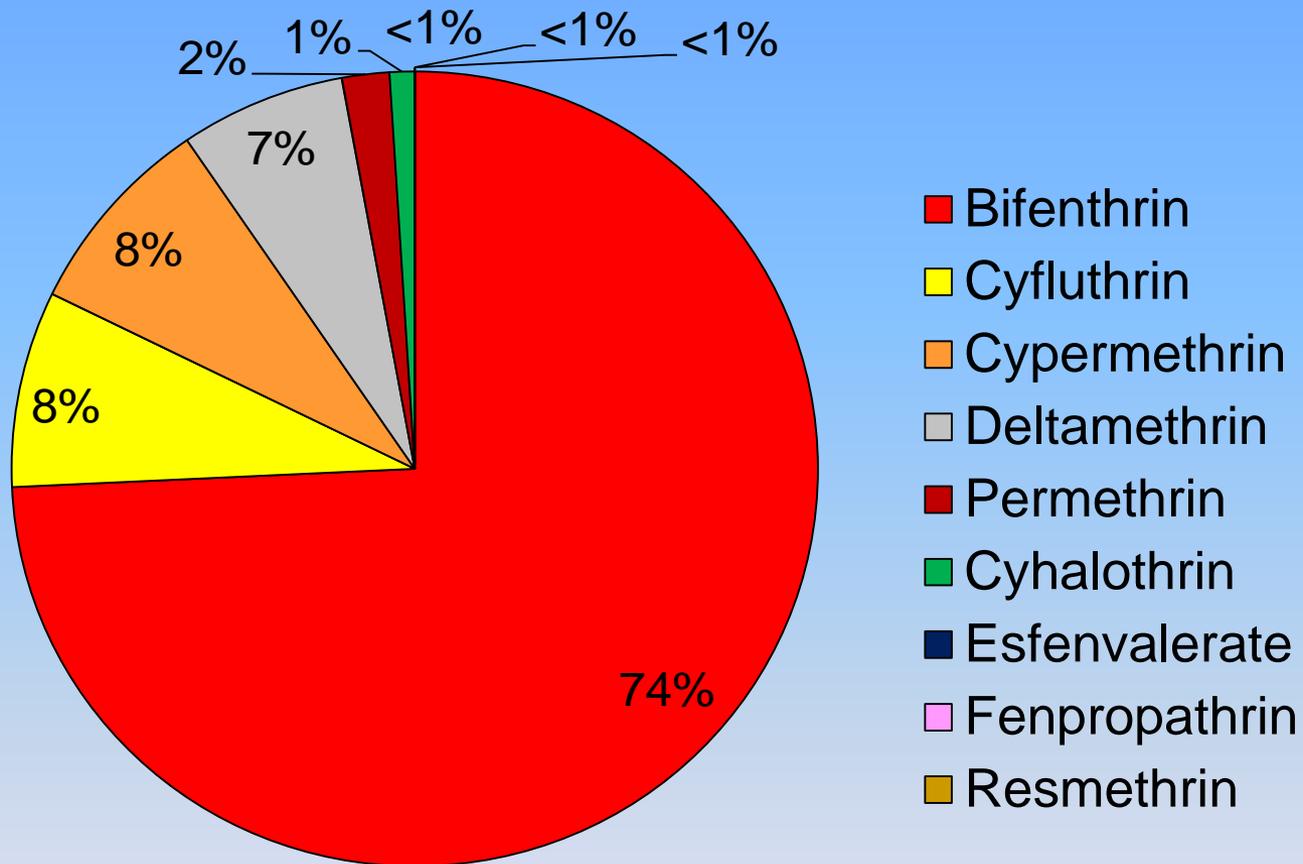
SD= Storm Drain
RW=Receiving Waters
Dash=Mean

Sediment Toxicity Units

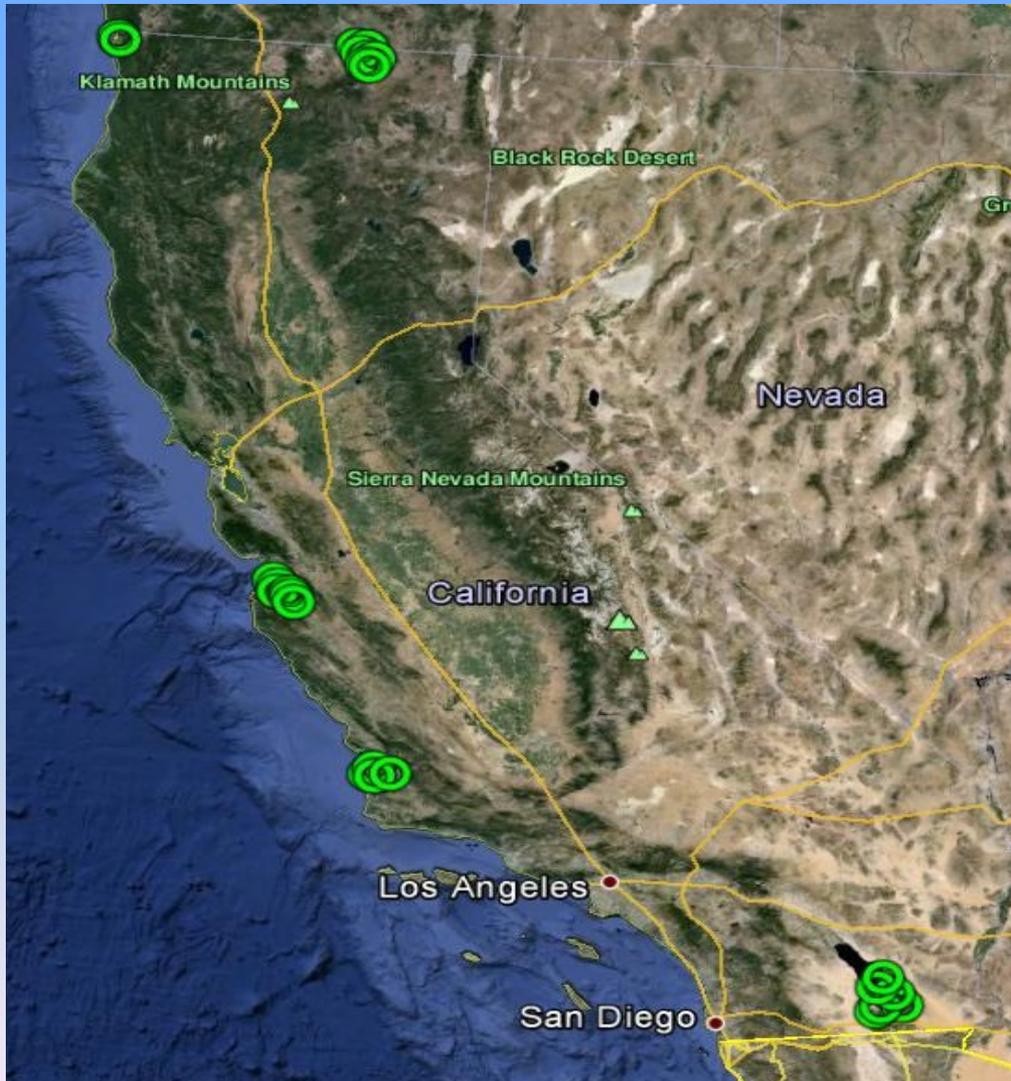


Toxicity Unit = $\frac{\text{OC Normalized Concentration}}{\text{LC50 value}}$

Sediment Toxicity Unit Contributions



Agriculture - Where we sample



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

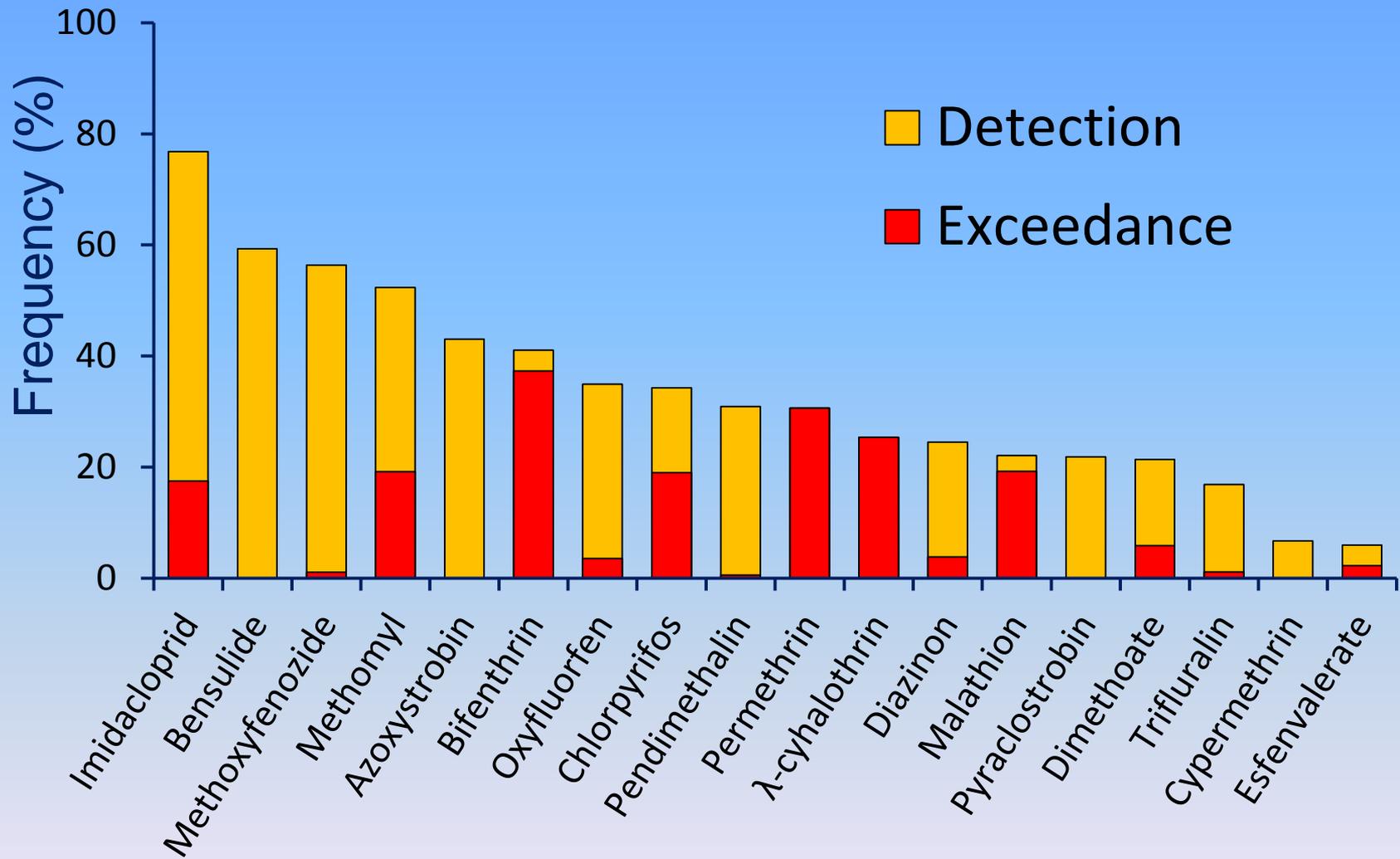
Southern California
Ag Drain – 8 sites
Receiving waters – 8 sites

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)

Oldest Record	1986
Agencies	25
Counties	54
Sites	>1,500
Records	488,954 Water 72,177 Sediment

Google fusion table interface:

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

Mitigation Efficacy

Buffer zone

Water quality treatment pond

Constructed wetland

Vegetated buffer strip

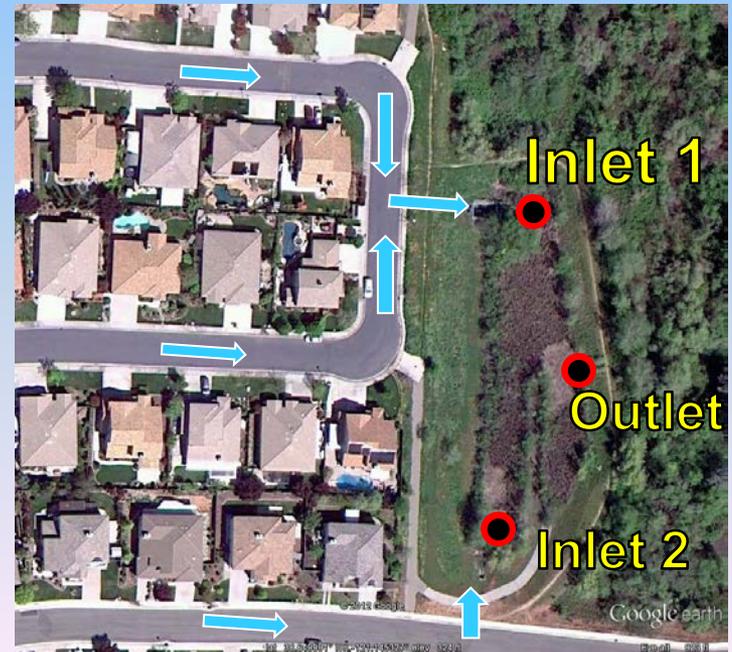
Grassed waterway

Cover crops

Charcoal Filters

Bioreactors

Enzymes



Thank You



Surface Water Protection Program