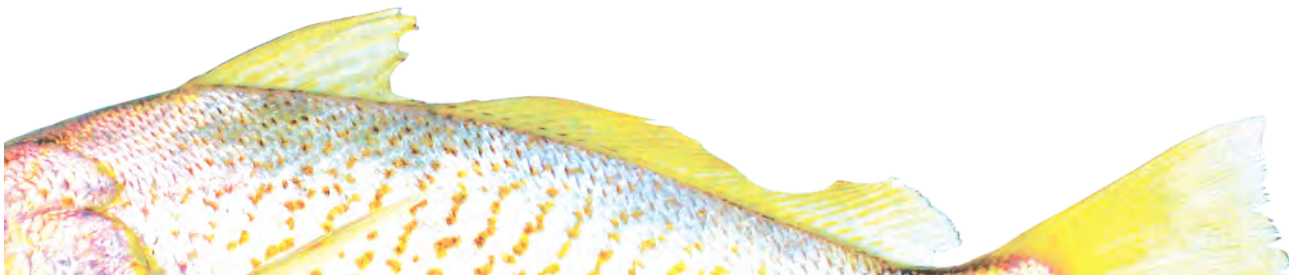


Pesticides in the RMP

ECWG meeting Oct 17 2008

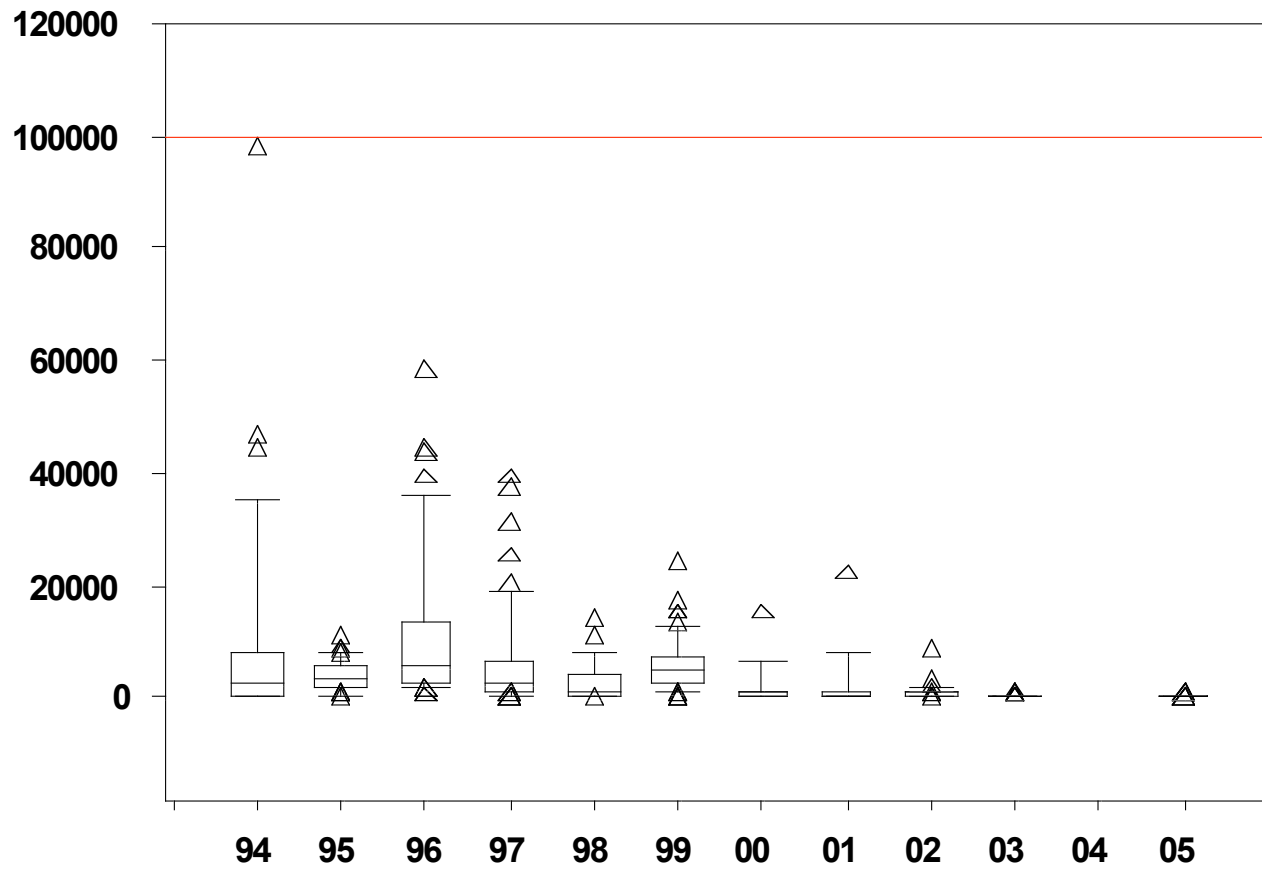


RMP Pesticide Monitoring

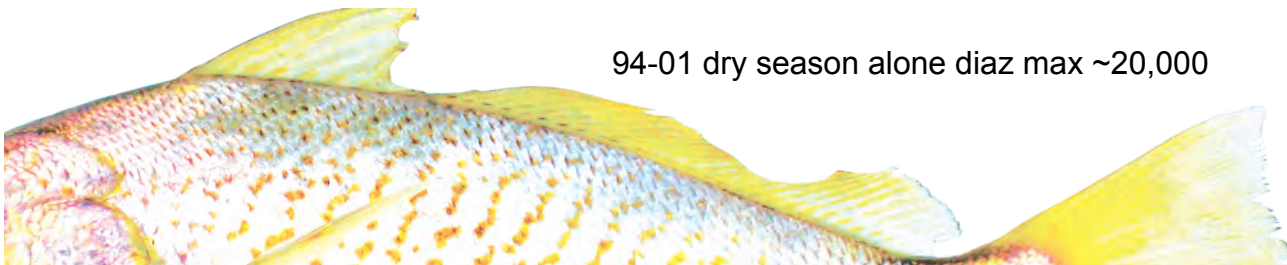
- Previous focus on legacy organochlorine pesticides (DDTs, etc)
- More recent focus on diazinon, chlorpyrifos
- Starting pyrethroid monitoring 2008
- How do we plan for next generation pesticides?



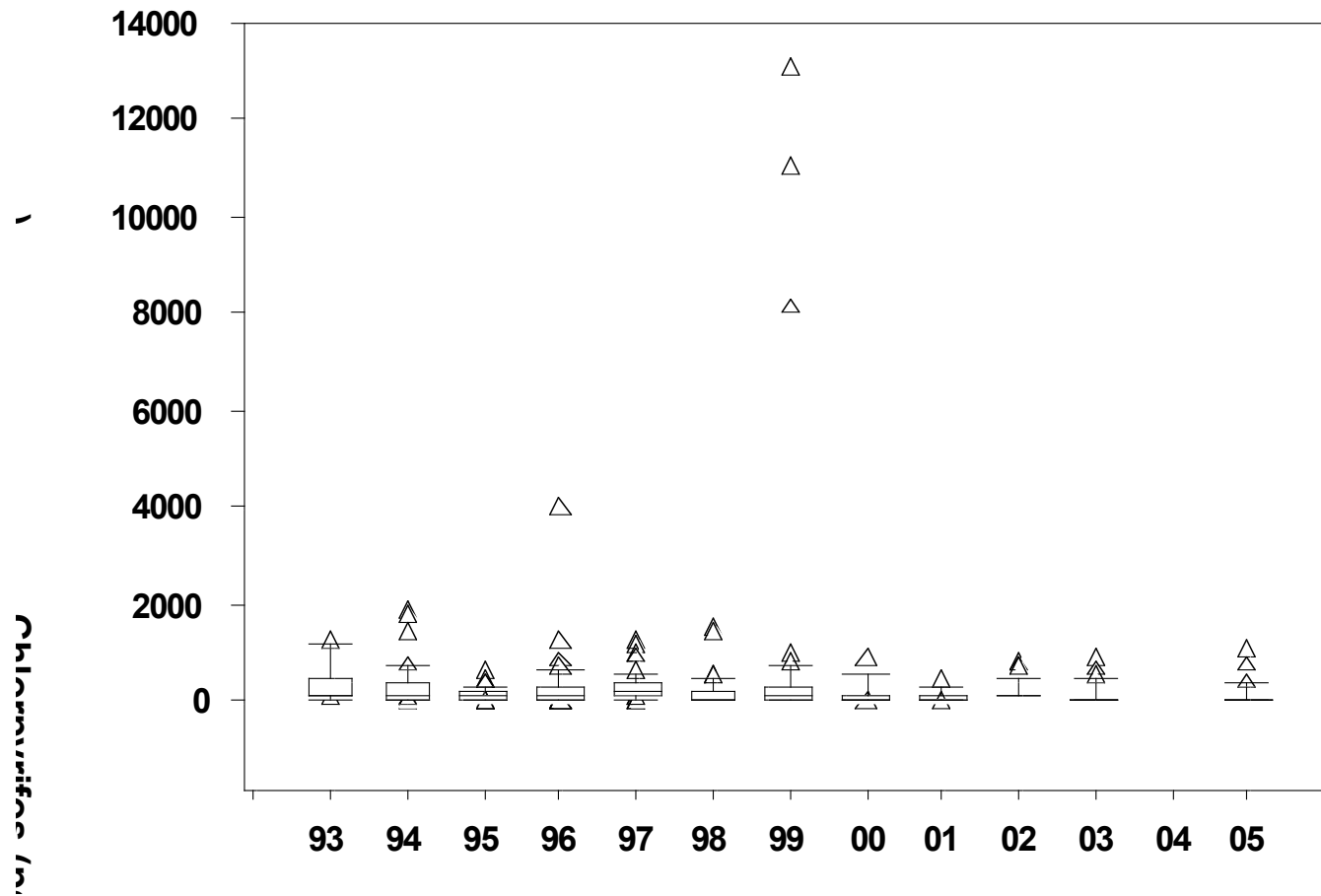
Dissolved Diazinon Concentrations by Year



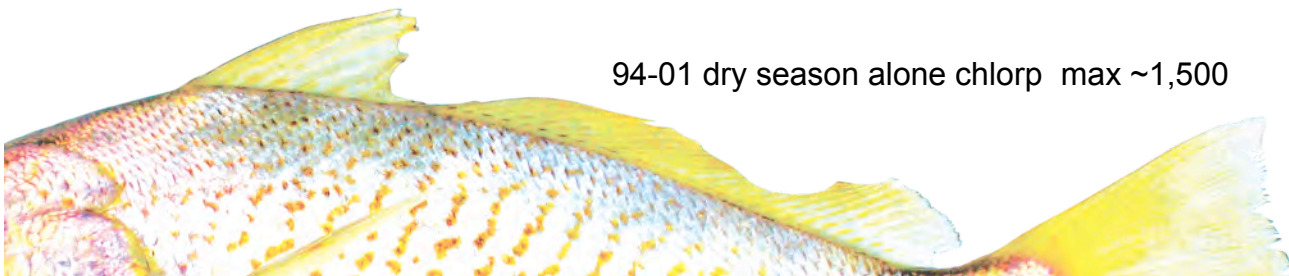
94-01 dry season alone diaz max ~20,000



Dissolved Chlorpyrifos Concentrations by Year



94-01 dry season alone chlorp max ~1,500



Pyrethroids in PRISM

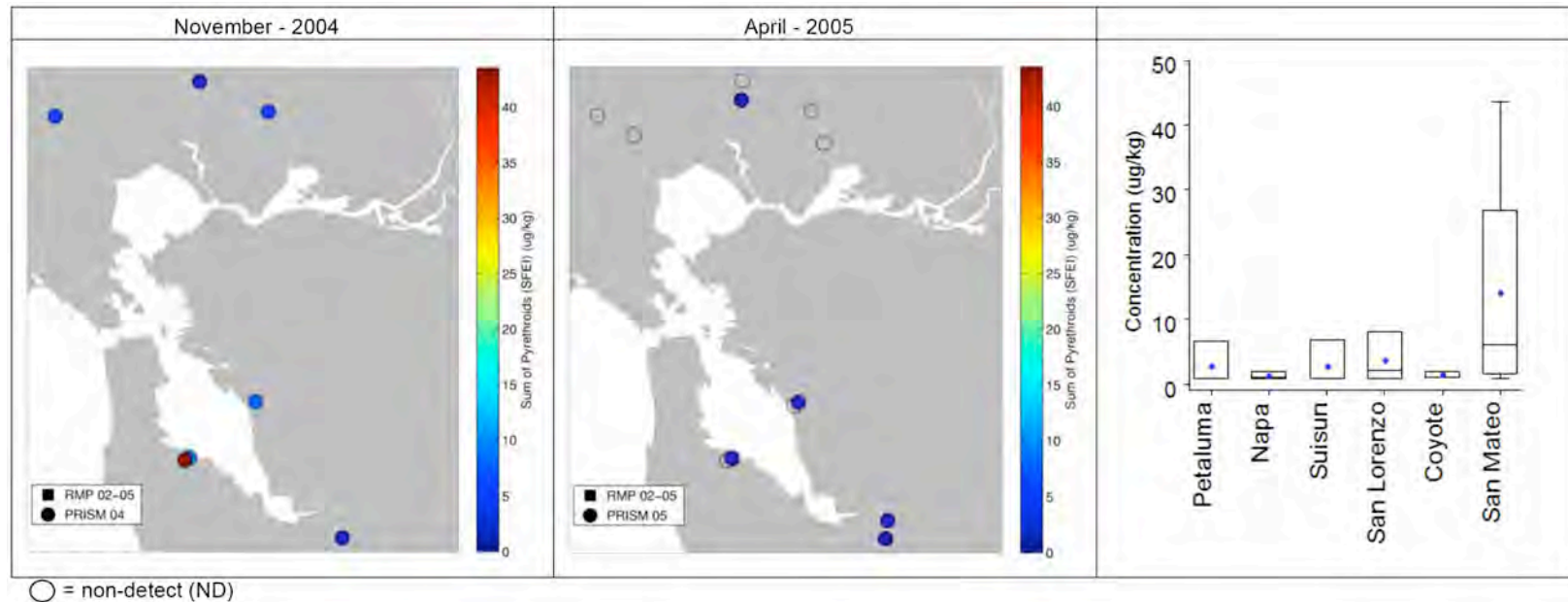
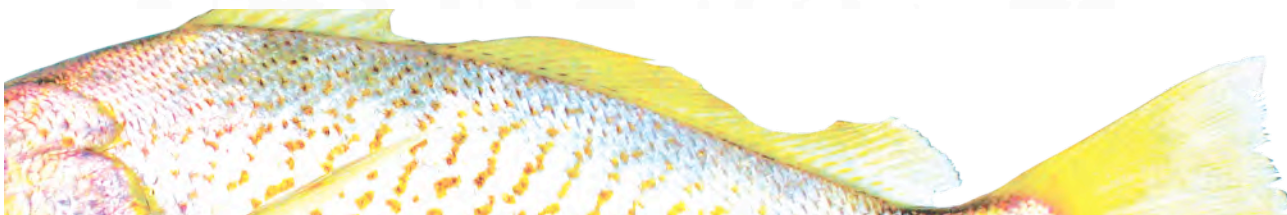
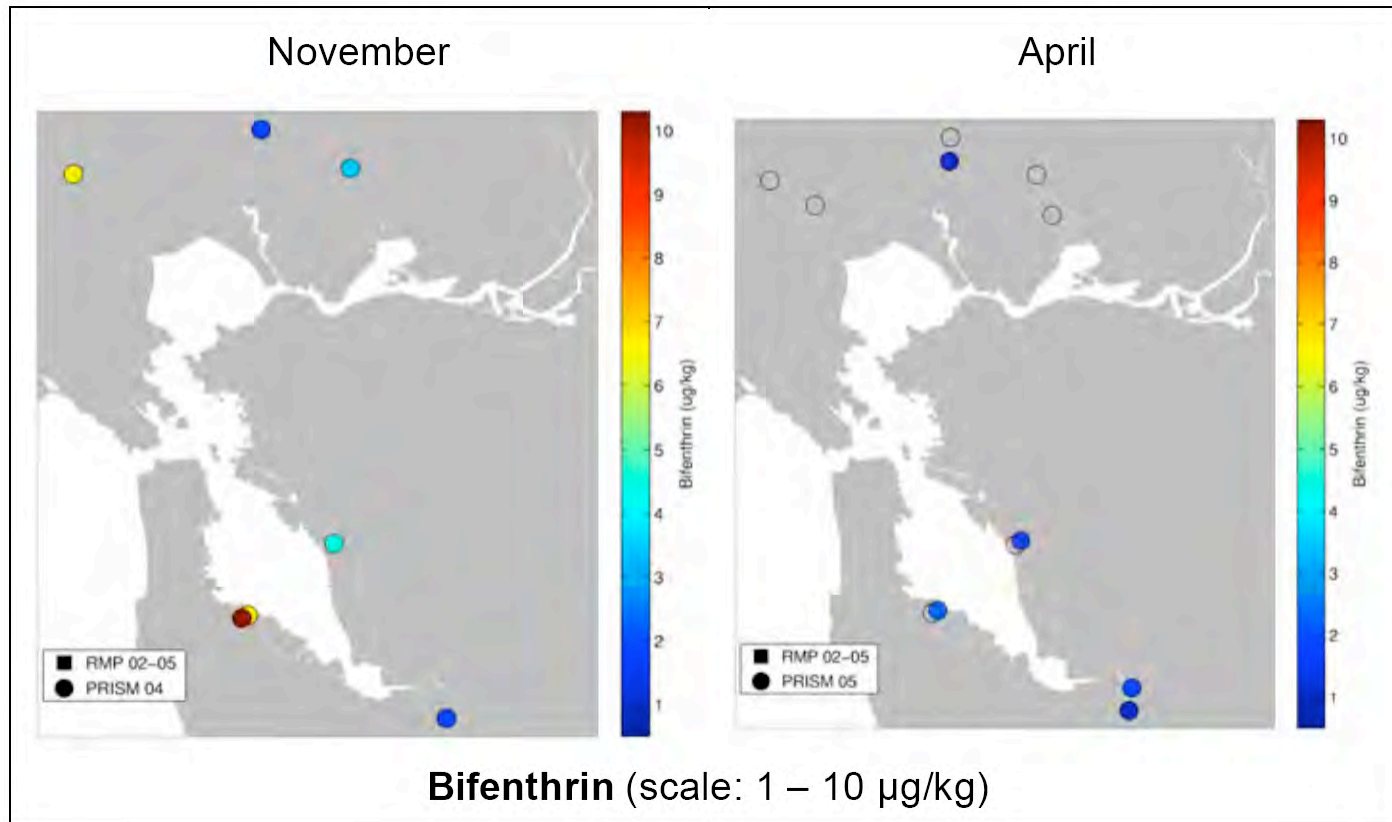


Figure 1.10. Sum of Pyrethroids measured in the tributaries (2004-2005).

Sum of Pyrethroids were detected in all samples from the November sampling period. No pyrethroids were measured in the RMP for comparison to in-Bay concentrations. The San Mateo Creek Upper station was the only location where 4 of the six pyrethroids analyzed were found above detection limits of 1-2 $\mu\text{g}/\text{kg}$. The San Mateo Creek Upper station had the highest concentrations of bifenthrin, and permethrin in November (10.3 and 20.5 $\mu\text{g}/\text{kg}$ respectively). Cypermethrin and cyfluthrin were only found in the San Mateo Creek Upper station in November (4.2 and 8.6 $\mu\text{g}/\text{kg}$ respectively). Bifenthrin was the only pyrethroid detected in all six tributaries at least once. Detected concentrations ranged from 1.1 to 6.7 $\mu\text{g}/\text{kg}$ in the North Bay tributaries, and 1.0 to 10.3 $\mu\text{g}/\text{kg}$ in the South Bay tributaries). Permethrin was detected in four samples from three tributaries in the November samples. This finding is consistent with other studies conducted in the region (Weston, 2006). Esfenvalerate and lambda-cyhalothrin were below detection in all samples.



Bifenthrin LC50 $\sim 10\mu\text{g}/\text{kg}$



- Other pyrethroids similar magnitude in Bay



Upland Concentrations Higher

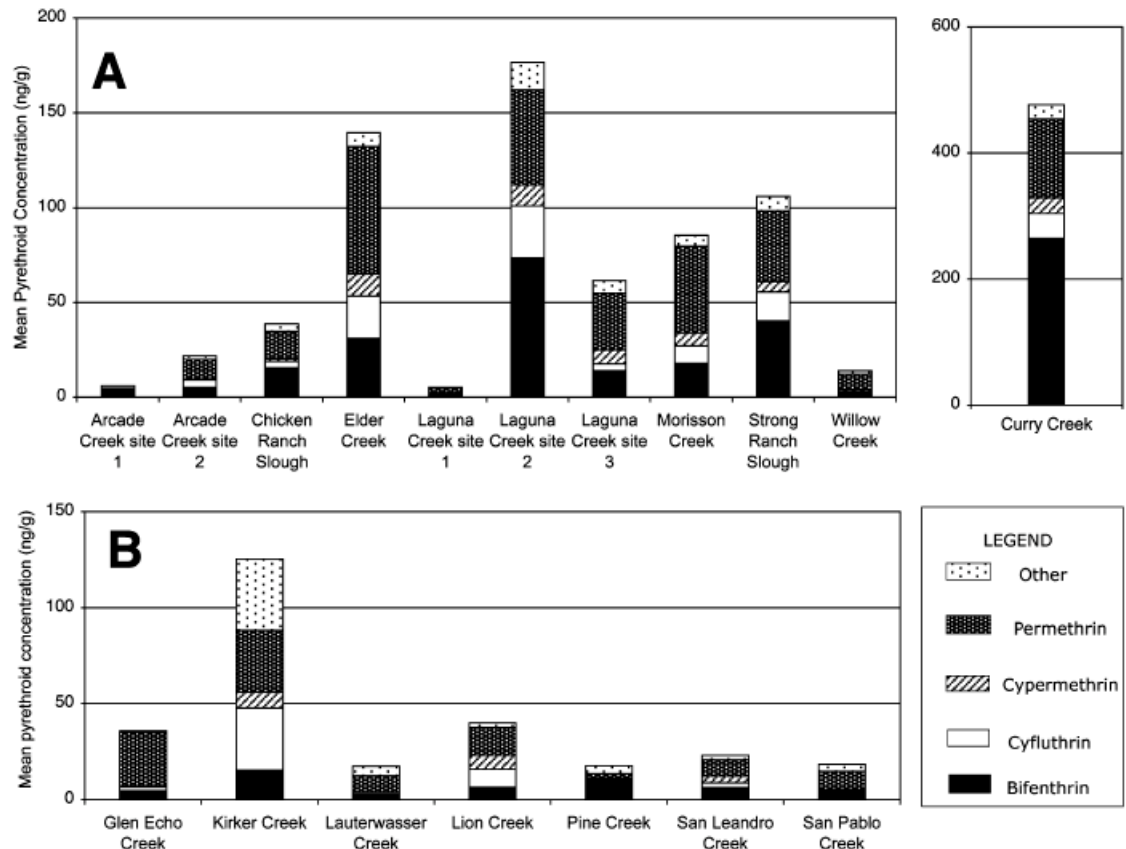
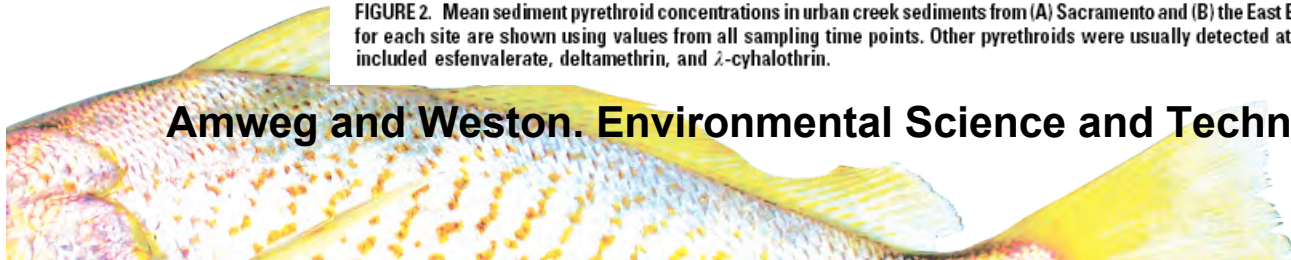


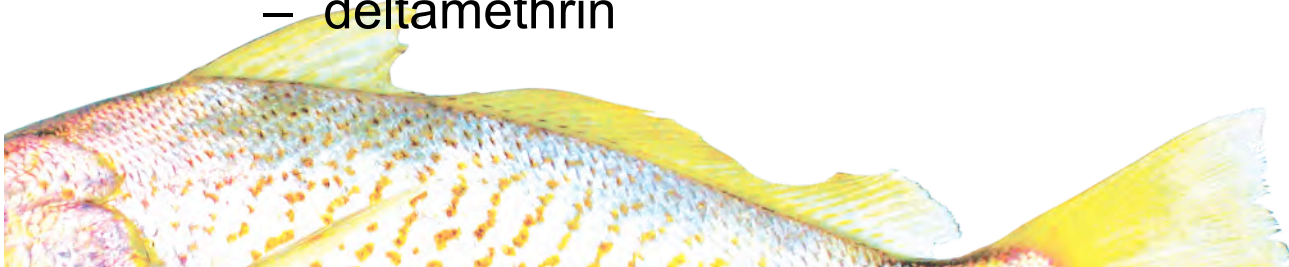
FIGURE 2. Mean sediment pyrethroid concentrations in urban creek sediments from (A) Sacramento and (B) the East Bay. Mean concentrations for each site are shown using values from all sampling time points. Other pyrethroids were usually detected at low concentrations and included esfenvalerate, deltamethrin, and λ -cyhalothrin.

Amweg and Weston. Environmental Science and Technology. 2006. 40: 1700-6.



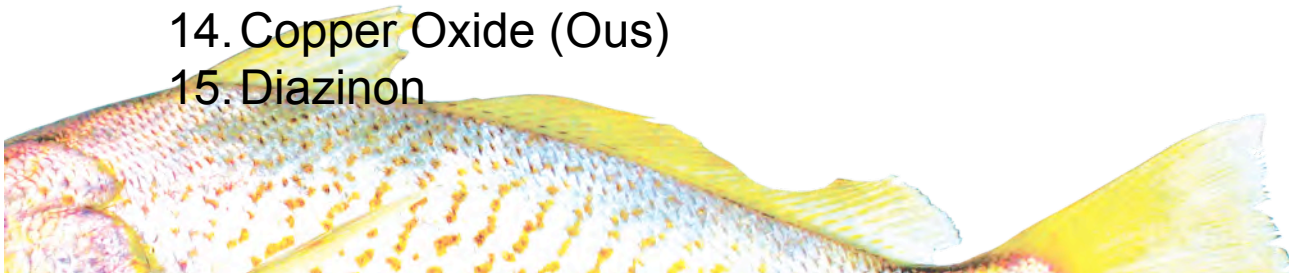
RMP S&T 2008: Pyrethroids

- Pyrethroids to be analyzed for 27 sediment sites
 - SQO sites (tox tests, benthic assessments also)
- Pyrethroids by CDFG:
 - allethrin
 - resmethrin
 - bifenthrin
 - phenothrin
 - permethrin-cis
 - cyfluthrin 1-4
 - esfenvalerate_fenvalerate-1&2
 - deltamethrin
 - paralethrin
 - tetramethrin
 - fenpropathrin
 - lambda-cyhalothrin-2
 - permethrin-trans
 - cypermethrin 1-4



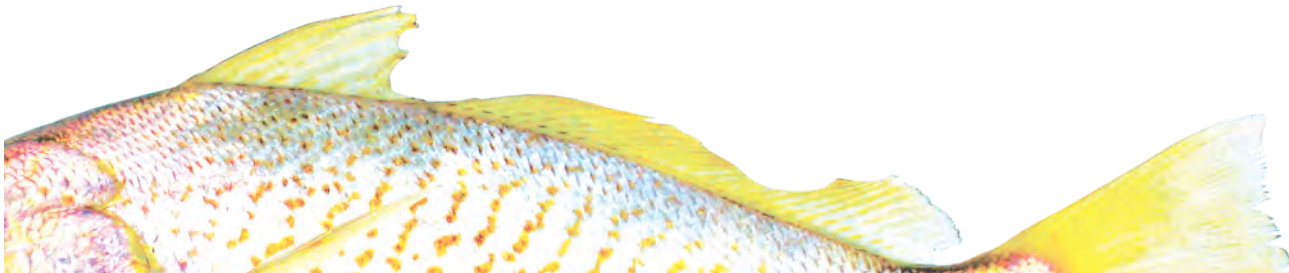
New Pests? Top 15 (by Use)

1. Glyphosate, Isopropylamine Salt
2. Copper Hydroxide
3. Diuron
4. 2,4-D, Dimethylamine Salt
5. Oryzalin
6. Copper Sulfate (Pentahydrate)
7. Chlorpyrifos
8. Copper Naphthenate
9. Oxyfluorfen
10. Chlorothalonil
11. Simazine
12. Pendimethalin
13. Trifluralin
14. Copper Oxide (Ous)
15. Diazinon



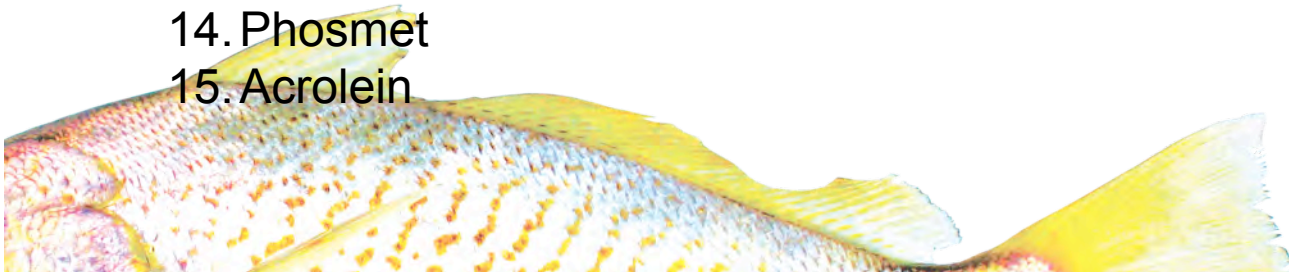
Choosing New Pesticides

- PUR volumes scaled by toxicity?
 - EC_{50} or reference dose from PAN site?
 - Min $EC_{50} \sim 10 \times \text{RefDose}$, but highly variable (<1x to 1000x)
 - Rank by $\text{PUR} / \min(EC_{50}, 10 \times \text{RefDose})$
 - Sometimes EC_{50} is single study, could be refined to 95%ile, etc



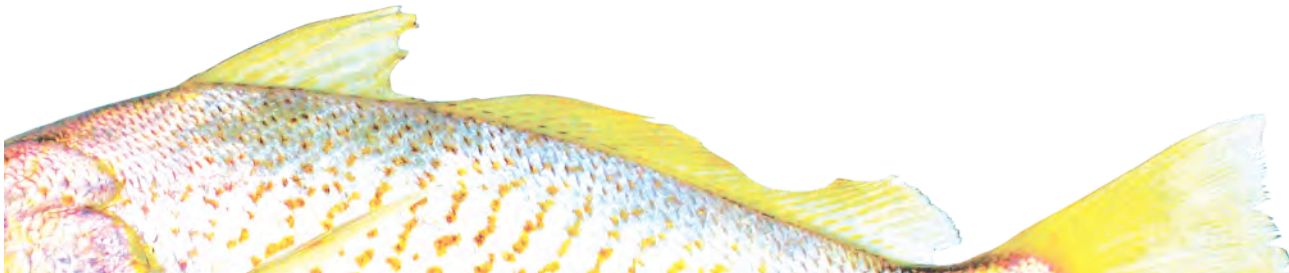
Top 15 by PUR/EC₅₀

1. Cypermethrin
2. Permethrin
3. Bifenthrin
4. Cyfluthrin
5. Fipronil
6. Diazinon
7. Lambda Cyhalothrin
8. Endosulfan
9. Diuron
10. Malathion
11. Chlorothalonil
12. Simazine
13. Azinphos Methyl
14. Phosmet
15. Acrolein

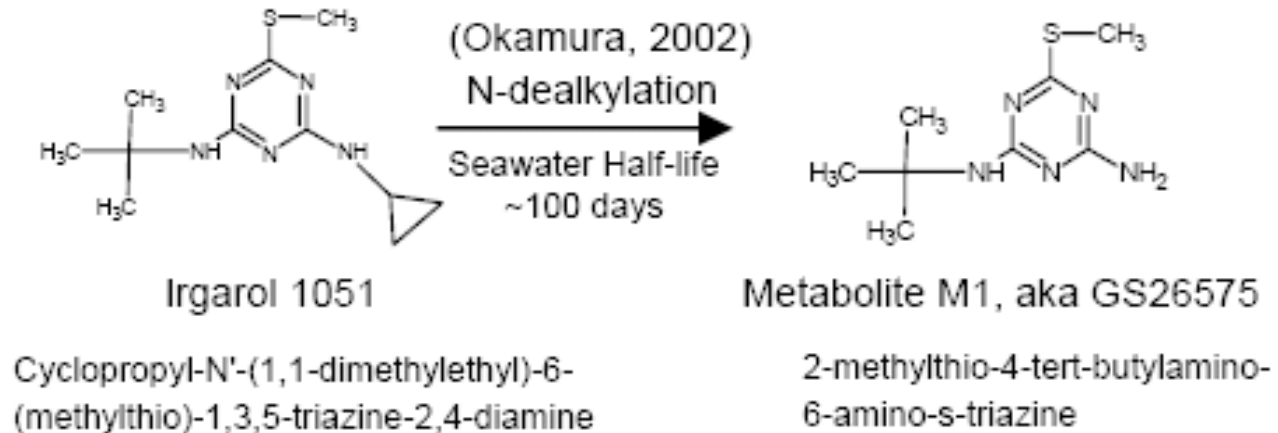


Other Additions?

- Other use segments
 - Kelly M. will discuss later
 - E.g. marine biocides
 - Marine use volumes may not be as high but more direct entry pathway



Irgarol[®]



- Anti-fouling organic algaecide (inhibits photosynthesis)
- 100% frequency of detection in SF Bay marinas (12-700ng/L); 80% > proposed ERL of 24 ng/L (NOAA 2007)
 - diuron also found 5-27 ng/L
- 5 SF Bay marinas and reference sites in 2006 (L. Hall, Univ. of MD, report available soon)
- Accumulates in sediments (mesocosm study, NOAA 2007)

