DEPARTMENT OF PESTICIDE REGULATION

AMBIENT MONITORING REPORT

Date: September 9, 2016

1. Study highlights:

- Study Number: 306
- Title: Surface Water Monitoring for Pesticides in Agricultural Areas of Northern California
- Author April R. DaSilva
- Study area:
  - County: Del Norte, Modoc, Siskiyou
  - Waterbody/ Watershed: Smith River and Klamath River Watersheds
- Land Use Type: ☒ Ag ☐ Urban ☒ Forested ☐ Mixed ☐ Other
- Water body type: ☐ Storm drain outfall ☒ Creek ☐ River ☐ Pond ☐ Lake ☒ Drainage ditch ☒ Other: Irrigation district canal
- Objectives: 1. Prioritize pesticide monitoring candidates based on current use reports at the watershed level; 2. Determine the presence and concentrations of prioritized pesticide active ingredients in surface waters in the Smith River and Klamath River watersheds; 3. Analyze chemistry data to evaluate potential impacts on aquatic life
- Sampling period: May 2016 – July 2016
- Pesticides monitored:

  2,4-D, Atrazine, ACET, Benfluralin, Bromacil, Chlorpyrifos, DACT, DEA, Dicamba, Dichlorvos (DDVP), Dimethoate, Disulfoton, Diuron, Ethalfluralin, Ethoprop, Fenamiphos, Hexazinone, Imidacloprid, Malathion, MCPA, Methidathion, Methyl Parathion, Metribuzin, Norflurazon, Oryzalin, Oxyfluorfen, Pendimethalin, Phorate, Prodiamine, Prometon, Prometryn, Simazine, Triclopyr, Trifluralin
- Major findings:

  Water samples collected from Smith River and Tulelake watersheds were monitored for 34 active ingredients (A.I.s), at eight agricultural field sites in May and July of 2016. A.I.s included herbicides and insecticides of high use for these particular areas. Of the herbicides, the most frequently detected were 2,4-D (64%) and dicamba (36%); neither exceeded their lowest U.S. Environmental Protection Agency (USEPA) aquatic benchmark values. Generally, higher concentrations were measured in July compared to May with 2,4-D having higher concentrations than dicamba. Both were most frequently detected among all Tulelake sites. There were no detections of any other herbicides in water collected from any of the sites. Of the insecticides, the most frequently detected was imidacloprid (22%); concentrations did not exceed its benchmark value. Each of the imidacloprid detections were in the Smith River Watershed. There were no detections of any other insecticides in water collected from any of the sites.

2. Pesticide detection frequency

Table 1. Pesticides detected in water. Complete data set in Appendix.

Pesticide	Number of samples	Number of detections	Reporting Limit (µg/L)	Detection frequency (%)	Lowest USEPA benchmark (BM) (µg/L)*		Number of BM exceedances	BM exceedance frequency (%)
2,4-D	14	9	0.05	64	13.1	VA	0	0
Atrazine	13	0	0.05	0	0.001	VA	0	0
ACET	13	0	0.05	0	NA		0	0
Benfluralin	11	0	0.05	0	1.9	FC	0	0
Bromacil	13	0	0.05	0	6.8	NVA	0	0
Chlorpyrifos	6	0	0.01	0	0.04	IC	0	0
DACT	13	0	0.05	0	NA		0	0
DEA	13	0	0.05	0	NA		0	0
Dicamba	14	5	0.05	36	61	NVA	0	0
Dichlorvos (DDVP)	6	0	0.05	0	0.0058	IC	0	0
Dimethoate	6	0	0.04	0	0.5	IC	0	0
Disulfoton	6	0	0.04	0	0.01	IC	0	0
Diuron	13	0	0.05	0	2.4	NVA	0	0
Ethalfluralin	11	0	0.05	0	0.4	FC	0	0
Ethoprop	6	0	0.05	0	0.8	IC	0	0
Fenamiphos	6	0	0.05	0	0.12	IC	0	0
Hexazinone	13	0	0.05	0	7	NVA	0	0
Imidacloprid	9	2	0.05	22	1.05	IC	0	0
Malathion	6	0	0.02	0	0.035	IC	0	0
MCPA	14	0	0.05	0	170	VA	0	0
Methidathion	6	0	0.05	0	0.66	IC	0	0
Methyl Parathion	6	0	0.03	0	0.25	IC	0	0
Metribuzin	13	0	0.05	0	8.7	NVA	0	0
Norflurazon	13	0	0.05	0	9.7	NVA	0	0
Oryzalin	11	0	0.05	0	15.4	VA	0	0
Oxyfluorfen	11	0	0.05	0	0.33	VA	0	0
Pendimethalin	11	0	0.05	0	5.2	NVA	0	0
Phorate	6	0	0.05	0	0.21	IC	0	0
Prodiamine	11	0	0.05	0	1.5	IC	0	0
Prometon	13	0	0.05	0	98	NVA	0	0
Prometryn	13	0	0.05	0	1.04	NVA	0	0
Simazine	13	0	0.05	0	2.24	NVA	0	0
Triclopyr	14	0	0.05	0	4100	NVA	0	0
Trifluralin	11	0	0.05	0	1.14	FC	0	0

*FA, fish acute; FC, fish chronic; IA, invertebrate acute; IC, invertebrate chronic; NVA, non-vascular acute; VA, vascular acute; NA, benchmark not available

3. Laboratory QC summary

QC Type		Water Samples		Sediment Samples	
		Total Number	Number of QC out of contro1	Total Number	Number of QC out of control
Lab Blanks		9	0	NA	NA
Matrix Spikes/Duplicates		9	0	NA	NA
Laboratory Control Spikes/Duplicates		0	0	NA	NA
Blind Spikes		5	0	NA	NA
Surrogate Spikes		13	0	NA	NA
Other QC:	Describe	NA	NA	NA	NA
Other QC:	Describe	NA	NA	NA	NA
Explain out of control QC and interpretation of data:		DEA - out of control range but within on-going control range (63.9%-119%); All QC recoveries were acceptable.			

4. Supporting Information

Index of Supporting Information

Appendix I. Study protocol
Appendix II. Sampling site information and pictures
Appendix III. Water quality data
Appendix IV. Water monitoring data
Appendix V. Analytical methods