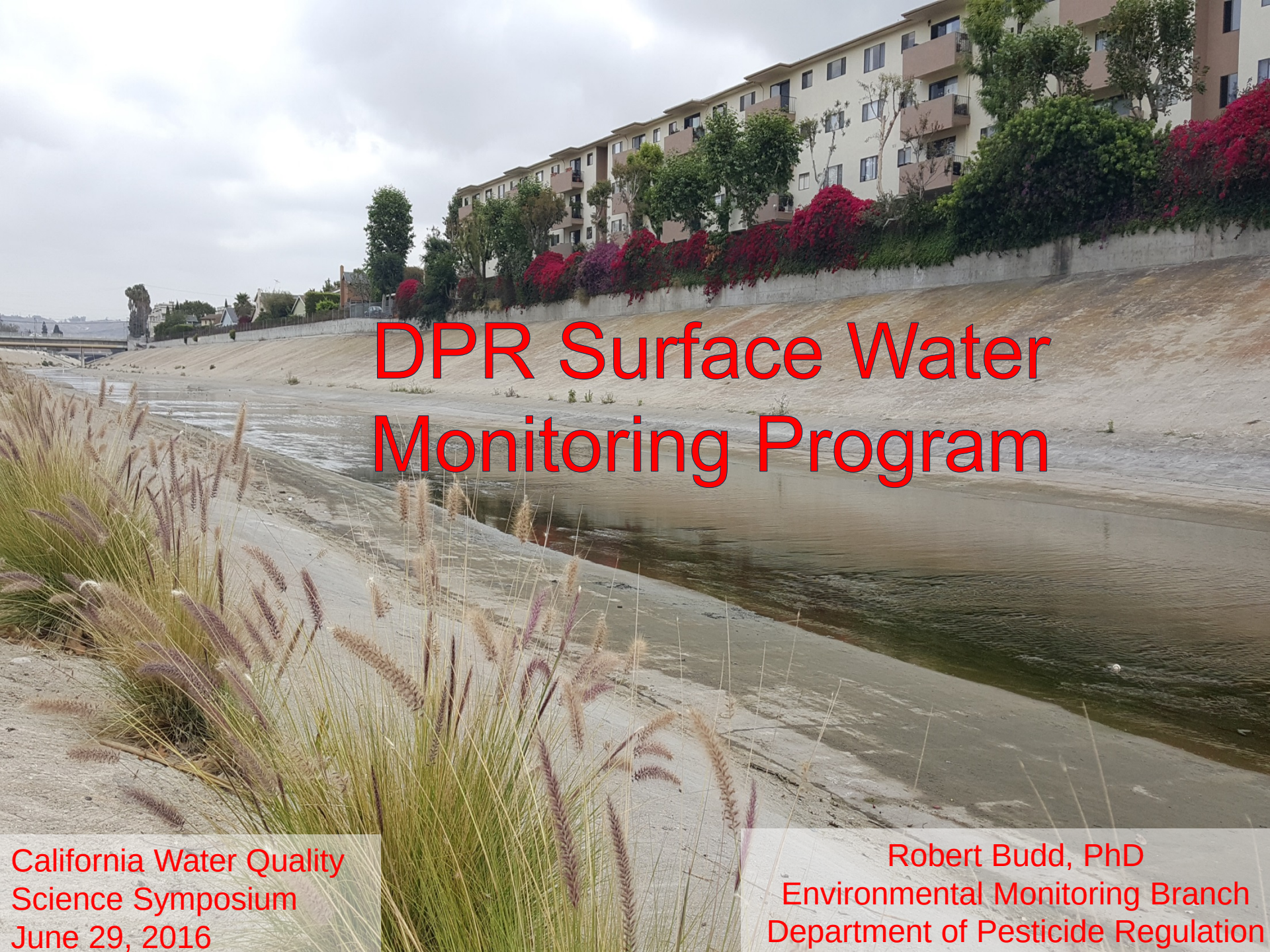
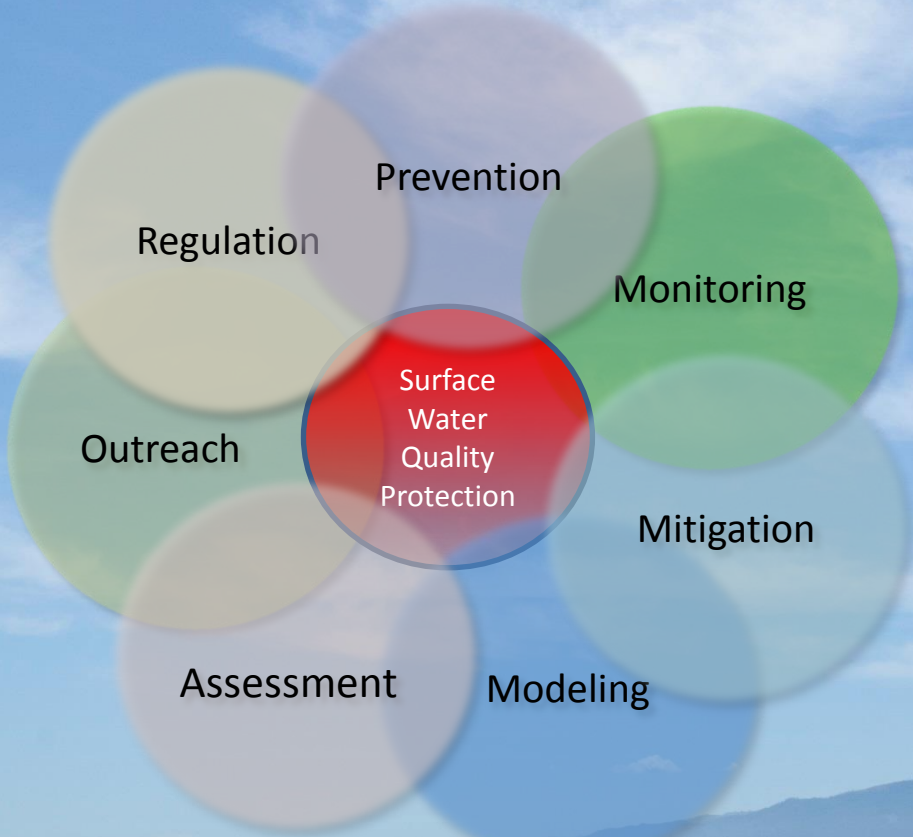


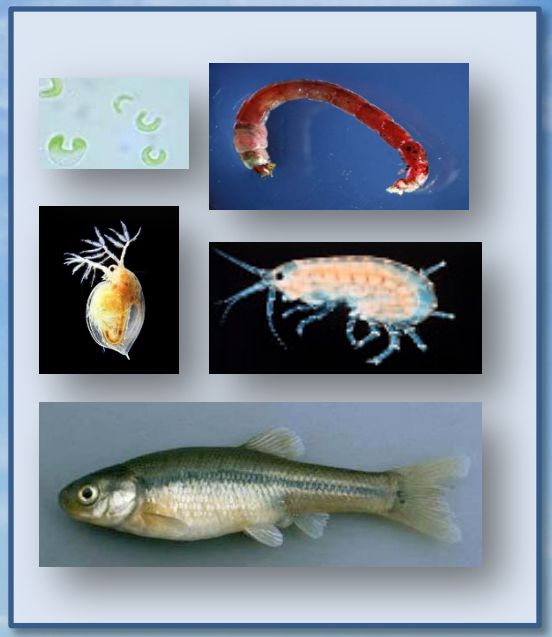
DPR Surface Water Monitoring Program

California Water Quality Science Symposium
June 29, 2016

Robert Budd, PhD
Environmental Monitoring Branch
Department of Pesticide Regulation

Program Overview





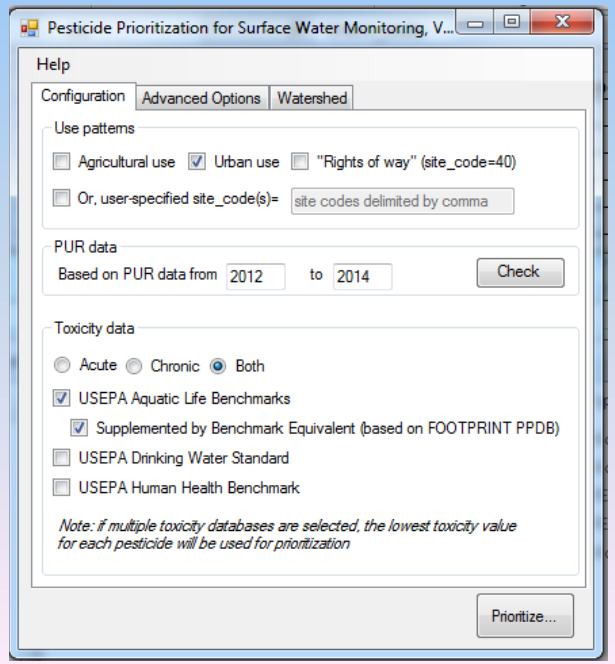
K. Goh

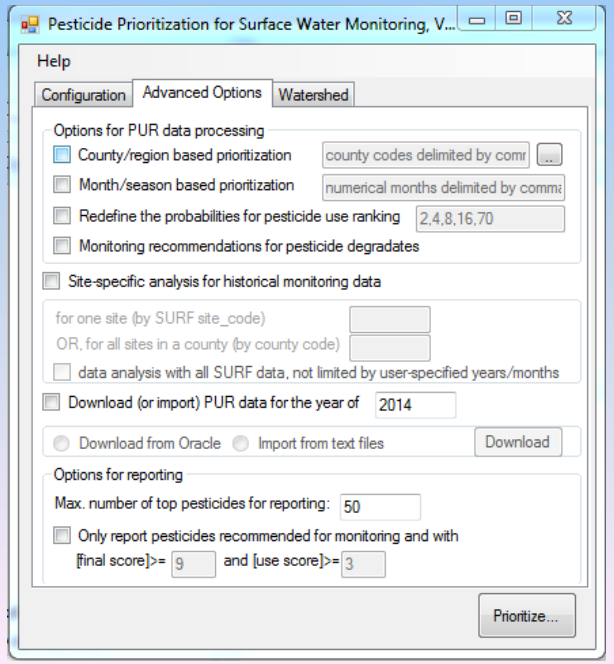
Monitoring Objectives

- 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.)





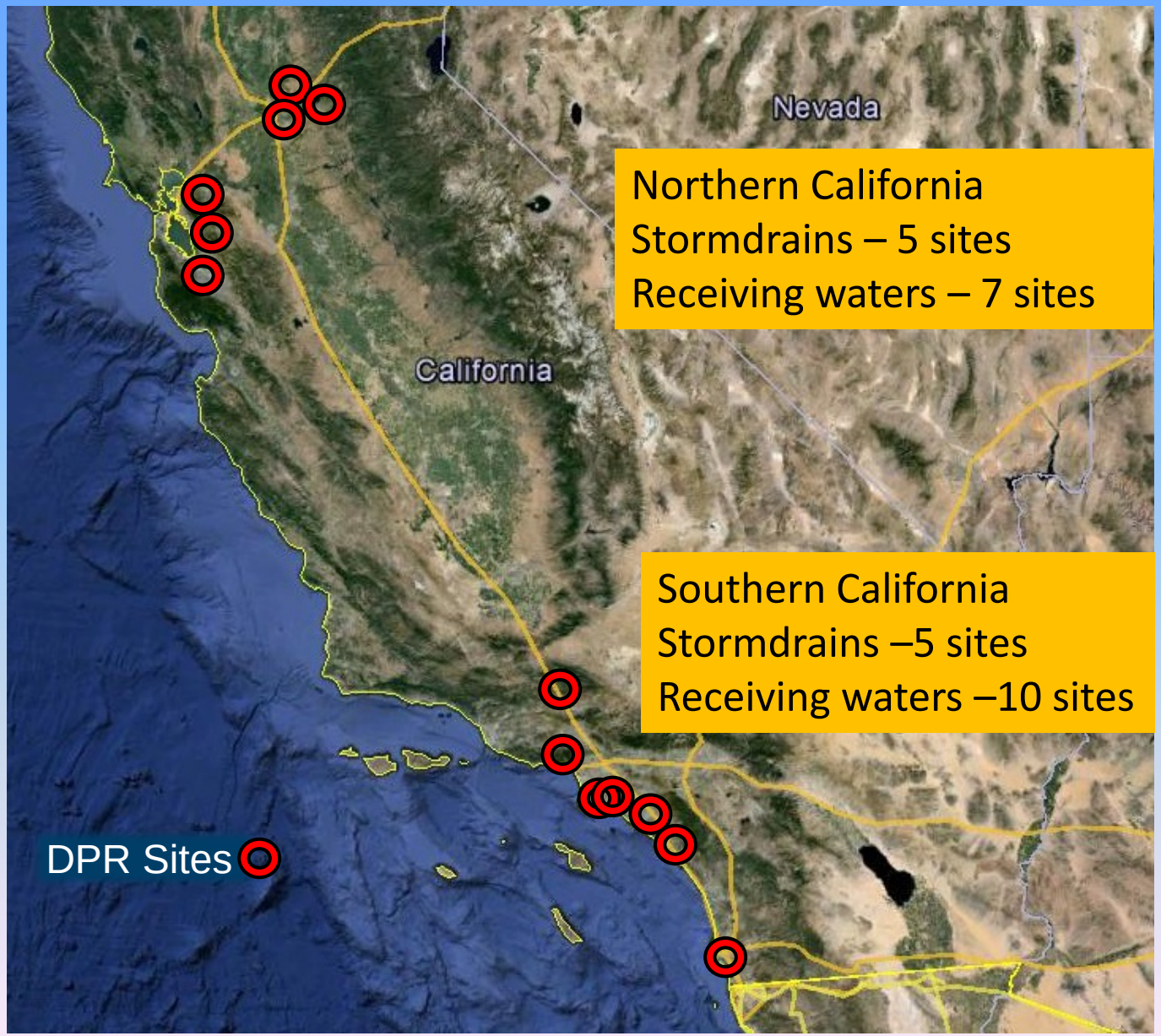
Urban Prioritization

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

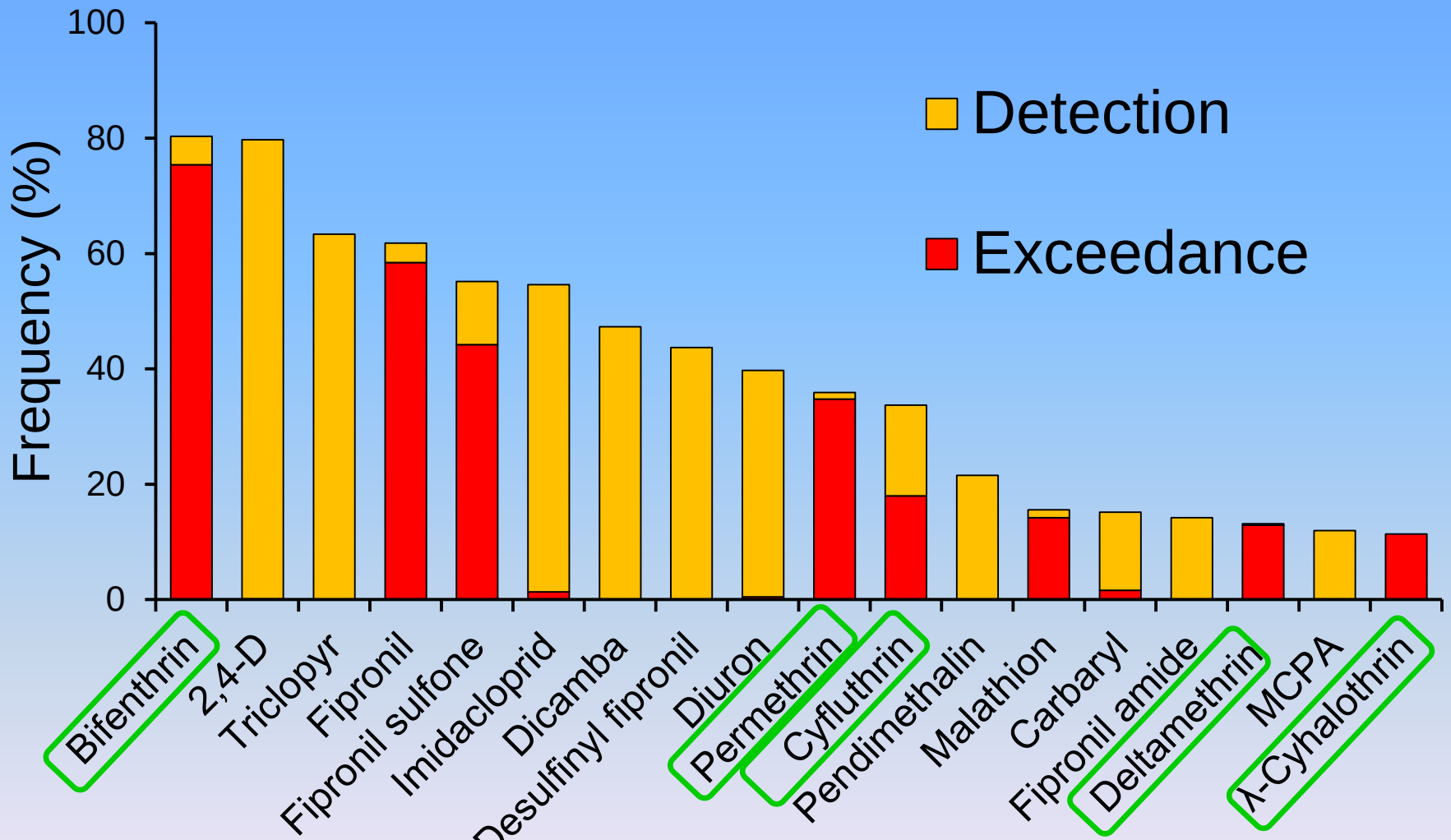
Urban - Where we sample



Sampling Protocol

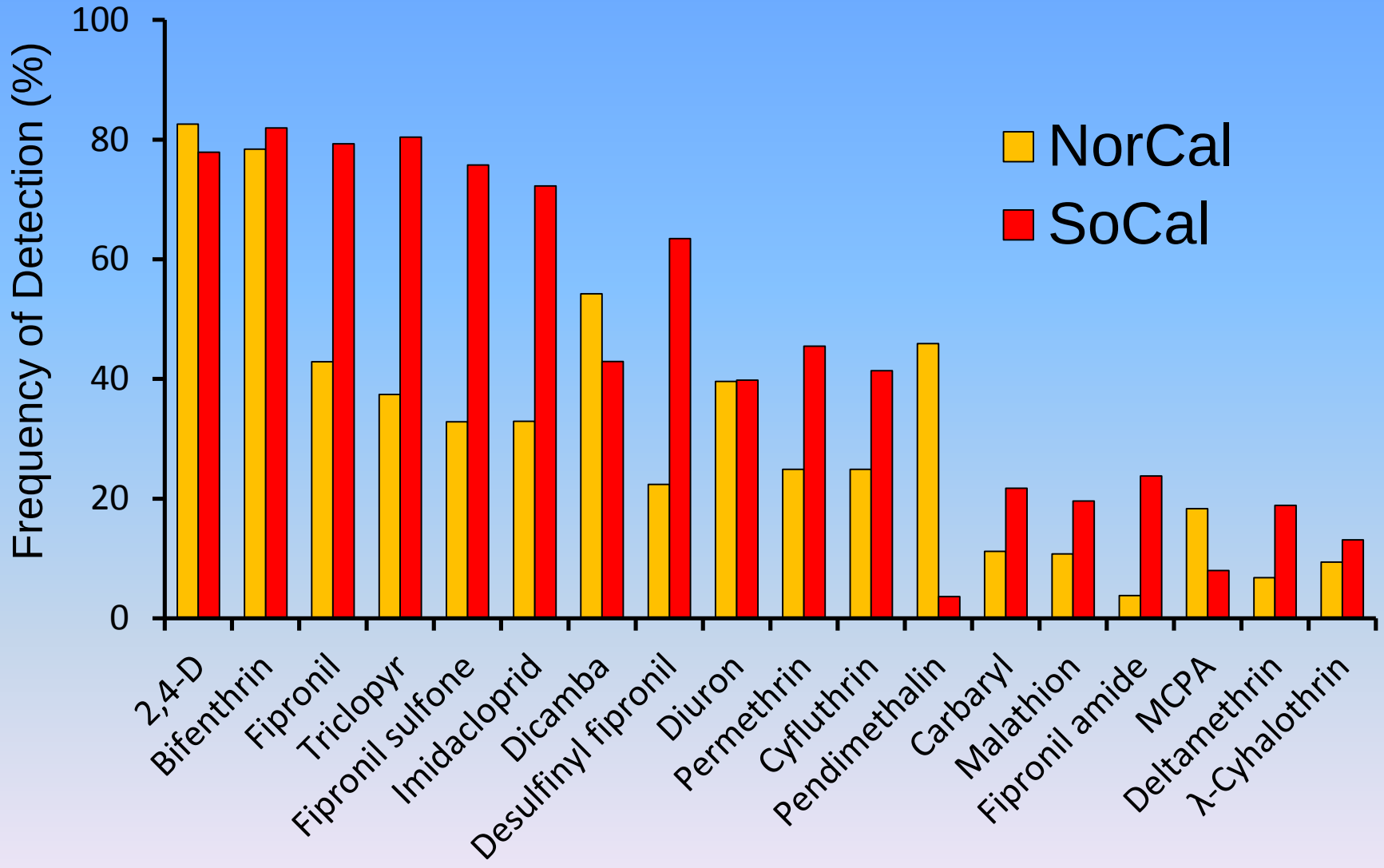
- 2008 – Present
- 4 – 5 events per year
  - 2 storm events
  - 2 dry season
- Sites located at storm drains and receiving waters
- Water samples analyzed for ~35 pesticides
- Water quality and flow recorded

Statewide Exceedances 2009-2016



* Pesticides with FD<10% not shown

Regional Differences



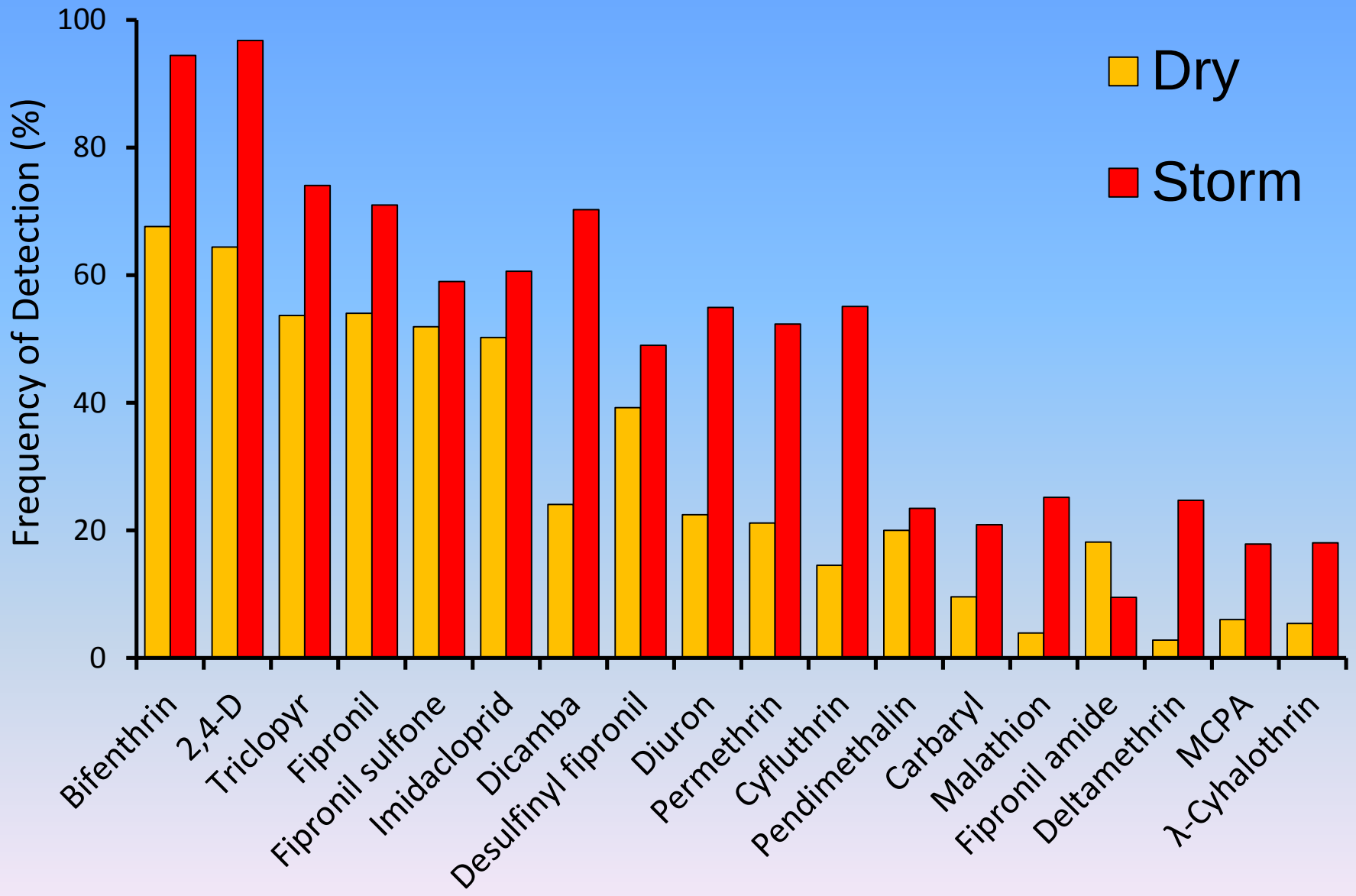
* Pesticides with average FD<10% not shown

Stormwater

Dry Season

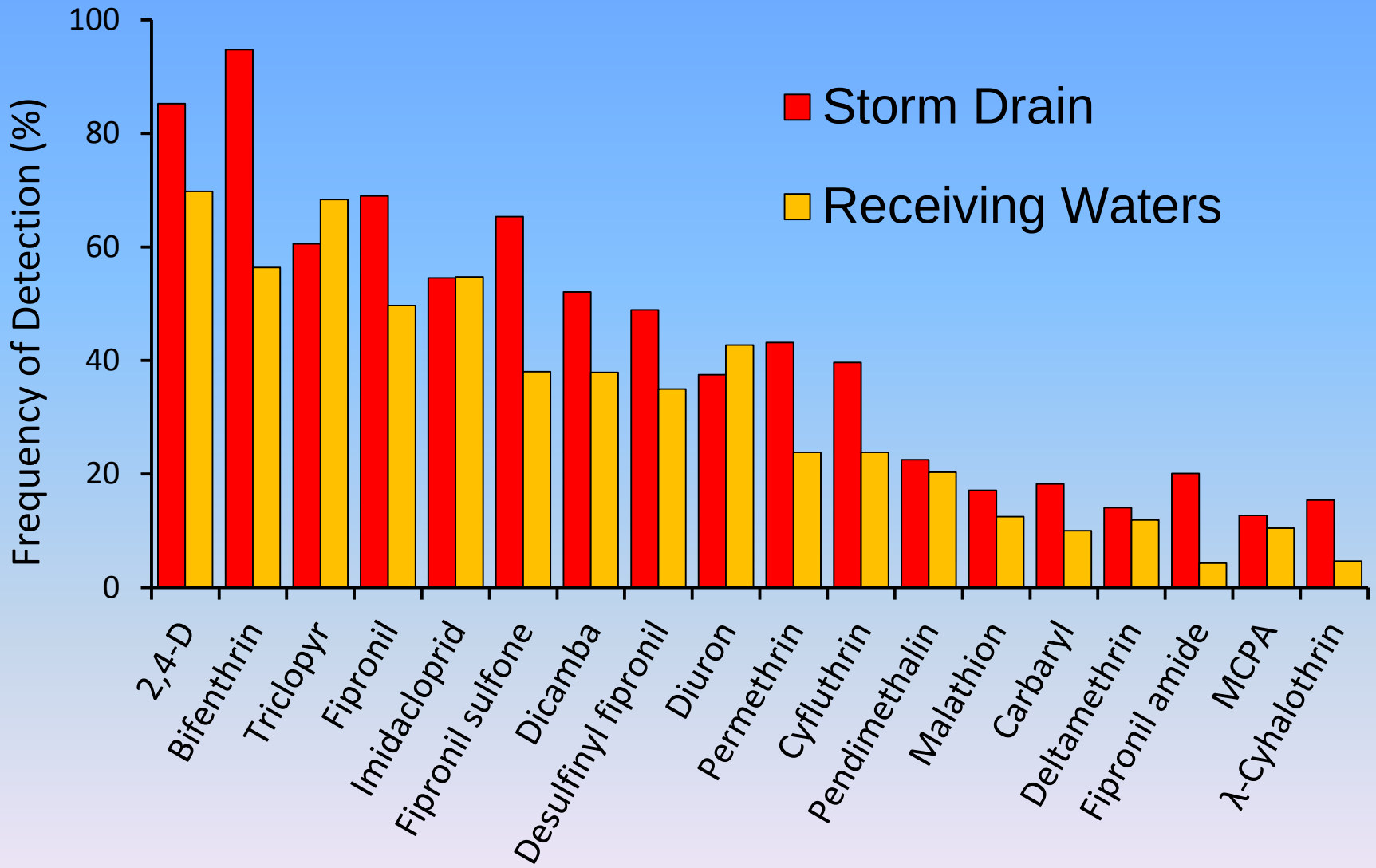
Rain Event

Seasonality



* Pesticides with average FD<10% not shown

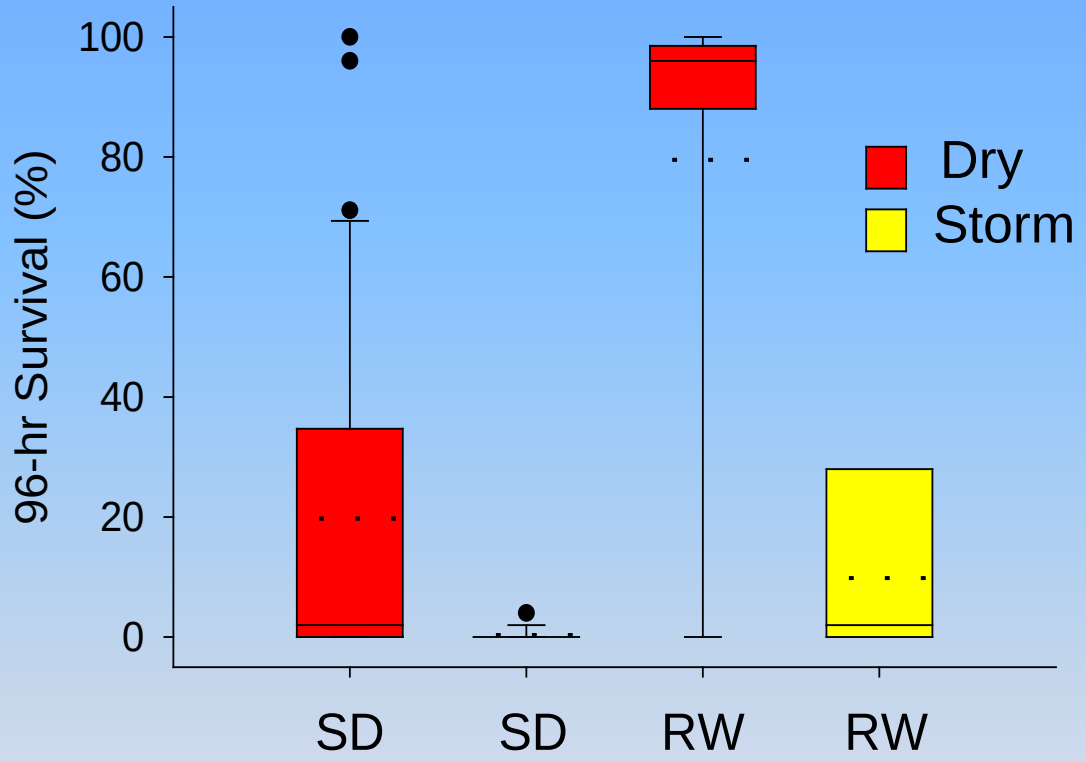
Hydrological Effects



* Pesticides with average FD<10% not shown

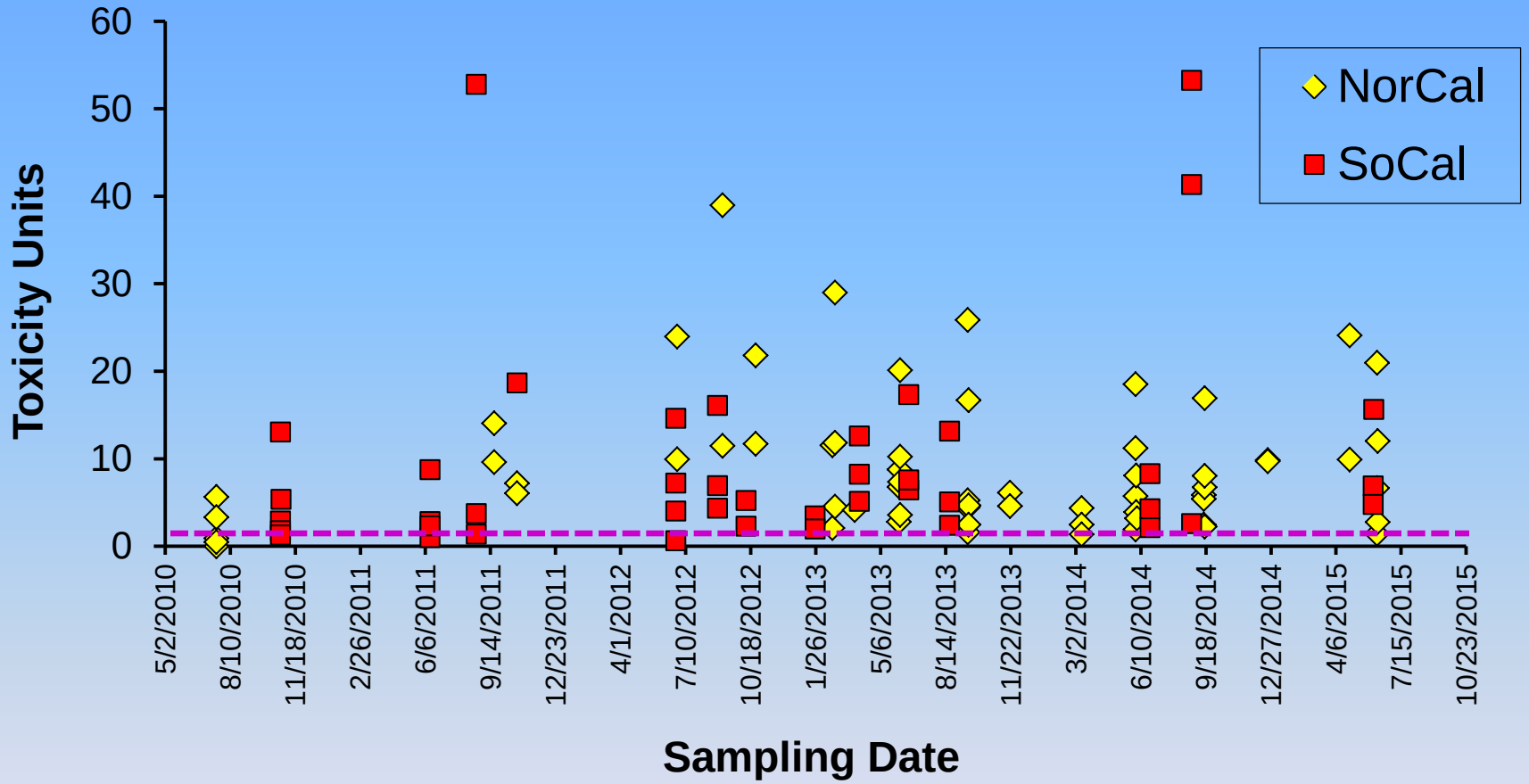
Water Toxicity

H. azteca



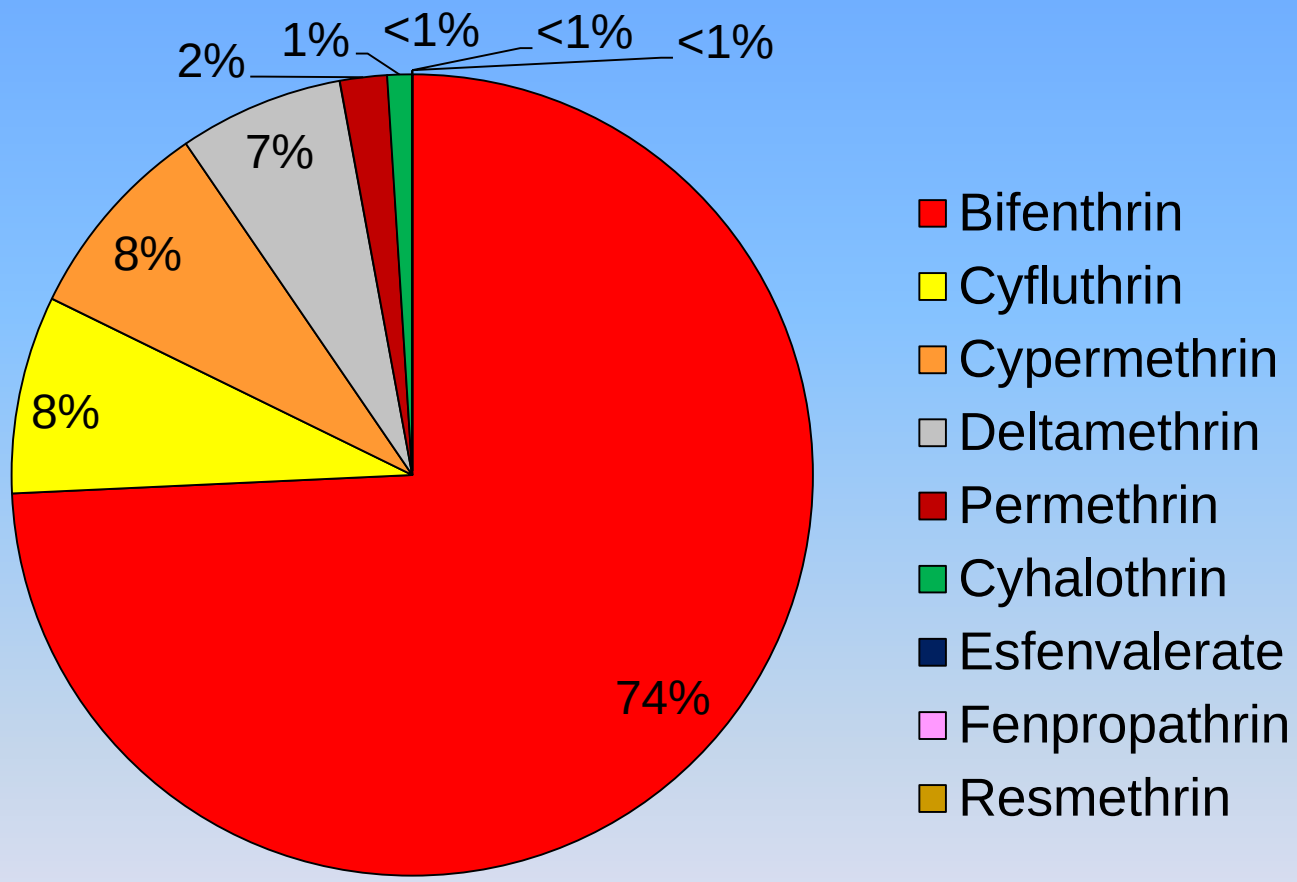
SD= Storm Drain
RW=Receiving Waters
Dash=Mean

Sediment Toxicity Units

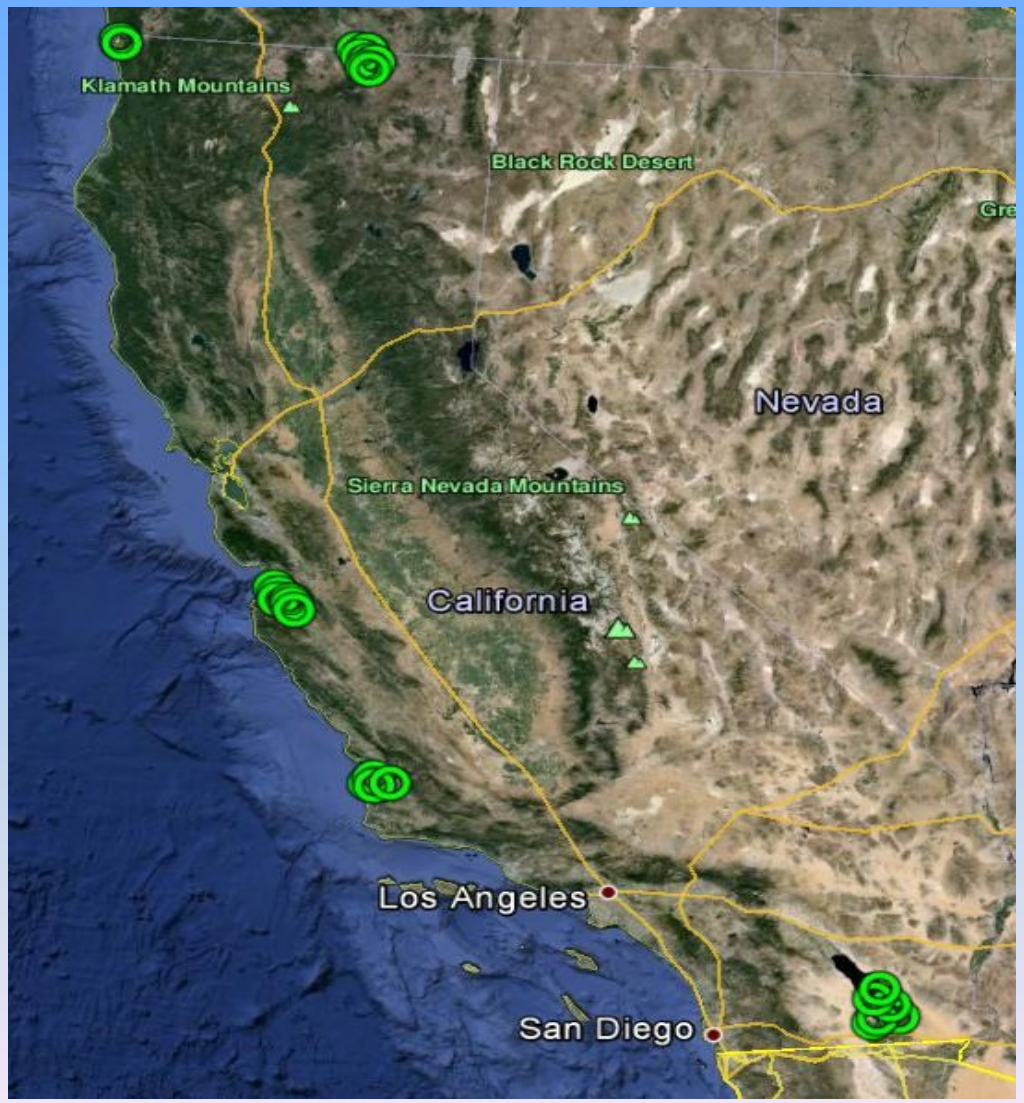


Toxicity Unit = $\frac{\text{OC Normalized Concentration}}{\text{LC50 value}}$

Sediment Toxicity Unit Contributions



Agriculture - Where we sample



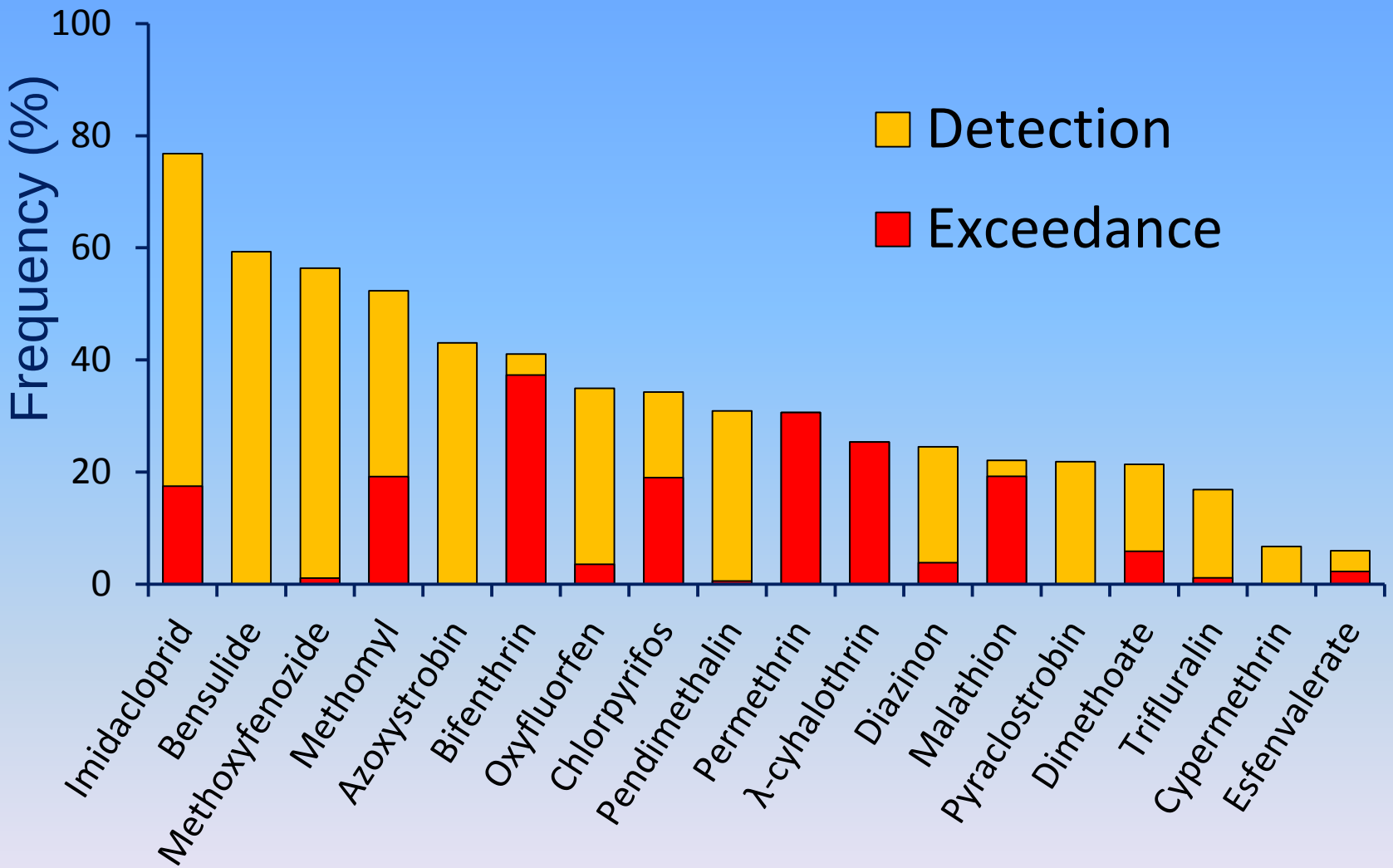
Northern California
Ag Drain – 6 sites
Receiving waters – 2 sites

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

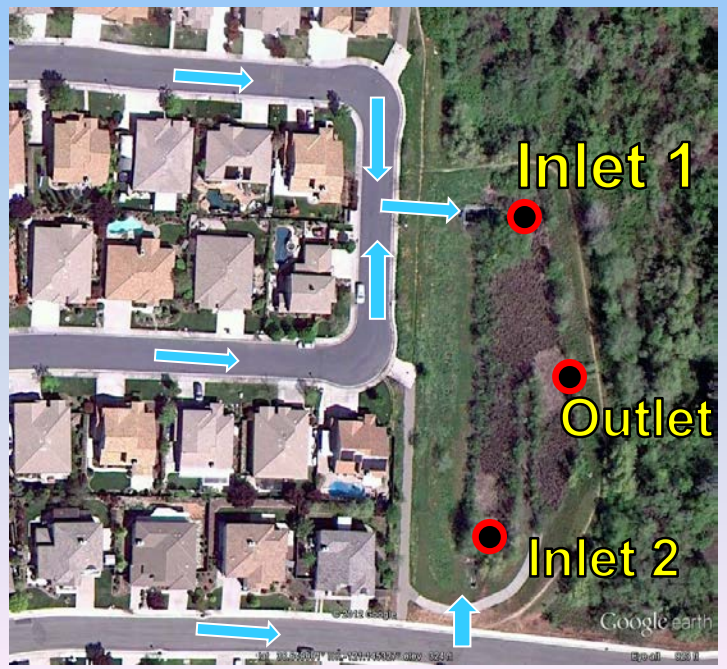
Google fusion table interface:

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



Regulatory Action

- Surface Water Regulations
  - ❖ Pyrethroids
- Restricted Use Classification
  - ❖ Chlorpyrifos (Ag)
- Product Cancellation
  - ❖ Carbofuran

Thank You

Surface Water Protection Program