# Protecting Urban Water Quality: New Surface Water Regulations 2012

Michael Ensminger, Ph.D.
Department of Pesticide Regulation
Environmental Monitoring
Surface Water Protection Program
Sacramento, CA

January 25, 2013

dpr

# Outline

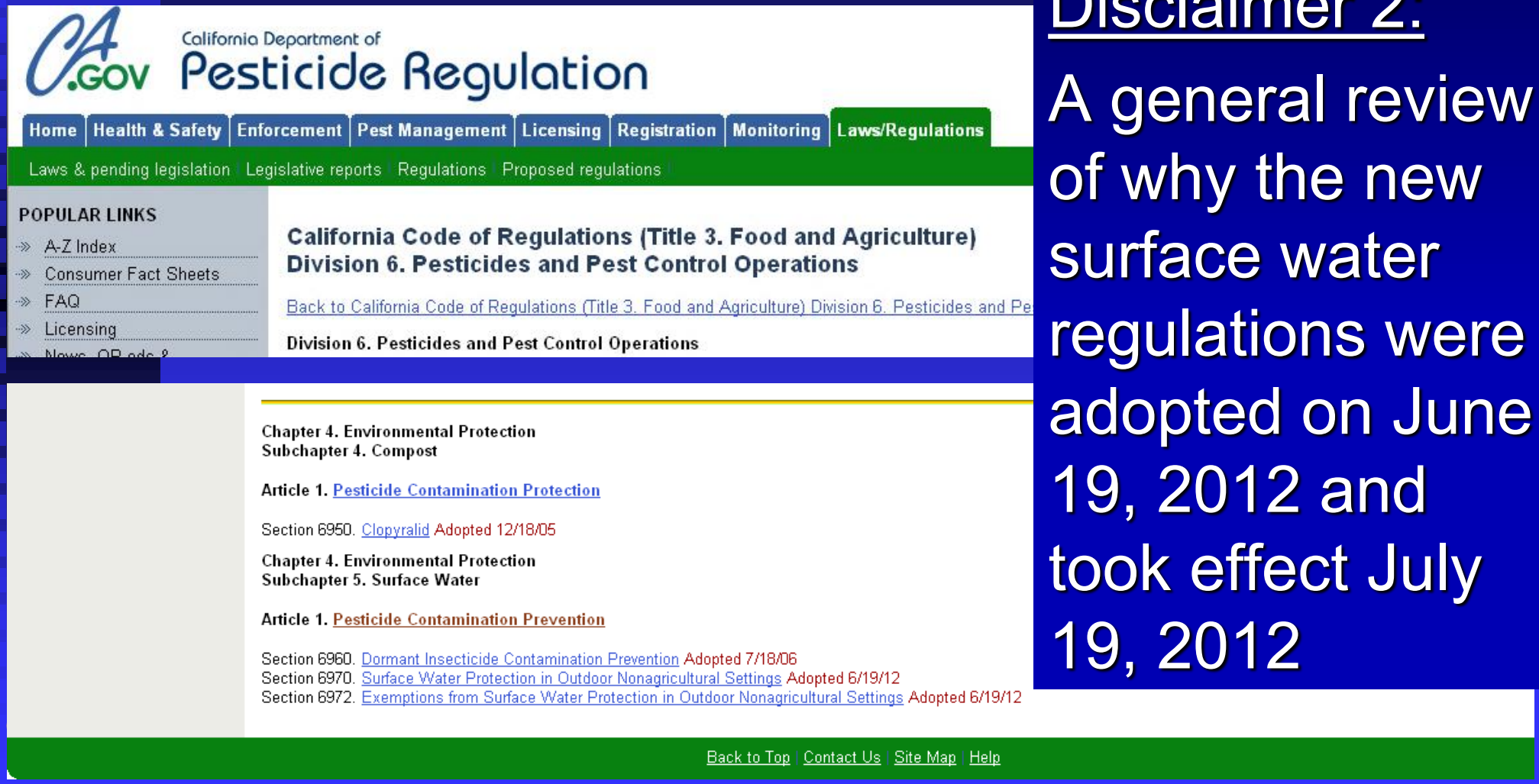
I. What is this talk about? - Disclaimers
II. Why are we discussing insecticides?
III. What are pyrethroids?
IV. Why are they a concern?
V. Generalities of Surface Water Regulations

# I. What this talk is NOT!

## Disclaimer 1:

Not an enforcement talk on the new pyrethroid surface water regulations

# I. What this talk IS:

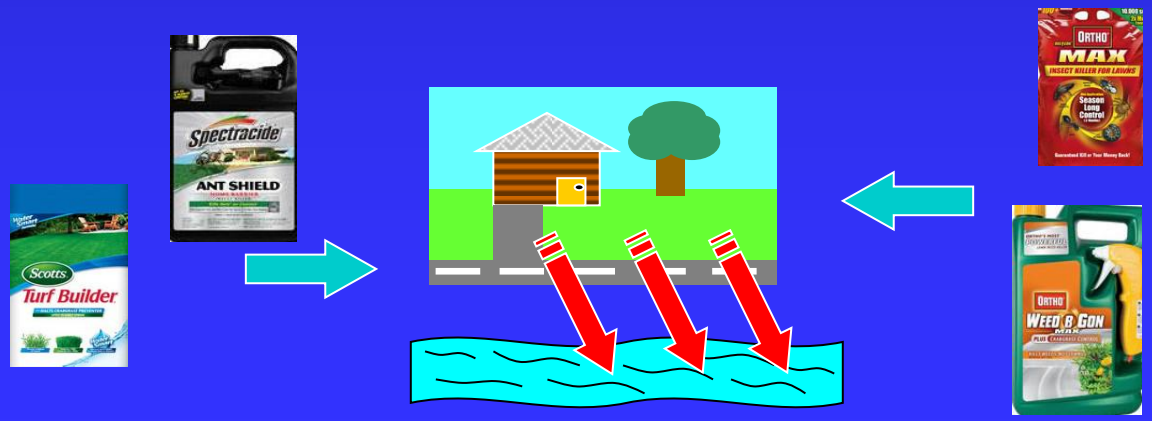



## Disclaimer 2:

A general review of why the new surface water regulations were adopted on June 19, 2012 and took effect July 19, 2012

# II. Why am I discussing insecticides at a herbicide meeting?

- General information to “any person performing pest control for hire”
- Knowledge and caution for general pesticide applications
  - Urban use pesticides can end up in surface waters



# II. Why am I discussing insecticides at a herbicide meeting?

- Surface Water Regulations
  - 2010: Draft regulatory concept
    - Prevent or reduce surface water contamination by *pesticides*
    - Various Workshops
    - 2012: Regulations re-written to include only *pyrethroid insecticides*

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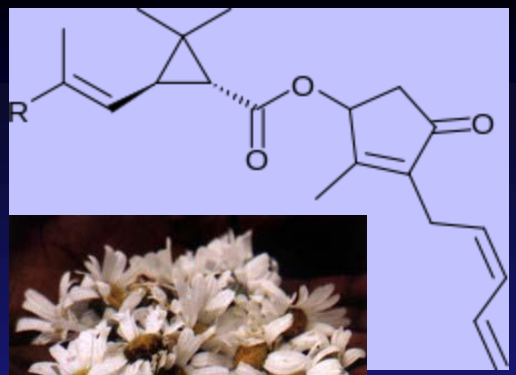
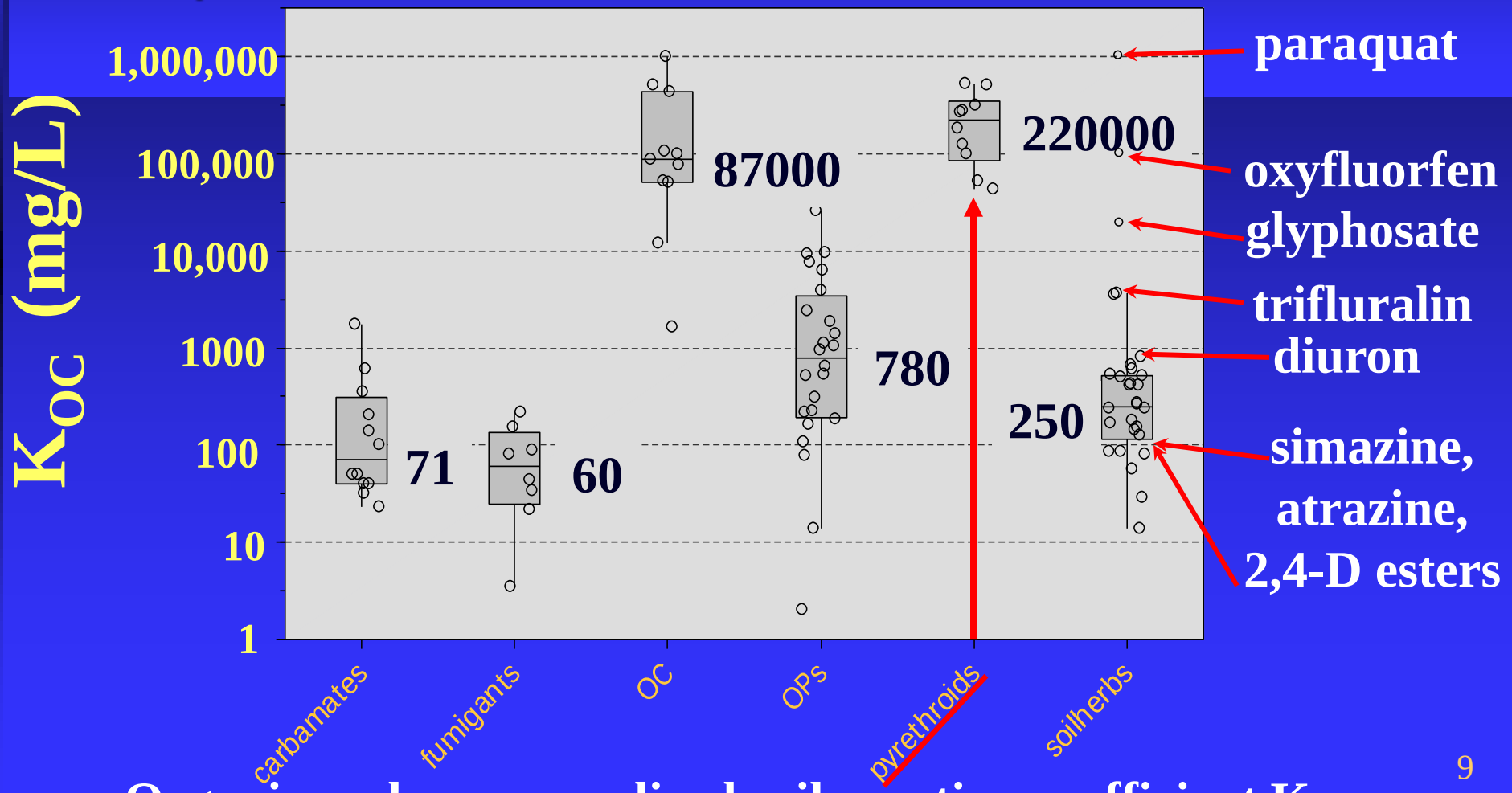
# III. What are Pyrethroids?



- Synthetic forms of pyrethrins
- Synthetic forms developed for increased persistence, toxicity
- Moderate to lengthy persistence
  - Soil half-life: ~1 week to > 1 year
- Low volatility
- Agriculture and non-Ag uses

# III. What are Pyrethroids?

- Highly hydrophobic – associate with suspended and bed sediments




Organic carbon-normalized soil sorption coefficient $K_{OC}$

# III. What are Pyrethroids?

- Controls crawling, flying, chewing insects
  - Ants, cockroaches, fleas

Pictures: http://www.pwg2pmp.com/

# III. What are Pyrethroids?

- Controls crawling, flying, chewing insects
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  - Mosquitos, wasps, hornets, flies, bees

http://www.ipm.ucdavis.edu/

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http://www.orkin.com/termites/

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Pictures: http://www.ipm.ucdavis.edu/PMG/NE/

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- Controls crawling, flying, chewing insects
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  - Beetles, borers, caterpillars
- Arachnids: mites, ticks, spiders

http://www.ipm.ucdavis.edu/PMG/NE/

http://www.pwg2pmp.com/

http://www.ento.csiro.au/education/allies/araneae.html

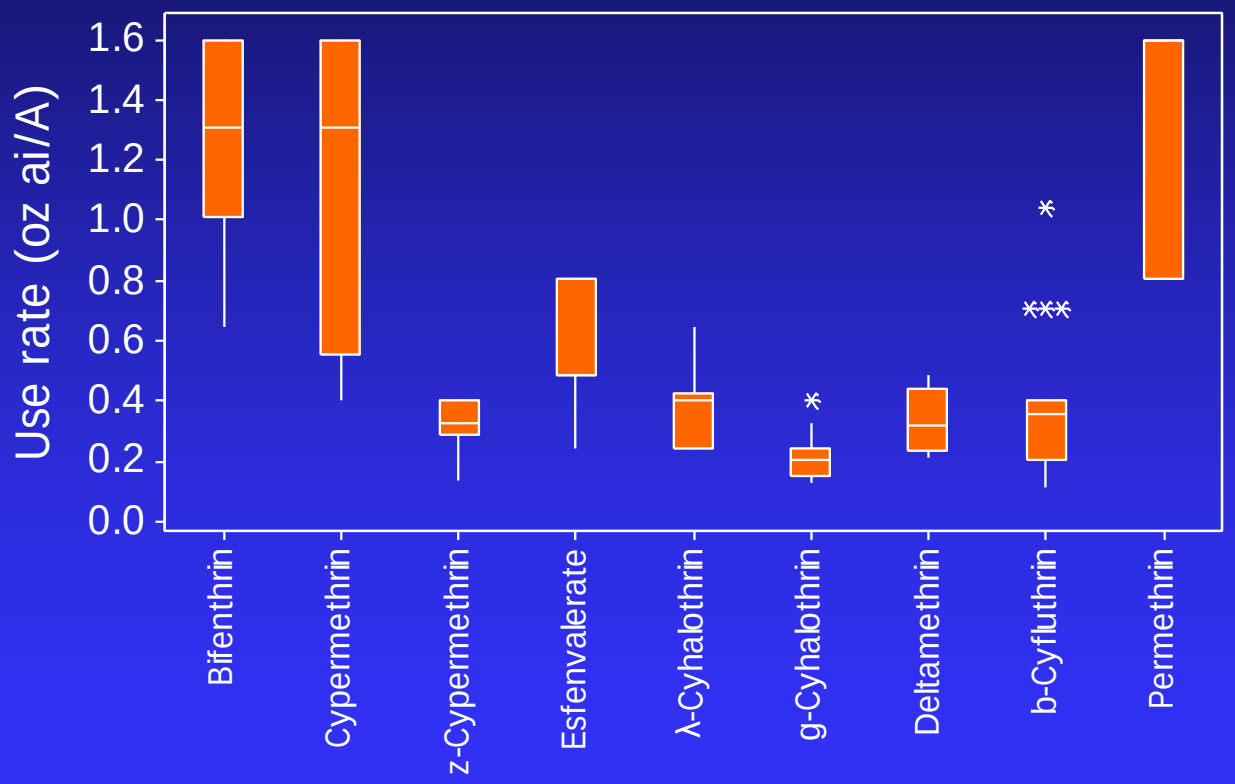
# III. What are Pyrethroids?

- Controls crawling, flying, chewing insects
  - Ants, cockroaches, fleas
  - Mosquitos, wasps, hornets, flies, bees
  - Termites
  - Beetles, borers, caterpillars
- Arachnids: mites, ticks, spiders
- Millipedes and centipedes

http://en.wikipedia.org/wiki//

# III. What are Pyrethroids?

- Highly active – low use rate




Recommended use rates, control of bollworms, cutworms, stinkbugs, alfalfa hopper, spider mites, beetles, grasshoppers, cloverworm, looper, earworm, armyworm in corn, soybean: UT @http://www.utcrops.com/cotton/cotton_insects/InsectBook.htm

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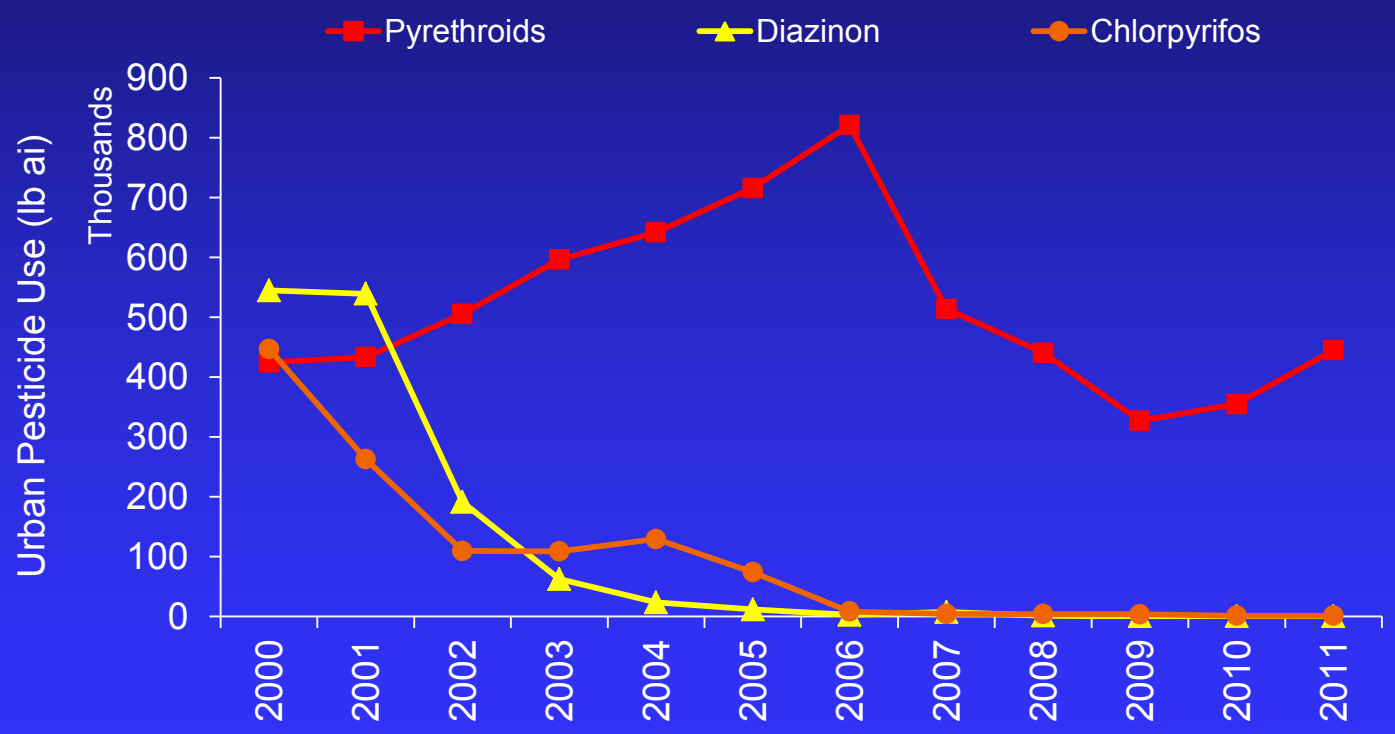
# IV. Why are Pyrethroids a concern in surface waters?

## 1. Pyrethroids have high use in urban areas

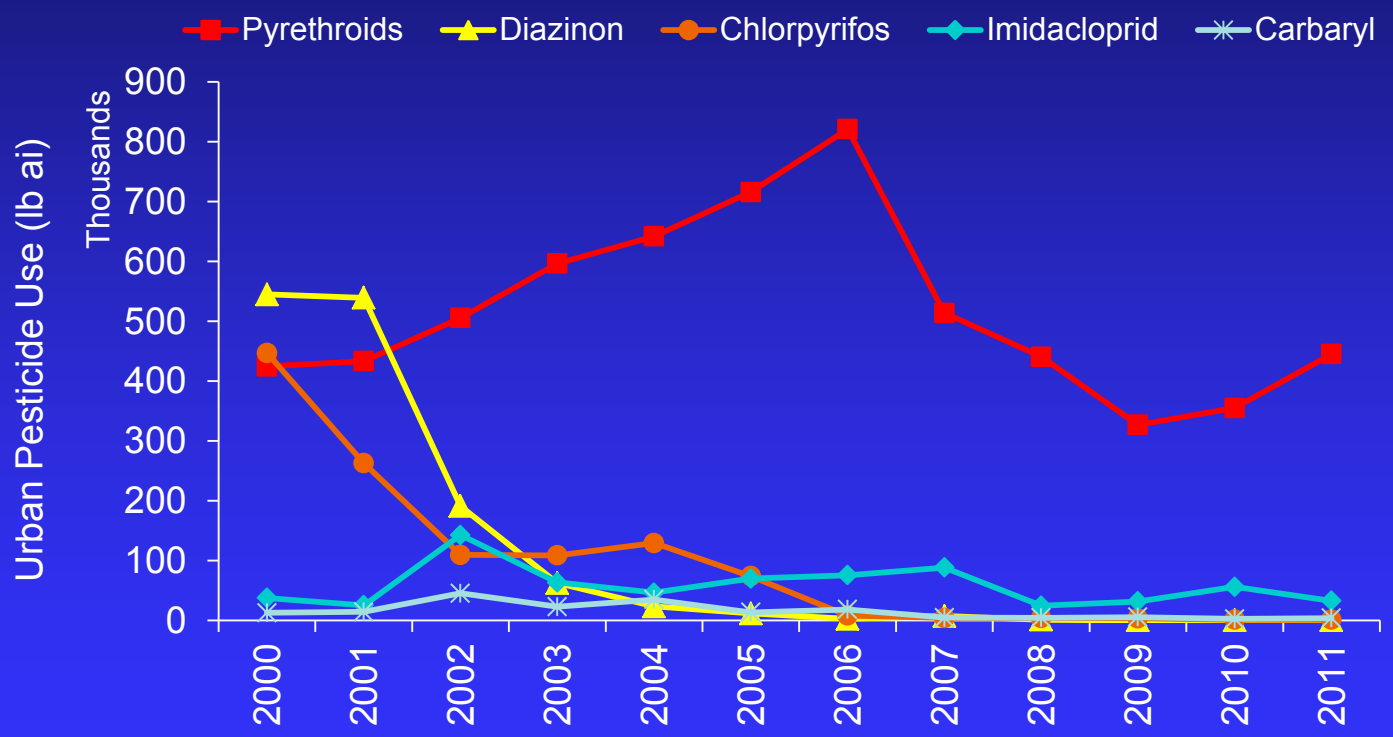



Pyrethroids: high, increasing use, replace OPs

CDPR PUR
Homeowner use not reported

# IV. Why are Pyrethroids a concern in surface waters?

## 1. Pyrethroids have high use in urban areas

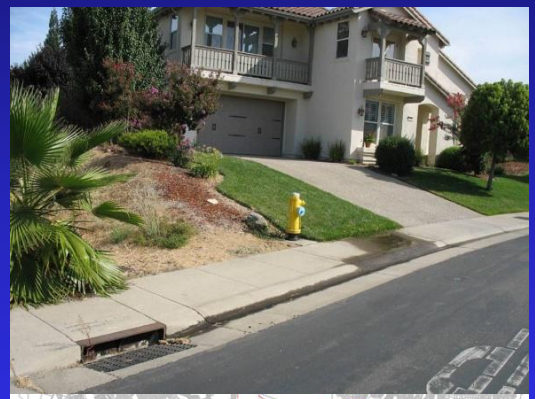


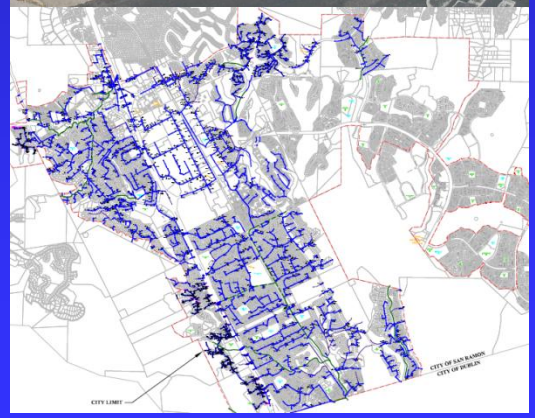

Other urban insecticides (carbaryl, imidacloprid) not replace OPs

CDPR PUR
Homeowner use not reported

# IV. Why are Pyrethroids a concern in surface waters?

2. Pyrethroids have high runoff potential from urban areas, more so than Ag
   - Urban hardscapes
     - Impervious surfaces
   - Storm drain systems
   - Lack of consumer awareness





# IV. Why are Pyrethroids a concern in surface waters?

- Lack of consumer awareness

UNIVERSITY OF CALIFORNIA AGRICULTURE & NATURAL RESOURCES

UC IPM Online

Statewide Integrated Pest Management Program

HOME

SEARCH

ON THIS SITE

- What is IPM?
- Home & landscape pests
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- Natural environment pests
- Exotic & invasive pests
- Weed gallery
- Natural enemies gallery
- Weather, models & degree-days
- Pesticide information
- Research
- Publications
- Events & workshops
- Online training

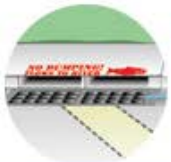
UC IPM Home > Homes, Gardens, Landscapes, and Turf > Pesticides and Water Quality

## Pesticides and Water Quality

**Pesticides applied in your home and landscape affect our creeks, rivers, and oceans!**

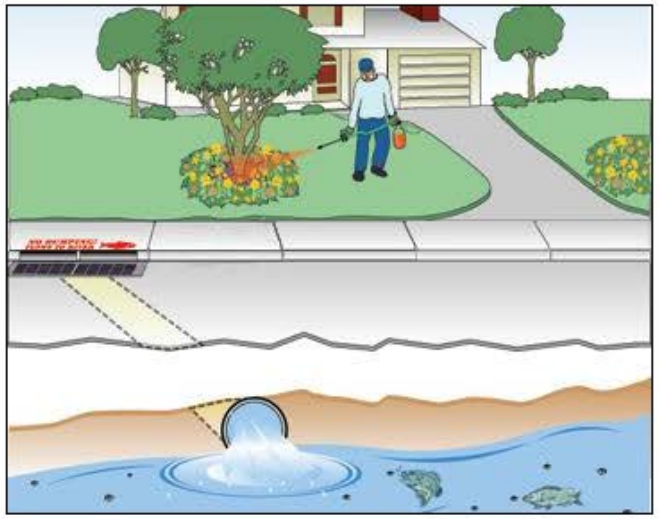
| Water Quality | Pesticide Movement | Safe Use of Pesticides | Safer Alternatives | Resources | Site Map |

How are pesticides affecting water quality?



How do pesticides get into our creeks and rivers?

What are safer alternatives to pesticides?



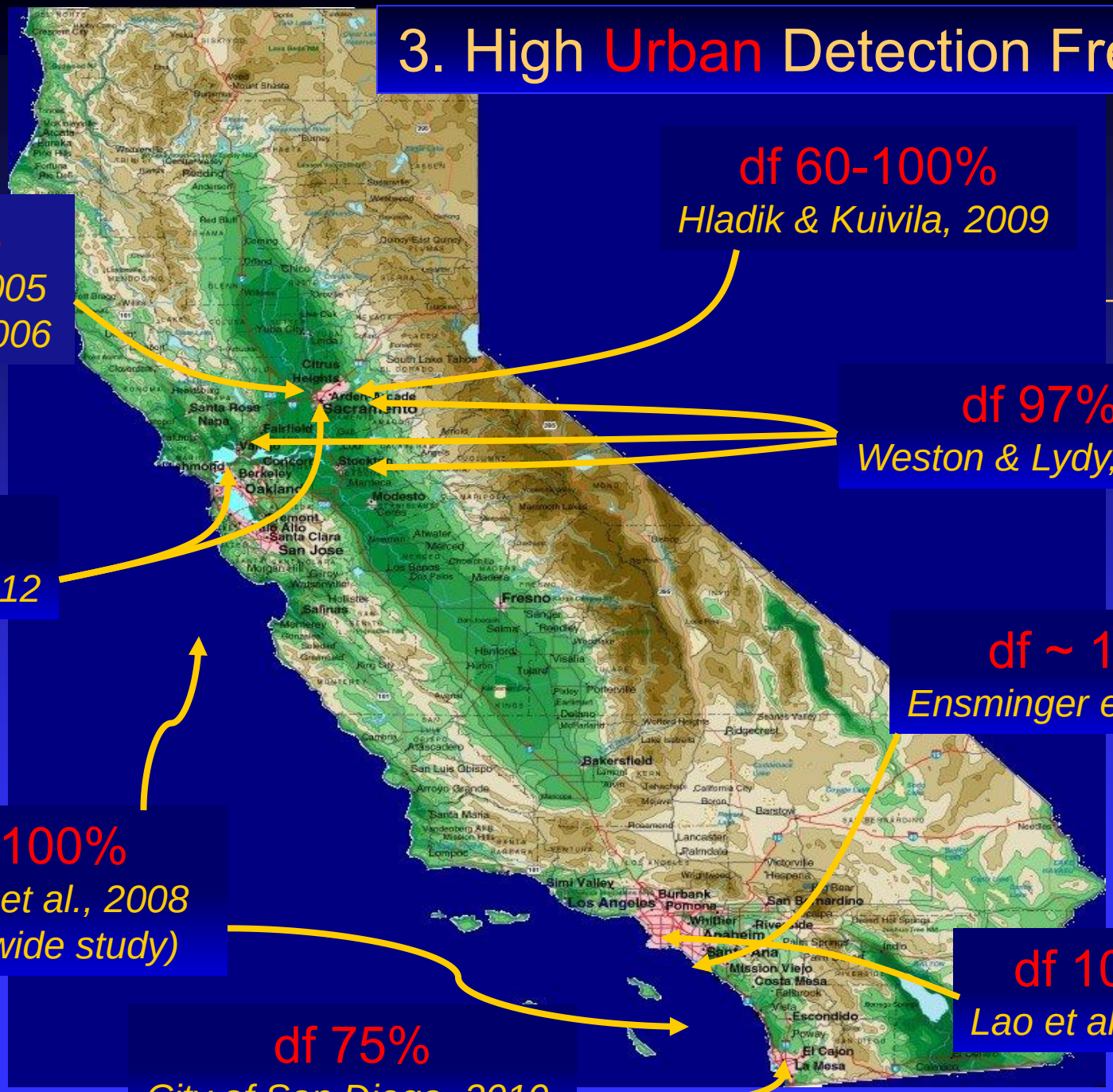
Illustrations by Celeste Rusconi

# IV. Why are Pyrethroids a concern in surface waters?

3. Detection of pyrethroids is frequent and widespread in water and sediments of urban waterways
   - Urban detection frequency >> Ag
     - Urban > 80% DF*,**
     - Ag samples ~ 10% DF**

*CDPR data **Weston & Lydy http://www.water.ca.gov/iep/docs/052510UrbanRunoff.pdf

# 3. High Urban Detection Frequency




df ~ 100%
*Weston et al., 2005*
*Amweg et al., 2006*

df 60-100%
*Hladik & Kuivila, 2009*

df 97%
*Weston & Lydy, 2010*

df ~ 100%
*Ensminger et al., 2012*

df ~ 100%
*Ensminger et al., 2012*

df 100%
*Holmes et al., 2008*
*(statewide study)*

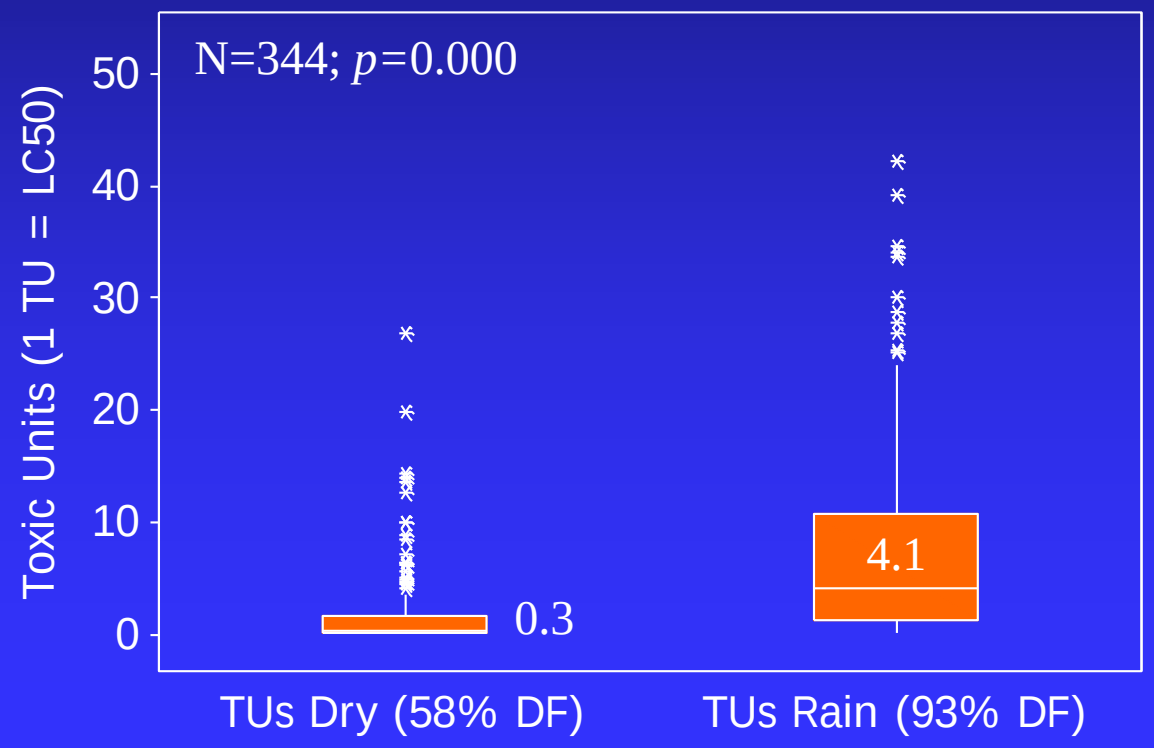
df 100%
*Lao et al., 2010*

df 75%
*City of San Diego, 2010*

# IV. Why are Pyrethroids a concern in surface waters?

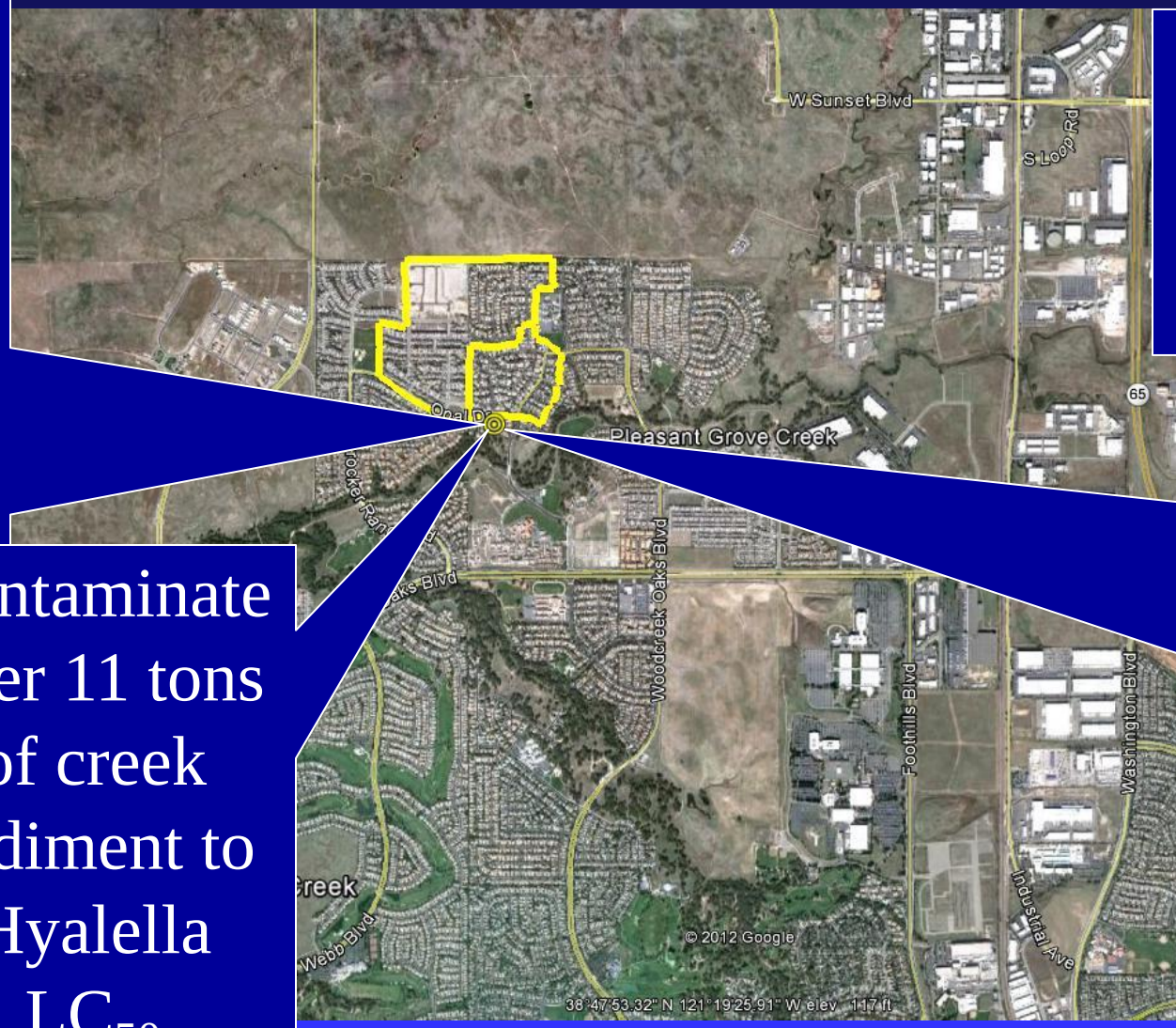
3. Detection of pyrethroids is frequent and widespread

- Rainfall increases runoff



# IV. Why are Pyrethroids a concern in surface waters?

400 homes: Over course of one rain storm, released 120 mg of bifenthrin in 24 hrs




Example: neighborhood in Roseville CA

Contaminate over 11 tons of creek sediment to Hyalella $LC_{50}$

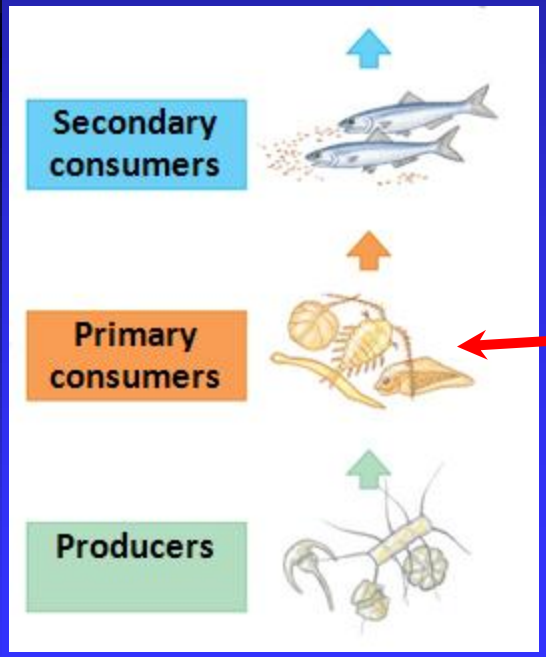
Contaminate over 10 million gallons of water to Hyalella $LC_{50}$

Weston & Lydy http://www.water.ca.gov/iep/docs/052510UrbanRunoff.pdf

# IV. Why are Pyrethroids a concern in surface waters?

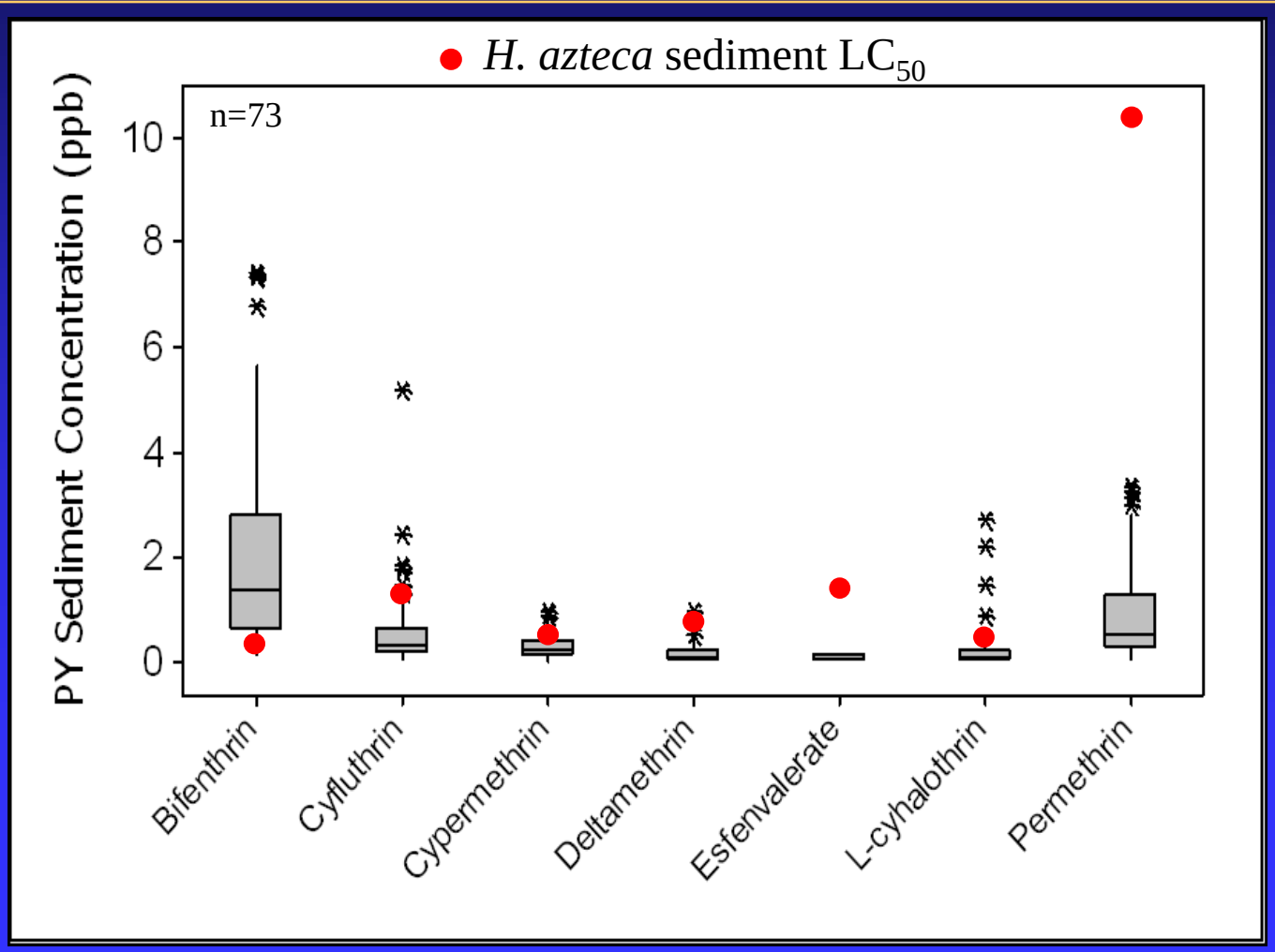
4. Pyrethroids in surface waters and sediments <u>do</u> affect primary consumers

   - Highly toxic

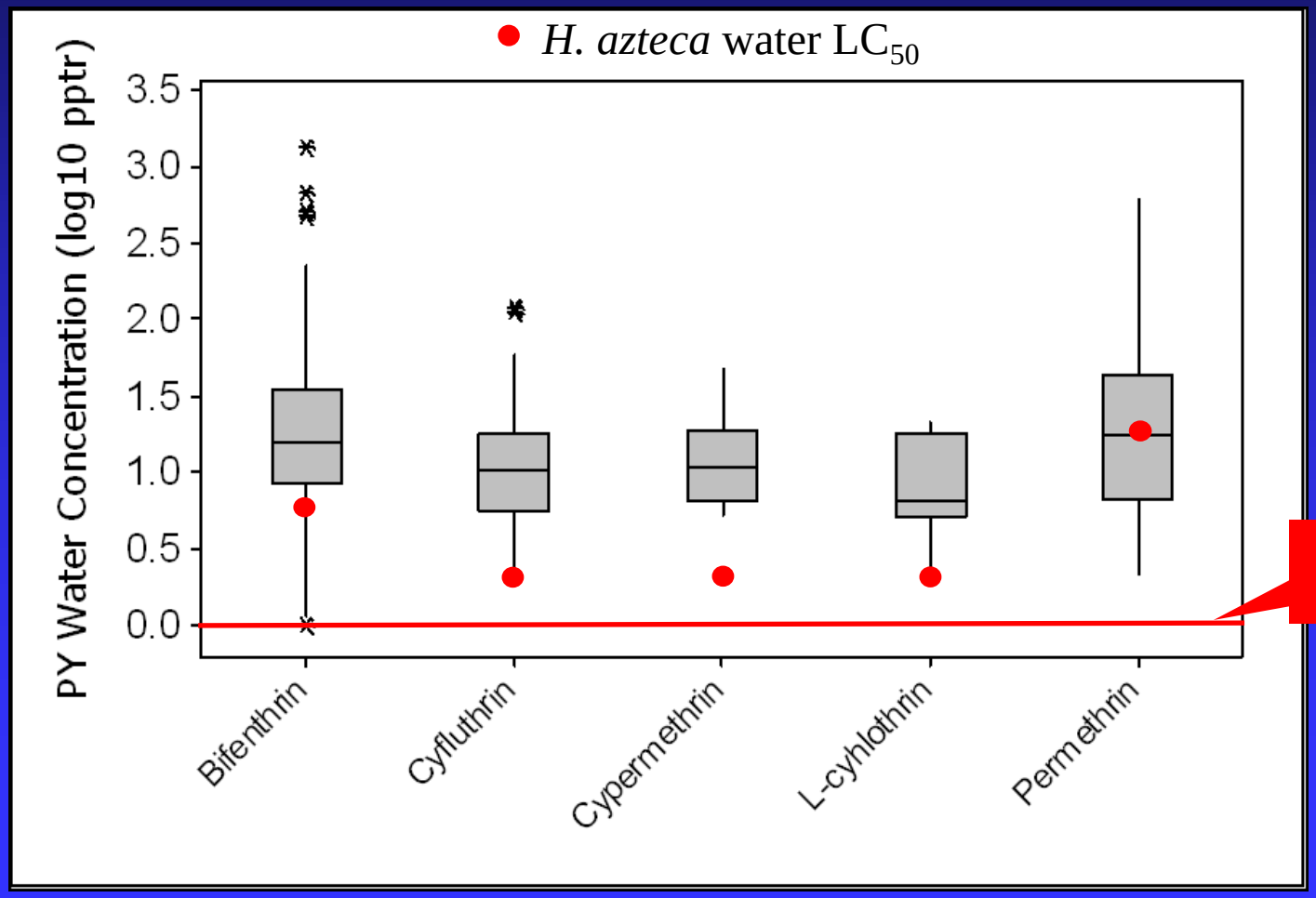



- Aquatic invertebrates more sensitive than terrestrial
- *Hyalella azteca* most sensitive

# Pyrethroid concentrations in sediment are usually compared to *Hyallela* $LC_{50}$ values normalized to sediment OC

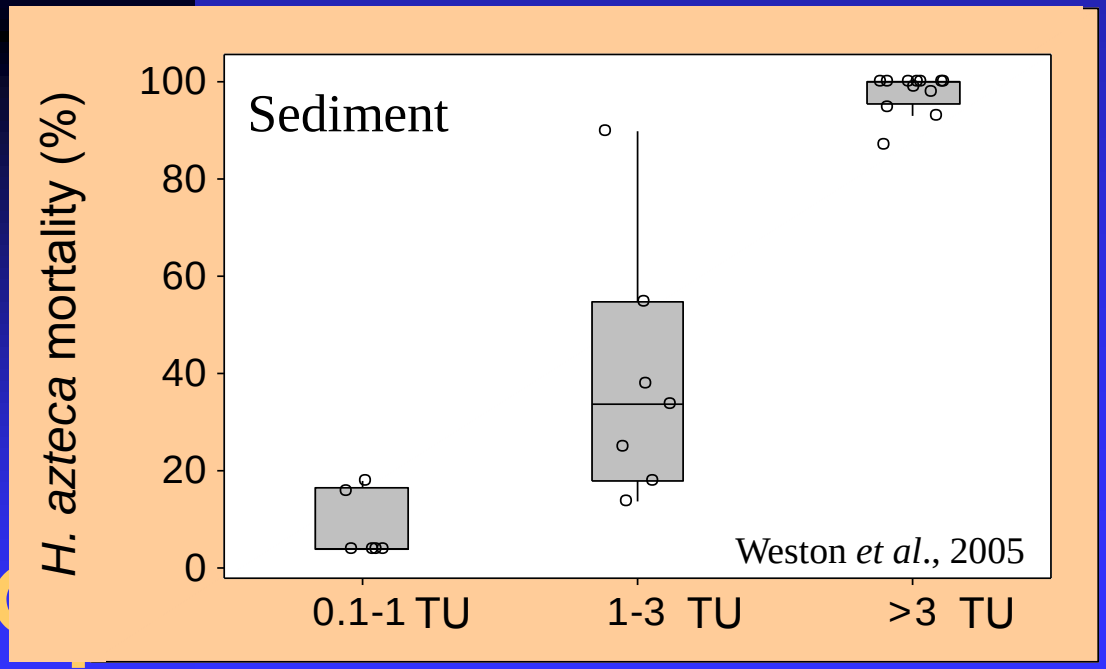


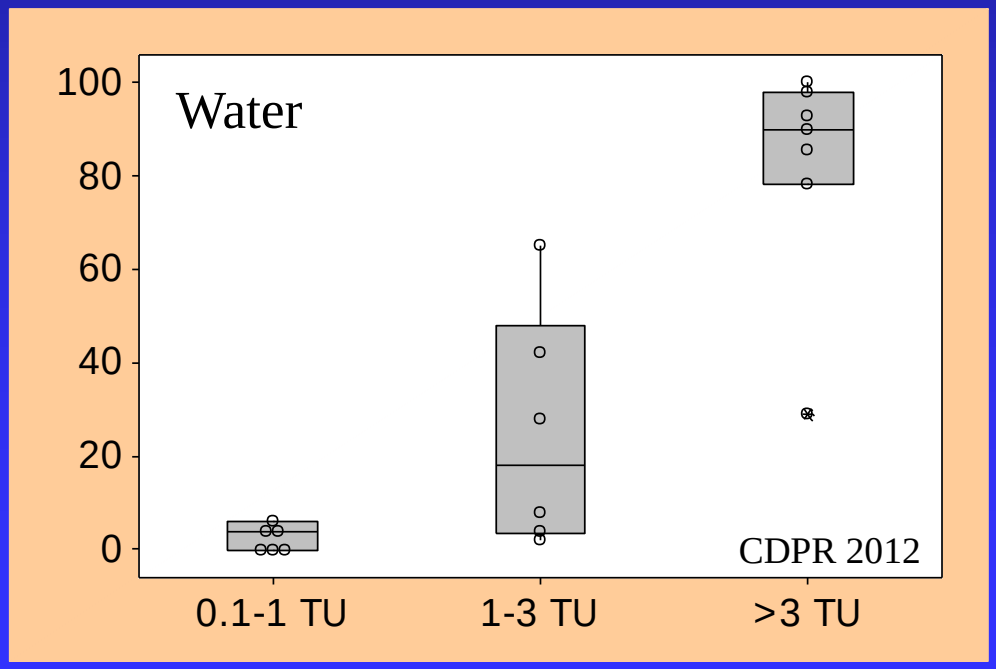
# Pyrethroid concentrations in water most often exceed Hyallela $LC_{50}$ values



# IV. Why are Pyrethroids a concern in surface waters?

5. Toxicity due to pyrethroids
   - Total pyrethroid concentration (toxic equivalents) correlated with observed bioassay mortality



# IV. Why are Pyrethroids a concern in surface waters?

1. Pyrethroids high use in urban areas
2. Urban areas engineered for high water (pesticide) runoff
3. Frequent pyrethroid detections
4. Pyrethroids are highly toxicity
5. Toxicity correlates to pyrethroid chemistry

Surface Water Regulations for Pyrethroids in Urban areas

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# V. Generalities of Surface Water Regulations

Purpose: Protect Surface Waters

- Reduce urban runoff of 17 pyrethroids
- Reduce the amount of pyrethroids applied in <u>outdoor urban</u> (non-ag) areas
  - Professional applicators, "including landscape maintenance gardeners"
    - Homeowner use not regulated

Main use reporting categories covered: <u>structural pest control</u>, <u>landscape maintenance</u>

# Applications to limit the amount of pyrethroids applied

Limit area:

- Spot
- Crack and crevice
- Pin stream of 1 inch or less

< 2 $ft^2$

http://ucanr.org/sites/UrbanAnts/files/77807.pdf

# Applications to limit amount of pyrethroids applied

Limit spraying on impervious surfaces

2 feet up

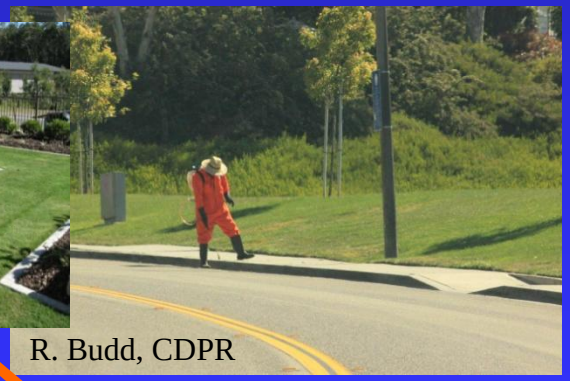
3 feet out

not w/in 2 feet and sweep

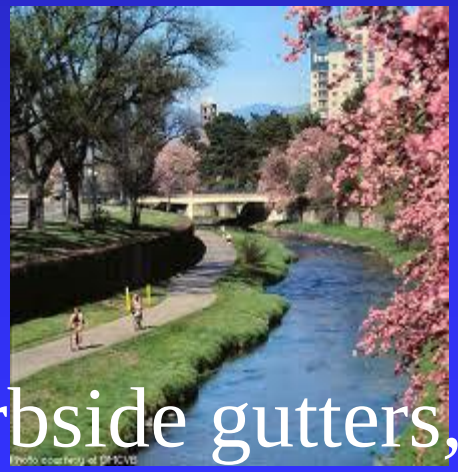
# Prohibited applications with rain or around water or where water can go

Rainfall

Standing water



R. Budd, CDPR

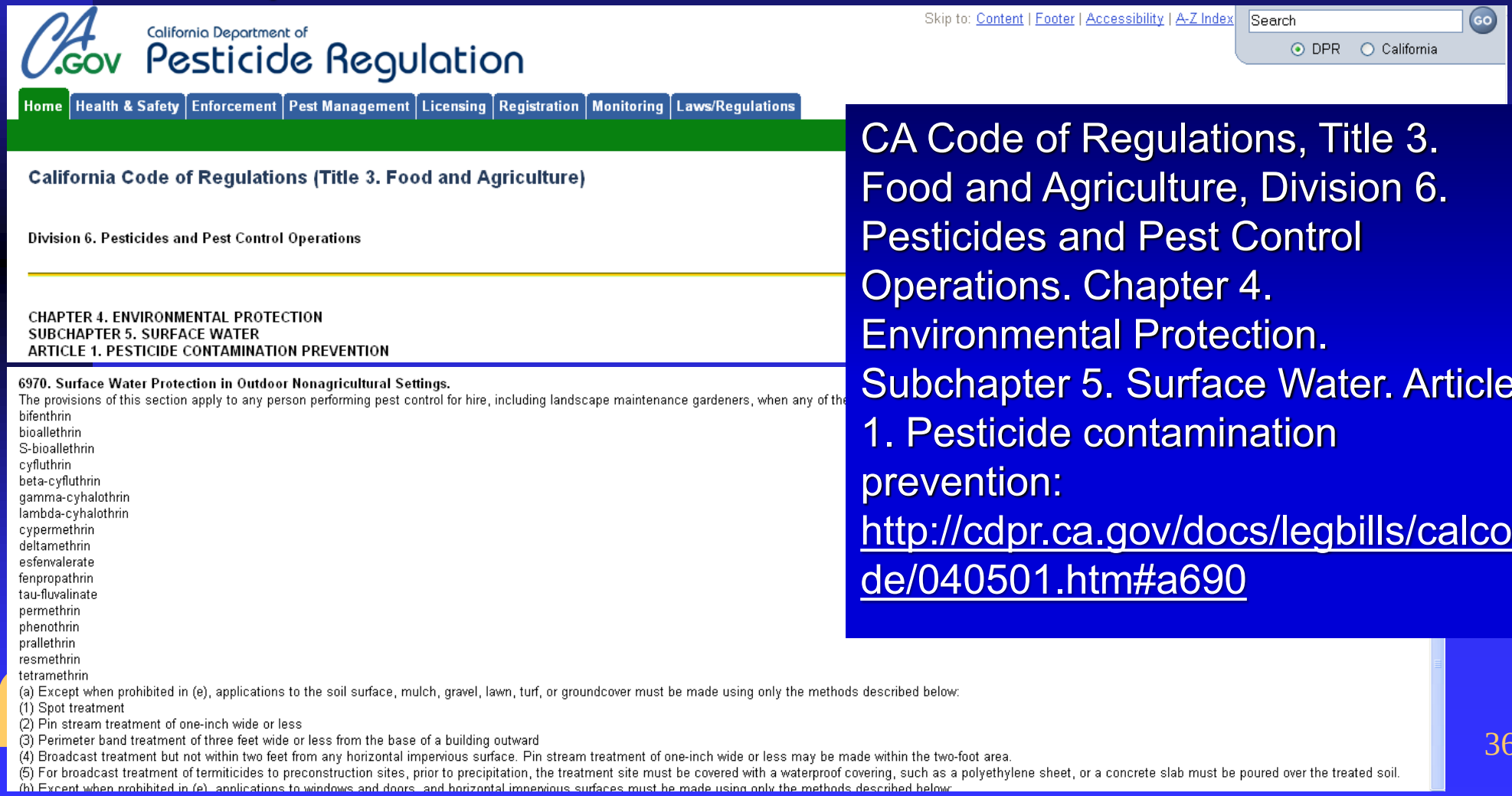


Stormdrains, curbside gutters, sewers, aquatic habitat

Unprotected termiticide

# Specifics and Exemptions

These are generalities – for specifics or exceptions see:



California Department of Pesticide Regulation

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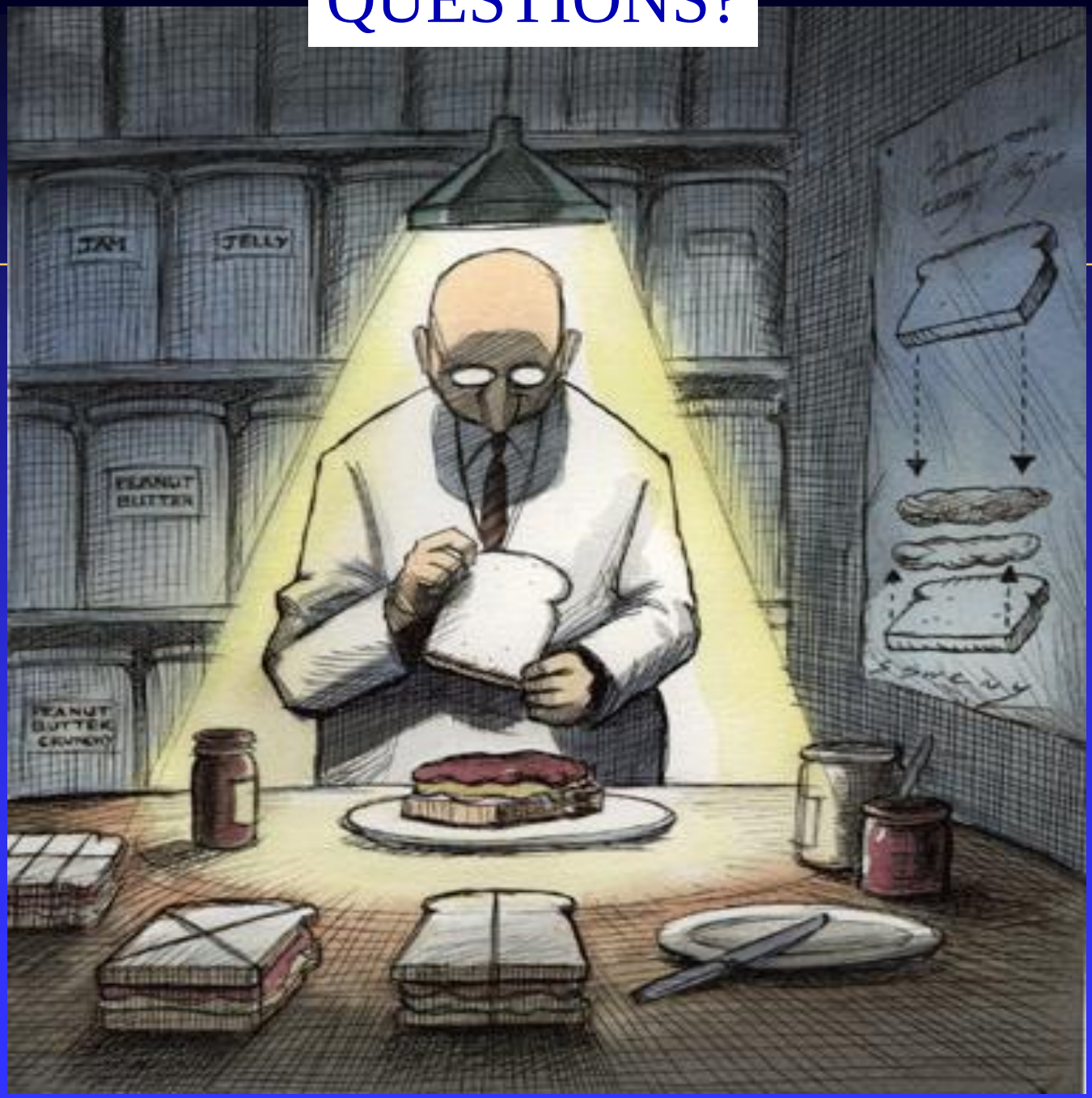
**California Code of Regulations (Title 3. Food and Agriculture)**

**Division 6. Pesticides and Pest Control Operations**

CHAPTER 4. ENVIRONMENTAL PROTECTION
SUBCHAPTER 5. SURFACE WATER
ARTICLE 1. PESTICIDE CONTAMINATION PREVENTION

**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
bifenthrin
bioallethrin
S-bioallethrin
cyfluthrin
beta-cyfluthrin
gamma-cyhalothrin
lambda-cyhalothrin
cypermethrin
deltamethrin
esfenvalerate
fenpropathrin
tau-fluvalinate
permethrin
phenothrin
prallethrin
resmethrin
tetramethrin
(a) Except when prohibited in (e), applications to the soil surface, mulch, gravel, lawn, turf, or groundcover must be made using only the methods described below:
(1) Spot treatment
(2) Pin stream treatment of one-inch wide or less
(3) Perimeter band treatment of three feet wide or less from the base of a building outward
(4) Broadcast treatment but not within two feet from any horizontal impervious surface. Pin stream treatment of one-inch wide or less may be made within the two-foot area.
(5) For broadcast treatment of termiticides to preconstruction sites, prior to precipitation, the treatment site must be covered with a waterproof covering, such as a polyethylene sheet, or a concrete slab must be poured over the treated soil.
(b) Except when prohibited in (e), applications to windows and doors, and horizontal impervious surfaces must be made using only the methods described below:

CA Code of Regulations, Title 3. Food and Agriculture, Division 6. Pesticides and Pest Control Operations. Chapter 4. Environmental Protection. Subchapter 5. Surface Water. Article 1. Pesticide contamination prevention: http://cdpr.ca.gov/docs/legbills/calcode/040501.htm#a690

# QUESTIONS?