

**Sacramento Regional
County Sanitation District
Sacramento Regional
Wastewater Treatment Plant**

California Sportsfishing Protection Alliance
(CSPA) Comments

Toxic metals

The California Toxics Rule (CTR, 40 CFR 131.38) includes criteria for 7 hardness dependant toxic metals:

- Cadmium
- Copper
- Chromium III
- Lead
- Nickel
- Silver
- Zinc

Hard water better protects fish from direct metal uptake. The lower the hardness the more toxic the metal.

Toxic metals

The CTR, Section 40 CFR 131.38 (b)(2), contains a table of factors and lists specific equations for calculating the hardness dependent toxic metals criteria.

Water Quality Objective = $WERe^{m[\ln(H)]+b}$

Toxic metals

- ▶ The CTR, Section 40 CFR 131.38 (c)(4), requires that: “For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations.”

Toxic metals

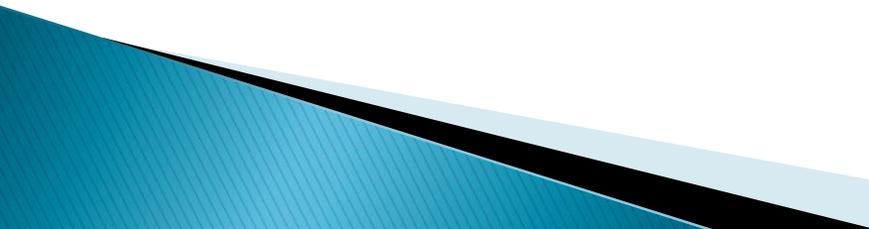
Federal Register, Volume 65, No. 97/Thursday, May 18th 2000 (31692), adopting the California Toxics Rule states that: *“If it appears that an effluent causes hardness to be inconsistent with alkalinity and/or pH the intended level of protection will usually be maintained or exceeded if either (1) data are available to demonstrate that alkalinity and/or pH do not affect the toxicity of the metal, or (2) the hardness used in the hardness equation is the hardness of upstream water that does not include the effluent.”*

In their biological opinion of the CTR the US Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) concluded that: *“The CTR should clearly state that to obtain a site hardness value, samples should be collected upstream of the effluent source(s).”*

Toxic metals

The effluent hardness ranged from 80 mg/L to 150 mg/L (as CaCO₃), based on 216 samples from June 2005 to July 2008. The upstream receiving water hardness varied from 26 mg/L to 100 mg/L (as CaCO₃), based on 100 samples from June 2005 to July 2008. (Permit page F-23)

Recall: The lower the hardness the more toxic the metal. The upstream receiving water hardness is the critical case.



Toxic metals

“Therefore, in this Order the ECA for all Concave Down Metals has been calculated using Equation 1 with a hardness of 80 mg/L (as CaCO3).” (Permit page F-24) *Chronic cadmium, chromium III, copper, nickel, and zinc.*

$$\text{CTR Criterion} = \text{WER} \times (e^{m[\ln(H)]+b})$$

“Using Equation 3, the lowest ECA results from using the minimum upstream receiving water hardness, the minimum effluent hardness, and assuming no receiving water assimilative capacity for lead...” (Permit page F-25) *Acute cadmium, lead, and acute silver.*

$$\frac{\text{Effluent Concentration}}{\text{Allowance}} = \left(\frac{m(H_e - H_{rw}) + b}{H_{rw}} \right) + e^{m \ln(H_{rw}) + b}$$

Toxic metals

Metals	Regional Board's Effluent Concentration Allowances, ECAs (ug/L) – using an effluent hardness of 80 mg/l.		Criteria (ug/l) Using a hardness of 26 mg/l* <small>(*19 mg/l total hardness was reported by USGS for the Sacramento River at Freeport.)</small>		Effluent Max concentration (ug/l)
	acute	chronic	acute	chronic	
Copper	11	7.7	3.9	3.0	6.43
Chromium III	1500	72	565	68	1.33
Cadmium	3.3	2.1	0.96	0.85	0.169
Lead	54	2.1	15	0.55	1.9
Nickel	390	43	155	17	3.41
Silver	1.8	--	0.37 (daily max)		0.149
Zinc	99	99	38	38	33.5*

Additive Toxicity

The Permit shows that **copper, lead and zinc** are present in the discharge at elevated concentrations and **have a potential for exhibiting additive toxic effects.**

The Basin Plan, *Implementation, Policy for Application of Water Quality Objectives* requires that: *“Where multiple toxic pollutants exist together in water, the potential for toxicologic interactions exists. On a case by case basis, the Regional Water Board will evaluate available receiving water and effluent data to determine whether there is a reasonable potential for interactive toxicity. Pollutants which are carcinogens or which manifest their toxic effects on the same organ systems or through similar mechanisms will generally be considered to have potentially additive toxicity.”*

California Water Code § 13146 requires that the Board in carrying out activities which affect water quality, shall comply with state policy (the Basin Plan).

Thermal Plan Exemption

The thermal exemption is largely based on a zone of passage for fish.

Page F-80 of the Permit states, in part, the following with regard to a thermal zone of passage for fish: **“The study concluded that both surface water swimming fish and bottom water swimming fish would avoid the heated plume by swimming around or on top of it.”**

In a 15 June 2010 letter the Director of the California Department of Fish and Game (DFG) stated: **“Department Fisheries Biologists have stated in previous comments to the Regional Board that manmade flows such as effluent discharge attract fish. The Department supports USEPA findings and recommends that acute and/or chronic mixing zones not be allowed and that conditions be set to meet Basin Plan Objectives allowing for no toxicity in the discharge.”**

In a 15 June 2010 letter to the Regional Board the US Fish and Wildlife Service stated: **“During the larval stage delta smelt are the most vulnerable to zones of poor water quality or high water temperature due to their reduced mobility.”**



Salinity (EC, TDS) Limitations

The Permit, page F-48, states that: *“Due to the site-specific conditions of the discharge, the Central Valley Water Board has used best professional judgment in determining the appropriate method for conducting the RPA for these non-priority pollutant salinity constituents. For conducting the RPA, the USEPA recommends using a mass-balance approach to determine the expected critical downstream receiving water concentration using a steady-state approach. This downstream receiving water concentration is then compared to the applicable water quality objectives to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion. This approach allows assimilative capacity and dilution to be factored into the RPA.”*

The Regional Board's unique approach for determining reasonable potential can only be undertaken if a mixing zone is considered. The Basin Plan contains requirements for mixing zones which has not been followed.

Additional Issues

- ▶ Late Revisions without Public Notice
 - ▶ Endangered Species
 - ▶ Aluminum Limitations
 - ▶ Mass Based Limitations
 - ▶ Copper Limitations and Criteria
 - ▶ Lead and Zinc Limitations
 - ▶ Statistical Variability Analysis
 - ▶ Compliance Schedules
 - ▶ Salinity Limitations
 - ▶ CCR Title 27 Exemption
 - ▶ Mixing Zones
 - ▶ Antidegradation
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