

Equilibrium Sediment Guidelines for Metals and PAH Mixtures

Equilibrium Sediment Guidelines (ESGs) for metals and PAHs were derived to address the additive toxicity of metal mixtures or PAH mixtures in sediments. ESGs are recommended by EPA to be used as a compliment to existing sediment assessment tools to help identify toxicity and targets for pollutant loading control measures (EPA, 2000b). The protocol provided in the following two documents was applied to the sediment data collected at Fisherville Pond, Singing Pond and Lake Wildwood:

- EPA. Date Unknown. Equilibrium Partitioning Sediment Guidelines (ESGs) for the Protection of Benthic Organisms: Metal Mixtures (Cadmium, Copper, Lead, Nickel, Silver and Zinc). DRAFT. Office of Science and Technology and Office of Research and Development. Washington D.C.
- EPA. 2000. Equilibrium Partitioning Sediment Guidelines (ESGs) for the Protection of Benthic Organisms: PAH Mixtures. Office of Science and Technology and Office of Research and Development. Washington D.C. April.

According to this guidance, metals mixtures are evaluated using AVS/SEM ratios as described in Section 3. PAH ESG toxic units (TU) were derived from a suite of 34 PAHs measured in the sediment. In circumstances where less than 34 PAHs were measured, a correction factor was applied (4.14). The ESGTU were calculated by dividing the organic-carbon corrected PAH concentration by the PAH-specific final chronic value (FCV) as defined by EPA, 2000. Each PAH-specific toxic unit calculated per station is then summed. The full equation is as follows:

$$ESG = \Sigma ESGTU = \sum_{Coc, PAHi, FCVi} \frac{Coci}{FCVi}$$

Where:

ESG = Equilibrium Sediment Guideline

$\Sigma ESGTU$ = Sum of Equilibrium Partitioning Sediment Guideline Toxic Units

Coci = Chemical concentration in sediments on an organic carbon basis

Coc, PAHi, FCVi = Effect concentration of a PAH in sediment on an organic carbon basis calculated from the product of its FCV and Koc

Calculation of the ESGTU for each sediment sampling station is presented in the attached tables.