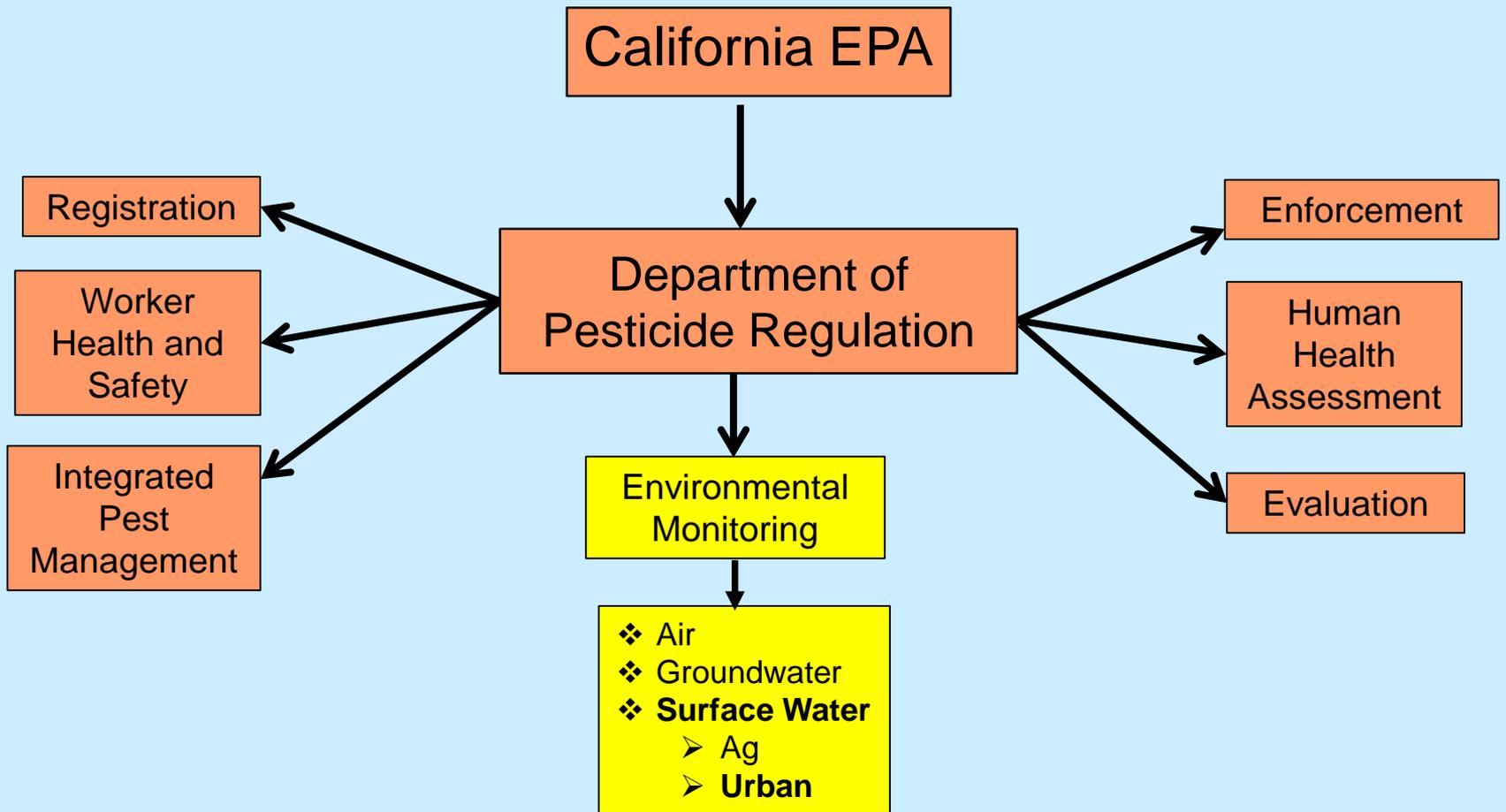


Monitoring and Mitigation of Pyrethroids in Surface Waters



Robert Budd, Ph.D.
Research Scientist III
Best Practices Webinar
March 9th, 2022



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

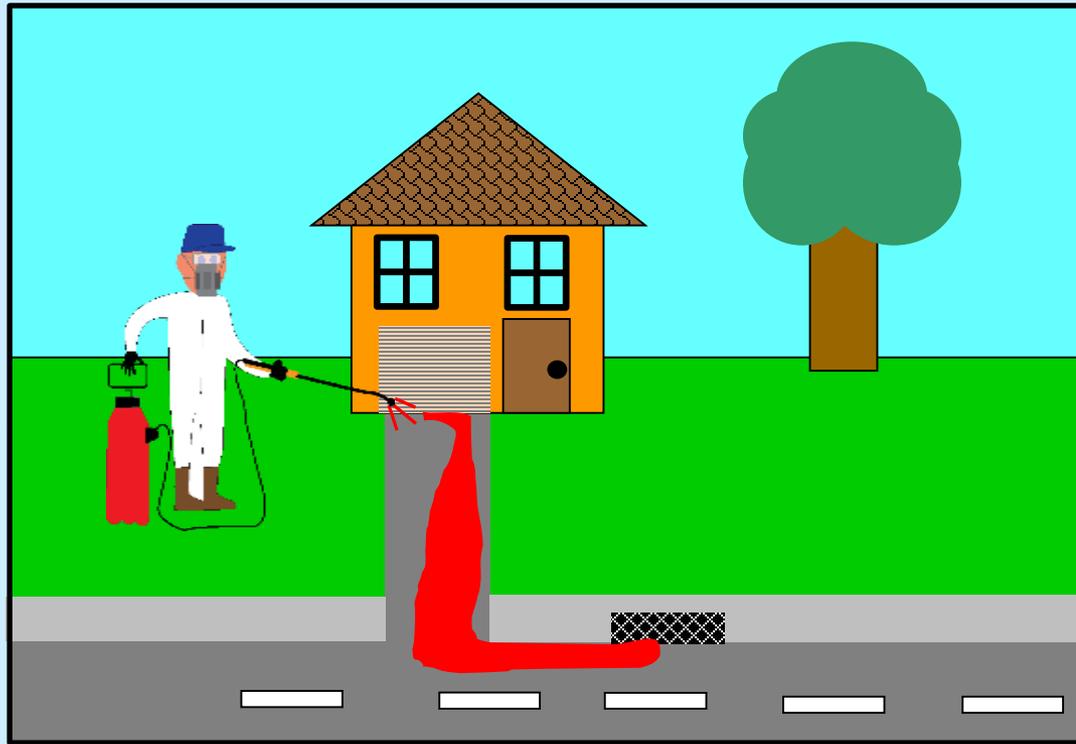
How Bad?

- Develop strategies to mitigate pesticides of concern

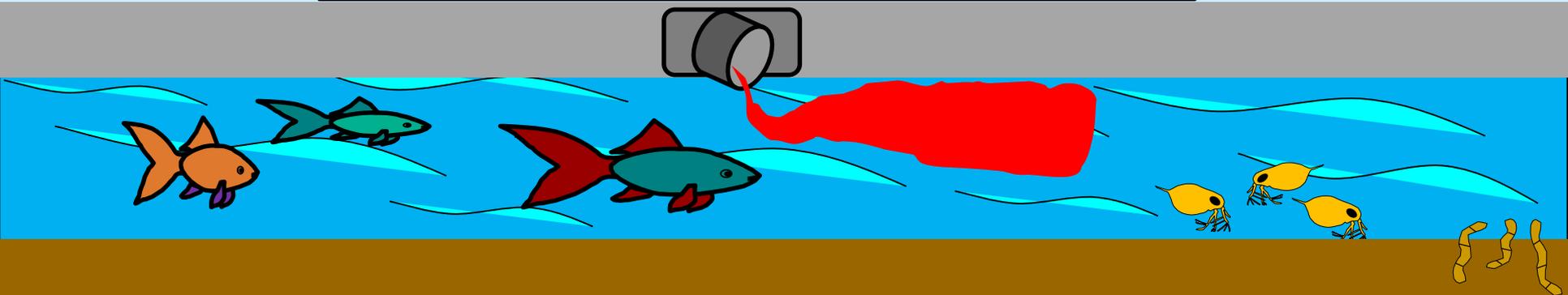
How To Change?

Pesticides in Urban Runoff

Types
Insecticides
Herbicides
Fungicides
Rodenticides



Formulations
Sprays
Granulars
Repellents
Traps



3,395 products; 666 active ingredients*

*As of Feb 24, 2022

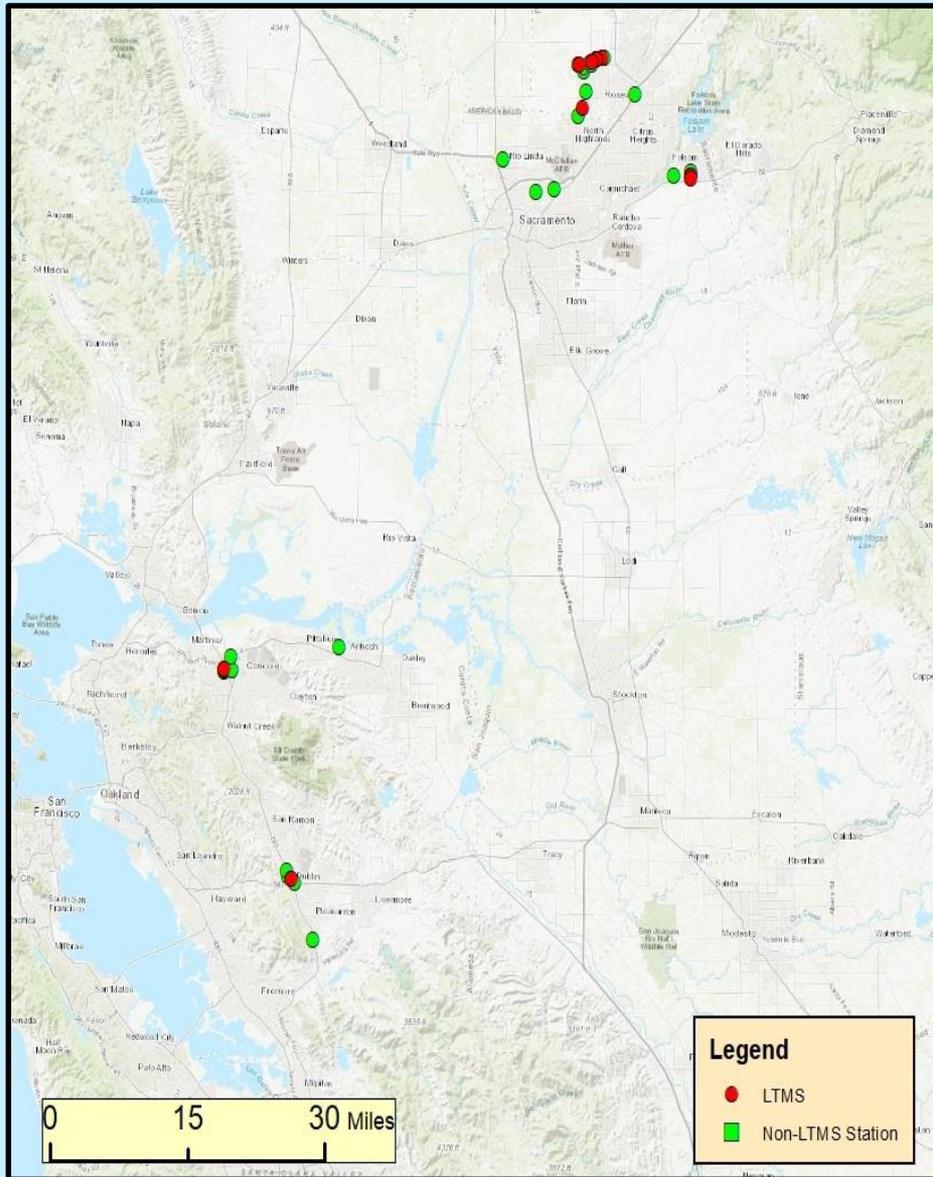
Sampling Design

- Use DPR Prioritization Model to identify high priority pesticides and watersheds
- Four events per year; two dry and two storms
- Currently ~ 80 pesticides monitored
- Concentrations compared to US EPA aquatic toxicity thresholds

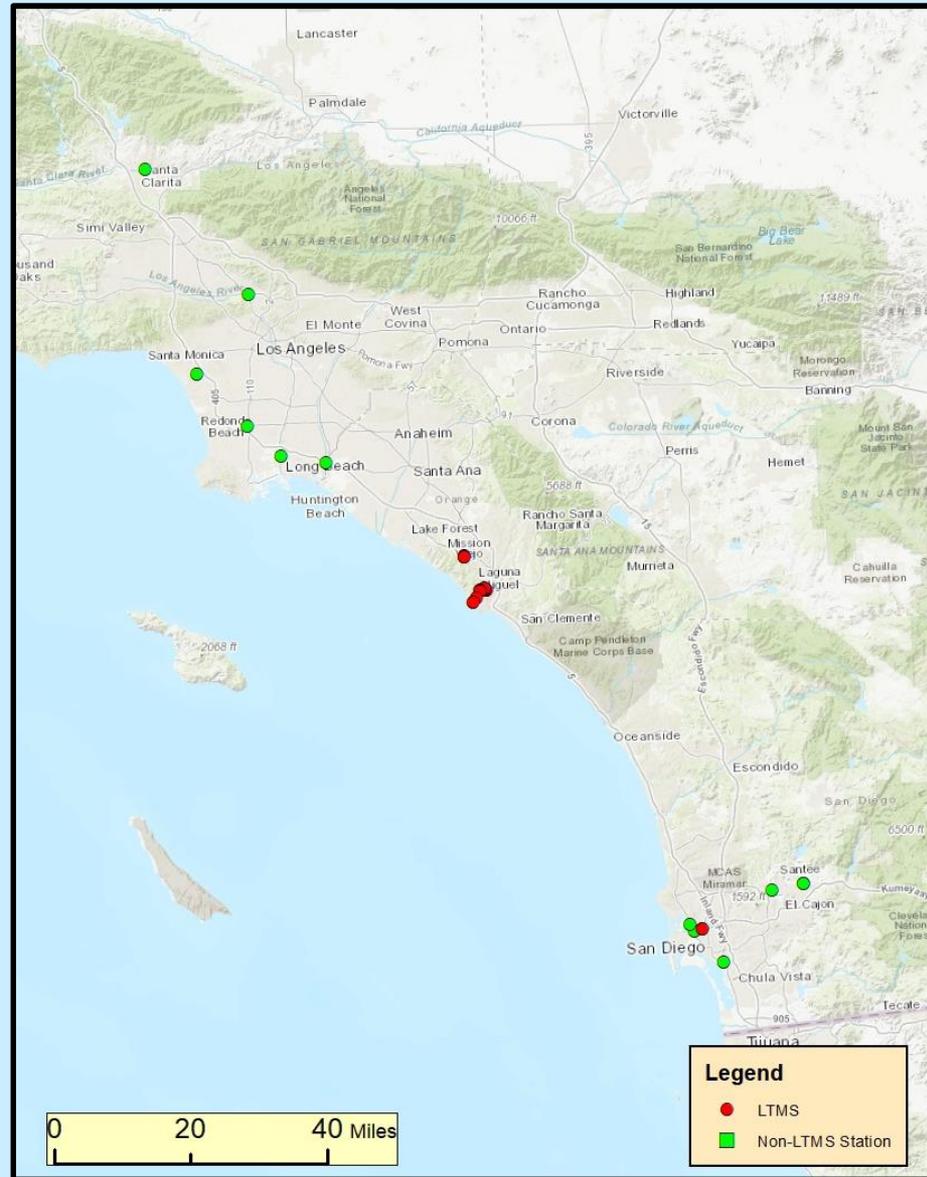


The screenshot shows the EPA website header with the logo and navigation menu. The main content area features the title "Aquatic Life Benchmarks and Ecological Risk Assessments for Registered Pesticides" and a paragraph explaining that the Office of Pesticide Programs' Aquatic Life Benchmarks for freshwater species and the Office of Water's Ambient Water Quality Criteria (when available) for registered pesticides in the United States are provided in the table below. It also mentions that Aquatic Life Benchmarks may be used in conjunction with environmental chemistry methods (ECMs), which are analytical methods for detecting pesticide residues, primarily in soil or water. State, tribal, and local governments can use the Aquatic Life Benchmarks in identifying and prioritizing sites and pesticides that may require further investigation.

Urban Sampling Locations



Northern California



Southern California

Site Type



Storm Drain



Receiving Water

Event Type



Dry Season



Rain Event

Language Barrier

Active Ingredient

Representative Products*

Bifenthrin

Bifen I/T, Talstar, Wisdom

Permethrin

Tengard, Martins, Astro

Esfenvalerate

Onslaught, Conquer

Cypermethrin

Cyper TC, Demon

Cyfluthrin

Cy-Kick, Tempid, Tempo

Deltamethrin

Suspend

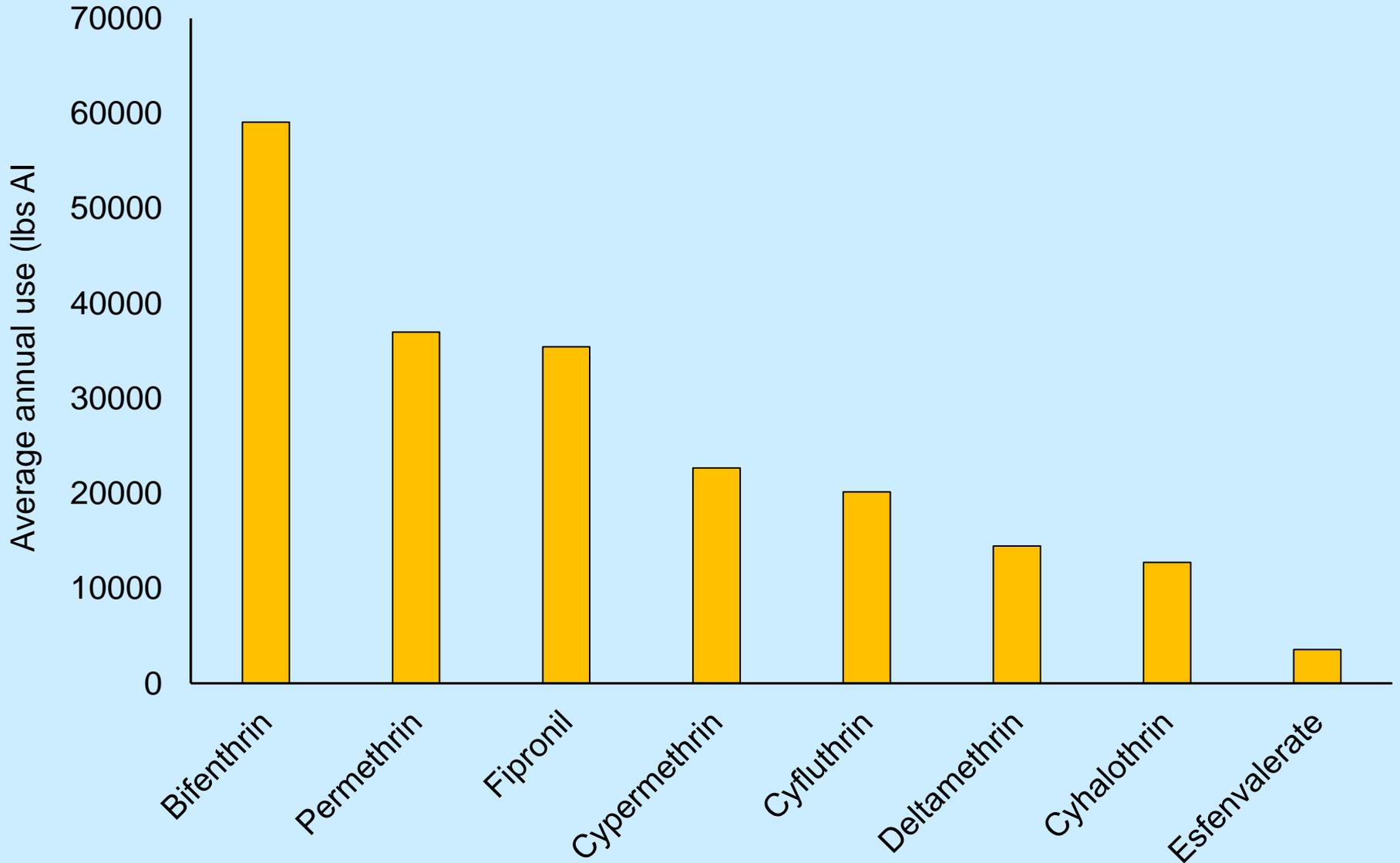
Lambda-cyhalothrin

Cyzmics, Demand

Fipronil

Termidor, Taurus, Fuse

Reported Use for Structural Pest Control



Elephant Equivalents



Bifenthrin

Permethrin

Fipronil

Cypermethrin

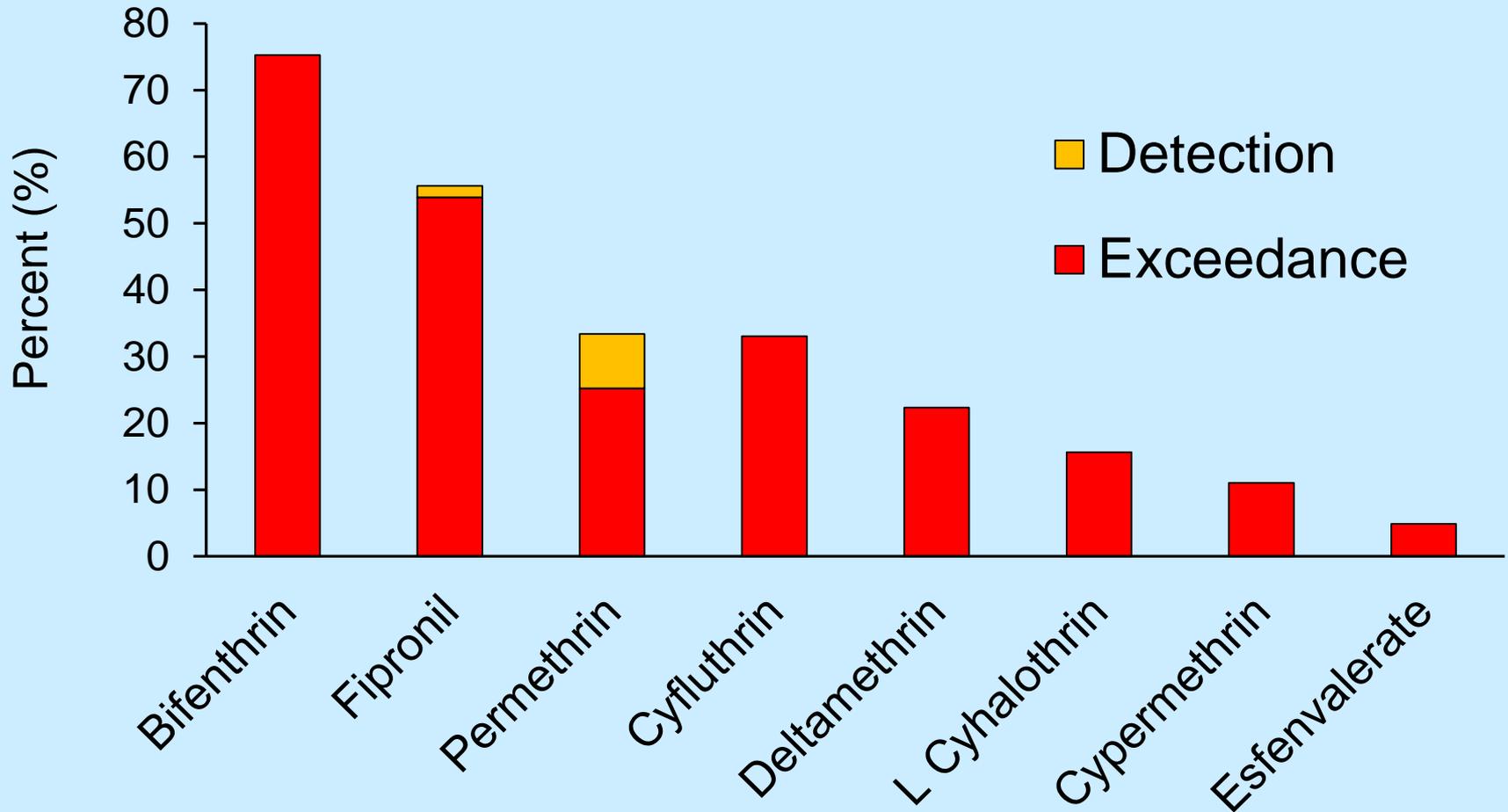
Cyfluthrin

Deltamethrin

Cyhalothrin

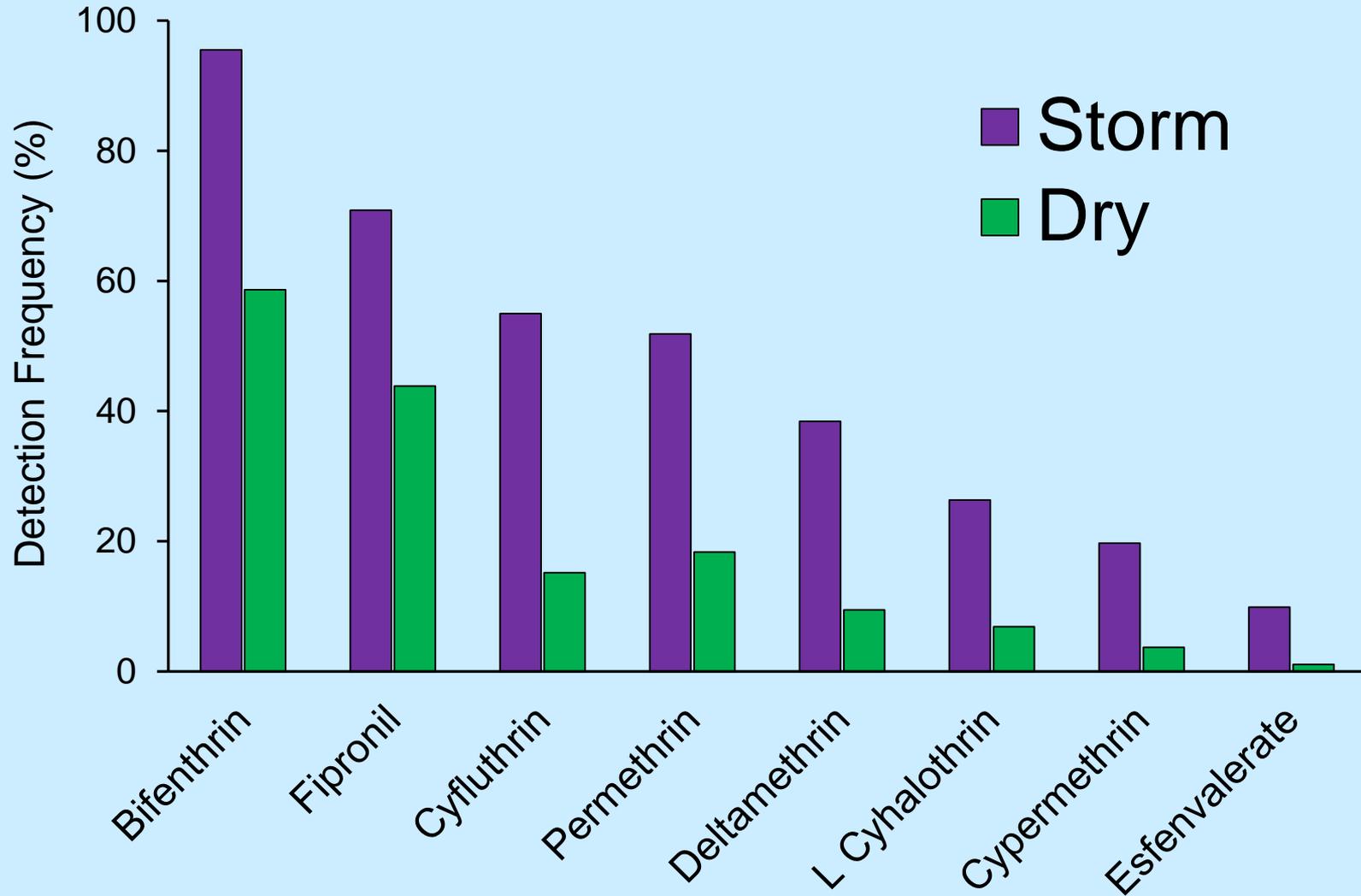
Esfenvalerate

Statewide Detection & Exceedance*



*Compared to minimum US EPA aquatic benchmark

Effect of Rainfall



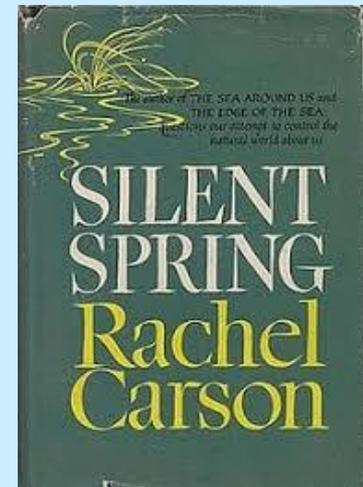
Why Do We Care?



Jorge Villalba, 2014



Societypages.org



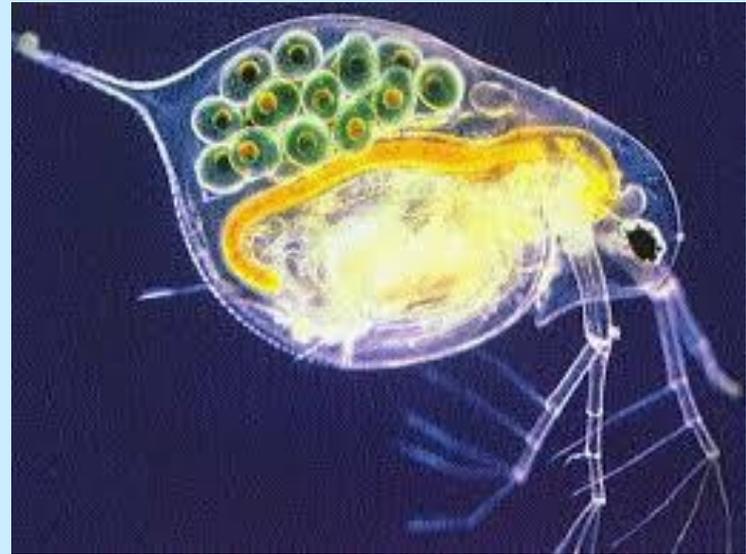
Amazon.com

Why Do We Care?



Scott Bauer, 2013

Hyalella azteca



Aqua-fish.com.au, 2009

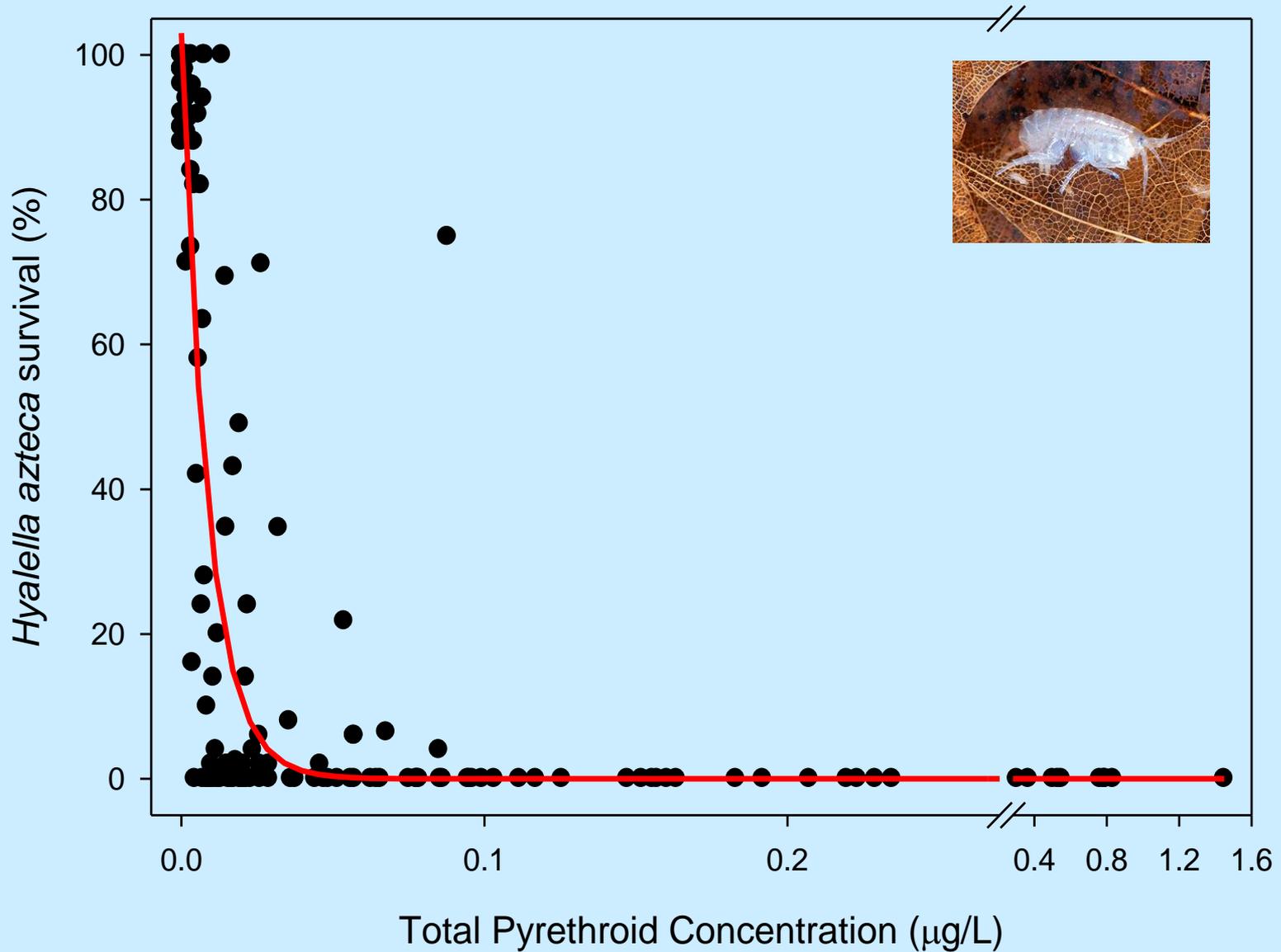
Ceriodaphnia dubia



Eiko Jones, 2017

Chinook Salmon

Toxicity



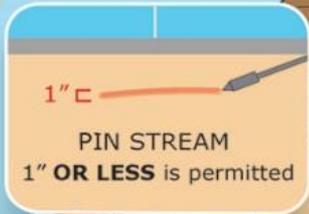
Surface Water Regulations

- 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" 

PIN STREAM
1" **OR LESS** is permitted



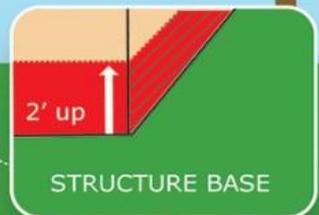
↑
2'
↓
← 2' →

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 Label Restrictions

Products that are included include the following characteristics:

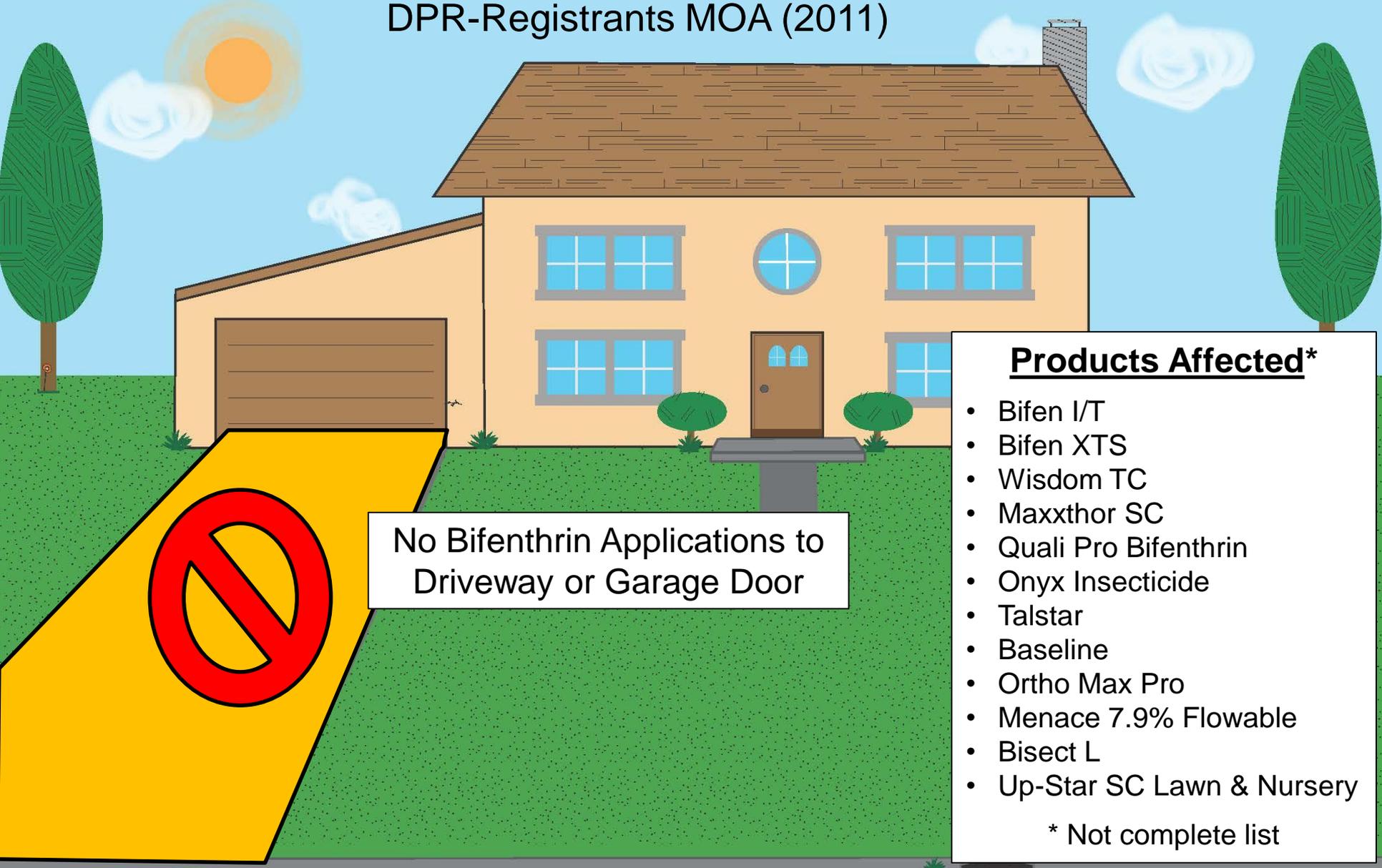
- 1) **Active Ingredient.** Contain bifenthrin as an active ingredient.
- 2) **Outdoor Structural Sites.** Include directions for outdoor applications to structural, residential, industrial and institutional sites.
- 3) **Non-porous Surfaces.** Include directions that allow (or don't otherwise prohibit) 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*

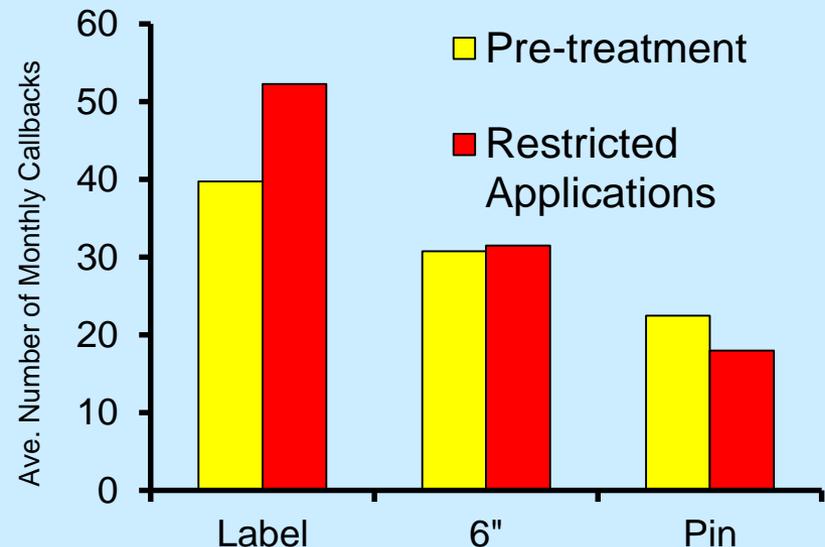
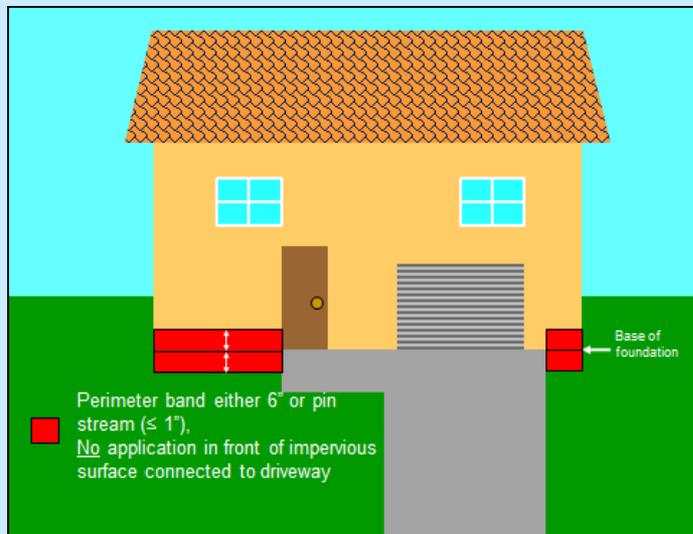
- Bifen I/T
- Bifen XTS
- Wisdom TC
- Maxxthor SC
- Quali Pro Bifenthrin
- Onyx Insecticide
- Talstar
- Baseline
- Ortho Max Pro
- Menace 7.9% Flowable
- Bisect L
- Up-Star SC Lawn & Nursery

* Not complete list

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

California Environmental Protection Agency
dpr Department of
Pesticide Regulation
<https://www.cdpr.ca.gov/>



DPR Outreach



PCOC
PAPA
CAPCA
CASQA
CAC
Public

DPR Outreach Materials



Fipronil Label Restrictions Placard



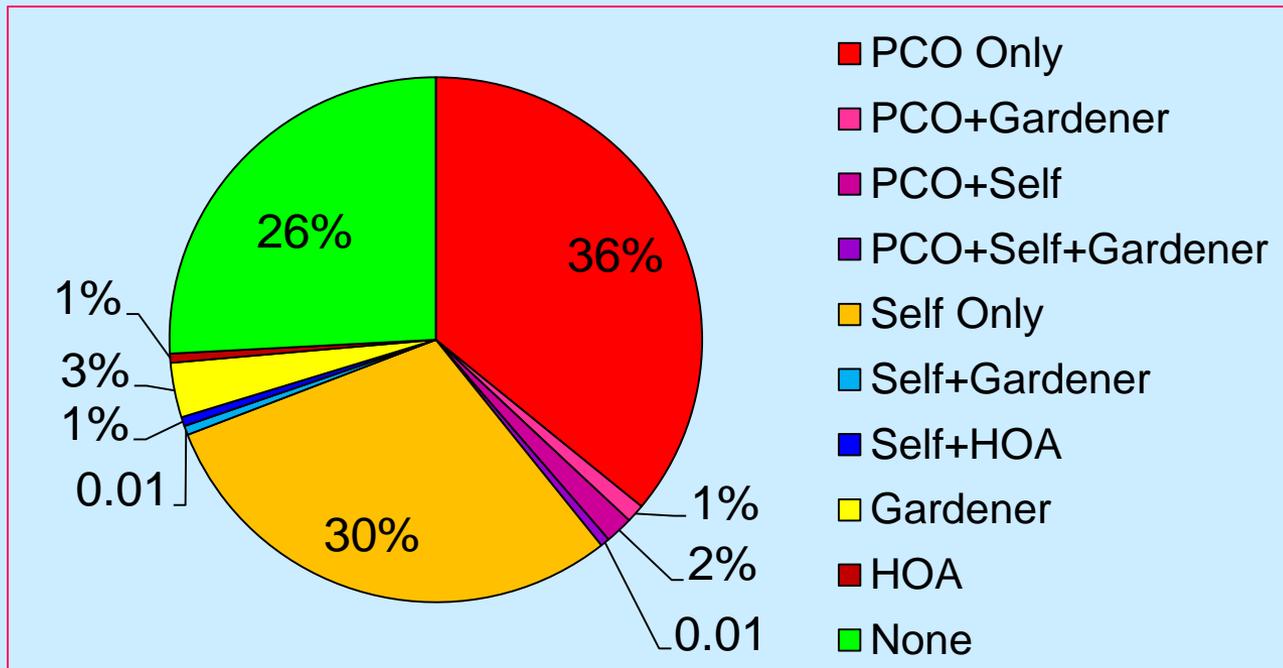
Surface Water Regulations Placard

Question:

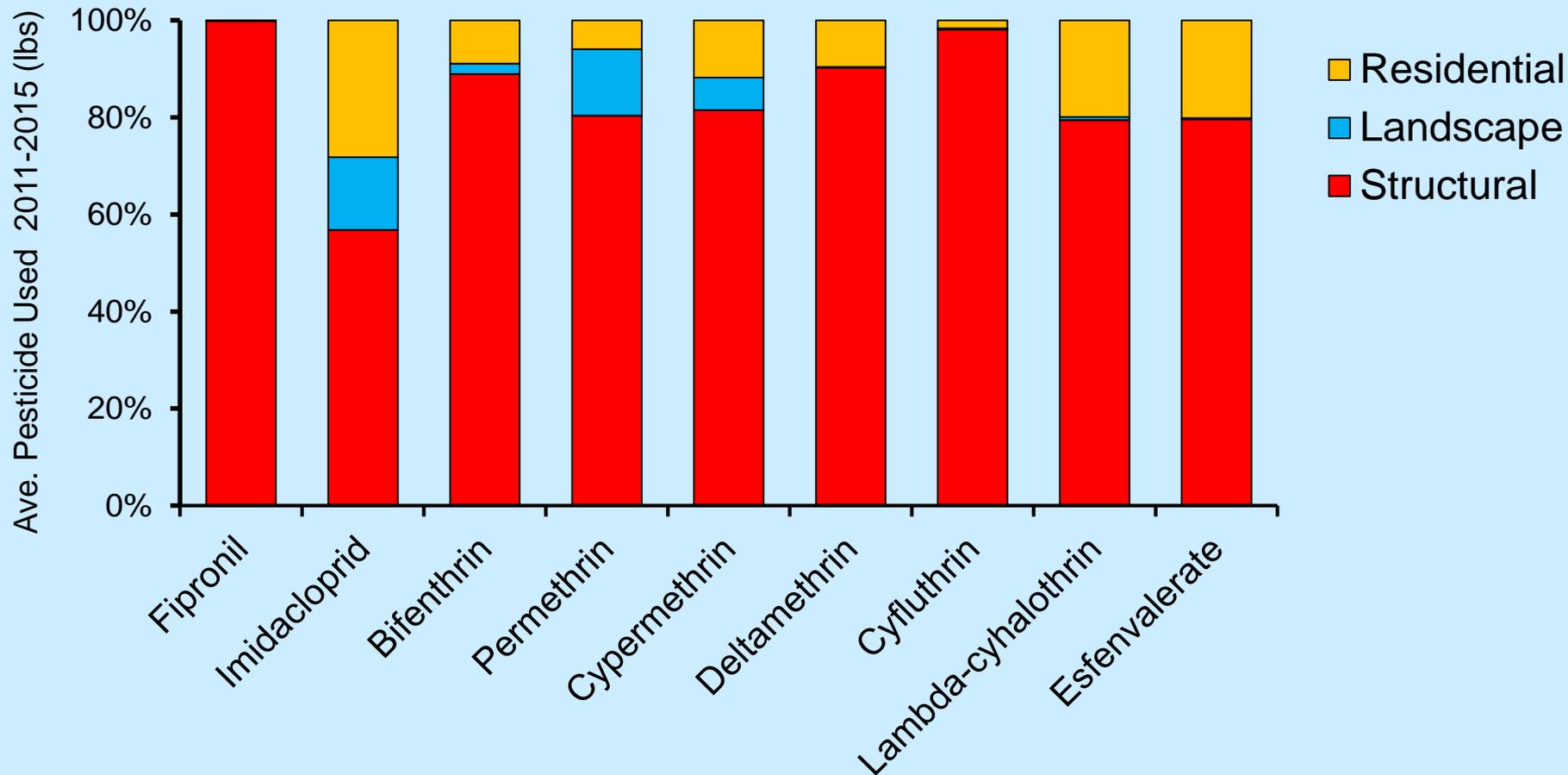
What About Homeowner Use?

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

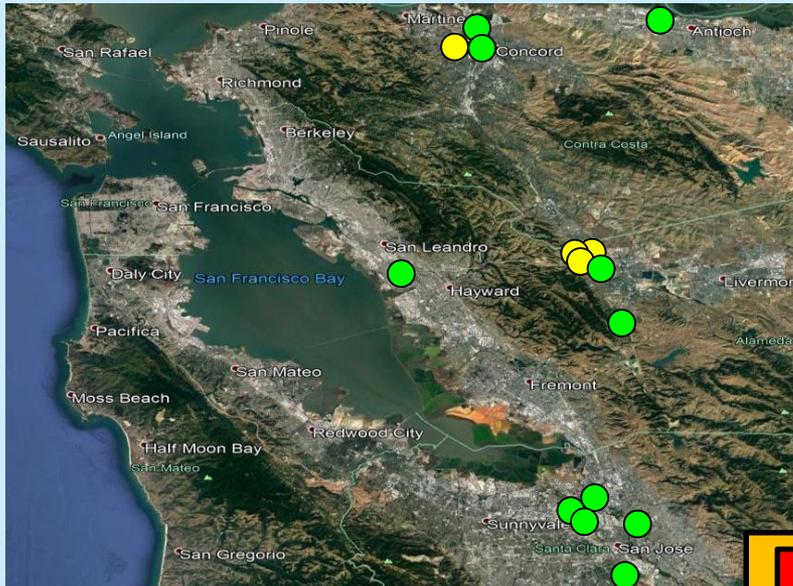
“For sale to, use and storage only by individuals/firms licensed or registered by the state to apply termiticide and/or general pest control products.”

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

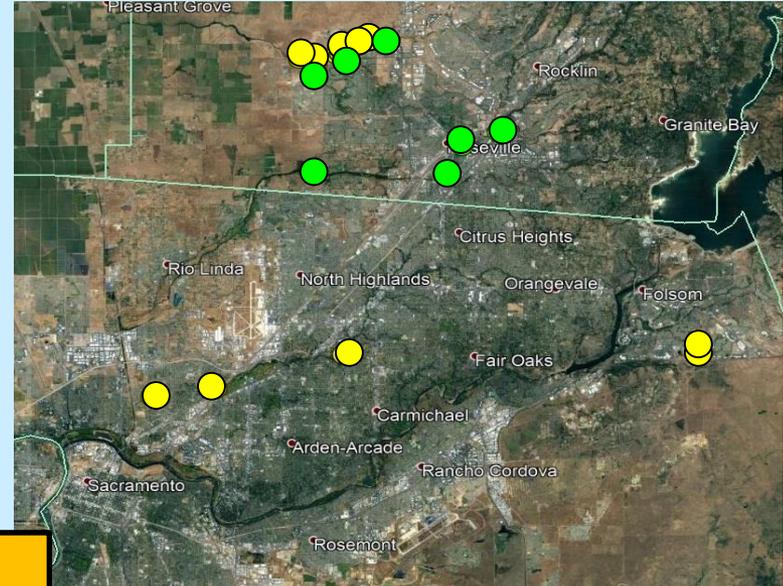


Questions?

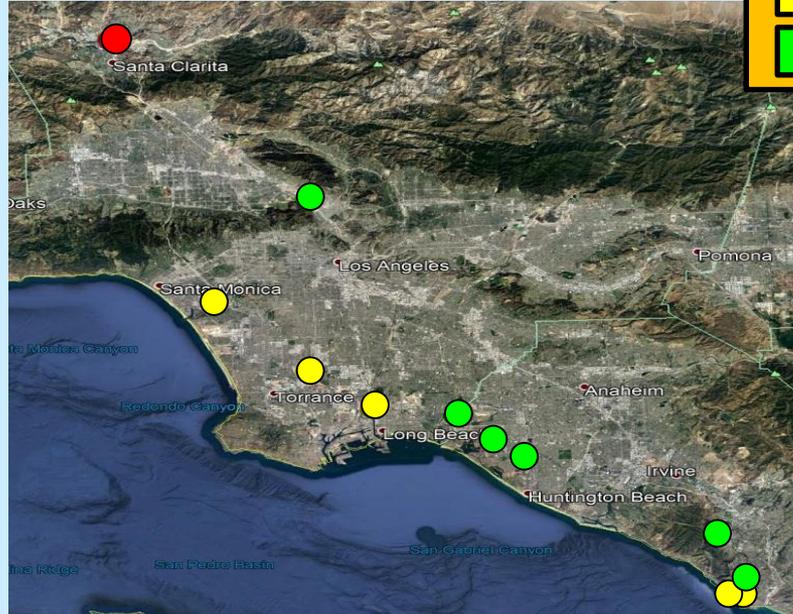
Median Bifenthrin Concentrations



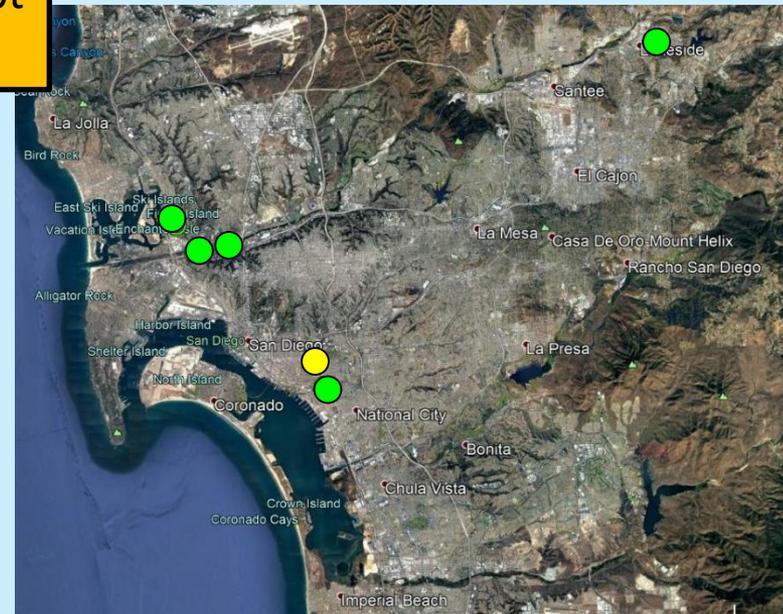
SF Bay



Sacramento



Los Angeles/Orange



San Diego

