

Pesticide Aquatic Life Toxicity Seeking Common Ground

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Outline

- FIFRA and CWA
- Is there common ground?
- Aquatic Life Toxicity Values
 - What, why, where, which?
- Conclusion

FIFRA and CWA Challenge

- ▶ **Federal Insecticide Fungicide and Rodenticide Act**--no unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide
- ▶ **Clean Water Act**--prohibits discharge of toxics in toxic amounts
- ▶ **Porter-Cologne**--attain the highest water quality which is reasonable, considering...the total values involved, beneficial and detrimental, economic and social, tangible and intangible.

Mandates are different

Is there common ground?

Is it possible for pesticide and water regulators to agree on a set, or sets, of pesticide aquatic life toxicity values?

It depends on the questions.

Aquatic Life Toxicity Values—What are they?

- ▶ Acute
 - ▶ Mortality or immobility
 - ▶ LC50 (concentration lethal to 50%)
- ▶ Chronic
 - ▶ Mortality, growth, reproduction, other sublethal
 - ▶ No Observed Effect Concentration (NOEC), Effect Concentration (EC10, EC5)
- ▶ Concentration in water (e.g., ug/L, ppb)
- ▶ Used to develop other kinds of toxicity values—e.g., criteria, benchmarks, reference values

Aquatic Life Toxicity Values—Where are they?

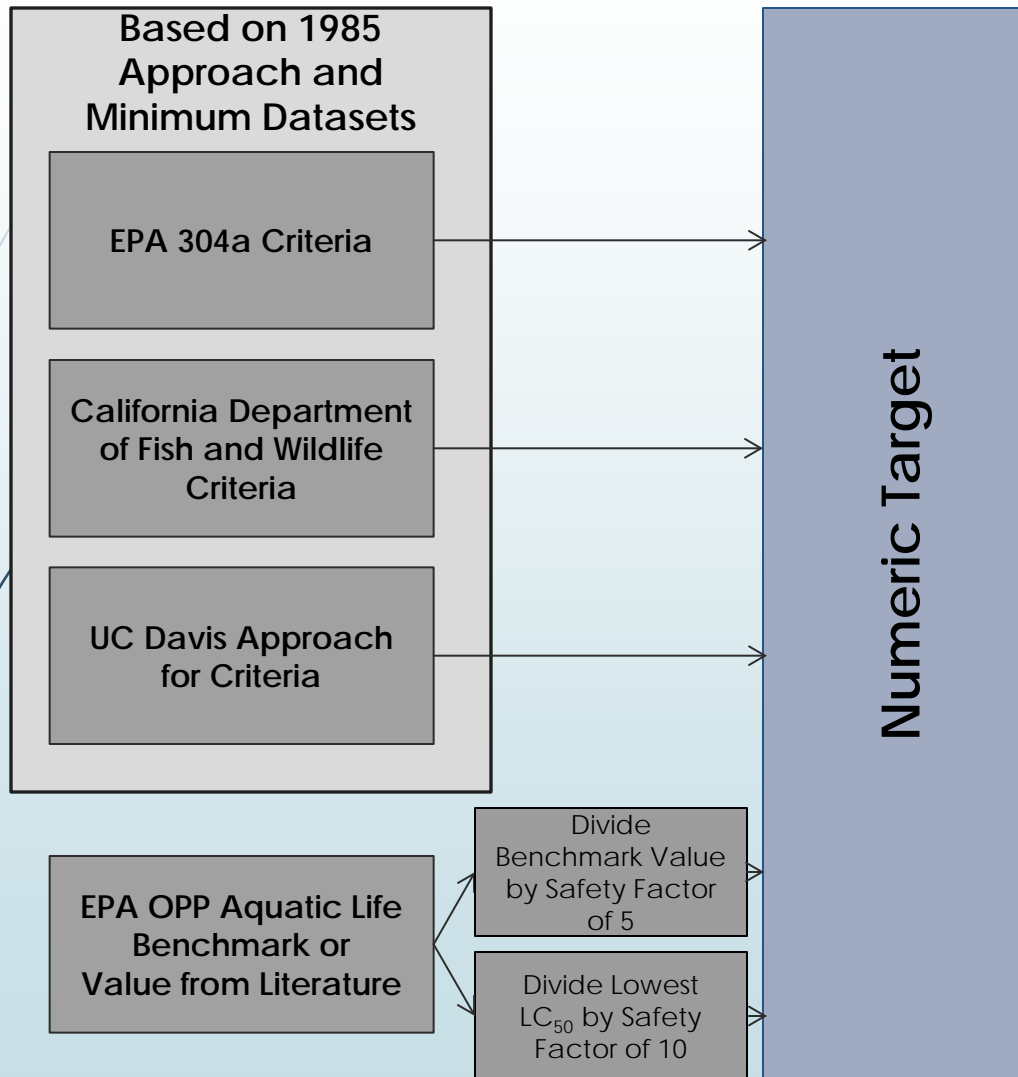
- ▶ CWA 304(a) criteria--few
- ▶ State-derived criteria--more
- ▶ OPP Aquatic Life Benchmarks--many
- ▶ DPR Benchmark Equivalents
- ▶ Values from literature
 - ▶ ECOTOX
 - ▶ Open literature

These are not regulatory values.

Aquatic Life Toxicity Values—What are they for?

- ▶ Developing Water Quality Standards/Objectives
 - ▶ Is this waterbody meeting narrative and numeric water quality standards/objectives?
- ▶ Developing and implementing permits, orders, monitoring program plans, TMDLs
 - ▶ Is this facility meeting its permit conditions?
- ▶ Assessing whether a program is meeting objectives
 - ▶ Are DPR surface water regulations working?
 - ▶ Is the Delta Monitoring Program meeting its study and program objectives?

Example: Options for Obtaining a Numeric Target for a Specific Pesticide



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Comparing Acute Values

Value	Chlorpyrifos	Diazinon
EPA 304(a)	0.08 ug/L	0.17 ug/L
State (UC Davis)	0.01 ug/L	0.2 ug/L
EPA Aquatic Life Benchmark	0.05 ug/L	0.1 ug/L

Why are they different?

- 1) Different data
- 2) Different derivation approach

Conclusion

- ▶ Toxicity values are needed for understanding environmental relevance of chemistry
- ▶ Common ground could be:
 - ▶ A set of aquatic life toxicity values that CalEPA agencies use for
 - ▶ Setting water quality objectives
 - ▶ Developing permits, orders, TMDLs
 - ▶ Pesticide registration decisions
 - ▶ Monitoring programs

References

- ▶ Phillips et al. Monitoring the Aquatic Toxicity of Mosquito Vector Control Spray Pesticides to Freshwater Receiving Waters. 2014. *Integrated environmental assessment and management*. 11(4) 449-455.
- ▶ TenBrook et al. The University of California-Davis methodology for deriving aquatic life pesticide water quality criteria. 2010. *Reviews of Environmental Contamination and Toxicology*. 209.

Questions?

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Pesticide Registration (federal)

- ▶ Minimum data requirements at 40CFR 158.630
 - ▶ Freshwater fish, acute
 - ▶ Freshwater fish, early life stage
 - ▶ Freshwater invertebrates, acute
 - ▶ Estuarine and marine organisms, acute
 - ▶ Invertebrate life cycle
- ▶ Level of Concern (LOC): EEC/Toxicity Value
 - ▶ 0.5 for acute
 - ▶ 1.0 for chronic
 - ▶ 0.05 for acute for endangered species

EEC = Estimated Environmental Concentration