



Department of Pesticide Regulation



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MEMORANDUM

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SUBJECT: STUDY GW06—SUMMARY OF RESULTS FOR FISCAL YEAR 2005—2006
GROUND WATER PROTECTION LIST MONITORING FOR ALDICARB

SUMMARY

Aldicarb was chosen for monitoring from the active ingredients (AIs) on the Ground Water Protection List (GWPL). Forty-seven wells were sampled in eight counties during February through May 2006. No residues of aldicarb or its degradates, aldicarb sulfone, and aldicarb sulfoxide, were detected in any of the wells.

BACKGROUND

The Department of Pesticide Regulation's (DPR's) GWPL is a list of pesticides having the potential to pollute ground water. Pursuant to California Food and Agricultural Code (FAC) section 13143, companies seeking to register an agricultural use pesticide containing a new AI must send DPR certain chemical and environmental fate data. If these data exceed certain key values and the pesticide label specifies certain application methods, FAC section 13144 requires DPR to add the pesticide to GWPL. GWPL is contained in the Title 3, California Code of Regulations section 6800. FAC section 13148 requires DPR to monitor pesticides on GWPL to "more accurately determine the mobility and persistence of the pesticides" and "determine if these pesticides have migrated to groundwaters of the state." Since 1990, DPR has sampled approximately 1100 wells for 81 pesticides and pesticide breakdown products as part of GWPL monitoring (CDPR, 2007a). The systemic insecticide aldicarb was selected for monitoring during fiscal year 2005—2006, based on procedures described in Troiano (1997). These herbicides were selected based on the availability of a combined laboratory analysis method and trends in reported use.



METHODS

DPR chose study sections based on soil vulnerability and the pounds of AI applied as reported in the Pesticide Use Reports (CDPR, 2007b). These sections were further prioritized based on the presence of wells in the area according to our well inventory database (CDPR, 2007a). Areas with clusters of high use sections, based on use for reporting years 1992–2003, were considered first (Table 1). DPR has classified many sections within the state as ground water protection areas (GWPAs) because they are more vulnerable to pesticide contamination of the ground water based on either (1) soil conditions and the depth to ground water less than 70 feet or (2) the presence of verified pesticide residues in the ground water of the section (Troiano et al., 2000). For this study, the majority of the sections with a high use of aldicarb were located outside of these GWPAs. As a result, areas of high aldicarb use and with ground water depths that were less than 100 feet and a record of available wells were given highest priority. The sampled sections were located in Colusa, Fresno, Glenn, Kings, Madera, Merced, Tulare, and Yolo counties (Table 2).

Table 1. Counties with the highest use of aldicarb for reporting years 1992–2003 (CDPR, 2007b).

Aldicarb	
County	Pounds AI
Fresno*	1,099,779
Kings*	974,679
Kern	796,321
Tulare*	516,447
Merced*	323,205
Madera*	143,089
Imperial	59,903
Yolo*	48,155
Colusa*	28,839
Solano	18,559
San Joaquin	15,605
Riverside	9,761
Modoc	9,623
Sutter	8,703
Sacramento	7,839
Glenn*	4,171
Siskiyou	4,132
Butte	3,509
Monterey	3,291
Santa Clara	1,704

* Sampled counties

Table 2. Sections containing wells sampled during 2005–2006 GWPL monitoring. Pounds of aldicarb applied in each section and the total for the 9-section area (sampled section and the surrounding 8 sections) are given for reporting years 1992–2003 (DPR, 2007b). Depth to ground water values are from Troiano et al. (2000).

County	Section	Depth to ground water (ft)	Pounds of aldicarb applied	
			In section	In 9-section
Colusa	06M13N01W08**	22	427	685
	06M14N02W23	32	522	1,639
	06M14N03W01	36	552	2,066
	06M15N04W14	7	224	1,490
Fresno	10M13S17E31	88	0	9,097
	10M14S17E05	80	2,348	9,242
	10M14S17E11	93	2,744	6,020
	10M15S16E11**	46	1,443	5,647
	10M15S17E30	75	2,432	17,967
	10M17S19E34**	104	1,849	9,322
	10M17S20E23**	68	1,726	2,815
Glenn	11M18N04W13**	12	1,158	1,293
Kings	16M17S22E29	52	3,850	17,807
	16M17S22E32	59	3,678	18,388
	16M18S20E28	59	2,678	26,829
	16M18S20E36	25	1,883	15,868
	16M18S21E14	71	1,986	14,940
	16M18S21E21	46	2,360	12,641
	16M18S22E13**	73	5,762	28,264
	16M18S22E28	86	2,360	13,675
	16M18S22E29	90	4,258	11,022
	16M19S22E07	88	2,981	11,169
	16M19S22E14	84	6,243	18,853
	16M19S22E30	90	3,380	16,449
Madera	20M10S15E22	91	2,072	5,848
	20M10S16E07	107	1,760	4,125
	20M11S17E31	81	1,399	1,399
	20M11S17E36	85	1,607	1,607
Merced	24M08S13E16**	22	3,058	6,430
	24M08S13E21	30	1,987	10,043
	24M10S10E04	10	357	9,756
	24M10S10E10	10	1,528	3,883
	24M10S10E24	10	1,319	8,506
	24M10S10E27	10	2,738	10,090
	24M11S10E01	10	2,002	6,904
	24M11S10E23	48	5,159	20,270
Tulare	54M18S25E26	44	1,843	3,798
	54M18S26E11*	23	2,879	2,879
	54M18S27E07*	26	5,566	8,601

County	Section	Depth to ground water (ft)	Pounds of aldicarb applied	
			In section	In 9-section
Tulare	54M19S25E15	47	1,965	4,858
	54M20S24E30	67	2,702	12,780
	54M21S26E01*	25	637	10,575
	54M21S27E07*	27	4,410	10,692
Yolo	57M09N01E19	9	1,136	3,853
	57M10N01W04	28	759	4,543
	57M10N01W05	35	1,058	3,789
	57M10N01W15**	26	1,090	3,419

*Section is a GWPA. **Section is adjacent to a GWPA.

DPR selected domestic wells for sampling according to procedures in SOP FSWA006.00 (Marade, 1998), with the goal of sampling at least one well in each selected section. If no suitable well could be located within a target section, a well within 0.2 miles of the target section could be sampled. Samples were collected using the methods described in SOP FSWA001.00 (Marade, 1996). DPR obtained information regarding the well construction and depth from the well owner. When possible, the sampling crew measured the depth to water using a Slope Water Level Indicator model WLI#51690030 meter.

The California Department of Food and Agriculture's Center for Analytical Chemistry analyzed one primary sample from each well for aldicarb, aldicarb sulfone and aldicarb sulfoxide. Samples containing known amounts of these compounds and disguised as actual samples (blind spikes) were prepared and analyzed in accordance with SOP QAQC001.00 (Segawa, 1995). Samples containing deionized water (field blanks) were collected at the same time as the field samples and would have been analyzed to confirm the validity of positive results. The reporting limit for all analytes was 0.05 parts per billion. The reporting limit is the smallest amount that can be reliably detected and is set by the testing laboratory for each compound.

RESULTS

A total of 47 wells in 47 sections were sampled in 8 counties, with no reported detections of aldicarb, aldicarb sulfoxide, or aldicarb sulfone. Aldicarb use for the years 1992–2003, GWPAs and the locations of wells sampled for this study are shown in figure 1.

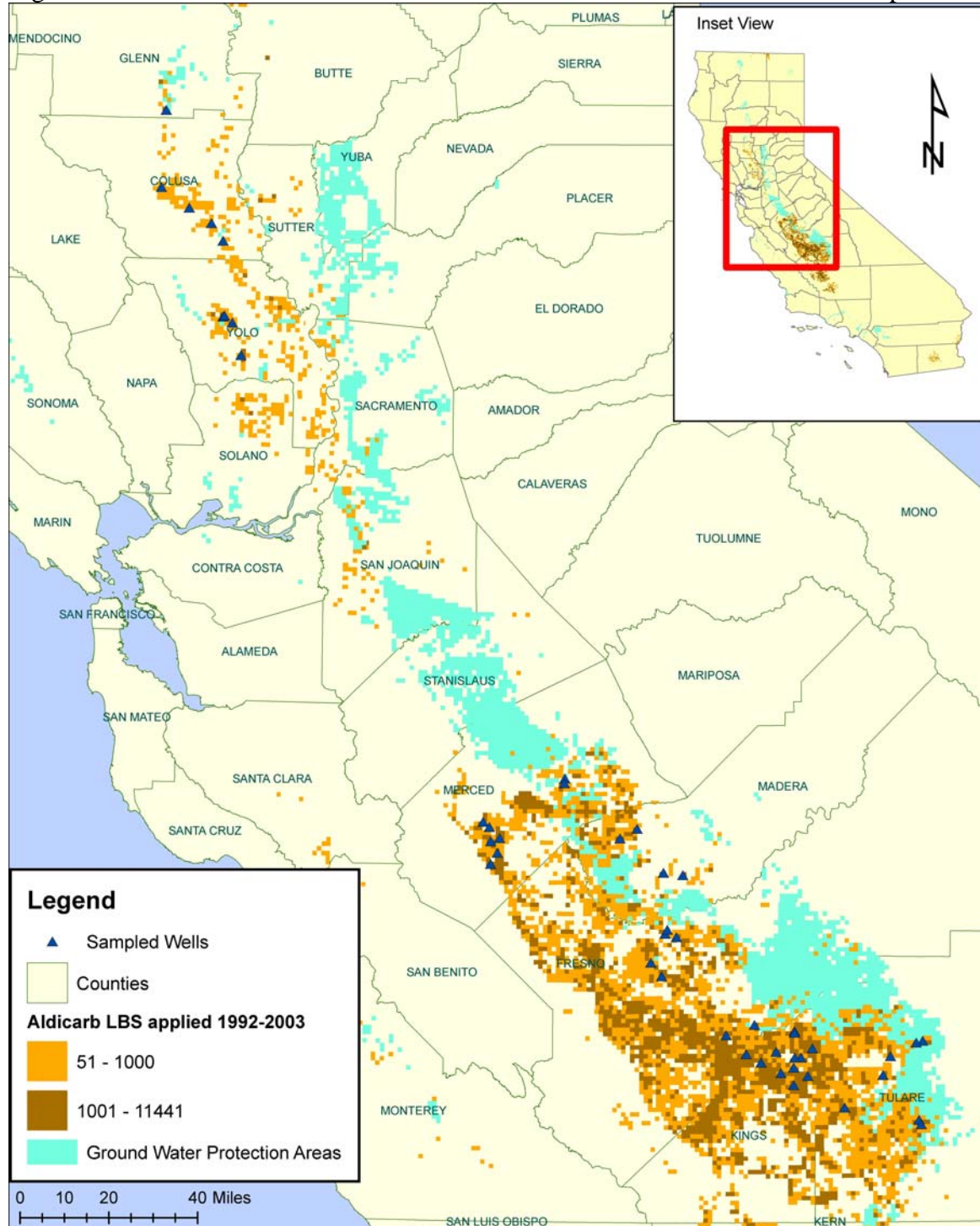
DISCUSSION

Aldicarb is a soil applied insecticide, nematicide, and miticide. In California, it is primarily (95%) used on cotton although there are 25 other crops that have reported some use for the period 1992–2003.

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None of the 47 sampled wells tested positive for either aldicarb, or its degradates, despite being located in high-use sections with shallow depths-to ground water. The results of this monitoring study indicates that aldicarb, at current use levels and practices, has a low potential for contaminating California ground water due to legal agricultural use in vulnerable areas. If aldicarb use levels increase or practices change in the future, DPR may conduct further studies.

Figure 1. Total California aldicarb use 1992–2003 and the locations of wells sampled.



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