Protecting Ground & Surface Water from Pesticide Contamination

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Mariposa County Department of Agriculture
History of Ground Water Protection
History of Surface Water Protection
Title 3, California Code of Regulation (3CCR) 6800
Title 3, California Code of Regulation (3CCR) 6970
Title 3, California Code of Regulation (3CCR) 6909
Quiz
Pesticide Contamination Prevention Act (1985)

Purpose: to prevent further pollution of groundwater due to agricultural use of pesticides
Surface Water Regulations became effective on July 19, 2012

- Pesticide runoff to surface water is a significant source of aquatic toxicity
- Purpose- Reduce surface water contamination from pyrethroid insecticides. Aquatic life is very sensitive to pyrethroids.
What is a pesticide?

A pesticide is any substance, or mixture of substances which is intended to be used for preventing, destroying, repelling or mitigating any pest, any plant growth regulator, and any "SPRAY ADJUVANT" which is used with a pesticide and is intended to be an aid to the application or effect of the pesticide. This includes materials used to control fungus, rust, mildew, insects, mites, weeds, snails, gophers, mice, moles, ground squirrels, and any other pests. (FAC 12753, 12758)

Any substance that will mitigate a pest.
Back to the Basic (con’t)

* Regulated Pesticides

* Obvious
  * Herbicides
  * Insecticides
  * Fungicides
  * Rodenticides
  * Miticides

* Not-So Obvious
  * Adjuvants
  * Biopesticides
  * Defoliants
  * Desiccants
  * Disinfectants
  * Insect & Plant Growth Regulators
  * Pheromones
  * Wood Preservatives
  * Repellants
Pesticide Products VS Ingredients

* >1,000 registered active ingredients
* >13,000 registered pesticide products
3 CCR 6800 Ground Water Protection List

- Pesticides labeled for agricultural, outdoor institutional or outdoor industrial use that contain any of the following chemicals are designated as having the potential to pollute ground water:
(a) The following chemicals detected in ground water or soil pursuant to section 13149 of the Food and Agricultural Code – “The Pesticide Contamination Prevention Act”

* (1) Atrazine
* (2) Simazine
* (3) Bromacil
* (4) Diuron, except for products with less than 7% diuron that are applied to foliage
* (5) Prometon
* (6) Bentazon (Basagran®)
* (7) Norflurazon
(b) The following chemicals identified pursuant to section 13145(d) of the Food and Agricultural Code

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Formulation</th>
</tr>
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<tbody>
<tr>
<td>Acephate</td>
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<tr>
<td>Alachlor</td>
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<tr>
<td>Aldicarb</td>
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<tr>
<td>Aminocyclopyrachlor</td>
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<tr>
<td>Aminocyclopyrachlor, potassium salt</td>
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<tr>
<td>Aminopyralid, triisopropanolamine salt</td>
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<tr>
<td>Azoxystrobin</td>
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<tr>
<td>Bensulfuron methyl</td>
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<tr>
<td>Bensulide</td>
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<tr>
<td>Bispyribac-sodium</td>
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<tr>
<td>Boscalid</td>
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<td>Carbaryl</td>
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<td>Chlorantraniliprole</td>
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<td>Chloropicrin</td>
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<td>Chlorothalonil</td>
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<td>Chlorsulfuron</td>
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<td>Clomazone</td>
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<tr>
<td>Clothianidin</td>
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<tr>
<td>Cycloate</td>
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<tr>
<td>Cyprodinil</td>
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<tr>
<td>2,4-D, 2-ethylhexyl ester</td>
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<tr>
<td>2,4-D, diethanolamine salt</td>
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<tr>
<td>2,4-D, dimethylamine salt</td>
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<td>2,4-D, isoctyl ester</td>
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<tr>
<td>Dazomet</td>
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<td>Diazinon</td>
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<td>Dicamba, diglycolamine salt</td>
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<tr>
<td>Dicamba, dimethylamine salt</td>
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<tr>
<td>Dicamba, sodium salt</td>
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<td>Dichlobenil</td>
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<td>Dichloran</td>
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<td>Dimethenamid-P</td>
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<td>Dimethoate</td>
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<td>Dimethomorph</td>
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<td>Dinotefuran</td>
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<td>Dithiopyr</td>
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<td>EPTC</td>
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<td>Ethofumesate</td>
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<td>Ethoprop</td>
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<tr>
<td>Fenamidone</td>
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<td>Flazasulfuron</td>
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<td>Fludioxonil</td>
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<td>Fluopicolide</td>
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<td>Flutolanil</td>
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<td>Fosetyl-Al (aluminum tris)</td>
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<tr>
<td>Fosthiazate</td>
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<td>Halosulfuron-methyl</td>
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<tr>
<td>Hexazinone</td>
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<td>Imazamox, ammonium salt</td>
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<tr>
<td>Imazapyr, isopropylamine salt</td>
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<tr>
<td>Imazethapyr, ammonium salt</td>
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</tbody>
</table>
3CCR 6800(b)

(b) The following chemicals identified pursuant to section 13145(d) of the Food and Agricultural Code

* Imidacloprid
* Indaziflam
* Iprodione
* Isoxaben
* Linuron
* Malathion
* Mefenoxam
* Mesotrione
* Metalaxyl
* Metaldehyde
* Metconazole
* Methiocarb
* Methomyl
* Metolachlor
* (S)-Metolachlor
* Metribuzin
* Myclobutanil
* Napropamide
* Nitrapyrin
* Orthosulfamuron
* Oryzalin
* Penoxsulam
* Phorate
* Prometryn
* Propamocarb hydrochloride
* Propanil
* Propiconazole
* Propyzamide
* Prothioconazole
* Pyraclostrobin
* Pyrazon
* Rimsulfuron
* Siduron
* Sulfentrazone
* Sulfometuron-methyl
* Tebuconazole
* Tebuthiuron
* Thiamethoxam
* Thiencarbazone-methyl
* Thiobencarb
* Thiophanate methyl
* Triadimefon
* Triallate
* Triclopyr, butoxyethyl ester
* Triclopyr, triethylamine salt
* Triflumizole
* Triticonazole
6970. Surface Water Protection in Outdoor Nonagricultural Settings

The provisions of this section apply to any person performing pest control for hire, including landscape maintenance gardeners, when any of the following pesticides is applied outdoors to structural, residential, industrial, and institutional sites:

- bifenthrin
- bioallethrin
- S-bioallethrin
- cyfluthrin
- beta-cyfluthrin
- gamma-cyhalothrin
- lambda-cyhalothrin
- cypermethrin
- deltamethrin
- esfenvalerate
- fenpropathrin
- tau-fluvalinate
- permethrin
- phenothrin
- prallethrin
- resmethrin
- tetramethrin
# 17 Regulated Pyrethroids: The Six A.I.s “Least Affected”

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Product Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioallethrin</td>
<td>Ace Wasp/Hornet Killer</td>
</tr>
<tr>
<td>S-bioallethrin</td>
<td>Zep Ant &amp; Roach Spray</td>
</tr>
<tr>
<td>Phenothrin</td>
<td>Wasp &amp; Hornet Killer</td>
</tr>
<tr>
<td>Prallethrin</td>
<td>Flying Insect Spray</td>
</tr>
<tr>
<td>Resmethrin</td>
<td>Black Flag Fogging Insecticide</td>
</tr>
<tr>
<td>Tetramethrin</td>
<td>Ortho Hornet/Wasp Killer 4</td>
</tr>
</tbody>
</table>
### 17 Regulated Active Ingredients: The 11 Most Affected

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Product Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bifenthrin</td>
<td>Talstar</td>
</tr>
<tr>
<td>Cyfluthrin</td>
<td>Tempo 20 WP</td>
</tr>
<tr>
<td>Beta-cyfluthrin</td>
<td>Tempo SC, Cyguard</td>
</tr>
<tr>
<td>Gamma-cyhalothrin</td>
<td>Standguard</td>
</tr>
<tr>
<td>Lambda-cyhalothrin</td>
<td>Demand, Cyonara</td>
</tr>
<tr>
<td>Cypermethrin</td>
<td>Demon Max</td>
</tr>
<tr>
<td>Deltamethrin</td>
<td>Enforcer, Deltagard</td>
</tr>
<tr>
<td>Esfenvalerate</td>
<td>Ortho Bug B Gon</td>
</tr>
<tr>
<td>Fenpropathrin</td>
<td>Tame</td>
</tr>
<tr>
<td>Tau-fluvalinate</td>
<td>Mavrik</td>
</tr>
<tr>
<td>Permethrin</td>
<td>Dragnet, Raid</td>
</tr>
</tbody>
</table>
Only pesticide applications
that meet all of the following criteria:

- **outdoor applications**
- **to non-agricultural sites** (including structural, residential, industrial, and institutional)
- **any of the 17 listed pyrethroids**
- **by persons performing pest control for hire** (pest control businesses, including landscape maintenance gardeners)
Applications to soft surfaces

Applications to various hard horizontal surfaces, plus doors and windows

Applications to vertical surfaces other than doors and windows

Prohibited applications (broadcast spraying on pervious surface)
**Surface Water Regulations:**

- **Limited to 4 options:**
- **Spot** treatments; or
- **Pin stream** treatments of 1” wide or less; or
- **Perimeter band** treatments < 3 feet outward from the base of a building;
- **Broadcast** treatments, but **not** within 2 feet of horizontal impervious surfaces
  - Pin stream treatments of ≤1” can be made within the 2-foot no-broadcast-treatment zone
Surface Water Regulations:

* Broadcast preconstruction termiticide treatments done prior to precipitation...
  * Site must be covered w/waterproof covering OR concrete slab must be poured over treated soil.
If you apply a granular pyrethroid pesticide, any granules that land on horizontal impervious surfaces must be swept back onto treatment site.
Regulated Applications to horizontal impervious surfaces and doors/windows

**Limited to:**

- Spot treatment
- Crack and crevice
- Pin stream of 1 inch or less
Regulated Applications to vertical surfaces other than doors, or windows

Limited to:

* Spot treatments
* Crack and crevice
* Pin stream of 1 inch or less
* Perimeter band treatment up to a max. of 2 feet above grade level*

* DPR reg more restrictive than U.S. EPA label (3 feet above grade level)
Prohibited Applications

* No applications **during** rainfall (except those to the underside of eaves)
* No applications to any **horizontal surface** (including the soil surface, mulch, gravel, lawn, turf, groundcover, or horizontal impervious surfaces) **with standing water**, including puddles
**Surface Water Regulations:**

- No applications to sewer or storm drains or curbside gutters
- No applications to constructed drainage systems that drain to a sewer/storm drain, curbside gutter, or aquatic habitat.
**Surface Water Regulations:**

- **Constructed Drainage Systems**
  - **Example:** Visible drainage grate connected to drain pipe
  - **Another Example:** Visible French drain, landscaped dry river bed, swale or trench filled with gravel or rock
Surface Water Regulations:

- No applications to any horizontal surface (soil, turf, impervious, etc., or preconstruction)
- Within 25 feet of aquatic habitat located downgradient from the application site
Surface Water Regulations:

- No applications to a preconstruction termiticide site
  - Within 10 feet of a storm drain located downgradient from the application

- No applications to plants/trees/shrubs if standing water is in the dripline or “perimeter” area of those plants
SURFACE WATER REGULATIONS: EXEMPTIONS

* Application Exemptions
  * Injections into soil or structural materials (concrete, wood)
  * Post-construction rod / trench termiticide apps
  * Applications to below-ground insect nests made of mud or paper comb
  * Applications of baits to weather-proof bait stations or applied as “gel baits”
  * Applications to receiving waters for which a NPDES* permit has been issued
    * For pesticide discharges to waters of the U.S. from spray applications and vector control applications
  * Applications to the **underside** of eaves
  * Fogger and aerosol applications
(a) Except as provided in subsection (b), the following activities shall be prohibited within 100 feet of a well (including domestic, municipal, agricultural, dry or drainage, monitoring, or abandoned wells):

* (1) mixing, loading, and storage of pesticides.
* (2) rinsing of spray equipment or pesticide containers.
* (3) maintenance of spray equipment that could result in spillage of pesticide residues on the soil.
* (4) application of preemergent herbicides.
(b) Wells shall not be subject to the requirements in (a) if they are:

1. sited so that runoff water from irrigation or rainfall does not move from the perimeter of the wellhead toward the wellhead and contact or collect around any part of the wellhead including the concrete pad or foundation; or

2. protected by a berm constructed of any material sufficient to prevents movement of surface runoff water from the perimeter of the wellhead to the wellhead.

(c) Application of preemergent herbicides shall be prohibited between the berm and the wellhead.
What Does CCR 6609 Mean?

- Prohibitions within 100 feet of a well
  - Including domestic, municipal, agricultural, dry or drainage, monitoring or abandoned wells

- No mixing, loading, or storage of pesticides
- Rinsing pesticide spray equipment or containers
- Maintenance of equipment
- Application of preemergent herbicides
Why???

* Pesticides listed in CCR 6800 have contaminated ground water
  * At a Point Source
  * Non-Point Source
Point Source

* Pesticide application near a well
* Pesticide spills from mixing and loading
* Runoff towards the well
Non-Point Source

* Leaching
How does ground water get contaminated? – Non-Point Source

- Leaching
- Soil type
How does ground water get contaminated? – Non-Point Source

* Leaching
* Solubility of pesticide
How does ground water get contaminated? – Non-Point Source

* Leaching
* Persistence of the pesticide

Initial amount
100%

After 1st half-life,
50% remains

After 2nd half-life,
25% remains

After 3rd half-life,
~12% remains

After 4th half-life,
~6% remains

After 5th half-life,
~3% remains
What Does CCR 6609 Mean?
Preemergent Herbicides

* Mode Of Action
  * Kills the germinating seed
  * Sprayed on bare soil
  * Not very water soluble
  * Persistent

* Rain or irrigation
  * Not going to leach through the soil
  * It will runoff

* Nearby well
  * It will run over to the well and seep down the outside of the well casing.
What Does CCR 6609 Mean? Preemergent Herbicides

- Examples of Preemergent Pesticides Allowed Within 100 Feet of a Well
  - Oxyfluorfen – such as Goal
  - Pendimethalin - such as Pendulum
  - Prodiamine – such as Barricide
  - Flumioxazin – such as Chateau
  - Oxadiazon – such as Rhonstar
these restrictions do not apply if
  - well sited so no runoff contacts well, or
  - berm constructed to divert runoff away from well
Wellhead Protection From Runoff

- What: 1. prohibit pesticide mixing, loading, storage, etc., within 100 feet of well
What Does CCR 6609 Mean?

Exemptions

* Exception: these restrictions do not apply if:
  * well sited so no runoff contacts well, or
  * berm constructed to divert runoff away from well
What Does CCR 6609 Mean?
Wellhead Protection Exceptions
Example of Berms

Concrete Pad

Concrete Pad Below the Soil

Concrete Pad Above the Soil
Example of Berms

Berms with no concrete pad

Berms should not touch casing
Example of Berms

On sloped ground, Berms may only be needed on the up-slope side.
QUIZ TIME