JULY 1997: THE CALIFORNIA TOXICS RULE (CTR)

PUBLIC HEARINGS ON THE U.S. EPA'S PROPOSED WATER QUALITY CRITERIA FOR PRIORITY TOXIC POLLUTANTS:
SAN FRANCISCO: Sept. 17th, 1:00 p.m., U.S. EPA, 75 Hawthorne St.
LOS ANGELES: Sept. 18th, 1:00 p.m., LA Dept. of Water & Power, 111 N. Hope St. (across from the LA Music Center)

FOR A COPY OF THE CTR, VISIT U.S. EPA'S WEBSITE AT:
http://www.epa.gov/OST/Rules/index.html#open

The U.S. Environmental Protection Agency (U.S. EPA) implements the objectives of the Clean Water Act, one of which is to restore and maintain the quality of our nations' waters to protect human health and aquatic life from harmful pollutants. The U.S. EPA will propose water quality criteria for priority toxic pollutants for the State of California in the Federal Register during the week of July 28th. The Agency will then take public comment on its proposal. This proposed rule will, when finalized, establish ambient water quality criteria for priority toxic pollutants for California inland surface waters, enclosed bays and estuaries.

BACKGROUND: The Clean Water Act (CWA) requires that states adopt water quality standards for priority toxic pollutants in order to ensure adequate protection of waters for certain uses such as swimming and fishing. The State of California adopted statewide water quality control plans for inland surface waters, enclosed bays and estuaries in 1991, partly to satisfy this CWA requirement; however, a state court, in 1994, overturned the State's plans on procedural grounds. California is the only state in the nation that lacks comprehensive water quality standards for priority toxic pollutants. The U.S. EPA and the State are currently working to restore water quality standards for priority toxic pollutants for those California water bodies: the U.S. EPA is now proposing water quality criteria, and the State will soon be proposing implementation procedures to ensure that the resulting water quality standards will be appropriately and consistently applied throughout the State.

After the State adopts implementation procedures, it plans to begin the process of readopting comprehensive statewide water quality control plans for inland surface waters, enclosed bays and estuaries. After such plans are adopted, the U.S. EPA will review and approve, as appropriate, the State's plans. The U.S. EPA intends to stay the CTR when State criteria are developed and approved.

WHAT IS A PRIORITY TOXIC POLLUTANT? The CWA at section 307(a) identifies the initial list of priority toxic pollutants. This section gives the U.S. EPA the authority to add or remove pollutants from the list after taking into account such factors as the toxicity of the pollutant, its persistence, its degradability, and its effect on

DRAFT

Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California

(Phase 1 of the Inland Surface Waters Plan and the Enclosed Bays and Estuaries Plan)
AND
FUNCTIONAL EQUIVALENT DOCUMENT
September 11, 1997

STATE WATER RESOURCES CONTROL BOARD

California Environmental Protection Agency

Toxicity Reduction Requirements

"If a discharge causes or contributes to chronic toxicity in receiving waters, a toxicity reduction evaluation (TRE) is required. The TRE shall include all reasonable steps to identify the source(s) of toxicity. Once the source of toxicity is identified, the discharger shall take all reasonable steps necessary to eliminate toxicity.

"If persistent toxicity is identified in ambient waters, and it appears to be due to nonpoint source discharges, the appropriate nonpoint source dischargers, in coordination with the RWQCB, shall perform a TRE. Once the source of toxicity is identified, the discharger shall take all reasonable steps to eliminate toxicity."

Water Quality Impact of Aquatic Life Toxicity Depends on

Magnitude of Toxicity/Duration of Exposure Relationship Relative to the Sensitivity of the Test and Field Organisms
- Event-Mean Concentrations Not Valid for Characterizing Water Quality Impact of Chemicals & Toxicity
- Must Relate Toxicity/Duration Relationship for the Test Organism(s) & Key Ambient Organisms

Areal Extent of Toxic Concentrations & Rate of Change of Toxic Conditions
- Toxicant Transformations
- Dilution of Toxic Concentrations Due to Mixing

Characteristics of Toxicity
- Rapid- or Slow-Acting (1 or 4-day)
- Species of Aquatic Organisms Impacted
  - Fish, Shellfish, Zooplankton, Algae
  - Importance to Water Quality & Society

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Table 11. Combined toxicity database. Acute toxicity (EC50 and LC50 concentrations, in ng/L) of diazinon to aquatic organisms. N=number of LC50 or EC50 values included in geometric mean. Data from EPA (1995), Menconi and Cox (1994), and AQUIRE (1995).

Species	Common Name	EC50 or LC50 (Geometric Mean, ng/L)	N
Gammarus fasciatus	Amphipod	200	1
Ceriodaphnia dubia	Daphnid	493	3
Daphnia pulex	Daphnid	776	3
Daphnia magna	Daphnid	1020	10
Simocephalus serrulatus	Daphnid	1590	2
Gammarus pseudolimnaeus	Amphipod	2000	1
Acartia tonsa	Copepod	2570	1
Neomysis mercedis	Mysid	4150	2
Mysidopsis bahia	Mysid	4500	2
Cloeon dipterum	Mayfly	7800	1
Orconectes propinquus	Crayfish	15000	1
Acroneuria ruralis	Stonefly	16000	1
Asellus communis	Amphipod	21000	1
Hyalella azteca	Amphipod	22000	1
Chasmichthys dolichognathus	Goby	23400	3
Baetis intermedius	Mayfly	24000	1
Pteronarcys californica	Stonefly	25000	1
Palaemonetes pugio	Shrimp	28000	1
Penaeus aztecus	Shrimp	28000	1
Seriola quinqueradiata	Yellowtail	40000	1
Paraleptophlebia pallipes	Mayfly	44000	1
Physa gyrina	Snail	48000	1
Lestes congener	Damselfly	50000	1
Anguilla anguilla	Eel	80000	1
Girella punctata	Green fish	94700	2
Orthetrum albistylum	Dragonfly	140000	1
Leuciscus idus	Golden orf	150000	1
Mugil cephalus	Mullet	150000	1
Gammarus lacustris	Amphipod	184000	2
Lepomis macrochirus	Bluegill sunfish	204000	13
Mugil curema	White mullet	250000	1
Notemigonus crysoleucas	Golden shiner	400000	1

(from Novartis Crop Protection, 1997)

Test Conditions

Must Consider Physical, Chemical, Biological Characteristics of Toxicity Test Relative to Those Experienced by Key Ambient-Water Organisms

Should Match Laboratory Exposure to Field Conditions in Follow-Up Testing

Interpretation of Toxicity Test Results Complex - Yes, But:

Far More Reliable Than Estimating Toxicity Based on Chemical Measurements

Chemical Approach Has All the Interpretation Problems of Toxicity Testing in Addition to the Need to Evaluate Whether the Regulated and Unregulated Chemicals in Sample Are Toxic

Urban OP Pesticide Toxicity - Water Quality Issues

- Only Toxic to *Ceriodaphnia, Others ?*
- Importance of *Ceriodaphnia*-Like Toxicity Sensitivity to Upper Newport Bay Waters
- Additive Toxicity
- Stormwater Runoff-Related
  - Short, Pulse Toxicity
- Importance of OP Pesticides to Society
- Political Power of Pesticide Companies & Ag Interests

Future Upper Newport Bay Toxicity Studies

With Support of US EPA 205(j) and 319(h) Grants as Part of the SARWQCB Watershed Initiative, and in Cooperation with the SARWQCB, Orange County Public Facilities & Resources Department, and Others, Will Determine:

- Pattern of Toxicity over the Year in San Diego Creek as It Enters Upper Newport Bay
- Fate and Persistence of Toxicity and Toxic Components in the Bay Waters
- Cause of the Toxicity through TIEs
- Water Quality Significance of the Toxic Pulses That Enter Upper Newport Bay in Stormwater Runoff
- Through Forensic Studies, Sources of Toxicity and Toxic Components

Information to be Used by the SARWQCB to Develop TMDL for Toxicity in Upper Newport Bay

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Conclusions

Occurrence of Urban Stormwater OP Toxicity to *Ceriodaphnia* Does Not Necessarily Mean That There Will Be Use-Impairment / Adverse Impact on Water Quality

Need Detailed, Site-Specific Investigation to Evaluate Water Quality (Use-Impairment) Significance of the Toxicity

- Best Done in Evaluation Monitoring Program Framework

Suggested Regulatory Approach

WRCB, Regional Boards, Regulated Community, Environmental Groups, & the Public Should Develop an Approach to Acquire the Information Needed to Define the Water Quality Significance of Aquatic Life "Toxicity"

Need to Appropriately Implement WRCB CTR Implementation Approach for Defining Significant Water Quality Impacts Due to Toxicity

http://home.pacbell.net/gfredlee/watrqual.html

Water Quality Evaluation & Management

Wastewater Discharges and Stormwater Runoff

Regulatory approaches typically used today tend to significantly over-regulate regulated chemicals in point source domestic and industrial wastewater discharges and non-point-source runoff from urban, agricultural, rural, forested, and mining areas. This is due to inadequate considerations being given to the aquatic chemistry of chemical constituents that influence their impacts on the beneficial uses of waterbodies. Dr. G. Fred Lee has worked on the development of water quality criteria and their implementation into water quality standards and discharge limits since the mid-1960's. He and Dr. Anne Jones-Lee have published extensively on this topic, with particular attention to residual chemicals in municipal and industrial wastewater discharges, urban and highway stormwater runoff, and non-point-source stormwater runoff from urban, agricultural, range, and forested lands. They have also developed a water quality-based hazard assessment approach for the evaluation of the impact of chemical constituents in a waterbody or tributary to it, on the beneficial uses of the waterbody.

While regulated chemicals tend to be over-regulated by current regulatory approaches, there is a vast areas of unregulated or inadequately regulated chemicals, such as the organophosphorus pesticides, that are adverse to the beneficial uses of waterbodies, which are not being adequately addressed by current regulatory approaches. Urban area and some rural stormwater runoff has been found to be highly toxic to aquatic life due to these and other chemicals.

An area of emphasis of their work has been the impacts of chemical constituents in urban area runoff and in highway stormwater runoff on water quality/use-impairment of receiving waters. They have published information on an Evaluation Monitoring approach for the identification of real water quality problems-use impairments caused by stormwater runoff. That suggested alternative to the traditional, mechanical monitoring of stormwater runoff provides a technically valid, cost-effective approach for developing reliable BMPs for managing stormwater runoff water quality impacts.

Additional Information on Water Quality Evaluation and Management

If you would like additional information on the work of Drs. Lee and Jones-Lee in the area of water quality evaluation and management, including their work on impact and management of pesticides, water quality standards and NPDES permits, and stormwater quality evaluation and management, or would like to access downloadable technical publications on those topics, click on the topic below.

- Publications on Water Quality Implications of Stormwater Runoff
- Publications on Water Quality

http://home.pacbell.net/gfredlee/aquafund.html

Contaminated Sediments - Aquafund

Aquatic sediments tend to accumulate a variety of chemical constituents that represent potential threats to water quality. The issue of pollutants in aquatic sediment is of sufficient concern to potentially lead to a new national Superfund-like program - "Aquafund" - in which large amounts of money could be spent to investigate and remediate contaminated sediments. Further, the US EPA is in the process of developing approaches for placing restrictions on NPDES permitted discharges that are based on the potential of constituents in these discharges to accumulate in aquatic sediments to a sufficient extent to be adverse to the waterbody's beneficial uses.

Drs. G. Fred Lee and Anne Jones-Lee have worked for many years on the evaluation of the water quality significance of contaminants in harbor and waterway sediments. Their work included conducting more than $1 million in research on the significance of contaminants in waterway sediments associated with navigational dredging projects that are conducted throughout the US. They have published papers and reports on the technical issues of impacts of sediment-associated contaminants, including factors that affect the availability of such contaminants.

There is considerable interest today in developing sediment quality criteria for regulating contaminated sediments. Several approaches have been proposed for the evaluation of the water quality significance of chemical constituents in aquatic sediments. While chemical-concentration-based approaches, such as equilibrium partitioning and co-occurrence, are being used, such approaches tend to be unreliable in their assessment of the water quality significance of chemicals in aquatic sediments. Drs. Lee and Jones-Lee's writings discuss many of the reasons that chemical-concentration-based approaches are not reliable for estimating sediment toxicity or bioaccumulation of sediment-associated chemicals into aquatic life. They recommend that biological-effects-based approaches (sediment toxicity and actual bioaccumulation) be used.

Dr. Lee presents a several-day short-course on sediment quality/water quality issues which can be made available at any location where a local sponsor will make arrangements.

Additional Information on Contaminated Sediments

If you would like additional technical information on the evaluation and management of sediment-associated contaminants, including deficiencies in some of the current approaches and making more technically reliable assessments and management decisions, or would like to access downloadable technical publications on that topic, click on the link below.

- Publications on Contaminated Sediments

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http://home.pacbell.net/gfredlee/hazchem.html

Evaluation & Remediation/Management of Impacts of Hazardous Chemicals

In some areas, industrial, municipal, or agricultural properties, and waterbodies (including groundwater) contain significantly elevated concentrations of potentially hazardous and otherwise deleterious chemicals. Those situations pose real or potential threats to public health, surface and groundwater resources, the environment, and/or the interests of those who own or use properties in the areas under the influence of those chemicals.

Drs. G. Fred Lee and Anne Jones-Lee have developed several professional papers and reports that discuss important issues for investigating and remediating areas that contain hazardous or otherwise deleterious chemicals. Information is provided on evaluating the adequacy of site investigation and remediation relative to the long-term threats that hazardous and otherwise deleterious chemicals may represent to public health, surface and groundwater resources, and the environment.

Additional Information on Evaluation & Management of Hazardous Chemicals

If you would like additional information on the evaluation and remediation/management of the impacts of hazardous and otherwise deleterious chemicals, or would like to access downloadable technical publications on that topic, click on the link below.

- Evaluation & Remediation of Hazardous Chemical Impacts

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