

Overview of DPR's Analysis of Irrigation-Season Diazinon Use & Monitoring Data



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Background

- Analysis has been ongoing @ DPR
- Region 3 officially submitted a letter of determinations to DPR in 10/08
- Sped up DPR's analysis
- Keith Starner (EM Staff Env. Scientist) – primary author/researcher
- Today's presentation is based on Keith's analysis

Diazinon

- Organophosphorus (OP) pesticide
 - In 2007 – 345,000 lbs. a.i. used
 - By 2004 – sales of outdoor urban use products ceased
 - Ag. Use (dormant sprays + in-season) continues
 - DPR placed dormant spray products into “reevaluation” & also established “dormant spray regulations”
 - In-Season use still common throughout CA

Analysis Objective

- Assess recent surface water monitoring data from ag. areas in CA to determine the extent of off-site movement of diazinon into surface water during the irrigation season

Materials & Methods

- Use DPR's Pesticide Use Reporting database to define seasonal use
 - Spring, Summer, Fall, Winter
 - 2003-2007 diazinon data
- Develop ag. use regional maps to calc. “use density” & “use ranks”
 - 9 use regions identified & used in analysis
 - Use ranks are relative (very low to very high)

Materials & Methods (cont.)

- Screened DPR's surface water database for relevant diazinon monitoring data
 - no sampling sites outside of ag. use areas
 - no sampling sites from urban areas
 - no sites from dormant-use areas in winter
- Compared w/ diazinon aquatic toxicity criteria, WQOs, & benchmarks to assess significance of detections

Table 1. Diazinon Aquatic Life Criteria and Benchmarks

<u>Diazinon Toxicity Value/Benchmark (ug/L)</u>	<u>Concentration</u>
CDFG Aquatic Life Criteria for FW - chronic (Region 9)	0.05
CDFG Aquatic Life Criteria for FW - acute (Region 9)	0.08
Recalculated CDFG Aquatic Life Criteria for FW - chronic (Region 5)	0.1
UCD Methodology Aquatic Life Criteria for FW - chronic (Region 5)	0.1
EPA Draft Aquatic Life Criteria for FW - chronic	0.1
EPA Draft Aquatic Life Criteria for FW - acute (Region 2)	0.1
US EPA acute invertebrate benchmark	0.105
Recalculated CDFG Aquatic Life Criteria for FW - acute (Region 5)	0.16
US EPA OW Aquatic Life Criteria (CMC) - acute	0.17
US EPA OW Aquatic Life Criteria (CCC) - chronic	0.17
UCD Methodology Aquatic Life Criteria for FW - acute (Region 5)	0.2

Figure 1. Regions of Agricultural Diazinon Use.

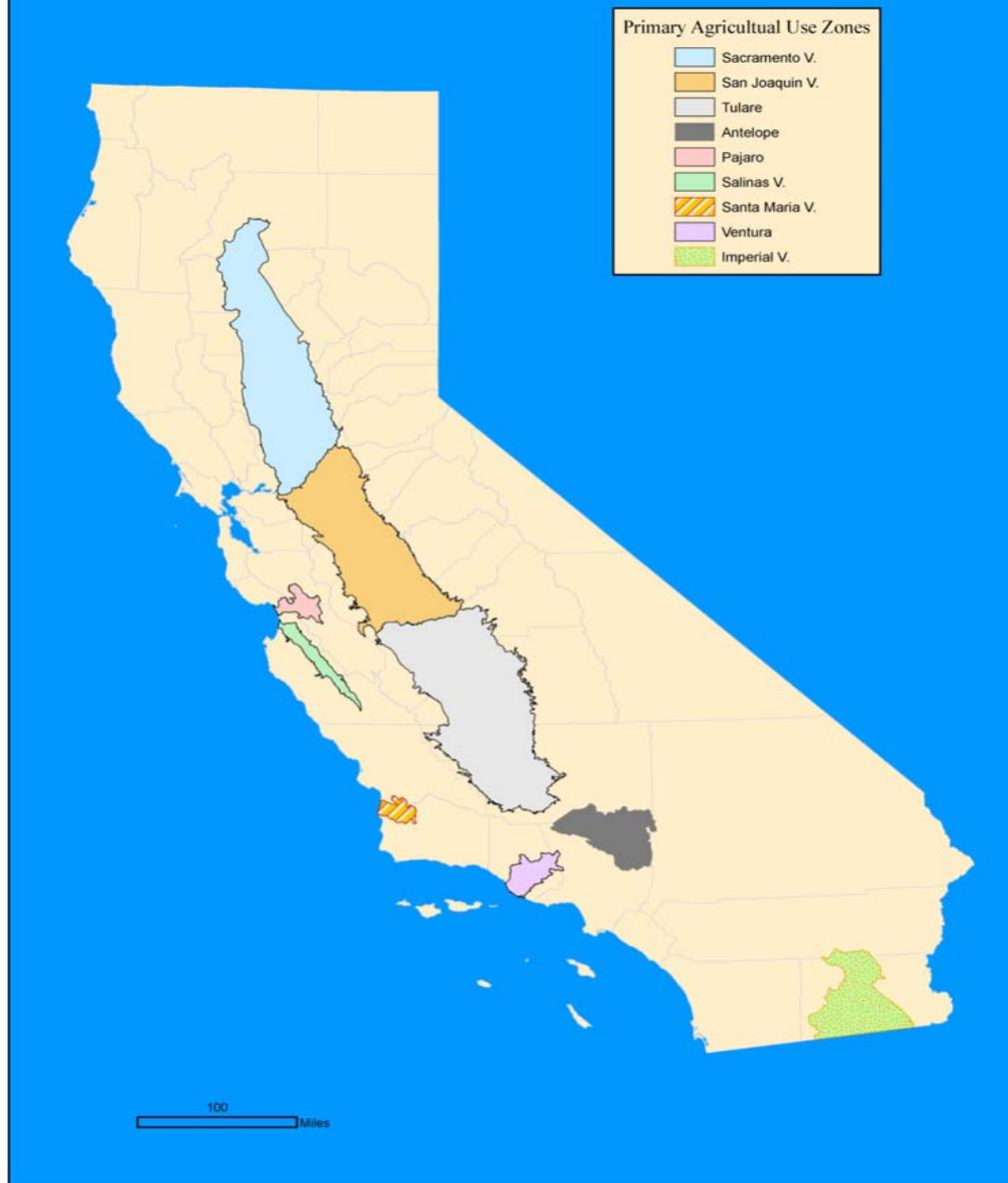


Figure 2. Average Diazinon Agricultural Use, Spring (March - May), 2003-2007. Use is in pounds of active ingredient.



Figure 3. Average Diazinon Agricultural Use, Summer (June - August), 2003-2007. Use is in pounds of active ingredient.

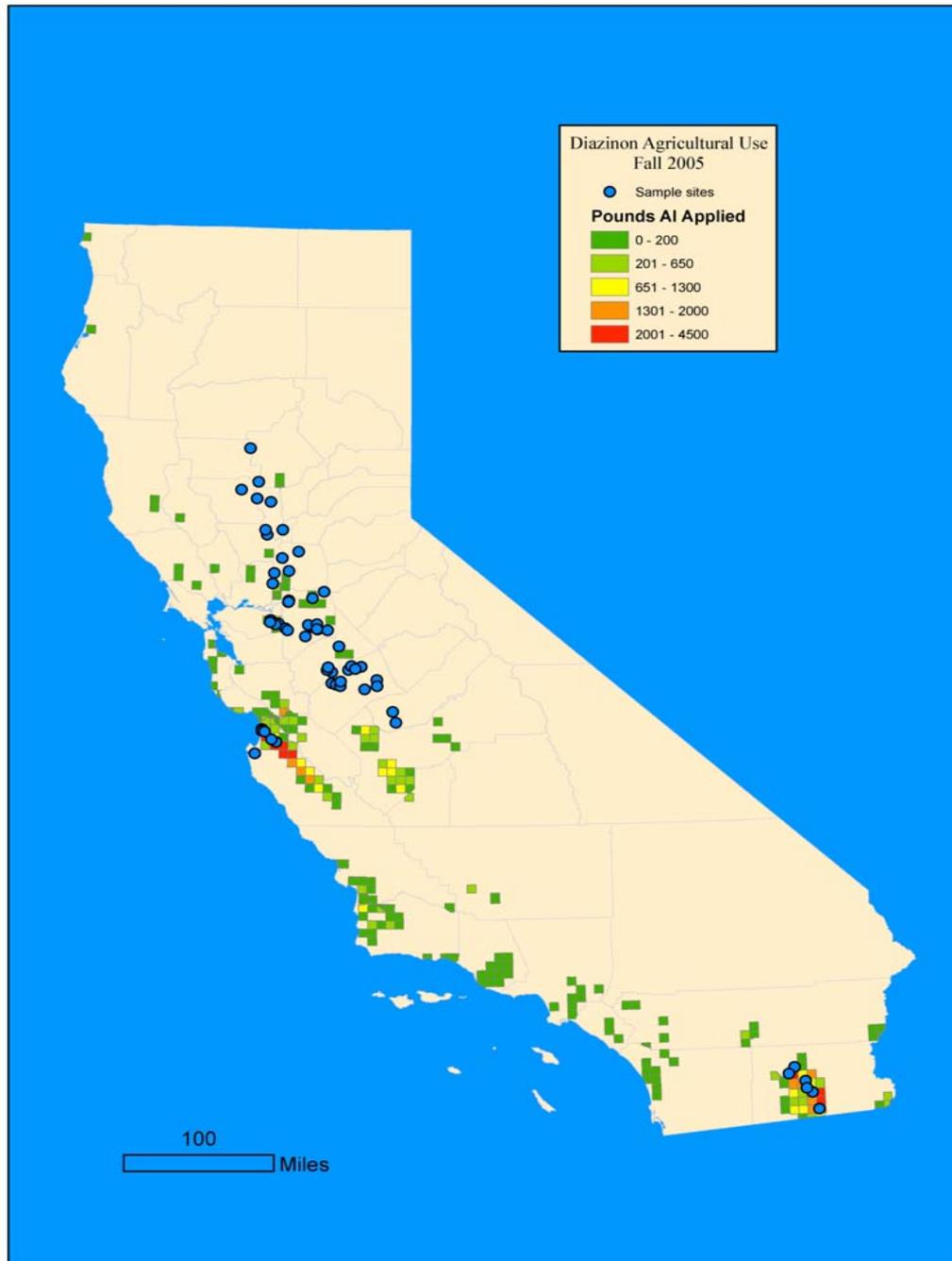


Figure 4. Average Diazinon Agricultural Use, Fall (September - November), 2003-2007. Use is in pounds of active ingredient.



Figure 5. Average Diazinon Agricultural Use, Winter (December - January) 2003-04 through 2006-07. Central Valley use not shown.





Use Observations

- Salinas Valley saw majority of diazinon use for all seasons
- Salinas Valley ~50% of use in spring & summer
- Imperial Valley ~40% of diazinon use in fall
- Pajaro region use ~15% of spring & summer use
- 9 selected regions ~ 96% of diazinon use statewide

Monitoring Data

- 4,500 samples from ~600 sites included in initial diazinon data set
- Screening resulted in ~2,660 sample results
 - Most from SJV > SacValley > Salinas > Tulare...
 - Some areas had limited # of samples
- Subset contained detections > reporting limit
- Analysis memo contains more detailed discussion of region-specific results

Overview of Diazinon Analysis Results

Very High

High

Moderate

Low

Very Low

Total Number of Samples (includes both river and tributary samples)

Season	Salinas	Pajaro	Sac V	SJV	Tulare	Imperial	S Maria	Ventura	Antelope
Spring	112	7	250	471	11	29	14	4	0
Summer	158	14	212	900	77	0	9	0	0
Fall	102	4	66	102	6	37	26	0	0
Winter	38	0	NI	NI	NI	0	10	0	0

Years of Monitoring Data

Season	Salinas	Pajaro	Sac V	SJV	Tulare	Imperial	S Maria	Ventura	Antelope
Spring	5	3	5	5	2	5	1	1	0
Summer	4	3	5	5	4	0	2	0	0
Fall	6	3	5	5	2	5	3	0	0
Winter	4	0	NI	NI	NI	0	1	0	0

Detection Frequency (%)

Season	Salinas	Pajaro	Sac V	SJV	Tulare	Imperial	S Maria	Ventura	Antelope
Spring	98	86	15 (25)	9 (19)	9	3	71	100	---
Summer	94	64	7	6	1	---	57	---	---
Fall	93	75	5	3	0	97	42	---	---
Winter	84	---	NI	NI	NI	---	---	---	---

Values in parentheses include trace detections.

Exceedance Frequency of US EPA Water Quality Criteria of 0.16 ug/L (%)

Season	Salinas	Pajaro	Sac V	SJV	Tulare	Imperial	S Maria	Ventura	Antelope
Spring	63	0	<1	<1	0	0	7	25	---
Summer	47	7	<1	1	0	---	29	---	---
Fall	43	0	0	0	0	65	15	---	---
Winter	24	---	NI	NI	NI	---	0	---	---

Conclusions

- Diazinon is frequently detected in areas w/ at least moderate irrigation-season ag. use
- Detections occur most frequently in areas w/ very high use
- Concentrations are frequently exceed aquatic life thresholds & may be negatively impacting sensitive aquatic organisms