

Stream Pollution Trends Monitoring Program (SPoT)



SWAMP Collaborations with DPR

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SPoT – General Design

- Directed design focusing on sediment contaminants and toxicity to *Hyalella azteca* (*Chironomus dilutus* added at urban sites in 2015)
- SPoT integrator sites are located at the base of the watersheds to capture influence of land use.

Sites	50 Annually
	50 Bi-Annually
Toxicity	<i>Hyalella azteca</i> (100)
	<i>Chironomus dilutus</i> (40)
Cold Toxicity	<i>Hyalella azteca</i> (25)
Pyrethroids	All
Fipronil, PAHs, PBDEs	40 Tier II (Urban)
OCs, PCBs, OPs, Metals	50 Bi-Annually
Microcystin	All



Stream Pollution Trends monitoring program (SPoT/DPR)

- Pyrethroid label restrictions implemented for commercial and residential applications by DPR in 2012
- DPR (Robert & Michael) and SPoT initiated collaborative monitoring to assess trends in pyrethroid pesticide concentrations in sediments: four urban sites monitored since spring 2013
- Goal: Evaluate the effectiveness of 2012 pyrethroid regulations for professional applicators, and provide additional trend information at a higher resolution (4x per year).
- Analyses include pesticide chemistry in sediments (DPR), additional analytes (SWAMP), and toxicity testing
- SPoT contacts: Brian Anderson/Bryn Phillips (UC Davis)



Intensive Sampling Study - DPR

- Four Urban sites chosen for intensive monitoring starting in 2013 (each sampled 4x per year):
 - Kirker Creek – Region 2 – SPoT site
 - Pleasant Grove Creek – Region 5 – DPR site
 - Bouquet Canyon Creek – Region 4 – SPoT site
 - Salt Creek – Region 9 – DPR site
- Previously, these sites have exhibited significant toxicity and toxic concentrations of pyrethroid pesticides.
- Fipronil and degradates included as emerging pesticide of concern (DPR funds 10 SPoT sites)



Kirker Creek (207KIR020)

Year	Percent Survival	Sum Pyrethroids (ng/g)	Sum Fipronil (ng/g)
2008	93	4.45	
2010	34	91.3	
2011	86	32.1	
2012	86	2.04	
2013 A	86	19.8	1.30
2013 B	100	17.8	4.52
2013 C	92	7.92	3.94
2013 D	89	29.9	5.94
2014 A	101	22.5	2.17
2014 B	82	Data Pending	3.24
2014 C	91	Data Pending	4.37
2014 D	59	16.7	3.87

- Pyrethroids – Maintaining historic concentrations.
- Fipronil – No trend and low concentrations.



Pleasant Grove Creek (519SED008)

Year	Percent Survival	Sum Pyrethroids (ng/g)	Sum Fipronil (ng/g)
2013 A	95	1.88	2.76
2013 B	96	0.45	2.70
2013 C	101	1.18	2.60
2013 D	91	0.147	0.18
2014 A	110	0.29	0.70
2014 B	108	Data Pending	2.56
2014 C	103	Data Pending	2.00
2014 D	64	4.16	2.04

- Pyrethroids –
- Fipronil – Consistent detections, but very low concentrations.



Salt Creek (901INTSC5)

Year	Percent Survival	Sum Pyrethroids (ng/g)	Sum Fipronil (ng/g)
2013 A	16	218	34.73
2013 B	28	99.0	19.73
2013 C	26	188	16.24
2013 D	26	245	18.42
2014 A	22	196	25.31
2014 B	31	Data Pending	21.39
2014 C	52	Data Pending	22.21
2014 D	0	264	39.77

- Pyrethroids –
- Fipronil –



Bouquet Canyon Creek (403STCBQT)

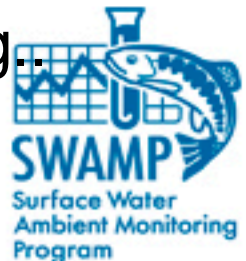
Year	Percent Survival	Sum Pyrethroids (ng/g)	Sum Fipronil (ng/g)
2010	0	1044	
2011	0	1571	
2012	0	1115	
2013 A	0	4254	106
2013 B	0	733	124
2013 C	0	2404	140
2013 D	4	1327	54.1
2014 A	0	1124	167
2014 B	0	Data Pending	288
2014 C	0	Data Pending	171
2014 D	51	26.56	7.48

- Precipitous drop in contaminants at the end of 2014, but sampled after storm event.
- Trend is uncertain.



SPoT/DPR Intensive Site Summary

- Pyrethroids and fipronil (and degradates) were detected in all of the samples.
- No clear reduction in pyrethroids at any sites to date (precipitous drop at Bouquet Canyon might be storm related).
- Preliminary analysis of 2014 data suggest increasing detections and concentrations at all SPoT Tier II sites.
- Concentrations of fipronil at Intensive Sites would be toxic to *Chironomus*.
- Confer in late 2015 for future collaborative monitoring.



Recent SWAMP/DPR Collaborative Monitoring: Agriculture

- DPR agriculture surface water monitoring program (Xin Deng)
- SWAMP regional collaboration in Regions 3 and 7
 - DPR = Sampling and Pesticide Chemistry
 - SWAMP = *Chironomus dilutus* and *Hyalella azteca* 10 d Water Toxicity Testing
 - SWAMP funding provided by Regions 3 and 7

SWAMP toxicity testing provides chronic effects-based measures to complement DPR pesticide data

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Pesticides of “Emerging” Concern

Pyrethroids (e.g., **bifenthrin**) – urban and agriculture

Neonicotinoids (e.g., **imidacloprid**) – agriculture and urban

Organophosphates (e.g., **chlorpyrifos** and **malathion**) – agriculture

Phenylpyrazoles (e.g., **fipronil** and degradates) – urban

Plus - herbicides and fungicides, etc.

Others (?) e.g., flupyradifurone – agriculture and maybe urban?



H. azteca – Sensitive to pyrethroids and some OPs



C. dilutus – Sensitive to neonicotinoids and fipronil

Current Collaborations:

Region 3: 9 collaborative sites in 2014

Region 7: 8 collaborative sites in 2014
9 collaborative sites in 2015

*All data formatted for SWAMP database

Future Collaborations?

Regions 3 and 7?

2016 DPR agriculture monitoring in Region 5?



The End

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