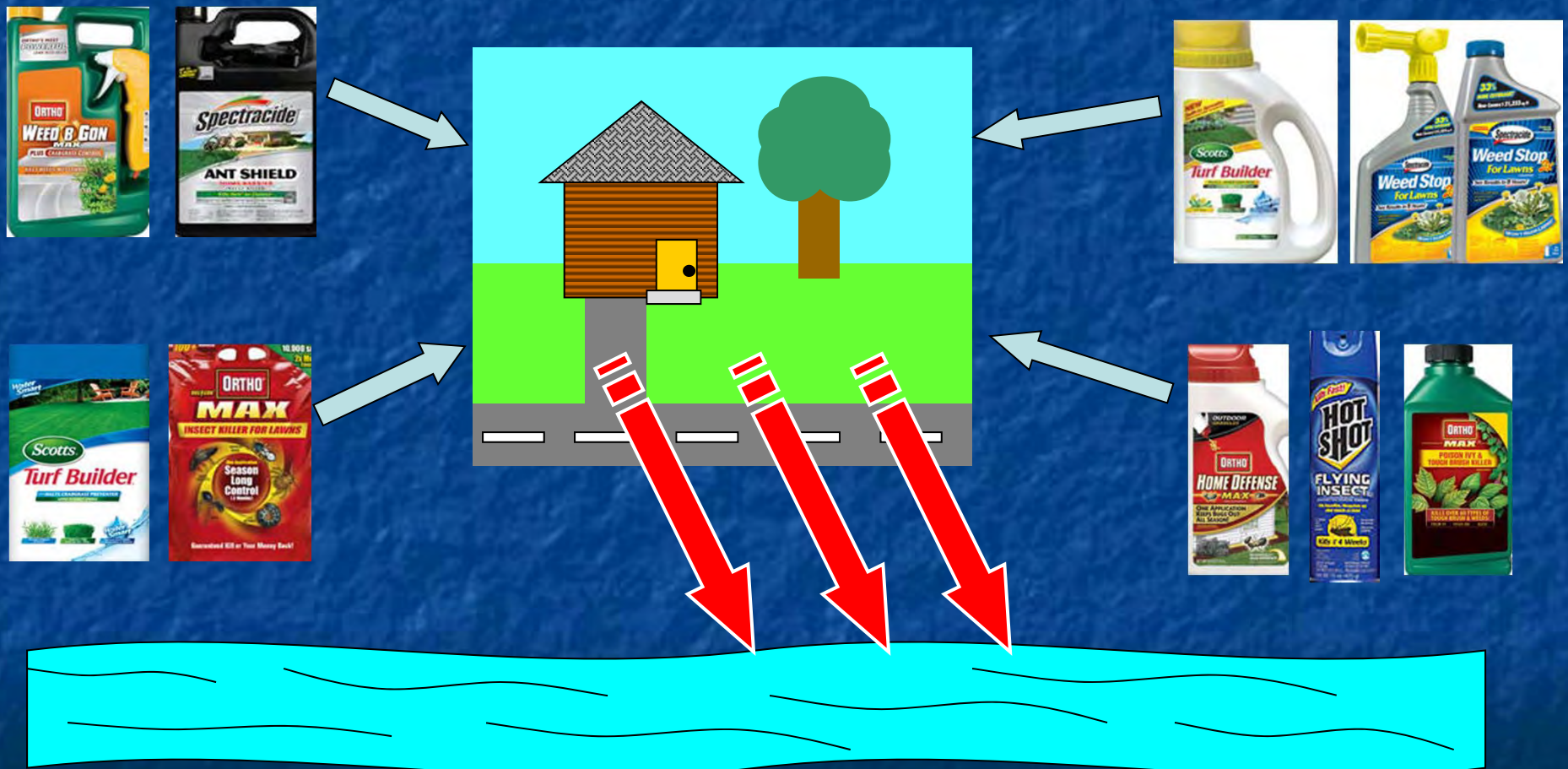




Monitoring Pesticides in Urban Runoff in California

Robert Budd, PhD
Environmental Monitoring Branch
Department of Pesticide Regulation

Objective 1: What Pesticides are in Urban Surface Waters?



Objective 2: Seasonal Differences



Dry Season



Storm Event

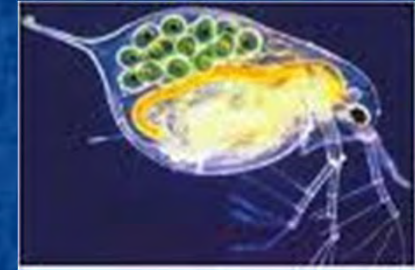
Objective 3: Toxic to Aquatic Species?



Dinoflagellates



Euglenozoans



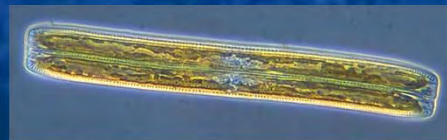
Hyalella



Rainbow Trout



Green algae

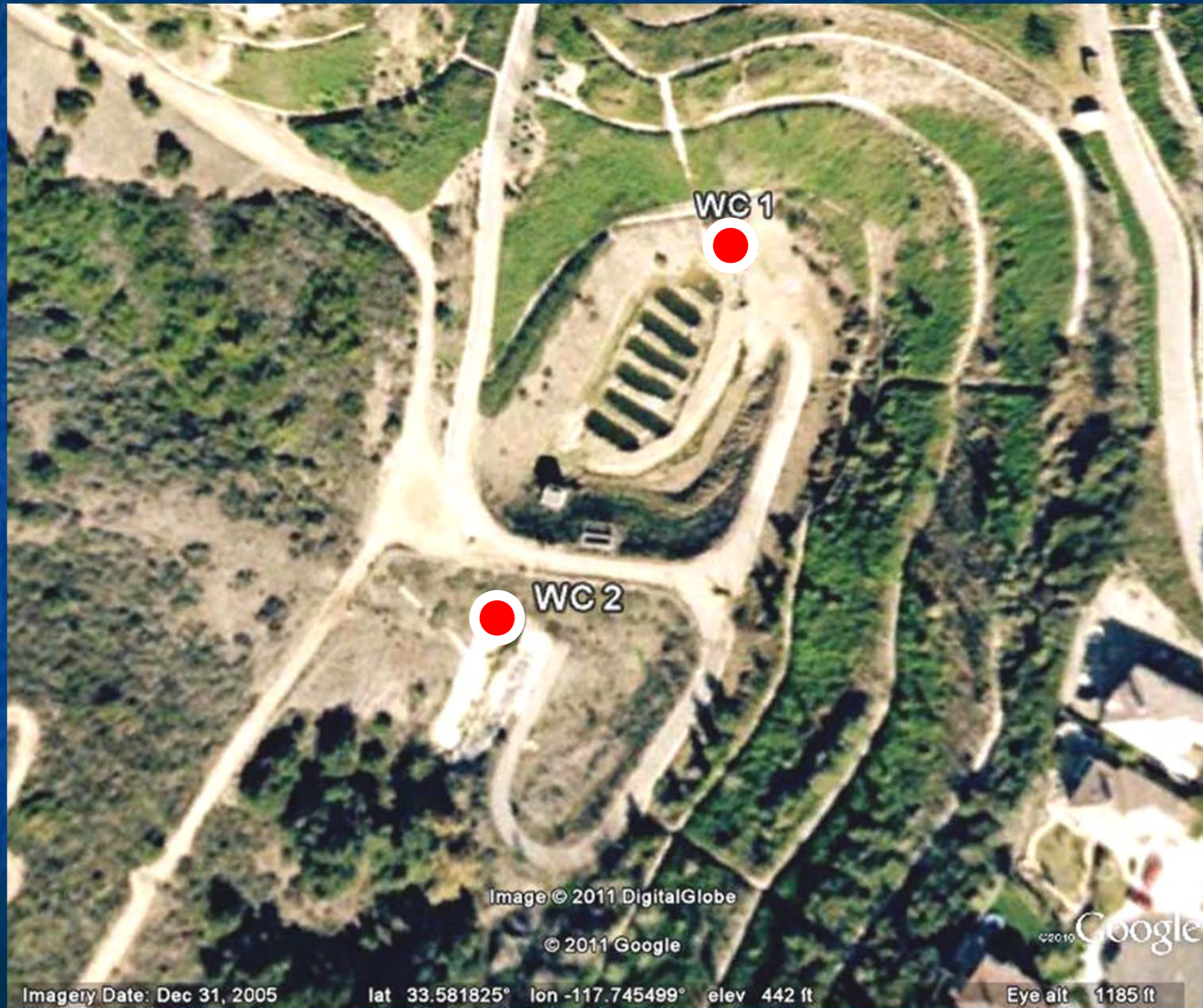


Diatoms



Ceriodaphnia

Objective 4: Mitigation Measures





Flow Paths



Monitoring Plan

- 2 Dry Season Events [May – Sept]
- 2 Storm Events [Oct – Apr]
- Water samples at 9 locations
- Sediment samples during dry events



Sampling Methods



Pesticide Analysis

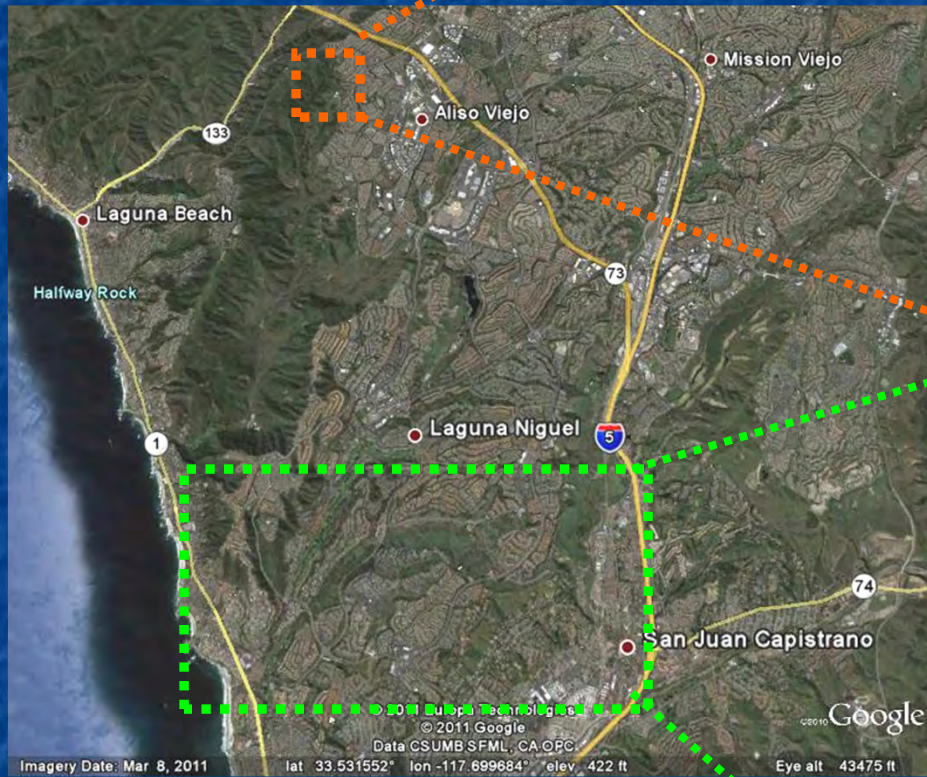
Insecticides

- Carbamates – Carbaryl
- Fipronil + Degradates
- Neonicotinoids – Imidacloprid (SoCal)
- Organophosphates
 - Chlorpyrifos, Diazinon, Dimethoate, Malathion, Methidathion
- Pyrethroids
 - Bifenthrin, λ -Cyhalothrin, Cyfluthrin, Cypermethrin, Deltamethrin, Fenpropathrin, Esfenvalerate, Permethrin, Resmethrin

Herbicides

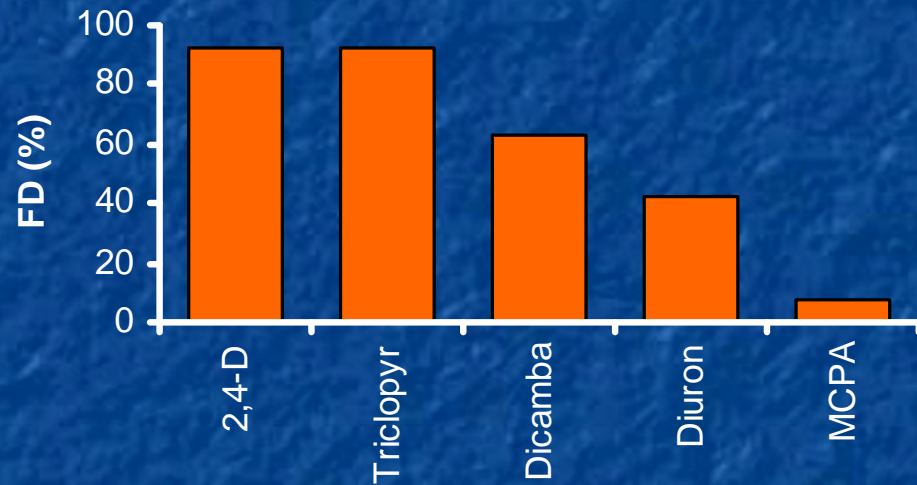
- Synthetic Auxins
 - 2,4-D, Dicamba, MCPA, Triclopyr
- Photosynthesis Inhibitors
 - Bromacil, Diuron, DACT, Hexazinone, Simazine

Southern California Sampling Locations

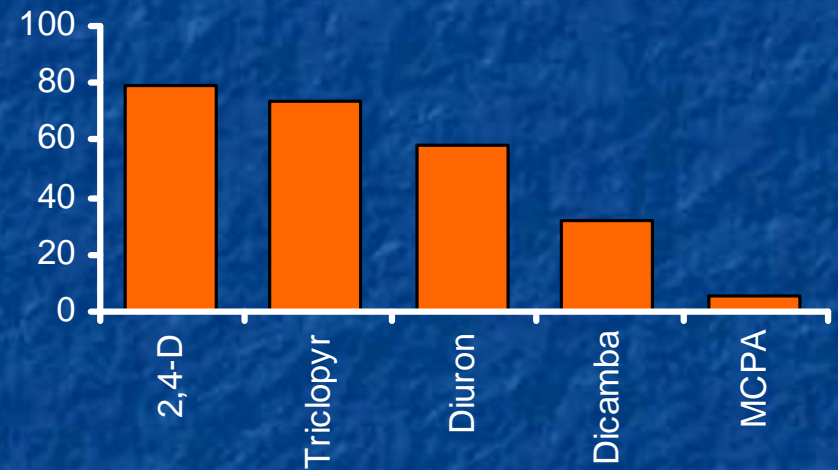


Study 270

Detected Herbicides



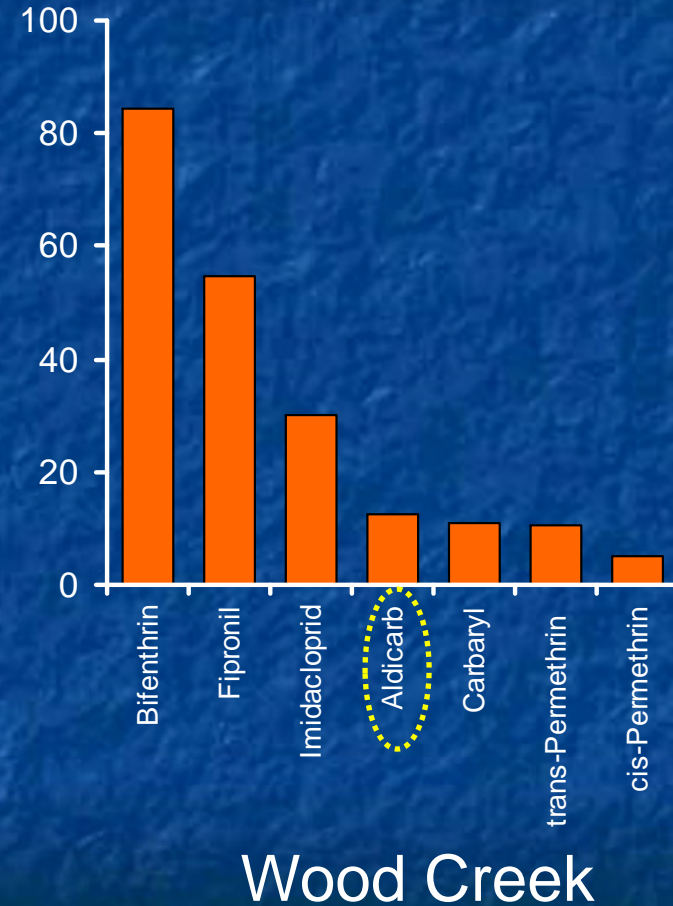
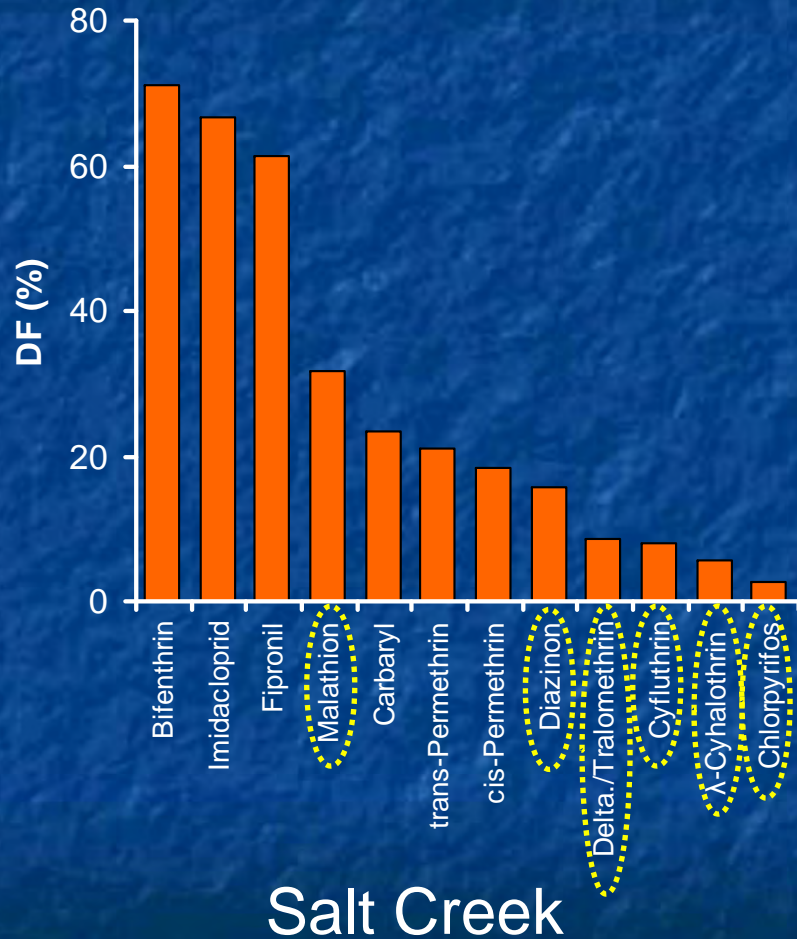
Salt Creek



Wood Creek

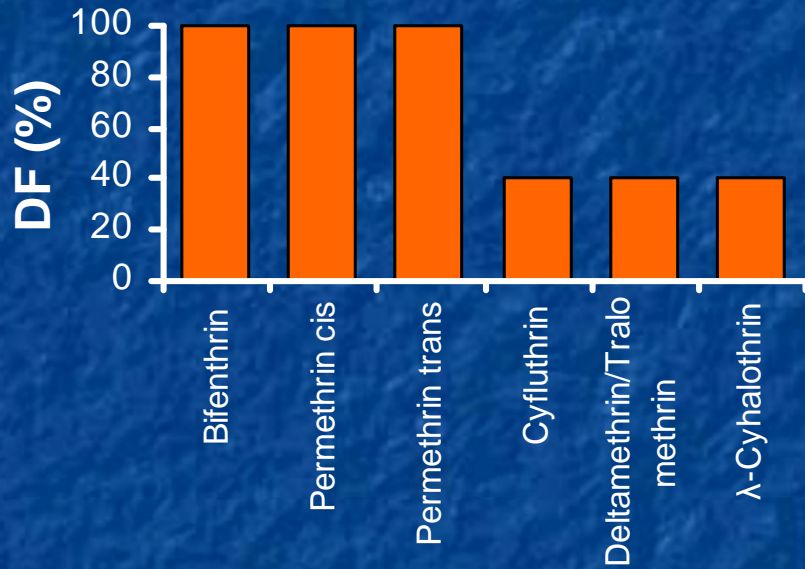
* Does not include Trace detections*

Detected Insecticides

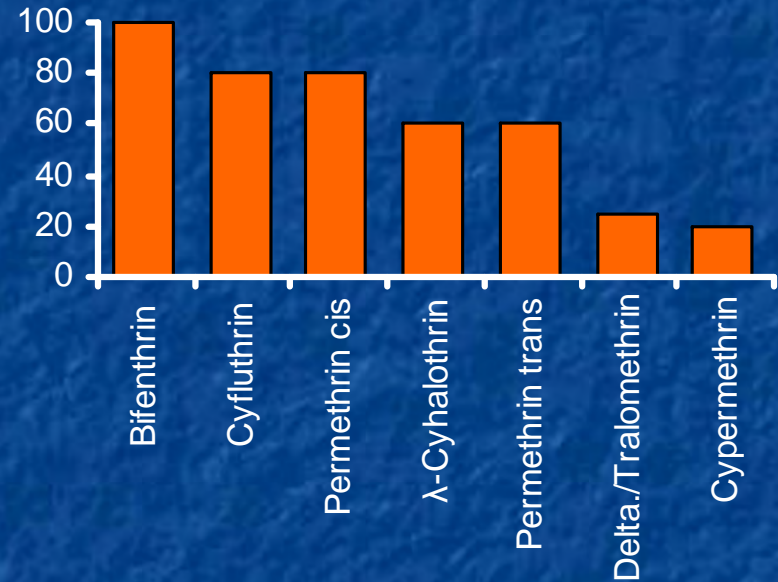


* Does not include Trace detections*

Pyrethroids in Sediment



Salt Creek



Wood Creek

Salt Creek

Analyte Name	Minimum Benchmark*	Median	Max	% Above Aquatic Benchmark
Fipronil	0.011	0.07	0.6	82
Fipronil sulfone	0.037	0.07	0.3	77
Bifenthrin	1.3	8.1	70	76
Malathion	0.035	nd	4.1	34
Permethrin (cis)	1.4	nd	260	29
Permethrin (trans)	1.4	nd	351	29
Cyfluthrin	7	nd	27	16
λ -Cyhalothrin	2	nd	15	8
Carbaryl	0.5	nd	0.5	3
Chlorpyrifos	0.04	nd	0.1	3
Diazinon	0.11	nd	0.1	3
Fipronil sulfide	0.11	trace	0.01	0
Imidacloprid	1.05	0.06	0.7	0
Dicamba	61	0.07	1.2	0
MCPA	170	nd	7.3	0
Triclopyr	100	0.15	1.1	0
Diuron	2.4	nd	0.3	0

* Pyrethroids (ppt) all others ppb

Wood Creek

Analyte Name	Minimum Benchmark	Median	Max	% Above Aquatic Benchmark
Bifenthrin	1.3	14	134	89
Fipronil	0.011	0.1	0.3	73
Fipronil sulfone	0.037	0.1	0.1	68
Permethrin (trans)	1.4	nd	311	17
λ -cyhalothrin	2	nd	7	11
Permethrin (cis)	1.4	nd	217	6
Aldicarb	0.46	nd	0.2	0
Carbaryl	0.5	nd	0.4	0
Fipronil sulfide	0.11	trace	0.01	0
Imidacloprid	1.05	nd.5	0.1	0
Dicamba	61	nd	0.1	0
MCPA	170	nd	0.1	0
Triclopyr	100	0.1	0.9	0
Cyfluthrin	7	nd	3	0
Diuron	2.4	0.07	0.4	0

* Pyrethroids (ppt) all others ppb

Questions?

