Rice Pesticide Use and Surface Water Monitoring 2002

Report to the California Regional Water Quality Control Board

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Introduction

The Department of Pesticide Regulation (DPR) implemented the Rice Pesticides Program in 1983 to reduce discharges into surface waterways of the rice herbicides molinate (Ordram®) and thiobencarb (Bolero® and Abolish®). In 1990, the objectives of these control efforts were expanded, following the adoption of amendments to the Central Valley Regional Water Quality Control Board's (CVRWQCB) Water Quality Control Plan (Basin Plan). This plan established performance goals for molinate and thiobencarb beginning in 1990, and the insecticides methyl parathion and malathion beginning in 1991.

Water samples are collected yearly during the rice pesticide application period (usually from April-July) at the Colusa Basin Drain at Highway 20 (CBD5) in Colusa County, Butte Slough at Lower Pass Road (BS1) in Sutter County, and from a site on the Sacramento River at the Village Marina (SR1). In addition, the City of Sacramento monitors for the presence of molinate and thiobencarb at the City of Sacramento drinking water intake (SRR) during the same time period. Additionally in 2001, water samples were collected at the City of West Sacramento's drinking water intake (WSR) and analyzed by the City of Sacramento's Water Quality Laboratory via a cooperative agreement between the two cities.

The following summary describes the factors affecting the presence of molinate, thiobencarb, methyl parathion, and malathion in agricultural drains and the Sacramento River and efforts to meet the performance goals in 2002. Other rice pesticides discussed include propanil (Propanil-4®, Wham E-Z®, Super Wham®), triclopyr (Grandstand®), diflubenzuron (Dimilin®), lambda cyhalothrin (Warrior®), cyhalofop butyl (Clincher®), and herbicides that are proposed for possible future registration in California for use on rice.

2002 RICE PESTICIDES PROGRAM REVIEW

County agricultural commissioners (CACs), with the use of restricted materials permits, implemented program requirements for molinate, thiobencarb, methyl parathion, and malathion in 2002. A description of the 2002 rice pesticide program requirements can be found in the guidelines provided to the CACs by the Director of DPR in a memorandum dated March 8, 1995 (Appendix 1). Additional permit conditions were added for seepage control in 2002. The remaining permit conditions were determined adequate for use in 2002 and were unchanged (Appendix 2).

Water Hold Requirements

Rice growers are required to hold water on their fields following application of rice pesticides (Appendix 2) that have been shown to be toxic to aquatic organisms and to ensure established water quality targets such as Maximum Contaminant Levels (MCLs) are protected. Holding periods allow for degradation of pesticides to occur, reducing concentrations contained in rice field runoff that enters waterways adjacent to treated fields. The standard molinate holding period remained 28 days in 2002. The holding period for granular thiobencarb (Bolero®) remained 30 days, and for liquid thiobencarb (Abolish®) remained 19 days in the Sacramento Valley. Reduced holding periods are allowed for molinate and thiobencarb when they are applied

in water-short areas, when closed water management systems are used, and in hydrologically isolated fields that do not enter adjacent waterways. The holding period for rice fields treated with methyl parathion remained 24 days. Shorter water holding periods are allowed for growers who utilize closed water systems when methyl parathion is applied. The water holding period for malathion remained four days.

In 2001, the CVRWQCB *Resolution No.5-01-074 (16 March 2001),* (Appendix 3), requested that DPR and the California rice industry evaluate and report the feasibility of holding water on rice fields treated with molinate and thiobencarb in the Colusa Basin watershed until June 15. It was hoped that this management measure would minimize discharges when drift and seepage are likely contributors to peak detections and subsequent performance goal violations. DPR concluded that extension of the current water holding periods would not significantly reduce detections of molinate and thiobencarb. The current 30-day holding period for thiobencarb results in less than one percent of the initial concentration persisting in field water. Additionally, 98 percent of molinate concentrations dissipate at the current 28-day hold. The California Rice Commission and University of California rice farm advisors stated that increasing the water holding periods may cause monetary losses due to decreased rice yields. The result of this evaluation can be found in Appendix 3.

Rice Pesticide Use in 2002

CACs located in rice growing counties of the Sacramento Valley keep records of pesticides applied to rice acreage with the use of Notices of Intent (NOIs) and Notices of Application (NOAs). Rice growers submit NOIs to the CACs at least 24 hours prior to application so that CAC staff can observe applications. NOAs are reported 24 hours after application occurs in order that water holding times can be recorded, inspected, and tracked.

There were 544,061 acres of rice planted in the Sacramento Valley in 2002 (Figure 1). This represented an increase of 49,931 acres from 494,130 acres planted in 2001.

There were 213,453 acres reported treated with molinate in 2002, compared to 217,250 acres treated in 2001 in the Sacramento Valley. Thiobencarb use significantly increased from 181,037 acres treated in 2001, to 215,021 acres treated in 2002. Propanil was reported applied to 330,685 acres in 2002 (Table 1), a significant increase from 300,595 acres reported in 2001. Triclopyr treated acres were also significantly higher with 247,262 acres treated in 2002 compared to 197,202 acres treated in 2001. Lambda cyhalothrin was reported applied to 77,499 acres in 2002 compared to 94,513 treated in 2001. Diflubenzuron use decreased from 9,361 acres reported treated in 2002 to 12,114 acres treated in 2001 (Table 2). Cyhalofop butyl (Clincher®) was reported applied to 34,952 acres valley-wide. The total pounds of applied active ingredient for each rice pesticide mentioned above are used in Tables 3 and 4. Pesticide use data in this report is preliminary. PUR data is finalized in the year after it is reported to DPR. Figure 2 shows the spatial use of thiobencarb in the Sacramento Valley.

Figure 1. Rice growing region of the Sacramento Valley and total rice acreage planted in 2002.

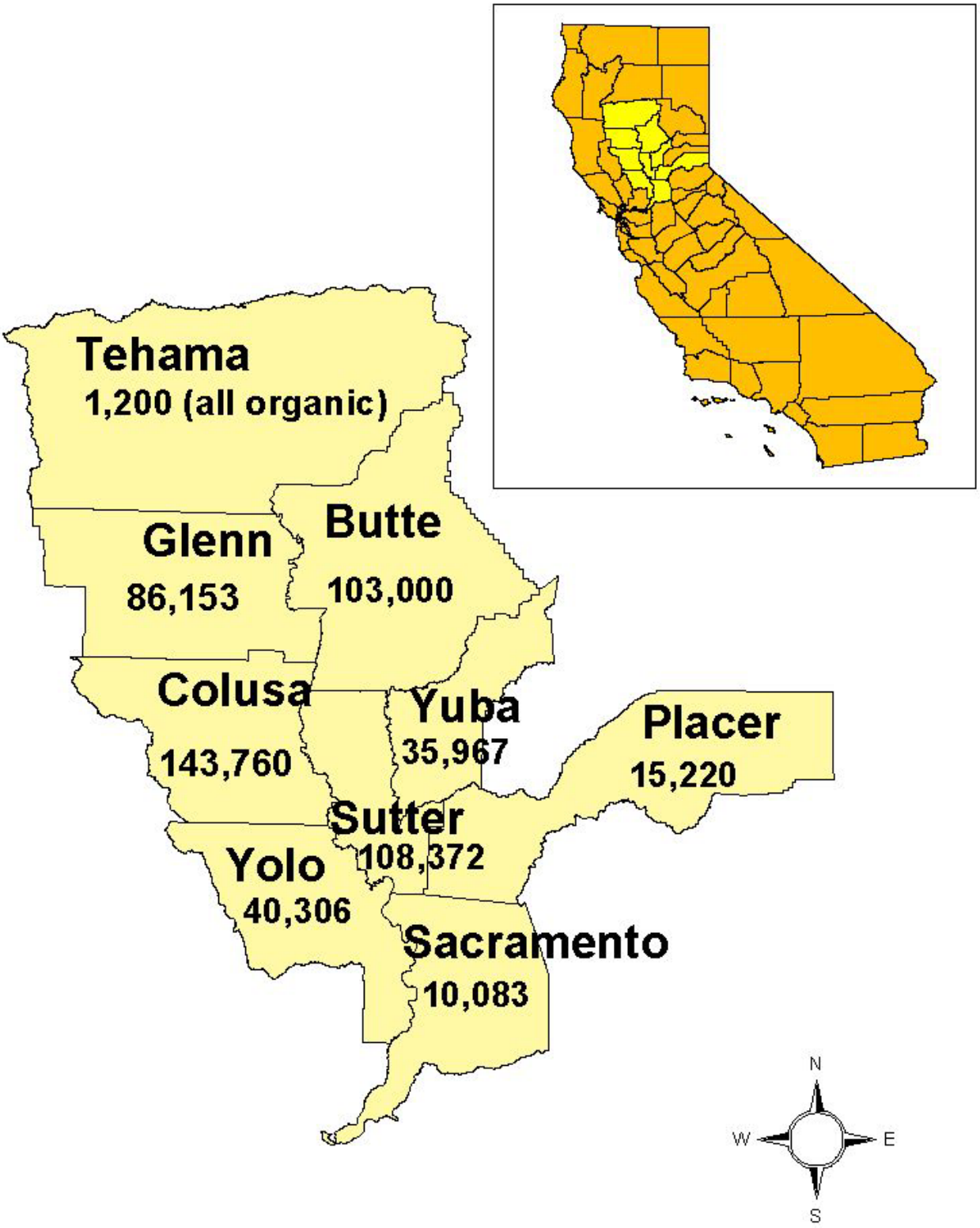


Figure 2. Total pounds (LBS) active ingredient of thiobencarb applied in Butte, Colusa, Glenn, Placer, Sacramento, Sutter, Yolo and Yuba counties in 2002.

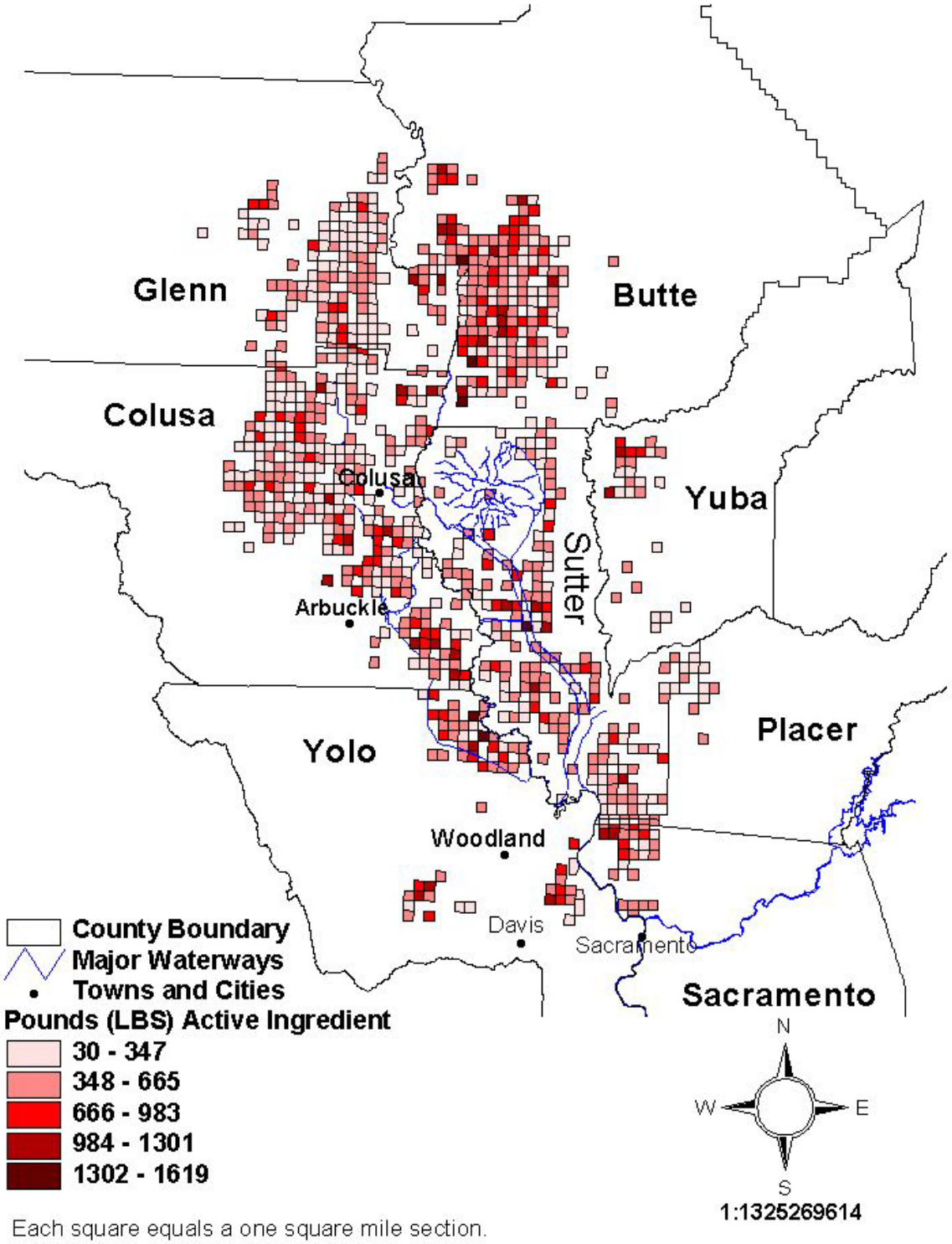


Table 1. Acres treated with molinate (Ordram®), thiobencarb (Bolero®/Abolish®), methyl parathion, malathion, and propanil (SuperWham®,Wham EZ®, Stam®) based on pesticide use reporting data in the rice growing region of the Sacramento Valley during 2002.

Acres Treated					
County	**Molinate**	**Thiobencarb**	**Methyl Parathion**	**Malathion**	**Propanil**
Butte	42,089	51,508	0	0	64,806
Colusa	41,195	67,929	0	97	85,750
Glenn	39,947	28,768	0	0	55,052
Placer	7,509	1,560	0	0	10,876
Sacramento	600	7,743	0	0	4,586
Stanislaus	0	63	0	0	2,324
Sutter	58,183	36,571	0	0	71,705
Yolo	5,962	15,985	0	50	10,569
Yuba	17,968	4,894	0	0	25,017
Total Acres	**213,453**	**215,021**	**0**	**147**	**330,685**

Table 2. Acres treated with triclopyr (Grandstand®), lambda cyhalothrin (Warrior®), diflubenzuron (Dimilin®), carfentrazone (Shark®), and cyhalofop-butyl (Clincher CA®) based on pesticide use reporting data in rice growing region of the Sacramento Valley in 2002.

Acres Treated				
County	**Triclopyr**	**Lambda cyhalothrin**	**Diflubenzuron**	**Cyhalofop butyl**
Butte	41,591	19,675	2,435	4,308
Colusa	93,958	15,750	1,019	8,721
Glenn	42,665	11,944	1,086	4,411
Placer	2,466	2,425	726	1,969
Sacramento	283	1,691	289	1,734
Sutter	47,332	17,539	2,394	11,009
Stanislaus	283	291	0	0
Yolo	14,013	662	0	0
Yuba	4,671	7,522	1,412	2,440
Total Acres	**247,262**	**77,499**	**9,361**	**34,592**

Table 3. Total active ingredient (LBS) applied for molinate (Ordram®), thiobencarb (Bolero®/Abolish®), methyl parathion, malathion, and propanil (SuperWham®, Wham EZ®, Stam®) based on pesticide use reporting data in the rice growing region of the Sacramento Valley during 2002.

Lbs Active Ingredient					
County	**Molinate**	**Thiobencarb**	**Methyl Parathion**	**Malathion**	**Propanil**
Butte	165,222	202,685	0	0	255,784
Colusa	157,289	255,378	0	121	382,257
Glenn	160,700	110,496	0	0	241,523
Placer	30,634	4,646	0	0	44,248
Sacramento	2,192	28,510	0	0	17,317
Stanislaus	0	236	0	0	9,357
Sutter	234,876	139,534	0	0	288,174
Yolo	23,752	59,725	0	59	43,748
Yuba	70,571	15,575	0	0	95,354
Total LBS	**845,236**	**816,785**	**0**	**180**	**1,377,762**

Table 4. Total active ingredient (LBS) applied of triclopyr (Grandstand®), lambda cyhalothrin (Warrior®), diflubenzuron (Dimilin®), carfentrazone (Shark®), and cyhalofop-butyl (Clincher CA®) based on pesticide use reporting data in rice growing counties of the Sacramento Valley in 2002.

Lbs Active Ingredient				
County	**Triclopyr**	**Lambda cyhalothrin**	**Diflubenzuron**	**Cyhalofop butyl**
Butte	8,171	658	312	1,154
Colusa	23,280	431	115	2,527
Glenn	6,183	401	124	1,164
Placer	534	60	94	500
Sacramento	708	49	32	394
Sutter	11,417	542	293	1,874
Stanislaus	77	8	0	0
Yolo	3,993	20	0	0
Yuba	1,637	220	212	616
Total	**56,000**	**2,389**	**1,182**	**8,229**

DESCRIPTION OF 2002 COOPERATIVE WATER QUALITY MONITORING PROGRAM

The California Rice Commission contracted with Kleinfelder, Inc., Sacramento, California, to collect water samples from CBD5 in Colusa County, BS1 in Sutter County, and SR1 on the Sacramento River. An additional monitoring site at CBD1 near Knight's Landing was added when thiobencarb levels exceeded the secondary maximum contaminant level (MCL) at the City of West Sacramento drinking water intake. A map of monitoring locations is contained in Figure 3. The sample collection methods, monitoring protocol, and laboratory plan for 2002 rice pesticide monitoring are in Appendix 4. Descriptions of locations of monitoring sites are below.

Monitoring Sites in the Sacramento Valley

CBD5 Colusa Basin Drain near Highway 20 in Colusa County.

CBD1 Colusa Basin Drain at Roads 109 and 99E near Knight's Landing in Yolo County, near the Colusa Basin Drain outfall on the Sacramento River.

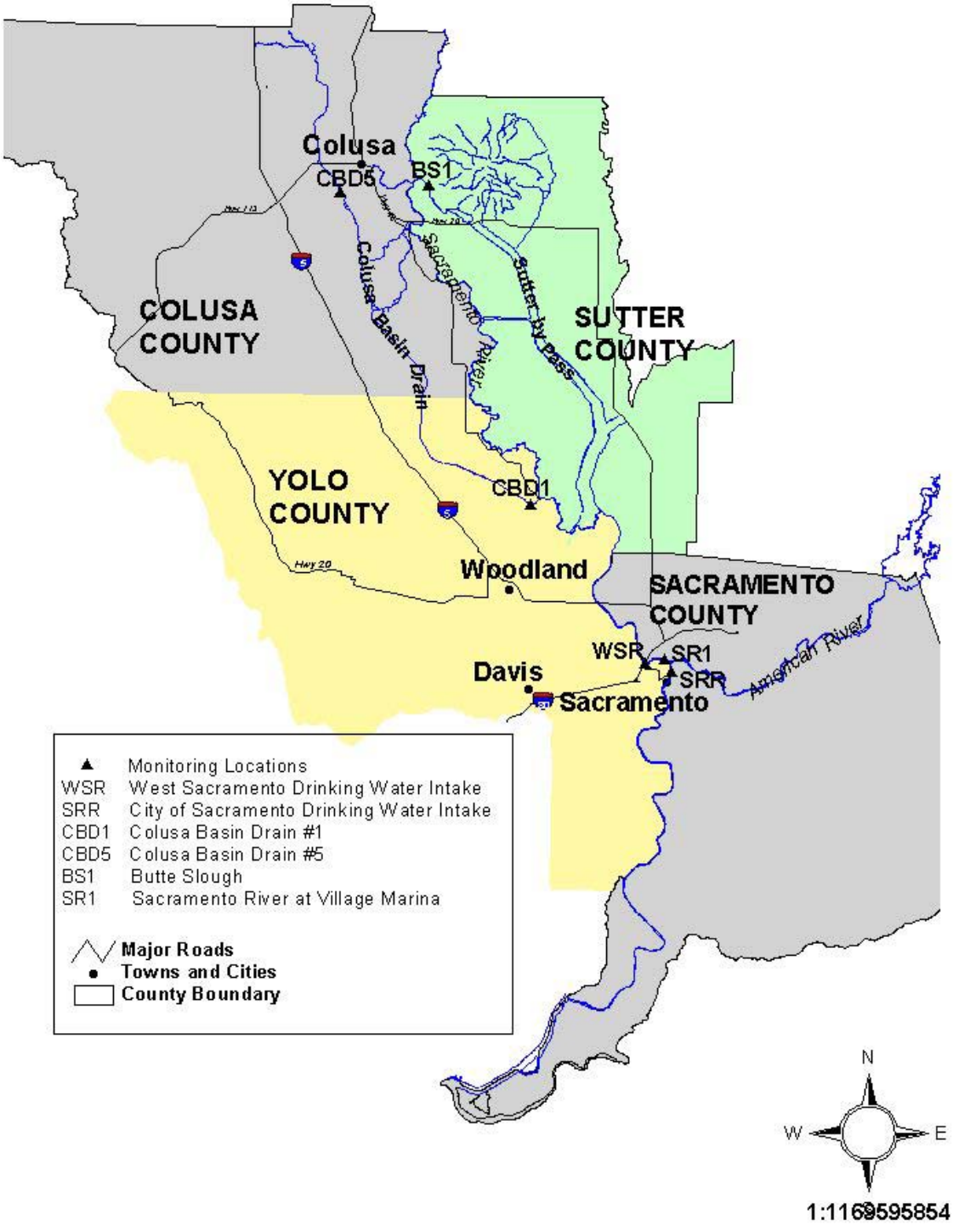
BS1 Butte Slough near Highway 20 in Sutter County.

SR1 Sacramento River approximately 1.5 kilometers upstream from the confluence with the American River, at the Village Marina in Sacramento County.

SRR Sacramento River at the intake to the water treatment facility in Sacramento, California, approximately 0.3 kilometers downstream from the confluence with the American River, in Sacramento County.

WSR Sacramento River at the intake to the water treatment facility in West Sacramento, California, approximately 100 yards west of Bryte Bend Bridge in West Sacramento.

Figure 3. Rice pesticide monitoring surface water location in the Sacramento Valley in 2002.



Sampling and Analytical Regimen for 2002

Water samples were collected from all sampling sites during the rice pesticide application time period based on when applications began. Background water samples were collected on April 9 and sampling began for methyl parathion and malathion on April 30 at all sampling sites. Sampling for thiobencarb and molinate began on May 7 at all sampling sites.

Primary water samples were delivered to Syngenta, manufacturer of Ordram, for molinate analyses. Primary water samples were delivered to Valent, the primary distributor of thiobencarb. Primary water samples were analyzed by California Department of Food and Agriculture (CDFA) analytical laboratory for methyl parathion and malathion. Additional samples representing ten percent of primary samples collected were analyzed for quality control (QC) purposes. Molinate and thiobencarb QC analysis were performed by CDFA laboratory. Additional samples were collected and stored for analyses in cases where confirmations of analytical results might have been required. Blind spikes were also submitted periodically for analyses with field samples for quality control purposes.

Figures 4 and 5 indicate molinate and thiobencarb use in Glenn and Colusa counties and concentrations of the two pesticides at CBD5 over time. Figures 6 and 7 indicate molinate and thiobencarb use in Butte County and concentrations of the two pesticides over time at BS1.

Monitoring results are included in Tables 5, 6, and 7 and can be summarized as follows:

Colusa Basin Drain (CBD5-Table 5)

- Molinate was detected above the performance goal (10.0 ppb) on each of the following dates: May 14 (12.0 ppb), May 16 (12.2 ppb), May 21 (12.9 ppb), May 23 (18.8 ppb), May 28 (18.8 ppb), and May 30 (12.3 ppb). A total of 22 detections of molinate occurred from May 7-July 18.
- Molinate concentrations were more frequent and longer in duration in 2002 than in 2001 at CBD5. Peak concentrations were slightly higher in 2002 than in 2001: 12.1 ppb was the highest detection in 2001, while 2002 resulted in detections of 18.8 ppb on May 17 and May 22.
- Thiobencarb was detected above the performance goal (1.5 ppb) during ten consecutive sampling events beginning May 7-June 20. A total of 14 detections of thiobencarb occurred from May 7-July 18.
- Thiobencarb concentrations were higher in 2002 than in 2001 at CBD5. Peak concentrations of thiobencarb at CBD5 in 2002 were on May 23 (8.2 ppb) and May 28 (7.3 ppb) slightly higher than the peak concentration in 2001 (5.9 ppb).
- There were no detections of malathion or methyl parathion.
- Peak molinate and thiobencarb concentrations at CBD5 were associated with the application period and during the week following a storm occurrence on May 20. Adequate water holding times had not been met during these circumstances (Figures 3 and 4).

Figure 4. Acres treated with thiobencarb in Colusa and Glenn Counties and concentrations of thiobencarb in the Colusa Basin Drain near SR20 in 2002.

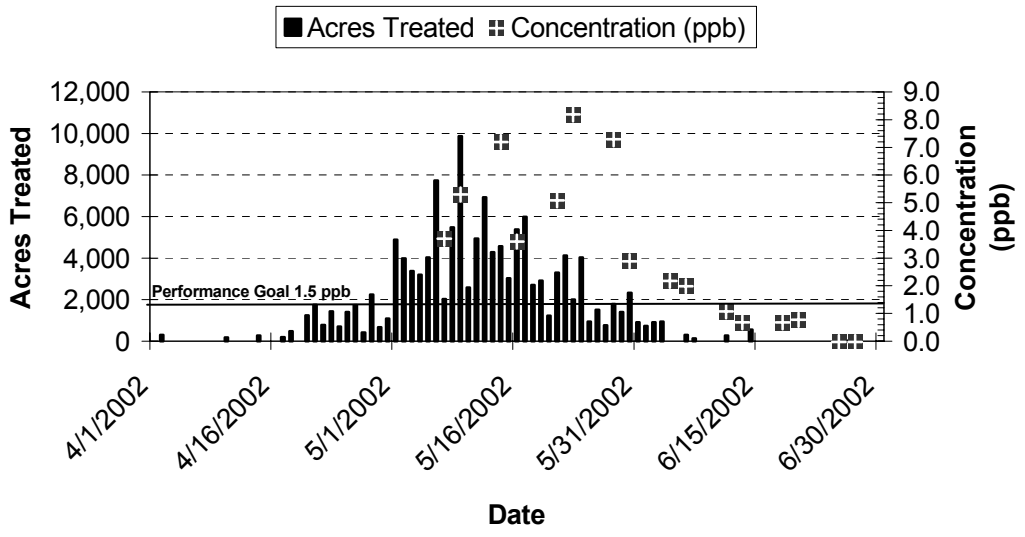


Figure 5. Acres treated with molinate in Colusa and Glenn Counties and concentrations of molinate in the Colusa Basin Drain near SR20 in 2002.

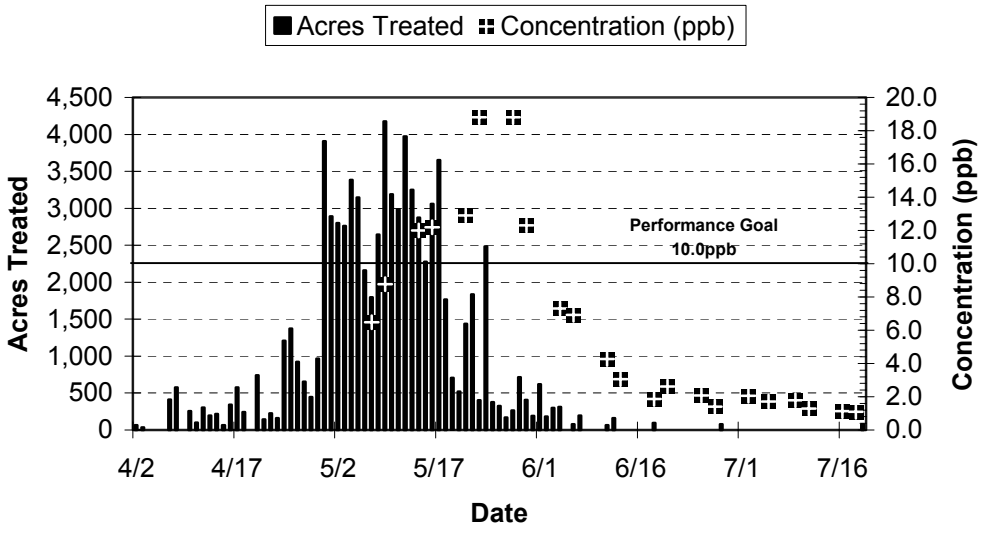


Figure 6. Acres treated with thiobencarb in Butte County and concentrations of thiobencarb in Butte Slough near SR20 in 2002.

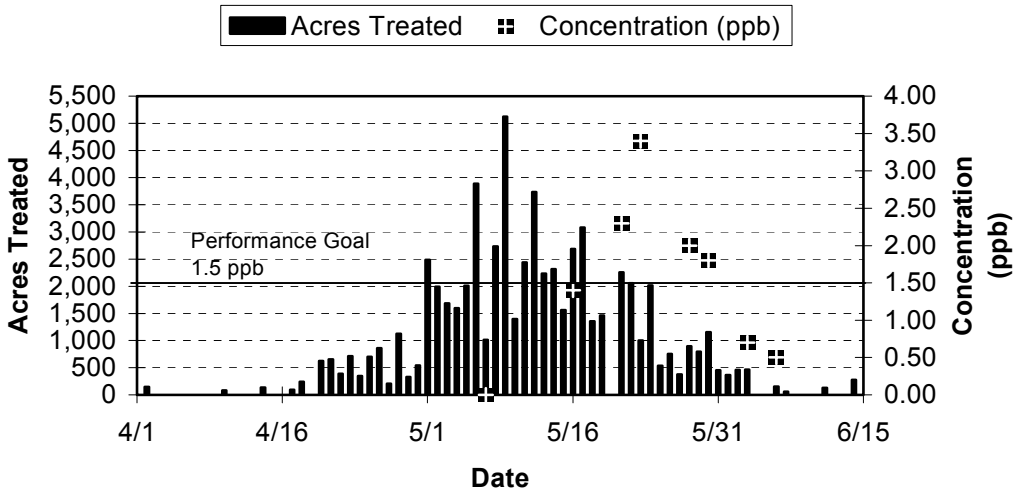


Figure 7. Acres treated with molinate in Butte County and concentrations of molinate in Butte Slough (BS1) in 2002.

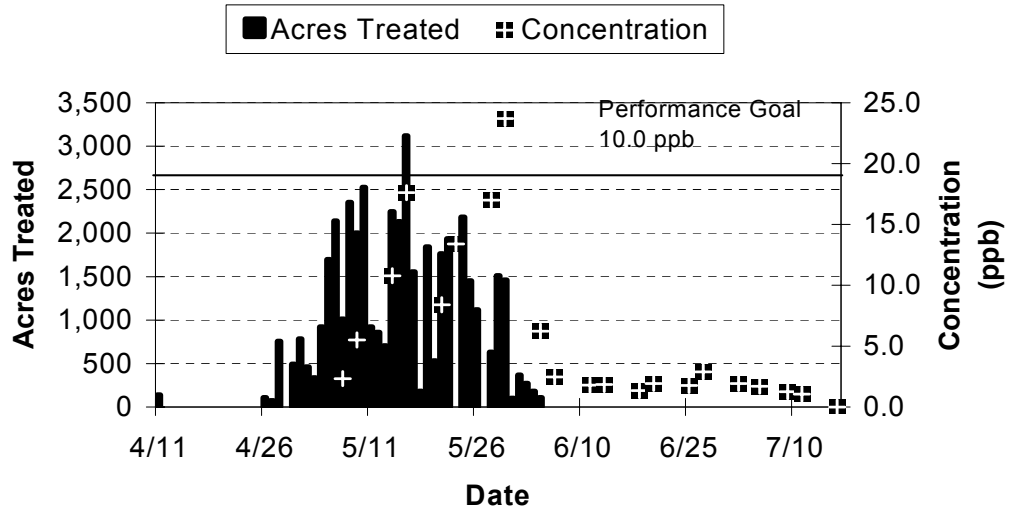


Table 5. 2002 Pesticide Concentrations at the Colusa Basin Drain near Highway 20 in Colusa County (CBD5) in parts per billion (ppb).
(Bolded numbers indicate peformance goal exceedance).

	Molinate		Thiobencarb		Methyl Parathion	Malathion
Sample Type	Primary	QC	Primary	QC	Primary	Primary
Reporting limit (ppb)	1.0	0.5	0.5	0.5	0.05	0.05
Date						
9-April	ND	ND	ND	ND	ND	ND
30-April	NA	NA	NA	NA	ND	ND
2-May	NA	NA	NA	NA	ND	ND
7-May	6.49	NA	**3.7**	NA	ND	ND
9-May	8.76	7.35	**5.3**	5.75	ND	ND
14-May	**12.0**	NA	**7.2**	NA	ND	ND
16-May	**12.2**	7.61	**3.6**	3.41	ND	ND
21-May	**12.9**	NA	**5.1**	NA	ND	ND
23-May	**18.8**	13.8	**8.2**	6.96	ND	ND
28-May	**18.8**	NA	**7.3**	NA	ND	ND
30-May	**12.3**	10.8	**2.9**	3.79	ND	ND
4-June	7.30	NA	**2.2**	NA	ND	ND
6-June	6.92	4.73	**2.0**	2.23	ND	ND
11-June	4.26	NA	1.1	NA	ND	ND
13-June	3.06	2.44	0.7	0.985	ND	ND
18-June	1.86	NA	0.7	NA	ND	ND
20-June	2.62	1.05	0.8	0.949	ND	ND
25-June	2.07	NA	ND	NA	ND	ND
27-June	1.40	0.728	ND	0.558	ND	ND

Samples collected by Kleinfelder, Inc. under contract with California Rice Commission.
Key to designations for rice water monitoring table for CBD5:

QC	Quality Control	**PERFORMANCE GOALS(ppb):**			
ND	Not Detected	molinate	10.0	malathion	0.1
NA	Not Analyzed	thiobencarb	1.5	methyl parathion	0.13

Table 5 con't. 2002 Pesticide Concentrations at the Colusa Basin Drain near Highway 20 in Colusa County (CBD5) in parts per billion (ppb).

	Molinate		Thiobencarb		Methyl Parathion	Malathion
Sample Type	Primary	QC	Primary	QC	Primary	Primary
Reporting limit (ppb)	1.0	0.5	0.5	0.5	0.05	0.05
Date						
2-July	2.06	NA	ND	NA	ND	ND
5-July	1.71	0.710	ND	ND	ND	ND
9-July	1.78	NA	ND	NA	NA	NA
11-July	1.29	0.585	ND	ND	NA	NA
16-July	1.13	NA	ND	NA	NA	NA
18-July	1.10	ND	ND	ND	NA	NA

Samples collected by Kleinfelder, Inc. under contract with California Rice Commission.
Key to designations for rice water monitoring table for CBD5:

QC	Quality Control	**PERFORMANCE GOALS(ppb):**			
ND	Not Detected	molinate	10.0	malathion	0.1
NA	Not Analyzed	thiobencarb	1.5	methyl parathion	0.13

Table 6. 2002 Pesticide Concentrations at Butte Slough at Lower Pass Road in Sutter County (BS1) in parts per billion (ppb).
(Bolded numbers indicate peformance goal exceedences).

	Molinate	Thiobencarb	Methyl Parathion	Malathion
Sample type	Primary	Primary	Primary	Primary
Reporting Limit (ppb)	1.0	0.5	0.05	0.05
Date				
9-April	ND	ND	ND	ND
30-April	NA	NA	ND	ND
2-May	NA	NA	ND	ND
7-May	2.33	ND	ND	ND
9-May	5.51	ND	ND	ND
14-May	**10.8**	ND	ND	ND
16-May	**17.6**	1.4	ND	ND
21-May	**8.41**	**2.3**	ND	ND
23-May	**13.4**	**3.4**	ND	ND
28-May	**17.0**	**2.0**	ND	ND
30-May	**23.7**	**1.8**	ND	ND
4-June	6.23	0.7	ND	ND
6-June	2.48	0.5	ND	ND
11-June	1.81	ND	ND	ND
13-June	1.84	ND	ND	ND
18-June	1.35	ND	ND	ND
20-June	1.93	ND	ND	ND
25-June	1.78	ND	ND	ND
27-June	2.89	ND	ND	ND

Samples collected by Kleinfelder, Inc. under contract with California Rice Commission.
Key to designations for rice water monitoring table for BS1:

QC	Quality Control	**PERFORMANCE GOALS(ppb):**			
ND	Not Detected	molinate	10.0	malathion	0.1
NA	Not Analyzed	thiobencarb	1.5	methyl parathion	0.13

Table 6 con't. 2002 Pesticide Concentrations at Butte Slough at Lower Pass Road in Sutter County (BS1) in parts per billion (ppb).

	Molinate	Thiobencarb	Methyl Parathion	Malathion
Sample type	Primary	Primary	Primary	Primary
Reporting Limit (ppb)	1.0	0.5	0.05	0.05
Date				
2-July	1.94	ND	ND	ND
5-July	1.70	ND	ND	ND
9-July	1.26	ND	NA	NA
11-July	1.06	ND	NA	NA
16-July	ND	ND	NA	NA
18-July	ND	ND	NA	NA

Samples collected by Kleinfelder, Inc. under contract with California Rice Commission.
Key to designations for rice water monitoring table for BS1:

QC	Quality Control	**PERFORMANCE GOALS(ppb):**			
ND	Not Detected	molinate	10.0	malathion	0.1
NA	Not Analyzed	thiobencarb	1.5	methyl parathion	0.13

Butte Slough (BS1-Table 6)

- Molinate was detected 20 times from May 7-July 11 and exceeded the performance goal six times from May 14-May 30 (Table 6). The highest concentration was 23.7 ppb on May 30. Molinate detections have increased in peak concentrations and frequency at BS1 since 1999.
- Thiobencarb was detected seven times between May 16 and June 6. The performance goal (1.5 ppb) was exceeded four times from May 21-May 30. The peak concentration was 3.4 on May 23.
- Thiobencarb concentrations were similar in 2002 and 2001 at BS1. The peak detection in 2002 (3.4 ppb) was higher than the peak detection in 2001 (1.6 ppb).
- There were no detections of methyl parathion or malathion at BS1.
- Peak molinate detections at BS1 were associated with the application period and the week following a storm event on May 20. The highest thiobencarb detections are mostly associated with the May 20 storm event in 2002 (Figures 6 and 7).

Sacramento River Monitoring Results (SR1-Table 7)

- Molinate was detected 12 times from May 14-July 9 at SR1. The performance goal (10.0 ppb) was not exceeded and the peak detection was 3.21 ppb on May 23.
- Thiobencarb was detected on May 21 (0.60 ppb), May 23 (0.90 ppb), and May 28 (0.60 ppb).
- There were no detections of methyl parathion or malathion.
- In 2001, molinate was detected on May 22 (2.03 ppb) and May 29 (2.21 ppb). Thiobencarb was detected one time on May 22 (0.50 ppb).

CBD1 Monitoring Results

Due to thiobencarb concentrations observed at the City of Sacramento and West Sacramento drinking water intakes, Valent, the primary registrant for thiobencarb products, decided to collect additional water samples at CBD1, a historical monitoring site located on Colusa Basin Drain at Roads 109 and 99E near Knight's Landing in Yolo County. This location is south of CBD5 near Highway 20 in Colusa County, and nearer to the Colusa Basin Drain outfall on the Sacramento River. Thiobencarb was found on May 30 (6.2 ppb), June 4 (4.7 ppb), June 6 (2.8 ppb), June 11 (2.0 ppb), and June 13 (1.4 ppb). These detections were expectedly higher on the same dates as water samples collected at CBD5 since there would be additional inputs downstream of CBD5. No comparison data is available in 2001 at this monitoring location.

Table 7. 2002 Rice Pesticide Concentrations in the Sacramento River at the Village Marina in Sacramento County (SR1) in parts per billion (ppb).

	Molinate	Thiobencarb	Methyl Parathion	Malathion
Sample type	Primary	Primary	Primary	Primary
Reporting Limit (ppb)	1.0	0.5	0.05	0.05
Date				
9-April	ND	ND	ND	ND
30-April	NA	NA	ND	ND
2-May	NA	NA	ND	ND
7-May	ND	ND	ND	ND
9-May	ND	ND	ND	ND
14-May	1.26	ND	ND	ND
16-May	1.06	ND	ND	ND
21-May	1.90	0.60	ND	ND
23-May	3.21	0.90	ND	ND
28-May	2.26	0.60	ND	ND
30-May	2.27	ND	ND	ND
4-June	1.35	ND	ND	ND
6-June	1.26	ND	NA	NA
11-June	ND	ND	ND	ND
13-June	ND	ND	ND	ND
18-June	ND	ND	ND	ND
20-June	ND	ND	ND	ND
25-June	ND	ND	ND	ND
27-June	1.42	ND	ND	ND

Samples collected by Kleinfelder, Inc. under contract with California Rice Commission.
Key to designations for rice water monitoring table for SR1:

QC	Quality Control	**PERFORMANCE GOALS(ppb):**			
ND	Not Detected	molinate	10.0	malathion	0.1
NA	Not Analyzed	thiobencarb	1.5	methyl parathion	0.13

Table 7 con't. 2002 Rice Pesticide Concentrations in the Sacramento River at the Village Marina in Sacramento County (SR1) in parts per billion (ppb).

	Molinate	Thiobencarb	Methyl Parathion	Malathion
Sample type	Primary	Primary	Primary	Primary
Reporting Limit (ppb)	1.0	0.5	0.05	0.05
Date				
2-July	1.47	ND	ND	ND
5-July	1.43	ND	ND	ND
9-July	1.23	ND	NA	NA
11-July	ND	ND	NA	NA
16-July	ND	ND	ND	ND
18-July	ND	ND	NA	NA

Samples collected by Kleinfelder, Inc. under contract with California Rice Commission.
Key to designations for rice water monitoring table for SR1:

QC	Quality Control	**PERFORMANCE GOALS(ppb):**			
ND	Not Detected	molinate	10.0	malathion	0.1
NA	Not Analyzed	thiobencarb	1.5	methyl parathion	0.13

Performance Goal Exceedances 1997-2002 (CBD5 and BS1-Table 8)

The following data shows the relative frequency of performance goal exceedence from 1997 through 2002. Exceedence frequency represents the percentage of samples in a given year that exceeded the performance goals for molinate and thiobencarb at CBD5 and BS1. Detection frequency represents the percentage of samples that had detections of molinate or thiobencarb.

The current monitoring program relies on performance goals as a measure of water quality compliance. However, performance goals were established to protect aquatic organisms from toxicity in agricultural drains. Generally, exceedences peaked at CBD5 and BS1 in 2000, declined in 2001, and climbed in 2002.

Table 8. Compilation of historical monitoring data showing exceedance frequencies of molinate and thiobencarb performance goals from 1997-2002 at CBD5 and BS1.

Location/Chemical		Year of Study					
		1997	1998	1999	2000	2001	2002
CBD5 Molinate	exceedance frequency (%)	50	50	55	60	18	32
	maximum concentration (ppb)	25.6	44.0	19.6	22.0	12.7	18.8
	median concentration (ppb)	10.2	10.9	10.3	15.7	5.07	6.49
	number of samples (primary)	16	16	11	10	17	19
	detection frequency (%)	100	100	91	100	100	100
CBD5 Thiobencarb	exceedance frequency (%)	83	81	92	100	58	67
	maximum concentration (ppb)	21.6	11.0	19.6	10.7	5.9	8.2
	median concentration (ppb)	3.45	2.1	10.3	4.75	1.5	2.9
	number of samples (primary)	18.0	16.0	12.0	14.0	19.0	15.0
	detection frequency (%)	94	88	92	100	95	93
BS1 Molinate	exceedance frequency (%)	53	11	0	40	22	27
	maximum concentration (ppb)	25.6	12.1	9.0	11.5	17.1	18.8
	median concentration (ppb)	11.1	5.8	5.0	6.6	2.4	3.6
	number of samples (primary)	17	9	6	5	9	22
	detection frequency (%)	100	100	83	100	78	100

Table 8 con't. Compilation of historical monitoring data showing exceedance frequencies of molinate and thiobencarb performance goals from 1997-2002 at CBD5 and BS1.

Location/Chemical		Year of Study					
		1997	1998	1999	2000	2001	2002
BS1 Thiobencarb	exceedance frequency (%)	19	6	14	29	18	20
	maximum concentration (ppb)	2.2	1.9	4.1	1.6	2.6	3.4
	median concentration (ppb)	0	0	0.6	1.1	0	1.8
	number of samples (primary)	16	16	7	7	11	20
	detection frequency (%)	44	38	57	71	27	35

Toxicity Testing

Water samples were collected for ten weeks at CBD5 from April 30 through July 2. DFG Aquatic Toxicology Laboratory staff conducted acute tests on neonate (<24 hours old) cladocerans (*Ceriodaphnia dubia*) to sample water for 96 hours and to control and blind spiked water samples. Percent survival was a measurement for presence of toxicity in water. Samples were also analyzed for conductivity, total alkalinity, total hardness, and dissolved oxygen. The toxicity tests were conducted following *ATL-SOP-012* based on the general guidelines of *USEPA/600/4-90/027F.*

Toxicity Monitoring Results

Toxicity analysis resulted in no significant mortality (<70% survival) of *Ceriodaphnia dubia.*).

Table 9. **Aquatic toxicity analysis results conducted by DFG Aquatic Toxicology Laboratory (ATL) on *Ceriodaphnia dubia* from April 9-July 2, 2002.**

Date of Sample	Week of Monitoring Study	Sample Survival %	Control Survival %
9-April	Background Sample	95	100
30-April	1	100	100
7-May	2	100	100
14-May	3	100	100
21-May	4	100	100
28-May	5	95	100
4-June	6	90	100
11-June	7	100	100
18-June	8	100	100
25-June	9	95	95
2-July	10	100	100

(SRR) Monitoring Results (Table 10)

In addition to DPR monitoring, the City of Sacramento monitors water for molinate and thiobencarb at the City of Sacramento drinking water intake located south of the American River confluence on the Sacramento River (SRR). In 2002, the City of Sacramento analyzed water samples for triclopyr in addition to molinate and thiobencarb. Some water mixing occurs from the American River at the Sacramento River confluence prior to the SRR drinking water intake. The City of Sacramento records taste complaints, on a yearly basis, from people whose water source comes from SRR. In a typical year, the City of Sacramento receives an average of two to three taste complaints from water consumers. Most of the taste complaints occur about the same time thiobencarb is detected at the 0.10 ppb level according to City of Sacramento water quality engineers. The primary Maximum Contaminate Level (MCL) is 70.0 ppb and the secondary MCL is 1.0 ppb for off-taste for thiobencarb. The MCL for molinate is 20.0 ppb.

The following is a summary of the monitoring results conducted by the City of Sacramento in 2002.

- Molinate was detected nine sampling days. The highest concentration of molinate detected was 1.7 ppb on May 24.

- Thiobencarb was detected on eight sampling days and the peak concentration reached 0.91 ppb on May 24. This level exceeded the CVRWQCB's concentration of 0.59 ppb as described in CVRWQCB *Resolution No.R5-2002-0080, Approval of the Management Practices Required by the Department of Pesticide Regulation's Rice Pesticide Program for the 2002-2003 Seasons* (Appendix 5).

- Concentrations of molinate and thiobencarb were higher in 2002 than in 2001 at the City of Sacramento drinking water intake.

(WSR) Monitoring Results (Table 10)

In 2002, water samples were collected at the West Sacramento drinking water intake and analyzed by the City of Sacramento Water Quality Laboratory. Historically, water monitoring for the rice pesticides has not routinely occurred at WSR, and detection limits were much higher when analysis was performed. West Sacramento's drinking water intake is located upstream of the confluence of the American River (Figure 2), and therefore does not have the same mixing of water prior to the drinking water intake that impacts the City of Sacramento's water intake. It is believed simple dilution that accounts for 85 percent of the difference in observed and expected concentrations between City of Sacramento and West Sacramento drinking water intakes when statistical analysis was applied to the 2001 observed concentrations.

- Molinate was detected during ten sampling events from May 6-June 12 (Table 10). The highest detections occurred on May 22 (2.4 ppb), May 24 (4.2 ppb), and June 1 (2.8 ppb). These detections were higher than the peak detections in 2001 that occurred around the same dates.

- Thiobencarb was detected eight times between May 10 and June 5. The highest concentrations were on May 22 (0.65 ppb) and May 24 (1.6 ppb), and May 27 (0.73 ppb). These levels exceeded the CVRWQCB's concentration of 0.59 ppb as described in *Resolution No. R5-2002-0080, Approval of the Management Practices Required by the Department of Pesticide Regulation's Rice Pesticide Program for the 2002-2003 Seasons* (Appendix 5). The May 24 concentration (1.6 ppb) also exceeded the secondary Maximum Contaminant Level for taste and odor.

- Concentrations at the WSR drinking water intake were higher than the City of Sacramento probably due to the location of WSR being north of the confluence of the American River. Concentrations were higher for thiobencarb and molinate in comparison to peak detections in 2001 that occurred around these same dates.

Table 10. 2002 rice herbicide monitoring results for molinate and thiobencarb reported by the City of Sacramento Division of Water, Water Quality Laboratory taken at the Sacramento River Water Treatment Plant (WTP) Intake (SRR) and West Sacramento River WTP Intake (WSR), results in ug/L, (ppb).

(Numbers in parenthesis are 2001 results from approximately same dates).

City of Sacramento SRR					City of West Sacramento WSR		
Date	**Molinate (Ordram®)**	**Thiobencarb (Bolero®, Abolish®)**	**Triclopyr (Grandstand®)**	**% Sacramento River at Intake**	**Molinate (Ordram®)**	**Thiobencarb (Bolero®, Abolish®)**	**Triclopyr (Grandstand®)**
24-April	<0.10	<0.10	NA	69.3	<0.10	<0.10	NA
26-April	NA	NA	NA	70.5	NA	NA	NA
29-April	NA	NA	NA	74.3	NA	NA	NA
1-May	<0.10	<0.10	NA	59.8	<0.10	<0.10	NA
3-May	NA	NA	NA	47.6	NA	NA	NA
6-May	<0.10	<0.10	NA	67.0	0.18	<0.10	NA
8-May	NA	NA	NA	70.2	NA	NA	NA
10-May	0.34 (0.28)	0.12	NA	67.0	0.96 (0.50)	0.23	NA
13-May	NA	NA	NA	63.6	NA	NA	NA
15-May	0.57 (0.64)	0.19 (0.20)	<0.20	77.4	0.88 (0.56)	0.22	<0.20
17-May	NA	NA	NA	88.4	NA	NA	NA
20-May	0.71	0.22 (0.30)	NA	56.8	1.4 (1.3)	0.34	NA
22-May	1.1	0.58	<0.10	54.8	2.4	0.65 (0.59)	<0.10
24-May	1.7 (1.1)	0.91 (0.28)	NA	53.2	4.2 (0.76)	1.6 (0.23)	NA
27-May	1.2	0.49	NA	57.5	2.8	0.73	NA
29-May	NA (1.4)	NA (0.38)	<0.10	73.8	NA (1.7)	NA (0.45)	<0.10
31-May	0.78	0.21	NA	83.0	1.5 (1.4)	0.30 (0.32)	NA
3-June	NA (.084)	NA	NA	66.3	NA	NA	NA
5-June	0.57	0.15	<0.10	76.0	1.0	0.25	NA
7-June	NA (0.47)	NA	NA	79.8	NA (0.56)	NA (<0.20)	NA

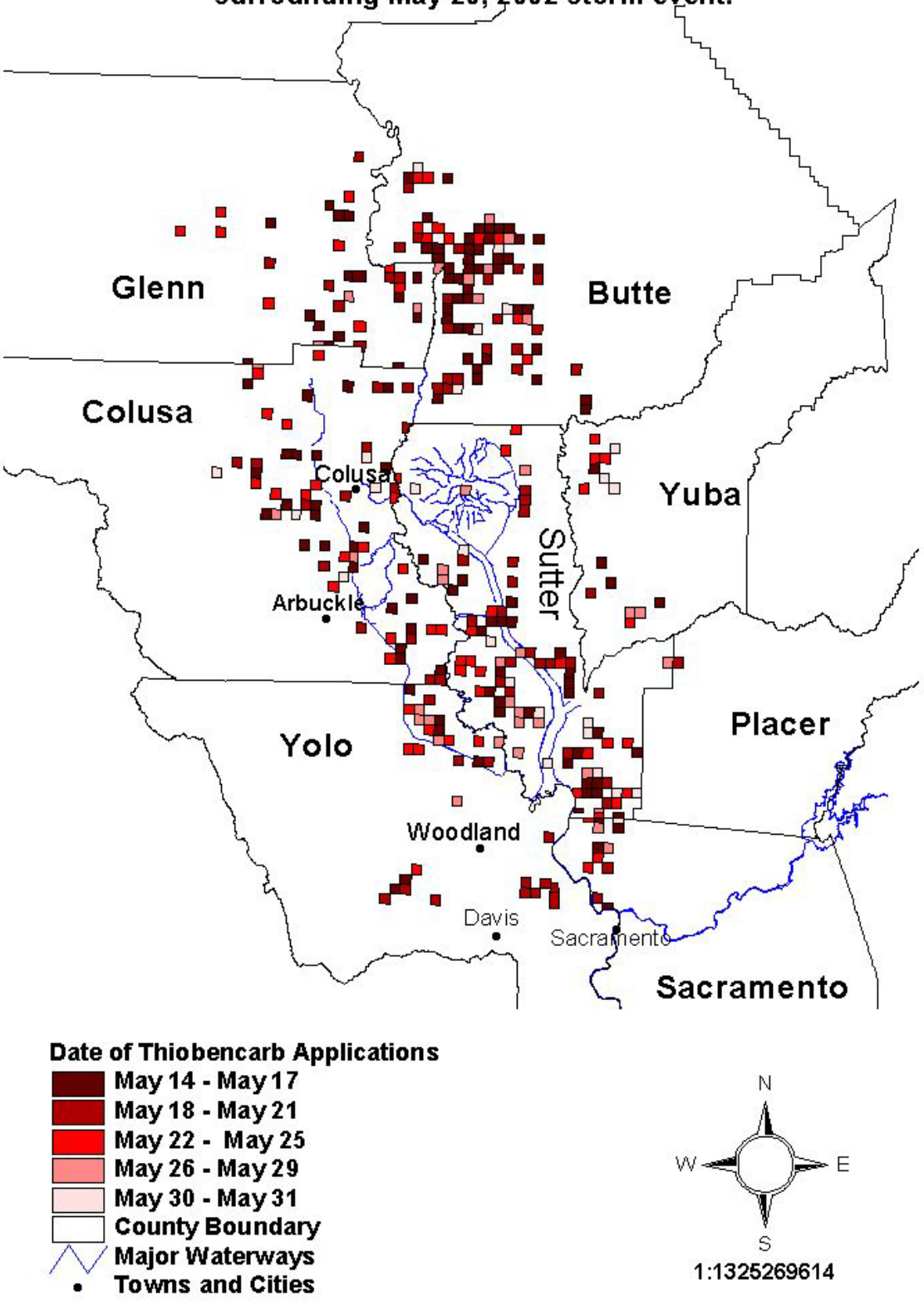
Table 10 con't. 2002 rice herbicide monitoring results for molinate and thiobencarb reported by the City of Sacramento Division of Water, Water Quality Laboratory taken at the Sacramento River Water Treatment Plant (WTP) Intake (SRR) and West Sacramento River WTP Intake (WSR), results in ug/L, (ppb).

(Numbers in parenthesis are 2001 results from approximately same dates).

10-June	NA	NA	NA	54.3	NA	NA	NA
12-June	0.21 (0.31)	<0.10	<0.10	40.0	0.22 (0.31)	<0.10	<0.10
19-June	NA	NA	<0.10	NR	NA	NA	0.11
26-June	NA	NA	0.20	NR	NA	NA	0.27
2-July	NA	NA	0.13	NR	NA	NA	0.22
10-July	<0.10	<0.10	<0.10	54.4	<0.10	<0.10	0.15
17-July	NA	NA	<0.10	NR	NA	NA	0.17

Key to Abbreviations **NA Not Analyzed** **NR Not Reported**

Figure 8. Thiobencarb applications from May 14-May 31, 2002 surrounding May 20, 2002 storm event.



Seepage Control

Rice field water can move laterally through rice levees bordering rice fields when levees are not constructed in a manner that prevents water from seeping through. Often levee borrow pits, commonly called "sweat ditches", are used to contain this water. When water becomes high enough, it can flow into local agricultural drainage conveyances.

CVRWQCB expressed concerns in the 1998-2000 approval of the Rice Pesticide triennial review that DPR's voluntary seepage management program is not an approved practice if rice pesticides are contained in seepage water. Current program recommendations require securing weir boxes in rice fields with plastic and soil to a depth higher than the water level. At rice pesticide permit issuance, CACs provide rice growers with a handout entitled: *Closed Rice Water Management Systems* prepared by the United States Department of Agriculture with the University of California (UCD) Cooperative Extension. Another brochure CACs provide to rice growers entitled: *Seepage Water Management-Voluntary Guidelines for Good Stewardship in Rice Production*, was cooperatively developed by the UCD-Department of Agronomy and Range Science, DPR, and University of California Cooperative Extension. This brochure explains the causes and voluntary activities growers should use to prevent seepage (Appendix 6). DPR hoped that grower education and voluntary efforts would eliminate the need for further regulatory efforts. In 2001, DPR issued suggested permit conditions to the CACs of rice counties that stated, "Growers shall not allow water to seep through borders surrounding rice fields." CAC staff will check for seepage at the same time they do water holding inspections. CAC staff will notify growers of seepage situations and report the information to DPR. Permit conditions will also require compaction of borders surrounding rice fields" (Appendix 7).

There were 1,956 seepage inspections performed by the CACs of the rice growing counties; no seepage was observed in 1,898 of those inspections. There were 48 sites where seepage was reported at less than five gallons/minute water discharge. There were ten sites with seepage reported at greater than five gallons/minute. Ordram had been applied to 43 of the sites where seepage was observed. Thiobencarb had been applied to 15 sites. CACs issued no Agricultural Civil Penalties (ACPs) as a result of seepage inspections.

Enforcement Activities in 2002

The role of the CAC staff in the enforcement of the Rice Pesticide Program includes:

- Advising growers, pest control advisers, and pest control operators on the proper use of rice pesticides.
- Issuing restricted material permits.
- Conducting pesticide use monitoring inspections.
- Evaluating emergency release variances.
- Reporting rice pesticide use to DPR.

Before any pesticide on the list of California restricted materials may be applied, growers must obtain a permit from their CAC. The permits may specify conditions for use of the pesticide, including post-application water-holding requirements. A NOI must be filed with the CAC 24 hours prior to the application, providing the CACs with the option of observing the mixing,

loading, and application of the material, thus enforcing regulations that pertain to pest control operations. Molinate, thiobencarb, and methyl parathion are currently California restricted materials, malathion is not. Permits that specify post-application water-holding requirements like those for the use of molinate, thiobencarb, and methyl parathion also require that the NOA be filed with the CAC within 24 hours after the application. NOAs are used to determine when water holding begins.

In 1998, DPR and the CACs implemented a Prioritization Plan and a Negotiated Workplan. Part of the plan included a negotiated number of water hold inspections. These plans allow the counties to set priorities within standard guidelines. Rice pesticide applications and water-hold inspections are ranked "High Priority" inspections when rice pesticides are registered as restricted materials. The county offices then receive partial reimbursement from DPR based on number of inspections completed.

In 2002, CACs staff of Butte, Colusa, Fresno, Glenn, Merced, Placer, Sacramento, San Joaquin, Stanislaus, Sutter, Tehama, Yolo, and Yuba counties inspected 2,976 fields for water holding compliance. There were 1,813 inspections for molinate with four non-compliances recorded and three ACPs issued. There were 1,163 inspections for thiobencarb resulting in six non-compliances and four ACPs issued. There were five monetary fines issued for ACPs. Other enforcement activities are listed in Table 11.

Table 11. Enforcement non-compliances reported by CACs in 2002 by pesticide.

Chemical/Inspection Type	Code Section	Description	Total
2,4-D			
Application	6630	Equipment identified	1
Application	6734(c)	Eyewash	1
Application	12973	Labeling-Chemical Resistant Boot	1
Application	12973	Permit Conditions	1
Application	6460	Phenoxy regulation	1
Application	6600	Suitable Methods/Manner/Climate	1
Abolish			
Application	12973	Labeling – work clothing	1
Application	6434	Notice of Intent	1
Application	12937	Permit Conditions	1
Application	6600	Suitable Methods/Manner/Climate	1
Application	14007	Valid Permit	1
MCPA			
Application	6600	Suitable Methods/Manner/Climate	1
Mix/Load	6600	Suitable Methods/Manner/Climate	1

Table 11 con't. Enforcement non-compliances reported by CACs in 2002 by pesticide.

Ordram 15G			
Application	12973	Permit Conditions	2
Application	6614	Protection of Persons/Animals/Property	1
Application	6406	Restricted material use supervised	2
Mix/Load	6734	Decontamination Facilities	1
Mix/Load	6726	Emergency Medical Care Posting	1
Mix/Load	6734(c)	Eyewash	1
Propanil			
Application	6684	Containers Properly Rinsed	1
Application	6726	Emergency Medical Care Posting	1
Application	12973	Labeling-PPE	1
Application	12973	Permit Conditions	2
Application	6600	Suitable Methods/Manner/Climate	1
Mix/Load	12973	Labeling-PPE	1
Mix/Load	6602	Registered Label at Use Site	1
Mix/Load	6738	Regulations	1
Triclopyr			
Application	6734(c)	Eyewash	1
Application	12973	Labeling –Protective eyewear	1
Mix/Load	6746	Closed System	4
Mix/Load	6734(c)	Eyewash	1
Mix/Load	12973	Labeling-PPE	2
Mix/Load	6736	Regulations-Coveralls	1

May 20, 2002 Storm Event

A storm event that occurred on May 20 is probably the primary contributor to peak detections of thiobencarb and molinate in 2002. Waterways upstream of City of West Sacramento were impacted by early releases of water from rice fields. Figure 8 shows applications of thiobencarb that were made from May 14 through May 31 (close to the storm event) and therefore believed to affect peak concentrations observed at the City of Sacramento and West Sacramento drinking water intakes.

It is likely that the May 20 storm event caused uncontrolled water releases and that documented emergency releases impacted peak detections observed at West Sacramento drinking water intake in 2002.

CACs reported that there were 303 emergency release inquiries reported of which 33 emergency releases were granted in 2002. These water releases followed a storm event that happened May 20 resulting in flooding. There were 292 release requests for thiobencarb resulting in 12 actual releases. Molinate treated fields resulted in 21 emergency releases.

DPR understands that the Natomas Mutual Water District released water during the May 20 storm event due to flooding of roadways north of the city. The fields that contained the released water had been recently treated with thiobencarb that had not adequately degraded to the lower concentrations it would have achieved had it undergone the normal water holding period. This water flows into the Sacramento River after it enters the American River.

Emergency Releases are generally limited to fields where an 11-day molinate hold has elapsed and circumstances beyond a conscientious grower's control lead to the need to release water. Growers granted such variances are instructed to drain water only to the extent necessary to restore a healthy growing environment for the rice seedlings.

DISCUSSION OF 2002 RICE SEASON

In 2002, the most significant conditions affecting concentrations of rice pesticides entering adjacent waterways included:

- An increase in planted rice acreage of 50,000 acres from 2001.
- A mid-May rain event that resulted in early water releases and uncontrolled releases that likely contributed to peak detections at the City of Sacramento and West Sacramento drinking water intakes. Current regulatory activities do not appear sufficient to prevent concentration of thiobencarb from exceeding the secondary MCL of 1.0 ppb at the Cities of Sacramento and West Sacramento when a major rain event occurs in May.
- Shifts in herbicide selection due to herbicide resistance and increased application rates on resistant weed species.
- Heavy reliance on a few effective pesticides due to the limited number of available products registered for use on rice.

- The contribution of drift during rice pesticide application.
- Weather and management practices that did not produce vigorous rice stands early in the season that could out compete weeds required increased herbicide use due to heavy weed pressure.
- Possible drift of dust from applications use of Bolero® 10G.
- Seepage from field borders that eventually flowed in agricultural drains.

RICE PESTICIDES RESEARCH

Rice Herbicide Resistance

Herbicide resistant weeds are increasing in geographic area in the Sacramento Valley rice growing counties. University of California, Davis (UCD) researchers have identified areas where resistance is occurring and continue to identify new areas. Molinate, thiobencarb, fenoxaprop, bensulfuron-methyl, bispyribac-sodium, and cyhalofop-butyl are all rice herbicide active ingredients where known herbicide resistance has been identified. Herbicide resistance is now known to exist where weed biotypes develop resistance to the mode of action of herbicides. This is referred to as cross resistance, wherein weeds expressing resistance to an herbicide will also express resistance to other herbicides with the same mode of action.

Research conducted by UCD indicates that to avert growing herbicide resistance to old and new herbicides, rice growers will be required to rotate modes of action, combine herbicides, and implement growing strategies which can decrease herbicide use. It has been suggested that pesticide label language could be used to encourage these strategies. Rice growers have the example of Londax® (bensulfuron-methyl) to remind them of how quickly weed resistance can develop when relying on a single chemical strategy for weed control. Research continues regarding cross and multiple resistance. Work also continues on developing submergence-tolerant and more competitive rice cultivars that can tolerate increased water depth for weed suppression. Rice growers are also encouraged to establish healthy rice stands and keep water as deep as possible during early rice establishment to help rice out-compete weeds.

Weed resistance to propanil has developed in foreign rice growing countries and in the southern United States. Researchers contend that had California not experienced a brief suspension of use in the late 1960's due to off-target phytotoxicity damage to adjacent crops that, it would be likely that resistance to propanil would already exist in the Sacramento Valley. Therefore, grower vigilance in rotation of herbicides will be important in delaying the development of weed resistance to propanil in California.

Registration Status of Future Herbicides Not Currently Registered in California

Clincher® (cyhalofop-butyl) was available for use on a maximum of 50,000 acres under provisions of a Section 18 Emergency Exemption in 2002 in Butte, Placer, Sacramento, Sutter, and Yuba counties. The use of Clincher® was restricted to rice basins/checks where a history of Delayed Phytotoxicity Syndrome existed and where infestations of bearded sprangletop density was one plant per square foot. Clincher® is a reduced risk herbicide and is much less toxic and persistant in water and soil than thiobencarb. A full Section 3 registration is near completion in California and will likely occur before the 2003 rice growing season.

Regiment® (bispyribac-sodium) is a new registered herbicide also considered much less persistant and less toxic to aquatic invertebrates than other herbicides used on rice. Neither of the new herbicides, when used alone, are effective against herbicide resistant watergrass. Both products are considered reduced risk herbicides, are used at low rates, and are less environmentally persistant than thiobencarb and molinate. Both Regiment® and Clincher® will be susceptible to weed resistance development if growers rely too heavily and do not incorporate a rotation stategy with other herbicides.

Cerrano® (clomazone), Sempra® (halosulfuron), and a new formulation fenoxaprop-ethyl Ricestar® are herbicides currently under registration review at DPR. Shark® (carfentrazone-ethyl) is undergoing further investigation regarding application methods that will avoid off site movement of the product. Currently DPR and FMC (registrant for Shark®) are discussing the proposed use of this material in 2003. Mustang® (cypermethrin) is a pyrethroid insecticide currently under review at DPR for rice water weevil control.

The availability of a wider array of herbicides could decrease reliance on herbicides such as propanil, molinate, and thiobencarb, thereby reducing the amount of these products currently used. This approach would spread out the use of herbicides currently used and help delay herbicide resistance as well.

2002 RICE PESTICIDES PROGRAM ACTIVITIES

Non-Regulatory Management Activities

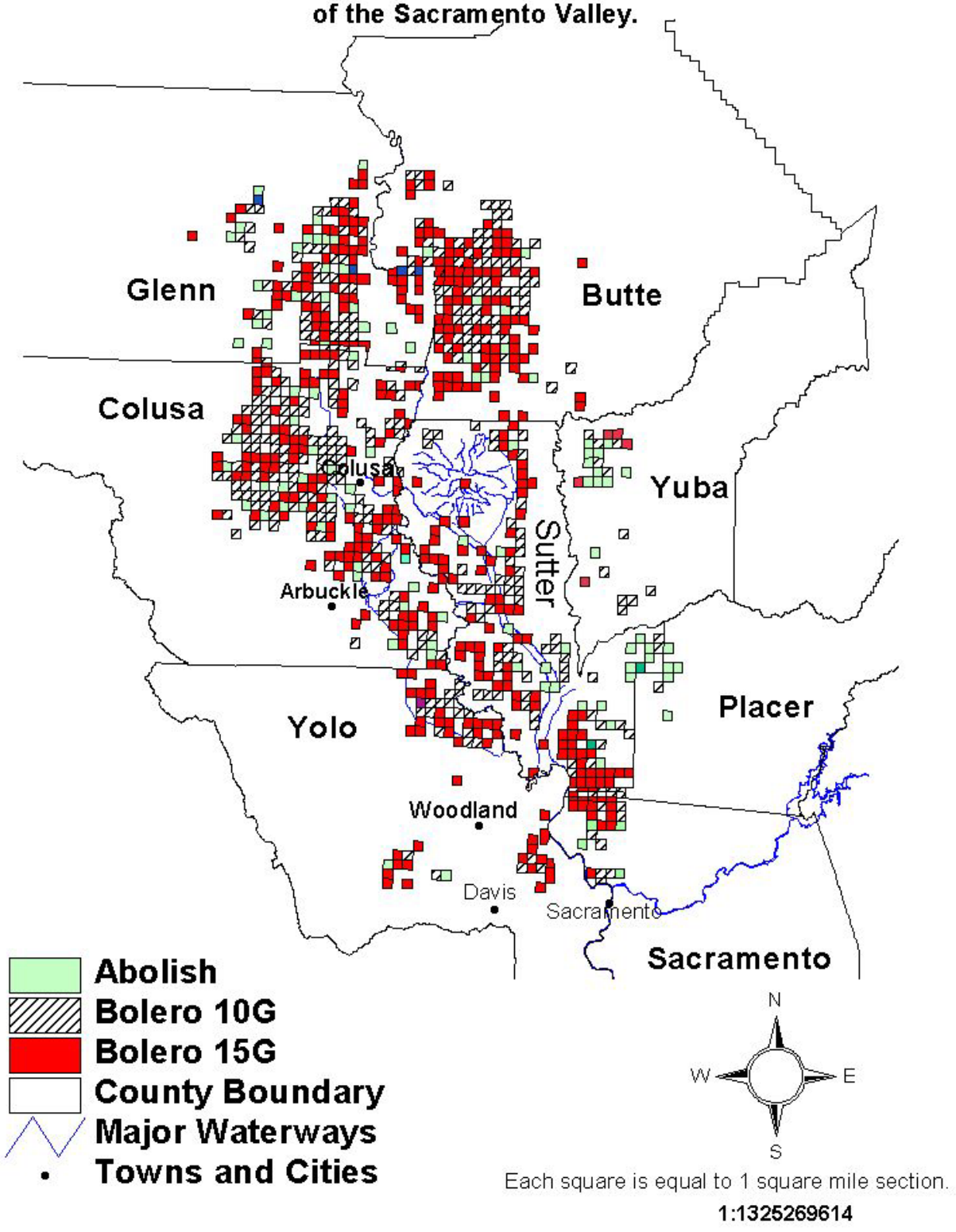
The cities of Sacramento and West Sacramento, the County of Sacramento, and the East Bay Municipal Utility District want to ensure that the Sacramento River is protected from rice pesticides. DPR is committed to responding to the cities' concerns and to work cooperatively with all stakeholders that are dealing with water quality issues related to rice pesticides. These stakeholders maintain that the water quality protection efforts of rice growers are the key component in keeping rice pesticides from reaching the Sacramento River. Educational outreach was provided to rice growers by these stakeholders in 2002 through various meetings and media prior to and during the rice pesticide application season.

The California Rice Commission conducted a Rice Pesticide Communications Outreach Plan with the Coalition for Urban/Rural Environmental Stewardship in 2002. The goal of the education and outreach was to inform rice growers, pest control advisors, crop consultants, applicators, and federal/state regulators about stewardship practices that allow for the safe and effective use of rice herbicides, insecticides, and fungicides in the rice production region of the Sacramento Valley. The participants developed materials that described best management practices and related water quality concerns of rice pesticides. Various media and outreach programs were used to distribute these materials in 2002.

In addition, because applications of Bolero® 10G resulted in dust and possible drift of material during applications, Valent, the primary manufacturer of Bolero® began to replace Bolero® 10G with a new 15G formulation that is less dusty. The company was to distribute the new Bolero® 15G for use in areas that were close to sensitive waterways. A final report from Valent about the

2002 stewardship efforts of Bolero® 15G is in Appendix 8. Figure 9, is a spatial depiction where different formulations of Bolero® were used in 2002 based on pesticide use data submitted to DPR by the CACs of the rice growing counties.

Figure 9. Bolero 10G, Bolero 15G, and Abolish applications from April 1 through July 31, 2002 in the rice growing region of the Sacramento Valley.



Rice Pesticide Program 2003

DPR, CRC, CVRWQCB, and CACs held meetings to discuss changes to the Rice Pesticide Program. The DPR and CVRWQCB roles are to establish necessary regulation to ensure water quality is protected from adverse levels of rice pesticides. DPR has proposed that the CRC assume the lead and assume responsibilities for the program beginning in 2003. DPR would be involved in reviewing, consultation, and regulatory issues in conjunction with the CVRWQCB. The CVRWQCB would make recommendations to the CRC regarding monitoring activities and necessary water quality endpoints that need to be adhered to.

Regulatory Proposals

DPR proposes no major regulatory program changes for 2003. The memorandum (Appendix 1) contains the description of the program to CACs. The program will continue to use restricted material permits and associated conditions to implement water management practices as a means to mitigate concentrations of rice pesticides in waterways adjacent to rice culture. DPR will work closely with the CVRWQCB and the CRC on necessary mitigation measures to meet established water quality criteria for rice pesticides.

Program Elements

Water Holding Requirements

The current water holding requirements are considered adequate for degrading pesticides to acceptable levels. Therefore, water-holding times will not change for molinate, thiobencarb, methyl parathion, and malathion. Carbofuran was not reported used and was not detected in any water samples in 2001. Rice growers in one of the several hydrologically-isolated areas may request that the CAC evaluate, on a case-by-case basis, whether discharges of water will flow into perennial streams.

Drift Control for Rice Pesticides

DPR continued its propanil monitoring activities on rice, determining the amount sold, the amount applied, and evaluating application and drift issues that occurred in 2002. DPR staff also assisted CACs in the counties of Butte, Colusa, Glenn, Placer, Sutter, Yolo, and Yuba counties with application permits.

USEPA's Office of Pesticide Programs released a draft Pesticide Registration (PR) Notice on improving pesticide product labeling. This PR Notice, *Spray and Dust Drift Label Statements for Pesticide Products*, was developed to inform pesticide applicators about the requirements to control off-target spray and dust drift. DPR will be submitting comments on the PR Notice to the USEPA before the end of 2001.

DPR is currently in the process of making changes to current drift regulations located in the California Code of Regulations. Changes include deleting out-dated language, revising current regulation sections, and creating a new section on drift minimization. It is anticipated that changes to the California drift regulations will occur sometime in 2002, after the rice application season.

Seepage

DPR is evaluating the seepage inspections performed in 2002 and will determine if further action is necessary to address the problem of seepage.

Emergency Release Provisions

Emergency release provisions will not change for the 2002 rice season. Rice growers and CACs have demonstrated they utilize emergency releases only as a last resort, demonstrating an improvement in water management. Detailed emergency release provisions are in Appendix 2.

Enforcement

CACs and DPR enforcement will continue enforcement activities that include issuing restricted material permits; inspecting pesticide mixing, loading, and application; inspecting and tracking water holding requirements; and enforcing existing provisions of the rice pesticide program.

Monitoring

DPR will continue to evaluate environmental hazards of proposed pesticides for use on rice in California and determine whether monitoring for these compounds is warranted on an as-needed basis when environmental hazards are evaluated. Monitoring for methy parathion and malathion is unnecessary as long as use is virtually ceased.

The rice industry and DPR are discussing other regulatory and non-regulatory actions that can be implemented for the 2003 rice season that would reduce the impact of rice pesticides on water quality.