

SAMPLING FOR PESTICIDE RESIDUES IN CALIFORNIA WELL WATER



Annual Well Sampling Report
Pursuant to the
Pesticide Contamination Prevention Act

California Environmental Protection Agency
DEPARTMENT OF PESTICIDE REGULATION
Environmental Monitoring Branch
Ground Water Protection Program

December 2017

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Cover photo—*Wet meadow sustained by high water table, Sierra Nevada foothills.*

ABSTRACT

This 2017 annual report summarizes ground water sampling results for pesticide residues, as required under Food and Agricultural Code (FAC) section 13152(e). The report includes sampling and detection data compiled by the Department of Pesticide Regulation (DPR) and State Water Resources Control Board (SWRCB) for calendar year 2016, plus data from DPR study Z588 (September, 2015).¹ Wells with detections are identified by county.² Actions taken by DPR to prevent migration of pesticides to ground water from nonpoint agricultural sources are also identified.

RESULTS OF WELL SAMPLING FOR PESTICIDE RESIDUES

The following table summarizes DPR and SWRCB well sampling data for the sampling period January through December 2016, and data from DPR study Z588 (September, 2015). Wells were sampled for one or more of 133 agricultural use pesticides and pesticide degradates (Table i).³ Twenty-one pesticides/degradates from nonpoint sources were detected; five of the detected pesticides are not registered for use in California (Table ii).

Table i. 2016 summary of well monitoring results from DPR and SWRCB (plus study Z588 detections.)

	DPR	SWRCB	† TOTAL	Percent of Total
‡ Pesticides/Degradates Sampled	56	97	133	15.8%
Pesticides/Degradates Detected	14	7	21	
‡‡ Wells Sampled	81	3874	3955	9.0%
Wells with Detections	68	286	354	
Counties Sampled	5	55	55	29.1%
Counties with Detections	4	16	16	

† “Total” reflects *unique* values, not a summation of values. For example, of the 58 California counties, some counties were sampled by more than one agency, but some were not sampled at all. (For the 2016 sampling period, Del Norte, Imperial and San Francisco counties were not sampled.)

‡ “Pesticides Sampled” and “Pesticides Detected” represents the total number of pesticides sampled or found in ground water regardless of the number of sampling events or detections that occurred during the reporting period.

‡‡ “Wells Sampled” and “Wells with Detections” represents the total number of wells sampled or found to contain pesticide residues regardless of the number of sampling events or detections that occurred during the reporting period.

¹ DPR study Z588 was initiated to survey detections of metolachlor, metalaxyl and hexazinone in Stanislaus County.

² Although DPR is required to provide locations of sampled wells, in this report information is summarized by county to protect well owner privacy. DPR can provide additional location information—including township, range, and section—upon request.

³ Some exceptions to the “agricultural use” status of sampled pesticides apply; some industrial use pesticides and pesticides that are no longer—or never were—registered for use in California are included due to the varying monitoring goals of reporting agencies.

Table ii summarizes detections of nonpoint agricultural source pesticides detected in ground water in 2016, plus detections made under DPR study Z588 (September, 2015). Of the 21 agricultural use pesticide/degradate detections reported, 11 are pesticides (or degradates of a parent compound) listed in 3CCR 6800(a) and regulated as ground water contaminants within GWPAs; three pesticides/degradates are listed in 3CCR 6800(b) as potential ground water contaminants, two are not listed under 3CCR 6800(a) or (b), and five are not registered for use in California.

Table ii. Pesticides detected in ground water in 2016, including detections made under DPR study Z588 (September, 2015). Detection concentrations and drinking water quality standards are reported in parts per billion (ppb).

Pesticide or Pesticide Degradate	Wells with Detections	Concentration Range (ppb)	† Drinking Water Quality Standards (ppb)					††Cancer Risk	Regulatory Status
			CA MCL	OEHHA PHG	U.S. EPA MCL	U.S. EPA MCLG	DPR Response to Detection		
1,2-dichloropropane (1,2-D) (propylene dichloride)	14	0.5 – 1.6	5	0.5	5	0	B2	Not registered for use in California.	
ACET (deisopropyl-atrazine or deethyl-simazine) (degradate of atrazine, simazine)	53	0.05 – 1.14	---	---	---	---	---	Parent pesticides are on the Ground Water Protection List (GWPL), * 3CCR 6800(a). ‡ All fifty three (53) wells with detections are in GWPAs. Pesticide applications in GWPAs are made under the authority of the Restricted Materials permit program (applications are managed by County Agricultural Commissioners).	
Atrazine	1	0.081	1	0.15	3	3	N	This pesticide is on the GWPL 3CCR 6800(a). One (1) well with a detection is in a Ground Water Protection Area (GWPA).	
Bentazon	4	0.056 - 0.199	18	200	---	---	E	This pesticide is on the GWPL 3CCR 6800(a), and listed in 3CCR section 6457. These four (4) detections are the first detections made outside of rice growing areas. The detections will be evaluated under DPR’s formal review process.	

Pesticide or Pesticide Degradate	Wells with Detections	Concentration Range (ppb)	† Drinking Water Quality Standards (ppb)					Regulatory Status	
			CA MCL	OEHHA PHG	U.S. EPA MCL	U.S. EPA MCLG	††Cancer Risk	DPR Response to Detection	
Bromacil	18	0.055 – 3.77	---	---	---	---	C	This pesticide is on the GWPL, 3CCR 6800(a). Seventeen (17) wells with detections are in GWPAs; one (1) detection is being evaluated under DPR study GW15.	
Carbon Disulfide	1	0.7	---	---	---	---	---	Not registered for use in California.	
DACT (diaminochlorotriazine) (degradate of simazine)	55	0.057 - 8.89	---	---	---	---	---	Parent pesticide is on the GWPL, 3CCR 6800(a). All fifty five (55) wells with detections are in GWPAs.	
Dacthal acid degradates	13	0.1 – 11.0	---	---	---	---	---	Parent pesticide is not listed on GWPL 3CCR 6800(a) or (b). DPR is conducting a field study for dacthal and dacthal acid degradates.	
DBCP (1,2-dibromo-3- chloropropane)	256	0.01 – 1	0.2	0.0017	0.2	0	B2	Not registered for use in California.	
DEA (deethyl-atrazine) (degradate of atrazine)	2	0.083 – 0.201	---	---	---	---	---	Parent pesticide is on the GWPL, 3CCR 6800(a). All wells (2) with detections are in GWPAs.	
Diuron	11	0.051 – 0.175	---	---	---	---	L	Pesticide is on the GWPL, 3CCR 6800(a). All eleven (11) wells with detections are in GWPAs.	
DSMN (desmethyl-norflurazon) (degradate of norflurazon)	29	0.06 – 0.838	---	---	---	---	---	Parent pesticide is on the GWPL, 3CCR 6800(a). All twenty-nine (29) wells with detections are in GWPAs.	

Pesticide or Pesticide Degradate	Wells with Detections	Concentration Range (ppb)	†Drinking Water Quality Standards (ppb)					Regulatory Status	
			CA MCL	OEHHA PHG	U.S. EPA MCL	U.S. EPA MCLG	††Cancer Risk	DPR Response to Detection	
Ethylene dibromide (EDB)	5	0.023-0.22	0.05	0.01 ¹	0.05	0	L	Not registered for use in California.	
Imidacloprid	4	0.066 – 0.644	---	---	---	---	---	Pesticide is on the GWPL, 3CCR 6800(b). Based on five previous detections in Fresno County, DPR expanded testing and detected imidacloprid in four (4) additional wells. All wells are in GWPAs. Study GW17 is being conducted to expand the area tested for imidacloprid.	
Methoxychlor	1	110	30	0.09	40	40	D	Not registered for use in California.	
Methyl bromide	1	0.52	---	---	---	---	---	This pesticide is not listed on the GWPL 3CCR 6800(a) or (b)—it is regulated as a California Restricted Material. ^{††} DPR will evaluate the detection if a second detection is made in this well.	
Metolachlor ESA <i>(degradate of metolachlor)</i>	4	0.119 - 1.67	---	---	---	---	---	Parent pesticide is on the GWPL, 3CCR 6800(b). Detections of this degradate are currently under investigation by DPR.	
Metolachlor OXA <i>(degradate of metolachlor)</i>	2	0.05 - 0.609	---	---	---	---	---	Parent pesticide is on the GWPL, 3CCR 6800(b). Detections of this degradate are currently under investigation by DPR.	
Norflurazon	16	0.052 - 0.446	---	---	---	---	---	Pesticide is on the GWPL, 3CCR 6800(a). All sixteen (16) wells with detections are in GWPAs.	

Pesticide or Pesticide Degradate	Wells with Detections	Concentration Range (ppb)	† Drinking Water Quality Standards (ppb)					†† Cancer Risk	Regulatory Status
			CA MCL	OEHHA PHG	U.S. EPA MCL	U.S. EPA MCLG	DPR Response to Detection		
Prometon	1	0.07 – 0.09	---	---	---	---	N	This pesticide is on the GWPL, 3CCR 6800(a). This well is in a GWPA.	
Simazine	35	0.051 - 0.158	4	4	4	4	N	This pesticide is on the GWPL, 3CCR 6800(a). All thirty-five (35) wells with detections are in GWPAs.	

† Drinking water quality standards: MCL: maximum contaminant level; MCLG: maximum contaminant level goal; PHG: public health goal. Other acronyms used include: California (CA); Office of Environmental Health Hazard Assessment (OEHHA); United States Environmental Protection Agency (U.S. EPA).

- California (State Water Resources Control Board) MCL values derived at: http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Documents/DWdocuments/MCLsEPAsDWP-2014-07-01.pdf.
- Office of Environmental Health Hazard Assessment public health goals available at: <https://oehha.ca.gov/water/public-health-goals-phgs>.
- U.S. EPA MCL, MCLG, and cancer risk (descriptor) designations derived from the publication *2012 Edition of the Drinking Water Standards and Health Advisories* available at: <https://www.epa.gov/sites/production/files/2015-09/documents/dwstandards2012.pdf>.

†† Cancer risk (descriptor) acronyms: (B2) sufficient evidence in animals (as a carcinogen), inadequate or no evidence in humans; (C) possible human carcinogen; (D) not classifiable as to human carcinogenicity; (E) evidence of noncarcinogenicity for humans; (N) not likely to be carcinogenic in humans; (L) likely to be carcinogenic to humans.

* Pesticides on the Ground Water Protection List (GWPL) 3CCR 6000(a) and (b) are those labeled for agricultural, outdoor institutional, or outdoor industrial use that have the potential to pollute ground water. Sublist 6800(a) includes seven agricultural herbicides that are regulated as ground water contaminants: atrazine, bentazon, bromacil, diuron, norflurazon, prometon, and simazine. Sublist 6800(b) includes 98 pesticides that have the potential to become ground water contaminants based on their mobility, persistence and legal uses. GWPL available at: <http://www.cdpr.ca.gov/docs/legbills/calcode/040101.htm>.

‡ DPR does not investigate detections within Ground Water Protection Areas (GWPA) for pesticides (or their degradates) that are on the 6800(a) list of known ground water contaminants.⁴ Applications of these pesticides in GWPAs are managed by County Agricultural Commissioners via the **Restricted Materials** permit program. This program requires applicators to modify their pesticide use practices based on soil properties of the GWPA.

¹ The Public Health Goal (PHG) for ethylene dibromide (EDB) is listed in the SWRCB (not OEHHA) data table under “More about MCLS and PHGs” at the following web address: http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.shtml. This is a September, 2016 update document.

†† All pesticides listed under 3CCR 6800(a), when labeled for agricultural, outdoor institutional, or outdoor industrial use, are also listed as California Restricted Materials and regulated accordingly. **Methyl bromide** is, however, listed as a Restricted Material based upon findings other than its detection in ground water.

⁴ Schuette, J. 2004. Summary of Program Policies Specifying When the Director Will Not Determine if a Detection Was the Result of Legal, Agricultural Use (“N” Memorandum). Department of Pesticide Regulation, Environmental Monitoring Branch. December 1, 2004.

PREFACE

This report fulfills the requirements of the Pesticide Contamination Prevention Act of 1985 (PCPA), Assembly Bill (AB) 2701 of 2004, and Senate Bill (SB) 1117 of 2014. The PCPA requires DPR to submit the results of ground water monitoring for pesticide residues in an annual *written* report; AB 2701 amended the PCPA to require DPR to post the report on the DPR Web site.

ACKNOWLEDGEMENTS

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

As required by the PCPA, this report describes active ingredients of registered pesticide products that have been found in ground water. DPR provides this information to satisfy legal mandates and provide information to the public. Any discussion of commercially available pesticide products does not constitute an actual or implied endorsement of the products by DPR.

ABBREVIATIONS

AB	Assembly Bill
CAC	County Agricultural Commissioner
CALVUL	California Vulnerability Model
3CCR	Title 3, California Code of Regulations
CDPH	California Department of Public Health
DDW	Division of Drinking Water
DPR	Department of Pesticide Regulation
FAC	Food and Agriculture Code
GAMA	Groundwater Ambient Monitoring and Assessment Program
GWPA	Ground Water Protection Area
GWPL	Groundwater Protection List
LLNL	Lawrence Livermore National Laboratory
LEACHM	Leaching Estimation and Chemistry Model
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
µg/L	Micrograms per Liter
OEHHA	Office of Environmental Health Hazard Assessment
PCPA	Pesticide Contamination Prevention Act
PHG	Public Health Goal
PMZ	Pesticide Management Zone
ppb	Parts per billion
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SNV	Specific Numerical Value
SWRCB	State Water Resources Control Board
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey

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BACKGROUND

PROTECTING GROUND WATER FROM PESTICIDE CONTAMINATION — THE PCPA

DPR began addressing pesticide contamination of ground water in the early 1980s after the discovery of 1,2-dibromo-3-chloropropane (DBCP) in well water. Subsequent reports of pesticides in ground water led to passage of the Pesticide Contamination Prevention Act (PCPA) of 1985,⁵ an act designed to prevent pesticide *pollution*⁶ of ground water by *agricultural use*⁷ pesticides, with emphasis on the protection of public drinking water supplies.

The PCPA authorized establishment of a program to identify pesticides with the potential to pollute ground water.⁸ Under this program, DPR is required to conduct ground water sampling, maintain a database of wells sampled for pesticides, and conduct a formal review to determine if use of detected pesticides can be modified to protect ground water.

To implement the PCPA, DPR:

- Obtains physical/chemical/environmental fate data from pesticide registrants to support the registration of agricultural use pesticides and maintains the data in DPR's Pesticide Chemistry Database (see Pesticide Data Index).
- Uses data in the Pesticide Chemistry Database to establish persistence and mobility threshold values called specific numerical values (SNV)⁹ and evaluates the ground water pollution potential of agricultural use pesticides based (in part) on these values. **NOTE:** SB 1117 modified the process for determining pollution potential by requiring DPR to develop a *peer reviewed method*¹⁰—in consultation with a subcommittee of the Director's Pesticide Registration and Evaluation Committee—to determine the potential of a pesticide to pollute ground water using specific numerical values. This revised procedure is under development; DPR is currently working with the United States Geological Survey (USGS), awaiting an analysis of USGS data collected nationwide.
- Adds to the Ground Water Protection List (GWPL)¹¹ agricultural use pesticide active ingredients, other specified ingredients, and degradation products of a pesticide that have the

⁵ The PCPA added sections 13141-13152 to the Food and Agricultural Code (FAC). Title 3, California Code of Regulations (3CCR) sections 6416-6487.5 and 6800-6804 implement these FAC sections.

⁶ FAC section 13142 defines "*pollution*" as "the consequence of polluting," and "*pollute*" as "...to introduce a product into the groundwaters of the state resulting in an active ingredient, other specified ingredient, or a degradation product of a pesticide above a level that does not cause adverse health effects, accounting for an adequate margin of safety."

⁷ California's definition of "agricultural use" is broad, and includes not only pesticides used in production agriculture, but also on turf (e.g., golf courses, cemeteries) and along rights-of-way.

⁸ See DPR's Ground Water Protection Program.

⁹ SNV threshold values for all parameters are listed in 3CCR section 6804.

¹⁰ Peer review is conducted using the process described in Section 57004 of the Health and Safety Code.

¹¹ The Ground Water Protection List (3CCR section 6800) is divided into two sublists: Sublist 6800(a) includes seven chemicals that have been detected in ground water or soil that are regulated as ground water contaminants: atrazine, bentazon, bromacil, diuron, norflurazon, prometon, and simazine. Sublist 6800(b) includes 98 chemicals that have the potential to become ground water contaminants based on their mobility, persistence and legal uses. SB 1117 requires DPR to "...include on the GWPL each active ingredient, other specified ingredient, and degradation product of a pesticide that, when applied, has the potential to pollute groundwater."

potential to pollute ground water. Also added are pesticides whose use has been modified following their detection in ground water.¹²

- Utilizes contaminant transport modeling tools to:
 - evaluate the contamination potential of pesticides prior to their California registration;
 - prioritize pesticides for monitoring; and
 - define Ground Water Protection Areas (GWPA).¹³
- Monitors agricultural use pesticides to determine if they have migrated to ground water.
- Evaluates reported pesticide detections in ground water, including those reported by other agencies.¹⁴
- Determines whether detection of a pesticide in ground water is the result of *legal* agricultural use¹⁵ and if so, conducts a formal review process to determine if the pesticide's use can be modified to prevent pollution.
- Mitigates the threat of pollution; conducts ongoing soil and ground water monitoring of pesticides whose continued use has been modified to prevent pollution.
- Continuously reviews new science and data that could impact the validity of a finding that a pesticide has not polluted and does not threaten to pollute the ground water of the state.
- Resubmits a pesticide to the formal review process if new information indicates continued use threatens to pollute ground water of the state.

In addition, DPR:

- Maintains a database of pesticide detections in ground water reported to DPR by local, county, and state agencies.¹⁶
- Prepares an annual Well Sampling Report that summarizes monitoring results and specifies actions taken by DPR in response to detections from nonpoint agricultural sources. (Annual Well Sampling Reports are available at: <http://www.cdpr.ca.gov/docs/emon/grndwtr/wellinv/wirmain.htm>.)

IDENTIFYING POTENTIAL GROUND WATER CONTAMINANTS UNDER THE PCPA

DPR developed several evaluation procedures to estimate a pesticide's potential to pollute ground water; these procedures are described below.

Using Environmental Fate Data to Predict Pesticide Behavior in the Environment

The PCPA required DPR to establish threshold SNVs for six physical/chemical parameters presumed to correlate a pesticide's potential to leach to ground water: water solubility, K_{oc}, hydrolysis half-life, aerobic soil metabolism half-life, anaerobic soil metabolism half-life, and field dissipation half-

¹² Previously detected pesticides on the GWPL (3CCR section 6800[a]) include: atrazine, bentazon, bromacil, norflurazon, prometon, simazine and diuron (except diuron products with less than 7% diuron that are applied to foliage).

¹³ See Appendix A for more information on GWPAs.

¹⁴ See Appendix B for a list of reporting agencies and a discussion of their role in the PCPA process.

¹⁵ Legal agricultural uses include pesticide applications made in accordance with the registered pesticide label.

¹⁶ See Appendix C for more information on the Well Inventory Database.

life. Water solubility and Koc are considered indicators of *mobility* within the soil, while the half-lives of hydrolysis, aerobic and anaerobic soil metabolism and field dissipation are considered indicators of *persistence* of the pesticide in soil.¹⁷ A pesticide is predicted to have the potential to leach to ground water if it is both mobile and persistent.

DPR developed threshold SNVs by evaluating nationwide ground water studies and performing a statistical comparison of the physical/chemical attributes of pesticides detected in ground water as a result of legal agricultural use (called *leachers*), and pesticides not detected (*nonleachers*). Analysis showed data for water solubility, hydrolysis half-life, Koc, and anaerobic soil metabolism half-life were significantly different for leachers and nonleachers (Wilkerson and Kim, 1986).¹⁸ However, leacher and nonleacher aerobic soil metabolism data were not significantly different.¹⁹

After establishing threshold SNVs, DPR scientists used the data to characterize a pesticide's behavior in the environment. Pesticides that exceed SNVs are placed on the GWPL and monitored to determine if they have migrated to ground water as a result of their legal agricultural use.

SB 1117 modified this process for estimating pollution potential by requiring DPR to develop a peer reviewed SNV-based method in consultation with a subcommittee of the Director's Pesticide Registration and Evaluation Committee. This revised procedure is under development; DPR is currently working with the USGS, awaiting an analysis of USGS data collected nationwide.

Using Computer Modeling Tools to Predict Pesticide Contamination Potential

In addition to evaluating the contamination potential of agricultural use pesticides through comparison of SNV values, DPR scientists use two models to predict pesticide behavior.²⁰

- **LEACHM**, the *leaching estimation and chemistry model* (Hutson and Wagenet, 1992) is a pesticide fate and transport modeling tool used to evaluate the leaching potential of a pesticide. The model enables DPR scientists to predict a pesticide's movement through the root zone of a leaching-vulnerable soil (Spurlock, 2000), and predict the occurrence and magnitude of well water concentrations based upon mobility and persistence data, label information, climate data, and label recommended irrigation practices (Troiano and Clayton, 2009). If the pesticide is deemed a potential ground water contaminate following the evaluation, the registrant is required to take steps—such as amending the product label or committing to a stewardship program—to mitigate the potential threat to ground water before DPR will approve the pesticide for use in California. If mitigation is not possible, California registration is denied.

¹⁷ Although DPR has not yet established an SNV for field dissipation data, these data are used in modeling procedures to assess the leaching potential of new products proposed for registration.

¹⁸ An evaluation of SNVs for these properties resulted in the identification of 90 percent of the chemicals found in ground water due to legal agricultural use.

¹⁹ Because the PCPA requires DPR to establish an SNV for each physical/chemical parameter, and because soil metabolism half-life appears to be an ineffective predictor of a pesticide's ground water contamination potential, the SNV for aerobic soil metabolism half-life is set at a value that minimizes its importance in the discrimination procedure.

²⁰ The data used in these models are maintained in DPR's Pesticide Chemistry Database. The database includes pesticide mobility and persistence data submitted by pesticide registrants.

- **CALVUL**, the *California vulnerability model* is used to evaluate areas of California that are vulnerable to pesticide contamination based on soil type and depth to ground water. If pesticide use on a given section of land is deemed likely to facilitate ground water contamination, the section is designated a GWPA.²¹

MONITORING FOR PESTICIDES—PRIORITIZING THE CANDIDATES

Pesticides that are predicted to have the potential to contaminate ground water are ranked for annual monitoring.²² This ranking enables DPR to focus limited resources on pesticides that present the greatest contamination risk. DPR assigns highest priority to California registered agricultural use pesticides that are:

- on the GWPL;²³
- reported as detections in ground water by public agencies (see Appendix B for a list of reporting agencies);
- believed to have a higher likelihood of contaminating ground water based on computer simulated transport modeling, or based upon a review of new science and data that indicate the pesticide could potentially pollute ground water;
- used intensively, or whose use is increasing (coupled with other risk factors such as persistence and mobility in soil); or
- injected into the soil by ground-based application equipment, or applied by chemigation or followed within 72 hours by flood or furrow irrigation.

DPR also assigns a higher priority to pesticides that:

- have been detected previously in California (or nationwide); and
- have no monitoring history in California.

RESPONDING TO PESTICIDE DETECTIONS IN GROUND WATER

DPR conducts sampling to confirm detections of agricultural use pesticides, but does not conduct additional sampling if the detected pesticide is: 1) not registered for use in California; 2) reported in error or is an invalid detection due to unacceptable analytical variability; 3) not detected in follow-up samples taken by the reporting agency; 4) detected at a concentration below DPR's Response Threshold (less than 80 percent of DPR's analytical reporting limit); 5) regulated as a ground water contaminant under 3CCR section 6800(a) and detected in a GWPA (where use of the

²¹ To use a pesticide regulated as a ground water contaminate in a GWPA, users must obtain a Restricted Materials permit from their County Agricultural Commissioner. These permits specify the enforceable management practices required for use in each type of GWPA. For more information on GWPAs, see Appendix A.

²² For more information on pesticide monitoring ranking see: Clayton, M. 2011, *Selection of Pesticide Active Ingredients for Future Analytical Method Development and Ground Water Monitoring*. Available at: http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/analysis_memos/ai_priorities_2011_2304-ross.pdf

²³ DPR samples ground water for pesticides on the GWPL to: 1) determine if pesticides identified as potential contaminants have migrated to ground water as a result of their legal agricultural use; 2) expand Ground Water Protection Areas (GWPAs) if additional detections are made; and 3) assess the effectiveness of mitigation measures used in the GWPAs.

pesticide is regulated); 6) registered for use as a pesticide but also occurs naturally (such as copper); or 7) detected in a private well that DPR does not have permission to sample. DPR will defer sampling and place a pesticide on a “watch list” if the pesticide was detected at less than 80 percent of DPR’s analytical reporting limit, or if DPR is unable to develop an analytical method that meets the criteria necessary to validate the detection.

If detections of an active ingredient or its degradates indicate a pesticide’s legal agricultural use pollutes ground water, the findings are subject to a public [formal review process](#) to determine if the pesticide’s use can continue under modified conditions.²⁴ If it is determined use can be modified so there is a high probability it will not pollute, DPR adds the pesticide to the GWPL and requires applicators to adopt mitigation measures when applying the pesticide in GWPAs. Detections of agricultural use pesticides (or their degradates or other specified ingredients) that do not trigger the formal review process are placed on a “watch list” and tracked by DPR for changes in detection concentration or frequency.

If a detected pesticide is added to the GWPL and regulated as a ground water contaminant under 3CCR section 6800(a)—and the well is located in a GWPA—regulation of use under the Restricted Materials permit program is believed to constitute an adequate response to detections unless concentrations are high enough to indicate existing mitigation measures are not adequate to prevent pollution. If the well is not located in a GWPA, DPR may establish a GWPA that includes the well site if: 1) the well is in a section of land that is adjacent to an existing GWPA; or 2) the pesticide is detected in two or more wells within a four section area that is not adjacent to an existing GWPA.

Areas of Non-Authorization

State law does not authorize DPR to regulate pesticide use when detections in ground water are the result of manufacturing processes, accidental spills/releases or illegal disposal; DPR refers these detections to the SWRCB for further investigation.

ASSESSING THE EFFECTIVENESS OF MITIGATION MEASURES

In 1999, DPR established a well monitoring network to evaluate baseline pesticide concentrations to measure the effectiveness of ground water protection regulations. Currently, DPR’s well monitoring network includes 63 shallow, domestic wells located in runoff and/or leaching GWPAs in Fresno and Tulare counties. Preliminary analysis suggests that regulatory action taken by DPR has resulted in measurable decreases in both detection frequencies and well water concentrations for many regulated pesticides (Garretson, 1999 and 2012).

²⁴ Pesticides subject to the public review process include **aldicarb (1988); atrazine (1986); bentazon (1989); bromacil (1986); diuron (1986); hexazinone (2010); norflurazon (1998); prometon (1986); and simazine (1986)**. With the exception of aldicarb and hexazinone, it was determined the agricultural use of these pesticides could be modified so there would be a high probability that their continued use would not pollute ground water. In 1988, statewide use restrictions were adopted for aldicarb; in 2010, it was determined hexazinone had not polluted or threatened to pollute ground water in the state (based on the low detected concentrations), but continued hexazinone monitoring was recommended.

Pesticides recently placed in the formal review process include **alachlor (2016)**, and **metolachlor/S-metolachlor degradates (2016)**. The formal review ofalachlor was suspended due to the imminent federal cancellation of allalachlor products; for metolachlor/S-metolachlor degradates, the DPR director issued a Notice of Decision (July 18, 2017) stating the find of these degradates in ground water “...has not polluted and do not threaten to pollute the ground water of the state.”

SAMPLING RESULTS

DETECTIONS OF PESTICIDES AND RELATED DEGRADATES

This annual report includes well sampling data for the sampling period January through December 2016, as well as sampling performed under DPR study Z588 (September, 2015). (See Table 1.)

Nearly 4,000 wells (3,955) were sampled for one or more of the 133 agricultural use pesticides and pesticide degradates monitored. Three hundred fifty-four (354) wells tested positive for one or more pesticides/pesticide degradates; sampling efforts yielded detections of 21 pesticides/degradates. Five of the detected pesticides are not registered for use in California.

Sampling data was collected from wells in 55 counties; Del Norte, Imperial and San Francisco counties were not sampled by any agency in calendar year 2016. Sixteen counties had wells with detections. (See Appendix D for county sampling results.)

Table 1. Summary of well monitoring results.

Key: Pesticides detected Pesticides detected but not registered for use in California

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
1,2-dicloropropane (1,2-D) (propylene dichloride)	5904 57	2822 14	55 8	0.5	0.5 - 1.6	SWRCB
1,2-D + 1,3-D + C-3 pesticides	4118 --	2052 --	53 --	0.05 - 0.5	--	SWRCB
1,3-D (1,3-dichloropropene) (telone)	7797 --	2000 --	49 --	0.5	--	SWRCB
2,4-D (2,4-dichlorophenoxy-acetic acid)	794 --	680 --	34 --	0.4 - 10	--	SWRCB
2,4,5-T 2,4,5-(trichloro phenoxy acetic acid)	314 --	277 --	26 --	0.09 - 2	--	SWRCB
2,4,6-trichlorophenol	1 --	1 --	1 --	5	--	SWRCB
4(2,4-DB) dimethylamine salt	97 --	92 --	12 --	3 - 10	--	SWRCB
ACET (deisopropyl-atrazine or deethyl-simazine) (degradate of atrazine/simazine)	84 53	80 53	5 2	0.05	0.05 - 1.14	DPR
Acifluorfen	42 --	39 --	6 --	0	--	SWRCB
Alachlor	1565 --	1247 --	38 --	0 - 1	--	DPR SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Aldicarb	493 --	433 --	30 --	3	--	SWRCB
Aldicarb sulfone (degradate of aldicarb)	493 --	433 --	30 --	2 - 4	--	SWRCB
Aldicarb sulfoxide (degradate of aldicarb)	493 --	433 --	30 --	3	--	SWRCB
Aldrin	481 --	351 --	28 --	0 - 0.075	--	SWRCB
Atraton	9 --	9 --	3 --	0.5	--	SWRCB
Atrazine	1787 1	1428 1	41 1	0.05 - 0.5	0.081	DPR SWRCB
Azinphos-methyl (guthion)	10 --	9 --	2 --	0.05	--	DPR
Azoxystrobin	16 --	15 --	3 --	0.05	--	DPR
Bensulide (bentasan)	77 --	76 --	5 --	0.05	--	DPR
Bentazon	790 6	673 4	36 1	0.05 - 2	0.056 - 0.199	DPR SWRCB
BHC (other than gamma isomer)	152 --	45 --	8 --	0.005 - 0.05	--	SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Bromacil	911 33	612 18	34 3	0 - 10	0.055 - 3.77	DPR SWRCB
Butachlor	743 --	524 --	32 --	0.3 - 0.38	--	SWRCB
Captan	36 --	31 --	5 --	0.1	--	SWRCB
Carbaryl	570 --	509 --	33 --	0.05 - 5	--	DPR SWRCB
Carbofuran	773 --	667 --	37 --	0.05 - 5	--	DPR SWRCB
Carbon disulfide	1114 1	384 1	23 1	0.5	0.7	SWRCB
Carbophenothion	36 --	31 --	5 --	0	--	SWRCB
Chlordane	620 --	483 --	32 --	0.1	--	SWRCB
Chlorobenzilate	12 --	12 --	1 --	0	--	SWRCB
Chloroneb	12 --	12 --	1 --	0	--	SWRCB
Chloroethanlonil	64 --	61 --	13 --	5	--	SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Chlorpropham	31 --	26 --	5 --	0	--	SWRCB
Chlorpyrifos	2 --	2 --	1 --	0	--	SWRCB
Chlorthal-dimethyl (dacthal/DCPA)	12 --	12 --	1 --	0	--	SWRCB
Clomazone	61 --	61 --	2 --	0.05	--	DPR
Cyanazine	36 --	31 --	5 --	0	--	SWRCB
DACT (diaminochlorotriazine) (degradate of simazine)	84 55	80 55	5 2	0.05	0.057 - 8.89	DPR
Dacthal acid degradates	163 13	144 13	23 4	0 - 2	0.1 – 11.0	SWRCB
Dalapon	765 --	656 --	35 --	0 - 10	--	SWRCB
DBCP (1,2-dibromo-3-chloropropane)	3505 1215	1686 256	45 11	0.01	0.01 - 1	SWRCB
DDD (dichloro diphenyl dichloro ethane) (degradate of DDT)	50 --	45 --	8 --	0.005 - 0.02	--	SWRCB
DDE (dichloro diphenyl dichloro ethylene) (degradate of DDT)	50 --	45 --	8 --	0.005 - 0.01	--	SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
DDT (dichloro diphenyl trichloro ethane)	50 --	45 --	8 --	0.005 - 0.02	--	SWRCB
DEA (deethyl-atrazine) (degradate of atrazine)	84 2	80 2	5 1	0.05	0.83 – 0.201	DPR
Diazinon	726 --	507 --	33 --	0.025 - 2	--	DPR SWRCB
Dicamba	509 --	446 --	32 --	0.08 - 1.5	--	SWRCB
Dichloran	61 --	61 --	2 --	0.05	--	DPR
Dichlorbenil (Casaron)	61 --	61 --	2 --	0.05	--	DPR
Dichlorprop, butoxyethanol ester	51 --	48 --	9 --	0.5	--	SWRCB
Dieldrin	409 --	317 --	26 --	0.005 - 0.02	--	SWRCB
Dimethenamid	77 --	76 --	5 --	0.05	--	DPR
Dimethoate	818 --	600 --	34 --	0.05 - 10	--	DPR SWRCB
Dinoseb	776 --	662 --	35 --	0.2 - 2	--	SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Diphenamid	38 --	33 --	6 --	100	--	SWRCB
Diquat dibromide	751 DSMN--	627 --	33 --	2 - 4	--	SWRCB
Disulfoton	99 --	94 --	8 --	0 - 0.05	--	DPR SWRCB
Diuron	173 16	93 11	8 2	0.05 - 2	0.051 - 0.175	DPR SWRCB
DSMN (desmethyl norflurazon) (degradate of norflurazon)	84 29	80 29	5 2	0.05	0.06 – 0.838	DPR
Endosulfan	51 --	46 --	9 --	0.005 - 0.1	--	SWRCB
Endosulfan II	50 --	45 --	8 --	0.005 - 0.01	--	SWRCB
Endosulfan sulfate (degradate)	51 --	45 --	8 --	0.005 - 0.05	--	SWRCB
Endothall	614 --	507 --	33 --	2 - 45	--	SWRCB
Endrin	630 --	488 --	32 --	0.005 - 0.1	--	SWRCB
Endrin aldehyde	50 --	45 --	8 --	0.01 - 0.05	--	SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
EPTC (S-ethyl-dipropylthiocarbamate)	53 --	46 --	10 --	0 - 0.1	--	SWRCB
Ethion	9 --	7 --	2 --	0	--	SWRCB
Ethofumesate	77 --	76 --	5 --	0.05	--	DPR
Ethoprop (prophos)	61 --	61 --	2 --	0.05	--	DPR
Ethyl Alcohol	1 --	1 --	1 --	0	--	SWRCB
Ethylene dibromide (EDB)	3063 26	1583 5	37 3	0 - 0.02	0.023 - 0.22	SWRCB
Fenamiphos	71 --	70 --	4 --	0.05	--	DPR
Fludioxonil	77 --	76 --	5 --	0.05	--	DPR
Fonofos (dyfonate)	61 --	61 --	2 --	0.05	--	DPR
Glyphosate	521 --	415 --	31 --	20 - 25	--	SWRCB
Heptachlor	623 --	485 --	32 --	0 - 0.01	--	SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Heptachlor epoxide	622 --	484 --	32 --	0.005 - 0.01	--	SWRCB
Hexachlorobenzene	791 --	581 --	34 --	0.01 - 0.5	--	SWRCB
Hexazinone	84 --	80 --	5 --	0.05	--	DPR
Hydroxycarbofuran (degradate of carbofuran)	488 --	428 --	30 --	3	--	SWRCB
Imidacloprid	99 6	81 4	5 1	0.05	0.066 - 0.644	DPR
Imidacloprid guanidine (degradate of imidacloprid)	22 --	22 --	1 --	0.05	--	DPR
Imidacloprid olefin (degradate of imidacloprid)	22 --	22 --	1 --	0.2	--	DPR
Imidacloprid olefinic-guanidine (degradate of imidacloprid)	22 --	22 --	1 --	0.05	--	DPR
Imidacloprid urea (degradate of imidacloprid)	22 --	22 --	1 --	0.05	--	DPR
Lindane (gamma-BHC)	721 --	533 --	34 --	0.005 - 0.2	--	SWRCB
Linuron	77 --	76 --	5 --	0.05	--	DPR

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Malathion	237 --	145 --	4 --	0 - 0.05	--	DPR SWRCB
MCPA	1 --	1 --	1 --	10	--	SWRCB
MCPP 2-(4-chloro-2-methylphenoxy) propionic acid	1 --	1 --	1 --	10	--	SWRCB
Metalaxyl	77 --	76 --	5 --	0.05	--	DPR
Methiocarb	247 --	232 --	28 --	0.05 - 5	--	DPR SWRCB
Methomyl	487 --	427 --	30 --	2	--	SWRCB
Methoxychlor	723 1	533 1	34 1	0 - 10	110	SWRCB
Methyl bromide	3571 1	1848 1	52 1	0 - 0.5	0.52	SWRCB
Methyl parathion	237 --	145 --	4 --	0 - 0.05	--	DPR SWRCB
Metolachlor	835 --	605 --	35 --	0.05 - 10	--	DPR SWRCB
Metolachlor ESA (degradate of metolachlor)	7 5	6 4	1 1	0.05	0.119 - 1.67	DPR

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Metolachlor OXA <i>(degradate of metolachlor)</i>	7 3	6 2	1 1	0.05	0.05 - 0.609	DPR
Metribuzin	827 --	605 --	35 --	0.05 - 1	--	DPR SWRCB
Molinate	1178 --	870 --	38 --	0 - 2	--	SWRCB
Napropamide	77 --	76 --	5 --	0.05	--	DPR
Norflurazon	161 27	81 16	5 2	0.05	0.052 - 0.446	DPR
Ortho-dichlorobenzene	5899 --	2821 --	55 --	0.5	--	SWRCB
Oryzalin	77 --	76 --	5 --	0.05	--	DPR
Oxamyl	701 --	596 --	33 --	5 - 20	--	SWRCB
Paraquat dichloride	2 --	2 --	1 --	20	--	SWRCB
Parathion / Ethyl parathion	237 --	145 --	4 --	0 - 0.05	--	DPR SWRCB
PCNB (pentachloronitrobenzene)	9 --	7 --	2 --	0.1	--	SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Permethrin	12 --	12 --	1 --	0	--	SWRCB
Permethrin, other related compounds	12 --	12 --	1 --	0	--	SWRCB
Phorate	61 --	61 --	2 --	0.05	--	DPR
Picloram	765 --	656 --	35 --	0.05 - 1	--	SWRCB
Piperonyl Butoxide	61 --	61 --	2 --	0.05	--	DPR
Prometon	340 2	201 1	13 1	0.05 - 0.5	0.07 - 0.09	DPR SWRCB
Prometryn	378 --	275 --	21 --	0.05 - 2	--	DPR SWRCB
Propachlor	797 --	560 --	32 --	0.5	--	SWRCB
Propanil	61 --	61 --	2 --	0.05	--	DPR
Propoxur	170 --	156 --	23 --	0 - 5	--	SWRCB
Secbumeton	9 --	9 --	3 --	0.5	--	SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Silvex	760 --	651 --	34 --	0.07 - 1	--	SWRCB
Simazine	1859 62	1436 35	42 2	0.05 - 1	0.051 - 0.158	DPR SWRCB
Tebuthiuron	95 --	76 --	5 --	0.05	--	DPR
Terbacil	89 --	78 --	13 --	0 - 0.1	--	SWRCB
Terbutryn	9 --	9 --	3 --	0.5	--	SWRCB
Tetrachloroethane	5896 --	2821 --	55 --	0.5	--	SWRCB
Thiamethoxam	77 --	76 --	5 --	0.05	--	DPR
Thiobencarb	1580 --	1159 --	42 --	0.05 - 1	--	DPR SWRCB
Toxaphene	623 --	484 --	32 --	0.5 - 1	--	SWRCB
Triallate	61 --	61 --	2 --	0.05	--	DPR
Trifluralin	52 --	47 --	7 --	0	--	SWRCB

Pesticide or Degradate	Samples Taken	Wells Sampled	Counties Sampled	‡ Reporting Limit (ppb)	Detected Concentration Range (ppb)	Sampling Agency(s)
	Positive Samples	Wells with Detections	Counties with Detections			
Uniconazole	77 --	76 --	5 --	0.05	--	DPR
Vernolate	6 --	6 --	2 --	1	--	SWRCB

‡ Some detection values listed in this table are below the reporting limit. Each reporting agency determines the value they will report regardless of “accepted” reporting limits. For instance, the SWRCB may report *estimated values*, which can be below reporting limits.

DPR RESPONSES TO PESTICIDE DETECTIONS

As required under the PCPA (FAC section 13152[e][4]), this section of the annual report describes actions taken by DPR to mitigate the detection of agricultural use pesticides in ground water (Table 2).

Of the 21 agricultural use pesticide/degradate detections reported in 2016, 11 are pesticides (or degradates of a parent compound) listed in 3CCR 6800(a) that are regulated as ground water contaminants within GWPAs; three pesticides/degradates are listed in 3CCR 6800(b) as potential ground water contaminants, two are not listed under 3CCR 6800(a) or (b), and five are not registered for use in California.

Table 2. DPR response to agricultural use pesticide detections reported in 2016, including detections made under DPR study Z588 (September, 2015).

Pesticide	Wells with Detections	Registration Status / DPR Detection Response to Detections in Wells
1,2-dichloropropane (1,2-D) (propylene dichloride)	14	Not registered for use in California.
ACET (deisopropyl-atrazine or deethyl-simazine) <i>(degradate of atrazine, simazine)</i>	53	Parent pesticides are on the GWPL [†] , 3CCR 6800(a). [‡] All fifty-three (53) wells with detections are in GWPAs. Pesticide applications in GWPAs are made under the authority of the [‡] Restricted Materials permit program (applications are managed by County Agricultural Commissioners).
Atrazine	1	Pesticide is on the GWPL, 3CCR 6800(a). One (1) well with a detection is in a GWPA.
Bentazon	4	Pesticide is on the GWPL, 3CCR 6800(a), and listed in 3CCR section 6457. These four (4) detections are the first detections made outside of rice growing areas. The detections will be evaluated under DPR's formal review process.
Bromacil	18	Pesticide is on the GWPL, 3CCR 6800(a). Seventeen (17) wells with detections are in GWPAs; one (1) detection is being evaluated under DPR study GW15.
Carbon disulfide	1	Not registered for use in California.

Pesticide	Wells with Detections	Registration Status / DPR Detection Response to Detections in Wells
DACT (diaminochlorotriazine) (degradate of simazine)	55	Parent pesticide is on the GWPL, 3CCR 6800(a). All fifty-five (55) wells are in GWPAs.
Dacthal acid degradates	13	Parent pesticide is not listed on the GWPL 3CCR 6800(a) or (b). DPR is conducting a field study for dacthal and dacthal acid degradates.
DBCP	256	Not registered for use in California.
DEA(deethyl-atrazine) (degradate of atrazine)	2	Parent pesticide is on the GWPL, 3CCR 6800(a). All wells (2) with detections are in GWPAs.
Diuron	11	Pesticide is on the GWPL, 3CCR 6800(a). All eleven (11) wells with detections are in GWPAs.
DSMN (desmethyl-norflurazon) (degradate of norflurazon)	29	Parent pesticide is on the GWPL, 3CCR 6800(a). All twenty-nine (29) wells with detections are in GWPAs.
Ethylene dibromide (EDB)	5	Not registered for use in California.
Imidacloprid	4	Pesticide is on the GWPL, 3CCR 6800(b). Based on five previous detections in Fresno County, DPR expanded testing and detected imidacloprid in four (4) additional wells. All wells are in GWPAs. DPR study GW17 is being conducted to expand the area tested for imidacloprid.
Methoxychlor	1	Not registered for use in California.
Methyl bromide	1	This pesticide is not listed on the GWPL 3CCR 6800(a) or (b)—it is regulated as a California Restricted Material. DPR will evaluate the detection if a second detection is made in this well.

Pesticide	Wells with Detections	Registration Status / DPR Detection Response to Detections in Wells
Metolachlor ESA <i>(degradate of metolachlor)</i>	4	Parent pesticide is on the GWPL, 3CCR 6800(b). Detections of this degradate are currently under investigation by DPR.
Metolachlor OXA <i>(degradate of metolachlor)</i>	2	Parent pesticide is on the GWPL, 3CCR 6800(b). Detections of this degradate are currently under investigation by DPR.
Norflurazon	16	Pesticide is on the GWPL, 3CCR 6800(a). All sixteen (16) wells with detections are in GWPAs.
Prometon	1	Pesticide is on the GWPL, 3CCR 6800(a). This well is in a GWPA.
Simazine	35	Pesticide is on the GWPL, 3CCR 6800(a). All thirty-five (35) wells with detections are in GWPAs.

† Pesticides on the Ground Water Protection List (GWPL) 3CCR 6000(a) and (b) are those labeled for agricultural, outdoor institutional, or outdoor industrial use that have the potential to pollute ground water. Sublist 6800(a) includes seven agricultural herbicides—atrazine, bentazon, bromacil, diuron, norflurazon, prometon, and simazine. Sublist 6800(b) includes 98 pesticides that have the potential to become ground water contaminants based on their mobility, persistence and legal uses.

If the detected pesticide is regulated as a ground water contaminant under 3CCR 6800(a)—and the well is located in a GWPA where use of the pesticide is regulated—current regulation of use is believed to constitute an adequate response to new detections *unless* concentrations are high enough to indicate existing mitigation measures are not adequate to prevent *pollution*. (“Pollution” is defined in FAC section 13142 as “...the consequence of polluting,” and “pollute” means “to introduce a pesticide product into the groundwaters of the state resulting in an active ingredient, other specified ingredient, or a degradation product of a pesticide above a level that does not cause adverse health effects, accounting for an adequate margin of safety.”)

‡ DPR does not investigate detections that occur within GWPAs for pesticides that are on the 6800(a) list of known ground water contaminants.²⁵ Applications of these pesticides in GWPAs are managed by County Agricultural Commissioners via the **Restricted Materials** permit program. This program requires users to modify their pesticide use practices based on soil properties of the GWPA.

²⁵ Schuette, J. 2004. *Summary of Program Policies Specifying When the Director Will Not Determine if a Detection Was the Result of Legal, Agricultural Use (“N” Memorandum)*. Department of Pesticide Regulation, Environmental Monitoring Branch. December 1, 2004.

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