SAMPLING FOR PESTICIDE RESIDUES IN CALIFORNIA WELL WATER

2006 Update of the Well Inventory Database

For Sampling Results Reported From July 1, 2005 through June 30, 2006

Twenty-first Annual Report

Pursuant to the
Pesticide Contamination Prevention Act

California Environmental Protection Agency
DEPARTMENT OF PESTICIDE REGULATION

December 2006

EH06-05

California Department of Pesticide Regulation

Arnold Schwarzenegger, Governor

Linda S. Adams, Secretary
California Environmental Protection Agency

Mary-Ann Warmerdam, Director
Department of Pesticide Regulation

SAMPLING FOR PESTICIDE RESIDUES IN CALIFORNIA WELL WATER

2006 Update of the Well Inventory Database

For Sampling Results Reported From July 1, 2005 to June 30, 2006

Twenty-first Annual Report

Pursuant to the
Pesticide Contamination Prevention Act

by
DPR portion:
C. Nordmark, J. Dias, M. Clayton, J. Troiano, M. Pepple
SWRCB Portion: Staff

California Environmental Protection Agency
California Department of Pesticide Regulation
Environmental Monitoring Branch
Ground Water Protection Program
1001 I Street, Sacramento, California 95814

EH06-05

EXECUTIVE SUMMARY

The Pesticide Contamination Prevention Act

The Pesticide Contamination Prevention Act (PCPA), enacted in 1985 and subsequently amended, provides mechanisms that strengthen the Department of Pesticide Regulation's (DPR's) regulatory authority to prevent ground water contamination and to respond to detections of pesticide residues in ground water. The PCPA requires:

1. DPR to maintain a statewide database of wells sampled for pesticide active ingredients (AIs).
2. State and local agencies to submit results of well sampling for AIs to DPR.
3. DPR to post on its website specified data contained in the database and actions taken to prevent pesticide contamination.

The Well Inventory Database

This is the twenty-first annual report, which summarizes data submitted to DPR that was collected from July 1, 2005 to June 30, 2006. Data in these reports are used to:

1. Display geographic distribution of well sampling.
2. Display geographic distribution of pesticides in sampled wells.
3. Identify areas potentially vulnerable to contamination by the legal, agricultural use of pesticides.
4. Design studies for future sampling.

The data do not represent a complete survey of ground water quality throughout the State, nor do they represent sampling for all pesticides. The data indicate pesticides that are present in well water among those pesticides for which analyses were performed.

Data Summary

1. Data in this report are the result of four well sampling surveys or reports
2. Data represent 3,915 wells in 56 counties that were sampled for 124 pesticide active ingredients and breakdown products (collectively referred to hereinafter as "pesticide-related compounds"). Ninety-nine percent of the wells sampled were municipal or domestic drinking water wells.
3. Twenty-five pesticide-related compounds were reported with detections. Ten of these reported detections were verified detections.
4. No new active ingredients have been verified in any wells.

Tables 1a and 1b provide an annual and cumulative summary of the number of wells and the number of pesticide-related compounds sampled throughout California for data submitted to DPR through June 30, 2006.

Table 1a. Annual and cumulative summary of the number of wells sampled and their detection status, and the number of counties sampled and their detection status.

Category	Year 2006	Total[b] 1985-2006
Total **wells** sampled	3,915	22,463
Wells with no detections	3,498	17,478
Wells with detections [a]	417	4,985
Wells with verified detections	82	1,028
Total **counties** sampled	56	58
Counties with no detections	37	8
Counties with detections [a]	19	50
Counties with verified detections	2	33

(a) Includes both verified and unverified detections. Detections of pesticide residues are verified if either the analytical method provides unequivocal identification of a chemical as approved by DPR or the residues were detected within 30 days using a second analytical method or a second analytical laboratory approved by DPR.
(b) The total represents unique wells sampled in a county where a single well with sampling data reported in more than one year is counted only once.

Table 1b. Annual and cumulative summary of the number of pesticide-related compounds analyzed, the number of compounds with detections and the number of compounds where DPR determined that detections were the result of non-point source pesticide applications.

Category	Year 2006	Total[b] 1985-2006
Total **pesticide-related** compounds analyzed	124	337
Compounds with no detections	99	228
Compounds with detections [a]	25	109
Compounds with verified detections	10	30
Compounds with detections in ground water as a result of non-point source pesticide applications	11 [c]	19 [d]

(a) Includes both verified and unverified detections. Detections of pesticide residues are verified if either the analytical method provides unequivocal identification of a chemical as approved by DPR or the residues were detected within 30 days using a second analytical method or a second analytical laboratory approved by DPR.
(b) The total represents unique compounds analyzed where a single compound that had sampling data reported in more than one year is counted only once.
(c) The eleven compounds are atrazine, bromacil, diuron, prometon, simazine, hexazinone, norflurazon, deethyl-atrazine (DEA), deethyl-simazine or deisopropyl-atrazine (ACET), diaminochlorotriazine (DACT), and demethylnorflurazon.
(d) The 19 compounds are 1,2-dichloropropane (1,2-D), ACET, aldicarb sulfone, aldicarb sulfoxide, atrazine, bentazon, bromacil, 1,2-dibromo-3-chloropropane (DBCP), DEA, DACT, diuron, ethylene dibromide (EDB), norflurazon, demethylnorflurazon, prometon, simazine, metolachlor oxanilic acid, metolachlor ethanesulfonic acid, alachlor oxanilic acid, alachlor ethanesulfonic acid and 2,3,5,6-trachloroterephthalic acid (TPA). See Appendix C for more information on individual compounds.

Verified Detections

Detections were verified in 82 wells in two counties. Table 2 summarizes the number of wells with verified detections of pesticide related compounds by county and pesticide.

Table 2. Wells with verified detections of pesticide residues, by county and chemical. Results are for data reported from July 1, 2005, to June 30, 2006.

County	atrazine	DEA	bromacil	diuron	hexazinone	norflurazon	demethylnorflurazon	prometon	simazine	ACET	DACT	Total Number of Wells
Fresno	3	4	14	26	1	12	25	1	35	47	43	51
Tulare	1	1	15	17		4	6		15	24	22	31
Total Number of Wells with Detections	4	5	29	43	1	16	31	1	50	71	65	82

Four-Section Surveys

DPR conducted three four-section surveys between July 1, 2005, and June 30, 2006, in response to reported detections of aldicarb breakdown products. No suitable wells were found for one of the studies and the results for the other two studies were not available until after June 30, 2006. No aldicarb or breakdown products were detected in any of the sampled wells. These results will be included in the 2007 report.

Pesticide Movement to Ground Water

DPR scientists have developed the California vulnerability model (CALVUL) to predict where pesticide contamination of ground water due to agricultural use is likely to occur. CALVUL is based on the soil types associated with sections of land where pesticides have been found in ground water. Using these soil types and depth to ground water of 70 feet or less, DPR identified one-square mile sections of land, called ground water protection areas (GWPAs), that are vulnerable to pesticide contamination. Sections of land where pesticides have already been found in ground water were also identified as GWPAs. GWPAs are classified as either runoff or leaching based on the pathway by which pesticides migrate to ground water in either hardpan or coarse soils, respectively. DPR has also developed runoff management practices and leaching management practices that can be used to minimize the movement of pesticides to ground water in runoff and leaching GWPAs. The GWPAs and management practices were adopted in regulations that became effective May 27, 2004. These regulations are designed to stop movement of pesticides in areas already contaminated, and prevent contamination in other areas before it occurs.

Ground Water Protection List

Pursuant to Food and Agriculture Code (FAC) section 13145(d), DPR established the Ground Water Protection List (GWPL) in Section 6800 of Title 3 of the California Code of Regulations (3CCR). This two-part list identifies pesticides that have been detected in soil or groundwater and those that have the potential to pollute ground water based on their physicochemical properties and labeled use patterns. 3CCR Section 6800(a) lists the pesticides that have contaminated soil or ground water due to legal, agricultural pesticide applications. The use of these products is highly regulated through the restricted material permit process implemented by the county agricultural commissioners. 3CCR Section 6800(b) includes pesticides whose physicochemical properties exceed certain specific numerical values and are intended to be applied to or injected into the soil by ground-based application equipment or by chemigation, or where the pesticide labels recommend or require their application to be followed, within 72 hours, by flood or furrow irrigation. Pesticides included in Section 6800(b) have not been detected in California's ground water. Each year, DPR monitors for a small number of the pesticides listed in 6800(b) to determine if any have migrated to ground water.

In 2005 the EM Branch of DPR completed a GWPL monitoring survey for EPTC. Forty-four wells were sampled in eight counties during October through December 2005. No residues of EPTC were detected in any of the wells.

Ground Water Monitoring Study

In 2004, the Environmental Monitoring (EM) Branch of DPR completed a study to determine the presence of the breakdown products of atrazine and simazine in public water system wells in three counties. Forty-nine wells were sampled in Fresno, Kern, and Tulare counties during October through December 2004. Seventeen wells had pesticide residues and fifteen wells contained residues of the breakdown products of atrazine or simazine. These data were not included in the 2005 report.

Chemigation Initiative

Chemigation is the application of pesticides through irrigation systems. As a result of the U.S. EPA's Label Improvement Program, pesticide labeling requires the use of specific backflow prevention devices to protect ground- or surface water sources when pesticides are applied through an irrigation system. DPR has an active chemigation training program that educates pesticide handlers, including growers, irrigation dealers, and pest control applicators, and state and local pesticide use enforcement staff on system engineering, safe handling practices and regulatory requirements. As a result, handlers and regulators are able to detect and correct problems before environmental damage occurs.

To evaluate chemigation-related educational and regulatory needs, DPR established a task force of irrigation specialists, backflow prevention equipment manufacturers and dealers, representatives from the agricultural community, engineers with expertise in backflow

prevention, representatives from the county agricultural commissioners, and other interested parties. The task force met three times between July 1, 2005, and June 30, 2006, to develop recommendations for adopting new chemigation regulations, alternative chemigation devices and best management practices for the timing and application of pesticides through irrigation systems. DPR is considering options for implementing the Task Force's recommendations.

Activities of the State and Regional Water Boards

The State Water Resources Control Board (SWRCB) and its nine regional water quality control boards are responsible for protecting the beneficial uses of water in California and for controlling all discharges of waste into waters of the state. Section IV of this report summarizes actions taken by SWRCB to prevent pesticides from migrating to ground water, which is available at: http://www.cdpr.ca.gov/docs/empm/pubs/ehapreps/swrcb/ab2021_fy0506.pdf

PREFACE

This report fulfills the requirements of AB 2701 (Chapter 644, Statutes of 2004), which amended the PCPA to require DPR to post specified information on sampling for pesticide residues in California ground water to its website no later than December 1 of each year. This law replaced the previous requirement that DPR submit the sampling information in a written report to the Legislature, SWRCB and the Department of Health Services (DHS).

This report presents data reported to or produced by DPR from July 1, 2005, to June 30, 2006.

The PCPA requires the annual report to give the location of wells for which sampling results were reported. Privacy and security concerns and the large number of wells sampled prevent DPR from listing exact well locations. Instead, this report summarizes the locations by county.

The information presented in Section IV was produced by SWRCB and is available at: http://www.cdpr.ca.gov/docs/empm/pubs/ehapreps/swrcb/ab2021_fy0506.pdf

ACKNOWLEDGMENTS

The authors wish to thank the reviewers whose unique perspectives and experiences helped ensure the accuracy and readability of this report. We gratefully acknowledge the staff of DPR and cooperating federal, state, local, and private agencies for contributing to the database.

DISCLAIMER

The mention of commercial products, their source, or their use in this report is not to be construed as either an actual or implied endorsement of such product.

TABLE OF ACRONYMS AND ABBREVIATIONS

1,2-D	1,2-dichloropropane (propylene dichloride)
3CCR	Title 3 or the California Code of Regulations
ACET	deethyl-simazine or deisopropyl-atrazine
AI(s)	active ingredient (s)
CAC	County Agricultural Commissioner
CALVUL	California Vulnerability Model
DHS	California Department of Health Services
CIT	Center for Irrigation Technology
DACT	diaminochlorotriazine
DBCP	1,2-dibromo-3-chloropropane
DEA	deethyl-atrazine
DPR	Department of Pesticide Regulation
EDB	ethylene dibromide
EM	Environmental Monitoring Branch
ESA	ethanesulfonic acid
ETo	evapotranspiration
FAC	Food and Agriculture Code
GIS	geographical information systems
GWPA	ground water protection area
GWPL	Ground Water Protection List
IRIS	integrated risk information system as a drinking water level
MCL	maximum contamination limit
MDL	minimum detection limit
OEHHA	Office of Environmental Health Hazard Assessment
OXA	oxanilic acid
PCPA	Pesticide Contamination Prevention Act
PDRP	Pesticide Detection Response Process
PMZ	Pesticide Management Zone
ppb	parts per billion
PREC	Pesticide Registration and Evaluation Committee
PUR	Pesticide Use Report
RWQCB	Regional Water Quality Control Board
SNARL	suggested no-adverse-response levels
SNV	specific numerical values
SWRCB	State Water Resources Control Board
TPA	2,3,5,6-tetrachloroterephthalic acid
USGS	United States Geological Survey

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
PREFACE vi
ACKNOWLEDGMENTS vi
DISCLAIMER vi
TABLE OF ACRONYMS AND ABBREVIATIONS vii
TABLE OF CONTENTS viii
LIST OF TABLES x
I. WELL INVENTORY DATABASE 1
Introduction 1
Criteria for Evaluating Data 2
Minimum Data Requirements 2
Interpretation Limitations 2
Classifying Analytical Results 2
Data Summary 4
Results by Reporting Agency 6
Results by County 6
Results by Pesticide 8
Status of Pesticides with Verified Detections 11
Status of Unverified Detections 16
II. PREVENTION OF PESTICIDE MOVEMENT TO GROUND WATER AS A RESULT OF LEGAL AGRICULTUAL APPLICATIONS 17
Discussion 17
Factors that Contribute to Pesticide Movement to Ground Water 18
Pesticide Factors 18
Soil Characteristics 18
Irrigation Practices 19
Climate 20
Pesticide Application Management Practices 21
Runoff GWPAs 21
Leaching GWPAs 23
Artificial Recharge Basins 23
Inside Canals and Ditch Banks 23
Engineered Rights-of-Ways Within GWPAs 23
III. ACTIONS TAKEN BY DPR TO PREVENT MOVEMENT OF PESTICIDES TO GROUND WATER 24
Pesticide Detection Response Process (PDRP) 24
Four-Section Survey 24
Ground Water Protection List Monitoring 26
Monitoring Study To Determine Distribution Of Atrazine/Simazine Parent And Breakdown Product Residues In Public Water Supply Wells 27
Well Network Monitoring -- Monitoring Temporal Changes in Concentrations of Detected Herbicides and Their Degradates 27
Probabilistic Modeling for Risk Assessment of Ground Water Contamination by Pesticides 28
Holding Pond Management Practices 28
Chemigation Initiative 29

Chemigation Study 29
Chemigation Training 29
Chemigation Task Force 30
Chemigation Websites 30
IV. ACTIONS TAKEN BY THE SWRCB AND IT' S REGIONAL BOARDS TO PREVENT 31
PESTICIDES FROM ENTERING GROUND WATER NOVEMBER 2005. 31
REFERENCES 32
APPENDIX A 35
Number of Wells Sampled and Positive Detections, by County and Chemical 35
APPENDIX B 117
Studies Included in the 2006 Update Report 117
APPENDIX C 119
Summary of Compounds Detected and Reported to DPR 119
APPENDIX D 136
Glossary of Terms 136

LIST OF TABLES

Table 1a. Annual and cumulative summary of the number of wells sampled and their detection status, and the number of counties sampled and their detection status. ii
Table 1b. Annual and cumulative summary of the number of pesticide-related compounds analyzed, the number of compounds with detections and the number of compounds where DPR determined that detections were the result of non-point source pesticide applications. ii
Table 2. Wells with verified detections of pesticide residues, by county and chemical. Results are for data reported from July 1, 2005, to June 30, 2006. iii
Table I-1a. Annual and cumulative summary of the number of wells sampled and their detection status, and the number of counties where samples were collected. 5
Table I-2. Summary, by agency, of records in the well inventory database for the reporting period July 1, 2005, to June 30, 2006. 6
Table I-3. Summary, by county, of the number of chemicals analyzed, the number of wells sampled, and the number of wells with unverified and verified detections reported for the period from July 1, 2005, to June 30, 2006. 6
Table I-4. Summary, by pesticide-related compounds, of the number of counties where wells were sampled, the number of wells sampled and the number of wells with verified and unverified detections for the period July 1, 2005 to June 30, 2006. 8
Table I-5. Summary, by county and pesticide, of the number of wells with verified detections. Results are for data reported from July 1, 2005, to June 30, 2006. 12
Table I-6. Major uses of atrazine reported in 2005. 12
Table I-7. Major uses of bromacil reported in 2005. 13
Table I-8. Major uses of diuron reported in 2005. 13
Table I-9. Major uses of hexazinone reported in 2005. 14
Table I-10.Major uses of norflurazon reported in 2005. 14
Table I-11. Major uses of prometon reported in 2005. 15
Table I-12. Major uses of simazine reported in 2005. 15
Table III-1. Detections that did not require further investigation. 25
Table III-2. Number of wells sampled in each county during the GWPL monitoring survey for EPTC. 26
Table III-3. Number of wells sampled in each county during the study to determine the presence of the breakdown products of atrazine and simazine in public water system wells. 27

I. WELL INVENTORY DATABASE

Introduction

In 1983, the Environmental Hazards Assessment Program of the California Department of Food and Agriculture, now the EM Branch of DPR, initiated a project to collect and store data in a database called the well inventory database. The purpose was to (1) compile reliable information on the occurrence of non-point source contamination of ground water and (2) facilitate graphical and numerical analysis of the data.

Enacted in 1985, the PCPA required DPR to take specific actions to prevent further pesticide pollution of the ground water aquifers of the State. One action was to develop and maintain a database of wells sampled for pesticides throughout the State. State and local agencies were required to submit ground water pesticide sampling data to DPR from both point and non-point sources for inclusion in the well inventory database. Additionally, the PCPA mandated DPR to determine if ground water detections of pesticides were due to legal agricultural use, formally review the agricultural use detections to determine if continued use could be allowed, and if so, adopt regulations to modify use of the pesticide. The Legislature amended the PCPA in 2004, (Chapter 644, Statutes of 2004, AB 2701) to allow DPR to post this report on its website in lieu of submitting a written report to the Legislature, SWRCB, and DHS [Food and Agricultural Code (FAC) section 13152(e)].

This is the twenty-first annual report, which summarizes data collected from July 1, 2005, to June 30, 2006. DPR produced two cumulative reports in 1992 and 2003, which presented all available data in addition to the required annual information for that year. The data in the well inventory database that has been summarized in these reports are used to:

- Display geographic distribution of well sampling
- Display geographic distribution of pesticides in sampled wells
- Identify areas potentially vulnerable to contamination by the legal, agricultural use of pesticides
- Design studies for future sampling

The first section of the report describes specific criteria that DPR uses before entering data into the database and the limitations of how the data can be interpreted, and provides a summary of the well inventory data collected from July 1, 2005, to June 30, 2006. The summary tables are organized to highlight verified detections, which are the only detections that serve a regulatory purpose (memo from Weaver D. to Goh K., January 1995). The second section provides a summary of the factors involved in the movement of pesticides to ground water and describes specific management practices that help prevent ground water contamination. The third section summarizes the actions DPR has taken to prevent movement of pesticides to ground water. The fourth section is a summary of the SWRCB's and the Regional Water Quality Control Board's

(RWQCB) monitoring activities and can be found at:
http://www.cdpr.ca.gov/docs/empm/pubs/ehapreps/swrcb/ab2021_fy0506.pdf

Criteria for Evaluating Data

Minimum Data Requirements

Effective December 1, 1986, DPR, SWRCB and DHS jointly agreed on the following minimum requirements to be included as part of any pesticide data submitted to DPR:

- State well number (township/range/section/tract/sequence number/base/meridian)
- County
- Date of sample (month/day/year)
- Chemical analyzed
- Individual sample concentration, in parts per billion
- Sampling agency
- Analyzing laboratory
- Street address of well location
- Well type
- Sample type (e.g., initial or confirmation)

Interpretation Limitations

Interpretation of sampling results in the database is subject to the following limitations:

(1) The data indicate specific pesticides and breakdown products detected in well water among those pesticides for which analyses were conducted. They do not represent a complete survey of groundwater quality throughout the state nor do they represent sampling for all pesticides used.

(2) Sampling by agencies other than DPR is not necessarily related to suspected agricultural non-point sources of contamination. It should not be assumed that results submitted by those agencies are an indication of which pesticides are more or less likely to reach groundwater as a result of non-point source agricultural use.

Classifying Analytical Results

Each record in the database represents a single well water sample analyzed for pesticide residue. The analytical result is classified according to the following criteria:

(1) A pesticide analysis of a well water sample is designated as a non-detection with the number zero in the concentration field, if the pesticide residue is not detected at or above the minimum detection limit (MDL) of the analytical method.

(2) Samples in which pesticide residues are detected at or above the MDL are classified into one of three categories:

a. ***Unconfirmed:*** pesticide residues detected in only one sample during a single monitoring survey.

b. ***Confirmed, unverified:*** pesticide residues detected in two discrete samples taken from a single well during a single monitoring survey.

c. ***Verified:*** confirmed and unconfirmed detections are verified if they meet the criteria specified in (FAC section 13149[d]), which requires that either the analytical method provides unequivocal identification of a chemical as approved by DPR or that the detection is verified within 30 days by a second analytical method or a second analytical laboratory approved by DPR. Criteria have been set by DPR (Biermann, 1989, 1996) for determining if the detection of a pesticide or its breakdown product(s) meets the standards of section 13149[d]. A confirmed or unconfirmed detection may not be verified for the following reasons:

i. "Follow-up sampling has not yet been completed by DPR." This means that at the cutoff date for the preparation of the well inventory report (usually 6-10 months before the release of the report) verification had not yet been completed for the pesticide-related compound.

ii. "Sampling was not conducted by DPR" because the detection occurred in a ground water protection area (GWPA) and the compound detected was on the 6800(a) list of known ground water contaminants. Since the use of 6800(a) compounds is already regulated to protect ground water in these areas, it is unnecessary to verify additional reported detections.

iii. The detection may have been referred to SWRCB for the following reasons: the pesticides were not currently registered for use; the pesticides were registered for other than agricultural, outdoor industrial, or outdoor institutional uses; or the pesticides were found in ground water, but were determined not to be the result of legal agricultural use.

iv. "There may be no wells available for sampling." The original well is not available for sampling because it has been destroyed (the standard term for sealing and closing a well), or is no longer functioning as a well. In addition, the original well may have been a monitoring well, usually reported by the U.S. Geological Survey (USGS), and there are no other wells within a four-section area available for sampling. Since monitoring wells require special equipment for sampling, they are not sampled by DPR unless there are other wells within a four-section area that can be sampled to help determine whether residues are due to legal agricultural use.

v. "Permission to sample could not be obtained from the well owner or manager." Historically, DPR has only sampled wells with the permission

of the well owner. Therefore, if a well has been sampled and the owner decides not to permit additional sampling, DPR would not be able to verify any reported detection in that well. Well owners rarely deny DPR permission to sample a well.

vi. "The detection reported by another agency was below 80 percent of the current MDL established by the California Department of Food and Agriculture (CDFA) laboratory." Some reports of pesticide residue detections are at levels far below the MDL obtainable by laboratories approved by DPR. Any attempt to verify these detections by DPR would be futile. Verifying these detections would be reconsidered if the CDFA laboratory's MDL is set lower.

vii. "DPR conducted sampling in response to a detection and did not detect the compound under investigation." This means that DPR was unable to verify the presence of the pesticide in the well as a result of analysis of a back-up sample or a subsequent sample taken.

A verified detection is the only type of detection that DPR uses for the basis of regulatory action.

Data Summary

1. Data in this report are the result of four well sampling surveys.
2. Data represent 3,915 wells in 56 counties that were sampled for 124 pesticide-related compounds. Ninety-nine percent of the wells sampled were municipal or domestic drinking water wells.
3. Twenty-five compounds were reported with detections. Ten detections were verified detections.
4. No new active ingredients or pesticide breakdown products were verified.

Tables I-1a and I-1b provide an annual and cumulative summary of the number of wells and the number of pesticides sampled throughout California for data produced by or submitted to DPR by June 30, 2006.

Table I-1a. Annual and cumulative summary of the number of wells sampled and their detection status, and the number of counties where samples were collected.

Category	Year 2006	Total[b] 1985-2006
Total **wells** sampled	3,915	22,463
Wells with no detections	3,498	17,478
Wells with detections [a]	417	4,985
Wells with verified detections	82	1,028
Total **counties** sampled	56	58
Counties with no detections	37	8
Counties with detections [a]	19	50
Counties with verified detections	2	33

(a) Includes both verified and unverified detections. Detections of pesticide residues are verified if either the analytical method provides unequivocal identification of a chemical as approved by DPR or the residues were detected within 30 days using a second analytical method or a second analytical laboratory approved by DPR.
(b) The total represents unique wells sampled in a county where a single well with sampling data reported in more than one year is counted only once.

Table I-1b. Annual and cumulative summary of the number of pesticide-related compounds analyzed, the number of compounds with detections and the number of compounds where DPR determined that detections were the result of non-point source pesticide applications.

Category	Year 2006	Total[b] 1985-2006
Total **pesticide-related** compounds analyzed	124	337
Compounds with no detections	99	228
Compounds with detections [a]	25	109
Compounds with verified detections	10	30
Compounds with detections in ground water as a result of non-point source pesticide applications	11 [c]	19 [d]

(a) Includes both verified and unverified detections. Detections of pesticide residues are verified if either the analytical method provides unequivocal identification of a chemical as approved by DPR or the residues were detected within 30 days using a second analytical method or a second analytical laboratory approved by DPR.
(b) The total represents unique compounds analyzed where a single compound that had sampling data reported in more than one year is counted only once.
(c) The eleven compounds are atrazine, bromacil, diuron, prometon, simazine, hexazinone, norflurazon, deethyl-atrazine (DEA), deethyl-simazine or deisopropyl-atrazine (ACET), diaminochlorotriazine (DACT), and demethylnorflurazon.
(d) The 19 compounds are 1,2-dichloropropane (1,2-D), ACET, aldicarb sulfone, aldicarb sulfoxide, atrazine, bentazon, bromacil, 1,2-dibromo-3-chloropropane (DBCP), DEA, DACT, diuron, ethylene dibromide (EDB), norflurazon, demethylnorflurazon, prometon, simazine, metolachlor oxanilic acid, metolachlor ethanesulfonic acid, alachlor oxanilic acid, alachlor ethanesulfonic acid and 2,3,5,6-trachloroterephthalic acid (TPA). See Appendix C for more information on individual compounds.

Results by Reporting Agency

The results of four well sampling surveys were reported to DPR, all of which had data that were added to the well inventory database from July 1, 2005, to June 30, 2006. The data represent 3915 wells in 56 counties that were sampled for 124 pesticide-related compounds. Table I-2 summarizes the data added to the database by sampling agency.

Ninety-nine percent of these wells were public or private drinking water wells. The other wells were non-drinking water or unused, or the well type was unknown.

Table I-2. Summary, by agency, of records in the well inventory database for the reporting period July 1, 2005, to June 30, 2006.

Sampling Agency	Wells	Counties	Chemicals Analyzed	Wells with Detections	Number of Surveys Reported	Records Added to Database
DHS	3,796	56	119	347	1	109,705
DPR	161	10	12	82	3	1,331

Results by County

The number of wells sampled in each county varied widely, from 715 wells in Los Angeles County to one well in Alpine, Imperial, and Sierra counties. Data were not reported for two counties – Modoc and San Francisco. Table I-3 summarizes, by county, the number of chemicals analyzed, the number of wells sampled, and the number of wells with verified and unverified detections of pesticide-related compounds. Individual wells may have both unverified and verified detections. Appendix A lists specific compounds that were sampled in each county and identifies the number of wells sampled and the number of wells with reported detections for each compound reported from July 1, 2005, to June 30, 2006.

Table I-3. Summary, by county, of the number of chemicals analyzed, the number of wells sampled, and the number of wells with unverified and verified detections reported for the period from July 1, 2005, to June 30, 2006.

County	Number of Chemicals Analyzed	Number of Wells Sampled	Number of Wells with Unverified Detections	Number of Wells with Verified Detections
Alameda	64	21	0	0
Alpine	11	1	0	0
Amador	16	2	0	0
Butte	42	42	0	0
Calaveras	23	2	0	0
Colusa	11	8	0	0
Contra Costa	60	10	0	0
Del Norte	11	2	0	0
El Dorado	44	22	0	0
Fresno	60	341	110	51

County	Number of Chemicals Analyzed	Number of Wells Sampled	Number of Wells with Unverified Detections	Number of Wells with Verified Detections
Glenn	42	21	0	0
Humboldt	11	2	0	0
Imperial	13	1	0	0
Inyo	59	16	0	0
Kern	81	267	29	0
Kings	27	34	2	0
Lake	76	21	0	0
Lassen	11	12	0	0
Los Angeles	76	715	16	0
Madera	59	47	3	0
Marin	55	3	0	0
Mariposa	26	14	0	0
Mendocino	76	18	0	0
Merced	62	64	12	0
Modoc	NR	NR	NR	NR
Mono	64	6	0	0
Monterey	71	69	0	0
Napa	45	2	0	0
Nevada	48	5	0	0
Orange	79	221	0	0
Placer	59	16	0	0
Plumas	13	4	0	0
Riverside	67	215	31	0
Sacramento	67	140	1	0
San Benito	46	21	0	0
San Bernardino	70	417	40	0
San Diego	76	47	0	0
San Francisco	NR	NR	NR	NR
San Joaquin	90	123	24	0
San Luis Obispo	58	68	1	0
San Mateo	78	22	1	0
Santa Barbara	60	37	1	0
Santa Clara	64	144	1	0
Santa Cruz	72	48	2	0
Shasta	10	12	0	0
Sierra	11	1	0	0
Siskiyou	12	11	0	0
Solano	60	25	0	0
Sonoma	80	92	32	0
Stanislaus	60	141	1	0
Sutter	36	8	0	0
Tehama	10	2	0	0
Trinity	9	2	0	0

County	Number of Chemicals Analyzed	Number of Wells Sampled	Number of Wells with Unverified Detections	Number of Wells with Verified Detections
Tulare	62	219	39	31
Tuolumne	23	6	0	0
Ventura	58	65	0	0
Yuba	25	9	1	0

NR = Not Reported

Results by Pesticide

Sampling results from July 1, 2005, to June 30, 2006, were reported for 124 pesticide-related compounds. Among the 25 detected compounds, 10 were verified detections. All of these compounds had been listed in previous years reports. Verified detections were the result of sampling conducted by the DPR (see Appendix B for a detailed summary of the study). Table I-4 summarizes, by chemical, the number of counties where wells were sampled, the number of wells sampled, and the number of wells that had verified and unverified detections of pesticide-related compounds. Most wells were sampled for more than one compound. The table is sorted alphabetically.

Table I-4. Summary, by pesticide-related compounds, of the number of counties where wells were sampled, the number of wells sampled and the number of wells with verified and unverified detections for the period July 1, 2005 to June 30, 2006.

Chemical	Number of Counties Sampled	Number of Wells Sampled	Number of Wells with Unverified Detections	Number of Wells with Verified Detections
1,1,2,2-tetrachloroethane	54	2757	0	0
1,2,4-trichlorobenzene	53	2712	1	0
1,2-D, 1,3-D, and C-3 compounds	54	2378	0	0
1,2-dichloropropane	54	2754	8	0
1,3-dichloropropene (1,3-D, telone)	34	901	0	0
2,3,7,8-TCDD (dioxin)	20	317	0	0
2,4,5-T	31	294	0	0
2,4,5-TP (silvex)	38	710	0	0
2,4,6-trichlorophenol	1	25	0	0
2,4-D	38	738	0	0
2,4-dinitrophenol	1	25	0	0
3-hydroxycarbofuran	37	603	0	0
4(2,4-DB), dimethylamine salt	13	79	0	0
Acenaphthene	6	60	0	0
ACET	3	117	0	71
Acetochlor	10	81	0	0

Chemical	Number of Counties Sampled	Number of Wells Sampled	Number of Wells with Unverified Detections	Number of Wells with Verified Detections
Acifluorfen, sodium salt	11	40	0	0
Acrylonitrile	4	21	0	0
Alachlor	45	1123	0	0
Aldicarb	37	605	0	0
Aldicarb sulfone	37	607	0	0
Aldicarb sulfoxide	37	607	0	0
Aldrin	35	640	0	0
Ametryne	1	2	0	0
Atraton	2	20	0	0
Atrazine	45	1595	0	4
Benefin (benfluralin)	1	6	0	0
Bentazon, sodium salt	38	712	0	0
Benzene (benzol)	54	2767	3	0
BHC (other than gamma isomer)	8	60	0	0
Bromacil	42	1065	0	29
Butachlor	42	925	0	0
Butylate	1	2	0	0
Carbaryl	37	602	0	0
Carbofuran	36	670	0	0
Carbon disulfide	21	338	1	0
Chlordane	34	671	0	0
Chlorobenzilate	5	16	0	0
Chloromethane (methyl chloride)	54	2167	14	0
Chloroneb	5	16	0	0
Chlorothalonil	27	382	0	0
Chlorpropham	1	2	0	0
Chlorthal-dimethyl (dacthal / DCPA)	3	21	0	0
Chlorthal-dimethyl acid breakdown products	23	260	3	0
Cycloate	1	2	0	0
DACT	3	117	0	65
Dalapon	38	707	0	0
DBCP	37	2165	0	0
DDD	8	45	0	0
DDE	15	71	0	0
DDT	12	58	0	0
DDVP (dichlorvos)	2	7	0	0
Deethyl-atrazine	3	117	0	5
Demethylnorflurazon	3	117	0	31
Demeton	1	2	0	0

Chemical	Number of Counties Sampled	Number of Wells Sampled	Number of Wells with Unverified Detections	Number of Wells with Verified Detections
Diazinon	37	800	0	0
Dicamba	38	637	0	0
Dichlorprop, butoxyethanol ester	12	43	0	0
Dieldrin	34	623	0	0
Dimethoate	42	948	0	0
Dinoseb	38	708	0	0
Diphenamid	1	2	0	0
Diquat dibromide	33	637	4	0
Disulfoton	2	26	0	0
Diuron	20	342	2	43
Endosulfan	6	43	0	0
Endosulfan sulfate	6	43	0	0
Endothall	32	528	0	0
Endrin	34	680	1	0
Endrin aldehyde	6	43	0	0
EPTC	15	72	0	0
Ethylene dibromide	38	2135	15	0
Ethylene glycol	1	2	0	0
Fenamiphos	1	2	0	0
Fonofos (dyfonate)	1	24	0	0
Glyphosate, isopropylamine salt	33	550	0	0
Heptachlor	34	673	0	0
Heptachlor epoxide	34	675	0	0
Hexachlorobenzene	35	795	0	0
Hexazinone	4	119	0	0
Lindane (gamma-BHC)	34	681	0	0
Linuron	1	25	0	0
Malathion	1	78	0	0
Merphos	2	7	1	0
Methiocarb	16	129	0	0
Methomyl	37	605	1	0
Methoxychlor	34	694	0	0
Methyl bromide (bromomethane)	54	2165	0	0
Methyl parathion	1	78	0	0
Metolachlor	42	941	0	0
Metribuzin	42	941	0	0
Mevinphos (phosdrin)	1	5	0	0
Molinate	44	1190	0	0
Naphthalene	49	2021	1	0
Napropamide	1	2	0	0

Chemical	Number of Counties Sampled	Number of Wells Sampled	Number of Wells with Unverified Detections	Number of Wells with Verified Detections
Norflurazon	3	117	0	16
Ortho-dichlorobenzene	54	2760	0	0
Oxamyl	37	674	0	0
Paraquat dichloride	10	72	0	0
Parathion or ethyl parathion	1	78	0	0
Pendimethalin	1	1	0	0
Pentachloronitrobenzene (pcnb)	1	6	0	0
Permethrin	5	16	0	0
Permethrin, other related	4	15	0	0
Picloram	38	711	0	0
Prometon	6	216	0	1
Prometryn	41	944	0	0
Propachlor	40	883	0	0
Propazine	5	15	0	0
Propoxur	15	126	0	0
Secbumeton	2	19	0	0
Simazine	45	1631	0	50
Simetryn	1	2	0	0
Tebuthiuron	1	2	0	0
Terbacil	12	74	0	0
Terbutryn	3	21	0	0
Tetrachlorvinphos (stirofos)	1	2	0	0
Thiobencarb	44	1406	0	0
Toxaphene	34	665	0	0
Triadimefon	1	2	0	0
Trichlorobenzenes	54	2374	2	0
Trifluralin	22	156	0	0
Vernolate	1	2	0	0
Xylene	53	2755	2	0

Status of Pesticides with Verified Detections

Detections were verified in 82 wells in two counties. Table I-5 summarizes, by county and pesticide, the number of wells with verified detections.

Table I-5. Summary, by county and pesticide, of the number of wells with verified detections. Results are for data reported from July 1, 2005, to June 30, 2006.

County	atrazine	DEA	bromacil	diuron	norflurazon	demethylnorflurazon	prometon	simazine	ACET	DACT	**Total Unique Wells**
Fresno	3	4	14	26	12	25	1	35	47	43	51
Tulare	1	1	15	17	4	6	0	15	24	22	31
Total Detections	4	5	29	43	22	32	1	50	71	65	82

The tables below summarize the year's major uses and total pounds applied in California for the AI of the pesticides that had verified detections of the parent compound or its breakdown products. Maximum contamination levels and health advisory levels for each compound were obtained from the Central Valley Regional Water Quality Control Board's Compilation of Water Quality Goals, August 2003. The pesticide use information in the following tables was obtained from the 2005 pesticide use report database (PUR).

Atrazine

Atrazine is a selective herbicide primarily used for corn, sudan grass and Bermuda grass. This compound is listed on the 6800(a) list of compounds that have been found in California ground water. DPR regulations require users who apply compounds on this list in leaching and runoff GWPAs to follow specific management practices (see section on pesticide management practices) to prevent movement to ground water. The highest residue level of atrazine verified by DPR was 0.11 ppb. DHS and U. S. EPA have established an MCL for atrazine at 1 ppb.

Table I-6. Major uses of atrazine reported in 2005.

Site	Pounds
Corn (Forage - Fodder)	7,580
Corn, Human Consumption	7,167
Sudangrass (Forage – Fodder)	6,914
Bermuda grass (Forage – Fodder)	5,648
Forest Trees, Forest Land	2,976
Sorghum/Milo General	1,453
All Other	1,134

Bromacil

Bromacil is a soil-applied herbicide primarily used for as a general herbicide for weed control in rights-of-way and a selective herbicide in citrus crops. Bromacil is listed on the 6800(a) list of compounds that have been found in California ground water. DPR regulations require users who apply compounds on this list in leaching and runoff GWPAs to follow specific management practices (see section on pesticide management practices) to prevent movement to ground water. The highest residue level of bromacil verified by DPR was 5.37 ppb. No MCL has been established for bromacil. U. S. EPA has established a drinking water advisory level (HAL) for bromacil at 90 ppb.

Table I-7. Major uses of bromacil reported in 2005.

Site	Pounds
Rights Of Way	21,581
Orange (All Or Unspecified)	16,568
Grapefruit	2,739
Landscape Maintenance	2,398
Lemon	2,148
Tangelo	1,775
All Other	937

Diuron

Diuron is a pre- and early post-emergent soil applied herbicide. Its major uses are as a general herbicide controlling weeds in rights-of-way, and as a selective herbicide in alfalfa and citrus crops. Diuron is listed on the 6800(a) list of compounds that have been found in California ground water. DPR regulations require users who apply compounds on this list in leaching and runoff GWPAs to follow specific management practices (see section on pesticide management practices) to prevent movement to ground water. The highest residue level of diuron verified by DPR was 1.35 ppb. No MCL has been established for diuron. The U.S. EPA HAL is 10 ppb.

Table I-8. Major uses of diuron reported in 2005.

Site	Pounds
Rights Of Way	319,162
Alfalfa (Forage - Fodder)	211,615
Orange (All Or Unspecified)	182,123
Landscape Maintenance	45,901
Walnut (English Walnut)	35,902
Cotton, General	30,521
All Other	102,133

Hexazinone

Hexazinone is a contact and residual selective herbicide used for weed control in alfalfa and forest trees. Hexazinone may be used as a general herbicide at higher application rates. The highest residue level of hexazinone verified by DPR was 0.263 ppb. No MCL has been established for hexazinone. The U.S. EPA HAL is 400 ppb.

Table I-9. Major uses of hexazinone reported in 2005.

Site	Pounds
Alfalfa (Forage - Fodder)	62,127
Forest Trees, Forest Land	42,066
Rights Of Way	1,761
Regulatory Pest Control	664
Landscape Maintenance	47
Pastures (All Or Unspecified)	22
All Other	9

Norflurazon

Norflurazon is a soil applied selective herbicide used primarily to control grasses and broadleaf weeds in alfalfa, and tree, citrus and vine crops. Norflurazon is listed on the 6800(a) list of compounds that have been found in California ground water. DPR regulations require users who apply compounds on this list in leaching and runoff GWPAs to follow specific management practices (see section on pesticide management practices) to prevent movement to ground water. The highest residue level of norflurazon verified by DPR was 1.35 ppb. There are no drinking water quality limits for norflurazon.

Table I-10.Major uses of norflurazon reported in 2005.

Site	Pounds
Almond	22,189
Alfalfa (Forage - Fodder)	20,838
Grapes	10,384
Tangerine (Mandarin)	10,100
Grapes, Wine	4,361
Rights Of Way	3,972
All Other	21,932

Prometon

Prometon is a non-selective soil applied herbicide used to control most annual, many perennial broadleaf weeds and grasses for a full season or longer. Prometon is listed on the 6800(a) list of compounds that have been found in California ground water. DPR regulations require users who apply compounds on this list in leaching and runoff GWPAs to follow specific management practices (see section on pesticide management practices) to prevent movement to ground water. The highest residue level of prometon verified by DPR was 0.091 ppb. No MCL has been established for prometon. The U.S. EPA HAL is 100 ppb.

Table I-11. Major uses of prometon reported in 2005.

Site	Pounds
Uncultivated Non-Ag Areas	3
Landscape Maintenance	0

Simazine

Simazine is a soil applied selective herbicide that can be used at higher rates as a general herbicide. Its major uses are controlling grass and broadleaf weeds in citrus, vine and nut crops and in rights or way. Simazine is listed on the 6800(a) list of compounds that have been found in California ground water. DPR regulations require users who apply compounds on this list in leaching and runoff GWPAs to follow specific management practices (see section on pesticide management practices) to prevent movement to ground water.

Table I-12. Major uses of simazine reported in 2005.

Site	Pounds
Orange (All Or Unspecified)	208,246
Grapes, Wine	115,921
Grapes	84,833
Rights Of Way	48,817
Almond	48,512
Walnut (English Walnut)	42,031
All Other	77,528

The highest residue level of simazine verified by DPR was 0.205 ppb. DHS and U. S. EPA have established an MCL for simazine at 4 ppb.

Status of Unverified Detections

Samples with unverified detections of registered pesticides were investigated by DPR. However, there are two exceptions to this rule. DPR will not further investigate a report of a detection (1) if the detected residue is from a compound that is listed on the 6800(a) list of known ground water contaminates and the detection occurred in a GWPA or (2) if the detection is below 80 percent of the MDL established by a lab approved by DPR.

The status of all positive samples (verified and unverified) added to the database is summarized in Appendix C. This appendix also includes the historical range of concentrations for compounds detected in ground water and, if a detection occurred, the detection levels reported during this fiscal year, from July 1, 2005, to June 30, 2006. Of the 111,036 records added to the well inventory database this year, there were 82 verified detections and 335 unverified detections from 3,915 wells in 56 counties for a total of 25 pesticide-related compounds. Ninety-five percent of these detections were of 10 chemicals not registered in California or not registered for agricultural use. The chemicals were 1,2,4-trichlorobenzene; 1,2-dichloropropane; benzene; chloromethane; DBCP; endrin, ethylene dibromide; merphos, trichlorobenzenes and xylene.

DHS reported detections of aldicarb sulfone, aldicarb sulfoxide, diuron (2 wells), methomyl (2 wells), metribuzin, and diquat dibromide (4 wells). DPR's investigation into the aldicarb sulfone, aldicarb sulfoxide, metribuzin, and one of the methomyl detections determined that the reported residues were in error based on the actual reports from the analyzing laboratory. The four wells with the diquat dibromide detections were retested shortly after the initial report of residues and these residues were not detected in the retested samples. The initial reported detections are assumed to be erroneous. The remaining methomyl detection and two diuron detections are currently being investigated by DPR.

II. PREVENTION OF PESTICIDE MOVEMENT TO GROUND WATER AS A RESULT OF LEGAL AGRICULTUAL APPLICATIONS

Discussion

Pesticides in soil gradually disappear from the site of deposition in a number of ways including photolysis; volatilization; microbial degradation; chemical degradation, such as hydrolysis; leaching; or runoff. In the event of runoff or leaching, some pesticides, usually those applied directly to soil, can move to ground water. Once ground water contamination occurs it is very difficult and costly to remove the pesticide residue. Therefore, the best way to protect ground water is to regulate pesticide use before contamination can occur.

The Pesticide Contamination Prevention Act requires DPR to take regulatory action to protect ground water only after a pesticide has been detected in ground water due to legal, agricultural use. Once a pesticide is found in ground water, the director may determine that use can be modified to eliminate the probability that the pesticide will pollute the ground waters of the state. Initially, DPR adopted use modifications that applied only where pesticides were found in ground water because vulnerability was only associated with detections. In some cases, the detected pesticide was prohibited in vulnerable areas. The problem with prohibiting use is that users often substitute other pesticides with the same environmental fate characteristics. As a result, eventually the substituted pesticide can also move to ground water.

Over time, DPR and other agencies have sampled many wells under a variety of soil, depth-to-ground water, and climatic conditions. As this monitoring data accumulated in the well inventory database, DPR was able to begin analyzing the relationship between detections and these other factors to determine if vulnerability could be determined before contamination actually occurs. In the 1990's, DPR scientists were able to develop the California vulnerability modeling (CALVUL) approach, which was used to determine vulnerable areas in California based on soil characteristics and depth-to-ground water data. Information on the CALVUL modeling approach can be found at http://www.cdpr.ca.gov/docs/gwp/index.htm. This approach related geographical factors to areas with known ground water contamination (Troiano, et al., 1994). Each section of land for which soil and depth-to-ground water data was available was screened to determine if it fit any of the profiles that characterize vulnerable areas; in coarse, permeable soils, residues leach with water during normal percolation processes and in less permeable soils with a hardpan layer, residues are moved offsite in runoff water to sensitive sites (Braun and Hawkins, 1991). Pesticide application management practices were developed based on the predominant soils in these vulnerable areas (Troiano et al., 2000). Sections of land meeting the vulnerable profiles and for which mitigation measures are available were designated GWPAs (Troiano, et al., 1997). DPR has identified 3,718 GWPAs as sections in coarse or hardpan soil clusters that have depth-to-ground water at 70 feet or shallower. In addition, all previous PMZs not classified by CALVUL were designated GWPAs. Effective May 27, 2004, DPR's new regulations allow

continued use of ground water contaminants if users can comply with new use restrictions (management practices) in GWPAs and restrictions that apply inside canal and ditch banks and artificial recharge basins.

The following section summarizes the factors that contribute to pesticide movement to ground water and provides details of the pesticide application management practices specified in regulation that will help to prevent contamination of ground water.

Factors that Contribute to Pesticide Movement to Ground Water

Pesticide Factors

The physical and chemical characteristics thought to be important in movement through soil are water solubility, soil adsorption coefficient, anaerobic and aerobic soil metabolism, hydrolysis and field dissipation. Under FAC section 13144, DPR is required to establish SNVs for these characteristics. To date, the SNVs have been established for water solubility, soil adsorption (Koc), and half-lives for hydrolysis, aerobic and anaerobic soil metabolism by comparing the values for pesticides found in ground water to values for pesticides sampled for but not detected in ground water (Johnson 1991). When a value exceeds the SNV for water solubility or it is less than the SNV for Koc, the pesticide is considered mobile. When a value exceeds the half-life SNVs for hydrolysis or soil metabolism, the pesticide is considered persistent. Pesticides that are both mobile and persistent are determined to have the potential to pollute ground water when they are applied directly to soil, or whose application is recommended or required by the label to be followed by flood or furrow irrigation within 72 hours.

Soil Characteristics

Soil characteristics that affect the movement of pesticides and subsequently the potential to contaminate ground water are:

1. The soil's water-holding and water retention properties.
2. Potential for compaction of the surface soil.
3. Soil components that bind with and retard movement of pesticide residues.
4. Presence of soil microbes that degrade pesticide residues.

Two soil properties that affect water-holding capacity are soil texture and organic carbon content. With respect to texture, water percolates to ground water much quicker in coarse-textured sandy soils than in clayey soils (Vereecken, et al., 1988). Coarse-textured soils have larger pore sizes, which allow for greater effect of gravitational forces to pull water down through the soil profile, as compared to clayey soils where the smaller pore sizes allow greater binding of water to soil particles, causing greater water retention. The organic carbon component of soil retains a large amount of water when wetted, so soils with higher organic carbon content will also have greater retention of water. Organic carbon content has been included as a variable in equations to describe water-holding capacity of soils (Rawls and Brankensiek, 1985)

Surface soil compaction is another property that affects pesticide movement to ground water. Soils that are prone to compaction will shed water as runoff. Runoff water can contain residues of pesticides that eventually contaminate California's ground water (Braun and Hawkins, 1991). In areas prone to surface soil compaction, surface water is often collected and diverted to more porous subsurface soil to relieve potential flooding that could damage crops. In this situation, the potential for ground water contamination is high because water shunted to subsurface soil bypasses the principal soil microbial zone where most degradation of pesticide residues occurs.

Reaction of soil components with pesticide residues also affects pesticide movement through soil. Although the physical-chemical nature of a pesticide determines how likely it will interact with soil components, the amount of pesticide that reacts with soil is determined by the organic carbon content, and to a lesser extent the clay content, present in a soil (Mingelgrin and Gerstl, 1983). Numerous studies have indicated the importance of organic carbon content in sorption of pesticide residues where the amount of pesticide adsorbed per unit of soil directly increases as organic carbon content increases. Greater adsorption of pesticide residues results in less available for downward movement through the soil profile. Many soils in California are vulnerable to leaching because they are low in organic carbon content. Clay particles can be important because they react with pesticides that contain ionic charges. For example, paraquat is highly polar and is highly reactive with the negative sites on the clay particles.

For pesticides that are incorporated into soil, the predominant pathway for degradation is metabolism by soil micro-flora, primarily bacteria and fungi. Thus, conditions that favor the presence and activity of soil micro-flora will also enhance degradation. For example, biological activity generally increases with increasing temperature so pesticides applied in cooler winter months will persist longer than pesticides applied in hotter summer months. Often, the soil micro-flora adapts to pesticide applications as indicated by faster rates of degradation measured after successive applications of pesticides (Suett and Jukes, 1988). Maintaining soil conditions that nurture soil microbial populations is important in ensuring fastest rates of biological degradation.

Irrigation Practices

Pesticide residues move with water that percolates into soil and eventually recharges ground water. The source of recharge water is either from natural rainfall or from irrigation used in crop production. Most areas of California experience a Mediterranean climate where most rainfall occurs during the late fall and winter months and with very little rainfall during the rest of the year. The relative potential for downward movement of pesticide residues caused by rainfall and then by irrigation was investigated by DPR scientists in the 1980's. First, the effect of rainfall on the movement of simazine was studied on a sandy soil in Fresno (Troiano and Garretson, 1988). Simazine was applied in November of 1987, exposed to the winter rains, and the soil cored to 10 feet in May of 1988. During that period, the site received 10 inches of natural rainfall, which also

is the average rainfall in that area. Most simazine residues were confined to the first six inches of soil, indicating that the amount of percolating water produced during the winter months was not sufficient to cause significant downward movement of the residues. This is due to the pattern of rainfall where the 10 inches of water received by the experimental site was spread out over a number of months and with many rainfall events of one inch and below. In coarse textured soils, this pattern of water deposition allows for greater loss of water to evaporation rather than to percolation and thus results in limited downward movement of water and consequently pesticide residues. Similar results were observed in a rainfall study conducted in Riverside (Neal, et al., 1991).

Pesticide residues have been detected in ground water in areas with coarse-textured soils, indicating movement with water that recharges the ground water aquifer. The pattern of irrigation water applications is in stark contrast to precipitation events. Large amounts of water can be applied during each irrigation event, resulting in much larger potential losses of water to percolation. In a follow-up study, the influence of method and amount of irrigation water application was investigated on the movement of atrazine, a pre-emergent herbicide detected in ground water (Troiano, et al., 1993). This study demonstrated the effect that percolating water produced by irrigation has on downward movement of pesticide residues. Water treatments were based on a proportional measurement of reference crop evapotranspiration so that the smallest proportion produced the least amount of percolating water. There was a positive relationship between the proportioned water treatments and downward movement of atrazine; the smallest proportion produced the least amount of percolating water and the least downward movement of atrazine residues whereas the largest proportion produced the greatest downward movement of water and atrazine. Although this relationship was similar for different methods of irrigation water, the exact method of irrigation further affected the magnitude of atrazine leaching. For example, sprinkler irrigation was more effective than basin-flooding irrigation in limiting the downward movement of water and, subsequently, atrazine residues. Leaching was less in sprinkler applications because water could be applied more frequently in smaller applications than for the basin-flooding method. For basin-flooding treatments, a large amount of water application was required during each irrigation event in order to provide application across the plot. Although irrigations were less frequent, the larger water volume caused greater downward movement of water and atrazine residues.

Climate

Another important contributing factor is regional climate, such as precipitation. In Del Norte County, the average annual rainfall is about 75 inches. One study, conducted in this region to determine downward movement of the pesticide fenamiphos attributed heavy rainfall to fenamiphos residue moving well below the zone of application (Weaver, et al., 1988). Forty-two inches of rain fell between the time fenamiphos was applied in October and the first soil cores were collected in March. Another study used parameters from the Smith River Plains area in Del

Norte County to input information into a computer model to simulate subsurface migration of a number of pesticides (Warner, et al., 1989). Concentrations of fenamiphos measured in the field study were compared with simulated concentrations generated from the computer model. Graphs of the measured and simulated values matched closely. In one particular simulation, staggering the application date of the pesticide by fifteen days resulted in the pesticide migrating deeper for all three years of the simulation. The difference in simulations was attributed to how closely the application date coincided with precipitation. However, in the 1988 Troiano and Garretson study in Fresno County, the 10 inches of rain received was insufficient to move the major portion of simazine beyond the first six inches of sandy soil.

Pesticide Application Management Practices

The new ground water regulations include application management practices, which are specific to runoff and leaching GWPAs, engineered rights-of-ways within GWPAs, and inside canals and ditch banks and artificial recharge basins statewide. A runoff GWPA is associated with low infiltration rate soils that facilitate runoff and a leaching GWPA is associated with sandy soils where leaching can occur. Application management practices in hardpan soil (runoff) areas are as follows:

<u>Runoff GWPAs</u>

Use of 6800(a) pesticides is prohibited in runoff GWPAs unless one of the following management practices can be met and is designated by the County Agricultural Commissioner on the permit.

(a) Soil disturbance. Within seven days before the pesticide is applied, the soil to be treated shall be disturbed by using a disc, harrow, rotary tiller, or other mechanical method. This practice does not apply to bentazon, does not apply to the area to be treated that is immediately adjacent to the crop row and that does not exceed 33 percent of the distance between crop rows, and does not apply out to the drip line in citrus; or

(b) Incorporation of the pesticide. Within 48 hours after the day the pesticide is applied, the pesticide shall be incorporated on at least 90 percent of the area treated, using a disc, harrow, rotary tiller, or other mechanical method, or by sprinkler or low flow irrigation, including chemigation if allowed by the label. The irrigation should be applied using a minimum of ¼ inch of irrigation water and a maximum of either one inch or the maximum amount of irrigation water specified on the label, at application rates that do not cause surface water runoff from the treated property or to wells on the treated property. This practice does not apply to bentazon, does not apply to the area that is immediately adjacent to the crop row and that does not exceed 33 percent of the distance between crop rows, and does not apply out to the drip line in citrus; or

(c) The pesticide shall be applied as a band treatment immediately adjacent to the crop row so that not more than 33 percent of the distance between rows is treated except in citrus where the treated band may extend out to the drip line of the tree; or

(d) The pesticide shall be applied between April 1 and July 31; or

(e) For six months following the application, the field shall be designed, by berms, levees, or non-draining circulation systems, to retain all irrigation runoff and all precipitation on, and drainage through, the field. The retention area on the field shall not have a percolation rate of more than 0.2 inches per hour (five inches per 24 hours) unless the drainage water is recirculated onto the field or an adjacent field under certain conditions every 24 hours; or

(f) For six months following the application, runoff shall be channeled to a holding area off the application site, under the control of the property operator, that is designed to retain all irrigation runoff and all precipitation on, and drainage through, the treated field and all other areas draining into that holding area. The holding area shall not have a percolation rate of more than 0.2 inches per hour (five inches per 24 hours); or

(g) Runoff onto a fallow field. For six months following application, runoff shall be managed so that it runs off onto an adjacent unenclosed fallow field at least 300 feet long that is not irrigated for six months after application, with full consideration of any plant back restrictions; or

(h) Tops and Outer Banks of Canals and Rights of Way, within Runoff GWPAs
Use of pesticides registered for agricultural, outdoor industrial, and outdoor institutional use containing chemicals listed in section 6800(a) may be applied to the tops and outer banks of canals and to rights of way within runoff GWPAs where runoff from the treated site flows to an area equal in size to the area treated, slowly infiltrates into the soil, and does not move to ditches, dry wells, or permeable retention areas.

(i) An alternative management practice or pesticide approved by the Director as follows:

i. Upon written request, the Director may evaluate and approve use of alternative management practices that are based on scientific data demonstrating their effectiveness in reducing movement of pesticides to ground water; or

ii. Upon written request, the Director may make a determination to allow the interim use of a pesticide containing a chemical listed in section 6800(a) in a runoff GWPA, for a period not to exceed three years, while the requestor is documenting an alternate management practice according to a protocol approved by the director. This option is only available if none of the existing management practices are feasible for a given crop or site.

Leaching GWPAs

Use of 6800(a) pesticides is prohibited in leaching GWPAs unless any one of the following management practices can be met and is designated by the commissioner on the permit:

(a) The permittee shall not apply any irrigation water for six months following application of the pesticide; or
(b) The permittee shall apply the pesticide to the planting bed or the berm above the level of irrigation water in the furrow or basin for six months following application of the pesticide; or
(c) Irrigation shall be managed so that the ratio of the amount of irrigation water applied divided by the net irrigation requirement is 1.33 or less for six months following application of the pesticide; or
(d) An alternative management practice or pesticide approved by the Director.

Artificial Recharge Basins

Use of pesticides registered for agricultural, outdoor industrial, and outdoor institutional use containing chemicals listed in section 6800(a) shall be prohibited below the high water line inside artificial recharge basins, unless the pesticide is applied six months or more before the basin is used to recharge ground water.

Inside Canals and Ditch Banks

Use of pesticides registered for agricultural, outdoor industrial, and outdoor institutional use containing chemicals listed in section 6800(a) shall be prohibited below the high water line inside unlined canals and ditches, unless at least one of the following applies:
(a) the pesticide user can document that the percolation rate of the canal or ditch is equal to or less than 0.2 inches per hour (0.002 gallons per minute per square foot); or
(b) the pesticide is applied six months before water is run in the canal or ditch.

Engineered Rights-of-Ways Within GWPAs

Use of pesticides registered for agricultural, outdoor industrial, and outdoor institutional use containing chemicals listed in section 6800(a) shall be prohibited on engineered rights-of-way in leaching or runoff ground water protection areas unless one of the following management options can be met and is designated by the commissioner on the permit:
(a) The property operator complies with one of the management practices specified for runoff GWPAS; or
(b) Any runoff from the treated right-of-way shall pass through a noncrop fully vegetated area adjacent, and equal in area, to the treated area; or
(c) The property operator complies with any permit issued pursuant to the storm water provisions of the federal Clean Water Act pertaining to the treated area; or
(d) An alternative management practice or pesticide approved by the Director.

III. ACTIONS TAKEN BY DPR TO PREVENT MOVEMENT OF PESTICIDES TO GROUND WATER

Pesticide Detection Response Process (PDRP)

The PDRP is a process where detections of pesticide active ingredients currently registered for agricultural use or their breakdown products are investigated, evaluated and mitigated, when necessary. Historically, DPR responded to any reported detection in ground water if the detected pesticide was currently registered for agricultural use. The response to many of these detections was to sample five or six wells in a four-section area around the contaminated well. However, due to shrinking resources, DPR has established policies that allow for greater scrutiny of the detection before it is entered into the PDRP.

Each year DPR receives reports of detections from various agencies. Occasionally, MDLs for some pesticides from submitted studies are below the MDLs obtainable by DPR laboratories. DPR's policy (memo from John Sanders to EM, July 2002) is not to confirm or verify detections with reported concentrations less than 80 percent of the current MDL established by the CDFA laboratory. Also, DPR does not confirm or verify detections of pesticides listed in 6800(a) or their breakdown products when the detection occurs within a GWPA because DPR adopted regulations that mitigate the environmental effects of 3CCR section 6800(a) compounds within these areas. As in the past, DPR enters all detections into the well inventory database for use in future analyses.

For detections entered into the PDRP, the investigative phase includes verification of the reported detection and a determination of agricultural use. Some of the investigative activities include determining whether:

- the application of the pesticide in the vicinity of the detection was reasonably likely;
- a point source was not a likely cause;
- a non-agricultural use of the pesticide was not a likely source; or
- a non-pesticide source was not a likely cause.

DPR combines an analysis of pesticide use in the area where the detection occurred with land use and a four-section survey (see below) to help determine if the detection is due to legal agricultural use.

<u>Four-Section Survey</u>

The four-section survey is a well monitoring survey which is conducted to determine if there is a second contaminated well in the same area as the reported positive well. This helps to determine that the residue did not result from a point source. Samples are taken from the five or six wells in the section of land of the original detection or one or more of the three most adjacent sections, and analyzed in order to confirm the initial detection. The location of a second positive well is an

indication that the detected residue may be the result of legal agricultural use and thus subject to the formal review process specified in FAC section 13149.

Verified detections of pesticide residues that are determined to be due to agricultural use and that have not been previously formally reviewed by the Director are subject to special review specified in FAC section 13150. The purpose of the review is to determine whether continued registration, sale, and use of the compound will be allowed. A subcommittee of the Pesticide Registration and Evaluation Committee holds a hearing, evaluates information, and makes recommendations to the Director of DPR, who then makes a determination regarding continued use of the compound in California.

DPR conducted three four-section surveys between July 1, 2005, and June 30, 2006, in response to reported detections of aldicarb breakdown products. No suitable wells were found for one of the studies and the results for the other two studies were not available until after June 30, 2006. No aldicarb or breakdown products were detected in any of the sampled wells. These results will be included in the 2007 report.

Table III-1. Detections that did not require further investigation.

County	Chemical	Comments
Fresno	Methyl bromide	Subsequent retesting of the well by DHS failed to confirm the initial report.
Los Angeles	Methyl bromide	Subsequent retesting of the well by DHS failed to confirm the initial report.
Merced	Propoxur	Initial reported residues of propoxur were determined to be a typographical error in the DHS report. The correct value was ‘none detected.’
Orange	Diazinon	Initial reported residue was erroneously reported with a value when the lab reported it as ‘trace.’ Subsequent retesting of the well by DHS failed to confirm the initial report.
Sacramento	Diquat dibromide	Initial reported residues of diquat dibromide were determined to be a typographical error in the DHS report. The correct value was ‘none detected.’
Stanislaus	Methyl bromide	Subsequent retesting of the well by DHS failed to confirm the initial report.
Ventura	Methyl bromide	Subsequent retesting of the well by DHS failed to confirm the initial report.
Fresno	Diazinon	Initial reported residue was erroneously reported as the analysis method number. The correct value was “none detected.”
Los Angeles	Methyl bromide	Subsequent retesting of the well by DHS failed to confirm the initial report.

Ground Water Protection List Monitoring

The GWPL is a list of pesticides having the potential to pollute ground water. It was established according to FAC section 13145(d) and placed in section 6800 of Title 3 of the California Code of regulations (3CCR). The GWPL is divided into sub-lists (a) and (b). Section 6800(a) is comprised of chemicals detected in soil or ground water as a result of legal, agricultural use. Section 6800(b) includes chemicals that exceed the SNVs and (1) are intended to be applied to or injected into the soil by ground-based application equipment or by chemigation; or (2) where the pesticide labels recommend or require their application to be followed, within 72 hours, by flood or furrow irrigation. To determine whether the pesticides listed in 6800(b) have migrated to ground water, DPR is required to conduct ground water monitoring for them.

In 1992, 47 pesticide AIs were placed in section 6800(b). Regulations that became effective on May 13, 1999, added 15 new AIs to section 6800(b), bringing the total number of AIs on the list to 62. Since resource limitations preclude concurrent annual monitoring of all 62 pesticides, DPR monitors the pesticides with the greatest potential to pollute groundwater. Candidate pesticides are selected based on their physicochemical characteristics, agricultural production practices for crops on which they are applied, target of application (soil versus foliar), information on recent detections in ground water and any other pertinent information.

In 2005 the EM Branch of DPR completed a GWPL monitoring survey for EPTC. Forty-four wells were sampled in eight counties during October through December 2005. No residues of EPTC were detected in any of the wells. The total number of wells that were sampled in each county is presented in Table III-2.

Table III-2. Number of wells sampled in each county during the GWPL monitoring survey for EPTC.

County	Wells Sampled
Butte	2
Fresno	6
Glenn	4
Merced	7
Sacramento	7
San Joaquin	10
Siskiyou	3
Stanislaus	5
Total	44

Monitoring Study To Determine Distribution Of Atrazine/Simazine Parent And Breakdown Product Residues In Public Water Supply Wells

In 2004, the EM Branch of DPR completed a study to determine the presence of the breakdown products of atrazine and simazine in public water system wells in three counties. Forty-nine wells were sampled in Fresno, Kern and Tulare counties during October through December 2004. Seventeen wells had pesticide residues, fifteen wells contained residues of the breakdown products of atrazine or simazine. Two of the wells with pesticide residues were outside existing GWPAs and have been entered into the PDRP. No further action was taken on the 15 remaining wells with residues because these detections occurred in a GWPA and the herbicides were already on the 6800(a) list. Five of the contaminated wells were in Fresno County and twelve were in Tulare County. This data was not included in the 2005 report. The total number of wells that were sampled in each county is presented in Table III-3

Table III-3. Number of wells sampled in each county during the study to determine the presence of the breakdown products of atrazine and simazine in public water system wells.

County	Wells Sampled
Fresno	21
Kern	1
Tulare	27
Total	49

Well Network Monitoring -- Monitoring Temporal Changes in Concentrations of Detected Herbicides and Their Degradates

The new regulations are more preventative than the past program because application management practices will be implemented in areas determined to be vulnerable to pesticide contamination but where pesticide residues have not yet been detected in ground water. One measure of success of the program will be to observe temporal changes in pesticide concentrations in wells that are known to contain residues. Beginning in 1999, DPR has sampled a group of 70 domestic wells in Fresno and Tulare counties. These wells were selected because previous sampling resulted in verified detections of one or more of the following pesticides—atrazine, simazine, bromacil, diuron, prometon and norflurazon—and because they are located in one of the two soil conditions identified as vulnerable to pesticide contamination, either coarse textured, sandy soil or hardpan soil.

The data gathered before the new regulations went into effect will be background data used to compare detected concentrations with concentrations after the new regulations were adopted. However, the effects of changing application management practices may not be discernible for at least a decade (Spurlock et al., 2000).

Probabilistic Modeling for Risk Assessment of Ground Water Contamination by Pesticides
During the review of pesticide products for registration, the EM Branch receives requests from the Pesticide Registration Branch to evaluate the potential for ground water contamination by pesticides. The evaluations are typically conducted based on concerns about the physical-chemical properties of new active ingredients or new use patterns of older active ingredients. EM scientists have developed a probabilistic modeling approach to evaluate the potential of pesticides to reach ground water in vulnerable California soils (Troiano and Clayton, 2004).

From July 1, 2005, through June 30, 2006, EM scientists used the probabilistic modeling approach to evaluate the environmental fate of 6 pesticide products formulated from 5 active ingredients, which were submitted for California registration. These active ingredients were imazapyr, propoxycarbazone-sodium, pyrimethanil, thiacloprid, and sulfentrazone. All except sulfentrazone were determined from submitted data to present a negligible threat to California ground water. Sulfentrazone is under further evaluation.

Holding Pond Management Practices
Pesticides detected in San Joaquin County near Tracy were attributed to non-point source agricultural use. DPR determined that there were two most likely pathways of residues to ground water, holding ponds and vertisols, which are the cracking clay soils in the area. Most fields in the area had ponds located at one end that were used to collect irrigation runoff, often laden with pesticides. Inspection of the dried soils indicated large contiguous cracks that could serve as a conduit to ground water within the field. DPR established a protocol (Marade, 2000) to determine the source of contamination. The study (Prichard et al., 2004) found little downward movement in soil in the field and determined that the most direct route for residues was from runoff water containing pesticides that drained into the holding ponds and infiltrated into the shallow ground water.

One management practice was to recycle the water collected in the ponds by pumping it back onto the field. Using the measured herbicide concentrations in pond runoff water and the volume of runoff water from a typical grower-operated pond, Prichard et al. calculated the amount of herbicide available for infiltration in the pond. Grower recycling, which applied 45% of the runoff water back onto the field, was assumed to reduce the amount of herbicide infiltrated an equivalent amount. Improvements in the design and management of the recycling system was estimated to increase recycling to 85-90% of the runoff water with equivalent reductions in the amount of herbicide infiltrated to ground water. This study was used by the Director as the basis for approving an alternative management practice for runoff GWPAs. That practice allows growers to apply pesticides regulated to protect ground water in fields where runoff was held on the field in a retention area with an infiltration greater than 0.2 inches per hour as long as the runoff water was completely recycled every 24 hours out of the retention area.

Chemigation Initiative

Chemigation is the application of pesticides through irrigation systems. Chemigation is a potential mitigation measure for both leaching and runoff GWPAs because pesticides can be placed and maintained at intended sites of application through careful operation of the irrigation system. As part of the U.S. EPA's Label Improvement Program, pesticide labeling must include specific instructions for use of backflow prevention devices to protect the water source when pesticides are chemigated.

Chemigation Study

Starting in 2004/2005, the EM Branch contracted with CIT to develop data on the effectiveness of chemigation and to demonstrate the application of preemergence herbicides through low-volume irrigation systems. For fiscal year 2004/2005, this was a cooperative study that included two cooperating citrus growers, registrants of simazine (Syngenta) and diuron (Griffin, LLC), DPR, and CIT technical staff (Troiano, 2003). For fiscal year 2005/2006, a second phase of this study was initiated to expand the crops to include one cooperating grape grower. Irrigation systems of cooperating growers were evaluated and renovated as required for chemigation. For example, backflow prevention devices needed to be installed.

An important aspect of the study was to develop data demonstrating the effectiveness of chemigation. A proven method of change in the agricultural sector is to introduce the practice to a small segment of growers and test it for effectiveness on their property. Demonstrations are then conducted focusing on the grower's experience with the adoption of the practice. Two citrus growers who participated in study indicated that the control achieved through chemigation was very effective. Furthermore, the study resulted in the registrants requesting, with a letter of support from Citrus Mutual, and receiving a Section 24 C registration, which allows chemigation of simazine and diuron through micro-sprinkler irrigation systems on citrus.

Further investigations and demonstrations are planned to include other crops. Currently, the Section 24 C registration is only for use on citrus but both herbicides have a much wider range of use on deciduous tree fruit and nut crops and on grapes. The next study in 2005/2006 is planned to include deciduous tree crops.

Chemigation Training

DPR contracted with the Center for Irrigation Technology (CIT) at California State University Fresno to provide chemigation training to the regulated community. Since 2001, CIT and DPR have provided 88 chemigation training sessions throughout California to growers, irrigation dealers, and pest control applicators, as well as to county agricultural commissioner and DPR enforcement staff. These training sessions focus on backflow prevention devices and their alternatives, which are required to be installed on any chemigation system. The sessions include a manual to help growers understand and comply with the requirements, and a demonstration

trailer that includes an irrigation supply line equipped with the required backflow prevention devices and some of their alternatives. The manual can be accessed at http://www.cdpr.ca.gov/docs/gwp/chem/grower_manual.pdf. These training sessions will continue to be offered throughout the state in an effort to bring chemigation applications into compliance with the pesticide labeling requirements.

Chemigation Task Force

DPR worked with CIT to form a task force to evaluate the need for further educational and regulatory action on chemigation applications. The task force was composed of irrigation specialists, backflow prevention equipment manufacturers and dealers, representatives from the agricultural community, engineers with expertise in backflow prevention, representatives from the CAC, and other interested parties. The task force met three times between July 1, 2005 and June 30, 2006 to discuss a variety of topics including alternative chemigation devices, recommendations for adopting chemigation regulations, and best management practices for the timing and application of pesticides by chemigation.

Chemigation Websites

Information about the Chemigation Initiative and chemigation requirements can be found on the DPR website at http://www.cdpr.ca.gov/docs/gwp/chem.htm. These web pages include an overview of backflow prevention regulations, and provide descriptions and diagrams of the required devices and their alternatives for use during chemigation applications. The CIT website can be found at http://cati.csufresno.edu/cit/. California Polytechnic State University, San Luis Obispo also has a website providing backflow prevention information at www.itrc.org/reports/chemigation/chemigationandfertigationforca.htm. This site includes links to several documents pertaining to chemigation, including an article written by Dr. Charles M. Burt, “Chemigation and Fertigation Basics for California,” which addresses questions about chemigation and irrigation management.

IV. ACTIONS TAKEN BY THE SWRCB AND IT' S REGIONAL BOARDS TO PREVENT PESTICIDES FROM ENTERING GROUND WATER NOVEMBER 2005.

The fourth section is a summary of the SWRCB's and the Regional Water Quality Control Board's (RWQCB) monitoring activities and is available at:
http://www.cdpr.ca.gov/docs/empm/pubs/ehapreps/swrcb/ab2021_fy0506.pdf

REFERENCES

Biermann, H. July 1989. Definition of a Second Analytical Method for the Purposes of AB2021 (memorandum). Department of Food and Agriculture, Sacramento, California. http://www.cdpr.ca.gov/docs/emon/grndwtr/polprocd/policy21.pdf (verified 11 Jan 2008)

Biermann, H. July 1996. Definition of 'Unequivocal Detection Methods' for the Purposes of SB810 (memorandum). Department of Pesticide Regulation, Sacramento, California. http://www.cdpr.ca.gov/docs/emon/grndwtr/polprocd/policy10.pdf (verified 11 Jan 2008)

Braun, A.L., and L.S. Hawkins. 1991. Presence of Bromacil, Diuron, and Simazine in Surface Water Runoff from Agricultural Fields and Non-Crop Sites in Tulare County, California. Pest Management Analysis and Planning Program, Department of Pesticide Regulation, California Environmental Protection Agency. Sacramento, California. PM 91-1. http://www.cdpr.ca.gov/docs/pestmgt/pubs/pm9101.pdf (verified 11 Jan 2008)

Johnson, B. 1991. Setting Revised Specific Numerical Values. Environmental Monitoring Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, California. EH 91-06. http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh9106.pdf (verified 11 Jan 2008)

Marade, J. February 2000. Protocol. Evaluation and Prevention of Offsite Movement of Hexazinone and Diuron From An Alfalfa Field. Environmental Monitoring Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, California. Study 187. http://www.cdpr.ca.gov/docs/emon/pubs/protocol/prot187.pdf (verified 11 Jan 2008)

Marshack, Jon B. 2003. A Compilation of Water Quality Goals. Central Valley Regional Water Quality Control Board, California Environmental Protection Agency.

Mingelgrin, U. and Z. Gerstl. 1983. Reevaluation of partitioning as a mechanism of nonionic chemicals adsorption in soils. J. Environ. Qual. 12:1-11.

Neal, R., R. Teso, T. Younglove, and D.L. Sheeks III. July 1991. Seasonal Rainfall Effects on Pesticide Leaching in Riverside. Environmental Monitoring Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, California. EH91-07. http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh9107.pdf (verified 11 January 2008)

Prichard, T., J. Troiano, J. Marade, F. Guo, and M. Canevari. 2005. Movement of diuron and hexazinone in clay soil and infiltrated pond water. J. Environ. Qual. 34: (In Press).

Prichard, T., L. Schwankl, and M. Canevari. September 2004. Develop Holding Pond Mitigation Practices to Prevent Herbicide Movement to the Ground Water. University of California Cooperative Extension in Cooperation with the Department of Pesticide Regulation. Environmental Monitoring Branch, California Environmental Protection Agency, Sacramento, California. EH04-03. http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh0403.pdf (verified 11 January 2008)

Rawls, W.J. and K.L. Brakensiek. 1985. Agricultural management effects on soil water retention. In: DeCoursey, D.G. (ed.), Proceedings of the 1983 Natural Resources Modeling Symposium. U.S. Department of Agriculture, Agricultural Research Service, ARS-30, 532 p.

Sanders J. April 1994. Creating Pesticide Management Zones (PMZs) Based on Detections of Degradation Products of Pesticide Active Ingredients in Ground Water. To Gosselin P. (Issue memo). Environmental Monitoring Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, California. http://www.cdpr.ca.gov/docs/emon/grndwtr/polprocd/policy16.pdf (verified 11 January 2008)

Sanders J. July 2002. Policy on Response to Certain Reported Detections of Pesticide in Ground Water. To EM staff (memorandum). Environmental Monitoring Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, California. http://www.cdpr.ca.gov/docs/emon/grndwtr/polprocd/gwp071202.pdf (verified 11 January 2008)

Spurlock F. March 2000. Chlorofluorocarbon dating of herbicide-containing well waters in Fresno and Tulare counties, California. J. Environ. Qual. 29:474-483. http://www.cdpr.ca.gov/docs/emon/pubs/ehapref/chlordat.pdf (verified 11 January 2008)

Suett, D. L. and A. A. Jukes. 1988. Evidence and implications of accelerated degradation of organophosphorus insecticides in soil. Toxicol. Environ. Chem. 18:37-49.

Troiano J. 2003. Protocol to Demonstrate the Effectiveness of Chemigation of Pre-emergence Herbicides through Low-Volume Irrigation Systems. Environmental Monitoring Branch, Department of Pesticide Regulation, CAL EPA, Sacramento, CA, 95812. Study 221. http://www.cdpr.ca.gov/docs/emon/pubs/protocol/prot221.pdf (verified 11 January 2008)

Troiano, J. and C. Garretson. January, 1988. Soil Distribution of Simazine, Diazinon and Bromide in Sandy Soil After Exposure to 1985-1986 Winter Rains in Fresno County. Environmental Monitoring Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, California. EH 88-02. http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh8802.pdf (verified 11 January 2008)

Troiano, J and M. Clayton. 2004. Probabilistic modeling for risk assessment of ground water contamination by pesticides. Environmental Monitoring Branch, California Department of Pesticide Regulation, Sacramento, CA. Report EH 9-06. http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/analysis_memos/prob_mod_policy.pdf . (verified 11 January 2008)

Troiano, J., B. Johnson, S. Powell, and S. Schoenig. August 1994. Use of cluster and principal component analysis to profile areas in California where ground water has been contaminated by pesticides. Environmental Monitoring and Assessment. 32: 269-288.

Troiano, J., C. Garretson, C. Krauter, J. Brownell, and J. Hutson. 1993. Influence of amount and method of irrigation water application on leaching of atrazine. J. Environ. Qual. 22: 290-298. http://www.cdpr.ca.gov/docs/emon/pubs/ehapref/atrzne.pdf (verified 11 January 2008)

Troiano, J., C. Nordmark, T. Barry, and B. Johnson. 1997. Profiling areas of ground water contamination by pesticides in California: Phase II - evaluation and modification of a statistical model. Environ. Monitor. Assess. 45:301-318.

Troiano, J., F. Spurlock, and J. Marade. 2000. Update of the California Vulnerability Soil Analysis for Movement of Pesticides to Ground Water: October 14, 1999. Environmental Monitoring Branch, California Department of Pesticide Regulation, Sacramento, CA 95812-4015. EH 00-05. http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh0005.pdf (verified 11 January 2008)

Vereecken, H., J. Maes, J. Feyen, and P. Darius. 1988. Estimating the soil moisture retention characteristic from texture, bulk density, and carbon content. Soil Science 48:389-483.

Warner, S.A, H. Lundborg, D. Whyte, M.J. Heassler, and S. Gergus. 1989. Ground Water Pollution by Pesticides on the Smith River Plains Del Norte County. Regional Water Quality Control Board. North Coast Region, Santa Rosa, California.

Weaver D., January 1995. Notification Process for Well Monitoring Results of Pesticides in Ground Water. To Goh K. (memorandum). Environmental Monitoring and Pest Management Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, California. http://www.cdpr.ca.gov/docs/emon/grndwtr/polprocd/policy14.pdf (verified 11 January 2008)

Weaver, D.J., V. Quan, C.N. Collison, N. Saini, and S.J. Marade. 1988. Monitoring the Persistence and Movement of Fenamiphos in Soils of Lily Bulb Fields in Del Norte County, 1986 Environmental Monitoring Branch, Department of Pesticide Regulation, California Environmental Protection Agency, Sacramento, California. EH 88-01. http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh8801.pdf (verified 11 January 2008)

APPENDIX A

Number of Wells Sampled and Positive Detections, by County and Chemical

This appendix lists the counties sampled for the period July 1, 2005, through June 30, 2006. Counties with pesticide detections during this period are marked with an asterisk.

Counties Sampled for This Report

Alameda	Madera*	San Mateo*
Alpine	Marin	Santa Barbara
Amador	Mariposa	Santa Clara*
Butte	Mendocino	Santa Cruz*
Calaveras	Merced*	Shasta
Colusa	Mono	Sierra
Contra Costa	Monterey	Siskiyou
Del Norte	Napa	Solano
El Dorado	Nevada	Sonoma*
Fresno*	Orange	Stanislaus*
Glenn	Placer	Sutter*
Humboldt	Plumas	Tehama
Imperial	Riverside*	Trinity
Inyo	Sacramento*	Tulare*
Kern*	San Benito	Tuolumne
Kings*	San Bernardino*	Ventura
Lake	San Diego	Yolo
Lassen	San Joaquin*	Yuba*
Los Angeles*	San Luis Obispo*	

Alameda	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	21	
	1,2,4-Trichlorobenzene	21	
	1,2-D, 1,3-D, and C-3 compounds	21	
	1,2-Dichloropropane	21	
	2,3,7,8-TCDD (dioxin)	11	
	2,4,5-TP (Silvex)	13	
	2,4-D	13	
	3-Hydroxycarbofuran	13	
	Alachlor	17	
	Aldicarb	13	
	Aldicarb sulfone	13	
	Aldicarb sulfoxide	13	
	Aldrin	16	
	Atrazine	17	
	Bentazon, sodium salt	13	
	Benzene (benzol)	21	
	Bromacil	12	
	Butachlor	15	
	Carbaryl	13	
	Carbofuran	13	
	Chlordane	16	
	Chloromethane (methyl chloride)	17	
	Chlorothalonil	3	
	Chlorthal-Dimethyl acid breakdown products	13	
	Dalapon	13	
	DBCP	16	
	DDD	3	
	DDE	3	
	DDT	3	
	Diazinon	12	
	Dicamba	13	
	Dieldrin	16	
	Dimethoate	12	
	Dinoseb	13	
	Diquat dibromide	11	
	Diuron	11	
	Endosulfan	3	
	Endosulfan sulfate	3	
	Endothall	11	
	Endrin	16	
	Endrin aldehyde	3	
	Ethylene dibromide	16	

Alameda	Chemical	Wells Sampled	Wells with Detections
	Glyphosate, isopropylamine salt	11	
	Heptachlor	16	
	Heptachlor epoxide	16	
	Hexachlorobenzene	16	
	Lindane (gamma-BHC)	16	
	Methomyl	13	
	Methoxychlor	16	
	Methyl bromide (bromomethane)	17	
	Metolachlor	15	
	Metribuzin	15	
	Molinate	17	
	Naphthalene	21	
	Ortho-Dichlorobenzene	21	
	Oxamyl	13	
	Picloram	13	
	Prometryn	12	
	Propachlor	15	
	Simazine	17	
	Thiobencarb	17	
	Toxaphene	16	
	Trichlorobenzenes	21	
	Xylene	21	

Alpine	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	1	
	1,2,4-Trichlorobenzene	1	
	1,2-D, 1,3-D, and C-3 compounds	1	
	1,2-Dichloropropane	1	
	Benzene (benzol)	1	
	Chloromethane (methyl chloride)	1	
	Methyl bromide (bromomethane)	1	
	Naphthalene	1	
	Ortho-Dichlorobenzene	1	
	Trichlorobenzenes	1	
	Xylene	1	

Amador	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	1	
	1,2,4-Trichlorobenzene	1	
	1,2-D, 1,3-D, and C-3 compounds	1	
	1,2-Dichloropropane	1	
	Alachlor	1	
	Atrazine	1	
	Benzene (benzol)	1	
	Chloromethane (methyl chloride)	1	
	Methyl bromide (bromomethane)	1	
	Molinate	1	
	Naphthalene	1	
	Ortho-Dichlorobenzene	1	
	Simazine	1	
	Thiobencarb	1	
	Trichlorobenzenes	1	
	Xylene	1	

Butte	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	1	
	1,1,2,2-Tetrachloroethane	28	
	1,2,4-Trichlorobenzene	27	
	1,2-D, 1,3-D, and C-3 compounds	27	
	1,2-Dichloropropane	28	
	2,4,5-T	22	
	2,4,5-TP (Silvex)	22	
	2,4-D	22	
	3-Hydroxycarbofuran	22	
	Alachlor	20	
	Aldicarb	22	
	Aldicarb sulfone	22	
	Aldicarb sulfoxide	22	
	Atrazine	20	
	Bentazon, sodium salt	22	
	Benzene (benzol)	27	
	Bromacil	20	
	Butachlor	20	
	Carbaryl	22	
	Carbofuran	22	
	Chloromethane (methyl chloride)	7	
	Dalapon	22	
	Diazinon	13	
	Dicamba	22	
	Dimethoate	20	
	Dinoseb	22	
	EPTC	2	
	Glyphosate, isopropylamine salt	18	
	Methomyl	22	
	Methyl bromide (bromomethane)	7	
	Metolachlor	20	
	Metribuzin	20	
	Molinate	20	
	Naphthalene	27	
	Ortho-Dichlorobenzene	28	
	Oxamyl	22	
	Picloram	22	
	Prometryn	20	
	Propachlor	20	
	Simazine	20	
	Thiobencarb	20	
	Trichlorobenzenes	27	
	Xylene	27	

Calaveras	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	7	
	1,2,4-Trichlorobenzene	7	
	1,2-D, 1,3-D, and C-3 compounds	8	
	1,2-Dichloropropane	7	
	Benzene (benzol)	7	
	Chloromethane (methyl chloride)	8	
	Methyl bromide (bromomethane)	7	
	Naphthalene	3	
	Ortho-Dichlorobenzene	7	
	Trichlorobenzenes	8	
	Xylene	7	

Colusa	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	7	
	1,2,4-Trichlorobenzene	7	
	1,2-D, 1,3-D, and C-3 compounds	8	
	1,2-Dichloropropane	7	
	Benzene (benzol)	7	
	Chloromethane (methyl chloride)	8	
	Methyl bromide (bromomethane)	7	
	Naphthalene	3	
	Ortho-Dichlorobenzene	7	
	Trichlorobenzenes	8	
	Xylene	7	

Contra Costa	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	7	
	1,1,2,2-Tetrachloroethane	10	
	1,2,4-Trichlorobenzene	10	
	1,2-D, 1,3-D, and C-3 compounds	9	
	1,2-Dichloropropane	10	
	2,3,7,8-TCDD (dioxin)	3	
	2,4,5-TP (Silvex)	7	
	2,4-D	7	
	3-Hydroxycarbofuran	7	
	Alachlor	7	
	Aldicarb	7	
	Aldicarb sulfone	7	
	Aldicarb sulfoxide	7	
	Aldrin	6	
	Atrazine	7	
	Bentazon, sodium salt	7	
	Benzene (benzol)	10	
	Bromacil	6	
	Butachlor	6	
	Carbaryl	7	
	Carbofuran	7	
	Carbon disulfide	4	
	Chlordane	7	
	Chloromethane (methyl chloride)	9	
	Chlorthal-Dimethyl acid breakdown products	1	
	Dalapon	7	
	DBCP	8	
	Diazinon	6	
	Dicamba	3	
	Dieldrin	6	
	Dimethoate	6	
	Dinoseb	7	
	Diquat dibromide	7	
	Diuron	6	
	Endothall	7	
	Endrin	7	
	Ethylene dibromide	8	
	Glyphosate, isopropylamine salt	7	
	Heptachlor	7	
	Heptachlor epoxide	7	
	Hexachlorobenzene	7	

Contra Costa	Chemical	Wells Sampled	Wells with Detections
	Lindane (gamma-BHC)	7	
	Methomyl	7	
	Methoxychlor	7	
	Methyl bromide (bromomethane)	9	
	Metolachlor	6	
	Metribuzin	6	
	Molinate	7	
	Naphthalene	9	
	Ortho-Dichlorobenzene	10	
	Oxamyl	7	
	Paraquat dichloride	1	
	Picloram	7	
	Prometryn	6	
	Propachlor	6	
	Simazine	7	
	Thiobencarb	7	
	Toxaphene	7	
	Trichlorobenzenes	9	
	Xylene	7	

Del Norte	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	1	
	1,2,4-Trichlorobenzene	1	
	1,2-D, 1,3-D, and C-3 compounds	1	
	1,2-Dichloropropane	1	
	Benzene (benzol)	1	
	Chloromethane (methyl chloride)	1	
	Methyl bromide (bromomethane)	1	
	Naphthalene	2	
	Ortho-Dichlorobenzene	1	
	Trichlorobenzenes	2	
	Xylene	1	

El Dorado	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	3	
	1,1,2,2-Tetrachloroethane	22	
	1,2,4-Trichlorobenzene	22	
	1,2-D, 1,3-D, and C-3 compounds	22	
	1,2-Dichloropropane	22	
	2,4,5-T	3	
	2,4,5-TP (Silvex)	3	
	2,4-D	3	
	Alachlor	3	
	Aldrin	3	
	Atrazine	3	
	Bentazon, sodium salt	3	
	Benzene (benzol)	22	
	Bromacil	3	
	Butachlor	3	
	Carbon disulfide	11	
	Chlordane	3	
	Chloromethane (methyl chloride)	22	
	Dalapon	3	
	Diazinon	3	
	Dicamba	3	
	Dieldrin	3	
	Dimethoate	3	
	Dinoseb	3	
	Endrin	3	
	Heptachlor	3	
	Heptachlor epoxide	3	
	Hexachlorobenzene	3	
	Lindane (gamma-BHC)	3	
	Methoxychlor	3	
	Methyl bromide (bromomethane)	22	
	Metolachlor	3	
	Metribuzin	3	
	Molinate	3	
	Naphthalene	15	
	Ortho-Dichlorobenzene	22	
	Picloram	3	
	Prometryn	3	
	Propachlor	3	
	Simazine	3	
	Thiobencarb	3	
	Toxaphene	3	
	Trichlorobenzenes	22	
	Xylene	22	

Fresno	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	27	
	1,1,2,2-Tetrachloroethane	75	
	1,2,4-Trichlorobenzene	75	
	1,2-D, 1,3-D, and C-3 compounds	75	
	1,2-Dichloropropane	75	1
	2,4,5-T	6	
	2,4,5-TP (Silvex)	6	
	2,4-D	6	
	3-Hydoxycarbofuran	5	
	ACET (deethyl-simazine or deisopropyl-atrazine)	69	47
	Alachlor	60	
	Aldicarb	5	
	Aldicarb sulfone	5	
	Aldicarb sulfoxide	5	
	Aldrin	12	
	Atrazine	120	3
	Bentazon, sodium salt	6	
	Benzene (benzol)	75	
	Bromacil	120	14
	Butachlor	60	
	Carbaryl	5	
	Carbofuran	5	
	Carbon disulfide	14	
	Chlordane	12	
	Chloromethane (methyl chloride)	70	
	Chlorothalonil	12	
	Dalapon	6	
	DBCP	264	110
	Deethyl-atrazine	69	4
	Demethylnorflurazon	69	25
	Diaminochlorotriazine (DACT)	69	43
	Diazinon	37	
	Dicamba	6	
	Dieldrin	12	
	Dimethoate	60	
	Dinoseb	6	
	Diquat dibromide	2	
	Diuron	70	26
	Endothall	2	
	Endrin	12	
	EPTC	6	
	Ethylene dibromide	255	3

Fresno	Chemical	Wells Sampled	Wells with Detections
	Glyphosate, isopropylamine salt	3	
	Heptachlor	12	
	Heptachlor epoxide	12	
	Hexachlorobenzene	12	
	Hexazinone	69	
	Lindane (gamma-BHC)	12	
	Methomyl	5	
	Methoxychlor	12	
	Methyl bromide (bromomethane)	70	
	Metolachlor	60	
	Metribuzin	60	
	Molinate	60	
	Naphthalene	75	
	Norflurazon	69	12
	Ortho-Dichlorobenzene	75	
	Oxamyl	5	
	Picloram	6	
	Prometon	69	1
	Prometryn	60	
	Propachlor	60	
	Simazine	120	35
	Thiobencarb	60	
	Toxaphene	12	
	Trichlorobenzenes	75	
	Trifluralin	12	
	Xylene	75	

Glenn	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	11	
	1,2,4-Trichlorobenzene	11	
	1,2-D, 1,3-D, and C-3 compounds	11	
	1,2-Dichloropropane	11	
	2,4,5-T	1	
	2,4,5-TP (Silvex)	1	
	2,4-D	1	
	3-Hydroxycarbofuran	1	
	Alachlor	1	
	Aldicarb	1	
	Aldicarb sulfone	1	
	Aldicarb sulfoxide	1	
	Atrazine	1	
	Bentazon, sodium salt	1	
	Benzene (benzol)	11	
	Bromacil	1	
	Butachlor	1	
	Carbaryl	1	
	Carbofuran	1	
	Chloromethane (methyl chloride)	8	
	Dalapon	1	
	DBCP	9	
	Dicamba	1	
	Dimethoate	1	
	Dinoseb	1	
	EPTC	4	
	Ethylene dibromide	9	
	Glyphosate, isopropylamine salt	1	
	Methomyl	1	
	Methyl bromide (bromomethane)	8	
	Metolachlor	1	
	Metribuzin	1	
	Molinate	1	
	Naphthalene	11	
	Ortho-Dichlorobenzene	11	
	Oxamyl	1	
	Picloram	1	
	Prometryn	1	
	Propachlor	1	
	Simazine	1	
	Thiobencarb	1	
	Trichlorobenzenes	11	
	Xylene	11	

Humboldt	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	2	
	1,2,4-Trichlorobenzene	2	
	1,2-D, 1,3-D, and C-3 compounds	2	
	1,2-Dichloropropane	2	
	Benzene (benzol)	2	
	Chloromethane (methyl chloride)	2	
	Methyl bromide (bromomethane)	2	
	Naphthalene	2	
	Ortho-Dichlorobenzene	2	
	Trichlorobenzenes	2	
	Xylene	2	

Imperial	Chemical	Wells Sampled	Wells with Detections
	Alachlor	1	
	Atrazine	1	
	Bromacil	1	
	Butachlor	1	
	Diazinon	1	
	Dimethoate	1	
	Metolachlor	1	
	Metribuzin	1	
	Molinate	1	
	Prometryn	1	
	Propachlor	1	
	Simazine	1	
	Thiobencarb	1	

Inyo	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	2	
	1,1,2,2-Tetrachloroethane	15	
	1,2,4-Trichlorobenzene	14	
	1,2-D, 1,3-D, and C-3 compounds	12	
	1,2-Dichloropropane	15	
	2,3,7,8-TCDD (dioxin)	3	
	2,4,5-TP (Silvex)	10	
	2,4-D	10	
	3-Hydroxycarbofuran	1	
	Alachlor	3	
	Aldicarb	1	
	Aldicarb sulfone	1	
	Aldicarb sulfoxide	1	
	Aldrin	3	
	Atrazine	3	
	Bentazon, sodium salt	10	
	Benzene (benzol)	15	
	Bromacil	3	
	Butachlor	3	
	Carbaryl	1	
	Carbofuran	3	
	Chlordane	3	
	Chloromethane (methyl chloride)	13	
	Chlorothalonil	3	
	Chlorthal-Dimethyl acid breakdown products	7	
	Dalapon	10	
	DBCP	10	
	Diazinon	3	
	Dicamba	8	
	Dieldrin	3	
	Dimethoate	3	
	Dinoseb	10	
	Diquat dibromide	3	
	Diuron	1	
	Endothall	3	
	Endrin	3	
	Ethylene dibromide	10	
	Glyphosate, isopropylamine salt	3	
	Heptachlor	3	
	Heptachlor epoxide	3	
	Hexachlorobenzene	3	
	Lindane (gamma-BHC)	3	

Inyo	Chemical	Wells Sampled	Wells with Detections
	Methomyl	1	
	Methoxychlor	3	
	Methyl bromide (bromomethane)	13	
	Metolachlor	3	
	Metribuzin	3	
	Molinate	3	
	Naphthalene	12	
	Ortho-Dichlorobenzene	15	
	Oxamyl	3	
	Picloram	10	
	Prometryn	3	
	Propachlor	3	
	Simazine	4	
	Thiobencarb	3	
	Toxaphene	3	
	Trichlorobenzenes	12	
	Xylene	15	

Kern	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	39	
	1,1,2,2-Tetrachloroethane	162	
	1,2,4-Trichlorobenzene	143	
	1,2-D, 1,3-D, and C-3 compounds	135	
	1,2-Dichloropropane	162	3
	2,4,5-T	11	
	2,4,5-TP (Silvex)	13	
	2,4-D	13	
	3-Hydoxycarbofuran	10	
	Acenaphthene	5	
	ACET (deethyl-simazine or deisopropyl-atrazine)	1	
	Acetochlor	1	
	Acifluorfen, sodium salt	1	
	Alachlor	69	
	Aldicarb	11	
	Aldicarb sulfone	11	
	Aldicarb sulfoxide	11	
	Aldrin	16	
	Atraton	19	
	Atrazine	83	
	Benefin (benfluralin)	6	
	Bentazon, sodium salt	13	
	Benzene (benzol)	163	
	BHC (other than gamma isomer)	18	
	Bromacil	56	
	Butachlor	42	
	Carbaryl	10	
	Carbofuran	11	
	Carbon disulfide	3	
	Chlordane	12	
	Chloromethane (methyl chloride)	84	1
	Chlorothalonil	4	
	Chlorthal-Dimethyl acid breakdown products	2	
	Dalapon	13	
	DBCP	161	19
	DDD	1	
	DDE	2	
	DDT	1	
	DDVP (dichlorvos)	5	
	Deethyl-atrazine	1	
	Demethylnorflurazon	1	
	Diaminochlorotriazine (DACT)	1	
	Diazinon	34	

Kern	Chemical	Wells Sampled	Wells with Detections
	Dicamba	11	
	Dichlorprop, butoxyethanol ester	1	
	Dieldrin	11	
	Dimethoate	55	
	Dinoseb	13	
	Diquat dibromide	8	
	Diuron	10	
	Endothall	10	
	Endrin	17	1
	EPTC	1	
	Ethylene dibromide	158	6
	Glyphosate, isopropylamine salt	1	
	Heptachlor	17	
	Heptachlor epoxide	17	
	Hexachlorobenzene	29	
	Hexazinone	1	
	Lindane (gamma-BHC)	30	
	Merphos	5	1
	Methomyl	10	
	Methoxychlor	30	
	Methyl bromide (bromomethane)	85	
	Metolachlor	55	
	Metribuzin	55	
	Mevinphos (Phosdrin)	5	
	Molinate	56	
	Naphthalene	134	
	Norflurazon	1	
	Ortho-Dichlorobenzene	162	
	Oxamyl	11	
	Pendimethalin	1	
	Pentachloronitrobenzene (PCNB)	6	
	Picloram	13	
	Prometon	19	
	Prometryn	55	
	Propachlor	40	
	Secbumeton	18	
	Simazine	83	
	Terbacil	2	
	Terbutryn	18	
	Thiobencarb	55	
	Toxaphene	17	
	Trichlorobenzenes	132	
	Trifluralin	3	
	Xylene	162	

Kings	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	4	
	1,2,4-Trichlorobenzene	4	
	1,2-D, 1,3-D, and C-3 compounds	4	
	1,2-Dichloropropane	4	
	Alachlor	11	
	Atrazine	11	
	Benzene (benzol)	6	2
	Bromacil	11	
	Butachlor	11	
	Carbon disulfide	1	
	Chloromethane (methyl chloride)	4	
	DBCP	28	
	Diazinon	8	
	Dimethoate	11	
	Ethylene dibromide	28	
	Methyl bromide (bromomethane)	4	
	Metolachlor	11	
	Metribuzin	11	
	Molinate	11	
	Naphthalene	4	
	Ortho-Dichlorobenzene	4	
	Prometryn	11	
	Propachlor	11	
	Simazine	11	
	Thiobencarb	11	
	Trichlorobenzenes	4	
	Xylene	4	

Lake	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	6	
	1,1,2,2-Tetrachloroethane	6	
	1,2,4-Trichlorobenzene	6	
	1,2-D, 1,3-D, and C-3 compounds	6	
	1,2-Dichloropropane	6	
	2,4,5-T	16	
	2,4,5-TP (Silvex)	16	
	2,4-D	16	
	3-Hydroxycarbofuran	10	
	4(2,4-Db), dimethylamine salt	14	
	Acifluorfen, sodium salt	10	
	Acrylonitrile	6	
	Alachlor	12	
	Aldicarb	10	
	Aldicarb sulfone	10	
	Aldicarb sulfoxide	10	
	Aldrin	9	
	Atrazine	10	
	Bentazon, sodium salt	16	
	Benzene (benzol)	6	
	BHC (other than gamma isomer)	3	
	Bromacil	6	
	Butachlor	6	
	Carbaryl	10	
	Carbofuran	10	
	Carbon disulfide	6	
	Chlordane	9	
	Chlorobenzilate	3	
	Chloromethane (methyl chloride)	6	
	Chloroneb	3	
	Chlorothalonil	3	
	Chlorthal-Dimethyl acid breakdown products	11	
	Dalapon	16	
	DBCP	7	
	DDD	3	
	DDE	3	
	DDT	3	
	Diazinon	6	
	Dicamba	16	
	Dichlorprop, butoxyethanol ester	10	
	Dieldrin	8	
	Dimethoate	6	

Lake	Chemical	Wells Sampled	Wells with Detections
	Dinoseb	16	
	Diquat dibromide	9	
	Endosulfan	3	
	Endosulfan sulfate	3	
	Endothall	11	
	Endrin	9	
	Endrin aldehyde	3	
	Ethylene dibromide	9	
	Heptachlor	9	
	Heptachlor epoxide	9	
	Hexachlorobenzene	9	
	Lindane (gamma-BHC)	9	
	Methiocarb	9	
	Methomyl	10	
	Methoxychlor	9	
	Methyl bromide (bromomethane)	6	
	Metolachlor	6	
	Metribuzin	6	
	Molinate	6	
	Naphthalene	6	
	Ortho-Dichlorobenzene	6	
	Oxamyl	11	
	Permethrin	3	
	Permethrin, other related	3	
	Picloram	16	
	Prometryn	6	
	Propachlor	8	
	Propoxur	9	
	Simazine	10	
	Thiobencarb	6	
	Toxaphene	9	
	Trichlorobenzenes	6	
	Trifluralin	3	
	Xylene	6	

Lassen	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	12	
	1,2,4-Trichlorobenzene	7	
	1,2-D, 1,3-D, and C-3 compounds	12	
	1,2-Dichloropropane	7	
	Benzene (benzol)	12	
	Chloromethane (methyl chloride)	12	
	Methyl bromide (bromomethane)	12	
	Naphthalene	6	
	Ortho-Dichlorobenzene	12	
	Trichlorobenzenes	12	
	Xylene	12	

Los Angeles	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	223	
	1,1,2,2-Tetrachloroethane	654	
	1,2,4-Trichlorobenzene	654	
	1,2-D, 1,3-D, and C-3 compounds	537	
	1,2-Dichloropropane	654	1
	2,3,7,8-TCDD (dioxin)	32	
	2,4,5-T	7	
	2,4,5-TP (Silvex)	44	
	2,4-D	44	
	3-Hydoxycarbofuran	34	
	4(2,4-Db), dimethylamine salt	1	
	Acenaphthene	1	
	Acetochlor	6	
	Acifluorfen, sodium salt	1	
	Alachlor	88	
	Aldicarb	36	
	Aldicarb sulfone	36	
	Aldicarb sulfoxide	36	
	Aldrin	35	
	Atrazine	194	
	Bentazon, sodium salt	44	
	Benzene (benzol)	654	
	Bromacil	76	
	Butachlor	67	
	Carbaryl	34	
	Carbofuran	46	
	Carbon disulfide	154	1
	Chlordane	42	
	Chloromethane (methyl chloride)	518	6
	Chlorothalonil	21	
	Chlorthal-Dimethyl (Dacthal / DCPA / dimethyl)	6	
	Chlorthal-Dimethyl acid breakdown products	14	1
	Dalapon	44	
	DBCP	297	3
	DDE	2	
	DDT	1	
	Diazinon	68	
	Dicamba	30	
	Dichlorprop, butoxyethanol ester	1	
	Dieldrin	35	
	Dimethoate	74	
	Dinoseb	44	

Los Angeles	Chemical	Wells Sampled	Wells with Detections
	Diquat dibromide	44	
	Diuron	11	
	Endothall	43	
	Endrin	41	
	EPTC	2	
	Ethylene dibromide	297	1
	Ethylene glycol	2	
	Glyphosate, isopropylamine salt	42	
	Heptachlor	41	
	Heptachlor epoxide	41	
	Hexachlorobenzene	54	
	Lindane (gamma-BHC)	41	
	Methiocarb	2	
	Methomyl	34	
	Methoxychlor	41	
	Methyl bromide (bromomethane)	519	
	Metolachlor	67	
	Metribuzin	67	
	Molinate	107	
	Naphthalene	300	
	Ortho-Dichlorobenzene	654	
	Oxamyl	46	
	Picloram	44	
	Prometryn	74	
	Propachlor	54	
	Propazine	1	
	Propoxur	1	
	Simazine	194	
	Terbacil	8	
	Thiobencarb	301	
	Toxaphene	41	
	Trichlorobenzenes	537	
	Trifluralin	3	
	Xylene	653	1

Madera	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	1	
	1,1,2,2-Tetrachloroethane	23	
	1,2,4-Trichlorobenzene	23	
	1,2-D, 1,3-D, and C-3 compounds	23	
	1,2-Dichloropropane	23	
	2,4,5-T	1	
	2,4,5-TP (Silvex)	1	
	2,4-D	1	
	3-Hydoxycarbofuran	1	
	Alachlor	9	
	Aldicarb	1	
	Aldicarb sulfone	1	
	Aldicarb sulfoxide	1	
	Aldrin	31	
	Atrazine	9	
	Bentazon, sodium salt	1	
	Benzene (benzol)	23	
	Bromacil	9	
	Butachlor	9	
	Carbaryl	1	
	Carbofuran	1	
	Chlordane	31	
	Chloromethane (methyl chloride)	23	
	Chlorothalonil	31	
	Dalapon	1	
	DBCP	21	3
	Diazinon	2	
	Dicamba	1	
	Dieldrin	31	
	Dimethoate	9	
	Dinoseb	1	
	Diquat dibromide	1	
	Endothall	1	
	Endrin	32	
	Ethylene dibromide	20	1
	Glyphosate, isopropylamine salt	1	
	Heptachlor	31	
	Heptachlor epoxide	31	
	Hexachlorobenzene	31	
	Lindane (gamma-BHC)	31	
	Methomyl	1	
	Methoxychlor	31	

Madera	Chemical	Wells Sampled	Wells with Detections
	Methyl bromide (bromomethane)	23	
	Metolachlor	9	
	Metribuzin	9	
	Molinate	9	
	Naphthalene	23	
	Ortho-Dichlorobenzene	23	
	Oxamyl	1	
	Picloram	1	
	Prometryn	9	
	Propachlor	8	
	Simazine	9	
	Terbacil	1	
	Thiobencarb	9	
	Toxaphene	31	
	Trichlorobenzenes	23	
	Trifluralin	31	
	Xylene	23	

Marin	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	2	
	1,2,4-Trichlorobenzene	2	
	1,2-D, 1,3-D, and C-3 compounds	2	
	1,2-Dichloropropane	2	
	2,4,5-T	1	
	2,4,5-TP (Silvex)	1	
	2,4-D	1	
	3-Hydroxycarbofuran	1	
	Alachlor	1	
	Aldicarb	1	
	Aldicarb sulfone	1	
	Aldicarb sulfoxide	1	
	Aldrin	1	
	Atrazine	1	
	Bentazon, sodium salt	1	
	Benzene (benzol)	2	
	Bromacil	1	
	Butachlor	1	
	Carbaryl	1	
	Carbofuran	1	
	Chlordane	1	
	Chloromethane (methyl chloride)	2	
	Chlorothalonil	1	
	Dalapon	1	
	DBCP	2	
	Dicamba	1	
	Dieldrin	1	
	Dimethoate	1	
	Dinoseb	1	
	Diquat dibromide	1	
	Endothall	1	
	Endrin	1	
	Ethylene dibromide	2	
	Heptachlor	1	
	Heptachlor epoxide	1	
	Hexachlorobenzene	1	
	Lindane (gamma-BHC)	1	
	Methomyl	1	
	Methoxychlor	1	
	Methyl bromide (bromomethane)	2	
	Metolachlor	1	
	Metribuzin	1	

Marin	Chemical	Wells Sampled	Wells with Detections
	Molinate	1	
	Naphthalene	2	
	Ortho-Dichlorobenzene	2	
	Oxamyl	1	
	Picloram	1	
	Prometryn	1	
	Propachlor	1	
	Simazine	1	
	Thiobencarb	1	
	Toxaphene	1	
	Trichlorobenzenes	2	
	Trifluralin	1	
	Xylene	2	

Mariposa	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	6	
	1,1,2,2-Tetrachloroethane	8	
	1,2,4-Trichlorobenzene	8	
	1,2-D, 1,3-D, and C-3 compounds	8	
	1,2-Dichloropropane	8	
	Alachlor	6	
	Atrazine	11	
	Benzene (benzol)	8	
	Bromacil	6	
	Butachlor	6	
	Chloromethane (methyl chloride)	8	
	DBCP	2	
	Dimethoate	6	
	Ethylene dibromide	1	
	Methyl bromide (bromomethane)	8	
	Metolachlor	6	
	Metribuzin	6	
	Molinate	6	
	Naphthalene	7	
	Ortho-Dichlorobenzene	8	
	Prometryn	6	
	Propachlor	6	
	Simazine	11	
	Thiobencarb	6	
	Trichlorobenzenes	8	
	Xylene	8	

Mendocino	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	4	
	1,1,2,2-Tetrachloroethane	4	
	1,2,4-Trichlorobenzene	4	
	1,2-D, 1,3-D, and C-3 compounds	4	
	1,2-Dichloropropane	4	
	2,4,5-T	7	
	2,4,5-TP (Silvex)	7	
	2,4-D	7	
	3-Hydroxycarbofuran	2	
	4(2,4-Db), dimethylamine salt	7	
	Acifluorfen, sodium salt	7	
	Acrylonitrile	4	
	Alachlor	6	
	Aldicarb	2	
	Aldicarb sulfone	2	
	Aldicarb sulfoxide	2	
	Aldrin	2	
	Atrazine	6	
	Bentazon, sodium salt	7	
	Benzene (benzol)	4	
	BHC (other than gamma isomer)	2	
	Bromacil	6	
	Butachlor	6	
	Carbaryl	2	
	Carbofuran	2	
	Carbon disulfide	4	
	Chlordane	2	
	Chlorobenzilate	2	
	Chloromethane (methyl chloride)	4	
	Chloroneb	2	
	Chlorothalonil	2	
	Chlorthal-Dimethyl acid breakdown products	8	
	Dalapon	7	
	DBCP	7	
	DDD	2	
	DDE	2	
	DDT	2	
	Diazinon	6	
	Dicamba	7	
	Dichlorprop, butoxyethanol ester	7	
	Dieldrin	2	

Mendocino	Chemical	Wells Sampled	Wells with Detections
	Dimethoate	6	
	Dinoseb	7	
	Diquat dibromide	3	
	Endosulfan	2	
	Endosulfan sulfate	2	
	Endothall	2	
	Endrin	2	
	Endrin aldehyde	2	
	Ethylene dibromide	7	
	Heptachlor	2	
	Heptachlor epoxide	2	
	Hexachlorobenzene	2	
	Lindane (gamma-BHC)	2	
	Methiocarb	2	
	Methomyl	2	
	Methoxychlor	2	
	Methyl bromide (bromomethane)	4	
	Metolachlor	6	
	Metribuzin	6	
	Molinate	6	
	Naphthalene	4	
	Ortho-Dichlorobenzene	4	
	Oxamyl	2	
	Permethrin	2	
	Permethrin, other related	2	
	Picloram	7	
	Prometryn	6	
	Propachlor	7	
	Propoxur	2	
	Simazine	6	
	Thiobencarb	6	
	Toxaphene	2	
	Trichlorobenzenes	4	
	Trifluralin	2	
	Xylene	4	

Merced	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	2	
	1,1,2,2-Tetrachloroethane	31	
	1,2,4-Trichlorobenzene	31	
	1,2-D, 1,3-D, and C-3 compounds	32	
	1,2-Dichloropropane	31	
	2,4,5-T	15	
	2,4,5-TP (Silvex)	17	
	2,4-D	17	
	3-Hydoxycarbofuran	17	
	4(2,4-Db), Dimethylamine Salt	2	
	Alachlor	34	
	Aldicarb	17	
	Aldicarb sulfone	17	
	Aldicarb sulfoxide	17	
	Aldrin	18	
	Atrazine	33	
	Bentazon, sodium salt	17	
	Benzene (benzol)	31	
	Bromacil	34	
	Butachlor	34	
	Carbaryl	17	
	Carbofuran	17	
	Chlordane	18	
	Chloromethane (methyl chloride)	32	
	Chlorothalonil	17	
	Dalapon	17	
	DBCP	50	11
	Diazinon	28	
	Dicamba	17	
	Dieldrin	18	
	Dimethoate	34	
	Dinoseb	17	
	Diquat dibromide	17	
	Diuron	14	
	Endothall	17	
	Endrin	18	
	EPTC	7	
	Ethylene dibromide	46	2
	Glyphosate, isopropylamine salt	18	
	Heptachlor	18	
	Heptachlor epoxide	18	
	Hexachlorobenzene	18	

Merced	Chemical	Wells Sampled	Wells with Detections
	Lindane (gamma-BHC)	18	
	Methiocarb	2	
	Methomyl	17	
	Methoxychlor	18	
	Methyl Bromide (bromomethane)	32	
	Metolachlor	35	
	Metribuzin	35	
	Molinate	33	
	Naphthalene	31	
	Ortho-Dichlorobenzene	31	
	Oxamyl	17	
	Picloram	17	
	Prometryn	35	
	Propachlor	35	
	Propoxur	2	
	Simazine	33	
	Thiobencarb	33	
	Toxaphene	18	
	Trichlorobenzenes	32	
	Trifluralin	13	
	Xylene	31	

Mono	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	1	
	1,1,2,2-Tetrachloroethane	4	
	1,2,4-Trichlorobenzene	3	
	1,2-D, 1,3-D, and C-3 compounds	3	
	1,2-Dichloropropane	4	
	2,3,7,8-TCDD (dioxin)	3	
	2,4,5-T	2	
	2,4,5-TP (Silvex)	3	
	2,4-D	3	
	3-Hydroxycarbofuran	1	
	Alachlor	2	
	Aldicarb	1	
	Aldicarb sulfone	1	
	Aldicarb sulfoxide	1	
	Aldrin	1	
	Atraton	1	
	Atrazine	2	
	Bentazon, sodium salt	3	
	Benzene (benzol)	4	
	BHC (other than gamma isomer)	1	
	Bromacil	2	
	Butachlor	1	
	Carbaryl	1	
	Chlordane	1	
	Chloromethane (methyl chloride)	4	
	Chlorothalonil	1	
	Dalapon	3	
	DBCP	1	
	Diazinon	2	
	Dicamba	3	
	Dieldrin	1	
	Dimethoate	2	
	Dinoseb	3	
	Diuron	1	
	Endothall	1	
	Endrin	1	
	Ethylene dibromide	1	
	Glyphosate, isopropylamine salt	1	
	Heptachlor	1	
	Heptachlor epoxide	1	
	Hexachlorobenzene	2	
	Lindane (gamma-BHC)	2	

Mono	Chemical	Wells Sampled	Wells with Detections
	Methiocarb	1	
	Methomyl	1	
	Methoxychlor	2	
	Methyl bromide (bromomethane)	4	
	Metolachlor	2	
	Metribuzin	2	
	Molinate	2	
	Naphthalene	3	
	Ortho-Dichlorobenzene	4	
	Oxamyl	1	
	Picloram	3	
	Prometon	1	
	Prometryn	2	
	Propachlor	1	
	Propoxur	1	
	Secbumeton	1	
	Simazine	2	
	Terbutryn	1	
	Thiobencarb	2	
	Toxaphene	1	
	Trichlorobenzenes	3	
	Xylene	4	

Monterey	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	8	
	1,1,2,2-Tetrachloroethane	45	
	1,2,4-Trichlorobenzene	45	
	1,2-D, 1,3-D, and C-3 compounds	45	
	1,2-Dichloropropane	45	
	2,4,5-T	9	
	2,4,5-TP (Silvex)	9	
	2,4-D	34	
	3-Hydroxycarbofuran	14	
	4(2,4-Db), dimethylamine salt	2	
	Acenaphthene	7	
	Acetochlor	7	
	Acifluorfen, sodium salt	2	
	Alachlor	18	
	Aldicarb	14	
	Aldicarb sulfone	14	
	Aldicarb sulfoxide	14	
	Aldrin	8	
	Atrazine	38	
	Bentazon, sodium salt	9	
	Benzene (benzol)	45	
	Bromacil	18	
	Butachlor	18	
	Carbaryl	14	
	Carbofuran	14	
	Carbon disulfide	9	
	Chlordane	8	
	Chloromethane (methyl chloride)	30	
	Chlorothalonil	1	
	Chlorthal-Dimethyl acid breakdown products	2	
	Dalapon	9	
	DBCP	4	
	DDE	7	
	DDT	7	
	Diazinon	9	
	Dicamba	9	
	Dichlorprop, butoxyethanol ester	2	
	Dieldrin	8	
	Dimethoate	11	
	Dinoseb	9	
	Diquat dibromide	37	
	Diuron	1	

Monterey	Chemical	Wells Sampled	Wells with Detections
	Endothall	1	
	Endrin	8	
	EPTC	7	
	Ethylene dibromide	1	
	Glyphosate, isopropylamine salt	1	
	Heptachlor	8	
	Heptachlor epoxide	8	
	Hexachlorobenzene	8	
	Lindane (gamma-BHC)	8	
	Methomyl	14	
	Methoxychlor	8	
	Methyl bromide (bromomethane)	30	
	Metolachlor	18	
	Metribuzin	18	
	Molinate	18	
	Naphthalene	50	
	Ortho-Dichlorobenzene	45	
	Oxamyl	14	
	Picloram	9	
	Prometryn	11	
	Propachlor	18	
	Propazine	7	
	Simazine	38	
	Terbacil	7	
	Thiobencarb	18	
	Toxaphene	1	
	Trichlorobenzenes	45	
	Trifluralin	8	
	Xylene	45	

Napa	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	1	
	1,2,4-Trichlorobenzene	1	
	1,2-D, 1,3-D, and C-3 compounds	1	
	1,2-Dichloropropane	1	
	2,4,5-T	2	
	2,4,5-TP (Silvex)	2	
	2,4-D	2	
	3-Hydroxycarbofuran	2	
	4(2,4-Db), dimethylamine salt	2	
	Alachlor	1	
	Aldicarb	2	
	Aldicarb sulfone	2	
	Aldicarb sulfoxide	2	
	Aldrin	1	
	Atrazine	2	
	Bentazon, sodium salt	2	
	Benzene (benzol)	1	
	Carbaryl	2	
	Carbofuran	2	
	Chlordane	1	
	Chloromethane (methyl chloride)	1	
	Dalapon	2	
	Dicamba	2	
	Dieldrin	1	
	Dinoseb	2	
	Diquat dibromide	2	
	Endothall	2	
	Endrin	1	
	Ethylene dibromide	2	
	Heptachlor	1	
	Heptachlor epoxide	1	
	Hexachlorobenzene	1	
	Lindane (gamma-BHC)	1	
	Methiocarb	2	
	Methomyl	2	
	Methoxychlor	1	
	Methyl bromide (bromomethane)	1	
	Ortho-Dichlorobenzene	1	
	Oxamyl	2	
	Picloram	2	
	Propoxur	2	
	Simazine	2	
	Toxaphene	1	
	Trichlorobenzenes	1	
	Xylene	1	

Nevada	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	5	
	1,2,4-Trichlorobenzene	5	
	1,2-D, 1,3-D, and C-3 compounds	5	
	1,2-Dichloropropane	5	
	2,3,7,8-TCDD (dioxin)	1	
	2,4,5-TP (Silvex)	2	
	2,4-D	2	
	3-Hydroxycarbofuran	2	
	Alachlor	2	
	Aldicarb	2	
	Aldicarb sulfone	2	
	Aldicarb sulfoxide	2	
	Aldrin	2	
	Atrazine	2	
	Bentazon, sodium salt	2	
	Benzene (benzol)	5	
	Carbaryl	2	
	Carbofuran	2	
	Chlordane	2	
	Chloromethane (methyl chloride)	5	
	Chlorthal-Dimethyl acid breakdown products	2	
	Dalapon	2	
	DBCP	2	
	Dicamba	2	
	Dieldrin	2	
	Dinoseb	2	
	Diquat dibromide	2	
	Endothall	2	
	Endrin	2	
	Ethylene dibromide	2	
	Glyphosate, isopropylamine salt	2	
	Heptachlor	2	
	Heptachlor epoxide	2	
	Hexachlorobenzene	2	
	Lindane (gamma-BHC)	2	
	Methomyl	2	
	Methoxychlor	2	
	Methyl bromide (bromomethane)	5	
	Molinate	2	
	Naphthalene	5	
	Ortho-Dichlorobenzene	5	
	Oxamyl	2	

Nevada	Chemical	Wells Sampled	Wells with Detections
	Picloram	2	
	Simazine	2	
	Thiobencarb	2	
	Toxaphene	2	
	Trichlorobenzenes	5	
	Xylene	5	

Orange	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	212	
	1,1,2,2-Tetrachloroethane	219	
	1,2,4-Trichlorobenzene	219	
	1,2-D, 1,3-D, and C-3 compounds	216	
	1,2-Dichloropropane	219	
	2,3,7,8-TCDD (dioxin)	1	
	2,4,5-TP (Silvex)	25	
	2,4,6-Trichlorophenol	25	
	2,4-D	25	
	2,4-Dinitrophenol	25	
	3-Hydroxycarbofuran	15	
	Acenaphthene	25	
	Acetochlor	25	
	Alachlor	81	
	Aldicarb	15	
	Aldicarb sulfone	15	
	Aldicarb sulfoxide	15	
	Aldrin	25	
	Atrazine	83	
	Bentazon, sodium salt	25	
	Benzene (benzol)	219	
	BHC (other than gamma isomer)	25	
	Bromacil	81	
	Butachlor	81	
	Carbaryl	15	
	Carbofuran	15	
	Chlordane	25	
	Chloromethane (methyl chloride)	216	
	Chlorothalonil	25	
	Dalapon	25	
	DBCP	213	
	DDD	25	
	DDE	25	
	DDT	25	
	Diazinon	81	
	Dicamba	25	
	Dieldrin	25	
	Dimethoate	81	
	Dinoseb	25	
	Diquat dibromide	25	
	Disulfoton	24	
	Diuron	25	

Orange	Chemical	Wells Sampled	Wells with Detections
	Endosulfan	25	
	Endosulfan sulfate	25	
	Endothall	25	
	Endrin	25	
	Endrin aldehyde	25	
	Ethylene dibromide	212	
	Fonofos (Dyfonate)	24	
	Glyphosate, isopropylamine salt	25	
	Heptachlor	25	
	Heptachlor epoxide	25	
	Hexachlorobenzene	25	
	Lindane (gamma-BHC)	25	
	Linuron	25	
	Malathion	78	
	Methiocarb	15	
	Methomyl	15	
	Methoxychlor	25	
	Methyl bromide (bromomethane)	216	
	Methyl parathion	78	
	Metolachlor	81	
	Metribuzin	81	
	Molinate	81	
	Naphthalene	213	
	Ortho-Dichlorobenzene	219	
	Oxamyl	15	
	Paraquat dichloride	25	
	Parathion or ethyl parathion	78	
	Picloram	25	
	Prometon	78	
	Prometryn	81	
	Propachlor	79	
	Propoxur	15	
	Simazine	83	
	Thiobencarb	84	
	Toxaphene	25	
	Trichlorobenzenes	216	
	Xylene	219	

Placer	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	12	
	1,2,4-Trichlorobenzene	12	
	1,2-D, 1,3-D, and C-3 compounds	10	
	1,2-Dichloropropane	12	
	2,3,7,8-TCDD (dioxin)	3	
	2,4,5-T	3	
	2,4,5-TP (Silvex)	4	
	2,4-D	4	
	3-Hydoxycarbofuran	4	
	Alachlor	4	
	Aldicarb	4	
	Aldicarb sulfone	4	
	Aldicarb sulfoxide	4	
	Aldrin	4	
	Atrazine	4	
	Bentazon, sodium salt	4	
	Benzene (benzol)	12	
	Bromacil	4	
	Butachlor	4	
	Carbaryl	4	
	Carbofuran	4	
	Carbon disulfide	2	
	Chlordane	4	
	Chloromethane (methyl chloride)	10	
	Chlorothalonil	3	
	Dalapon	4	
	DBCP	4	
	Diazinon	4	
	Dicamba	4	
	Dieldrin	4	
	Dimethoate	4	
	Dinoseb	4	
	Diquat dibromide	1	
	Endothall	1	
	Endrin	4	
	Ethylene dibromide	4	
	Glyphosate, isopropylamine salt	1	
	Heptachlor	4	
	Heptachlor epoxide	4	
	Hexachlorobenzene	4	
	Lindane (gamma-BHC)	4	
	Methomyl	4	

Placer	Chemical	Wells Sampled	Wells with Detections
	Methoxychlor	4	
	Methyl bromide (bromomethane)	10	
	Metolachlor	4	
	Metribuzin	4	
	Molinate	4	
	Naphthalene	10	
	Ortho-Dichlorobenzene	12	
	Oxamyl	4	
	Picloram	4	
	Prometryn	4	
	Propachlor	4	
	Simazine	4	
	Thiobencarb	4	
	Toxaphene	4	
	Trichlorobenzenes	10	
	Trifluralin	3	
	Xylene	12	

Plumas	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	4	
	1,2,4-Trichlorobenzene	4	
	1,2-D, 1,3-D, and C-3 compounds	4	
	1,2-Dichloropropane	4	
	Benzene (benzol)	4	
	Chloromethane (methyl chloride)	4	
	DBCP	3	
	Ethylene dibromide	3	
	Methyl bromide (bromomethane)	4	
	Naphthalene	4	
	Ortho-Dichlorobenzene	4	
	Trichlorobenzenes	4	
	Xylene	4	

Riverside	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	5	
	1,1,2,2-Tetrachloroethane	185	
	1,2,4-Trichlorobenzene	187	
	1,2-D, 1,3-D, and C-3 compounds	168	
	1,2-Dichloropropane 2-D)	187	
	2,3,7,8-TCDD (dioxin)	29	
	2,4,5-TP (Silvex)	45	
	2,4-D	45	
	3-Hydoxycarbofuran	47	
	Acetochlor	5	
	Alachlor	57	
	Aldicarb	47	
	Aldicarb sulfone	47	
	Aldicarb sulfoxide	47	
	Aldrin	40	
	Atrazine	121	
	Bentazon, sodium salt	45	
	Benzene (benzol)	187	
	Bromacil	43	
	Butachlor	43	
	Carbaryl	47	
	Carbofuran	48	
	Carbon disulfide	42	
	Chlordane	45	
	Chloromethane (methyl chloride)	170	1
	Chlorothalonil	27	
	Chlorthal-Dimethyl acid breakdown products	14	1
	Dalapon	45	
	DBCP	117	28
	DDE	5	
	Diazinon	43	
	Dicamba	44	
	Dieldrin	40	
	Dimethoate	43	
	Dinoseb	45	
	Diquat dibromide	39	
	Diuron	37	2
	Endothall	44	
	Endrin	45	
	EPTC	5	
	Ethylene dibromide	117	

Riverside	Chemical	Wells Sampled	Wells with Detections
	Glyphosate, isopropylamine salt	48	
	Heptachlor	45	
	Heptachlor epoxide	45	
	Hexachlorobenzene	86	
	Lindane (gamma-BHC)	41	
	Methiocarb	17	
	Methomyl	47	
	Methoxychlor	45	
	Methyl bromide (bromomethane)	170	
	Metolachlor	43	
	Metribuzin	43	
	Molinate	98	
	Naphthalene	166	1
	Ortho-Dichlorobenzene	187	
	Oxamyl	48	
	Paraquat dichloride	5	
	Picloram	45	
	Prometryn	42	
	Propachlor	28	
	Propoxur	17	
	Simazine	120	
	Terbacil	5	
	Thiobencarb	98	
	Toxaphene	45	
	Trichlorobenzenes	166	
	Xylene	187	

Sacramento	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	91	
	1,1,2,2-Tetrachloroethane	110	
	1,2,4-Trichlorobenzene	106	
	1,2-D, 1,3-D, and C-3 compounds	94	
	1,2-Dichloropropane	110	
	2,3,7,8-TCDD (dioxin)	11	
	2,4,5-T	9	
	2,4,5-TP (Silvex)	20	
	2,4-D	20	
	3-Hydoxycarbofuran	17	
	Acetochlor	1	
	Alachlor	22	
	Aldicarb	17	
	Aldicarb sulfone	17	
	Aldicarb sulfoxide	17	
	Aldrin	14	
	Atrazine	35	
	Bentazon, sodium salt	20	
	Benzene (benzol)	110	
	Bromacil	25	
	Butachlor	12	
	Carbaryl	17	
	Carbofuran	17	
	Carbon disulfide	5	
	Chlordane	24	
	Chloromethane (methyl chloride)	94	
	Chlorothalonil	11	
	Chlorthal-Dimethyl acid breakdown products	11	
	Dalapon	20	
	DBCP	29	1
	DDE	1	
	Diazinon	25	
	Dicamba	20	
	Dieldrin	14	
	Dimethoate	25	
	Dinoseb	20	
	Diquat dibromide	17	
	Diuron	5	
	Endothall	17	
	Endrin	24	
	EPTC	8	
	Ethylene dibromide	29	

Sacramento	Chemical	Wells Sampled	Wells with Detections
	Glyphosate, isopropylamine salt	17	
	Heptachlor	24	
	Heptachlor epoxide	24	
	Hexachlorobenzene	21	
	Lindane (gamma-BHC)	24	
	Methomyl	17	
	Methoxychlor	24	
	Methyl bromide (bromomethane)	92	
	Metolachlor	12	
	Metribuzin	12	
	Molinate	35	
	Naphthalene	93	
	Ortho-Dichlorobenzene	110	
	Oxamyl	17	
	Paraquat dichloride	10	
	Picloram	20	
	Prometryn	25	
	Propachlor	13	
	Simazine	35	
	Terbacil	1	
	Thiobencarb	39	
	Toxaphene	24	
	Trichlorobenzenes	94	
	Trifluralin	7	
	Xylene	109	

San Benito	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	1	
	1,1,2,2-Tetrachloroethane	15	
	1,2,4-Trichlorobenzene	15	
	1,2-D, 1,3-D, and C-3 compounds	15	
	1,2-Dichloropropane	15	
	2,4,5-T	15	
	2,4,5-TP (Silvex)	15	
	2,4-D	18	
	3-Hydoxycarbofuran	14	
	4(2,4-Db), dimethylamine salt	1	
	Acifluorfen, sodium salt	1	
	Alachlor	18	
	Aldicarb	13	
	Aldicarb sulfone	14	
	Aldicarb sulfoxide	14	
	Atrazine	18	
	Bentazon, sodium salt	18	
	Benzene (benzol)	15	
	Bromacil	15	
	Butachlor	15	
	Carbaryl	13	
	Carbofuran	16	
	Chloromethane (methyl chloride)	15	
	Chlorthal-Dimethyl acid breakdown products	1	
	Dalapon	15	
	Diazinon	9	
	Dicamba	15	
	Dichlorprop, butoxyethanol ester	1	
	Dimethoate	15	
	Dinoseb	15	
	Diquat dibromide	17	
	Methomyl	14	
	Methyl bromide (bromomethane)	15	
	Metolachlor	15	
	Metribuzin	15	
	Molinate	15	
	Naphthalene	15	
	Ortho-Dichlorobenzene	15	
	Oxamyl	13	
	Picloram	15	
	Prometryn	15	
	Propachlor	15	
	Simazine	18	
	Thiobencarb	15	
	Trichlorobenzenes	15	
	Xylene	15	

San Bernardino	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	44	
	1,1,2,2-Tetrachloroethane	325	
	1,2,4-Trichlorobenzene	325	
	1,2-D, 1,3-D, and C-3 compounds	197	
	1,2-Dichloropropane	325	
	2,3,7,8-TCDD (dioxin)	151	
	2,4,5-T	1	
	2,4,5-TP (Silvex)	176	
	2,4-D	176	
	3-Hydoxycarbofuran	133	
	Acetochlor	24	
	Alachlor	165	
	Aldicarb	133	
	Aldicarb sulfone	133	
	Aldicarb sulfoxide	133	
	Aldrin	154	
	Atrazine	185	
	Bentazon, sodium salt	176	
	Benzene (benzol)	325	
	Bromacil	96	
	Butachlor	96	
	Carbaryl	133	
	Carbofuran	179	
	Carbon disulfide	6	
	Chlordane	163	
	Chloromethane (methyl chloride)	197	
	Chlorothalonil	90	
	Chlorthal-Dimethyl (Dacthal / DCPA / dimethyl)	7	1
	Chlorthal-Dimethyl acid breakdown products	94	
	Dalapon	176	
	DBCP	281	40
	DDE	5	
	Diazinon	97	
	Dicamba	131	
	Dieldrin	153	
	Dimethoate	96	
	Dinoseb	176	
	Diquat dibromide	166	
	Diuron	48	
	Endothall	141	
	Endrin	161	

San Bernardino	Chemical	Wells Sampled	Wells with Detections
	EPTC	5	
	Ethylene dibromide	276	
	Glyphosate, isopropylamine salt	179	
	Heptachlor	163	
	Heptachlor epoxide	163	
	Hexachlorobenzene	178	
	Lindane (gamma-BHC)	163	
	Methiocarb	33	
	Methomyl	133	
	Methoxychlor	163	
	Methyl bromide (bromomethane)	197	
	Metolachlor	96	
	Metribuzin	96	
	Molinate	179	
	Naphthalene	197	
	Ortho-Dichlorobenzene	325	
	Oxamyl	179	
	Paraquat dichloride	11	
	Picloram	176	
	Prometryn	96	
	Propachlor	100	
	Propoxur	33	
	Simazine	220	
	Terbacil	24	
	Thiobencarb	187	
	Toxaphene	163	
	Trichlorobenzenes	197	
	Trifluralin	1	
	Xylene	325	

San Diego	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	17	
	1,1,2,2-Tetrachloroethane	40	
	1,2,4-Trichlorobenzene	40	
	1,2-D, 1,3-D, and C-3 compounds	38	
	1,2-Dichloropropane	40	
	2,3,7,8-TCDD (dioxin)	23	
	2,4,5-T	16	
	2,4,5-TP (Silvex)	37	
	2,4-D	37	
	3-Hydoxycarbofuran	35	
	4(2,4-Db), dimethylamine salt	16	
	Acenaphthene	19	
	Acetochlor	6	
	Acifluorfen, sodium salt	2	
	Alachlor	36	
	Aldicarb	35	
	Aldicarb sulfone	35	
	Aldicarb sulfoxide	35	
	Aldrin	36	
	Atrazine	38	
	Bentazon, sodium salt	37	
	Benzene (benzol)	40	
	Bromacil	33	
	Butachlor	33	
	Carbaryl	35	
	Carbofuran	35	
	Carbon disulfide	15	
	Chlordane	36	
	Chloromethane (methyl chloride)	38	
	Chlorothalonil	34	
	Chlorthal-Dimethyl (Dacthal / DCPA / dimethyl)	8	
	Chlorthal-Dimethyl acid breakdown products	6	
	Dalapon	36	
	DBCP	33	
	DDE	2	
	DDT	2	
	Diazinon	31	
	Dicamba	36	
	Dichlorprop, butoxyethanol ester	2	
	Dieldrin	36	
	Dimethoate	31	
	Dinoseb	37	

San Diego	Chemical	Wells Sampled	Wells with Detections
	Diquat dibromide	29	
	Diuron	24	
	Endothall	28	
	Endrin	36	
	EPTC	2	
	Ethylene dibromide	33	
	Glyphosate, isopropylamine salt	36	
	Heptachlor	36	
	Heptachlor epoxide	36	
	Hexachlorobenzene	36	
	Lindane (gamma-BHC)	36	
	Methiocarb	17	
	Methomyl	36	
	Methoxychlor	36	
	Methyl bromide (bromomethane)	38	
	Metolachlor	34	
	Metribuzin	34	
	Molinate	34	
	Naphthalene	38	
	Ortho-Dichlorobenzene	40	
	Oxamyl	36	
	Paraquat dichloride	16	
	Picloram	37	
	Prometryn	32	
	Propachlor	37	
	Propazine	2	
	Propoxur	15	
	Simazine	38	
	Terbacil	6	
	Thiobencarb	36	
	Toxaphene	36	
	Trichlorobenzenes	38	
	Trifluralin	2	
	Xylene	40	

San Joaquin	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	6	
	1,1,2,2-Tetrachloroethane	42	
	1,2,4-Trichlorobenzene	36	
	1,2-D, 1,3-D, and C-3 compounds	39	
	1,2-Dichloropropane	42	
	2,4,5-TP (Silvex)	15	
	2,4-D	15	
	3-Hydoxycarbofuran	15	
	Alachlor	11	
	Aldicarb	15	
	Aldicarb sulfone	15	
	Aldicarb sulfoxide	15	
	Aldrin	9	
	Ametryne	2	
	Atrazine	52	
	Bentazon, sodium salt	15	
	Benzene (benzol)	42	
	BHC (other than gamma isomer)	1	
	Bromacil	11	
	Butachlor	11	
	Butylate	2	
	Carbaryl	15	
	Carbofuran	15	
	Chlordane	10	
	Chlorobenzilate	1	
	Chloromethane (methyl chloride)	27	5
	Chloroneb	1	
	Chlorothalonil	9	
	Chlorpropham	2	
	Chlorthal-Dimethyl acid breakdown products	15	
	Cycloate	2	
	Dalapon	15	
	DBCP	102	21
	DDD	1	
	DDE	1	
	DDT	1	
	DDVP (dichlorvos)	2	
	Demeton	2	
	Diazinon	9	
	Dicamba	15	
	Dichlorprop, butoxyethanol ester	3	
	Dieldrin	9	
	Dimethoate	11	
	Dinoseb	15	
	Diphenamid	2	

San Joaquin	Chemical	Wells Sampled	Wells with Detections
	Diquat dibromide	14	4
	Disulfoton	2	
	Endothall	4	
	Endrin	10	
	EPTC	12	1
	Ethylene dibromide	101	
	Fenamiphos	2	
	Glyphosate, isopropylamine salt	1	
	Heptachlor	10	
	Heptachlor epoxide	10	
	Hexachlorobenzene	14	
	Hexazinone	2	
	Lindane (gamma-BHC)	10	
	Merphos	2	
	Methiocarb	14	
	Methomyl	15	1
	Methoxychlor	10	
	Methyl bromide (bromomethane)	27	
	Metolachlor	11	
	Metribuzin	11	
	Molinate	15	
	Naphthalene	24	
	Napropamide	2	
	Ortho-Dichlorobenzene	42	
	Oxamyl	15	
	Permethrin	1	
	Picloram	15	
	Prometon	2	
	Prometryn	11	
	Propachlor	11	
	Propazine	2	
	Propoxur	14	
	Simazine	52	
	Simetryn	2	
	Tebuthiuron	2	
	Terbacil	8	
	Terbutryn	2	
	Tetrachlorvinphos (stirofos)	2	
	Thiobencarb	16	
	Toxaphene	10	
	Triadimefon	2	
	Trichlorobenzenes	39	
	Trifluralin	2	
	Vernolate	2	
	Xylene	42	

San Luis Obispo	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	24	
	1,1,2,2-Tetrachloroethane	58	
	1,2,4-Trichlorobenzene	58	
	1,2-D, 1,3-D, and C-3 compounds	33	
	1,2-Dichloropropane	58	
	2,4,5-T	2	
	2,4,5-TP (Silvex)	3	
	2,4-D	4	
	3-Hydoxycarbofuran	2	
	4(2,4-Db), dimethylamine salt	2	
	Alachlor	29	
	Aldicarb	2	
	Aldicarb sulfone	2	
	Aldicarb sulfoxide	2	
	Aldrin	3	
	Atrazine	46	
	Bentazon, sodium salt	3	
	Benzene (benzol)	59	
	Bromacil	19	
	Butachlor	19	
	Carbaryl	2	
	Carbofuran	3	
	Chlordane	12	
	Chloromethane (methyl chloride)	33	1
	Chlorothalonil	1	
	Dalapon	3	
	DBCP	41	
	Diazinon	13	
	Dicamba	2	
	Dieldrin	3	
	Dimethoate	19	
	Dinoseb	3	
	Diquat dibromide	4	
	Endrin	12	
	Ethylene dibromide	40	
	Heptachlor	11	
	Heptachlor epoxide	11	
	Hexachlorobenzene	4	
	Lindane (gamma-BHC)	11	
	Methiocarb	2	
	Methomyl	2	
	Methoxychlor	11	

San Luis Obispo	Chemical	Wells Sampled	Wells with Detections
	Methyl bromide (bromomethane)	33	
	Metolachlor	19	
	Metribuzin	19	
	Molinate	20	
	Naphthalene	14	
	Ortho-Dichlorobenzene	59	
	Oxamyl	4	
	Picloram	3	
	Prometryn	19	
	Propachlor	11	
	Propoxur	2	
	Simazine	46	
	Thiobencarb	20	
	Toxaphene	11	
	Trichlorobenzenes	33	
	Xylene	58	

San Mateo	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	6	
	1,1,2,2-Tetrachloroethane	21	
	1,2,4-Trichlorobenzene	21	
	1,2-D, 1,3-D, and C-3 compounds	20	
	1,2-Dichloropropane	21	1
	2,3,7,8-TCDD (dioxin)	5	
	2,4,5-T	10	
	2,4,5-TP (Silvex)	11	
	2,4-D	11	
	3-Hydoxycarbofuran	7	
	4(2,4-Db), dimethylamine salt	4	
	Acifluorfen, sodium salt	4	
	Acrylonitrile	4	
	Alachlor	6	
	Aldicarb	7	
	Aldicarb sulfone	7	
	Aldicarb sulfoxide	7	
	Aldrin	10	
	Atrazine	6	
	Bentazon, sodium salt	11	
	Benzene (benzol)	21	
	BHC (other than gamma isomer)	4	
	Bromacil	6	
	Butachlor	6	
	Carbaryl	7	
	Carbofuran	7	
	Carbon disulfide	11	
	Chlordane	10	
	Chlorobenzilate	4	
	Chloromethane (methyl chloride)	14	
	Chloroneb	4	
	Chlorothalonil	10	
	Chlorthal-Dimethyl acid breakdown products	5	
	Dalapon	11	
	DBCP	8	
	DDD	4	
	DDE	4	
	DDT	4	
	Diazinon	6	
	Dicamba	11	
	Dichlorprop, butoxyethanol ester	4	
	Dieldrin	10	

San Mateo	Chemical	Wells Sampled	Wells with Detections
	Dimethoate	6	
	Dinoseb	11	
	Diquat dibromide	7	
	Diuron	4	
	Endosulfan	4	
	Endosulfan sulfate	4	
	Endothall	7	
	Endrin	10	
	Endrin aldehyde	4	
	Ethylene dibromide	8	
	Glyphosate, isopropylamine salt	7	
	Heptachlor	10	
	Heptachlor epoxide	10	
	Hexachlorobenzene	11	
	Lindane (gamma-BHC)	10	
	Methomyl	7	
	Methoxychlor	10	
	Methyl bromide (bromomethane)	14	
	Metolachlor	6	
	Metribuzin	6	
	Molinate	7	
	Naphthalene	20	
	Ortho-Dichlorobenzene	21	
	Oxamyl	7	
	Paraquat dichloride	1	
	Permethrin	4	
	Permethrin, other related	4	
	Picloram	11	
	Prometryn	6	
	Propachlor	10	
	Simazine	6	
	Thiobencarb	7	
	Toxaphene	10	
	Trichlorobenzenes	20	
	Trifluralin	10	
	Xylene	21	

Santa Barbara	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	18	
	1,1,2,2-Tetrachloroethane	37	
	1,2,4-Trichlorobenzene	36	
	1,2-D, 1,3-D, and C-3 compounds	13	
	1,2-Dichloropropane	37	
	2,3,7,8-TCDD (dioxin)	4	
	2,4,5-T	1	
	2,4,5-TP (Silvex)	5	
	2,4-D	5	
	3-Hydoxycarbofuran	4	
	Acetochlor	3	
	Alachlor	14	
	Aldicarb	4	
	Aldicarb sulfone	4	
	Aldicarb sulfoxide	4	
	Aldrin	5	
	Atrazine	25	
	Bentazon, sodium salt	5	
	Benzene (benzol)	37	
	Bromacil	13	
	Butachlor	13	
	Carbaryl	4	
	Carbofuran	4	
	Chlordane	5	
	Chloromethane (methyl chloride)	13	
	Chlorthal-Dimethyl acid breakdown products	4	
	Dalapon	5	
	DBCP	28	
	Diazinon	13	
	Dicamba	5	
	Dieldrin	5	
	Dimethoate	13	
	Dinoseb	5	
	Diquat dibromide	5	
	Endothall	5	
	Endrin	5	
	Ethylene dibromide	28	
	Glyphosate, isopropylamine salt	5	
	Heptachlor	5	
	Heptachlor epoxide	5	
	Hexachlorobenzene	5	
	Lindane (gamma-BHC)	5	

Santa Barbara	Chemical	Wells Sampled	Wells with Detections
	Methomyl	4	
	Methoxychlor	5	
	Methyl bromide (bromomethane)	13	
	Metolachlor	13	
	Metribuzin	13	
	Molinate	14	
	Naphthalene	13	
	Ortho-Dichlorobenzene	37	
	Oxamyl	4	
	Picloram	6	
	Prometryn	13	
	Propachlor	4	
	Simazine	25	
	Terbacil	3	
	Thiobencarb	14	
	Toxaphene	5	
	Trichlorobenzenes	13	
	Xylene	37	

Santa Clara	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	14	
	1,1,2,2-Tetrachloroethane	114	
	1,2,4-Trichlorobenzene	113	
	1,2-D, 1,3-D, and C-3 compounds	114	
	1,2-Dichloropropane	114	
	2,3,7,8-TCDD (dioxin)	18	
	2,4,5-T	27	
	2,4,5-TP (Silvex)	31	
	2,4-D	31	
	3-Hydroxycarbofuran	28	
	Alachlor	32	
	Aldicarb	28	
	Aldicarb sulfone	28	
	Aldicarb sulfoxide	28	
	Aldrin	27	
	Atrazine	62	
	Bentazon, sodium salt	31	
	Benzene (benzol)	114	
	Bromacil	30	
	Butachlor	26	
	Carbaryl	28	
	Carbofuran	28	
	Carbon disulfide	5	
	Chlordane	27	
	Chloromethane (methyl chloride)	54	
	Chlorothalonil	4	
	Chlorthal-Dimethyl acid breakdown products	4	
	Dalapon	31	
	DBCP	41	1
	Diazinon	30	
	Dicamba	31	
	Dieldrin	27	
	Dimethoate	30	
	Dinoseb	31	
	Diquat dibromide	28	
	Diuron	1	
	Endothall	29	
	Endrin	27	
	Ethylene dibromide	41	
	Glyphosate, isopropylamine salt	28	
	Heptachlor	27	
	Heptachlor epoxide	27	

Santa Clara	Chemical	Wells Sampled	Wells with Detections
	Hexachlorobenzene	68	
	Lindane (gamma-BHC)	27	
	Methiocarb	1	
	Methomyl	28	
	Methoxychlor	27	
	Methyl bromide (bromomethane)	54	
	Metolachlor	26	
	Metribuzin	26	
	Molinate	62	
	Naphthalene	114	
	Ortho-Dichlorobenzene	114	
	Oxamyl	28	
	Picloram	31	
	Prometryn	30	
	Propachlor	26	
	Propoxur	1	
	Simazine	62	
	Thiobencarb	67	
	Toxaphene	27	
	Trichlorobenzenes	114	
	Trifluralin	3	
	Xylene	114	

Santa Cruz	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	2	
	1,1,2,2-Tetrachloroethane	31	
	1,2,4-Trichlorobenzene	31	
	1,2-D, 1,3-D, and C-3 compounds	31	
	1,2-Dichloropropane	31	
	2,3,7,8-TCDD (dioxin)	1	
	2,4,5-T	19	
	2,4,5-TP (Silvex)	22	
	2,4-D	22	
	3-Hydoxycarbofuran	10	
	4(2,4-Db), dimethylamine salt	3	
	Acenaphthene	3	
	Acetochlor	3	
	Acifluorfen, sodium salt	3	
	Alachlor	37	
	Aldicarb	10	
	Aldicarb sulfone	10	
	Aldicarb sulfoxide	10	
	Aldrin	21	
	Atrazine	40	
	Bentazon, sodium salt	22	
	Benzene (benzol)	31	
	Bromacil	28	
	Butachlor	28	
	Carbaryl	10	
	Carbofuran	10	
	Carbon disulfide	13	
	Chlordane	14	
	Chloromethane (methyl chloride)	31	
	Chlorthal-Dimethyl acid breakdown products	5	
	Dalapon	22	
	DBCP	3	
	DDE	3	
	DDT	3	
	Diazinon	21	
	Dicamba	22	
	Dichlorprop, butoxyethanol ester	3	
	Dieldrin	13	
	Dimethoate	25	
	Dinoseb	22	
	Diquat dibromide	22	
	Endothall	2	

Santa Cruz	Chemical	Wells Sampled	Wells with Detections
	Endrin	21	
	EPTC	3	
	Ethylene dibromide	2	
	Glyphosate, isopropylamine salt	2	
	Heptachlor	13	
	Heptachlor epoxide	15	
	Hexachlorobenzene	21	
	Lindane (gamma-BHC)	12	
	Methiocarb	1	
	Methomyl	10	
	Methoxychlor	21	
	Methyl bromide (bromomethane)	30	
	Metolachlor	28	
	Metribuzin	28	
	Molinate	28	
	Naphthalene	32	
	Ortho-Dichlorobenzene	31	
	Oxamyl	10	
	Paraquat dichloride	1	
	Picloram	22	
	Prometryn	25	
	Propachlor	28	
	Propazine	3	
	Simazine	41	
	Terbacil	3	
	Thiobencarb	28	
	Toxaphene	12	
	Trichlorobenzenes	31	
	Trifluralin	3	
	Xylene	31	1

Shasta	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	11	
	1,2,4-Trichlorobenzene	11	
	1,2-D, 1,3-D, and C-3 compounds	12	
	1,2-Dichloropropane	11	
	Benzene (benzol)	11	
	Chloromethane (methyl chloride)	11	
	Methyl bromide (bromomethane)	11	
	Ortho-Dichlorobenzene	11	
	Trichlorobenzenes	12	
	Xylene	11	

Sierra	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	1	
	1,2,4-Trichlorobenzene	1	
	1,2-D, 1,3-D, and C-3 compounds	1	
	1,2-Dichloropropane	1	
	Benzene (benzol)	1	
	Chloromethane (methyl chloride)	1	
	Methyl bromide (bromomethane)	1	
	Naphthalene	1	
	Ortho-Dichlorobenzene	1	
	Trichlorobenzenes	1	
	Xylene	1	

Siskiyou	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	6	
	1,2,4-Trichlorobenzene	3	
	1,2-D, 1,3-D, and C-3 compounds	6	
	1,2-Dichloropropane	6	
	Benzene (benzol)	6	
	Chloromethane (methyl chloride)	6	
	EPTC	3	
	Glyphosate, isopropylamine salt	1	
	Methyl bromide (bromomethane)	6	
	Ortho-Dichlorobenzene	6	
	Paraquat dichloride	1	
	Trichlorobenzenes	6	
	Xylene	6	

Solano	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	4	
	1,1,2,2-Tetrachloroethane	23	
	1,2,4-Trichlorobenzene	23	
	1,2-D, 1,3-D, and C-3 compounds	23	
	1,2-Dichloropropane	23	
	2,3,7,8-TCDD (dioxin)	10	
	2,4,5-T	3	
	2,4,5-TP (Silvex)	18	
	2,4-D	18	
	3-Hydoxycarbofuran	17	
	Alachlor	17	
	Aldicarb	17	
	Aldicarb sulfone	17	
	Aldicarb sulfoxide	17	
	Aldrin	17	
	Atrazine	16	
	Bentazon, sodium salt	18	
	Benzene (benzol)	23	
	Bromacil	16	
	Butachlor	16	
	Carbaryl	17	
	Carbofuran	17	
	Chlordane	17	
	Chloromethane (methyl chloride)	19	
	Chlorothalonil	2	
	Chlorthal-Dimethyl acid breakdown products	15	
	Dalapon	18	
	DBCP	17	
	Diazinon	16	
	Dicamba	18	
	Dieldrin	17	
	Dimethoate	16	
	Dinoseb	18	
	Diquat dibromide	17	
	Endothall	17	
	Endrin	17	
	Ethylene dibromide	17	
	Glyphosate, isopropylamine salt	17	
	Heptachlor	17	
	Heptachlor epoxide	17	
	Hexachlorobenzene	16	
	Lindane (gamma-BHC)	17	

Solano	Chemical	Wells Sampled	Wells with Detections
	Methomyl	17	
	Methoxychlor	17	
	Methyl bromide (bromomethane)	19	
	Metolachlor	16	
	Metribuzin	16	
	Molinate	16	
	Naphthalene	23	
	Ortho-Dichlorobenzene	23	
	Oxamyl	17	
	Picloram	18	
	Prometryn	16	
	Propachlor	16	
	Simazine	16	
	Thiobencarb	16	
	Toxaphene	17	
	Trichlorobenzenes	23	
	Trifluralin	2	
	Xylene	22	

Sonoma	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	7	
	1,1,2,2-Tetrachloroethane	62	
	1,2,4-Trichlorobenzene	64	
	1,2-D, 1,3-D, and C-3 compounds	62	
	1,2-Dichloropropane	62	
	2,3,7,8-TCDD (dioxin)	6	
	2,4,5-T	35	
	2,4,5-TP (Silvex)	44	
	2,4-D	43	
	3-Hydoxycarbofuran	30	
	4(2,4-Db), dimethylamine salt	24	
	Acifluorfen, sodium salt	8	
	Acrylonitrile	7	
	Alachlor	30	
	Aldicarb	30	
	Aldicarb sulfone	30	
	Aldicarb sulfoxide	30	
	Aldrin	21	
	Atrazine	46	
	Bentazon, sodium salt	43	
	Benzene (benzol)	63	
	BHC (other than gamma isomer)	6	
	Bromacil	25	
	Butachlor	25	
	Carbaryl	30	
	Carbofuran	32	
	Carbon disulfide	7	
	Chlordane	23	
	Chlorobenzilate	6	
	Chloromethane (methyl chloride)	62	
	Chloroneb	6	
	Chlorothalonil	10	
	Chlorthal-Dimethyl acid breakdown products	15	
	Dalapon	43	
	DBCP	33	
	DDD	6	
	DDE	6	
	DDT	6	
	Diazinon	23	
	Dicamba	42	
	Dichlorprop, butoxyethanol ester	8	
	Dieldrin	21	

Sonoma	Chemical	Wells Sampled	Wells with Detections
	Dimethoate	25	
	Dinoseb	43	
	Diquat dibromide	37	
	Diuron	4	
	Endosulfan	6	
	Endosulfan sulfate	6	
	Endothall	38	
	Endrin	22	
	Endrin aldehyde	6	
	Ethylene dibromide	38	1
	Glyphosate, isopropylamine salt	4	
	Heptachlor	23	
	Heptachlor epoxide	23	
	Hexachlorobenzene	15	
	Lindane (gamma-BHC)	22	
	Methiocarb	9	
	Methomyl	30	
	Methoxychlor	22	
	Methyl bromide (bromomethane)	62	
	Metolachlor	25	
	Metribuzin	25	
	Molinate	25	
	Naphthalene	37	
	Ortho-Dichlorobenzene	62	
	Oxamyl	36	
	Paraquat dichloride	1	
	Permethrin	6	
	Permethrin, other related	6	
	Picloram	44	
	Prometryn	25	
	Propachlor	27	
	Propoxur	10	
	Simazine	46	
	Thiobencarb	25	
	Toxaphene	23	
	Trichlorobenzenes	62	1
	Trifluralin	10	
	Xylene	63	

Stanislaus	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	8	
	1,1,2,2-Tetrachloroethane	90	
	1,2,4-Trichlorobenzene	88	
	1,2-D, 1,3-D, and C-3 compounds	90	
	1,2-Dichloropropane	90	
	2,4,5-T	15	
	2,4,5-TP (Silvex)	16	
	2,4-D	16	
	3-Hydoxycarbofuran	37	
	Alachlor	41	
	Aldicarb	37	
	Aldicarb sulfone	37	
	Aldicarb sulfoxide	37	
	Aldrin	37	
	Atrazine	44	
	Bentazon, sodium salt	16	
	Benzene (benzol)	90	
	Bromacil	41	
	Butachlor	41	
	Carbaryl	37	
	Carbofuran	37	
	Carbon disulfide	21	
	Chlordane	37	
	Chloromethane (methyl chloride)	90	
	Chlorothalonil	37	
	Dalapon	16	
	DBCP	109	32
	Diazinon	41	
	Dicamba	16	
	Dieldrin	37	
	Dimethoate	41	
	Dinoseb	16	
	Diquat dibromide	26	
	Diuron	3	
	Endothall	26	
	Endrin	37	
	EPTC	5	
	Ethylene dibromide	106	
	Glyphosate, isopropylamine salt	37	
	Heptachlor	37	
	Heptachlor epoxide	37	
	Hexachlorobenzene	37	

Stanislaus	Chemical	Wells Sampled	Wells with Detections
	Lindane (gamma-BHC)	37	
	Methomyl	37	
	Methoxychlor	37	
	Methyl bromide (bromomethane)	90	
	Metolachlor	41	
	Metribuzin	41	
	Molinate	41	
	Naphthalene	82	
	Ortho-Dichlorobenzene	90	
	Oxamyl	37	
	Picloram	16	
	Prometryn	41	
	Propachlor	41	
	Simazine	44	
	Thiobencarb	41	
	Toxaphene	37	
	Trichlorobenzenes	90	
	Trifluralin	25	
	Xylene	90	

Sutter	Chemical	Wells Sampled	Wells with Detections
	2,4,5-T	2	
	2,4,5-TP (Silvex)	7	
	2,4-D	7	
	3-Hydoxycarbofuran	7	
	4(2,4-Db), dimethylamine salt	1	
	Acifluorfen, sodium salt	1	
	Alachlor	7	
	Aldicarb	7	
	Aldicarb sulfone	8	
	Aldicarb sulfoxide	8	
	Atrazine	7	
	Bentazon, sodium salt	7	
	Bromacil	7	
	Butachlor	7	
	Carbaryl	7	
	Carbofuran	8	
	Chlorthal-Dimethyl acid breakdown products	5	
	Dalapon	6	
	DBCP	2	1
	Diazinon	7	
	Dicamba	6	
	Dichlorprop, butoxyethanol ester	1	
	Dimethoate	7	
	Dinoseb	6	
	Ethylene dibromide	2	
	Glyphosate, isopropylamine salt	8	
	Hexachlorobenzene	5	
	Methomyl	8	
	Metolachlor	7	
	Metribuzin	7	
	Molinate	7	
	Oxamyl	7	
	Picloram	7	
	Prometryn	6	
	Simazine	7	
	Thiobencarb	7	

Tehama	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	2	
	1,2,4-Trichlorobenzene	1	
	1,2-D, 1,3-D, and C-3 compounds	2	
	1,2-Dichloropropane	2	
	Benzene (benzol)	2	
	Chloromethane (methyl chloride)	2	
	Methyl bromide (bromomethane)	2	
	Ortho-Dichlorobenzene	2	
	Trichlorobenzenes	2	
	Xylene	2	

Trinity	Chemical	Wells Sampled	Wells with Detections
	1,1,2,2-Tetrachloroethane	2	
	1,2-D, 1,3-D, and C-3 compounds	2	
	1,2-Dichloropropane	2	
	Benzene (benzol)	2	
	Chloromethane (methyl chloride)	2	
	Methyl bromide (bromomethane)	2	
	Ortho-Dichlorobenzene	2	
	Trichlorobenzenes	2	
	Xylene	2	

Tulare	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	50	
	1,1,2,2-Tetrachloroethane	98	
	1,2,4-Trichlorobenzene	98	1
	1,2-D, 1,3-D, and C-3 compounds	98	
	1,2-Dichloropropane	98	
	2,4,5-T	13	
	2,4,5-TP (Silvex)	19	
	2,4-D	19	
	3-Hydoxycarbofuran	21	
	ACET (deethyl-simazine or deisopropyl-atrazine)	47	24
	Alachlor	101	
	Aldicarb	21	
	Aldicarb sulfone	21	
	Aldicarb sulfoxide	21	
	Aldrin	32	
	Atrazine	141	1
	Bentazon, sodium salt	19	
	Benzene (benzol)	99	
	Bromacil	141	15
	Butachlor	99	
	Carbaryl	21	
	Carbofuran	21	
	Carbon disulfide	3	
	Chlordane	32	
	Chloromethane (methyl chloride)	84	
	Chlorothalonil	12	
	Chlorthal-Dimethyl acid breakdown products	6	
	Dalapon	19	
	DBCP	160	39
	Deethyl-atrazine	47	1
	Demethylnorflurazon	47	6
	Diaminochlorotriazine (DACT)	47	22
	Diazinon	66	
	Dicamba	19	
	Dieldrin	32	
	Dimethoate	99	
	Dinoseb	19	
	Diquat dibromide	19	
	Diuron	58	17
	Endothall	18	
	Endrin	32	

Tulare	Chemical	Wells Sampled	Wells with Detections
	Ethylene dibromide	154	
	Glyphosate, isopropylamine salt	11	
	Heptachlor	32	
	Heptachlor epoxide	32	
	Hexachlorobenzene	32	
	Hexazinone	47	
	Lindane (gamma-BHC)	32	
	Methomyl	21	
	Methoxychlor	32	
	Methyl bromide (bromomethane)	84	
	Metolachlor	99	
	Metribuzin	99	
	Molinate	99	
	Naphthalene	92	
	Norflurazon	47	4
	Ortho-Dichlorobenzene	98	
	Oxamyl	21	
	Picloram	19	
	Prometon	47	
	Prometryn	99	
	Propachlor	99	
	Simazine	141	15
	Terbacil	6	
	Thiobencarb	99	
	Toxaphene	32	
	Trichlorobenzenes	98	1
	Trifluralin	6	
	Xylene	99	

Tuolumne	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	2	
	1,1,2,2-Tetrachloroethane	6	
	1,2,4-Trichlorobenzene	6	
	1,2-D, 1,3-D, and C-3 compounds	6	
	1,2-Dichloropropane	6	
	Alachlor	4	
	Aldrin	2	
	Atrazine	5	
	Benzene (benzol)	6	
	Bromacil	4	
	Butachlor	4	
	Chloromethane (methyl chloride)	6	
	Dimethoate	4	
	Methyl bromide (bromomethane)	6	
	Metolachlor	4	
	Metribuzin	4	
	Molinate	4	
	Naphthalene	2	
	Ortho-Dichlorobenzene	6	
	Simazine	5	
	Thiobencarb	4	
	Trichlorobenzenes	6	
	Xylene	6	

Ventura	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	50	
	1,1,2,2-Tetrachloroethane	52	
	1,2,4-Trichlorobenzene	52	
	1,2-D, 1,3-D, and C-3 compounds	42	
	1,2-Dichloropropane	52	
	2,3,7,8-TCDD (dioxin)	1	
	2,4,5-T	12	
	2,4,5-TP (Silvex)	12	
	2,4-D	12	
	3-Hydoxycarbofuran	9	
	Alachlor	21	
	Aldicarb	9	
	Aldicarb sulfone	9	
	Aldicarb sulfoxide	9	
	Aldrin	11	
	Atrazine	28	
	Bentazon, sodium salt	12	
	Benzene (benzol)	54	
	Bromacil	18	
	Butachlor	18	
	Carbaryl	9	
	Carbofuran	9	
	Chlordane	11	
	Chloromethane (methyl chloride)	42	
	Dalapon	12	
	DBCP	27	
	Diazinon	18	
	Dicamba	12	
	Dieldrin	11	
	Dimethoate	18	
	Dinoseb	12	
	Diquat dibromide	9	
	Diuron	8	
	Endothall	5	
	Endrin	11	
	Ethylene dibromide	27	
	Glyphosate, isopropylamine salt	5	
	Heptachlor	11	
	Heptachlor epoxide	11	
	Hexachlorobenzene	11	
	Lindane (gamma-BHC)	11	
	Methomyl	9	

Ventura	Chemical	Wells Sampled	Wells with Detections
	Methoxychlor	11	
	Methyl bromide (bromomethane)	42	
	Metolachlor	18	
	Metribuzin	18	
	Molinate	18	
	Naphthalene	42	
	Ortho-Dichlorobenzene	52	
	Oxamyl	9	
	Picloram	12	
	Prometryn	18	
	Propachlor	18	
	Simazine	28	
	Thiobencarb	18	
	Toxaphene	11	
	Trichlorobenzenes	42	
	Xylene	54	

Yolo	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	9	
	1,1,2,2-Tetrachloroethane	31	
	1,2,4-Trichlorobenzene	29	
	1,2-D, 1,3-D, and C-3 compounds	31	
	1,2-Dichloropropane	31	
	2,3,7,8-TCDD (dioxin)	1	
	2,4,5-T	8	
	2,4,5-TP (Silvex)	8	
	2,4-D	8	
	3-Hydoxycarbofuran	8	
	Alachlor	14	
	Aldicarb	8	
	Aldicarb sulfone	8	
	Aldicarb sulfoxide	8	
	Aldrin	8	
	Atrazine	14	
	Bentazon, sodium salt	8	
	Benzene (benzol)	31	
	Bromacil	14	
	Butachlor	14	
	Carbaryl	8	
	Carbofuran	8	
	Carbon disulfide	2	
	Chlordane	8	
	Chloromethane (methyl chloride)	31	
	Chlorothalonil	8	
	Dalapon	8	
	DBCP	25	
	Diazinon	8	
	Dicamba	8	
	Dieldrin	8	
	Dimethoate	14	
	Dinoseb	8	
	Diquat dibromide	8	
	Endothall	7	
	Endrin	8	
	Ethylene dibromide	25	
	Glyphosate, isopropylamine salt	7	
	Heptachlor	8	
	Heptachlor epoxide	8	
	Hexachlorobenzene	8	
	Lindane (gamma-BHC)	8	

Yolo	Chemical	Wells Sampled	Wells with Detections
	Methiocarb	2	
	Methomyl	8	
	Methoxychlor	8	
	Methyl bromide (bromomethane)	31	
	Metolachlor	14	
	Metribuzin	14	
	Molinate	14	
	Naphthalene	31	
	Ortho-Dichlorobenzene	31	
	Oxamyl	8	
	Picloram	8	
	Prometryn	14	
	Propachlor	14	
	Propoxur	2	
	Simazine	14	
	Thiobencarb	14	
	Toxaphene	8	
	Trichlorobenzenes	31	
	Trifluralin	6	
	Xylene	31	

Yuba	Chemical	Wells Sampled	Wells with Detections
	1,3-Dichloropropene (1,3-D, Telone)	1	
	1,1,2,2-Tetrachloroethane	4	
	1,2,4-Trichlorobenzene	4	
	1,2-D, 1,3-D, and C-3 compounds	3	
	1,2-Dichloropropane	4	
	Alachlor	3	
	Atrazine	3	
	Benzene (benzol)	5	1
	Bromacil	3	
	Butachlor	3	
	Chloromethane (methyl chloride)	2	
	Dimethoate	3	
	Glyphosate, isopropylamine salt	2	
	Methyl bromide (bromomethane)	2	
	Metolachlor	3	
	Metribuzin	3	
	Molinate	3	
	Naphthalene	3	
	Ortho-Dichlorobenzene	4	
	Prometryn	3	
	Propachlor	3	
	Simazine	3	
	Thiobencarb	3	
	Trichlorobenzenes	3	
	Xylene	4	

APPENDIX B

Studies Included in the 2006 Update Report

A summary of the well sampling surveys that were added to the well inventory database during the period July 1, 2005, through June 30, 2006. The study number assigned by DPR is shown to the left.

DEPARTMENT OF HEALTH SERVICES (Sanitary Engineering Branch)

STUDY	COUNTY *Study type (italics)*	WELLS SAMPLED	SAMPLING DATES	CHEMICALS SAMPLED (UNDERLINE INDICATES A VERIFIED DETECTION)
0023	56 counties *Mandated Sampling*	3,796 wells	January through December 2005	119 chemicals

DEPARTMENT OF PESTICIDE REGULATION

STUDY	COUNTY *Study type (italics)*	WELLS SAMPLED	SAMPLING DATES	CHEMICALS SAMPLED (UNDERLINE INDICATES A VERIFIED DETECTION)
0440	Fresno/Tulare *Well Network*	68 wells	May through June 2005	atrazine, bromacil, simazine, diuron, prometon, hexazinone, norflurazon, DEA, ACET, DACT, DMN
0464	Butte/Fresno/Glenn/ Merced/Sacramento/ San Joaquin/Siskiyou/ Stanislaus *Ground water monitoring for EPTC*	44 wells	October through December 2005	EPTC
0466	Fresno/Kern/Tulare *Monitoring for atrazine and simazine breakdown products in large water system wells*	49 wells	October through December 2004	atrazine, bromacil, simazine, diuron, prometon, hexazinone, norflurazon, DEA, ACET, DACT, and demethylnorflurazon
Memo Only	Fresno	Methyl bromide		Subsequent retesting of the well by DHS failed to confirm the initial report.
Memo Only	Los Angeles	Methyl bromide		Subsequent retesting of the well by DHS failed to confirm the initial report.
Memo Only	Merced	Propoxur		Initial reported residues of propoxur were determined to be a typographical error in the DHS report. The correct value was 'none detected.'

STUDY	COUNTY *Study type (italics)*	WELLS SAMPLED	SAMPLING DATES	CHEMICALS SAMPLED (UNDERLINE INDICATES A VERIFIED DETECTION)
Memo Only	Orange	Diazinon		Initial reported residue was erroneously reported with a value when it was reported by the lab as 'trace.' Subsequent retesting of the well by DHS failed to confirm the initial report.
Memo Only	Sacramento	Diquat dibromide		Initial reported residues of diquat dibromide were determined to be a typographical error in the DHS report. The correct value was 'none detected.'
Memo Only	Stanislaus	Methyl bromide		Subsequent retesting of the well by DHS failed to confirm the initial report.
Memo Only	Ventura	Methyl bromide		Subsequent retesting of the well by DHS failed to confirm the initial report.
Memo Only	Fresno	Diazinon		Initial reported residue was erroneously reported with a value when it was reported by the lab as 'trace.'
Memo Only	Los Angeles	Methyl bromide		Subsequent retesting of the well by DHS failed to confirm the initial report.

APPENDIX C

Summary of Compounds Detected and Reported to DPR

The following table provides updated information, as of June 30, 2006, of all reported pesticide detections in ground water. It includes the historical range of residue concentrations for all compounds detected and the range of residue concentrations for compounds detected during this fiscal year, from July 1, 2005, to June 30, 2006.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
(S)-metolachlor	11/2 counties 94/2 wells	0.036-0.1		USEPA SNARL - 100	Selective herbicide. AR. Detections reported by USGS were not verified in subsequent DPR sampling.
1,1,2,2-tetrachloroethane	57/6 counties 8,644/6 wells	0.83 - 51.4		CDHS - 1 PHG - 0.1	Herbicide. Not registered for agricultural use (NR).
1,2,4-trichlorobenzene	58/3 counties 7,813/5 wells	0.53 - 21	0.6	CDHS - 5 PHG - 0.5	Herbicide. NR.
1,2-D, 1,3-D, and C-3 compounds	57/1 counties 7,350/1 wells	1.2		See 1,2-D and 1,3-D limits below	Fumigant. NR. Regulations were adopted in 1985 that prohibit the use or sale of pesticides in California in which 1,2-D exceeds 0.5% of the total formulation.
1,2-dichloropropane (1,2-D)	58/23 counties 12,096/167 wells	0.1 - 160	0.51 – 303	CDHS - 5 USEPA - 5 PHG - 0.5	Fumigant. NR. Source of residues were determined by DPR to be due to historical non-point source, legal, agricultural use. Regulations were adopted in 1985 that prohibit the use or sale of pesticides in California in which 1,2-D exceeds 0.5% of the total formulation. Detections referred to SWRCB.
1,3-dichloropropene (1,3-D)	56/3 counties 9,247/6 wells	0.84 - 1.9		CDHS - 0.5 PHG - 0.2	Fumigant. Active registration in California (AR).

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
2,4,5-T	46/2 counties 1,754/2 wells	0.02 - 0.21		USEPA IRIS - 70 USEPA SNARL - 70	Herbicide. NR.
2,4,5-TP (silvex)	58/3 counties 6,216/4 wells	0.15 - 1.4		CDHS - 50 USEPA - 50 PHG - 25	Herbicide. NR.
2,4-D	58/11 counties 6,915/16 wells	0.3 - 46		CDHS - 70 USEPA - 70 PHG - 70	Selective herbicide. AR.
2,4-DP, isooctyl ester	9/2 counties 106/3 wells	0.01 - 0.06		No limits established	Selective herbicide. AR.
2-hydroxycyclohexyl hexazinone	8/1 counties 69/1 wells	0.126		No limits established	Breakdown product of hexazinone.
Acenaphthene	24/1 counties 810/25 wells	98-117		U.S. EPA IRIS Rfd - 420	Fungicide. NR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
ACET	35/17 counties 1,139/342 wells	0.032 - 6	0.023 – 1.49	No limits established	Breakdown product of atrazine and simazine. This compound has contaminated ground water due to legal agricultural use (LAU) of atrazine or simazine. It is considered as toxic as atrazine and simazine and detections of ACET have been used to regulate the use of both parent compounds. Detections were due to LAU.
Alachlor	55/3 counties 7,471/3 wells	0.1 - 9		CDHS - 2 USEPA - 2 PHG - 4	Selective herbicide. AR.
Alachlor ESA	9/5 counties 100/19 wells	0.05 - 1.38		No limits established	Breakdown product of alachlor. Alachlor is AR. DPR determined that contamination of ground water occurred from non-point source pesticide applications. A review of the compound by DPR's Medical Toxicology Branch personnel determined that toxicological data are equivocal and require further consultation with other agencies. Therefore, since DPR cannot determine whether alachlor ESA poses a threat to public health, the alachlor parent is not subject to the formal PCPA review process at this time.
Alachlor OXA	9/1 counties 100/1 wells	0.05 - 0.051		No limits established	Breakdown product of alachlor. Alachlor is AR.
Aldicarb	55/2 counties 5,550/4 wells	1.1 - 7.2		USEPA - 3 CDHS AL - 7	Systemic insecticide. AR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Aldicarb sulfone	51/6 counties 4,326/61 wells	0.05 - 1281		USEPA - 3 USEPA SNARL - 10 (10-day)	Breakdown product of aldicarb. Aldicarb is AR. This compound has contaminated ground water due to LAU of aldicarb.
Aldicarb sulfoxide	51/5 counties 4,331/25 wells	0.06 - 13.2		USEPA - 4 USEPA SNARL - 10 (10-day)	Breakdown product of aldicarb. Aldicarb is AR. This compound has contaminated ground water due to LAU of aldicarb.
Aldrin	54/2 counties 5,277/24 wells	21-107		CDHS AL - 0.002 USEPA IRIS - 0.21 USEPA SNARL - 0.3 (10-day)	Insecticide. NR.
Atrazine	57/24 counties 11,990/301 wells	0.001 - 8.5	0.085- 0.113	CDHS - 1 USEPA - 3 PHG - 0.15	Selective herbicide. AR. This compound has contaminated ground water due to LAU. Detections were determined to be due to LAU.
Azinphos-methyl	43/1 counties 1,292/1 wells	0.014		No limits established	Insecticide. AR.
Benomyl	38/2 counties 1,090/2 wells	190 - 500		USEPA IRIS - 350	Systemic fungicide. AR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Bentazon, sodium salt	55/17 counties 5,416/113 wells	0.02 - 20		CDHS - 18 PHG - 200	Selective herbicide. AR
Benzene (benzol)	57/12 counties 7,419/21 wells	0.2 - 102	0.8 - 61	CDHS - 1 USEPA - 5 PHG - 0.15	Benzene was an ingredient in some early grain fumigants. NR. Non-agricultural uses of industrial chemicals may contribute to these findings. Detections referred to SWRCB.
BHC	47/1 counties 2,081/1 wells	0.08		No limits established	Insecticide. NR.
Bromacil	56/19 counties 9,765/259 wells	0.025 - 23	0.05-5.37	USEPA SNARL - 90	Selective herbicide. AR. This compound has contaminated ground water due to LAU. Detections were determined to be due to LAU.
Butachlor	52/1 counties 5,151/1 wells	0.39		No limits established	Selective herbicide. NR.
Captan	38/2 counties 1,470/3 wells	0.1 - 0.5		CDHS AL - 1.5, USEPA IRIS - 910	Fungicide. AR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Carbaryl	53/4 counties 5,597/4 wells	2-55		CDHS AL - 700, USEPA IRIS - 700 USEPA SNARL - 700	Insecticide. AR.
Carbofuran	54/4 counties 6,204/5 wells	0.016 - 0.686		CDHS - 18 USEPA - 40 PHG - 1.7	Insecticide. AR.
Carbon disulfide	28/4 counties 574/11 wells	0.2 - 5	0.55	CDHS AL - 160, USEPA IRIS - 700	Fumigant. NR.
Chlordane	56/1 counties 6,556/1 wells	20		CDHS - 0.1 USEPA - 2 PHG - 0.03	Insecticide. NR.
Chloromethane	57/28 counties 7,342/107 wells	0.5 - 37	0.5 - 2.5	USEPA SNARL - 3	Fumigant. NR. Non-pesticidal uses of industrial chemicals may contribute to these findings. Detections referred to SWRCB.
Chlorothalonil	51/1 counties 4,287/1 wells	0.8 - 1.1		USEPA IRIS - 110 USEPA SNARL - 200 (10-day)	Fungicide. AR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Chlorpyrifos	38/2 counties 1,403/3 wells	0.02 - 0.06		USEPA IRIS - 21 USEPA SNARL - 20	Insecticide. AR.
Chlorthal-Dimethyl	33/4 counties 1,507/9 wells	0.03 - 300		USEPA IRIS - 70 USEPA SNARL - 70	Selective herbicide. AR.
Chlorthal-Dimethyl acid breakdown products	41/11 counties 1,495/94 wells	0.03 - 10.9	1.05 – 4.32	No limits established	Breakdown product of chlorthal-dimethyl. DPR determined that this compound contaminated ground water due to non-point source applications of the parent, chlorthal-dimethyl. DPR reviewed toxicological studies and determined that at detection levels that were reported, this compound did not pose a threat to public health; so no further action required.
Coumaphos	11/1 counties 132/1 wells	1		No limits established	Insecticide. AR.
DACT	24/9 counties 554/174 wells	0.05 - 6.9	0.058-3.25	No limits established	Breakdown product of atrazine and simazine. This compound has contaminated ground water due to LAU of atrazine or simazine. It is considered as toxic as atrazine and simazine and detections of DACT have been used to regulate the use of both compounds. Detections were determined to be LAU.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Dalapon	50/1 counties 4,718/5 wells	1-17		CDHS - 200 USEPA - 200 PHG - 790	Selective herbicide. NR.
DBCP	55/24 counties 12,245/3058 wells	0.001 - 8000	0.01 – 1.93	CDHS - 0.2 USEPA - 0.2 PHG - 0.0017	Soil fumigant. NR. Source of residues considered by DPR to be from historical non-point source, LAU. Detections referred to SWRCB.
DDD	41/1 counties 1,823/1 wells	1.04		No limits established	Insecticide. NR.
DDE	43/3 counties 3,336/6 wells	0.01 - 0.09		No limits established	Breakdown product of DDT.
DDT	41/3 counties 2,029/4 wells	0.02 - 0.12		USEPA IRIS - 3.5	Insecticide. NR.
Deethyl-Atrazine (DEA)	36/17 counties 1,184/92 wells	0.001 - 2	0.066-0.264	No limits established	Breakdown product of atrazine. This compound has contaminated ground water due to LAU of atrazine. It is considered as toxic as atrazine and detections of DEA have been used to regulate the use of atrazine. Detections were determined to be LAU.
Demethylnorflurazon	4/3 counties 130/36 wells	0.24-0.939	0.05-0.939	No limits established	Breakdown product of norflurazon, which is AR. DPR assumes that this compound contaminated ground water due to non-point source applications of the parent, norflurazon and therefore detections are the result of LAU.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Demeton	46/1 counties 1,774/1 wells	1		USEPA IRIS - 0.3	Systemic-insecticide. NR.
Diazinon	56/7 counties 6,879/9 wells	0.01 - 507		CDHS AL - 6 USEPA SNARL - 0.6	Insecticide. AR. Investigation by DPR found the detection to be due to a transcription error.
Dicamba	52/5 counties 4,512/7 wells	0.01 - 5		USEPA IRIS - 210 USEPA SNARL - 200	Selective herbicide. AR.
Dichlorprop	3/1 counties 49/1 wells	6.8		No limits established	Hormone-systemic type herbicide. NR.
Dichlorprop, butoxyethanol ester	26/3 counties 379/3 wells	0.1 - 6.8		No limits established	Hormone-systemic type herbicide. NR.
Dieldrin	56/5 counties 5,340/6 wells	0.05 - 7		CDHS AL - 0.002	Insecticide. NR.
Dimethoate	54/3 counties 6,367/3 wells	0.38 - 10		CDHS AL – 1, USEPA IRIS - 1.4	Insecticide. AR.
Dinoseb	50/1 counties 5,761/1 wells	30		CDHS - 7 USEPA - 7	Herbicide, desiccant. AR

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Diquat dibromide	46/4 counties 4,328/7 wells	2 - 549.1	4.6 – 6.6	CDHS - 20 USEPA - 20 PHG - 15	Selective herbicide. AR.
Diuron	54/22 counties 7,759/481 wells	0.023 - 5.2	0.015 - 1.5	USEPA IRIS - 14 USEPA SNARL - 10	Selective herbicide. AR. This compound has contaminated ground water due to LAU. Detections reported this year were determined to be due to LAU.
Endosulfan	48/4 counties 2,787/10 wells	0.01 - 34.7		USEPA IRIS - 42	Insecticide. AR.
Endosulfan sulfate	47/2 counties 2,140/3 wells	0.15 - 0.48		No limits established	Breakdown product of endosulfan. Endosulfan is AR.
Endothal, disodium salt	49/2 counties 3,800/3 wells	100 – 548.1		CDHS - 100 USEPA - 100 PHG - 580	Selective herbicide. NR. Early 1989 detections were not confirmed by DPR monitoring. Inactive in 1992.
Endrin	58/4 counties 6,908/5 wells	0.03 - 0.21	2	CDHS - 2 USEPA - 2 PHG - 2	Insecticide. NR.
EPTC	40/1 counties 2,256/1 wells	5.6 - 170		USEPA IRIS -180	Selective herbicide. AR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Ethylene dibromide	56/20 counties 8,251/177 wells	0.006 - 4.7	0.01-0.44	CDHS - 0.05 USEPA - 0.05 PHG - 0.01	Fumigant, insecticide, nematicide. NR since January 1987. Source of residues considered by DPR to be from historical non-point source, LAU. Referred to SWRCB.
Ethylene dichloride	11/1 counties 197/1 wells	2.9		CDHS - 0.5 USEPA - 5 PHG - 0.4	Fumigant. NR.
Ethylene thiourea	8/1 counties 67/1 wells	0.725		USEPA IRIS - 0.6 USEPA SNARL - 300 (10-day)	Fumigant. NR.
Glyphosate, isopropylamine salt	51/1 counties 4,433/1 wells	20		CDHS - 700 USEPA - 700 PHG - 1,000	Nonselective, postemergence herbicide. AR.
Heptachlor	56/4 counties 6,319/12 wells	0.01 - 0.25		CDHS - 0.01 USEPA - 0.4 PHG - 0.008	Insecticide. NR.
Heptachlor epoxide	56/1 counties 6,315/1 wells	0.01		No limits established	Breakdown product of heptachlor. Heptachlor is NR.
Hexazinone	46/9 counties 2,058/19 wells	0.05 - 0.55	0.062-0.263	USEPA IRIS - 230 USEPA SNARL - 400	Selective herbicide. AR. Detections have been determined to result from non-point source pesticide applications but no LAU determination has been made.
Lindane (gamma-BHC)	58/2 counties 6,989/4 wells	0.05 - 180		CDHS - 0.2 USEPA - 0.2 PHG - 0.032	Insecticide. AR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Malathion	37/1 counties 1,220/1 wells	0.32		CDHS AL – 160, USEPA IRIS - 140 USEPA SNARL - 100	Insecticide. AR.
Merphos	21/2 counties 422/2 wells	1	1.5	USEPA IRIS - 0.2	Defoliant. NR.
Methomyl	52/2 counties 5,143/2 wells	0.8	15	USEPA IRIS - 180 USEPA SNARL - 200	Insecticide. AR.
Methoxychlor	57/1 counties 6,502/2 wells	0.5		CDHS - 30 USEPA - 40 PHG - 30	Insecticide. NR.
Methyl bromide	58/12 counties 11,756/25 wells	0.5 - 6.4	1.4	USEPA IRIS - 9.8 USEPA SNARL - 10	Fumigant. AR. Detection is CUI.
Methylene chloride	6/2 counties 61/6 wells	3-6		PHG - 4	Fumigant. NR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Metolachlor ESA	9/6 counties 100/32 wells	0.05 – 24	0.091-1.1	No limits established	Breakdown product of metolachlor. Metolachlor is AR. DPR determined that contamination of metolachlor in ground water occurred from non-point source pesticide applications. A review of the compound by DPR's Medical Toxicology Branch's personnel determined that toxicological data are equivocal and require further consultation with other agencies. Therefore, since DPR cannot determine whether metolachlor ESA poses a threat to public health, the metolachlor parent is not subject to the formal PCPA review process at this time.
Metolachlor OXA	9/4 counties 100/11 wells	0.05 - 2.65	0.279	No limits established	Breakdown product of metolachlor. Metolachlor is AR. DPR determined that contamination of metolachlor in ground water occurred from non-point source pesticide applications. A review of the compound by DPR's Medical Toxicology Branch's personnel determined that toxicological data are equivocal and require further consultation with other agencies. Therefore, since DPR cannot determine whether metolachlor OXA poses a threat to public health, the metolachlor parent is not subject to the formal PCPA review process at this time.
Mexacarbate	23/1 counties 427/1 wells	22		No limits established	Insecticide. NR
Molinate	55/6 counties 7,090/13 wells	0.002 - 29		CDHS - 20 USEPA IRIS - 14	Selective herbicide. AR.
Molinate sulfoxide	17/1 counties 210/1 wells	0.8		No limits established	Breakdown product of molinate. Molinate is AR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Monuron	25/1 counties 504/4 wells	0.04 - 2		No limits established	Herbicide. NR.
MTP	10/1 counties 274/1 wells	2.41 - 2.55		No limits established	Breakdown product of chlorthal-dimethyl. AR.
Naled	16/1 counties 221/1 wells	5		USEPA IRIS - 14	Insecticide. AR.
Naphthalene	57/11 counties 7,545/24 wells	0.5 - 66	1.6	CDHS A L-170, USEPA IRIS - 14 USEPA SNARL - 100	Fumigant. NR in California since 1991.
Norflurazon	31/6 counties 804/48 wells	0.022 –1.62	0.054 – 1.35	USEPA IRIS - 280	Selective herbicide. AR. This compound has contaminated ground water due to LAU. Detections were determined to be due to LAU.
Ortho-Dichlorobenzene	58/9 counties 10,944/10 wells	0.56 - 12		CDHS - 600 USEPA - 600 PHG - 600	Herbicide and insecticide. NR.
Paraquat dichloride	31/3 counties 791/5 wells	0.91 - 16		USEPA IRIS - 3.2 USEPA SNARL - 30	Herbicide. AR.
Picloram	51/3 counties 4,794/5 wells	0.1 – 1.1		CDHS - 500 USEPA - 500 PHG - 500	Selective herbicide. NR.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Prometon	49/13 counties 4,862/51 wells	0.05 - 80	0.091	USEPA IRIS - 110 USEPA SNAR L- 100	Nonselective herbicide. AR. This compound has contaminated ground water due to LAU. Detections were determined to be due to LAU.
Prometryn	57/3 counties 8,270/3 wells	0.1 - 0.5		USEPA IRIS - 28	Selective herbicide. AR.
Propachlor	52/1 counties 5,054/1 wells	1.1		USEPA IRIS - 91 USEPA SNARL - 90	Selective herbicide. NR.
Propazine	41/1 counties 1,098/1 wells	0.2		USEPA IRIS - 14 USEPA SNARL - 10	Selective herbicide. NR.
Propham	35/1 counties 1,063/1 wells	6		USEPA IRIS - 140 USEPA SNARL - 100	Selective herbicide. NR.
Propoxur	45/2 counties 1,312/2 wells	4-5		CDHS AL – 30, USEPA IRIS - 2.8 USEPA SNARL - 3	Insecticide. AR.
Simazine	57/29 counties 12,538/797 wells	0.002 - 49.2	0.05 – 0.205	CDHS - 4 USEPA - 4 PHG - 4	Selective herbicide. AR. This compound has contaminated ground water due to LAU. Detections were determined to be due to LAU.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments
Tebuthiuron	24/4 counties 163/4 wells	0.005 - 22.1		USEPA IRIS - 490 USEPA SNARL - 500	Herbicide. AR.
Tetrachloroethylene	9/3 counties 193/5 wells	0.2 - 2.5		CDHS - 5 USEPA - 5 PHG - 0.06	Insecticide. NR.
Tetrachlorovinphos	23/1 counties 189/1 wells	1		USEPA IRIS - 210	Insecticide. AR.
Thiobencarb	55/6 counties 6,820/8 wells	0.006 - 8.7		PHG - 70 USEPA IRIS - 70	Selective herbicide. AR.
Thiram	2/1 counties 18/4 wells	5-17		USEPA IRIS - 35	Fungicide. AR.
Toxaphene	10/2 counties 110/33 wells	1-57		CDHS - 3 USEPA - 3 PHG - 0.03	Insecticide. NR.
TPA	10/8 counties 274/35 wells	0.1 - 15		No limits established	Breakdown product of chlorthal-dimethyl.
Trifluralin	35/2 counties 1,079/2 wells	0.01 - 0.9		USEPA SNARL - 5	Selective herbicide. AR.
Xylene	58/30 counties 10,779/105 wells	0.25 - 1100	0.68 - 1.8	CDHS - 1,750 USEPA - 10,000 PHG -1,800	Insecticide (NR) and solvent. Non-pesticidal uses of industrial chemicals may contribute to these findings. Detections referred to SWRCB.

Compound Detected	Number of Counties and Wells Tested / Positive for Compound	Historical Range of Residue Concentrations (ppb)	Fiscal Year 2005/2006: Range of Residue Concentrations (ppb)	Water Quality Limits(ppb)[a]	Fiscal Year 2005/2006 Information: Type of Compound, Registration Status, Comments

[a] CDHS = California Department of Health Services' drinking water standard, maximum contamination level (MCL); CDHS-AL = California Department of Health Services' action level; USEPA= U.S. Environmental Protection Agency's MCL; PHG = Office of Environmental Health Hazard Assessment's California public health goal; USEPA IRIS = U.S. EPA integrated risk information system reference dose as a drinking water level; USEPA SNARL = U.S EPA suggested no-adverse-response level for toxicity other than cancer risk.
Marshack, J.B. 2003. A Compilation of Water Quality Goals. Definition of water quality limits is given in Appendix D (Glossary of Terms).
NR: Not registered
AR: Actively registered in California
CUI: Currently under investigation by DPR
LAU: Legal agricultural use

APPENDIX D

Glossary of Terms

AB 1803 - (1983) (Chapter 881, Statutes of 1983) A law that required the California Department of Health Services (DHS) to evaluate each public water system to determine its potential for contamination. The systems were required to conduct specified water analyses and to report those results. Monitoring required by AB 1803 was completed in June 1989.

AB 2021 - See "Pesticide Contamination Prevention Act."

Action level (AL) - Published by DHS's Office of Drinking Water, ALs are based mainly on health affects. ALs are advisory to water suppliers. Although not legally enforceable, the majority of water suppliers have complied with action levels as though they were maximum contaminant levels.

Active ingredient - The chemical or chemicals in a pesticide formulation that are biologically active and which are capable, in themselves, of preventing, destroying, repelling or mitigating insects, fungi, rodents, weeds, or other pests.

Agricultural Commissioner - For each county in California, under supervision of DPR, the Agricultural Commissioner enforces the laws and regulations pertaining to agricultural and structural pest control and all other pesticide uses.

Agricultural use - (See also "legal agricultural use" and "legal agricultural use determination.") The use of any pesticide or method or device for the control of plant or animal pests, or any other pests, or the use of any pesticide for the regulation of plant growth or defoliation of plants. It excludes the sale or use of pesticides in properly labeled packages or containers which are intended only for any of the following: home use, use in structural pest control, industrial or institutional use, the control of an animal pest under the written prescription of a veterinarian, local districts, or other public agencies which have entered into and operate under a cooperative agreement with the Dept. of Public Health pursuant to section 2426 of the Health and Safety Code. (Food and Agr. Code, section 11408)

Analysis – For the well inventory data, it is the act of determining whether a substance is present in a water sample using laboratory methodology.

Aquifer - A geologic formation, group of formations, or part of a formation, that is water bearing and which transmits water in sufficient quantity to supply springs and pumping wells.

Basin irrigation – ASAE(2001) definition: irrigation by flooding areas of level land surrounded by dikes. Used interchangeably with level border irrigation, but usually refers to smaller areas.

Birth Defect Prevention Act (BDPA) - (SB 950, 1984) A law requiring DPR to acquire certain toxicological data for registered pesticides in order to make a scientific determination that their uses will not cause significant adverse health effects. The BDPA prohibits the registration of any new pesticide active ingredient if required mandatory health effects studies are missing, incomplete, or invalid. Pesticide active ingredients already registered that are identified as having the potential to cause significant adverse health effects following a thorough review by DPR scientific staff will be canceled.

Chemigation - The application of pesticides through irrigation water, using irrigation techniques and equipment.

Confirmed detection - For purposes of the well inventory database, the detection of a compound in two discrete samples taken from the same well during the time period of a single monitoring survey.

Database record - Each chemical analysis of a well water sample for a pesticide residue or related chemical constitutes one record in the database. Each record may contain up to 149 columns of data.

Degradation - The breakdown of a chemical by the action of microbes, water, air, sunlight, or other agents.

Detection - A well water sample in which the presence of a pesticide chemical is detected at or above the, minimum detection limit of the analytical instruments used for analysis of the compound under investigation. A detection may be designated as confirmed or unconfirmed.

Discrete sample - Samples taken separately from a well; not a single sample split into smaller samples.

Established PMZ - A Pesticide Management Zone (PMZ) (see def.) formally listed in section 6802, Title 3 of the California Code of Regulations (3CCR).

Ground water protection areas (GWPA) - Areas of the state identified by DPR that are vulnerable to pesticide movement to ground water. GWPAs are identified by base meridian, township, range and section. Currently, there are leaching GWPAs and runoff GWPAs. GWPAs include all sections of land where pesticides have been found in ground water due to Legal

agricultural use (see Pesticide Management Zones*)* and additional sections of land that contain similar characteristics of areas where pesticides have been found in ground water.

Ground Water Protection List (GWPL) - A list, required by the PCPA and established in section 6800 (3CCR), of pesticides having the potential to pollute ground water. The GWPL is divided into two sublists. Sublist (a) is comprised of chemicals that have been detected in ground water as a result of legal agricultural use. Pesticide active ingredients whose physicochemical properties exceed the specific numerical values (see def.) and that are labeled for soil application under certain conditions or are required or recommended to be followed by flood or furrow irrigation within 72 hours are placed on sublist (b) of the GWPL. Chemicals placed on the GWPL sublist (a) are subject to certain restrictions.

Health advisory level (HAL) - An advisory number published by U.S. EPA's Office of Drinking Water and Office of Water Regulations and Standards. Short-term (10 days or less), long-term (7 years or less), and lifetime exposure health advisories for non-carcinogens and suspected human carcinogens are included where data sufficient for derivation of the advisories exist. HALs are a guideline which include a margin of safety to protect human health. For lifetime HALs, water containing pesticides at or below the HAL is acceptable for drinking every day over the course of one's lifetime.

Initial detection sample - For a single study and a particular well, the initial detection sample for a chemical will be the positive sample with the earliest sampling date and/or time. Replicate samples are coded in relation to the initial sample detection.

Large water system well - A well supplying 200 or more service connections.

Leaching - A pathway by which agricultural chemicals may reach ground water; the process by which residues are dissolved in soil water and follow the movement of water through the soil matrix as it recharges a ground water aquifer.

Legal agricultural use - The application of a pesticide, according to its labeled directions and in accordance with federal and state laws and regulations, for agricultural use as defined in Food and Agricultural Code, section 11408. (See "agricultural use.”)

Legal agricultural use determination - A determination required by section 13149 (FAC) and based upon the following criteria: (1) the detection of a pesticide ingredient or its breakdown product in ground water that has been verified according to DPR criteria; (2) a detection of the same pesticide ingredient or its breakdown product in ground water, verified at a second site within a four-section area of the original detection; (3) the detected pesticide ingredient must be formulated in a product which has one or more agricultural uses listed on its label; (4) the

application of the agricultural use product(s) in the vicinity of the reported detections should either be documented historically, confirmed by local interviews, or presumed by the identification of a target pest or commodity; and (5) the detected pesticide is not exclusively due to illegal use or a point source. The director may consider a preponderance of evidence as meeting these criteria.

Maximum contaminant levels (MCLs) - MCLs are part of the drinking water quality standards adopted by DHS and by USEPA under the Safe Drinking Water Act. MCLs are formally established in regulation and are enforceable by DHS on water suppliers.

Minimum detection limit (MDL) - The lowest concentration of a substance that a method of analysis can quantify reliably. The MDL is established in the protocol for a study either as a result of a method validation study or by using accepted proven analytical methods (e.g., EPA methods).

Mitigation measure - An activity to substantially reduce any adverse impact of a given condition.

Model - Mathematical equations that represent certain processes. These equations can be implemented in a computer program in order to facilitate calculations and test model predictions against measured data.

Monitoring well - A well used principally for any of the follow purposes: (1) observing ground water levels and flow conditions, (2) obtaining samples for determining ground water quality, or (3) evaluating hydraulic properties of water-bearing strata.

Non-crop areas - These areas include rights-of-way, golf courses, cemeteries, and industrial and institutional sites. Agricultural use of pesticides in non-crop areas include weed control around buildings on a farm or on rights-of-way, irrigation canals and ditches, golf courses, parks, and cemeteries.

Non-point source – Contamination that cannot be traced to a small definable location (compare with "point source"), e.g., applications of agricultural chemicals to crops.

Organic matter - Plant and animal debris or remains found in the soil in all stages of decay. The major elements in organic matter are oxygen, hydrogen, and carbon.

Parts per billion (ppb) - A way to express the concentration of a chemical in a liquid, solid, or in air. Since one liter of water weighs one billion micrograms, one microgram of a chemical in one liter of water is equal to one ppb.

Restricted material permit – Restricted material permits are issued by Agricultural Commissioners for a specific site for the use of chemicals that have usually been designated as restricted pesticides. Restricted pesticides, for various reasons, are potentially more hazardous than other pesticides.

Pest control adviser (PCA) - A person, licensed by DPR and registered with the Agricultural Commissioner, who makes pest control recommendations. All agricultural use recommendations must be in writing and contain certain information. A PCA must complete continuing education requirements before his/her license may be renewed.

Pesticide Contamination Prevention Act (PCPA, AB 2021)-A law, effective January 1, 1986, which added agricultural use sections 13141 through 13152 to Division 7 of the FAC. The PCPA requires the following: (1) each registrant of an agricultural use pesticide to submit environmental fate data to DPR; (2) the director to use those data to establish a list of pesticides with the potential to pollute ground water (Ground Water Protection List); (3) the director to monitor ground water for these pesticides; (4) all local, county and state agencies to report to DPR the results of pesticides sampled in ground water; (5) the director to maintain a specified well sampling database and to post certain information annually on its website about pesticides in ground water and (6) a specified subcommittee and the director to conduct a formal review to determine if continued use of a pesticide can be allowed if it is detected and verified in ground water due to legal agricultural use.

Pesticide Detection Response Process (PDRP) – A process, established pursuant to sections 13149 through 13151 (FAC), in which the detection of a pesticide residue in ground water is investigated, evaluated, and, when necessary, mitigated. As part of the process, a determination must be made that the detection resulted from a legal agricultural use application of the pesticide. As a result of this process, the use of a pesticide in California may be modified or cancelled.

Pesticide Management Zone (PMZ) - A former geographic surveying unit of approximately one square mile, which is vulnerable to ground water contamination based on detections of a pesticide-related compound in ground water due to legal, agricultural use. PMZs were pesticide specific. The use of a pesticide inside its PMZs was subject to certain ground water protection restrictions and requirements. PMZs were renamed GWPAs in May 2004.

Physicochemical - The types of behavior that a substance exhibits in chemical reactions are called its chemical properties; other characteristics that are typical of a substance are called its physical properties. Taken together, the chemical and physical properties of a substance are called its physicochemical properties.

Point source - A source of contamination, such as a spill or at a waste site that is initially deposited and concentrated in a small, well-defined area. The contamination can be traced to its point of origin by locating a specifically shaped pattern of residues in the ground water called a plume.

Range - A single series or row of townships, each six miles square, extending parallel to, and numbered east and west from, a survey base meridian line. (See well numbering system.)

Recommended PMZ - A section of land that had been identified as sensitive to ground water pollution by specific pesticides base on detections in ground water but not formally adopted into section 6802 (3CCR).

Registered pesticide - A pesticide product approved by the USEPA and DPR for use in California.

Regulations - These are adopted by state agencies to implement or clarify statutes enacted by the California Legislature. They can also be adopted in response to federal legislation, court decisions, changing technologies, and concerns for the health and well being of the residents of California.

Replicate sample - A discrete sample taken from a well at the same time as the initial detection sample; not a single sample split into multiple samples.

Restricted material - Compounds designated as "restricted materials" in section 6400 (3CCR) that, for various reasons, are potentially more hazardous to people, animals, or the environment than other pesticides. As a result, the use of these materials is regulated more closely and is permitted only when additional precautionary measures are taken where applicable. Certain reporting requirements and dealer responsibilities apply to the use of restricted materials.

Section - A land unit of 640 acres or one square mile, equal to l/36 of a township. (See well numbering system.)

Small public water system well - A well serving fewer than 200 connections.

Specific numerical values (SNV) - Certain numeric threshold values that the PCPA requires to be established for the following physical and chemical properties of pesticide active ingredients: water solubility, soil adsorption coefficient, hydrolysis, aerobic and anaerobic soil metabolism, and field dissipation (the field dissipation SNV has not yet been established). The PCPA associates these properties with the longevity and mobility of a chemical in the soil and requires

the establishment of SNVs in regulation as a means of predicting which pesticides are likely to pollute ground water.

State Well Number - See “well numbering system.”

Survey - In this report, well monitoring conducted by an agency or private firm for a specified length of time in a designated area.

Township - A public land surveying unit that is a square parcel of land, six miles on each side. The location of a township is established as being so many six-mile units east or west of a north-south line running through an initial point (called the "principal meridian") and so many six-mile units north or south of an east-west line running through another point (called the "baseline"). (See “well numbering system.”)

Triazine - A chemical compound derived from any of three isomeric compounds, each having three carbon and three nitrogen atoms in a six-member ring. Triazines are strong inhibitors of photosynthesis. Atrazine and simazine are triazine herbicides.

Verified detection - confirmed and unconfirmed detections are verified if they meet the criteria specified in (FAC section 13149[d]) which requires that either the analytical method provides unequivocal identification of a chemical and is approved by DPR or that the detection is verified within 30 days by a second analytical method or a second analytical laboratory approved by DPR. Criteria have been set by DPR (Biermann, 1989, 1996) for determining if the detection of a pesticide or its breakdown product(s) meets the standards of section 13149[d].

Water quality limits –(Marshack, Jon B., 2003).

Water solubility - The ability of a substance to go into solution with water.

Well inventory database- a statewide database, required by the PCPA, of wells sampled for pesticide active ingredients.

Well numbering system - The California well numbering system is based on a rectangular system commonly referred to as the Public Lands Survey. Under this system, all tracts of lands are tied to an initial point and identified as being in a township. A township is a square parcel of land six miles on each side. Its location is established as being so many six-mile units east or west of a north-south line running through the initial point (called the “principal meridian") and so many six-mile units north or south of an east-west line running through the point (called the "baseline”). The meridian lines parallel to, and east or west of, the principal meridian are called range lines. Every township is further divided into 36 parts called sections. A section is also

described as a square parcel of land one mile on a side, each containing 640 acres. Each well in California is assigned a unique number (referred to as the State Well Number) by the Department of Water Resources (DWR). For well numbering purposes, each section of land is divided into sixteen 40-acre tracts. Once the well location is established in the 40-acre tract it is assigned a sequence number, which is assigned in chronological order by DWR personnel. The DWR maintains an index of state well numbers to prevent duplication.