



State of California
California Environmental Protection Agency
AIR RESOURCES BOARD

**Final Report on Ambient Air Monitoring
for Propanil
In Colusa, Butte and Glenn Counties during June and July 2008**

Prepared by

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This report has been reviewed by the staff of the California Air Resources Board (CARB) and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Monitoring Report Approval

Report Title: Report on Ambient Air Monitoring For Propanil
in Colusa, Butte and Glenn Counties
During June and July 2008

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Executive Summary

Report on Ambient Air Monitoring For Propanil In Colusa, Butte and Glenn Counties During June and July 2008

At the request of the Department of Pesticide Regulation (DPR), the Air Resources Board (ARB) conducted ambient air monitoring for propanil in Colusa, Butte and Glenn Counties during June and July 2008. Propanil is applied directly to rice fields either by aerial application or ground spraying and is used as an herbicide to control a wide range of grasses and broad-leaved weeds within rice fields. Ambient Air Monitoring was conducted to coincide with the use of propanil during the rice growing season.

Two hundred and twenty four (224) field samples, including four (4) field spikes and four (4) trip spikes, were collected from six different locations throughout Colusa, Butte and Glenn Counties. The sampling locations were chosen for their proximity to both agricultural fields and populations. Samples were collected by passing a measured volume of ambient air through quartz filters using an Air-Metrics Mini-Vol ambient air sampler. The sampling flow rate of 3.0 liters per minute (lpm) was accurately measured and logged during the continuous 24 hour ambient air sampling. The filters were protected from direct sunlight and supported about 1.5 meters above roofline in an open secured area which meets ambient monitoring siting criteria. At the end of each sampling period, the filters were placed in filter containers with an affixed identification label. At the end of each sampling event, the sample filters were transported on blue ice, as soon as possible, to the ARB Sacramento Monitoring and Laboratory Division laboratory for analysis. The samples were then stored in a freezer until analyzed.

- Reported propanil results indicated ambient concentrations ranging from less than the Method Detection Limit ($0.004 \mu\text{g}/\text{m}^3$) to a maximum of $0.149 \mu\text{g}/\text{m}^3$ occurring at Richvale Elementary School on July 9, 2008.

Quality control field samples included 24 collocated pairs, 4 field spikes, 4 trip spikes, and 4 lab spikes. The average percent difference for the collocated pairs is -4.64 %. Laboratory staff prepared the spikes at $0.500 \mu\text{g}$ of propanil per sample. The average Field spike recovery percentage is 106 % with a standard deviation of 21.3 %. All field spikes were collected at the Chico Air Monitoring Station. The average trip spike recovery is 93% with a standard deviation of 13%. The average laboratory spike recovery is 92% with a standard deviation of 10.3%.

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1.0 Introduction

At the request of the California Department of Pesticide Regulation (DPR) (January 4, 2008 Memorandum, Warmerdam to Goldstene, Appendix F), the Air Resources Board (ARB) staff conducted sampling of airborne concentrations of propanil in Colusa, Glenn and Butte Counties. The ambient air monitoring program was performed over an eight (8) week period. Ambient air monitoring was conducted to coincide with the use of propanil as an herbicide on rice fields.

Two hundred and twenty four (224) ambient air samples, including four (4) field spikes and four (4) trip spikes, were collected at six (6) different monitoring sites in Colusa, Glenn and Butte Counties from June 9, 2008 to August 1, 2008. The monitoring was performed under the requirements of AB 1807/3219 (Food and Agricultural Code, Division 7, Chapter 3, Article 1.5) which requires the ARB, "...to document the level of airborne emissions...of pesticides that may be determined to pose a present or potential hazard...", when requested by the DPR.

2.0 Sampling Sites

As part of the Cal/EPA Environmental Justice (E.J.) Action Plan, DPR recommended ambient air monitoring of 3,4-dichloropropionanilide (propanil) and the breakdown product 3,4-dichloroaniline, in rural communities to address the environmental risk factors that impact children's health.

DPR selected 16 communities in Glenn, Butte, Sutter, Colusa, Yuba, Placer, and Yolo counties based on their proximity to propanil applications. Being at close proximity to agricultural fields, California rural communities have the potential for elevated levels of propanil in the air relative to urban communities. Propanil use during peak months June and July 2005 are shown in, Figures 1 and 2. Similarly, Figures 3 and 4 show propanil use in 2006. These communities were identified by name in the 2000 U.S. Census (U.S. Census Bureau, 2000), and are also included in a spatial dataset given by the U.S. Census Bureau for use in a Geographic Information Systems (GIS).

These 16 communities were rated on the following categories and subcategories:

- Environmental justice factors
- Population density of children (less than 18 years old) per square mile
- Median family income
- Hispanic population percentage
- Non-white population percentage
- Pesticide use • Regional (within 5 mile radius of community) use density of propanil
- Local (within 1 mile radius of community) use density of propanil.

Using the data from the 16 communities, each community was ranked for each category of the four (4) Environmental Justice factors. The four (4) Environmental Justice Factors include median family income, Hispanic population percentage, non-White population percentage and pesticide use, and ranking them from highest to lowest. Then the four ranks of each community were added together to establish one value per community. These values were ranked again from highest to lowest.

ARB staff, in consultation with DPR, chose six sampling sites (five air monitoring sites and one urban background site). These sites were selected in relatively high-population areas or in areas frequented by people (e.g., schools or school maintenance buildings). In addition to the primary samples, replicate (co-located) samples were collocated every other week at each sampling location. The ambient air monitoring sites were located in areas where there is high use of propanil and where environmental justice factors are highest.

ARB staff, in consultation with DPR, selected these sampling sites based upon several factors:

- Historical use of propanil as indicated by use-maps.
- Proximity of sampling site to agricultural fields.
- Presence or proximity of residents, students, or populations in general to rice fields.
- Considerations for both staff accessibility and security of the sampling equipment.
- Maximum practical compliance with established siting criteria.

These sites are indicated in Figure 5, Satellite View of Propanil Sampling Sites

Chico Air Monitoring Station (urban background site)
468 Manzanita Avenue
Chico, CA 95926
530-949-7496

Public Works Office
755 6th Street
Williams, CA 95987
530-473-2519

George T. Egling Middle School
813 Webster Street
Colusa, CA 95932
530-458-8107

Maxwell Elementary School
146 North Street
Maxwell, CA 95955
530-438-2401

Willows Intermediate School
1145 W Cedar Street
Willows, CA 95988
530-330-1042

Richvale Elementary School
5236 Church Street
Richvale, CA 95974
530-868-1281

At each sampling site, four 24-hour samples were collected per week with the addition of one collocated sample from each site every other week. ARB personnel collected the samples over an eight-week period from June 9 through August 1, 2008. The 24-hour samples collected Monday through Friday (4 samples/week per site) at the flow rates of 3.0 lpm.

The background site was chosen for its greater relative distance from agricultural areas. Photographic images of each of the following monitoring sites are presented in Appendix A:

Figure 1

Propanil Use, June 2005 Map

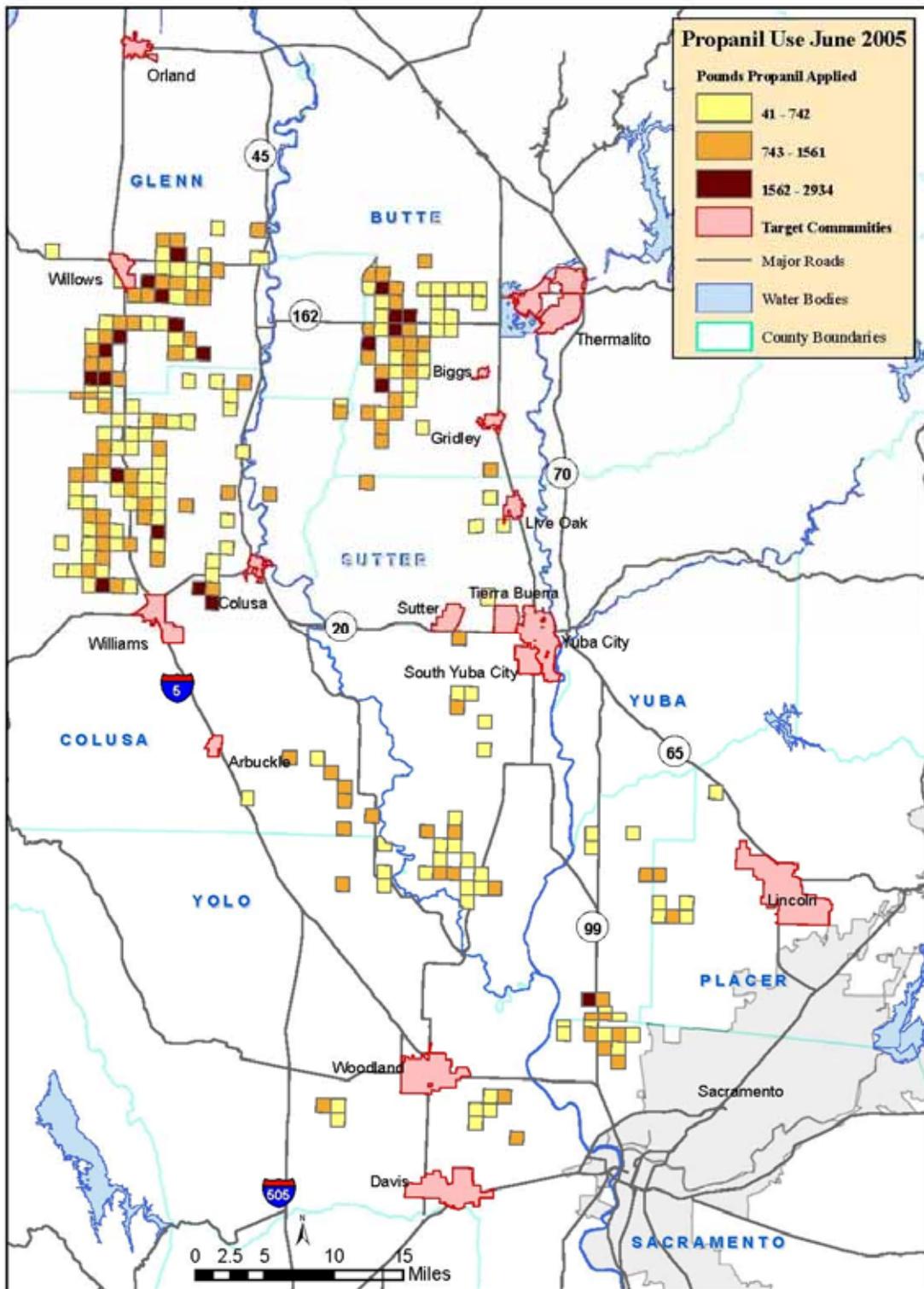


Figure 2

Propanil Use, July 2005 Map

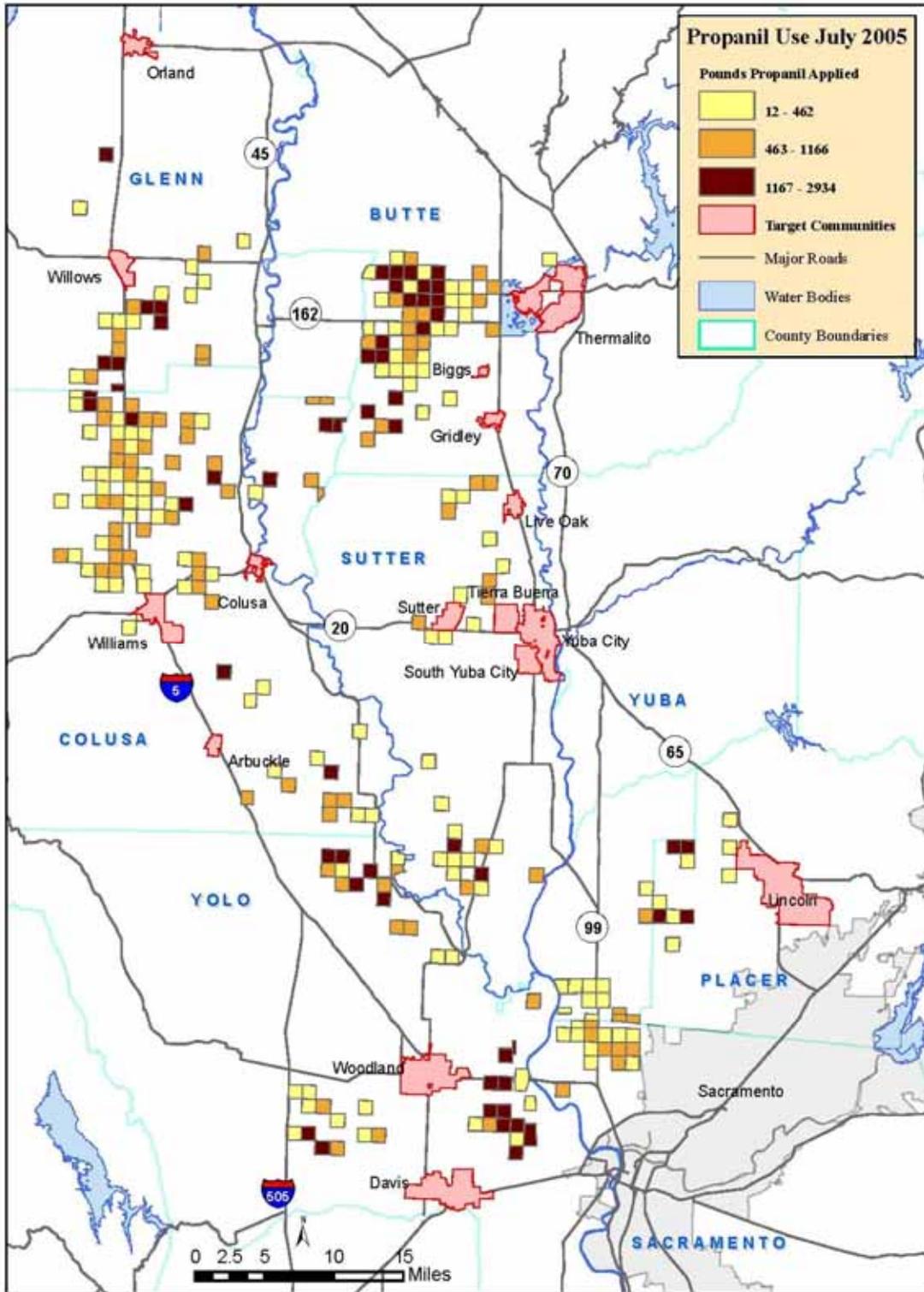


Figure 3

Propanil Use, June 2006 Map

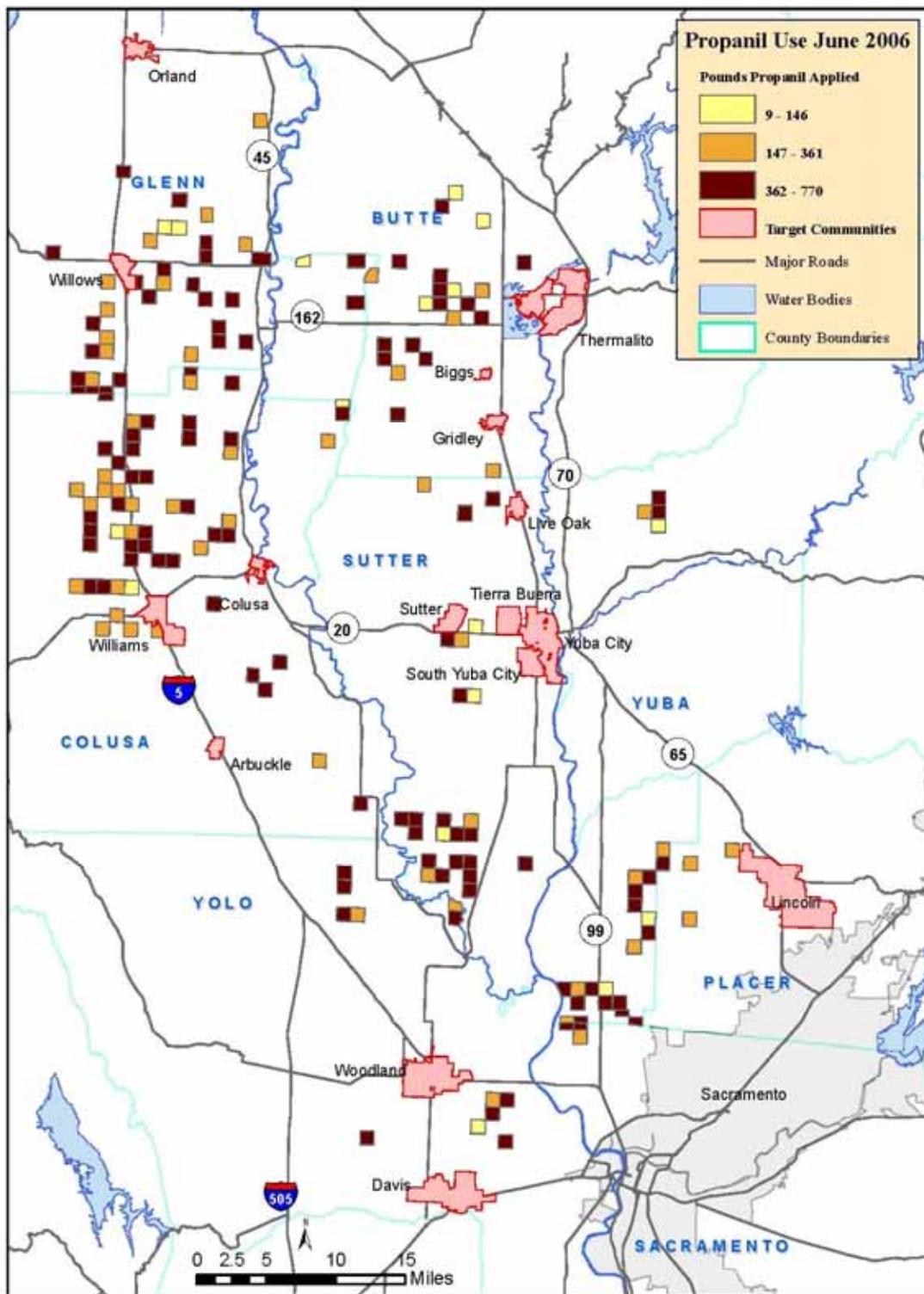


Figure 4

Propanil Use, July 2006 Map

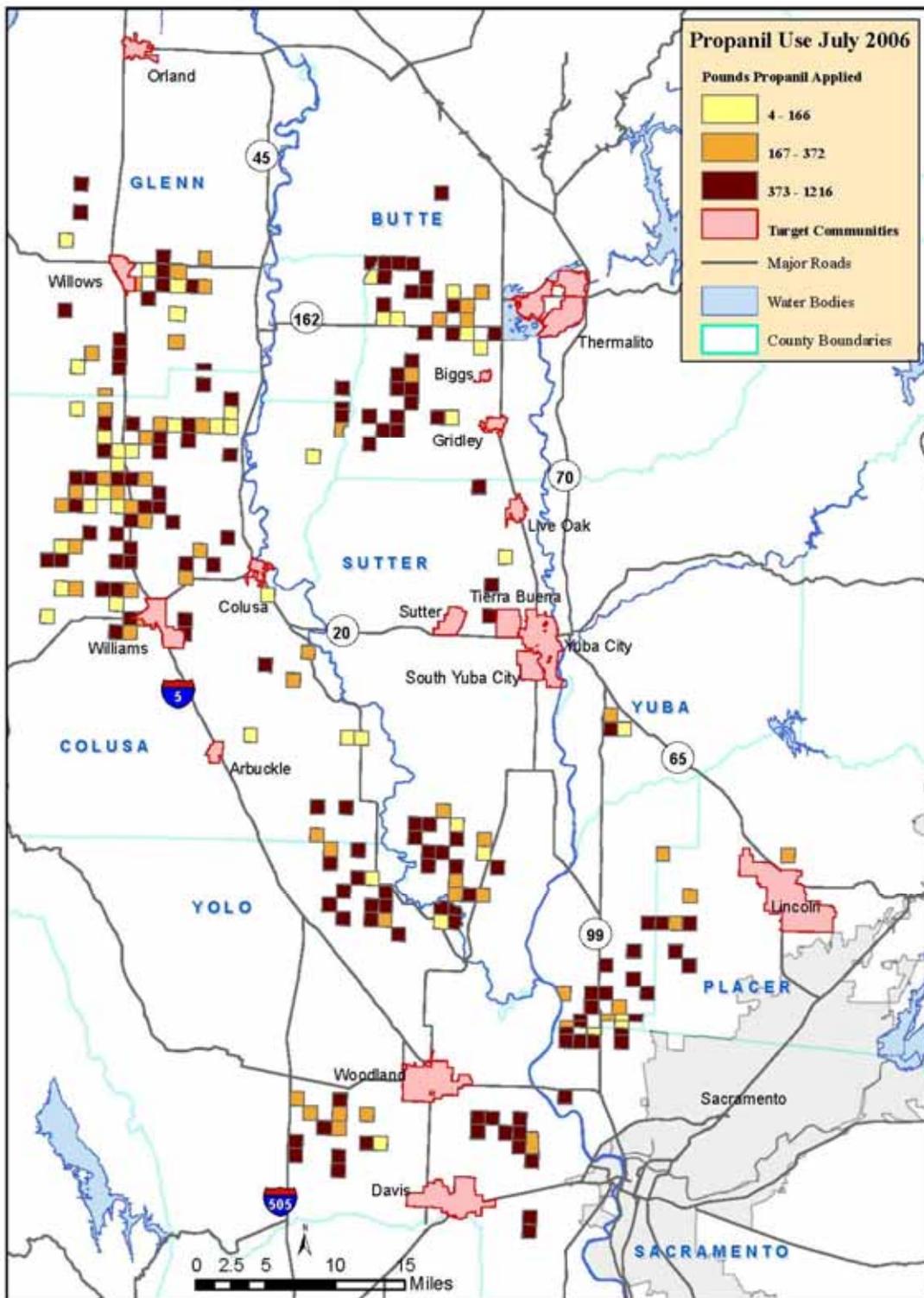


Figure 5

Satellite Map of Propanil Sampling Sites



Figure 6

Satellite Map of Chico Air Monitoring Station

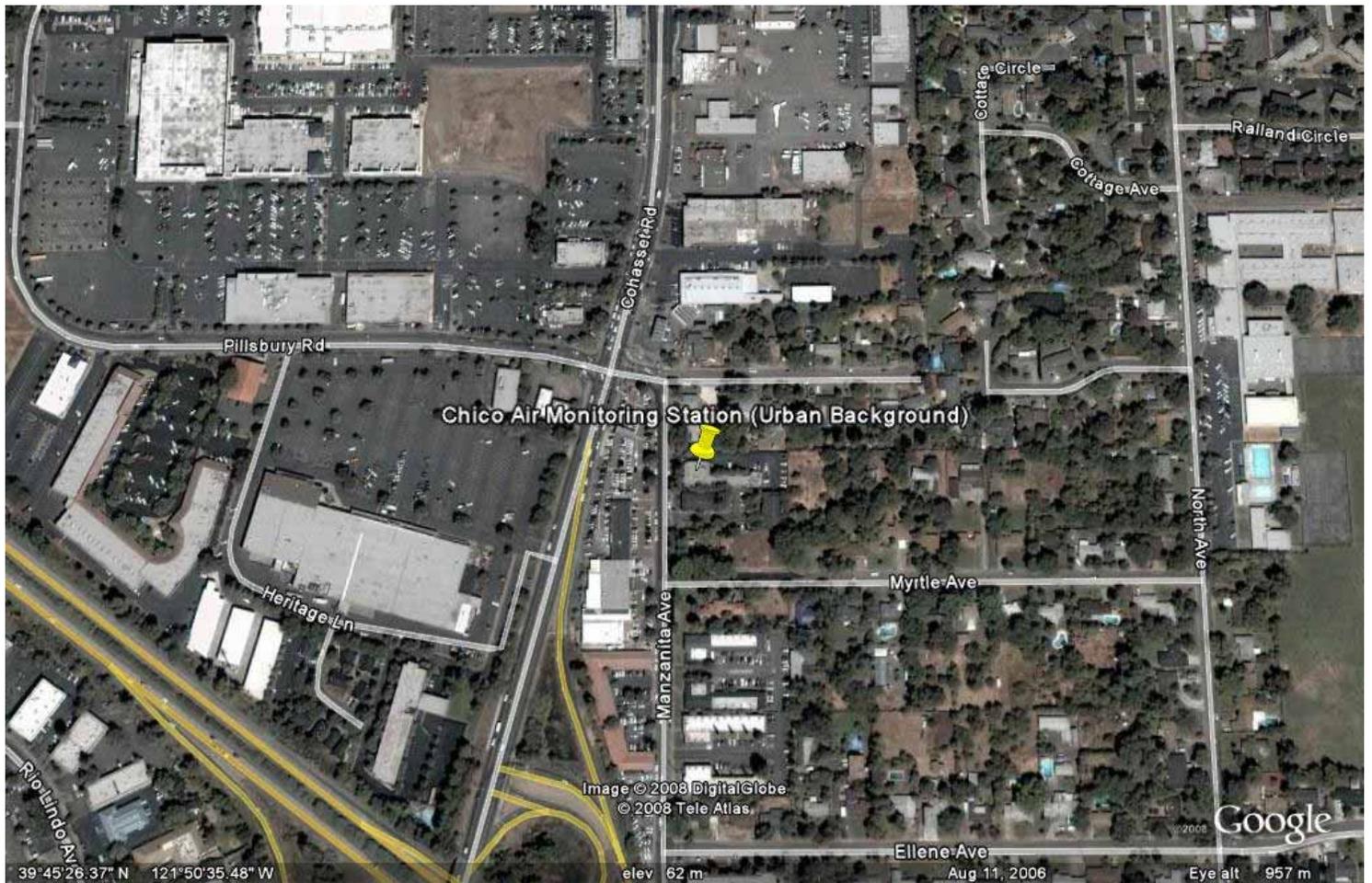


Figure 7

Satellite Map of Richvale Elementary School

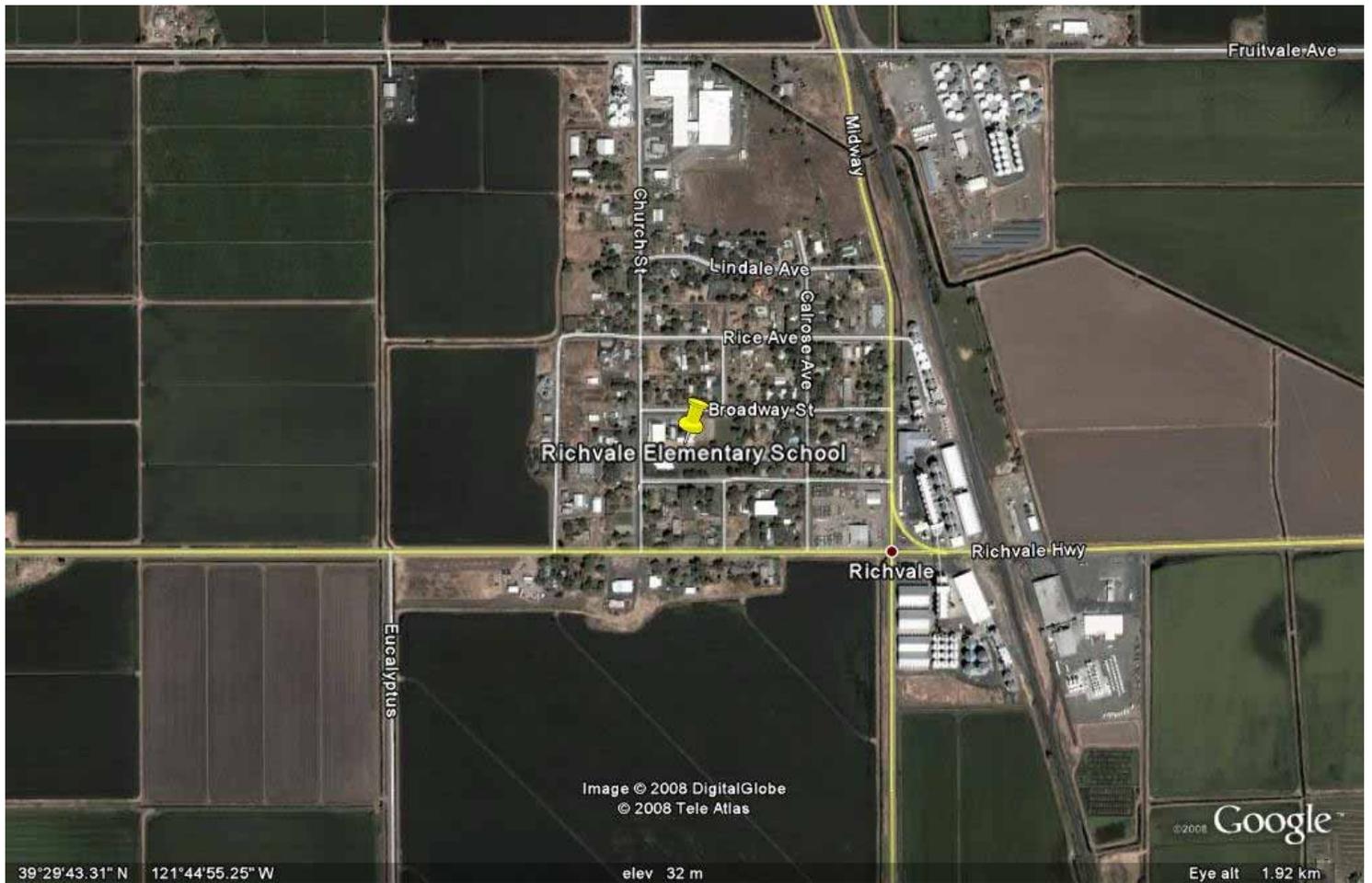


Figure 8

Satellite Map of Willows Intermediate School

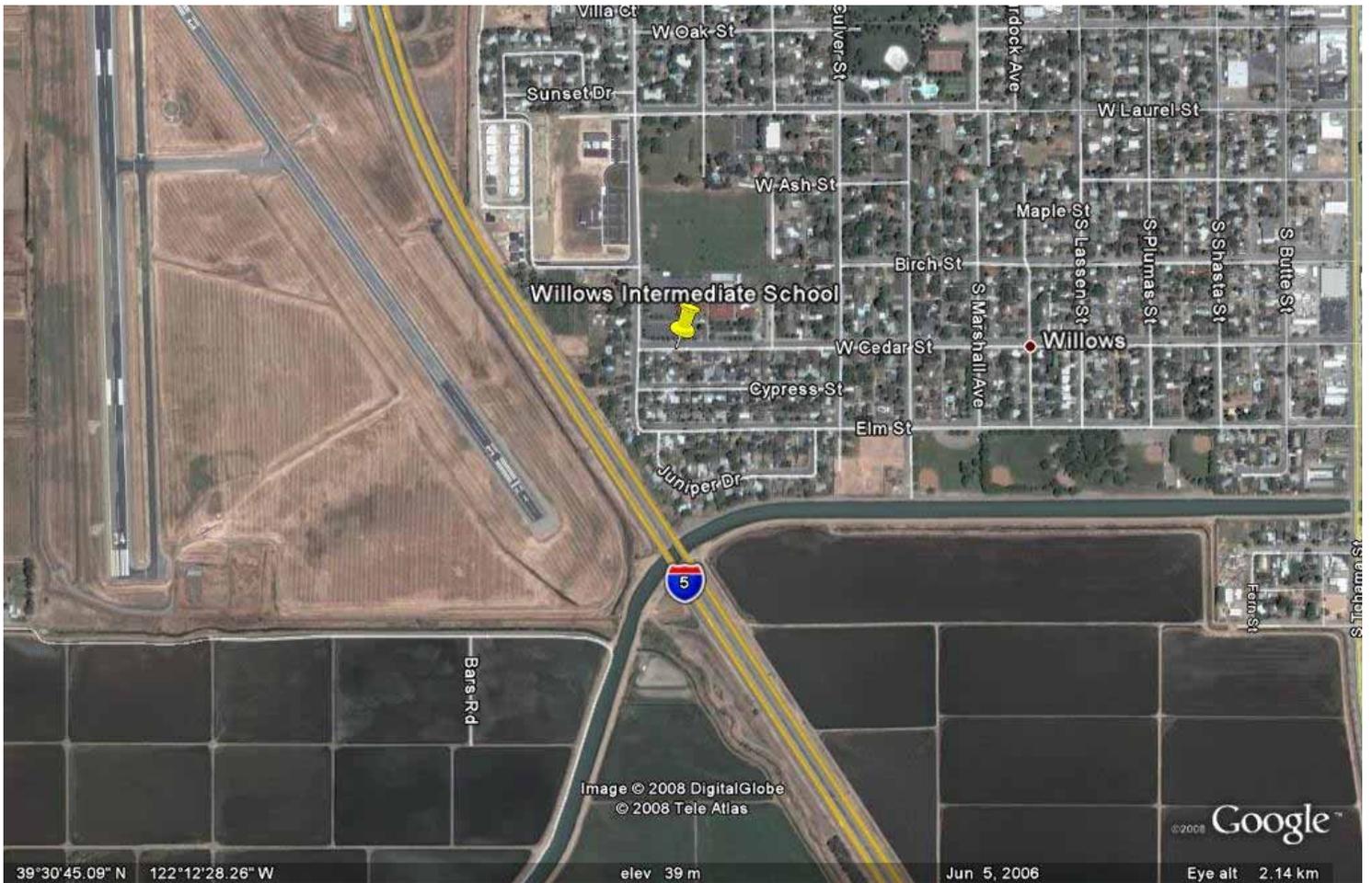


Figure 9

Satellite Map of Maxwell Elementary School

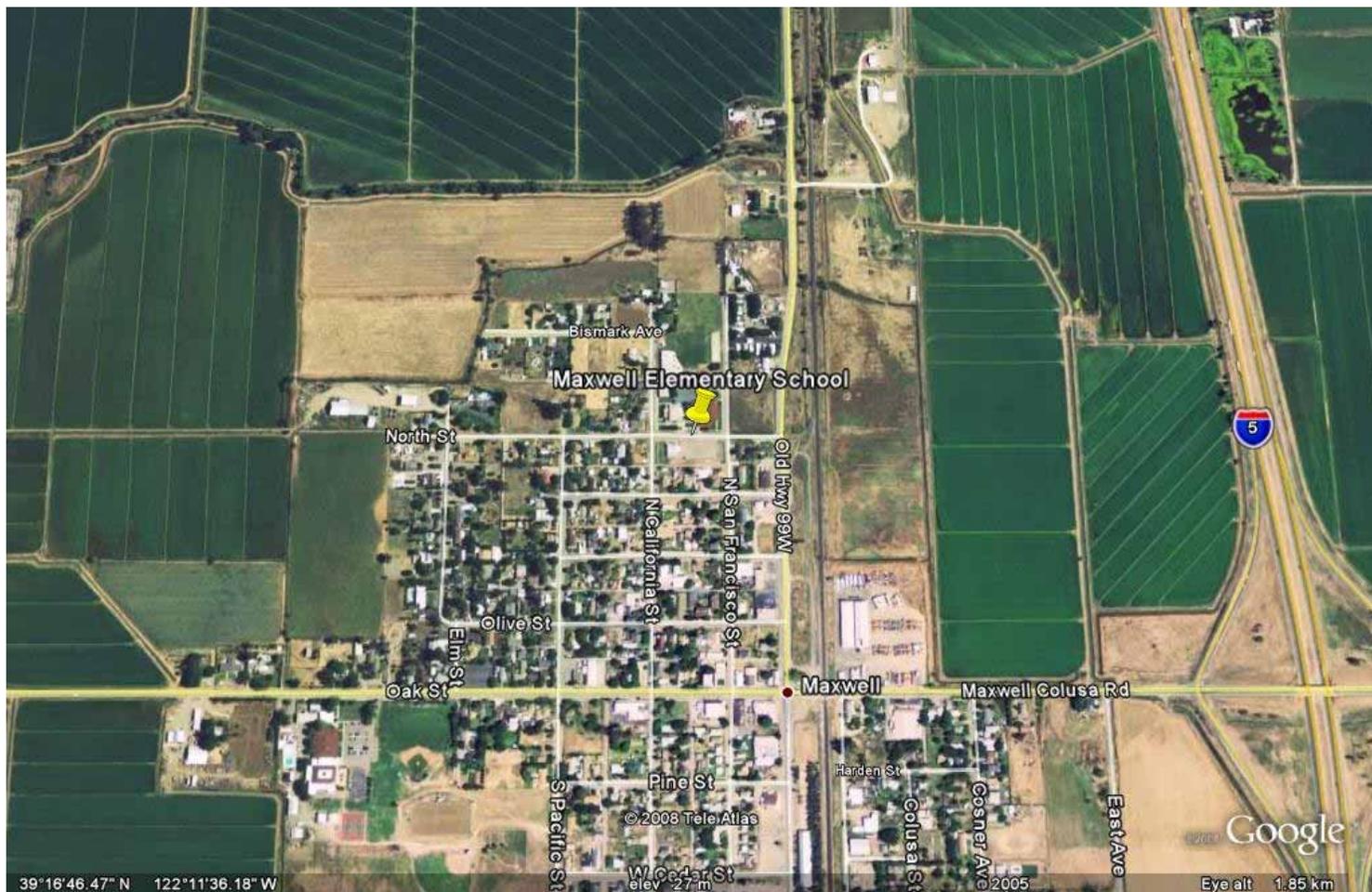


Figure 10

Satellite Map of George T. Egling Middle School, Colusa

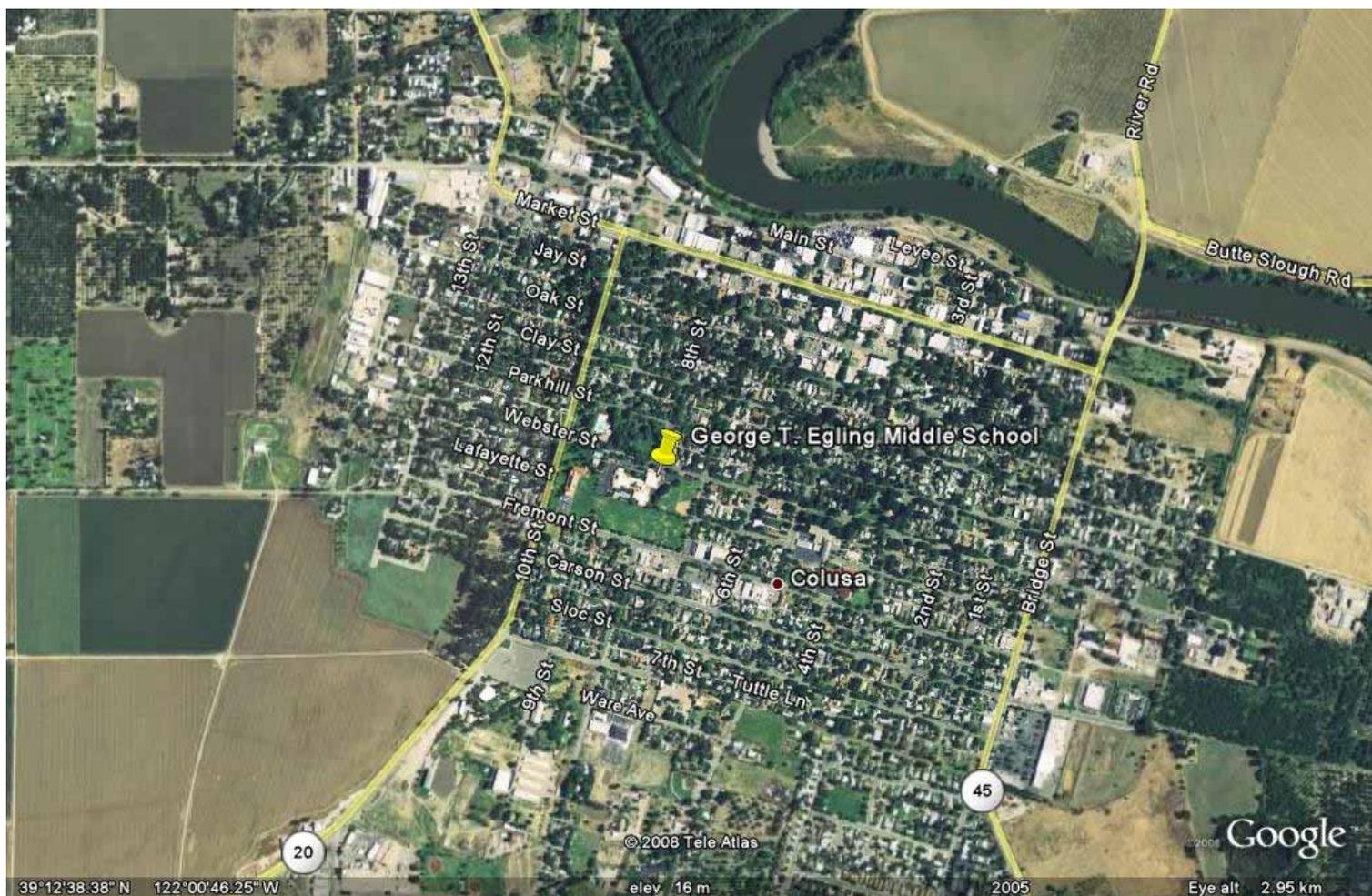


Figure 11

Satellite Map of Public Works Office



3.0 Methods

Samples were collected by passing a measured volume of ambient air through quartz filters as shown in Figure 12 (page 17), Ambient Air Sampler Mounted on Tripod. The sampling flow rates of 3.0 liters per minute (lpm) were accurately measured and the sampling system operated continuously for 24 hours \pm 1 hour with the exact operating interval recorded in the logbook. The filters were protected from direct sunlight. The sampling trees were approximately 1.5 meters above roofline and in an open secured area. At the end of each sampling period, the filters were placed in their filter containers with an identification label affixed. The quartz filters were stored in an ice chest with (blue ice) and transported to the ARB Sacramento Monitoring and Laboratory Division laboratory for analysis. The samples were stored in the freezer or extracted/analyzed immediately.

An AALBORG certified mass flow meter (MFM) was used to measure sample flow rates. The flow rates were set to 3.0 lpm, as measured using a digital MFM scaled from 0-10 lpm before the start of each sampling period. The flow rate was measured and adjusted as needed, using the MFM, at the end of each period. Samplers were leak-checked prior to each sampling period with the sampling tubes installed. Any change in the flow rates were recorded in the field logbook. The field logbook was also used to record start and stop times, start and stop flow rates, start and stop counter readings, sample identifications and any other significant data.

The certification certificate for the MFM is located in Appendix E.

In addition to ambient air samples, quality control samples consisting of collocated samples, field spikes and trip spikes were collected.

For details of the monitoring method, please refer to Appendix B, "Protocol for the Ambient Air Monitoring of Propanil" (dated June 13, 2008). There were no significant deviations from this protocol during the ambient monitoring study.

Collected samples were analyzed by the Special Analysis Laboratory Section of MLD's Northern Laboratory Branch, who performed the analyses for propanil collected by the quartz fiber filter method. Laboratory analyses were performed in accordance with the standard operating procedures "Standard Operating Procedure for Sampling and Analysis of 3,4-Dichloropropionanilide (Propanil) in Application and Ambient Air using Gas Chromatography/Mass Selective Detector" (Appendix C).

Appendix C contains the laboratory results report entitled, "Laboratory Results Report".



Figure 12

Ambient Air Sampler Mounted on Tripod

4.0 Results

The results collected at six (6) different monitoring sites in Colusa, Glenn and Butte Counties from June 9, 2008 to August 1, 2008 are located in Tables 1 through 6 on the following pages. The sampling results from each site were graphed to show comparison to the method estimated quantitation limit (EQL) of 0.02 µg/m³ and method detection limit (MDL) of 0.004 µg/m³ (based on a target sampling volume of 4.3 lpm). The analytical results from the Special Analysis Laboratory Section of MLD's Northern Laboratory Branch are presented in Table 3, "Propanil Ambient Air Monitoring Results for Butte, Glenn, and Colusa County 2008" located in Appendix C, "Laboratory Results Report". For additional information on these results, please refer to Appendix C and see below.

A sequential Log Number (#) was assigned to each sample by field staff prior to sampling or processing as a quality control sample. At the same time, a unique Sample Identification Name was assigned to each sample.

Site/Sample Identification

The propanil sampling sites will be named accordingly for the locations, Date and type of sample:

Ambient Site Naming:

CHIC 1-32	Chico Air Monitoring Station
IAMS 1-32	Public Works Office
MAXW 1-32	Maxwell Elementary School
WILL 1-32	Willows Intermediate School
COLU 1-32	George T. Egling Middle School
RICH 1-32	Richvale Elementary School

Note: Site addresses are located section 2.0 page 3

Letter Abbreviations as follows

FS = Field Spike
CO= Co-located
TS = Trip Spike
TB = Trip Blank

In addition, the following abbreviations are also used in this report:

MDL – Method Detection Limit
EQL – Estimated Quantitation Limit
LOD – Level of Detection

Out of a total of 224 collected samples (216 ambient including four field spikes and four trip spikes) 219 samples are considered valid for a **data completeness of 98%**.

Log #	Date	Sample Name	Corrected Average Flow (lpm)	Sample Run Time (min)	Total Volume Cubic Meters (m ³)	Propanil Results (µg/sample)	Propanil Results (µg/m ³)
001	6/9/08	RICH-1-P017	3.00	1447.20	4.34	0.130	0.030
007	6/10/08	RICH-2-P012	3.24	1447.80	4.69	0.032	0.007
019	6/11/08	RICH-3-P008	3.24	1416.00	4.59	0.030	0.007
025	6/12/08	RICH-4-P049	3.05	1524.00	4.65	0.101	0.022
033	6/16/08	RICH-5-P044	3.02	1452.00	4.39	0.326	0.074
045	6/17/08	RICH-6-P019	3.08	1446.00	4.45	0.275	0.062
051	6/18/08	RICH-7-P047	3.08	1434.00	4.41	0.156	0.035
057	6/19/08	RICH-8-P053	3.02	1428.00	4.32	0.210	0.049
063	6/23/08	RICH-9-P063	3.02	1440.00	4.35	0.153	0.035
075	6/24/08	RICH-10-P243	3.02	1440.00	4.35	0.180	0.041
082	6/25/08	RICH-11-P236	3.02	1446.00	4.37	0.183	0.042
088	6/26/08	RICH-12-P270	3.02	1452.00	4.39	0.578	0.132
094	6/30/08	RICH-13-P266	3.10	1458.00	4.53	0.174	0.038
106	7/1/08	RICH-14-P238	3.02	1446.00	4.37	0.161	0.037
112	7/2/08	RICH-15-P253	3.02	1416.00	4.28	0.151	0.035
118	7/3/08	RICH-16-P262	3.02	1440.00	4.35	0.090	0.021
124	7/7/08	RICH-17-P264	3.02	1452.00	4.39	0.278	0.063
130	7/8/08	RICH-18-P226	3.02	1524.00	4.61	0.334	0.073
136	7/9/08	RICH-19-P280	3.02	1410.00	4.26	0.634	0.149
142	7/10/08	RICH-20-P282	3.02	1380.00	4.17	0.307	0.074
150	7/14/08	RICH-21-P078	3.02	1434.00	4.33	0.124	0.029
156	7/15/08	RICH-22-P257	3.02	1428.00	4.32	0.110	0.025
162	7/16/08	RICH-23-P209	3.02	1440.00	4.35	0.093	0.021
168	7/17/08	RICH-24-P162	3.02	1416.00	4.28	0.125	0.029
174	7/21/08	RICH-25-P207	3.02	1392.00	4.21	0.130	0.031
180	7/22/08	RICH-26-P144	3.02	1476.00	4.46	0.178	0.040
188	7/23/08	RICH-27-P159	3.02	1398.00	4.22	0.079	0.019
194	7/24/08	RICH-28-P147	1.37	372.00	0.51	0.064	0.125
200	7/28/08	RICH-29-P084	3.02	1416.00	4.28	<0.02	<0.004
206	7/29/08	RICH-30-P153	3.02	1428.00	4.32	<0.02	<0.004
212	7/30/08	RICH-31-P088	3.02	1434.00	4.33	0.039	0.009
218	7/31/08	RICH-32-P200	3.02	1524.00	4.61	0.039	0.008

Table 1
Monitoring Results Richvale Elementary School

Log #	Date	Sample Name	Corrected Average Flow (lpm)	Sample Run Time Minutes (min)	Total Volume Cubic Meters (m ³)	Propanil Results (µg/sample)	Propanil Results (µg/m ³)
002	6/9/08	CHIC-1-P004	3.05	1442.40	4.40	0.079	0.018
009	6/10/08	CHIC-2-P028	3.16	1438.80	4.55	0.027	0.006
020	6/11/08	CHIC-3-P039	3.10	1408.20	4.37	0.032	0.007
026	6/12/08	CHIC-4-P046	3.02	1514.40	4.58	0.051	0.011
035	6/16/08	CHIC-5-P065	3.02	1445.40	4.37	0.044	0.010
046	6/17/08	CHIC-6-P029	3.13	1451.40	4.55	0.052	0.011
052	6/18/08	CHIC-7-P032	3.10	1423.80	4.42	0.043	0.010
058	6/19/08	CHIC-8-P054	3.02	1427.40	4.31	0.062	0.014
065	6/23/08	CHIC-9-P062	3.10	1440.60	4.47	0.060	0.013
076	6/24/08	CHIC-10-P240	3.10	1432.80	4.45	0.104	0.023
083	6/25/08	CHIC-11-P249	3.02	1444.20	4.36	0.107	0.025
089	6/26/08	CHIC-12-P300	3.08	1446.60	4.45	0.099	0.022
096	6/30/08	CHIC-13-P284	3.02	1464.60	4.43	0.087	0.020
107	7/1/08	CHIC-14-P242	3.02	1424.40	4.30	0.055	0.013
113	7/2/08	CHIC-15-P256	3.02	1424.40	4.30	0.070	0.016
119	7/3/08	CHIC-16-P241	3.02	1426.80	4.31	0.074	0.017
125	7/7/08	CHIC-17-P278	3.02	1434.00	4.33	0.070	0.016
131	7/8/08	CHIC-18-P259	3.02	1524.00	4.61	0.072	0.016
137	7/9/08	CHIC-19-P245	3.02	1417.20	4.28	0.113	0.026
143	7/10/08	CHIC-20-P224	3.02	1380.60	4.17	0.129	0.031
151	7/14/08	CHIC-21-P281	3.02	1438.80	4.35	0.097	0.022
157	7/15/08	CHIC-22-P199	3.02	1422.00	4.30	0.096	0.022
163	7/16/08	CHIC-23-P178	3.02	1443.00	4.36	0.078	0.018
169	7/17/08	CHIC-24-P172	3.02	1415.40	4.28	0.075	0.018
175	7/21/08	CHIC-25-P220	3.02	1389.00	4.20	0.117	0.028
182	7/22/08	CHIC-26-P164	-0.28	0.00	0.00	0.116	Invalid
189	7/23/08	CHIC-27-P216	3.02	1412.40	4.27	0.053	0.012
195	7/24/08	CHIC-28-P272	3.02	1404.60	4.24	0.054	0.013
201	7/28/08	CHIC-29-P245	3.02	1414.80	4.28	<0.02	<0.004
207	7/29/08	CHIC-30-P283	3.02	1427.40	4.31	<0.02	<0.004
213	7/30/08	CHIC-31-P187	3.02	1430.40	4.32	0.020	0.005
219	7/31/08	CHIC-32-P074	3.02	1519.20	4.59	0.026	0.006

Table 2
Monitoring Results Chico Air Monitoring Station

Log #	Date	Sample Name	Corrected Average Flow (lpm)	Sample Run Time Minutes (min)	Total Volume Cubic Meters (m ³)	Propanil Results (µg/sample)	Propanil Results (µg/m ³)
003	6/9/08	WILL-1-P038	3.20	1448.40	4.63	0.146	0.032
011	6/10/08	WILL-2-P006	3.16	1462.20	4.62	0.037	0.008
021	6/11/08	WILL-3-P060	3.02	1380.60	4.17	0.029	0.007
028	6/12/08	WILL-4-P025	3.02	1485.00	4.49	0.147	0.033
037	6/16/08	WILL-5-P052	3.02	1461.60	4.42	0.586	0.133
047	6/17/08	WILL-6-P021	3.02	1455.00	4.40	0.260	0.059
053	6/18/08	WILL-7-P033	3.02	1413.60	4.27	0.155	0.036
059	6/19/08	WILL-8-P036	3.02	1405.20	4.25	0.275	0.065
067	6/23/08	WILL-9-P005	2.99	1427.40	4.27	0.217	0.051
078	6/24/08	WILL-10-P090	3.08	1418.40	4.36	0.325	0.074
084	6/25/08	WILL-11-P283	3.02	1445.40	4.37	0.309	0.071
090	6/26/08	WILL-12-P265	2.99	1426.80	4.27	0.356	0.083
098	6/30/08	WILL-13-P294	3.02	1459.80	4.41	0.153	0.035
108	7/1/08	WILL-14-P285	3.02	1428.60	4.32	0.158	0.037
114	7/2/08	WILL-15-P098	3.02	1411.20	4.26	0.126	0.030
120	7/3/08	WILL-16-P247	3.02	1415.40	4.28	0.119	0.028
126	7/7/08	WILL-17-P073	3.02	1431.00	4.32	0.116	0.027
132	7/8/08	WILL-18-P250	3.02	1518.00	4.59	0.091	0.020
138	7/9/08	WILL-19-P272	3.02	1417.80	4.28	0.147	0.034
145	7/10/08	WILL-20-P227	3.02	1401.60	4.24	0.252	0.059
152	7/14/08	WILL-21-P277	3.02	1447.20	4.37	0.103	0.024
158	7/15/08	WILL-22-P211	3.02	1405.20	4.25	0.103	0.024
164	7/16/08	WILL-23-P139	3.02	1452.00	4.39	0.081	0.018
170	7/17/08	WILL-24-P140	3.02	1414.80	4.28	0.088	0.021
176	7/21/08	WILL-25-P168	3.02	1413.60	4.27	0.120	0.028
184	7/22/08	WILL-26-P151	3.02	1481.40	4.48	0.128	0.029
190	7/23/08	WILL-27-P165	3.02	1375.80	4.16	0.059	0.014
196	7/24/08	WILL-28-P198	3.02	1445.40	4.37	0.070	0.016
202	7/28/08	WILL-29-P062	3.02	1389.60	4.20	<0.02	<0.004
208	7/29/08	WILL-30-P085	3.02	1427.40	4.31	<0.02	<0.004
214	7/30/08	WILL-31-P118	3.02	1419.60	4.29	0.034	0.008
220	7/31/08	WILL-32-P126	3.02	1513.20	4.57	0.033	0.007

Table 3
Monitoring Results Willows Intermediate School

Log #	Date	Sample Name	Corrected Average Flow (lpm)	Sample Run Time (min)	Total Volume Cubic Meters (m ³)	Propanil Results (µg/sample)	Propanil Results (µg/m ³)
004	6/9/08	MAXW-1-P027	3.10	1453.20	4.51	0.242	0.054
013	6/10/08	MAXW-2-P018	3.16	1457.22	4.60	0.092	0.020
022	6/11/08	MAXW-3-P055	3.02	1387.20	4.19	0.064	0.015
029	6/12/08	MAXW-4-P010	3.08	1469.40	4.52	0.201	0.044
039	6/16/08	MAXW-5-P045	3.19	1418.40	4.52	0.398	0.088
048	6/17/08	MAXW-6-P007	3.02	1458.60	4.41	0.249	0.056
054	6/18/08	MAXW-7-P070	3.08	1409.40	4.34	0.331	0.076
060	6/19/08	MAXW-8-P057	3.02	1430.40	4.32	0.340	0.079
069	6/23/08	MAXW-9-P293	3.02	1448.40	4.38	0.183	0.042
079	6/24/08	MAXW-10-P271	3.08	1423.20	4.38	0.202	0.046
085	6/25/08	MAXW-11-P235	3.05	1418.40	4.33	0.265	0.061
091	6/26/08	MAXW-12-P263	3.02	1434.60	4.34	0.344	0.079
100	6/30/08	MAXW-13-P234	3.02	1540.80	4.66	0.145	0.031
109	7/1/08	MAXW-14-P268	3.02	1351.80	4.09	0.129	0.032
115	7/2/08	MAXW-15-P267	3.02	1399.80	4.23	0.135	0.032
121	7/3/08	MAXW-16-P231	3.02	1442.40	4.36	0.147	0.034
127	7/7/08	MAXW-17-P228	3.02	1429.80	4.32	0.176	0.041
133	7/8/08	MAXW-18-P232	3.02	1511.40	4.57	0.206	0.045
139	7/9/08	MAXW-19-P116	3.02	1420.80	4.29	0.269	0.063
146	7/10/08	MAXW-20-P230	3.02	1501.20	4.54	0.216	0.048
153	7/14/08	MAXW-21-P273	3.02	1446.00	4.37	0.101	0.023
159	7/15/08	MAXW-22-P141	3.02	1405.80	4.25	0.106	0.025
165	7/16/08	MAXW-23-P142	3.02	1461.60	4.42	0.097	0.022
171	7/17/08	MAXW-24-P169	3.02	1413.60	4.27	0.092	0.022
177	7/21/08	MAXW-25-P185	3.02	1416.00	4.28	0.119	0.028
185	7/22/08	MAXW-26-P137	3.02	1479.00	4.47	0.141	0.032
191	7/23/08	MAXW-27-P217	3.02	1378.80	4.17	0.068	0.016
197	7/24/08	MAXW-28-P103	3.02	1488.00	4.50	0.071	0.016
203	7/28/08	MAXW-29-P197	3.02	1399.20	4.23	<0.02	<0.004
209	7/29/08	MAXW-30-P124	3.02	1414.80	4.28	<0.02	<0.004
215	7/30/08	MAXW-31-P189	3.02	1417.20	4.28	0.031	0.007
221	7/31/08	MAXW-32-P190	3.02	1516.80	4.58	0.031	0.007

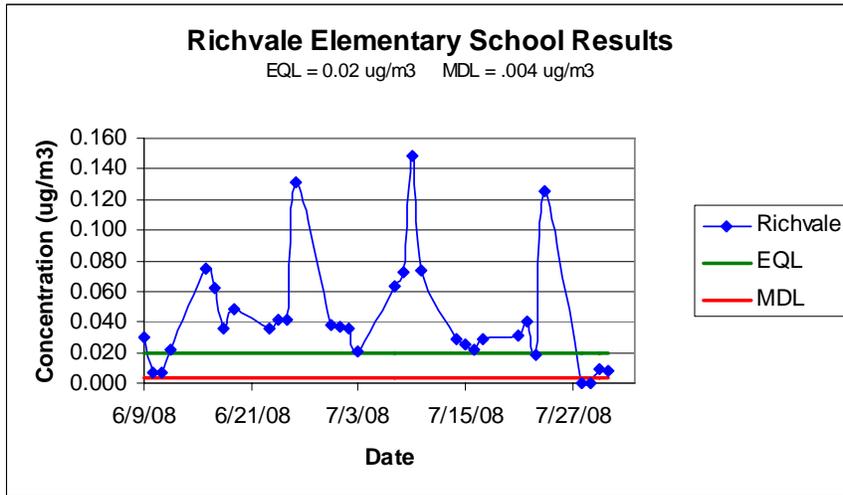
Table 4
Monitoring Results Maxwell Elementary School

Log #	Date	Sample Name	Corrected Average Flow (lpm)	Sample Run Time Minutes (min)	Total Volume Cubic Meters (m ³)	Propanil Results (µg/sample)	Propanil Results (µg/m ³)
005	6/9/08	COLU-1-P003	1.37	921.00	1.26	0.099	0.078
015	6/10/08	COLU-2-P034	3.10	1449.00	4.50	0.028	0.006
023	6/11/08	COLU-3-P048	3.10	1369.20	4.25	0.045	0.011
030	6/12/08	COLU-4-P016	3.10	1462.80	4.54	0.080	0.018
041	6/16/08	COLU-5-P064	3.02	1413.60	4.27	0.063	0.015
049	6/17/08	COLU-6-P031	3.02	1464.00	4.42	0.052	0.012
055	6/18/08	COLU-7-P069	2.97	1404.60	4.17	0.095	0.023
061	6/19/08	COLU-8-P050	3.02	1426.80	4.31	0.114	0.026
071	6/23/08	COLU-9-P290	3.02	1447.80	4.38	0.055	0.013
080	6/24/08	COLU-10-P261	3.05	1440.60	4.39	0.122	0.028
086	6/25/08	COLU-11-P295	3.08	1402.20	4.31	0.075	0.017
092	6/26/08	COLU-12-P291	3.02	1427.40	4.31	0.171	0.040
102	6/30/08	COLU-13-P289	3.02	1537.80	4.65	0.077	0.017
110	7/1/08	COLU-14-P237	3.02	1347.60	4.07	0.081	0.020
116	7/2/08	COLU-15-P254	3.02	1396.80	4.22	0.083	0.020
122	7/3/08	COLU-16-P296	3.02	1437.00	4.34	0.088	0.020
128	7/7/08	COLU-17-P255	3.02	1429.20	4.32	0.122	0.028
134	7/8/08	COLU-18-P225	3.02	1511.40	4.57	0.118	0.026
140	7/9/08	COLU-19-P233	3.02	1418.40	4.29	0.281	0.066
147	7/10/08	COLU-20-P279	3.02	1498.20	4.53	0.148	0.033
154	7/14/08	COLU-21-P274	3.02	1447.20	4.37	0.099	0.023
160	7/15/08	COLU-22-P204	3.02	1405.80	4.25	0.099	0.023
166	7/16/08	COLU-23-P180	3.02	1461.00	4.42	0.082	0.019
172	7/17/08	COLU-24-P143	3.02	1419.00	4.29	0.080	0.019
178	7/21/08	COLU-25-P191	3.02	1416.00	4.28	0.119	0.028
186	7/22/08	COLU-26-P146	3.02	1477.20	4.46	0.125	0.028
192	7/23/08	COLU-27-P152	3.02	1381.80	4.18	0.061	0.015
198	7/24/08	COLU-28-P093	3.02	1487.40	4.49	0.064	0.014
204	7/28/08	COLU-29-P203	3.02	1397.40	4.22	<0.02	<0.004
210	7/29/08	COLU-30-P215	3.02	1422.60	4.30	<0.02	<0.004
216	7/30/08	COLU-31-P112	3.02	1408.80	4.26	0.025	0.006
222	7/31/08	COLU-32-P075	3.02	1516.20	4.58	0.034	0.007

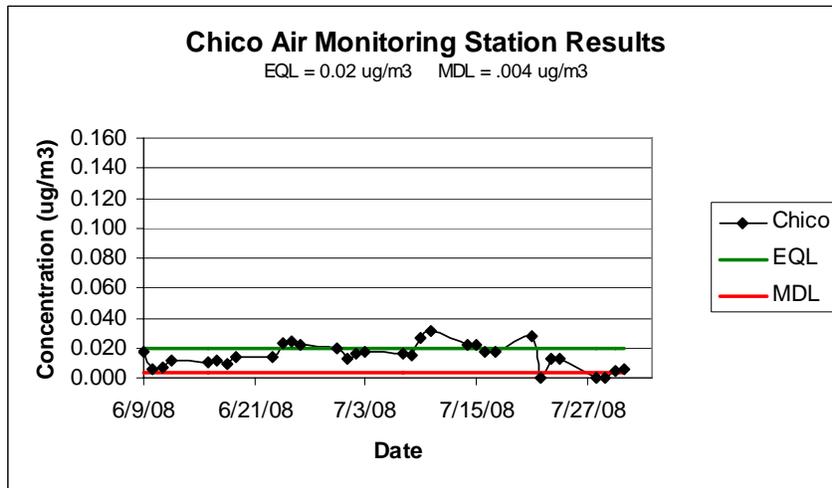
Table 5
Monitoring Results George T. Egling Middle School

Log #	Date	Sample Name	Corrected Average Flow (lpm)	Sample Run Time (min)	Total Volume Cubic Meters (m ³)	Propanil Results (µg/sample)	Propanil Results (µg/m ³)
006	6/9/08	IAMS-1-P026	3.08	1476.00	4.54	0.161	0.035
017	6/10/08	IAMS-2-P041	3.16	1434.60	4.53	0.052	0.011
024	6/11/08	IAMS-3-P056	3.19	1425.00	4.54	0.064	0.014
031	6/12/08	IAMS-4-P041	3.02	1402.80	4.24	0.151	0.036
043	6/16/08	IAMS-5-P051	3.02	1410.00	4.26	0.084	0.020
050	6/17/08	IAMS-6-P043	3.08	1470.00	4.52	0.120	0.027
056	6/18/08	IAMS-7-P009	3.02	1400.40	4.23	0.098	0.023
062	6/19/08	IAMS-8-P024	3.02	1418.40	4.29	0.142	0.033
073	6/23/08	IAMS-9-P297	3.02	1446.60	4.37	0.109	0.025
081	6/24/08	IAMS-10-P286	3.02	1441.80	4.36	0.173	0.040
087	6/25/08	IAMS-11-P248	3.02	1404.00	4.24	0.147	0.035
093	6/26/08	IAMS-12-P244	3.02	1419.60	4.29	0.174	0.041
104	6/30/08	IAMS-13-P239	3.02	1533.60	4.63	0.112	0.024
111	7/1/08	IAMS-14-P258	3.02	1345.80	4.07	0.090	0.022
117	7/2/08	IAMS-15-P251	1.37	116.40	0.16	0.061	invalid
123	7/3/08	IAMS-16-P107	3.02	1423.80	4.30	0.095	0.022
129	7/7/08	IAMS-17-P252	3.02	1427.40	4.31	0.105	0.024
135	7/8/08	IAMS-18-P246	3.02	1509.00	4.56	0.123	0.027
141	7/9/08	IAMS-19-P260	3.02	1422.60	4.30	0.219	0.051
148	7/10/08	IAMS-20-P275	3.02	1492.20	4.51	0.141	0.031
155	7/14/08	IAMS-21-P276	3.02	1447.80	4.38	0.100	0.023
161	7/15/08	IAMS-22-P138	3.02	1407.60	4.25	0.099	0.023
167	7/16/08	IAMS-23-P145	3.02	1462.20	4.42	0.082	0.019
173	7/17/08	IAMS-24-P160	1.37	653.40	0.90	0.076	0.085
179	7/21/08	IAMS-25-P201	3.02	1400.40	4.23	0.118	0.028
187	7/22/08	IAMS-26-P171	3.02	1477.80	4.47	0.173	0.039
193	7/23/08	IAMS-27-P222	3.02	1382.40	4.18	0.070	0.017
199	7/24/08	IAMS-28-P219	3.02	1486.20	4.49	0.070	0.016
205	7/28/08	IAMS-29-P177	1.37	69.60	0.10	<0.02	<0.004
211	7/29/08	IAMS-30-P186	3.02	1416.00	4.28	<0.02	<0.004
217	7/30/08	IAMS-31-P208	3.02	1406.40	4.25	0.023	0.005
223	7/31/08	IAMS-32-P114	3.02	1516.20	4.58	0.032	0.007

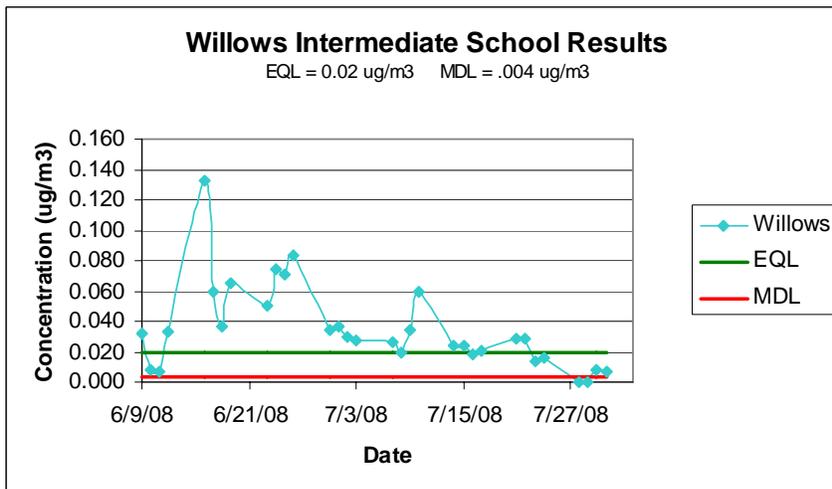
Table 6
Monitoring Results Public Works Office



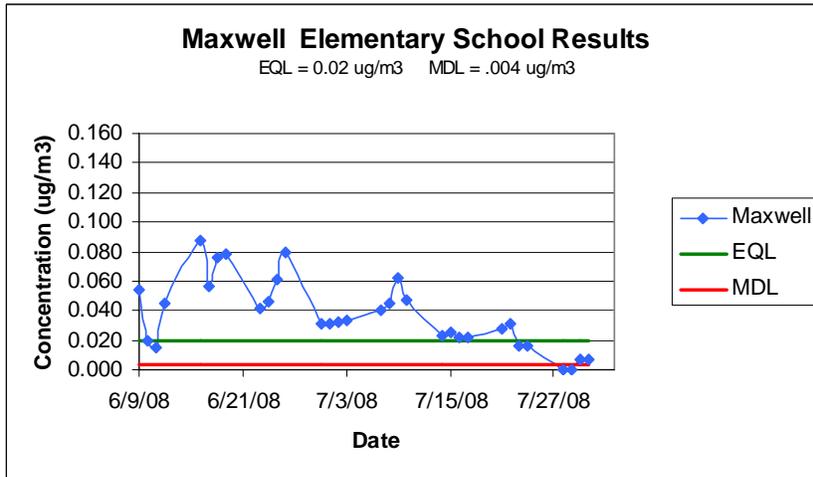
Graph 1
Richvale Elementary School Results



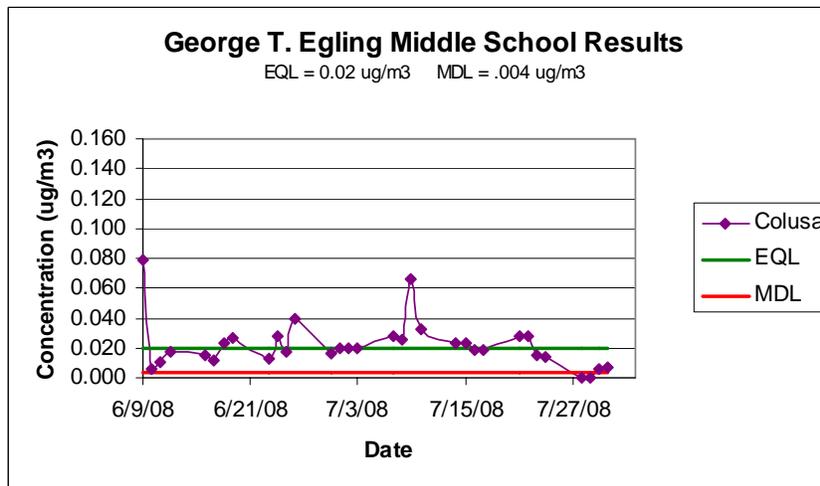
Graph 2
Chico Air Monitoring Station Results



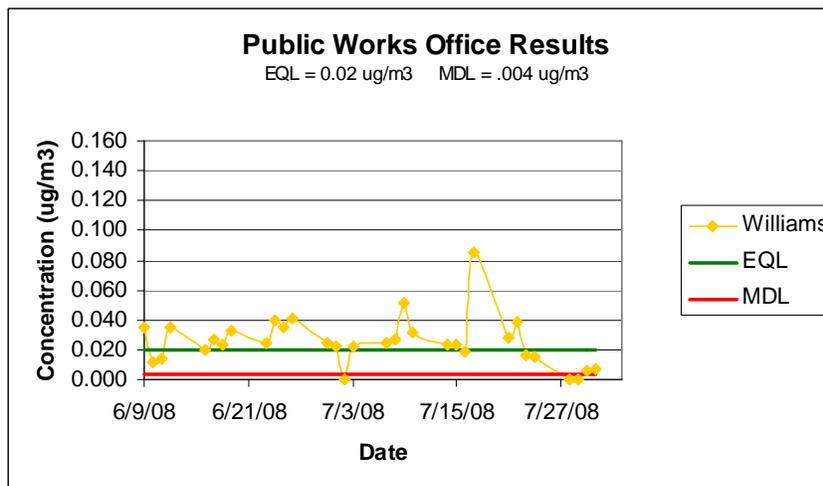
Graph 3
Willows Air Monitoring Results



Graph 4
Maxwell Elementary School Results

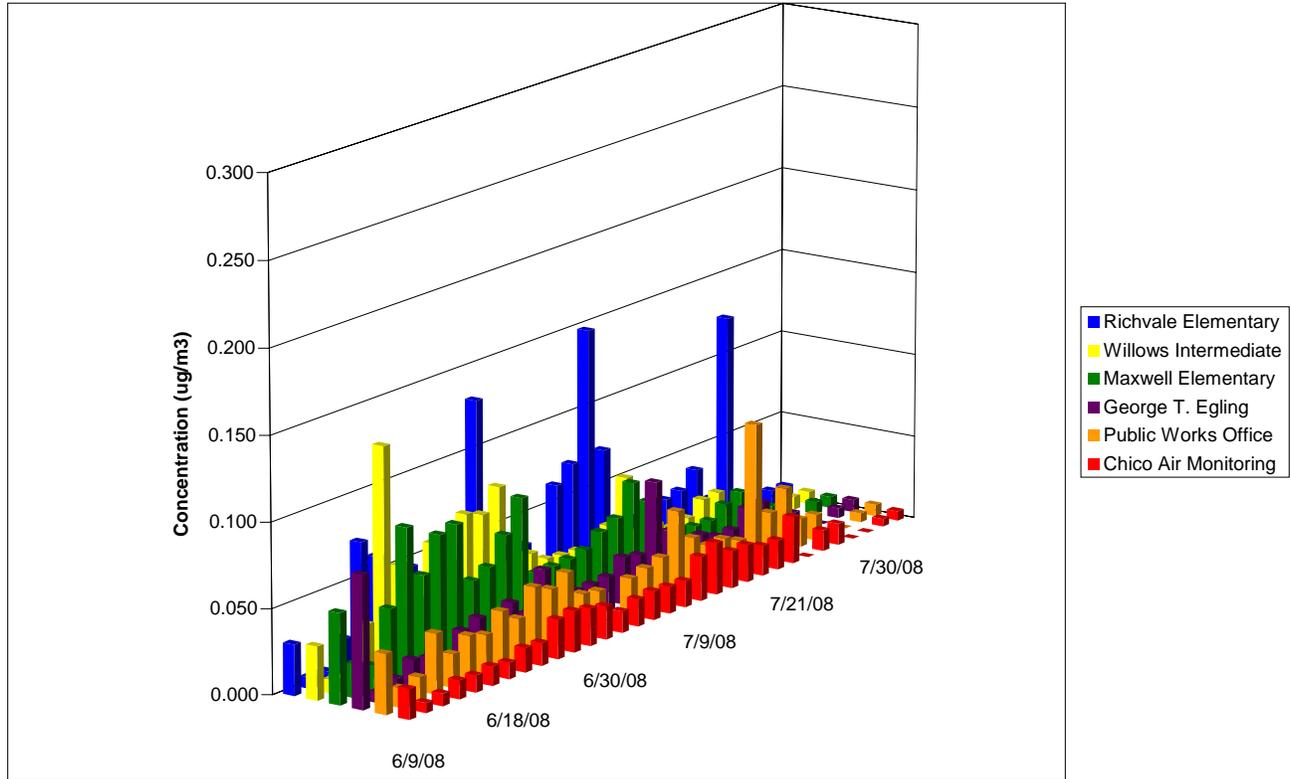


Graph 5
George T. Egling School Results



Graph 6
Public Works Office Results

Propanil Results 2008



Graph 7
Propanil Monitoring Comparison Results

Propanil Concentrations Calculated using the following formula:

$$\text{Propanil } (\mu\text{g}) \text{ per Sample} / \text{Volume of air passed through } (\text{m}^3) = \text{Propanil } (\mu\text{g}/\text{m}^3)$$

5.0 DISCUSSION

The Laboratory received 224 field samples, including four (4) field spikes and four (4) trip spikes. Four (4) laboratory spikes were prepared and held at the laboratory at the same time the field/trip spikes were prepared for the field. Results for propanil ranged from <0.02 $\mu\text{g}/\text{m}^3$ to 0.149 $\mu\text{g}/\text{m}^3$, with an overall average of 0.033 $\mu\text{g}/\text{m}^3$ and a standard deviation of 0.029 $\mu\text{g}/\text{m}^3$. All of the samples, it should be emphasized, are well below the requested DPR EQL of 4.3 $\mu\text{g}/\text{m}^3$ and MDL of 0.9 $\mu\text{g}/\text{m}^3$. The table below summarizes the results per site in $\mu\text{g}/\text{m}^3$.

Site	Minimum	Maximum	Average	Standard Deviation
RICH	<0.02	0.149	0.045	0.036
CHIC	<0.02	0.031	0.016	0.007
WILL	<0.02	0.133	0.037	0.028
MAXW	<0.02	0.088	0.039	0.023
COLU	<0.02	0.066	0.023	0.015
IAMS	<0.02	0.085	0.039	0.066
Overall	<0.02	0.634	0.033	0.029

Propanil Statistical Results for each site
Table 7

Propanil has a very low vapor pressure and is solid at room temperature. When applied it is prepared as an emulsion/solution in water. Propanil behaves as a particulate when the liquid is vaporized. Recovery of propanil applied as a liquid on the filters was nearly 100%. No breakthrough analysis was performed based on the assumption that any propanil would be retained on the filter associated with any particulate that is collected.

The Laboratory analysis report (Appendix C) states that some pre-exposed quartz fiber filters may have contained a phthalate contaminate (1,2-benzenedicarboxylic acid bis-[2-methylpropyl] ester). To eliminate interferences caused by the phthalate compound, the pre-exposed filters were soaked in dichloromethane (DCM) for 30 minutes and then air dried.

For the duration of the ambient study a series of fires had occurred in the area. These fires may have caused a larger than normal amount of particulate matter to be collected on the filters.

6.0 Quality Control Results

Quality Control samples collected from the field consisted of 24 collocated samples, 4 Field Spikes, and 4 Trip Spikes. The following bullets summarize the quality control results of these samples collected. For more detailed information, see Table 8 on the following page, “Collocated Quality Control Results” and the “Laboratory Results Report” located in Appendix C of this report.

Laboratory staff prepared the spikes at 0.500 µg of propanil per sample.

- Collocated sample results and their Relative Percent Differences (RPD), $a-b \div [(a+b) \div 2] \times 100 = \text{RPD}$, primary and collocated sample pairs are presented in Table 8.
- 24 valid collocated pairs, the RPD ranged from 0.00 to -66.67% with an overall average of -4.71%.
- The Field Spike average recovery was 92%. Values ranged 0.459-0.686 µg/sample. All field spikes were collected at the Chico Air Monitoring Station.
- The trip spikes recoveries averaged 93% with a standard deviation of 13%. The values ranged 0.379-0.533 µg/sample.
- The laboratory spikes recoveries averaged 92% with a standard deviation of 10.3%. Values ranged 0.399-0.510 µg/sample.

Field Spike Percent Recovery Chart

Quality Control Type	Log #	Laboratory ID #	Collection Volume m ³	Propanil Spike Conc. (µg/sample)	Propanil Spike Conc. (µg/m ³)	Propanil Sample Conc. (µg/m ³)	Difference Spike & Sample (µg/m ³)	Difference in (µg/sample)	Percent Recovery (%)
Field Spike	27	P08027	4.3	0.494	0.115	0.011	0.104	0.447	89
0.5 µg/sample	77	P08077	4.3	0.472	0.110	0.023	0.087	0.373	75
	144	P08144	4.3	0.686	0.160	0.031	0.129	0.553	111
	183	P08182	4.3	0.459	0.107	invalid	invalid	invalid	invalid

Sample Calculations

$$\text{Spike Concentration} = 0.494 \text{ µg/sample} \times \text{sample}/4.3 \text{ m}^3 = \mathbf{0.115 \text{ µg/m}^3}$$

$$\text{Difference µg/ m}^3 = 0.115 \text{ µg/ m}^3 - 0.011 \text{ µg/ m}^3 = \mathbf{0.104 \text{ µg/m}^3}$$

$$\text{Difference µg/sample} = 0.104 \text{ µg/ m}^3 \times 4.3 \text{ m}^3/ \text{sample} = \mathbf{0.447 \text{ µg/sample}}$$

$$\text{Percent Recovery \%} = \frac{0.447 \text{ µg / Sample}}{0.500 \text{ µg / Sample}} \times 100 = \mathbf{89 \%}$$

Site	Start Date	End Date	Analysis Date	Lab ID	Client ID	ug/sample	ug/m ³	R P D
Richvale	10-Jun	11-Jun	17-Jun	P08007	RICH-2-P012	0.032	0.007	0.00%
Elementary			17-Jun	P08008	RICH-2-P013-CO	0.030	0.007	
	16-Jun	17-Jun	20-Jun	P08033	RICH-5-P044	0.326	0.074	0.00%
			20-Jun	P08034	RICH-5-P030-CO	0.326	0.074	
	23-Jun	24-Jun	9-Jul	P08063	RICH-9-P063	0.153	0.035	5.88%
			9-Jul	P08064	RICH-9-P068-CO	0.144	0.033	
	30-Jun	1-Jul	11-Jul	P08094	RICH-13-P266	0.174	0.038	8.22%
			11-Jul	P08095	RICH-13-P269-CO	0.155	0.035	
Chico Air	10-Jun	11-Jun	17-Jun	P08009	CHIC-2-P028	0.027	0.006	0.00%
Station			17-Jun	P08010	CHIC-2-P023-CO	0.027	0.006	
Monitoring	16-Jun	17-Jun	20-Jun	P08035	CHIC-5-P065	0.044	0.010	0.00%
			20-Jun	P08036	CHIC-5-P059-CO	0.043	0.010	
	23-Jun	24-Jun	9-Jul	P08065	CHIC-9-P062	0.06	0.013	-14.29%
			9-Jul	P08066	CHIC-9-P022-CO	0.065	0.015	
	30-Jun	1-Jul	11-Jul	P08096	CHIC-13-P284	0.087	0.020	10.53%
			11-Jul	P08097	CHIC-13-P298-CO	0.083	0.018	
Willows Middle	10-Jun	11-Jun	17-Jun	P08011	WILL-2-P006	0.037	0.008	13.33%
School			17-Jun	P08012	WILL-2-P002-CO	0.032	0.007	
	16-Jun	17-Jun	20-Jun	P08037	WILL-5-P052	0.586	0.133	-7.25%
			20-Jun	P08038	WILL-5-P001-CO	0.611	0.143	
	23-Jun	24-Jun	9-Jul	P08067	WILL-9-P005	0.217	0.051	0.00%
			9-Jul	P08068	WILL-9-P035-CO	0.221	0.051	
	30-Jun	1-Jul	11-Jul	P08098	WILL-13-P294	0.153	0.035	-8.22%
			11-Jul	P08099	WILL-13-P287-CO	0.167	0.038	
Maxwell	10-Jun	11-Jun	17-Jun	P08013	MAXW-2-P018	0.092	0.020	0.00%
Elementary			17-Jun	P08014	MAXW-2-P020-CO	0.09	0.020	
	16-Jun	17-Jun	20-Jun	P08039	MAXW-5-P045	0.398	0.088	10.78%
			20-Jun	P08040	MAXW-5-P058-CO	0.338	0.079	
	23-Jun	24-Jun	9-Jul	P08069	MAXW-9-P293	0.183	0.042	2.41%
			9-Jul	P08070	MAXW-9-P288-CO	0.198	0.041	
	30-Jun	1-Jul	11-Jul	P08100	MAXW-13-P234	0.145	0.031	-9.23%
			11-Jul	P08101	MAXW-13-P229-CO	0.165	0.034	
George Egling	10-Jun	11-Jun	17-Jun	P08015	COLU-2-P034	0.028	0.006	-66.67%
School			17-Jun	P08016	COLU-2-P014-CO	0.055	0.012	

Colusa	16-Jun	17-Jun	20-Jun	P08041	COLU-5-P064	0.063	0.015	14.29%
			20-Jun	P08042	COLU-5-P037-CO	0.055	0.013	
	23-Jun	24-Jun	9-Jul	P08071	COLU-9-P290	0.055	0.013	-26.67%
			9-Jul	P08072	COLU-9-P299-CO	0.074	0.017	
	30-Jun	1-Jul	11-Jul	P08102	COLU-13-P289	0.077	0.017	-25.64%
			11-Jul	P08103	COLU-13-P292-CO	0.102	0.022	
Public Works	10-Jun	11-Jun	17-Jun	P08017	IAMS-2-P041	0.052	0.011	-16.67%
Office			17-Jun	P08018	IAMS-2-P015-CO	0.056	0.013	
	16-Jun	17-Jun	20-Jun	P08043	IAMS-5-P051	0.084	0.020	0.00%
			20-Jun	P08044	IAMS-5-P066-CO	0.084	0.020	
	23-Jun	24-Jun	9-Jul	P08073	IAMS-9-P297	0.109	0.025	-3.92%
			9-Jul	P08074	IAMS-9-P301-CO	0.112	0.026	
	30-Jun	1-Jul	11-Jul	P08104	IAMS-13-P239	0.112	0.024	0.00%
			11-Jul	P08105	IAMS-13-P087-CO	0.11	0.024	

* Note: RPD is Relative Percent Difference

Table 8
Collocated Quality Control Results

Formula

$$RPD = a-b \div [(a+b) \div 2] \times 100$$