

A Case Study Involving California's Latest Sediment Tool: Human Health Sediment Quality Objective Tier III Assessment

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Background/Objectives. The Greater Los Angeles and Long Beach Harbor Waters (Harbor) are required to comply with the metrics established in the Final Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants Total Maximum Daily Load (Harbor Toxics TMDL). The Harbor Toxics TMDL is expected to be modified to allow compliance for bioaccumulative compounds to be demonstrated using the Human Health Sediment Quality Objective (HHSQO) assessment process as described in the recently adopted amendments to the Water Quality Control Plan for Enclosed Bays and Estuaries in California (Plan). The amended Plan describes the basis for the HHSQO and implementation procedures. A tiered process is used to evaluate whether site sediments meet the HHSQO and are protective of human seafood consumers; tiers range from a screening level evaluation (Tier I) to a site-specific assessment (Tier III). The assessment includes two lines of evidence: chemical exposure, or the magnitude of bioaccumulative concentrations in sportfish, and sediment linkage, or the sediment contribution to sportfish contamination levels in the site.

Approach/Activities. We will present the first HHSQO Tier III site assessment, used to evaluate whether sediment quality in the Harbor is sufficient for the protection of human health. Sediment linkage was estimated using Anchor QEA's site-specific, calibrated bioaccumulation model. The peer-reviewed model relies on the AQFDCHN bioaccumulation model framework of Thomann and Connolly (1984) and has been modified to represent the Harbor food web structure for target fish species and to incorporate fish migration, site-specific growth rates, and seasonal changes in diet and lipid. In short, sediment linkage was estimated for each subarea, or fish movement zone (FMZ) by performing steady-state simulations under baseline conditions and then under conditions where sediment was set to zero; sediment linkage was based on the difference in estimated fish tissue concentrations under the two simulations. Chemical exposure was the weighted-average fish contaminant concentration within each FMZ separately and categorized by comparing to State tissue advisory thresholds.

Results/Lessons Learned. The integrated site assessment results for PCBs and DDX will be presented. Results showed a Likely Unimpacted result for all but three FMZs, indicating that these FMZs meet the HHSQO. In these FMZs, the chemical exposure was moderate to high, but there was very low sediment linkage, suggesting that sediment PCB concentrations were not the only contributor to fish PCB body burdens. The site assessment result for PCBs in three FMZs was Likely or Clearly Impacted. In these two areas, the chemical exposure result was high or very high and the sediment linkage ranged from low to high indicating a relationship between sediment PCB levels and those in fish. We will discuss the basis for these results and the application of the HHSQO Tier III assessment in the determination of TMDL compliance.