

# Quantitative Methods for Allocating Multiple Contaminant Types in Sediments

**Kurt Herman** (kherman@gradientcorp.com), Caroline Tuit, Manu Sharma, and Jessie Kneeland  
(Gradient, Cambridge, MA, USA)

**Background/Objectives.** Sediments in urban water bodies are often impacted by multiple categories of contaminants (e.g., polychlorinated biphenyls [PCBs], metals, polycyclic aromatic hydrocarbons [PAHs]) from a variety of legacy and ongoing sources. Many of these water bodies are subject to environmental response actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (or the state equivalent) and subsequent cost allocation proceedings in an attempt to equitably allocate the costs for implementing the response actions to potentially responsible parties (PRPs). One common issue in allocation proceedings is finding a quantitative method of allocating sediment impacts among the various contaminant categories (e.g., how best to estimate the relative impact of PCBs *versus* metals *versus* PAHs). The objective of this presentation is to provide case studies in which this issue has been addressed.

**Approach/Activities.** Several case studies that describe different quantitative approaches for evaluating relative contaminant contribution will be presented. These case study sites are at different stages in the Superfund process.

Case Study #1: Remedial investigation/feasibility study (RI/FS) underway but human health/baseline environmental risk assessment (HHRA/BERA) incomplete. Record of Decision (ROD) not yet issued. In this case study, a database of Preliminary Remediation Goals (PRGs) for other sites where RODs had been issued for the same contaminant categories was used to rank the relative contribution of the different contaminant types, absent site-specific cleanup goals (which are contingent upon a future agency determination).

Case Study #2: RI/FS and HHRA/BERA complete and ROD issued. In this case study, the PRGs for different contaminant categories were used as the allocation basis. In general, the relative frequency and/or intensity of PRG exceedances for contaminants may be used to allocate impacted sediment between contaminant types. The rationale is that: (1) once the PRGs are exceeded, some type of remedial action is warranted, and (2) the level of remedial action intensity is related to the severity of the PRG exceedances. For example, an institutional control may be appropriate for marginal PRG exceedances, whereas significant PRG exceedances will typically require more intense and active remediation.

**Results/Lessons Learned.** While every site is different, this presentation illustrates several practical methods for cost allocation at multi-contaminant sites.