

Sediment Remediation Goals Based on Cause-Effect-Oriented Literature

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Introduction: Sediment quality guidelines are often adopted as remediation goals, despite widely acknowledged limitations such as the lack of a cause-effect basis.

For a site on the Delaware River, we focused instead on applying available scientific literature to characterize cause-effect, concentration-response relationships for arsenic, lead, and DDT (and its metabolites). Preliminary remediation goals (PRGs) were developed separately for protection of benthic invertebrates, fish, and human health.

Methods: The PRGs for benthic invertebrates were identified based on multiple lines of evidence, including published spiked sediment toxicity studies, toxicity or benthic community studies at sites where our chemical of interest was the primary contaminant, and (for DDT) the equilibrium partitioning approach.

For protection of fish and humans, safe fish tissue concentrations were identified and extrapolated to sediment using biota-sediment accumulation factors. The resulting PRGs were also confirmed to be protective of birds.

Results/Lessons learned: This approach resulted in conservative, protective PRGs that were higher than the available sediment quality guidelines.

The PRGs were accepted as final remediation goals, without the need for costly site-specific toxicity or bioaccumulation testing.