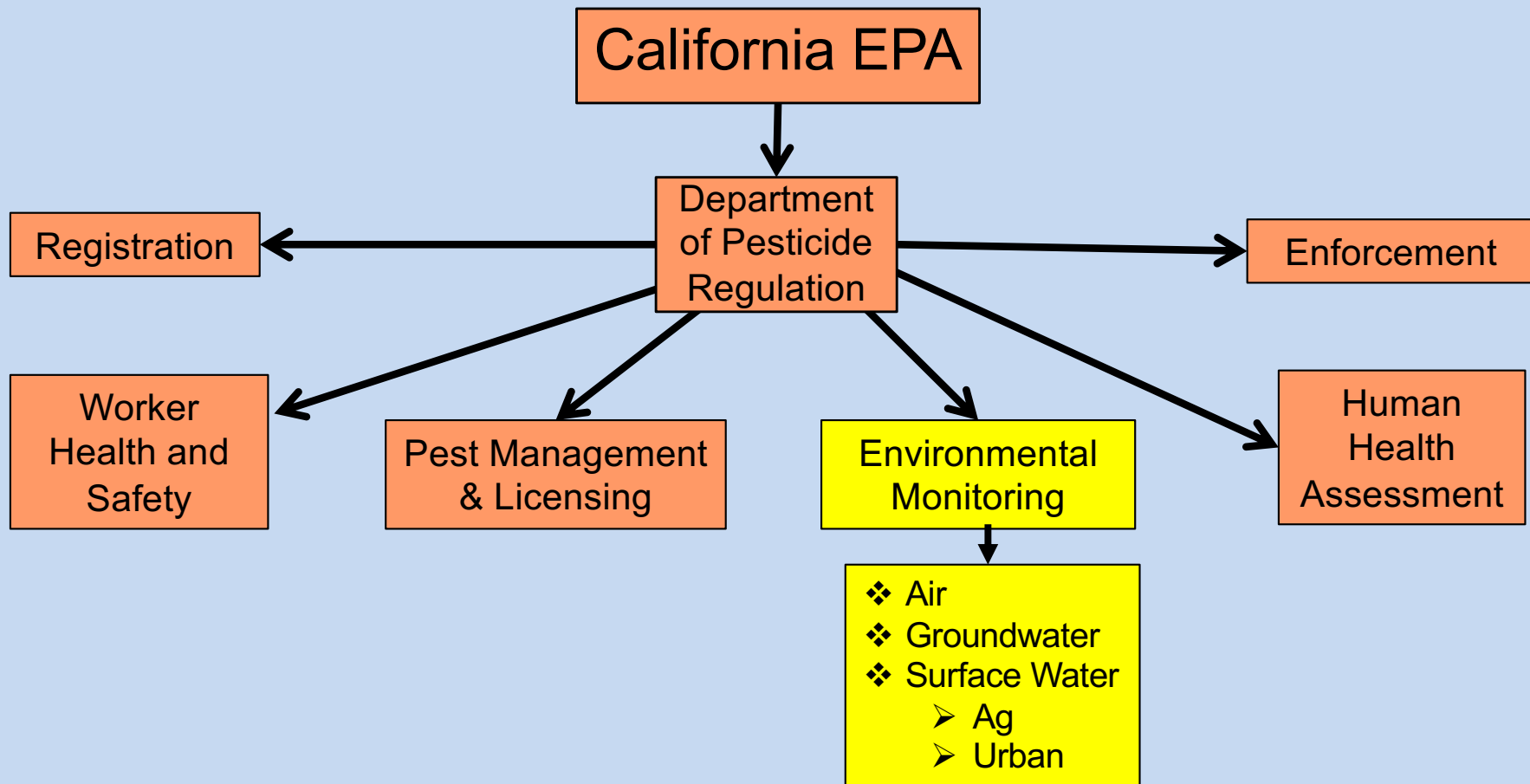


Monitoring and Mitigation of Pyrethroids in Surface Waters



Robert Budd, Ph.D.
Research Scientist III
Santa Clarita PCO CE
March 11th, 2020



California Food and Agricultural Code:

Mandates DPR protect environment from adverse effects of pesticide use

Surface Water Monitoring Program Objectives

- Determine presence of pesticides in surface waters

What?

- Evaluate spatial and temporal trends in concentrations

Where and How Often?

- Evaluate ecological risk of detected concentrations

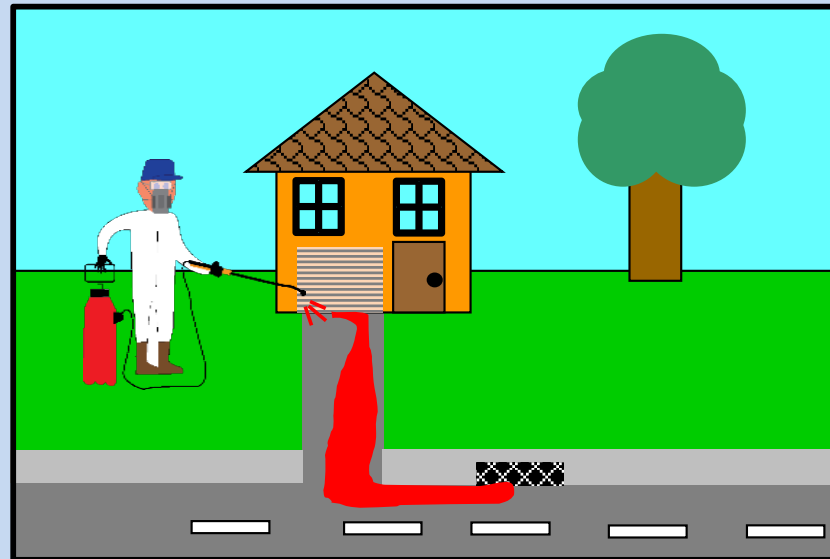
How Bad?

- Develop strategies to mitigate pesticides of concern

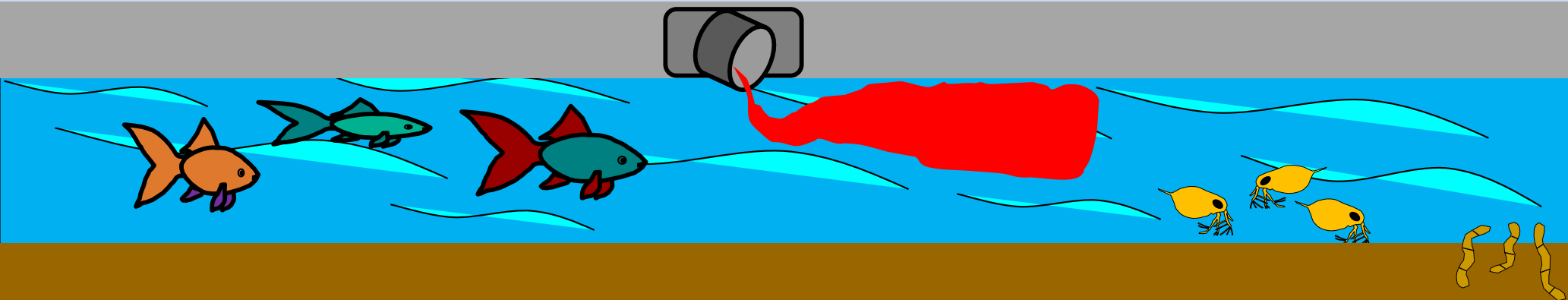
How To Change?

Pesticides in Urban Runoff

Types
Insecticides
Herbicides
Fungicides
Rodenticides



Formulations
Sprays
Granulars
Repellents
Traps



4,184 products; 711 active ingredients*

Site Type



Storm Drain



Receiving Water

Event Type



Dry Season



Rain Event

Language Barrier

Active Ingredient

Bifenthrin

Permethrin

Esfenvalerate

Cypermethrin

Cyfluthrin

Deltamethrin

Lambda-cyhalothrin

Fipronil

Representative Products*

Bifen I/T, Talstar, Wisdom

Tengard, Martins, Astro

Onslaught, Conquer

Cyper TC, Demon

Cy-Kick, Tempid, Tempo

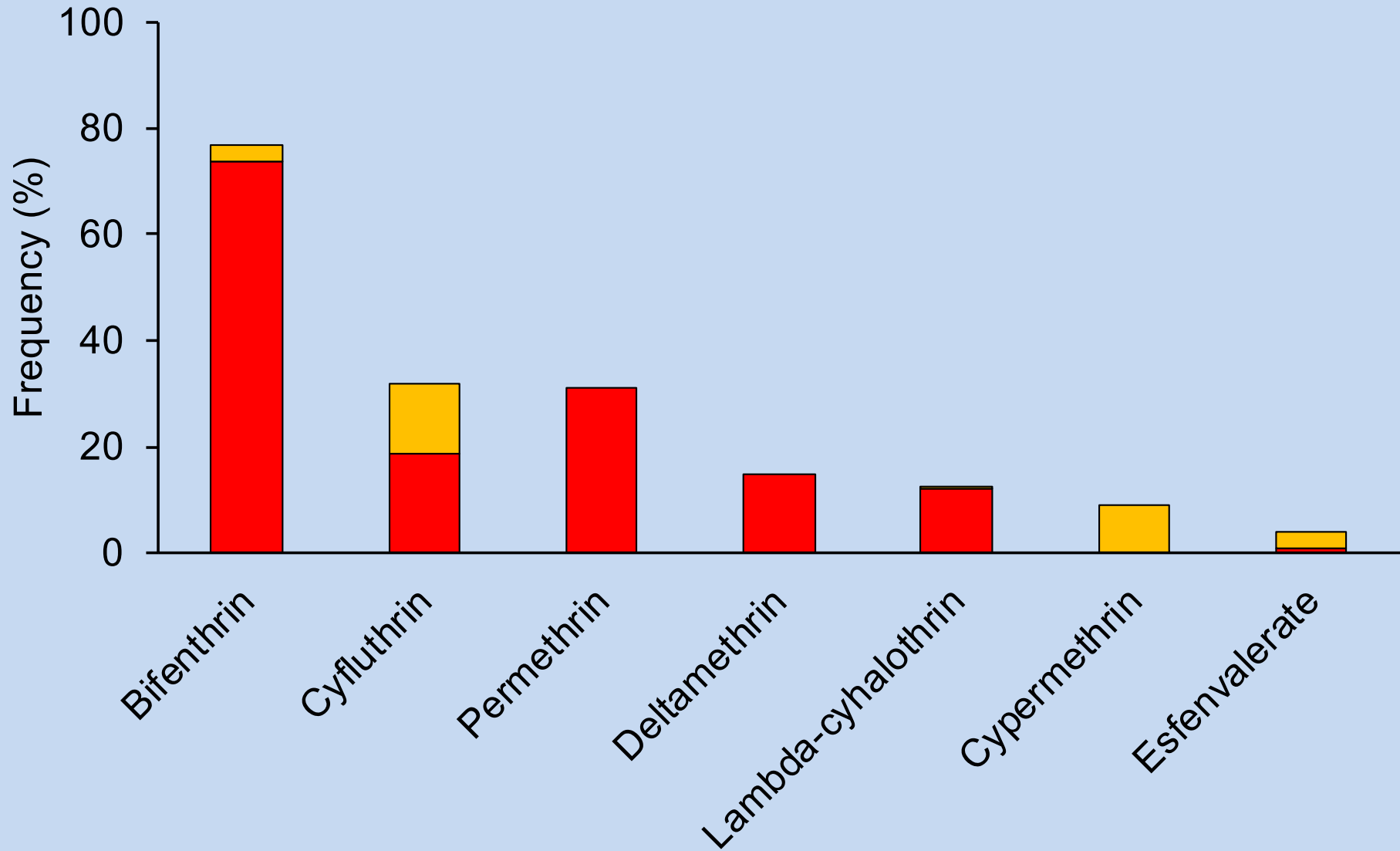
Suspend

Cyzmics, Demand

Termidor, Taurus

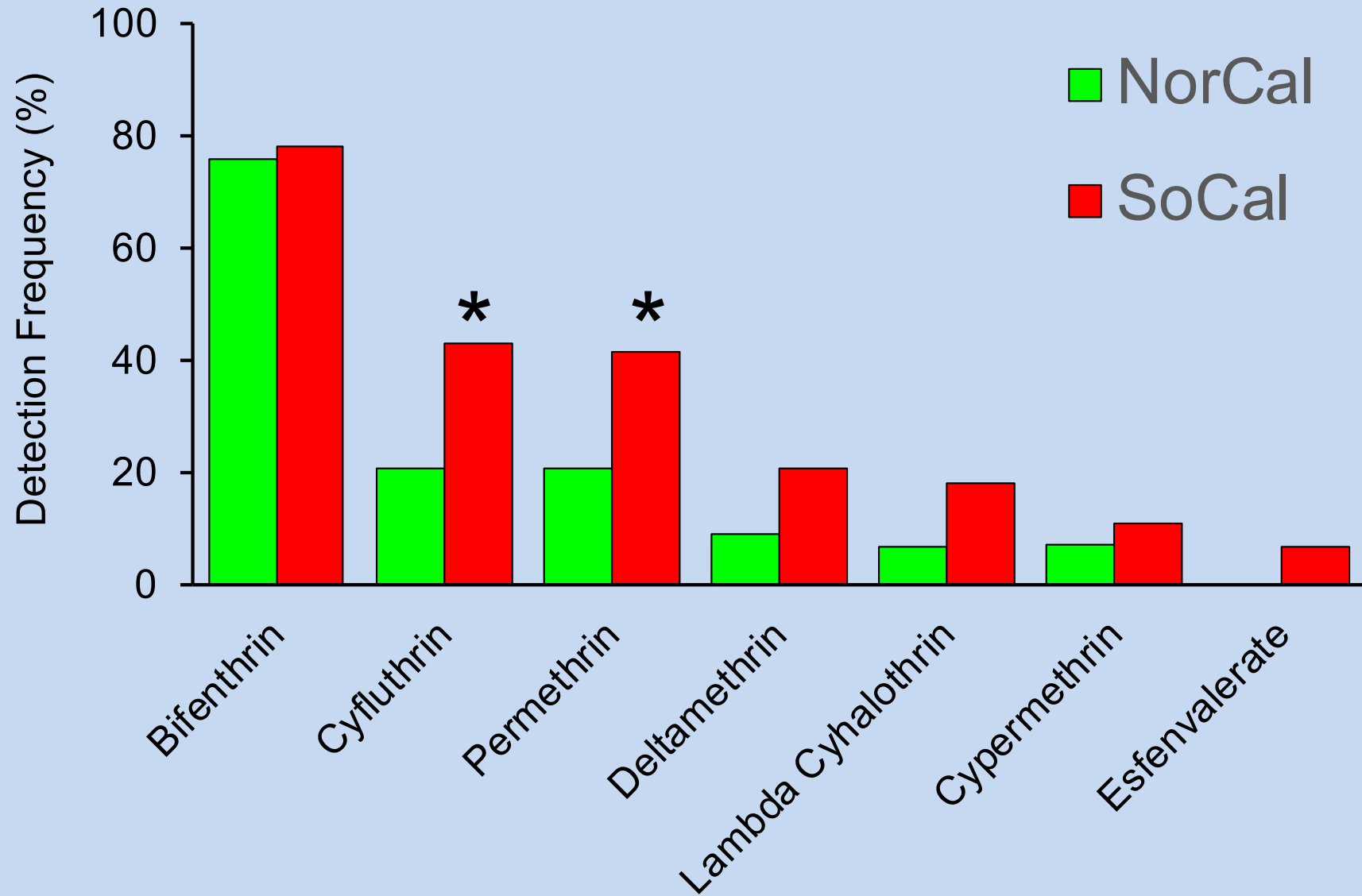
*Top reported urban use products in 2015

Statewide Detection & Exceedance*



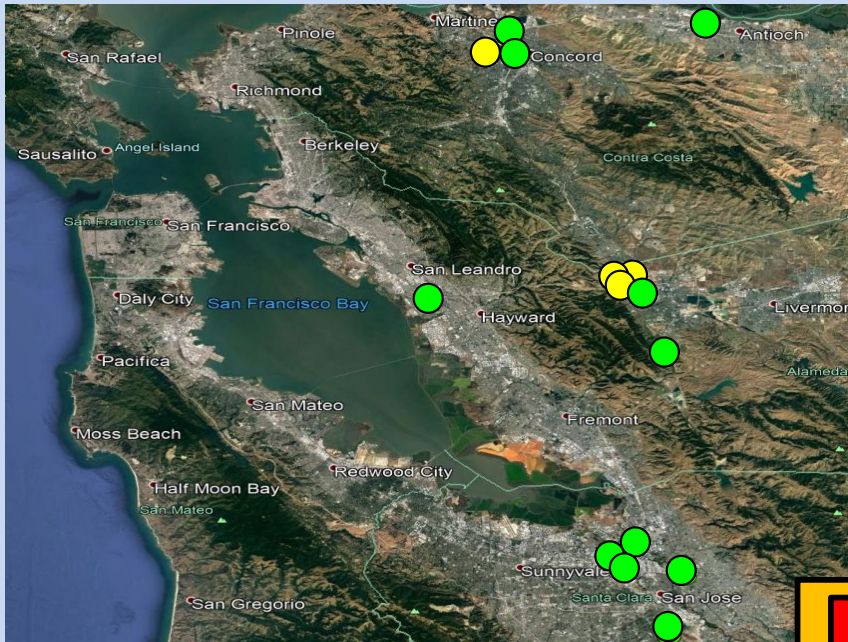
*Compared to minimum US EPA aquatic benchmark

Regional Differences

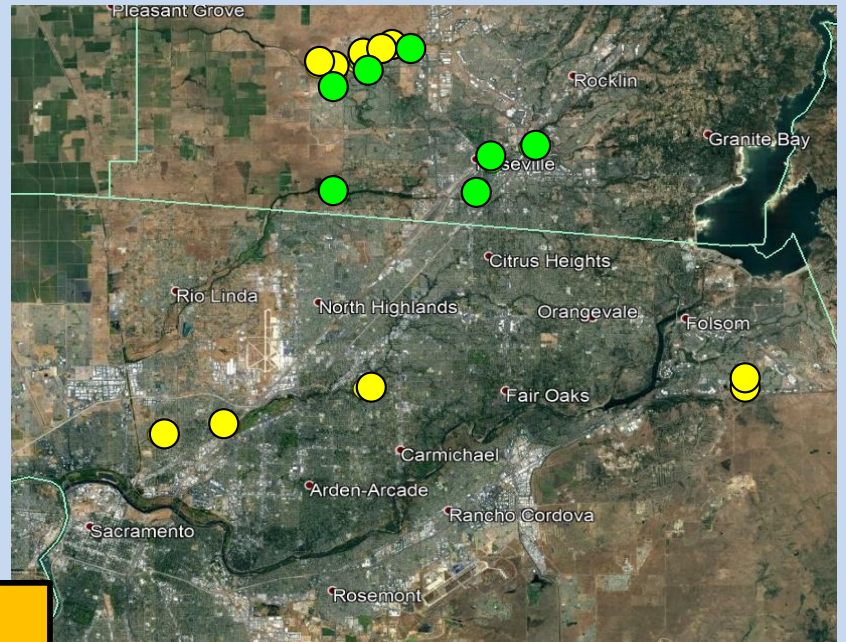


* Significantly higher concentrations

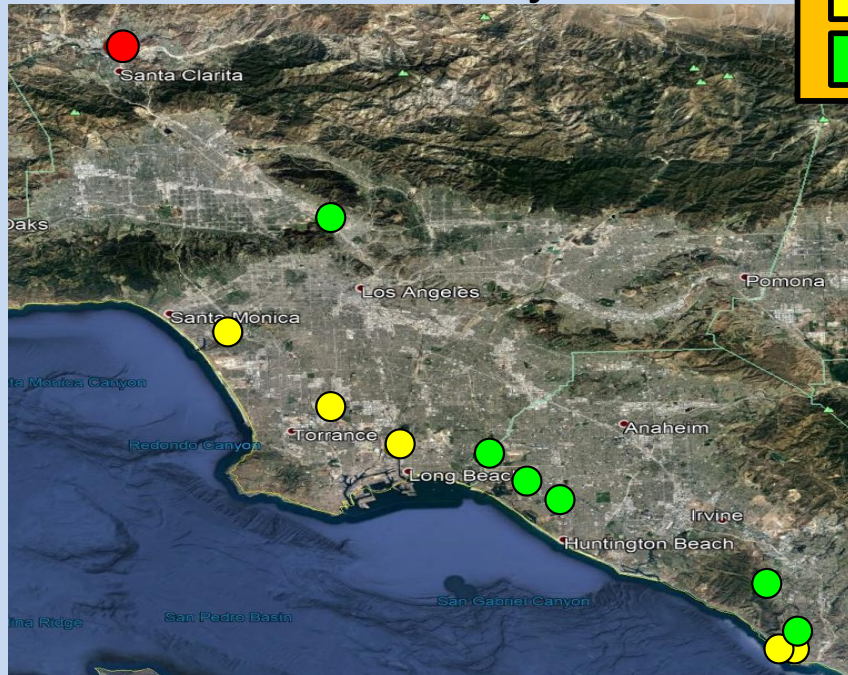
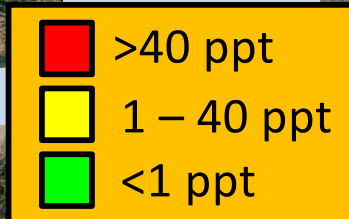
Median Bifenthrin Concentrations



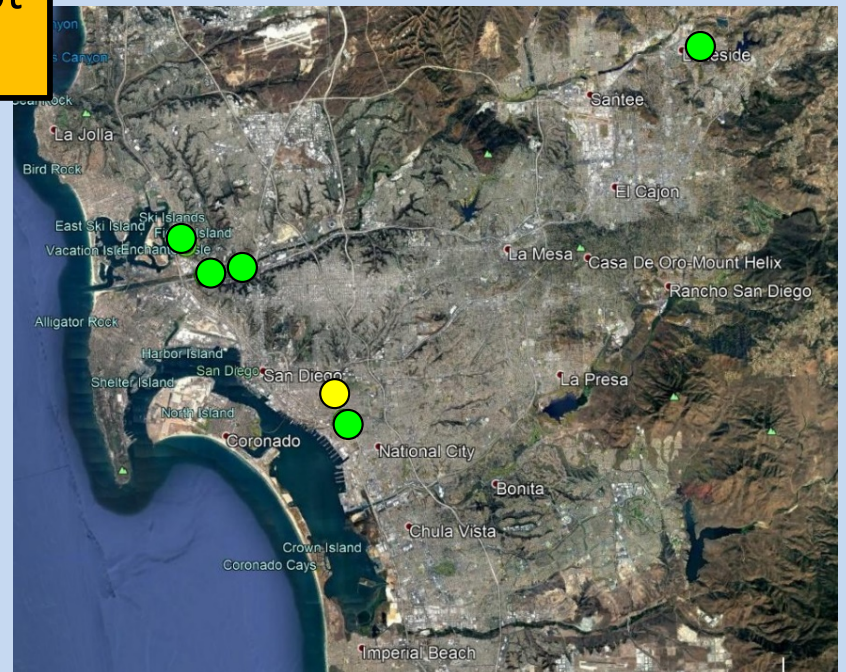
SF Bay



Sacramento

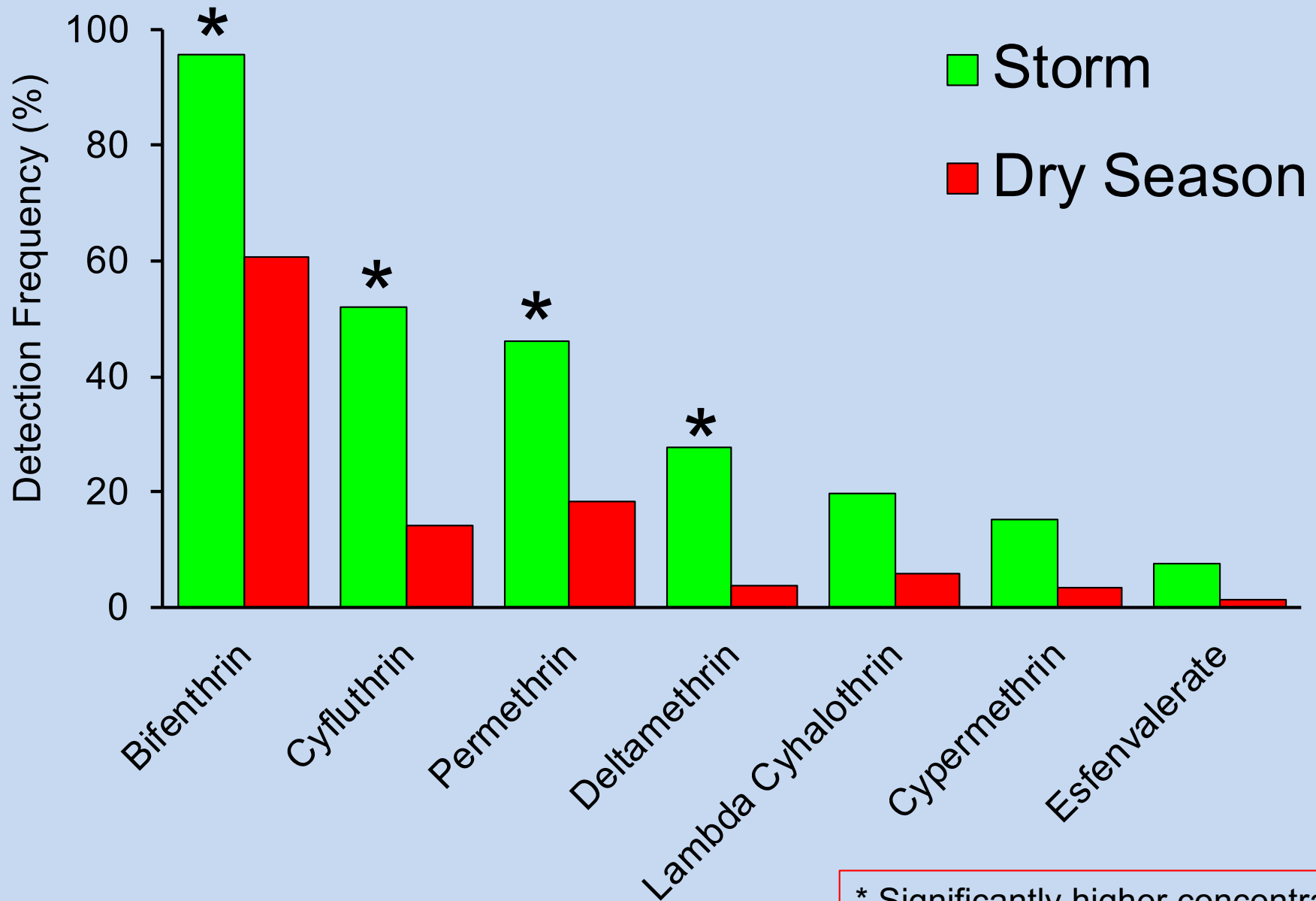


Los Angeles/Orange



San Diego

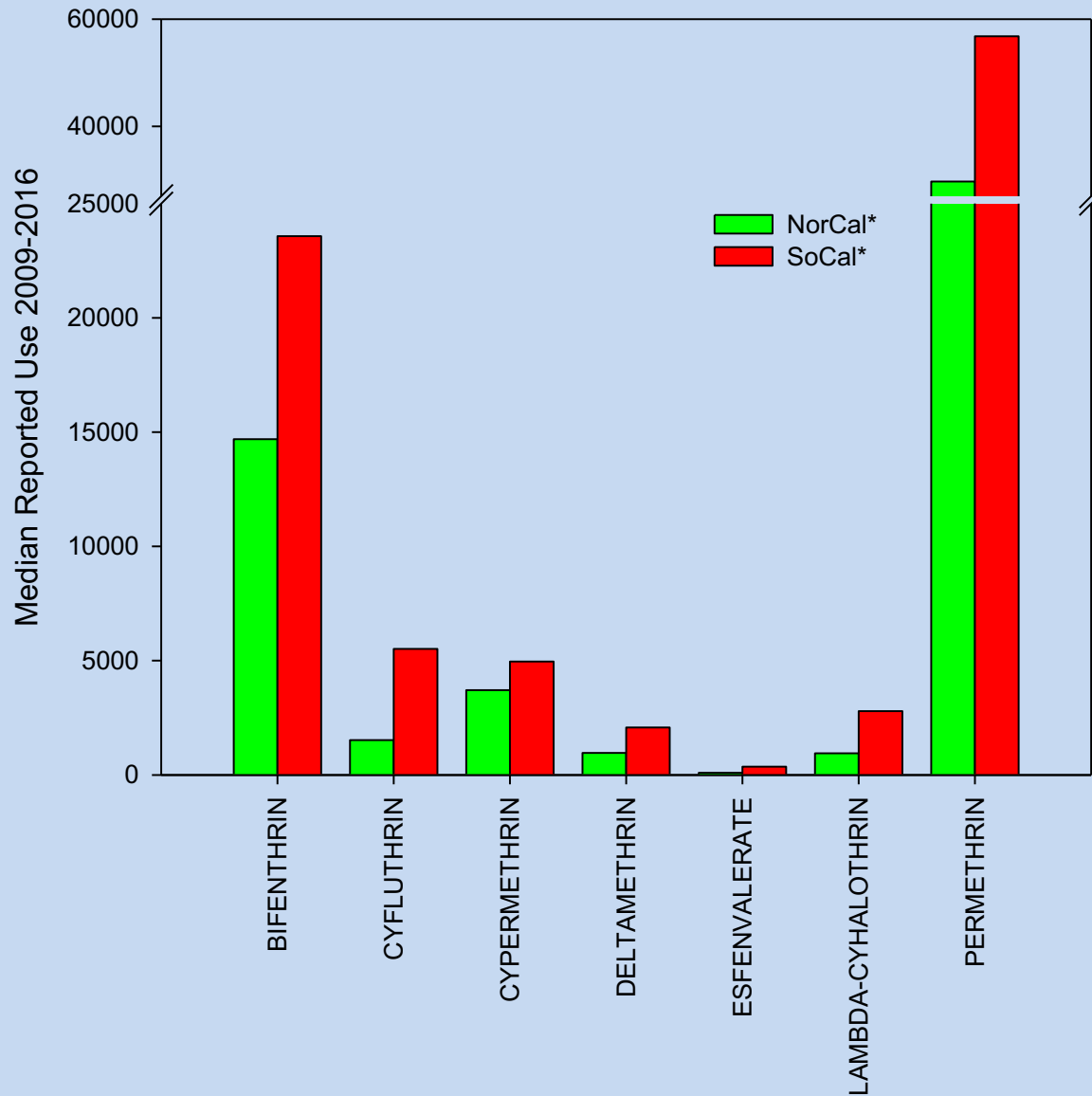
Event Type Differences



* Significantly higher concentrations

Reported Use for Structural Pest Control

(Selected Counties)

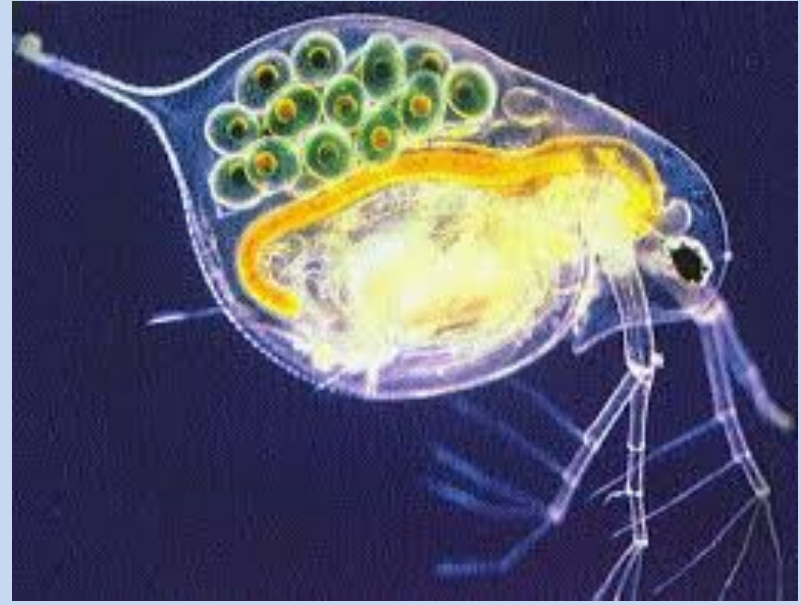


Why Do We Care?



Scott Bauer, 2013

Hyalella azteca



Aqua-fish.com.au, 2009

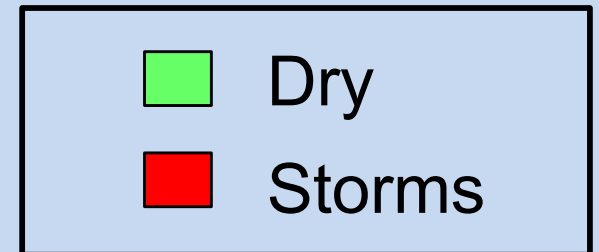
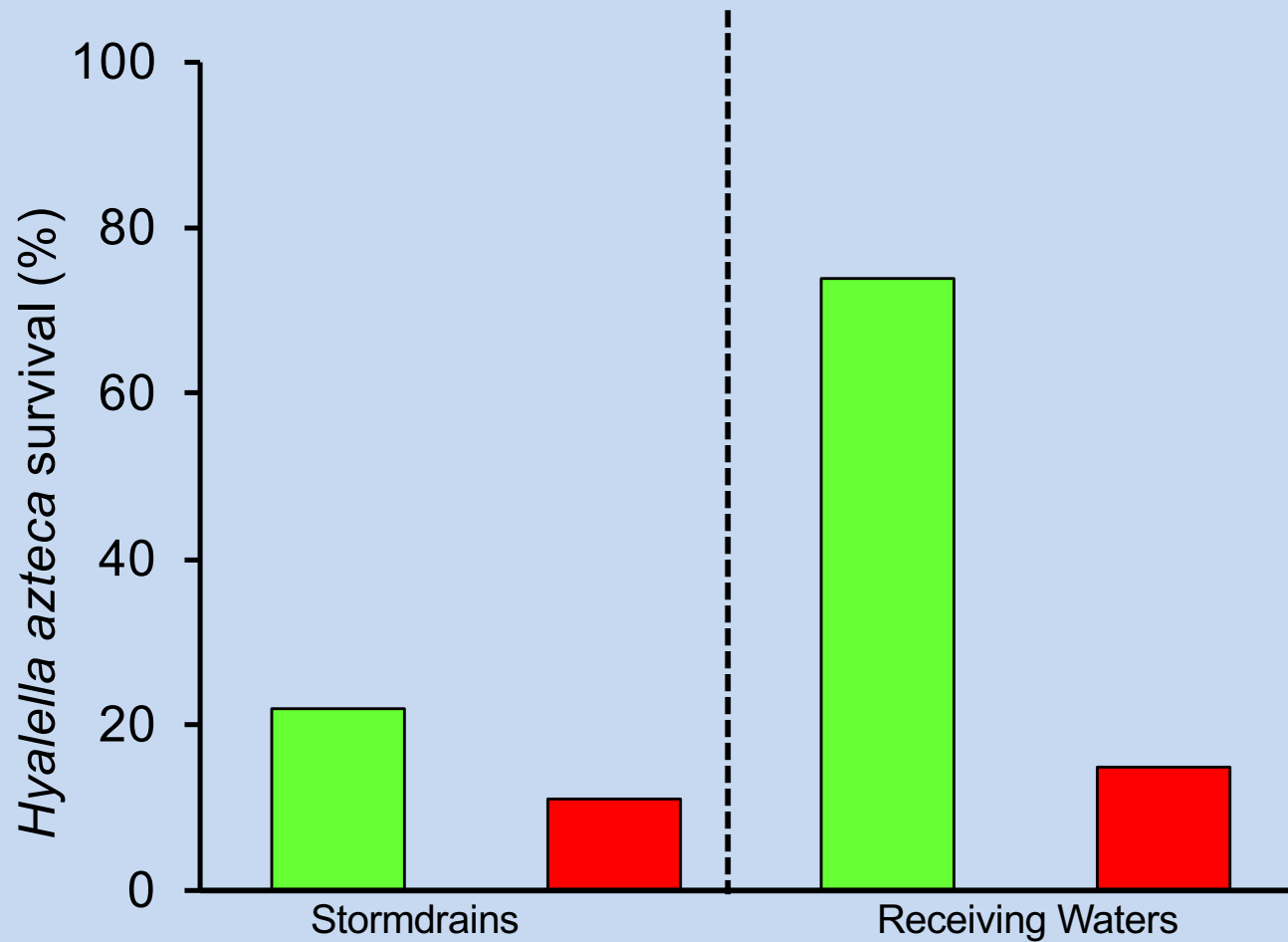
Ceriodaphnia dubia



Eiko Jones, 2017

Chinook Salmon

Toxicity



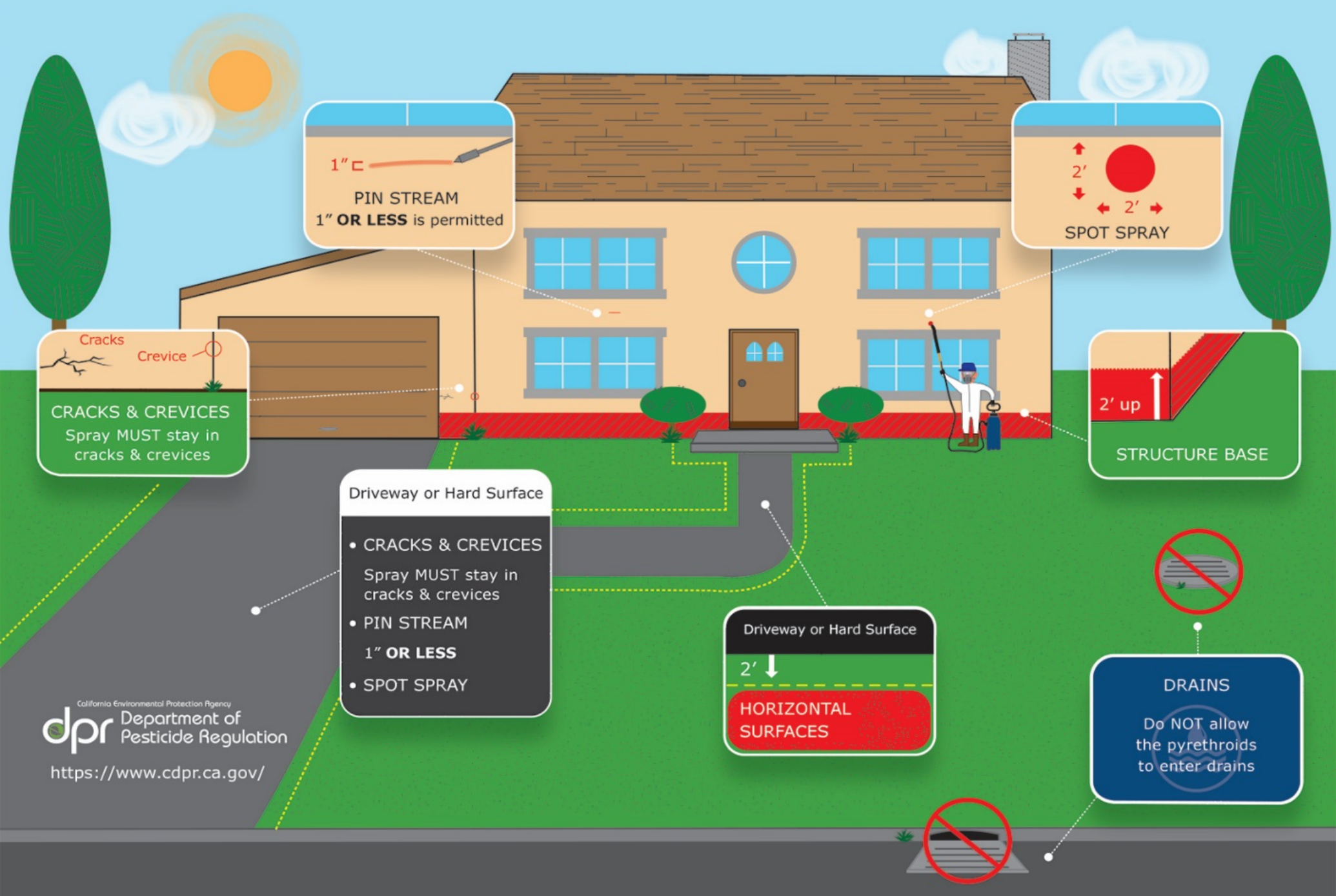
Surface Water Regulations

- Went into effect 2012
- Professional applicators, including landscape maintenance
- Reduce amount of pyrethroids in runoff

- | | |
|----------------------|-------------------|
| • Bifenthrin | • Fenpropathrin |
| • Permethrin | • Bioallethrin |
| • Cyfluthrin | • S-Bioallethrin |
| • Cypermethrin | • Phenothrin |
| • Deltamethrin | • Resmethrin |
| • Prallethrin | • Tetramethrin |
| • Lambda-cyhalothrin | • Tau-fluvalinate |
| • Gamma-cyhalothrin | • Esfenvalerate |
| • Beta-cyfluthrin | |



SURFACE WATER REGULATIONS



1" C
PIN STREAM
1" OR LESS is permitted

2'
2'
SPOT SPRAY

Cracks
Crevice
CRACKS & CREVICES
Spray MUST stay in cracks & crevices

2' up
STRUCTURE BASE

Driveway or Hard Surface

- CRACKS & CREVICES
Spray MUST stay in cracks & crevices
- PIN STREAM
1" OR LESS
- SPOT SPRAY

Driveway or Hard Surface

2' ↓
HORIZONTAL SURFACES


DRAINS
Do NOT allow the pyrethroids to enter drains

Bifenthrin MOA

Products that are included include the following characteristics:

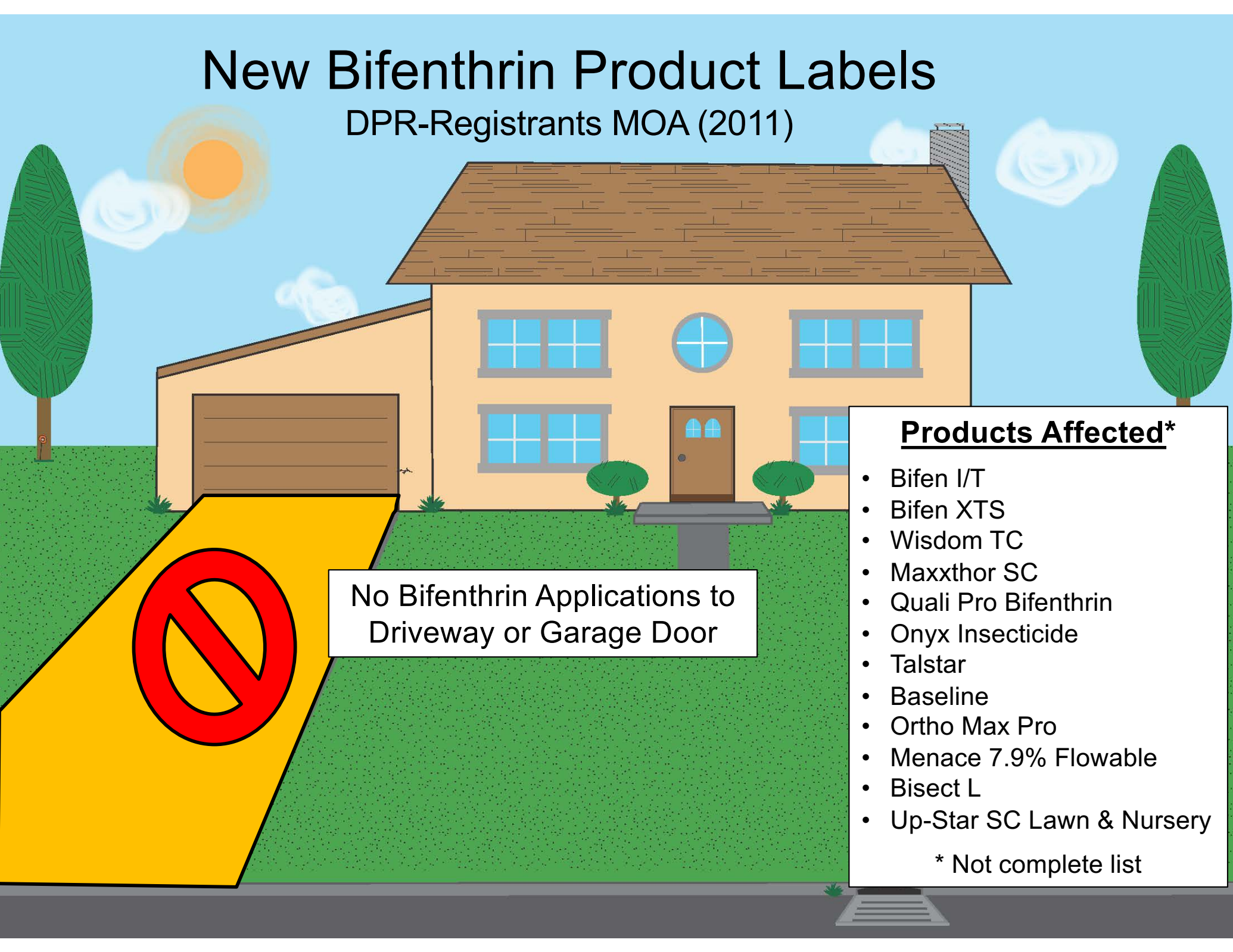
- 1) **Active Ingredient.** Contain bifenthrin as an active ingredient.
- 2) **Outdoor Structural Sites.** Include directions for outdoor applications to structural, residential, industrial and institutional sites.
- 3) **Non-porous Surfaces.** Include directions that allow (or don't otherwise prohibit) applications to non-porous outdoor surfaces, either vertical or horizontal (e.g., foundations or sidewalks).
- 4) **Professional Use.** Intended for use by persons performing pest control for hire. (Note: products that may be occasionally used by professionals for small jobs are not included)

Summary of label restrictions:

- 1) **Horizontal Impervious Surfaces.** Prohibit applications to horizontal impervious surfaces (e.g., driveways, walkways) unless the surface is protected from rainfall and spray from sprinklers.
- 2) **Vertical Impervious Surfaces.** Prohibit applications to vertical impervious surfaces (e.g., foundations) that abut horizontal impervious surfaces (e.g., driveways, walkways), unless either:
 - a. The vertical surfaces are protected from rainfall or spray from sprinklers, or
 - b. The horizontal surfaces do not drain into sources of stormwater (e.g., the abutted driveways/walkways do not drain into streets).

New Bifenthrin Product Labels

DPR-Registrants MOA (2011)



No Bifenthrin Applications to
Driveway or Garage Door

Products Affected*




- Bifen I/T
- Bifen XTS
- Wisdom TC
- Maxxthor SC
- Quali Pro Bifenthrin
- Onyx Insecticide
- Talstar
- Baseline
- Ortho Max Pro
- Menace 7.9% Flowable
- Bisect L
- Up-Star SC Lawn & Nursery

* Not complete list

Concentration Trends

Region	Test	Bifenthrin	Cyfluthrin	Cypermethrin	Deltamethrin
State	All	Significant decrease	No observable trend	No observable trend	Significant increase
Northern	All Data	Significant decrease	No observable trend	Significant decrease	Significant increase
	Storm drain	Significant decrease	No observable trend	Significant decrease	Significant increase
	Receiving Water	No observable trend	No observable trend	No observable trend	No observable trend
	Storms	Significant decrease	No observable trend	Significant decrease	Significant increase
	Dry	Significant decrease	No observable trend	No observable trend	No observable trend
Southern	All	No observable trend	Significant increase	No observable trend	No observable trend
	Storm drain	No observable trend	Significant increase	No observable trend	No observable trend
	Receiving Water	No observable trend	No observable trend	No observable trend	No observable trend
	Storms	Significant increase	Significant increase	No observable trend	No observable trend
	Dry	Significant decrease	No observable trend	No observable trend	No observable trend

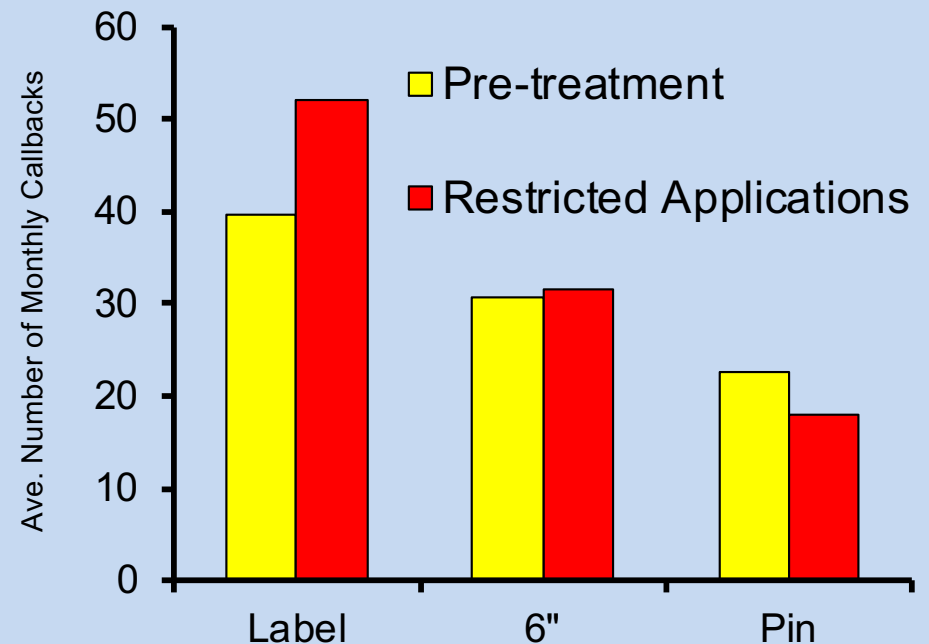
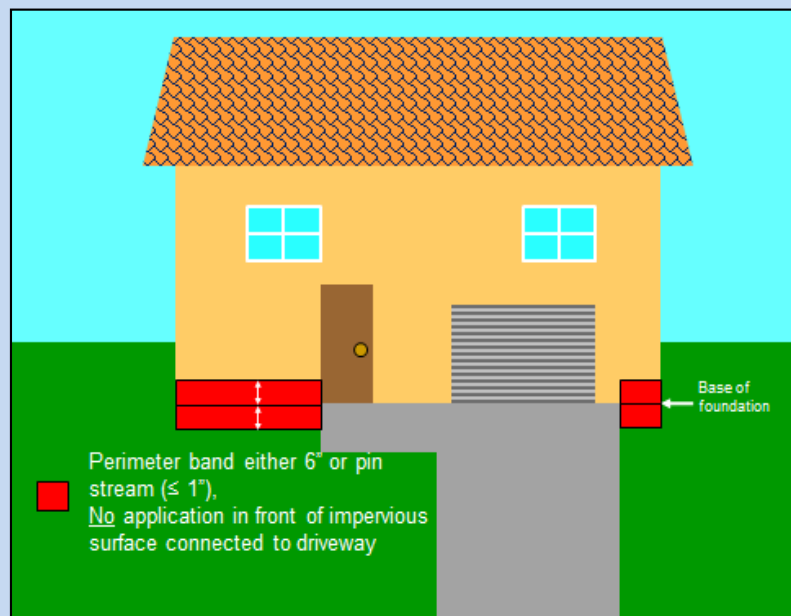
* No observable trends for Esfenvalerate, Lambda-cyhalothrin, and Permethrin

-  Significant decrease
-  Significant increase
-  No observable trend

Fipronil Mitigation Development

UC and PCO field trials

- Restricted applications
- Measured runoff, ant populations, and number of customer call-backs (**2000+** residences)
- Observed reduced runoff and little to no change in efficacy/call-backs for different applications



NEW CALIFORNIA FIPRONIL LABELS

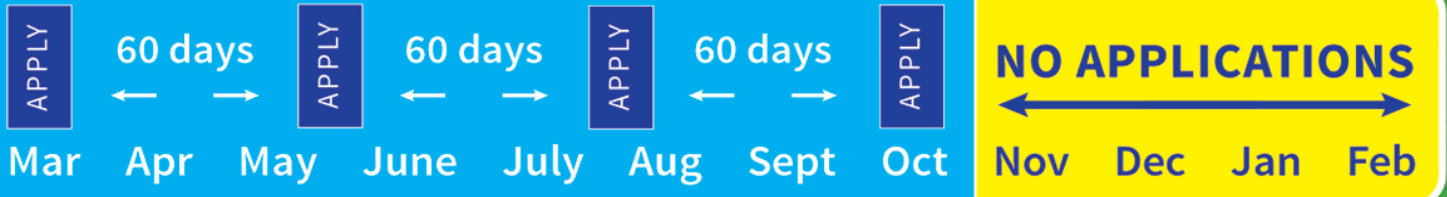
*DOES NOT AFFECT TRAPS OR BAIT PRODUCTS

Only apply
0.03%
finished dilution

Do not apply to
garage door or
driveway

6" up
6" out

Only apply bandwidth
6 inches up and out
from foundation



DPR Outreach



PCOC
PAPA
CAPCA
CASQA
CAC
Public

DPR Outreach Materials

California Fipronil Label Restrictions*

dpr
www.cdpr.ca.gov

- Only apply 0.03% finished dilution
- Only apply spray bandwidth 6 inches up or out from where foundation meets the ground
- Do not apply to garage door, driveway, or cracks and crevices adjacent or leading to driveway
- Maximum 4 applications per year
- Minimum 60 days between applications
- Do not apply between November 1st and February 28th

*Does not affect traps or bait products

6" up
6" out

No Applications

0.03%

Apply ← 60 days → Apply ← 60 days → Apply ← 60 days → Apply

Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb

No Applications

Fipronil Label Restrictions Placard

PWG PMP
www.pwg2pmp.com

Spray Smart Best Practices for Complying with California Surface Water Regulations

- Structure Base**
STAY 2 feet up and 3 feet out as directions permit
- Spot Spray**
NO LARGER than 2 square feet
- Drains**
Do NOT allow the pyrethroids to enter drains
- Cracks & Crevices**
Spray MUST stay in cracks & crevices
- Pin Stream**
On vertical & horizontal surfaces that do not have cracks, a pin stream application of 1" OR LESS is permitted
- DRIVEWAY OR HARD SURFACE**
Pin Stream OK } 2' away
Horizontal Surfaces
Broadcast spray must stay at least 2 feet AWAY from concrete AND hard surfaces

Avoid spraying on hard surfaces like driveways & sidewalks that lead to gutters & drains to minimize pyrethroid runoff. Always read & follow label directions.

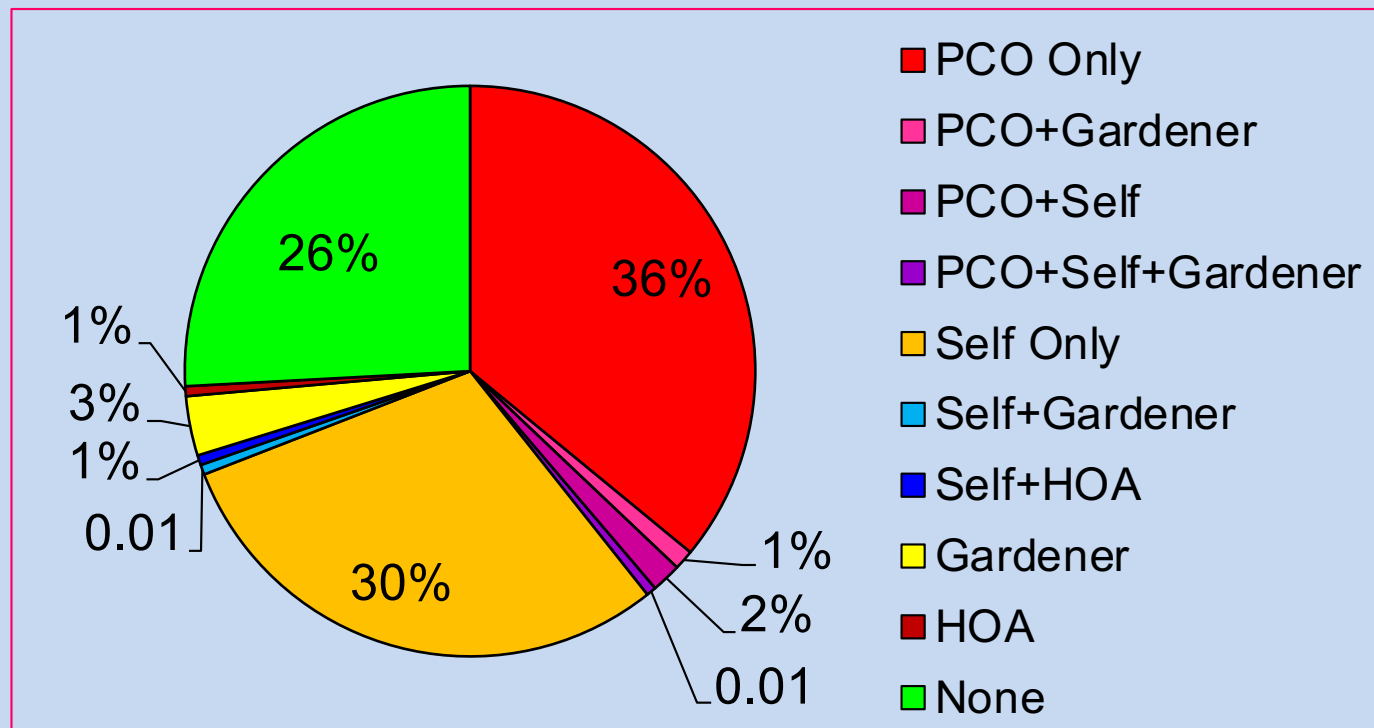
Surface Water Regulations Placard

Question:

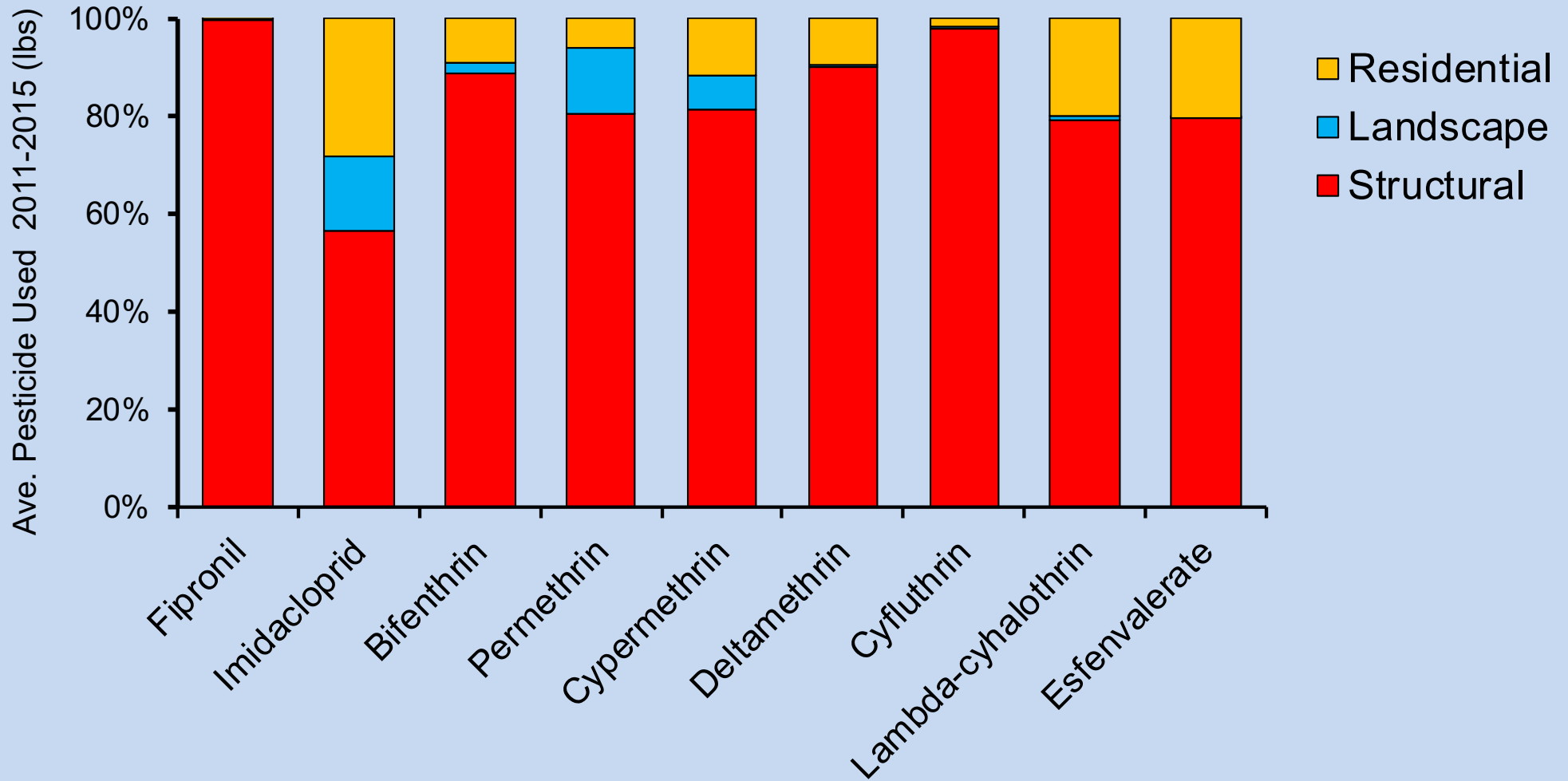
What About Homeowner Use?

Residential Survey

- Door-to-door survey in NorCal and SoCal residential neighborhood
- 178 participants answered 5 questions concerning pesticide use



Pesticide Use By Group*



*Residential use estimated by product sales, outdoor use products only

Question:

What About Online Sales?

Online Sales

- Products labeled for professional use only

“For sale to, use and storage only by individuals/firms licensed or registered by the state to apply termiticide and/or general pest control products.”

- Several states have addressed this through regulations (ex. NY, CT, MN)
- California looking into options

Questions?