TECHNICAL FACT SHEET

Final Rule Establishing a Freshwater Numeric Water Quality Criterion for Selenium for California Waters

December 2024

The U.S. Environmental Protection Agency is amending a Federal Clean Water Act (CWA) rule, called the California Toxics Rule, by promulgating a revised statewide freshwater selenium water quality criterion applicable to certain California waters to help protect aquatic life and aquatic-dependent wildlife from long-term (chronic) exposure to toxic levels of selenium. Elevated selenium levels can harm fish and aquatic-dependent birds, with the most severe toxic effects being reproductive harm.

Background

To protect aquatic organisms from the harmful effects of pollutants in water bodies, states must establish water quality criteria to support the designated uses of their waters under CWA Section 303(c). The EPA periodically publishes water quality criteria recommendations under CWA Section 304(a) to provide information that states may consider when adopting criteria as part of their water quality standards.

The EPA promulgated California's existing selenium criterion for certain waters on the state's behalf in 1992 as part of the National Toxics Rule (NTR), and again in 2000 as part of the California Toxics Rule (CTR) based on available science at the time. In 2013, Our Children's Earth Foundation and Ecological Rights Foundation filed a complaint against the EPA in the United States District Court for the Northern District of California. The complaint alleged, in part, that the EPA failed to establish a selenium criterion in the CTR consistent with the requirements of the CWA. In 2014, the EPA entered into a consent decree that required the agency to propose a selenium criterion for certain California fresh waters to protect aquatic life and aquatic-dependent wildlife no later than November 30, 2018, and to finalize the rule within six months of completing Endangered Species Act (ESA) consultation on the promulgation. In 2016, the EPA published a revised national recommended chronic aquatic life selenium criterion for freshwater based on the latest scientific knowledge (see the EPA's 2021 Revision to: Final Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016). On November 29, 2018, the EPA proposed a rule to revise the current federal CWA selenium water quality criterion applicable to certain fresh waters of California. The EPA has now completed ESA consultation and has finalized the rule.

Details of the final selenium criterion

The EPA is establishing a chronic freshwater selenium criterion for California based on the EPA's current CWA Section 304(a) recommended freshwater aquatic life criterion for selenium, which is comprised of fish tissue and water column criterion elements; with the addition of a bird tissue criterion element derived to protect aquatic-dependent wildlife, and an optional performance-based approach for translating the tissue criterion elements into corresponding water column criterion elements on a site-specific basis. See table 1 on page 3. Although selenium may cause acute (short-term) toxicity at high concentrations, the most harmful effect on aquatic organisms is due to its bioaccumulative properties. These chronic effects occur at lower concentrations of selenium in aquatic organisms than acute effects, primarily through dietary exposure. Therefore, this chronic criterion also protects against acute effects.

The EPA is establishing selenium fish and bird tissue criterion elements because they reflect biological uptake through diet, the predominant pathway for selenium toxicity, and because they are most predictive of the observed biological endpoint of concern, reproductive toxicity.

In addition to providing the monthly average water column criterion element, the EPA is including an optional performance-based approach in the rule to enable California to translate the tissue criterion elements into protective water column criterion elements on a site-specific basis. This approach maximizes the flexibility for the state to develop water column translations specifically tailored to each individual waterbody. The rule does not require California to use the performance-based approach; however, if the state chooses to use it, the rule requires California to follow the methodology provided in the performance-based approach.

The EPA's final rule applies to certain waters of California in a manner consistent with the CTR where the protection of aquatic life and aquatic-dependent wildlife are designated uses; this includes the waters of the San Luis National Wildlife Refuge and the Los Banos State Wildlife Refuge. The final rule does not apply to California waters where site-specific selenium criteria have been adopted, nor does it apply to California waters with selenium criteria promulgated in the NTR. Accordingly, this rule does not apply to the San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta, the San Joaquin River from Sack Dam to Vernalis, Mud Slough (north), Salt Slough, the constructed and reconstructed water supply channels in the Grassland watershed, and surface waters that are tributaries to the Salton Sea.

Where can I find more information?

Learn more about this final rule and find supporting documents on the EPA's Water Quality Standards website.

Table 1. California Chronic Freshwater Selenium Water Quality Criterion

Media Type	Bird Tissue	Fish Tissue[1]		Water Column[4]	
Criterion Element	**Bird Egg[2]**	**Egg-Ovary[2]**	**Fish Whole-Body or Muscle[3]**	**Monthly Average Exposure[5]**	**Intermittent Exposure[6]**
Magnitude	11.2 mg/kg dw	15.1 mg/kg dw	8.5 mg/kg dw whole-body or 11.3 mg/kg dw muscle (skinless, boneless filet)	1.5 µg/L in lentic aquatic systems 3.1 µg/L in lotic aquatic systems	$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$
Duration	Instantaneous measurement[7]	Instantaneous measurement[7]	Instantaneous measurement[7]	30 days	Number of days/month with an elevated concentration
Frequency	Not to be exceeded	Not to be exceeded	Not to be exceeded	Not more than once in three years on average	Not more than once in three years on average

1. Fish tissue criterion elements are expressed as steady state.
2. Fish egg-ovary supersedes any whole-body, muscle, or water column criterion elements for aquatic life when fish egg-ovary are measured, except as noted in footnote 4. Bird egg supersedes water column criterion elements for aquatic-dependent wildlife when bird eggs are measured, except as noted in footnote 4. The bird tissue criterion element is independently applicable from and equivalent to the fish tissue criterion elements.
3. Fish whole-body or muscle tissue supersedes the water column criterion elements when both fish tissue and water concentrations are measured, except as noted in footnote 4.
4. Water column criterion elements are based on dissolved total selenium in water and are derived from fish tissue and bird tissue criterion elements via bioaccumulation modeling. When selenium inputs are increasing, water column criterion elements are the applicable criterion elements in the absence of steady-state condition fish tissue or bird tissue data.
5. The water column criterion element, which applies independently to the respective aquatic life and aquatic-dependent wildlife uses, is applicable for all CWA purposes and consists of a water column value of 1.5 µg/L in lentic aquatic systems and 3.1 µg/L in lotic aquatic systems unless or until a site-specific water column criterion element is derived for a particular waterbody following the methodology described in *Method for Translating Selenium Tissue Criterion Elements into Site-specific Water Column Criterion Elements for California, Version 2, December 2024*. This publication is incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available at EPA, OW Docket, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC, 20004; phone: (202) 566-2426; website: https://www.epa.gov/wqs-tech/water-quality-standards-establishment-numeric-criterion-selenium-fresh-waters-california. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, visit www.archives.gov/federal-register/cfr/ibr-locations or email fr.inspection@nara.gov.
6. Where $WQC_{30\text{-}day}$ is the applicable water column monthly criterion element, C_{bkgrnd} is the average background selenium concentration, and f_{int} is the fraction of any 30-day period during which elevated selenium concentrations occur, with f_{int} assigned a value ≥0.033 (corresponding to 1 day).
7. Fish tissue and bird tissue data provide instantaneous point measurements that reflect integrative accumulation of selenium over time and space in bird or fish population(s) at a given site.