

Background on Pyrethroids: Urban Uses and Upcoming Regulatory Agency Actions

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Where Are More Pesticides Used in California?



Photo courtesy USGS





Presentation Overview

- Which urban pyrethroids are most likely to cause adverse water quality effects?
- How are these pyrethroids used in urban areas?
- What are the trends in use?
- How will pyrethroid research results be used by regulators?
- What are the biggest research needs?
- What's next?

Data Sources—

Pyrethroids Selection

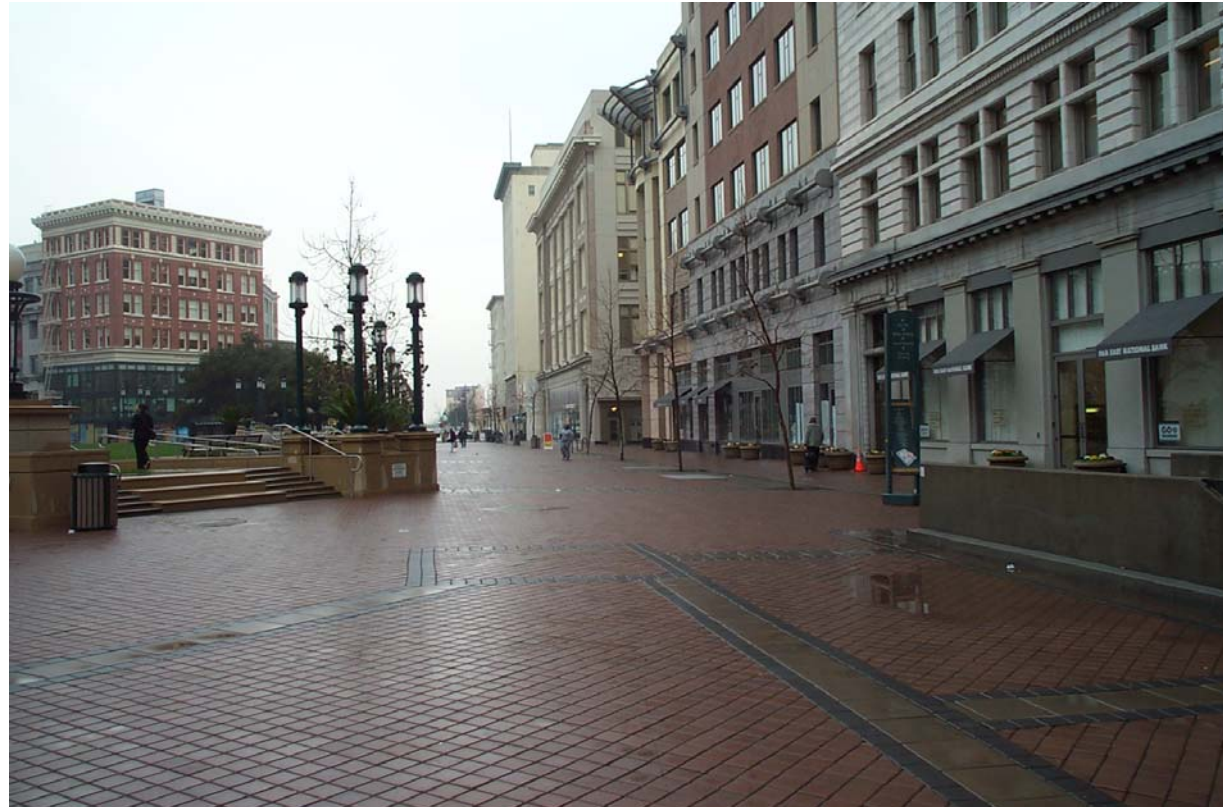
- Market Analysis/Usage Pattern Review
 - User surveys in San Francisco Bay Area, Sacramento, and Stockton (Flint 2003)
 - Older surveys—usage patterns only (Cooper 1996, Scanlin & Cooper 1997; URS 2000; Wilen 2001; Wilen 2002)
 - Retail shelf surveys (TDC Environmental 2004)
 - Retail brand product review (Ortho, Bayer, Scotts, Spectracide Internet sites)
- Urban Uses that Have Potential for Meaningful Quantities to Reach Surface Water
 - Analysis of sources, pathways, washoff, and relative potential to release insecticides to surface waters (for DPR, TDC Environmental 2001)

Pyrethroids Have Many Uses

- Keeping insects out of buildings
- Underground termites
- Lawn/garden insects
- Pet fleas



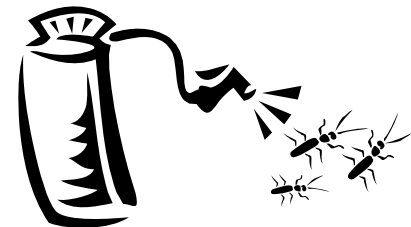
Which Pesticide Uses Matter More for Water Quality?



Which Pesticide Uses Matter More for Water Quality?

- Applications on outdoor impervious surfaces
- Applications involving discharges to drains (including sewers)
- Applications to and near water
- Using large quantities of active ingredient

Source: Analysis for DPR (TDC Environmental 2001)





Priority Pyrethroids

- Greatest potential to cause adverse effects in aquatic ecosystems receiving urban discharges
 - Bifenthrin
 - Cyfluthrin and Beta-Cyfluthrin
 - Cypermethrin
 - Deltamethrin
 - Esfenvalerate
 - Lambda-Cyhalothrin
 - Permethrin
 - Possible addition: Tralomethrin



Approach to Estimating Bay Area Urban Pesticide Use

Unreported Use = Statewide sales – Reported use

Urban Use = Reported urban use + unreported use

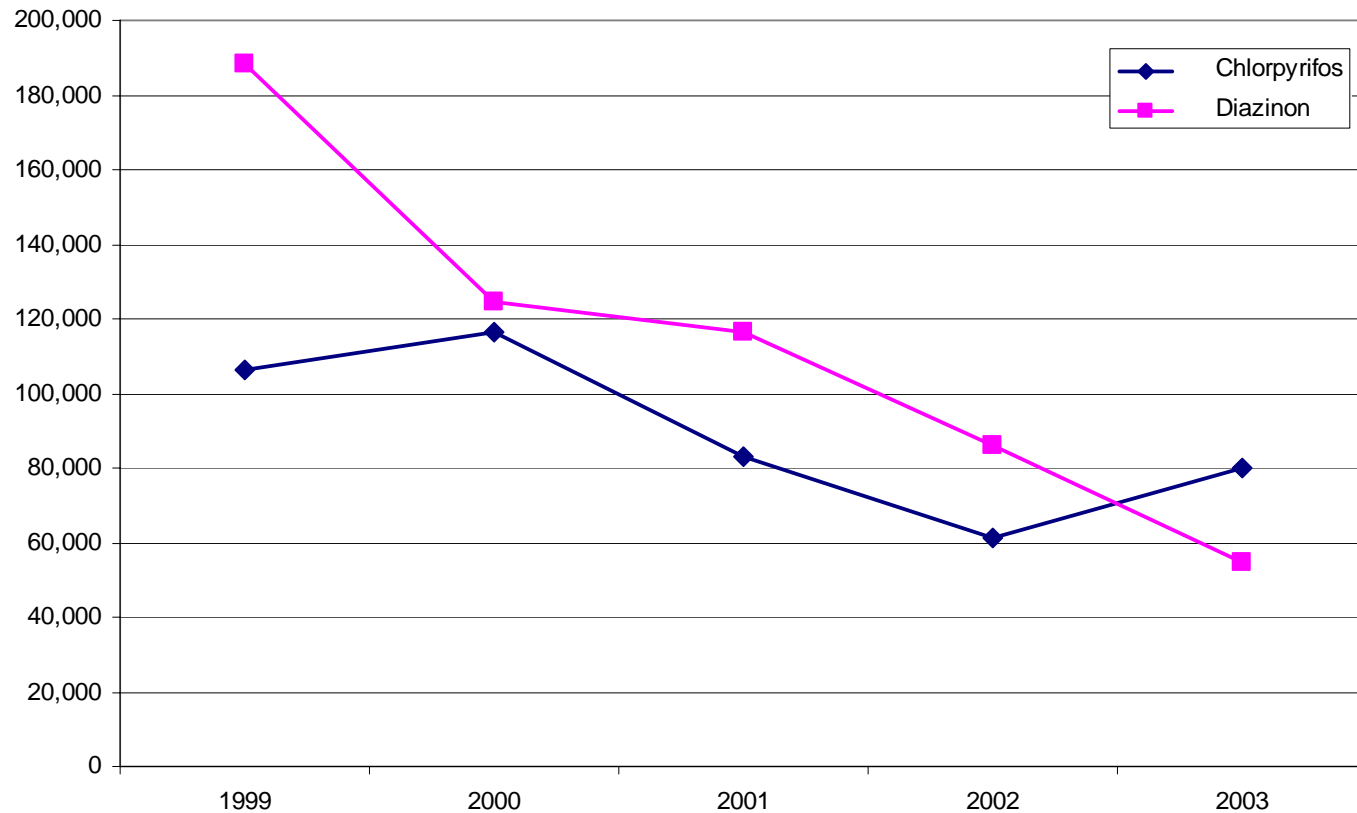
- *All unreported use is assumed to occur in urban areas*
- *City or County use unreported use is estimated on a per capita basis*



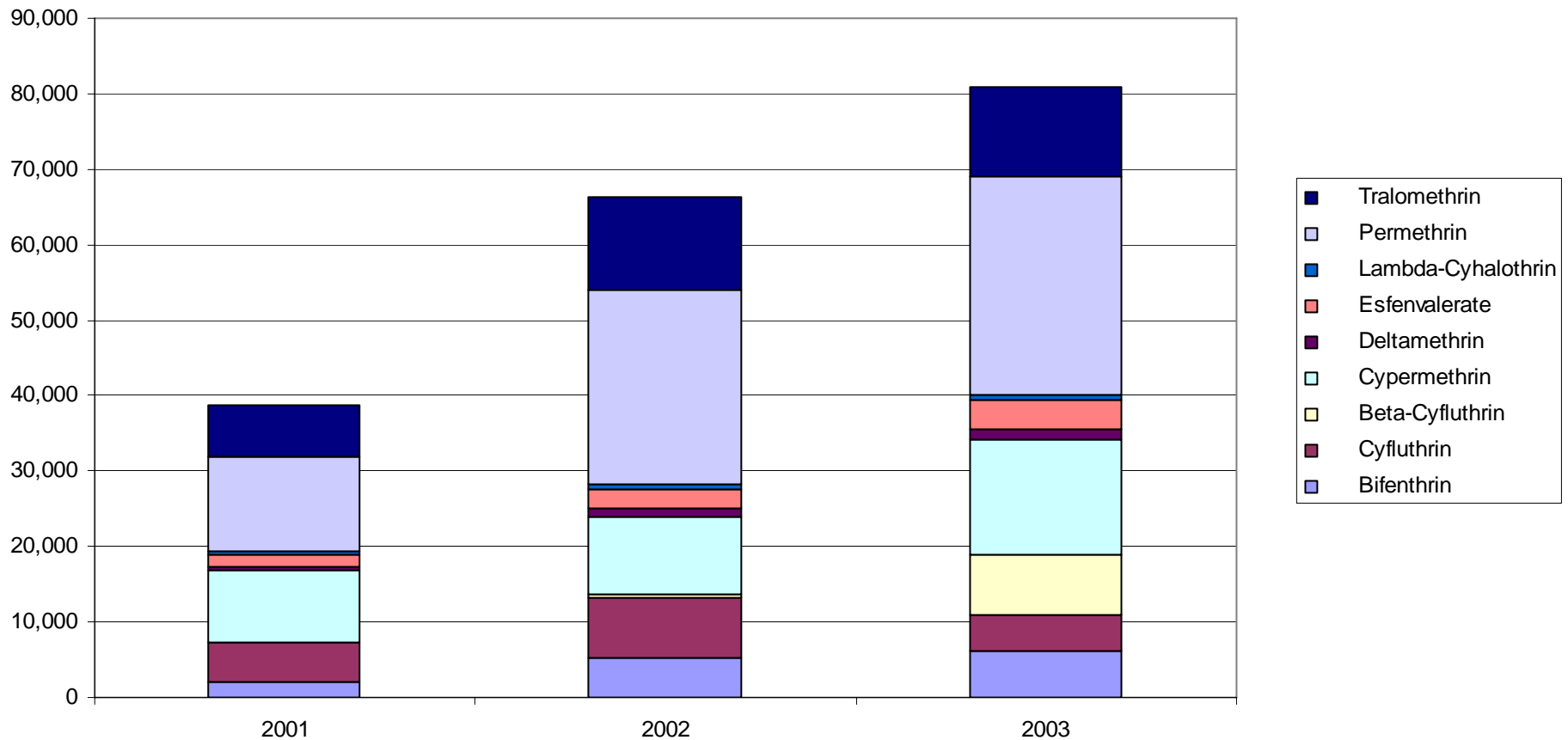
Data Sources

- DPR Pesticide Use Reports
 - Under-reported (at least 10%)
 - Use data cannot differentiate above ground and subterranean applications
- DPR Pesticide Sales Data
 - Under-reported (on average 10%)
- Population (CA Dept. of Finance)

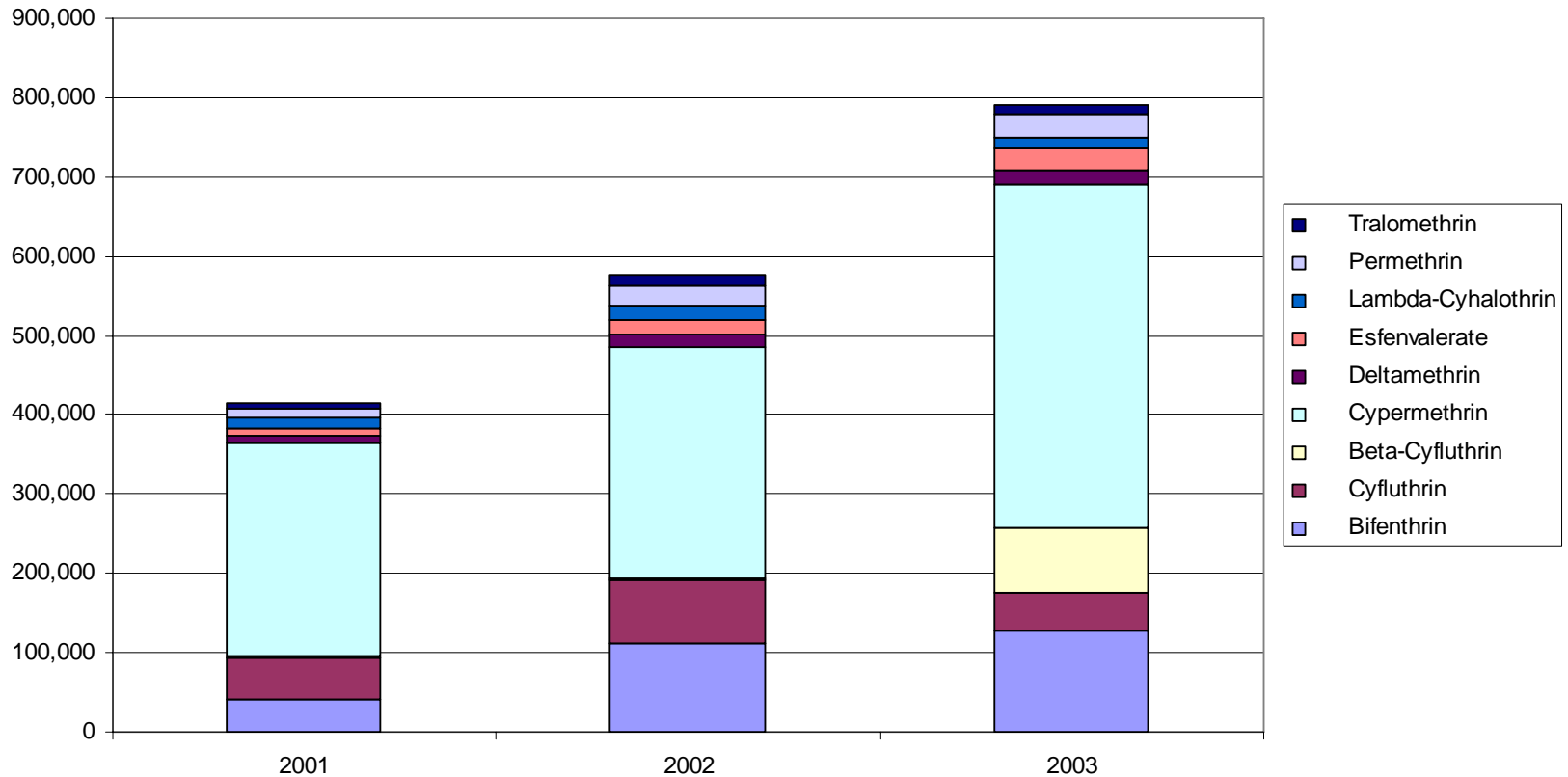
Bay Area Diazinon & Chlorpyrifos Use Decreased from 1999-2003



Bay Area Pyrethroid Use (Lb A.I.) Doubled Between 2001 and 2003



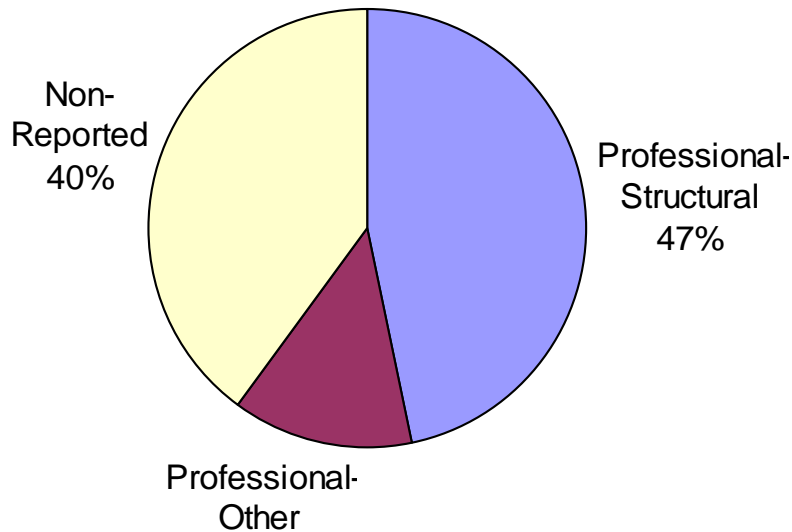
Bay Area Cypermethrin & Bifenthrin Applications Contain the Most Toxicity



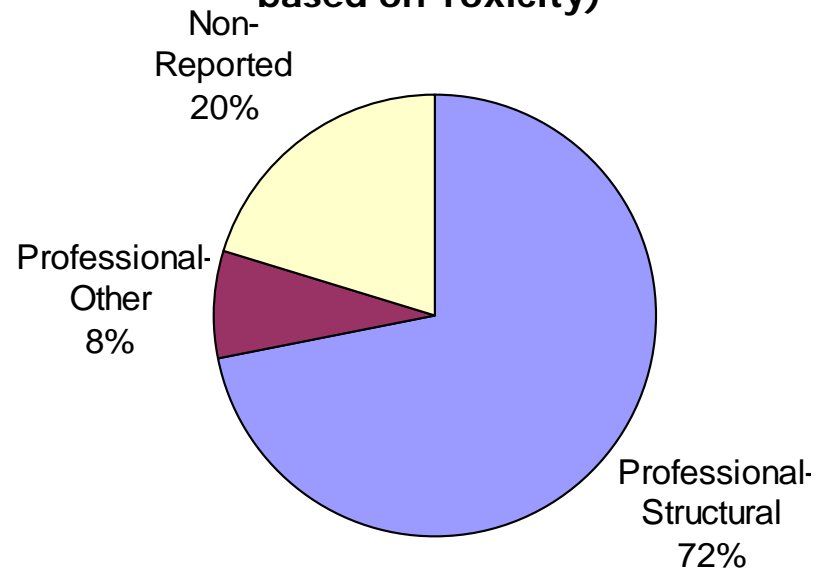
Expressed in pounds permethrin equivalents, based on ratio of each compound's sediment toxicity to *Hyallela azteca* to permethrin's toxicity (Amweg et al. 2005; Maund et al. 2002)

Most Urban Pyrethroids are Applied by Professionals for Structural Pest Control

San Francisco Bay Area Study List
Pyrethroids Urban Uses, 2003 (Lb. A.I.)



San Francisco Bay Area Study List
Pyrethroids Urban Uses, 2003
(Expressed in Permethrin Equivalents,
based on Toxicity)



Expressed in pounds permethrin equivalents, based on ratio of each compound's sediment toxicity to *Hyallela azteca* to permethrin's toxicity (Amweg et al. 2005; Maund et al. 2002)

U.S. EPA Re-Registration

- Only certain pyrethroids (Permethrin, Cypermethrin, Remethrin, Allethrins, Tetramethrin, Sumithrin)
- EPA risk assessments rely on available data
 - Many data gaps
 - Default EPA assumption is no significant risk





Other Regulatory Possibilities

- 303(d) Water Body Impairment Listings?
 - Could occur as soon as 2006
 - Many data needs for TMDLs
- DPR Re-evaluation?

Research Needs— Analytical Methods

- Try out pyrethroid methods in all media
- Develop standard procedures for pyrethroid sample collection & handling



Photos courtesy USGS

Research Needs—Monitoring

- Surveillance monitoring needed
 - Priority: Sediments/toxicity
 - Need adequate d.l. for pyrethroids (for sediments see LC50s in Amweg et al. 2005; for water see TDC Environmental 2003)
 - Salt water, fresh water, POTW discharges
- Check for pyrethroids when toxicity is found
- Inform U.S. EPA and DPR of any pesticide-related toxicity

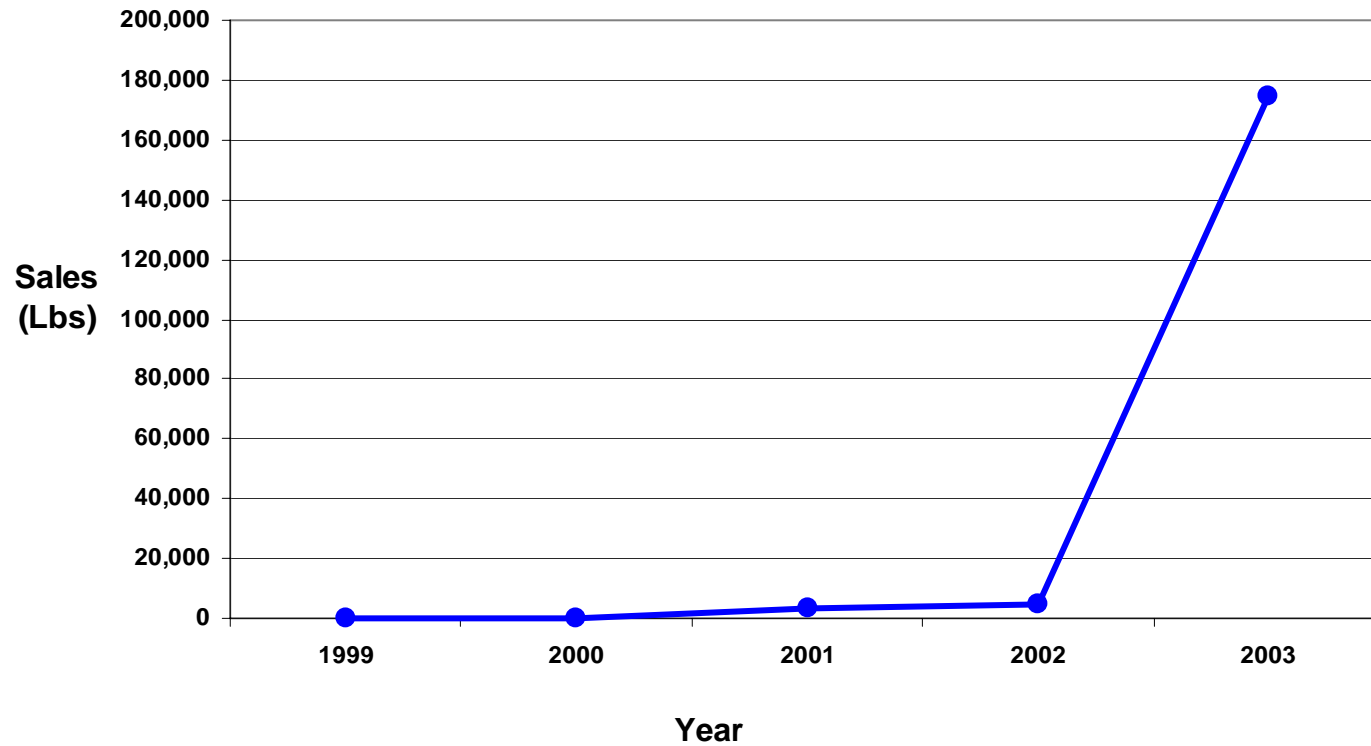




Research Needs—Toxicity

- Tralomethrin *Hyallela azteca* LC50s
- Marine sediment organism toxicity data
- Sublethal and chronic endpoints for pyrethroids (particularly sediment)
- Pyrethroid mixtures
 - Need to prove additivity
- Temperature effects
 - Surface water colder than labs

What's Next? Fipronil





More Information

- www.UP3Project.org